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Original Research Article

Inter-hospital obstetric referrals: public versus private sector to a tertiary care teaching hospital in South Kerala, India

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ABSTRACT

Background: Inter-hospital Emergency obstetric transfers should be carried out effectively and efficiently to avoid maternal and fetal morbidity and mortality. Authors would like to analyse the determinants, patterns and reasons for referrals to tertiary hospital for women with obstetric high-risk, complications and obstetric emergencies from both public and private sectors and look into course in hospital and their foeto-maternal morbidities.

Methods: Descriptive study done at a tertiary care teaching hospital where 124 obstetrical referrals from nearby private and public health sectors were recruited.

Results: Infertility treated obstetric referrals were at significant risk of referral (p value-0.002). Public sector referrals had past history of early pregnancy loss which was significant (p value-0.002). Public sector had statistically significant in -labour referrals (p value-0.04). All the obstetric referrals from public health sector reached within half an hour while one third of private sector referrals travelled more than an hour for emergency obstetric care (p value 0.001). Bronchial Asthma caused significant morbidity among public sector referrals (p value-0.001). Public sector referrals <31 weeks were nil while 55 % obstetric referrals were referred <31 weeks from various private hospitals sought neonatal care with significant p value (0.016). NICU admissions were statistically significant in private sector referrals (p-value 0.001). Mean hospital stay in private sector referrals was 10.17 days and it was 7.62 days in government referrals.

Conclusions: Specific guidelines for whom to refer, how to refer, when to refer and where to refer would be helpful in making timely referral. More stringent documentation in the referral slips and more co-ordination between the referral unit and the higher centers are required to build a strong health system.

Keywords: Inter-hospital, Kerala, Obstetric, Private, Public, Referral

INTRODUCTION

Inter-hospital emergency obstetric transfers should be carried out effectively and efficiently to avoid maternal and fetal morbidity and mortality. WHO has launched recommendations for antenatal care and for positive pregnancy care which emphasise appropriate maternal and foetal assessment during antenatal care, timely identification of medical or obstetric complications and

high-risk pregnancies, and provision of appropriate treatment and referral.¹ For this there has to be an efficient appropriate referral system which if not followed can lead to unnecessary referrals and can increase the workload on tertiary hospitals thereby causing discomfort to antenatal women and their relatives. Safe motherhood initiative acknowledges the fact of antenatal referrals by stating that a minimum of 15% of all pregnant women should deliver in obstetric

referral facilities.² An institution referral is when a pregnant woman seeks care at a lower level health facility (basic emergency obstetric care) and is referred onwards to a higher-level health facility (comprehensive emergency obstetric care). Referral institutions should provide a reasonable level of quality care. Referral is especially important within obstetrics due to the high numbers of professionals who support a woman through pregnancy and birth, the speed with which action often needs to be taken and the global burden of maternal mortality.³

Delays in accessing emergency obstetric care, including poor referral systems, contribute to an increase in maternal mortality and morbidity.⁴ Well-established operational referral system is an essential component of strong health care system and is reflected in emergency obstetric care (EmOC) which is an indicator of an efficiently functioning health system.⁵ Prompt unmet obstetric needs can be better monitored if primary, secondary and tertiary levels of health care are linked through an established communication transport system.⁶ Obstetric complications have a different spectrum and urgency for referral. A woman with a high-risk pregnancy may require referral for further antenatal care or delivery, an early complication in pregnancy may require referral on urgent basis (within 2-3 days), and an emergency complication will require immediate transfer. Each of the complication states will also require different referral pathways.

India has a national public health sector which provides free care, and a prominent private sector which charges for services and is largely unregulated. In urban areas, cities have urban health centres and urban health posts for preventive and primary level curative care. But largely the urban population depends on public tertiary level institutions or the private sector for health care. India has a maternal mortality ratio (MMR) of 162 deaths per 100,000 live births and accounts for 17% of global maternal deaths.⁷

Kerala is a high-performing Indian state with regards to health indicators, with an MMR of 31 per 100,000, an institutional delivery rate of 99% and almost universal antenatal care (ANC).⁸ Kerala has a 94% literacy rate and over 90% of houses having electricity and a toilet facility.⁹ Hence, studies regarding healthcare in Kerala is likely to represent the best-case scenario within India. Even though state of Kerala has state of art health care, limited studies have been conducted to analyse referral patterns and differences in referral between public and private hospitals their outcomes and morbidities in both mother and fetus. The sixth review of NRHM10 estimated that only 22% of out-patients and 64% of in-patients visited public sector facilities.

