Original Research Article: Emergency Obstetric Referrals to a Tertiary Care Hospital: Profile and Interfacility Transfer

Ankur Shakya[1], Avani Kadia[2], Sachin Prajapati[3], Devangi Panchal[4], Vaishali Rathwa [5], Ujjval Parikh[6*]

[1]Assistant Professor, Department of Obstetrics and Gynecology, Parul Institute of Medical science and Research, Parul University, Vadodara, Gujarat, India
[2]Second year Resident , Department of Obstetrics and Gynecology, Parul Institute of Medical science and Research, Parul University, Vadodara, Gujarat, India
[3]Second year Resident , Department of Obstetrics and Gynecology, Parul Institute of Medical science and Research, Parul University, Vadodara, Gujarat, India
[4]Third year Resident , Department of Obstetrics and Gynecology, Parul Institute of Medical science and Research, Parul University, Vadodara, Gujarat, India
[5]Third year Resident , Department of Obstetrics and Gynecology, Parul Institute of Medical science and Research, Parul University, Vadodara, Gujarat, India
[6]Professor, Department of Obstetrics and Gynecology, Parul Institute of Medical science and Research, Parul University, Vadodara, Gujarat, India

Abstract:

Background: Maternal morbidity and mortality remains a major challenge to health system globally. Referral services for identification and referral of high risk pregnancies are an integral part of maternal and child health services. Timely and appropriate referral to higher and well equipped centers with provision of EmOC is very crucial.

Objectives: The objective of this study was to analyzed quality of interfacility transfer of emergency obstetric referral including transportation, and communication between referring institution, patient and the referral facility .This study also aimed to study feto-maternal outcome of these emergency obstetric referrals.

Methodology: The observational study was conducted in Department of Obstetrics and Gynaecology in collaboration with Department of Paediatrics in Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi. Time period of the study was 14 months. Out of all referred women 224 were selected for the study after taking written consent.

Results: During the study period, referral rate of obstetric cases were 16.4%. Majority of women were referred from public sector hospitals i.e. 98.2% and 2.7% were referred from two referring centers. Most of the women were referred from secondary health care centre i.e. 95.1% and only 1.3% women referred from primary health care centre, and 3.6% from tertiary health care centre. Most of the referred women were multigravida i.e. 59.4%. Majority of cases i.e. 56.3% were antepartum, followed by intrapartum and postpartum 37.9% and 4.5% respectively. Commonest obstetric causes for referral were hypertensive disorders of pregnancy i.e. 18.2%. Commonest medical cause for referral was anemia i.e. 78.4%. In all referred cases, majority of women used ambulance i.e. 78.6%, of which 98.9% were transported free of cost. Out of 224 referred women, 3 antenatal women expired, 4 had abortion, in remaining 217 women 38.71% women undergone LSCS. Out of 220 delivered newborns, 6.8% were stillbirth and 28.2% were preterm. A total of 27.7% newborns had birth weight <2.5 kg (LBW) and 19.1 % were SGA. Out of 205 live births, 18.1 % newborns were admitted to NICU and neonatal mortality rate was 7.8%.

Conclusion: To raise the standard of emergency obstetric care overall, referral procedures must be improved. Our results highlight the necessity of a regulated feedback and communication system between receiving and referring facilities. It is advised to simultaneously ensure EmOC at various health facility levels through the upgrading of health infrastructure.

Keywords: Pregnancy, Referral, Communication, Transport, Complication.

Introduction

It is estimated that, nearly 287,000 woman die of obstetric causes every year worldwide.1 According to World Health Organization (WHO) estimates, a woman in developing country has 33 times higher risk of death from obstetric causes as compared to developed country.[1] Developing nations like India, Nepal, Pakistan accounted for approximately 99% maternal mortality in 2015. [1]At country level, India accounts for a fifth of annual global maternal deaths, with a maternal mortality rate (MMR) of 122/100,000 live births. [2]

The prevention of maternal mortality network proposed a three delay model for referral in obstetric emergencies to provide a conceptual framework of factors that prevent timely access to emergency care. These include delays to seek care, delays in reaching a health facility and delay in provision of optimal care at the facility. [3]

Any transfer of a pregnant woman from one health facility to another or Interfacility Transfer (IFT) is done on the advice of a health care provider. [4] Appropriate transportation and communication protocols are the key components of such transfer and play an important role in reducing maternal morbidity and mortality.

Timely available transportation with en-route stabilization ensures safe transfer of cases from referring to referral facility. [5] Communication of key information is also crucial for high quality care. Communication can prevent phase III delays by pre transfer assessment of health care facilities at the referral centre .As per the Operational Guidelines on Maternal and newborn health ministry of health and family welfare (MoHFW) Govt. of India 2010, all health facilities accredited for safe delivery or institutional delivery should necessarily have an assured referral transport linkage and an assured referral facility linkage. An assured referral transport should be available free of cost, within 30 minutes and be able to take the woman or newborn to a referral site within one hour. Referral facility has to be intimated by phone about the referral with a brief history of the patient, so that on arrival the women is received and treatment started immediately.

Regarding transportation of referred cases an Indian study reported that nearly 65% women were referred from a distance of <50 km and 12% from >150 km. [6]   Between 7% to 38% patients reportedly used ambulance for transportation.11,20 A study from Nepal observed that referral slip was not available in 12% cases, while prior of telephonic communication was received only in 7% cases.

However, only few studies have analyzed quality of interfacility transfer of emergency obstetric referral including transportation, and communication between referring institution, patient and the referral facility. This study proposes to address both these issues, in addition to the profile and feto-maternal outcome of obstetric referrals to a tertiary care hospital.

Methodology

This observational study was conducted in the Department of Obstetrics and Gynaecology in collaboration with the Department of Paediatrics, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi from May 2018-Nov 2019.

Study Population: All women attending to the obstetric emergency of the Department of Obstetrics and Gynaecology SJH during the study period of these, those who meet the inclusion and exclusion criteria were enrolled for the study.

Inclusion Criteria: Obstetric emergencies referred from any health care provider or referring facility.

Exclusion Criteria: Cases booked at Safdarjung hospital, Self referred cases and Gynaecological emergencies

Sample Size: Taking the cause for referral as Anemia in 28%, 95% CI, 80% power, 10% non-response error and 6% absolute precision using the formula 4pq/d2 the sample size come out to be 224.

Sampling Technique: Nearly 150-250 women are referred to obstetric emergency of our department every month. As the sample size is 224, hence 3 consecutive women who were referred on 2 fixed days a week were enrolled for the study till the required sample size was achieved.

Methodology

All the enrolled women were attended in the obstetric emergency, and managed as per the departmental protocols. After stabilization of the patient, the following data were recorded on a predesigned proforma.

1. Socio demographic profile including age, parity, literacy, occupation, socioeconomic status (per capita income), residence and antenatal care status (whether supervised antenatally or not)

2. Detailed clinical history including presenting complaints with their duration, along with any treatment received prior to admission.

3. Whether woman is ante-partum/ intra-partum/ post-partum/ postabortal

If post-delivery: Place of delivery - home/ Institutional,   Type   of   delivery   – NVD/Instrumental/LSCS, Interval since delivery

If post abortal: Place of abortion/intervention, Interval since intervention

4. Detailed obstetrical history including gravida, parity, number of live issues, abortions, mode of previous delivery and any high risk factor during previous pregnancy

5. General condition on arrival at referral facility (according to American Hospital Association Society Guidelines) Good/ Fair/ Serious/ Critical

6. Any resuscitative measures required at arrival in referral facility (e.g. Vasopressors, oxygen, iv fluids, emergency drugs like anticonvulsants, antihypertensive, others)

7. Complete general, physical and systemic examination

8. Complete obstetrical examination

9. Provisional diagnosis at admission.

10. Indication for referral: Obstetric complication, medical disorders, lack of Operation Theatre / blood bank /surgical expertise /others