In this study, authors have selected those cases which have been referred to a tertiary care centre in South Kerala and analysed determinants, reasons of referral,

medical co-morbidities, gestational age at referral, decision-delivery delay, outcomes of mother, near misses and perinatal morbidities and documentation of referral slips.

The aims and objectives of this study are to analyse the determinants and reasons of referrals to tertiary care hospital for women with obstetric high-risk, complications, or obstetric emergencies from different sectors -Public and private sector; to look into the referral characteristics-sociodemographic, reproductive and medical comorbidities in both public and private sector obstetric referrals and to know the clinical course, maternal and neonatal morbidities in public versus private obstetric referrals.

METHODS

An observational study was conducted at a tertiary care hospital in Kerala. The sample population consisted of 124 obstetric referrals of gestation 24 weeks or more. They were grouped into public and private sector referrals All booked cases and obstetric referrals of less than 24 weeks and 6 out referrals were excluded from the study. The cases were grouped into public and private hospital referral group.

Study protocol was approved by the ethical committee. Using a pre-structured designed questionnaire, socio demographic details, medical co morbidities, indications for referral-maternal and fetal were obtained. Referral slips were analysed and documentation patterns were sought. Patients referred while in labor was noted. Gestational age at referral and gestational age at delivery was asked and decision-delivery delay was noted.

Emergency and elective case referrals were sorted. Intra partum variables and surgical morbidities were evaluated. Need for ventilation and multi-disciplinary team work, neonatal survivors versus non-survivors, term versus preterm birth, weight of babies, need for NICU admission, period of NICU stay, management in NICU and neonatal morbidities were noted in both the groups.

Statistical analysis

Data was analysed for descriptive statistics such as mean, standard deviation and percentages were computed using SPSS for Windows version 20. P value-<0.05 was significant.

RESULTS

The study population had 21 public sector and 103 private sector referrals. The socio-demographic data, maternal age, domicile, religion, maternal education and employment during pregnancy was comparable between these two groups. Private referrals had better monthly income than public sector (Table 1).

Table 1: Socio-demographic profile of public and private sector referrals.

Variables	Public	Private	P-value
Age (years)			
< 19	3 (14)	5 (4.9)	0.226
20-29	15 (72)	87 (85)	
>30	3 (14)	11 (10.1)	
Domicile			
Rural	18 (86)	84 (82)	0.649
Urban	03 (14)	19 (18)	
Monthly income of family (Rs)			
<10000	3 (14)	7 (6.8)	0.604
10000-20000	11 (52)	37 (36)	
>20000	07 (34)	59 (57.2)	
Number of adults in house (excluding participant)/ Family			
1-2 (nuclear)	0	02 (1.4)	0.115
3-4 (extended nuclear)	18 (86)	87 (85)	
5-6 (joint)	03 (14)	14 (13.6)	
Employed during pregnancy			
No	16 (76.2)	76 (73.8)	0.811
Yes	5 (23.8)	27 (26.2)	
Highest level of education			
Completed secondary school	06 (28.5)	16 (15)	0.817
Higher secondary school/ Vocational training	07 (33)	53 (52)	
Graduate	08 (38.5)	34 (33)	

Table 2: Marital and reproductive career of public sector and private obstetric referrals.

Variable	Public n=21	Private n=103	P-value
Married life in years			
<2 years	5 (24)	26 (25)	0.217
2-4 years	10 (48)	30 (29)	
>4 years	6 (28)	47 (46)	
Infertility Treated			
Yes	6 (28)	22 (21)	0.002
No	15 (82)	81 (79)	
Abortion-past H/o			
Yes	6 (28)	20 (20)	0.002
No	15 (82)	80 (80)	
Previous delivery	n=10	n=49	
Normal delivery	4 (40)	12 (24)	0.314
Caesarean	6 (60)	37 (76)	
Children in house			
0	11 (52)	54 (52)	0.992
1-2	8 (38)	40 (38)	
3-4	2 (10)	9 (10)	

Infertility treated obstetric referrals were at significant risk of referral (p value-0.002).