11. Referring facility: Govt. / Private / others

12. Number of places referred from:

Interfacility Transfer (transport and communication) as per Operational Guidelines on Maternal and Newborn Health, MOHFW Govt. of India [8]

13. Transportation details: Mode of transport used: Govt. ambulance / Private vehicle ,Whether ambulance provided by referring facility or called from higher facility ,Whether ambulance service was free of cost ,Any difficulty faced in arranging vehicle ,Whether accompanied by any paramedic or doctor ,Interval between decision to transfer and availability of transport ,Was en-route stabilization facility present in transport vehicle ,Distance covered (Km) and time taken in transport (Hours)

14. Communication Details: Whether pre-transfer counseling of patient and relatives by referring facility, explaining need for referral was done, Whether referral slips given to patient with details of treatment given and any investigation at referring facility and Whether prior telephonic communication sent from referring facility to referral facility.

Maternal Outcome: Clinical course and management: conservative/ obstetrical surgical intervention/non-obstetrical intervention (if yes, details)., Mode of delivery (NVD/LSCS/Instrumental delivery). , Any obstetrical or medical complications, Need for ICU admission with indication and duration. Condition on discharge: improved / residual morbidity

Fetal outcome: Term /preterm; Live births/ still birth; SGA / AGA; NND, APGAR <7 at 1 min; weight (kg); sex; Congenital anomaly, Need for NICU admission with indication and duration, Important relevant investigations, Any other fetal morbidity Women and their neonates were followed up till discharge and condition on discharge were noted. If maternal or fetal mortality occurs, cause analyzed.

Statistical Analysis: Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. The data was entered in MS EXCEL spread sheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0

Results

The present study was performed to study socio-demographic and clinical profile, interfacility transfer and feto-maternal outcome of emergency obstetric referrals. During study period a total of 8,081 women were referred to our Obstetric emergency out of which 224 women were enrolled and socio-demographic and clinical profile, interfacility transfer and feto-maternal outcome of these women were studied.

Table 1: Distribution of women according to referring centre (Private/public sector) (n=224)

Referring centre	Number	Percentage (%)
Private sector	4	1.8
Public sector	220	98.2
Total	224	100

Majority of women in our hospital referred from public sector hospitals i.e. 98.2%.(Table 2)

Table 2: Distribution of women according to number of referring units (n=224)

Referring units	Number	Percentage (%)
1	218	97.3
2	6	2.7
Total	224	100

Most of the women referred from one referring centre i.e. 97.3%. .Only 2.7% referred from 2 referring centre. (Table 3)

Table 3: Distribution of women according to level of referring centre (n=224)

Level of referring centre	number	Percentage (%)
Primary health care centre	3	1.3
Secondary health care centre	213	95.1
Tertiary health care centre	8	3.6
Total	224	100

Most of the women were referred from secondary health care centre i.e. 95.1%. Only 1.3% women referred from primary health care centre, and 3.6% from tertiary health care centre. (Table 4)

Table 4: Distribution of cases according to age (years) (n=224)

Age(years)	Number	Percentage (%)
18-25	144	64.3
26-30	59	26.3
31-40	21	9.4
Mean ± SD	25 ± 3.9 years	
Median(IQR)	24(22-27.25) years	
Range	18-39 years	

The age of referred women ranged from 18-39 years, with mean age being 25+3.9 years.(Table 4) Nearly 2/3rd of women i.e. 64.3% were in the age group 18-25 years and 9.4% in the age group 31-40 years(Table 5) A total of 98.7% women were homemakers .(Table 6)

Table 5: Distribution of subjects according to area of residence (n=224)

Area of residence	Number	Percentage (%)
Rural	67	29.9
Urban	157	70.1
Total	224	100

Table 6: Distribution of cases according to occupation (n=224)

Occupation	Number	Percentage (%)
Homemaker	221	98.7
Private school teacher	1	0.4
Sweeper	1	0.4
Tailor	1	0.4

Table 7: Distribution of cases according to education status (n=224)

Education	Number	Percentage (%)
Illiterate	81	36.2
Primary	65	29.0
Secondary	40	17.8
Senior secondary	34	15.2
Graduate	4	1.8
Total	224	100

Nearly 2/3rd of the women i.e. 65.2% were either illiterate or had only primary education. Only 1.8% women were graduate. (Table 7) Most of the referred women were multigravida i.e. 59.4%. (Table 9)

Table 8: Distribution of cases according to socioeconomic status (n=224)

Socioeconomic status	Number	Percentage (%)
Lower	0	0.0
Upper lower	111	49.5
Lower middle	111	49.5
Upper middle	1	0.5
Upper class	1	0.5
Total	224	100

Table 9: Distribution of subjects according to parity (n=224)

Parity	Number	Percentage (%)
Primigravida	91	40.6
Multigravida	133	59.4
Total	224	100

Table 10: Distribution of subjects according to pregnancy status (n=224)

Pregnancy status	Number	Percentage (%)
Antepartum	126	56.3
Intrapartum	85	37.9
Postpartum	10	4.5
Post abortal	3	1.3
Total	224	100

Most of the cases i.e. 56.3% were antepartum, followed by intrapartum and postpartum 37.9% and 4.5% respectively. Only 1.3% women were postabortal.(Table 10) A total of 83.5% cases were referred for obstetric causes, while 16.5% due to medical causes. (Table 11)

Table 11: Distribution of women according to causes of referral (n=224)

Causes of referral	Number	Percentage (%)
Obstetric causes	187	83.5
Medical causes	37	16.5
Total	224	100

Table 11 a: Distribution of women according to obstetric causes of referral (n=187)

Obstetric causes of referral	Number	Percentage (%)
Hypertensive disorder of pregnancy	34	18.2
Previous LSCS	27	14.5
Antepartum hemorrhage	20	10.7
Preterm Labour/ PPROM	16	8.5
Meconium stained liquor	15	8.0
Malpresentation	12	6.4
Oligo/Polyhydramnios	7	3.8
Rh negative	7	3.8
Cephalopelvic disproportion	5	2.7
Decrease fetal movement	4	2.1
Non reassuring fetal heart rate	4	2.1
Fetal growth restriction	4	2.1
Gross congenital anomaly in baby	4	2.1
Postdatism	4	2.1
Loop of cord around neck	4	2.1
Postpartum hemorrhage	3	1.6
Obstructed Labour	3	1.6
Intra-uterine fetal demise	3	1.6
Incomplete abortion	3	1.6
Cord prolapse/Hand prolapse	2	1.1
Rupture uterus/Impending rupture	2	1.1
Vulval hematoma	2	1.1
Gestational diabetes mellitus	1	0.6
Longitudinal vaginal septum	1	0.5
Total	187	100

Major obstetric causes for referral were hypertensive disorders of pregnancy i.e. 18.2%, followed by previous LSCS i.e. 14.5%, antepartum hemorrhage i.e. 10.7% and preterm labour/Preterm premature rupture of membrane (PPROM) i.e. 8.5%. Meconium stained liquor (MSL) and malpresentation were 8.0% and 6.4% respectively.

Commonest cause for referral in postpartum women was postpartum hemorrhage i.e. 1.6%. Major medical causes for referral were anemia i.e. 78.4%, followed by heart disease, HIV/ hepatitis B and thrombocytopenia in 5.4% cases each. (Table 11a and 11 b)

Table 11 b: Distribution of women according to medical causes of referral (n=37)

Medical causes of referral	Number	Percentage (%)
Anemia	29	78.4
Heart disease	2	5.4
HIV/Hepatitis B	2	5.4
Thrombocytopenia	2	5.4
Acute kidney injury (AKI) with jaundice	1	2.7

Hypothyroidism	1	2.7
Total	37	100

Table 12: Distribution of women according to reason for referral (n=214)*

Reason for referral	Number**	Percentage (%)**
Lack of operation theatre (OT)/ emergency OT	106	49.5
Lack of blood bank	80	37.4
Lack of ICU	29	13.6
Lack of NICU	26	12.2
Non-availability of specific blood group	2	0.9
Lack of emergency ultrasonography facility	2	0.9
Lack of neuro surgery facility	1	0.5
Lack of emergency Lab	1	0.5