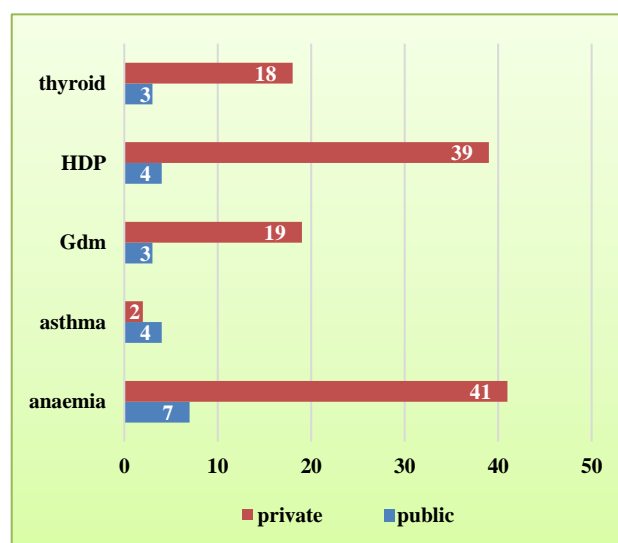
Public sector referrals had past history of early pregnancy loss which was significant (p value-0.002) (Table 2).

Public sector had statistically significant in-labour referrals (p value-0.04). All the obstetric referrals from public health sector reached within half an hour while one third of private sector referrals travelled more than an hour for emergency obstetric care (p value 0.001) (Table 3).

Table 3: Status at referral and distance travelled for care from hospital of referral.

Variable	Public n=21	Private n=103	P-value
Referral Status	Public	Private	
In labour	14 (66)	46 (45)	0.065
Not in labour	07 (34)	57 (55)	
Time taken to reach tertiary care centre			
Within half an hour	21 (100)	69 (67)	0.001
>Half an hour	0	34 (33)	

Asthma was significant morbidity for public sector referrals (p value-0.001) (Figure 1).

**Figure 1: Medical conditions complicating obstetric referrals.**

Maternal reasons predominated public sector referrals while fetal causes dominated private referrals (P value - 0.05). Many patients had multiple complications at the time of referral (Table 4).

Authors had 72% emergency referrals. There were no referrals from public sector <31 weeks while 55 % were referred <31 weeks from private hospitals for neonatal care with significant p value (0.016) (Table 5).

Table 4: Maternal and fetal reasons for referral in public and private obstetric cases.

Reasons for referral	Public n=21	Private n=103
Maternal	(% =76)	(% = 58)
Previous caesarean in labour	03	08
Preterm labour	03	10
Severe pre-eclampsia eclampsia	02	08
Multifetal gestation	02	11
APH-abruptio/ praevia	02	06
Malpresentation	02	02
CPD/ failed induction	01	03
PPROM	02	12
Fetal	(%=14)	(%=42)
FGR-oligamnios	01	13
Doppler abnormality	-	10
Intra -uterine demise	01	05
Fetal distress NRFHR	01	08
Others	01	07
	P-value-0.05	

Others include Rh negative, short primigravida in public group and 2 cases of dengue fever, 2 cases of Chicken pox, 2 cases of HbSAg positive and a case of facial nerve palsy-acute episode in the private sector group.

Table 5: Gestational age at referral and timing of delivery in both groups.

GA at the time of referral (weeks)	Government n=21	Private n=103	P-value
24-30.6	-	25 (24.3)	0.016
31-33.6	06 (28.5)	32 (31)	
34-35.6	06 (28.5)	28 (27.2)	
36-40	09 (43)	18 (17.5)	
GA at decision/delivery (weeks)			
24-30.6	-	20 (19.4)	0.046
31-33.6	06 (28.5)	28 (27.2)	
34-36.6	04 (19)	26 (25.3)	
36-40	11 (52.5)	29 (28.1)	
Referral emergency/ Elective			
Emergency	15 (71.5)	75 (72.8)	0.89
Elective	06 (28.5)	28 (27.2)	

Caesarean section accounted for 83% of referrals. Previous caesareans (obstetric historical risk) and high-risk obstetric referrals accounted for the bulk (Figure 2).

Ten cases needed blood transfusion. 12 cases were given Magsulf regime for impending eclampsia/ eclampsia/ severe preeclampsia. There were 2 cases of Posterior

Reversible Encephalopathy Syndrome. All the 7 mothers who needed ventilator support not related to anesthesia were from private sector (Figure 3).