The commonest reasons for referral to our hospital were lack of operation theatre (OT) or emergency OT in 49.5%, followed by lack of blood bank in 37.4% cases and lack of ICU in 13.6%; Non availability of NICU was reason for referral in 12.2% women. (Table 12) Most of the referred women were fair i.e. 64.3%, while 21% were serious and 5.4% were critical and at arrival.(Table 13)

Table 13: Distribution of referred women according to condition at arrival (n=224)

Condition at arrival	Number	Percentage (%)
Good	0	0.0
Fair	165	73.7
Serious	47	21.0
Critical	12	5.3
Total	224	100

Table 14: Distribution of women according to mode of transportation used (n=224)

Private vehicle/Ambulance	Number	Percentage (%)
Ambulance	176	78.6
Private vehicle	48	21.4
Total	224	100

In all referred cases, majority of women used ambulance i.e. 78.6%. (Table 14) Most of the women used free ambulance i.e. 98.9%, while 1.1% came by paid ambulance. Range of distance travelled by women was 2.5-150 km. A total of 51.8% women have covered the distance <10 km, while 31.3% cases covered >20 km to reach to our hospital.

Table 15: Distribution of women according to duration of travel (hours/min) (n=224)

Duration of travel (hours)	Number	Percentage (%)
<1	126	56.2
1-2	88	39.3
>2	10	4.5
Mean ± SD	0.97 ± 0.62 hours	
Median(IQR)	0.75(0.5-1.5) hours	
Range	0.25-4 hours (15-240 min)	

Most of the women i.e. 95.5% reached our hospital within 2 hour, while 4.5% took more than 2 hours.(Table 15) Only 3.1% of referred women were accompanied by health care worker in the ambulance. There were no facilities of en-route stabilization in 95.5% transport vehicle

Table 16: Distribution of cases according to availability of referral slip (n=224)

Referral slip	Number	Percentage (%)
No	6	2.7
Yes	218	97.3
Total	224	100

In most of the cases i.e. 97.3% referral slips were available. In most of the cases i.e. 94.5% referral slips were complete, while 5.5% referral slips were incomplete with missing variables.(Table 16) In majority of referred cases i.e. 88.8% pre-transfer counselling of patient/relatives at referring facility regarding need and place of transfer was not done. No prior tele-communication was received from referring to referral centre for any women.

Table 17: Distribution of cases according to mode of delivery (n=217)*

Mode of delivery	Number	Percentage (%)
Normal vaginal delivery	131	60.4
LSCS	84	38.7
Instrumental delivery	2	0.9
Total	217	100

A total of 38.7% women underwent LSCS, while 60.4% had normal vaginal delivery (Table 17).

Table 18: Distribution of women according to post admission complications (n=224)

Complication	Number	Percentage (%)
No	207	92.4
Yes	17	7.6
Various complications (n=17)		
Maternal complications Postpartum hemorrhage (PPH)	4	23.5
Severe preeclampsia	3	17.6
Cardiac failure	2	11.8
Pulmonary edema	1	5.9
Hemorrhagic shock	1	5.9
Antepartum eclampsia (APE)	1	5.9
Sepsis	1	5.9
Fetal complications Fetal distress (FD)	2	11.8
Cord prolapse	1	5.9
Intrauterine fetal demise (IUFD)	1	5.9

A total of 7.6% referred women developed complications, of which: maximum number of women had PPH i.e. 23.5% followed by severe preeclampsia i.e. 17.6% and fetal distress in 11.8%. (Table 18) A total of 8% women required ICU admission with mean duration 3.11+ 2.45 days. Almost all referred women recovered completely at the time of discharge i.e. 99.1%. Only 0.9% had residual morbidity i.e. acute kidney injury at resolving phase. (Table 18)

Table 19: Distribution of women according to maternal mortality (n=224)

Maternal mortality	Number	Percentage (%)
No	221	98.7
Yes	3	1.3
Total	224	100

Out of 224 referred women 3 women expired (1.3%). The cause of maternal mortality was antepartum eclampsia with pulmonary edema in 2 women and severe anemia with heart failure in one woman. (Table 19) Out of 224 referred women, 3 expired undelivered, 4 had abortion; in remaining 217 women 3 had twins, thus fetal outcome was calculated in 220 newborns Majority of women had term deliveries i.e.70.9%, followed by preterm and post term in 28.2% and 0.9% respectively.