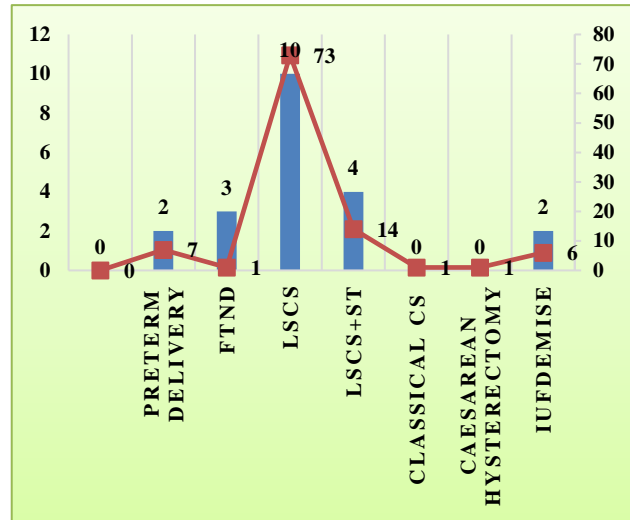


Figure 2: Outcomes of referral in both groups.

16 out of 17 babies <1 kg were born to private referrals. 55% babies weighed 1500-1999g (Table 6).

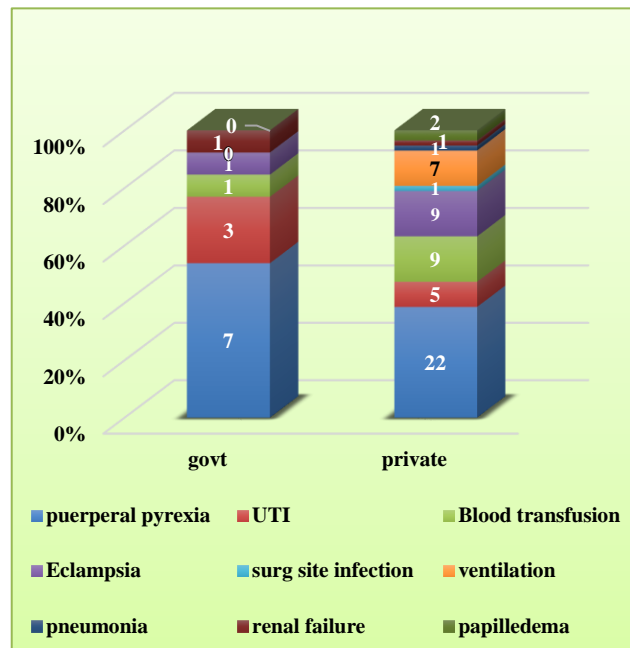


Figure 3: Morbidities of referral in both groups.

NICU admissions were statistically significant in private sector referrals (p-value 0.001) due to preterm referrals and very low-birth weight babies. As the public sector referral babies were near term, shorter NICU stay (<6 days) 83% making p value statistically significant (p-value 0.007). Need to resuscitate by ventilator was 71% in private sector and 50% in public sector referrals (p - value 0.020) (Table 7).

Table 6: Comparison of birth weights of babies born to public versus private.

Birth weight (kg)	Public	Private
<1.000kg	1 (4.1)	16 (13.55)
1.000-1.499 kg	3 (14.5)	27 (22.88)
1.500-1.999 kg	7 (30.5)	28 (23.73)
2.000-2.499 kg	4 (17.3)	23 (19.49)
2.500-2.999 kg	4 (17.3)	12 (10.17)
3.000-3.499 kg	4 (17.3)	10 (8.48)
>3.500 kg	0	2 (1.69)
Total	23	118

Table 7: Neonatal morbidity among public versus private obstetric referrals.

	Public	Private	P-value
Total neonates (n=141)			
Survivors	21	90	-
Non-survivors	2	22	
IUF Demise	2	4	
Admission to NICU	n= 23	n =112	
Yes	12 (52.17)	84 (75)	0.001
No	11 (47.83)	18 (25)	
Days in NICU (n=96)	n=12	n=84	
<2 days	4 (33.3)	12 (14.3)	0.007
3 - 6 days	6 (50)	18 (21.4)	
>6 days	2 (16.7)	54 (64.3)	
Patient in NICU	n=12	n=84	
Ventilator	6 (50)	60 (71.4)	0.020
CPAP	6 (50)	14 (16.6)	
Phototherapy	0	10 (12)	
Mean NICU stay in days-government referrals	7.62		
Mean NICU stay in days-private referrals	10.17		

In present study, 70% of private sector referrals had structured letters and 28% had unstructured ones and 2% had no document available at referral while documentation was slightly better in the public sector (Table 8).

Table 8: Document handed over to the in-referral centre.