Table 20: Distribution of newborns according to birth weight (kg) (n=220)

Birth weight(kg)	Number	Percentage (%)
<2.5	61	27.7
>=2.5	159	72.3
Mean ± SD	2.6 ± 0.56 kg	
Median(IQR)	2.7(2.4-2.9) kg	
Range	0.7-3.6 kg	

A total of 27.7% newborns had low birth weight <2.5 kg, while mean birth weight was 2.6+ 0.56 kg.(Table 20) A total of 19.1% newborns were small for gestational age (SGA). (Table 21)

Table 21: Distribution of newborns according to APGAR score (at 1min) (n=195)*

APGAR score	Number	Percentage (%)
<7	27	13.8
>=7	168	86.2
Mean ± SD	6.92 ± 0.73	
Median(IQR)	7(7-7)	
Range	3-9	

A total of 13.8% newborns had APGAR score less than 7 at 1 min. Out of 205 live births, 18.1 % were admitted to NICU. The mean duration of NICU stay in these newborns were 4.08+3.3 days. (Table 21)

Table 22: Distribution of newborns according to neonatal mortality (n=205)*

Neonatal mortality	Number	Percentage (%)
No	189	92.2
Yes	16	7.8
Total	205	100

A total of 16 newborns out of 205 live births were expired i.e. 7.8%. The main cause of neonatal deaths was prematurity and neonatal sepsis.(Table 22)

Discussion

The present study was conducted in the Department of Obstetrics and Gynecology, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi. A total of 224 referred women attending the obstetric emergency during the study period, who met the inclusion and exclusion criteria were enrolled for the study. These women analyzed to study their socio-demographic & clinical profile and interfacility transfer including transport and communication. This study also aimed to study feto-maternal outcome of these emergency obstetric referrals.

During the study period, a total of 8,081 women were referred, out of 47,975 admissions in obstetric emergency, giving a referral rate of 16.4%. Almost similar referral rate i.e. 20.9% was observed by Goswami P. et al in an Indian study from Madhya Pradesh.[6]A study from tertiary care centre from Jodhpur, Rajasthan observed comparatively lower referral rate i.e. 9.96%.[9] In contrast referral rates were very low i.e. 2.6% and 1.7% in studies from Nepal and Pakistan respectively. [10,11]A large proportion of cases referred to tertiary hospital could have been managed at their level of health care centers. These unnecessary referrals overburden the referral hospital and reduce their ability to cope with demand and provide specialist care. [12,13,14]. The present study observed that, the majority of women were referred from Public sector hospitals i.e. 98.2%, whereas only 1.8% referred from private hospitals. Our observation was similar to study done in Rajasthan by Jakhar R. et al where 99.22% patients were referred from Government hospitals and only 0.88% from private hospitals and clinics.[9]A study by Jyotsana et al in tertiary health centre in Gujarat observed a slightly lower proportion i.e. 83% cases referred from public sector. [15] Study from Nepal also found that maximum cases were referred from Government hospital. [6] Our hospital being a Government tertiary care hospital is a referral linkage of secondary level health facilities. Besides it caters mainly to low and middle socio-economic status population, hence the higher proportion of referrals from public sector health care centers.

In this study, most of the women i.e. 97.3% were referred directly to our hospital and only 2.7% women had two referral units. Our observations are different from a study done in tertiary teaching hospital of Nepal where 12.5% patient went to other hospitals and were then referred. [11]Similarly in a Nigerian study, Akaba G.O et al found that nearly 15% of women came from the referring centre via a second 80 hospital.[16] In the present study, 40.6% of referred women were primigravida and 59.4% were multigravida. Our observation are similar to three Indian studies, where 40.7% to 47.0% referred women were primigravida and 50.0% to 53.0% were multigravida.[10,15,16] In contrast, studies from Pakistan and Nigeria observed relatively lower proportion of primigravida i.e. 35.6% and 34.1% respectively.[10,16]

In the present study, 83.5% patients were referred due to obstetric causes, while 16.5% were due to medical disorders associated with pregnancy. Commonest obstetric cause was Hypertensive disorders of pregnancy i.e. 18.4%, followed by previous LSCS in 15.1% and antepartum hemorrhage in 11.2%. Preterm labour and preterm premature rupture of membranes constituted 8.9% of all referred cases.

In the present study, commonest reasons for referral were lack of operation theatre (OT) and emergency OT in 49.5% cases, non-availability of blood back in 37.4% followed by non-availability of ICU and NICU in 13.6% and 12.2% cases respectively. Almost similar reasons for referral were reported by Jakhar R. et al including lack of facilities and personnel (obstetrician, anesthetist, and paediatrician) to do caesarean section, lack of blood bank, trained staff and equipments to manage obstetric emergencies.[9] Similarly in another Indian study Goswami et al found that 16.87% cases were referred due to lack of functional OT, blood banks and gynecologist competent enough to do caesarean section.[6] A Nigerian study also found that main non obstetric reason were inadequate manpower in 26.8% and lack of bed in 20.3% cases.

Present study observed, 78.6% of referred women were transported by ambulance while 21.4% used private vehicles to reach the referral facility. Out of those who used ambulance most of the women i.e. 98.9% used free ambulance provided by the 89

referring hospital, only 1.1% women used paid private ambulance. Our observations are similar to an Indian study from a tertiary care centre in Gujarat, where 75% referred patients used government ambulance and 25% used private vehicles.4 In contrast another Indian study from Madhya Pradesh by Goswami P.et al, reported that only 38% cases were transported by hospital ambulance, whereas 62% women used private vehicles. [6] In the present study, only 3.1% referred women (7 out of 224) were accompanied by any health care worker during referral transportation. All these 7 cases were critical on arrival at the referral facility (5 were eclampsia, 1 ruptured uterus and 1 severe anemia in failure). Accompanying HCW assisted in en-route stabilization of these women and provided oxygen support, intravenous access and ensured patency of airway. En-route stabilization facilities were available only in 4.5% ambulances.

Almost similar observation made by Akaba G. O et al in a Nigerian study where only 6.5% referred women were accompanied by any medical staff. The present study observed that in 97.3% cases referral slips from referring centre were available; only 2.7% cases were referred without any written communication. Majority of the referral slips were complete i.e. 94.5%, and only 5.5% were incomplete. Missing variables in the incomplete referral slips included reason of referral, treatment given at referring facility and investigations reports. Our observations are similar to those of Jyotsana et al from Gujarat, who reported that 98% cases were referred with a referral slips and only 2% came without slips. [15] A study from Nepal also observed that most of referred patients came with referral slips i.e. 88.4% and only in 11.6% cases referral slips was not available. Kulshrestha A. et al in a study of inter-hospital and intra-hospital patient transfer also suggested that a communication between referring and referral facility with sharing of relevant information, general condition, reason for referral and treatment given in a written template is one of the crucial elements of patient transfer. [17]

In the present study, out of 217 referred women who delivered (3 women expired undelivered, 4 had abortion, hence the total is 217 and not 224) 60.4% had normal vaginal delivery while 38.7% had caesarean section including 3 caesarean hysterectomies. The caesarean section rate was almost similar to the overall LSCS rate during the study period. Our observations were similar to an Indian study from Gujarat by Jyotsana et al where 57% women had normal delivery, 42% had caesarean section and 1% exploratory laprotomy. [15]However, 2 different studies from Gwalior (Madhya Pradesh) by Bindal J.et al and Goswami P et al reported lower LSCS rates i.e. 27.9% and 28%