Referral letter	Public n=21	Private n=103
Structured	17	72
Unstructured	3	29
No document available	1	2
Medical, obstetric details, scan	n=21	n=103
Available	16	67
Not available	5	36

DISCUSSION

In present descriptive study there were 1600 deliveries which constituted 131 in-referrals and 7 out-referrals which in present study is 8% similar to 9.4% in Chaturvedi.¹¹ The proportion of in-referrals was highest in government tertiary institutions (21.2%) followed by private hospitals (16.1%) in contrast to 16.9% and 83.1% in public and private hospitals respectively. 73.4% were in the age group of 20-30 years as in Morsheda et al.¹² 82.3% were from the rural area in this and also in Vinayak et al and Wahane et al that reported 77%.^{13,14} This high proportion of rural population may be due to delay in access to health care and lack of awareness and poor transport facilities. Infertility treated obstetric referrals were at significant risk of referral (p value-0.002). Public sector referrals had past history of early pregnancy loss which was significant (p value-0.002). Public sector had statistically significant in-labour referrals (p value-0.04) in contrast to inter-hospital transfers in Brunei where antenatal referrals constituted the majority.¹⁵ All the obstetric referrals from public health sector reached within half an hour while one third of private sector referrals travelled more than an hour for emergency obstetric care (p value 0.001) similar to Brunei study but in contrast to Sheik et al.¹⁶ The high proportion of referrals and the experience faced during the same are probably a reason why pregnant women in India chose to deliver at private institutions to avoid transfers.¹⁷ In present institution where annual delivery rates are around 700 cases and 52 cases were referred per year authors had 16.9% public and 83.1% private sector referrals. Tanzanian study reported that 28% of women registered for ANC at peripheral health centre were referred to higher level hospitals including private tertiary care teaching hospitals.¹⁸

Referral is a component of high-quality obstetric care and good communication depends on knowledge, skills and practices of obstetricians and inter-facility relationships. Referral letter reflects the diagnostic skills, communication skills and professionalism of the doctor. The RCH guidelines recommend that health staff should provide a brief referral note, and if possible, inform the higher-level facility, mostly they just give verbal instructions to the family of the patient.¹⁹ 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. Maitra, and Barua, noted that there were no referral records for identifying high-risk pregnancies before the intervention was implemented.^{20,21} Grimshaw et al, reported that only structured referral sheets and involvement of consultants in educational activities would improve the effectiveness and efficiency of referrals from primary care to secondary care, following Cochrane data base review.²² The lack of a referral letter or a poor quality referral letter can compromise management of a patient.²² In present study,

70% of private sector referrals had structured letters and 28 % had unstructured ones and 2% had no document available at referral while documentation was slightly better in the public sector. Ohn et al had 19.4% referrals with no referral slips.¹⁵ In Chaturvedi et al study and Madhya Pradesh study, 72% in-referred cases had a referral slip however they mostly did not contain the reasons for referral and the treatment provided before referral.^{11,23} As studied by Alehgen, referrals were to be made to the next level of available public health institution or to a private health institution or if they complied with the choice of suggested referral institution.²⁴ Authors observed that 76% public sector referrals had obstetric scans and antenatal card with them while 35% of private care seekers had no sonogram or antenatal card making treatment expensive and unnecessary phase 2 delay. Interventions of formalised patient held records are supported by the World Health Organisation to improve the quality and utilisation of antenatal care.¹ According to Sheikh et al, 86% of participants thought that receiving documents such as referral letters was important; mostly because it helped them understand their condition and explain it to others.¹⁶ Women generally recognised the importance of information transfer and of receiving documentation from their healthcare providers.

Pre-eclampsia was detected in 11% and severe anaemia in 8% of all pregnant women in the study by Alehgen in 2012.²⁴ Anaemia was prevalent in 38.7% in this study comparing to Rathi et al 46%.²⁵ Institutions providing obstetric care should have back up of blood bank. Patel et al noted that HDP was 16% and it was higher, 33.06% in this study.²⁶ Asthma was significant morbidity among public sector referrals (p value-0.001) as in Ohn et al.¹⁵ A study conducted in Tanzania reported that among 28% of referred patients, 70% were referred due to demographic risks, 12% due to obstetric historical risks, 12% prenatal and 5.5% intrapartum and postpartum risks. Jahn and De Brouwere identified a core set of indications for referral which would produce referral rates of 6% to 10% and reduce a lot of un-necessary high-risk referrals mainly previous caesarean section (obstetric historical risk), breech presentation, transverse lie, multiple gestation, hypertension, and severe anaemia. Maternal referrals included previous Caesarean in labor, preterm labour, severe preeclampsia, multi-fetal gestation. 27.6% referrals were for hypertensive disorders and 34.5% were for preterm labor in the study by Agarwal et al.²⁷ There were 2 chronic HBV infections similar to Agarwal et al.²⁷ Infections included 4 dengue fever cases, 2 cases of chickenpox in labour in private referrals. Emergency intervention was needed for severe preeclampsia, eclampsia, previous cesarean in labour, antepartum haemorrhage preterm labour and higher order pregnancies remote from term. Agarwal et al, reported 16 patients with eclampsia, a major preventable cause of maternal mortality. Most of the patients 42% in private and 14% in public were referred for better neonatal care either due to anticipated preterm birth, fetal growth