respectively.[6,18] In contrast, a Nigerian and Pakistani study observed high rate of LSCS i.e. 58.2% and 69% respectively. In the present study, a total of 7.6% (17 out of 224) referred women developed complications. Out of maternal complications, most common complication was PPH i.e. 23.5% followed by severe preeclampsia i.e. 17.6%; whereas out of fetal complications fetal distress was the most common complication in 11.8% cases . Out of 224 referred women, 8% (18 out of 224) required ICU admission and mean duration of ICU stay was 3.11 + 2.45 days with range of 1-11 days. Almost similar observations were made by Goswami P. et al where 13.34% of referred cases required 99 obstetric ICU admission.[6]However an Indian study by Bindal J et al reported a higher proportion of referrals required obstetric ICU admissions i.e. 17.4%.[18] A Nepali study by Maskey S. found that 18.75% of referred patients required intensive care management.19 In contrast a study from Rajasthan by Jakhar R et al reported a lower proportion i.e. 5.3% referred women were admitted in ICU. [9]

In the present study, out of 224 referred women 3 expired before delivery, in remaining 221 women 99.1% had complete recovery, whereas 0.9% had residual morbidity i.e. acute kidney injury in recovery phase on discharge. Similar observations were made by Jakhar R et al in a study from Rajasthan, in which most of patients i.e. 98.34% were discharged whereas 0.78% had residual morbidity and shifted to other departments for further management of respective complications. In the present study, there were 1.3% maternal deaths (3 out of 224 cases) out of total referred women.

This is similar to a Nepali study where 1.75% maternal mortality observed in referred women.19 Two Indian studies by Goswami P. et al, and Bindal J et al also observed 2.06% and 2.2% maternal deaths.[6,18] A higher proportion i.e. 5% maternal mortality was observed by Jyotsana et al in a study from Gujarat4; whereas a lower proportion of maternal mortality i.e. 0.75% and 0.88% were observed in a study from Pakistan and Rajasthan respectively.

In the present study, 93.2% newborns were live births and 6.8% stillbirth. A total of 7.8% of live births had neonatal death and the most common cause of NND was prematurity with neonatal sepsis. Almost similar observation made by a Nigerian study there were 83.6% live births, 11.5% fresh stillbirths and 4.9% macerated stillbirths.[16] In contrast an Indian study from Gujarat by Jyotsana et al reported a higher proportion of still births and neonatal deaths.

The authors observed that out of 57% normal delivered newborns, 19.2% were stillborn, 12.2% died; and out of 42% delivered by caesarean section 47.6% newborns were alive and healthy,

9.52% were stillborn, 11.9% died.[15] Maskey S. in a study from Nepal also observed a higher proportion of fetal losses i.e. 3.5% still births and 15.17% IUFD, and 4.28% neonatal deaths.[11] The birth weight in newborns in our study ranged from 0.7-3.6 kg with the mean weight being 2.6 + 0.56 kg and 2.7 kg being the median. Out of total 27.7% babies were <2.5 kg termed as low birth weight (LBW); most of them were preterm (102).

Majority 80.9% of newborns were appropriate for gestational age (AGA) and 19.1% were small for gestational age (SGA). In the present study, out of total live births 18.1% newborns required admission to NICU, majority of them were preterm. Mean duration of stay was 4.08 + 3.3 days. In Contrast a study at tertiary teaching hospital of Nepal 40% of newborns required NICU admission.19 Similarly an Indian study by Jyotsana et al reported that out of normally delivered newborns 31.5% required NICU admission and out of those who delivered by Caesarian section 45.2% were admitted in NICU.

Conclusion

To raise the standard of emergency obstetric care overall, referral procedures must be improved. Our results highlight the necessity of a regulated feedback and communication system between receiving and referring facilities. It is advised to simultaneously ensure EmOC at various health facility levels through the upgrading of health infrastructure.

Limitations: The present study spans over a limited period. Data collection and analysis of profile, feto-maternal outcome and interfacility transfer over a few years give a better idea of the trends and patterns. The present study is single urban hospital based study; hence the distribution of rural area was not represented in it.

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