restriction, oligamnios, fetal distress, Doppler abnormality had to be managed with emergency caesarean delivery. In-referrals in Rajasthan had reasons such as obstructed labour (25%), antepartum haemorrhage (16%), pregnancy induced hypertension (16%), severe anaemia (14%), complicated abortion (12%), post-partum haemorrhage (6%) and twin pregnancy (6%).²⁸

Authors had seven out-referrals (5.6%), two cases of complete placenta praevia from public sector and five cases from private sector (Scrub typhus, Swine flu, Autoimmune Thrombocytopenia, Hepatitis A, PPRM). Chaturvedi reported that 5.9% women seeking delivery care were referred out.¹¹ The out-referral rate was highest from PHCs (14%) followed by CHCs (8%) and tertiary hospitals (1%). Half of the referrals from PHC were directly to tertiary hospitals, bypassing the CHCs. There were 11% "near-miss" cases in Kaul et al and 4 near-miss" (3.22%) referrals from present private sector needing multidisciplinary care.²⁹

Kirti et al in a similar study had 34% referrals from state general hospitals and 27% rural hospitals while 9% were only from private hospitals.³⁰ In contrast to ours where 83% from private hospitals There were no referrals from public sector <31 weeks while 55 % were referred <31 weeks from private hospitals for neonatal care with significant p value (0.016). 43 % of these preterm were delivered by emergency caesareans <34 weeks while 52% of public sector babies were born >36 weeks. 16 out of 17 babies <1 kg were born to private referrals. 55% babies weighed 1500-1999g.

Caesarean section accounted for outcome of 83% of referrals. Previous caesareans (obstetric historical risk) and high-risk obstetric referrals accounted for the bulk. The rate of caesarean deliveries in the private sector is extremely high (70%) and more than twice that in the public sector in Brazil as many Brazilian obstetricians believe that a caesarean section is actually safer for the newborn and more comfortable than a vaginal delivery for most high risk women.³¹ Ambreen et al had 62% cesarean deliveries.³² Goswami et al had 43.5% cesarean deliveries.³³ A contrast observation was that vaginal delivery rate was 78% in spite of high risk conditions and various complications in Devineni et al.³⁴

A maternal death in a gravid 5 had overt diabetes and hypertension and previous two abortions and 2 cesarean section presented with rupture uterus and shock was from private sector and reached in half an hour. Cesarean hysterectomy and five units of Packed RBCs were transfused, and maternal death could not be averted. Goswami et al reported hypertensive disorders and their complications as a leading cause of maternal mortality.³³ There were 4 near misses which were due to severe preeclampsia and HELLP syndrome. Ten cases needed blood transfusion. 12 cases were given Magsulf regime for impending eclampsia/ eclampsia/ severe

preeclampsia. There were 2 cases of posterior reversible encephalopathy syndrome. All the 7 mothers who needed ventilator support not related to anesthesia were from private sector. There were 2 cases of papilledema and 2 patient needed plasmapheresis for acute renal failure. Goswami et al reported 8.02 % needed obstetric ICU admissions.³³ Shelat et al concluded that emergency obstetric referrals were exposed to highest risk of maternal and perinatal complications.³⁵

Out of 141 babies, there were 121 survivors (21 and 90 in public and private) sector respectively. NICU admissions were statistically significant in private sector referrals (p-value 0.001) due to preterm referrals and very low-birth weight babies. As the public sector referral babies were near term, shorter NICU stay (<6 days) 83% making p value statistically significant (p-value 0.007). Need to resuscitate by ventilator was 71% in private sector and 50% in public sector referrals (p-value 0.020). Mean hospital stay in private sector referrals was 10.17 days and it was 7.62 days in government referrals. Survival rate of babies in present study was 84.5% due to the state-of-the-art neonatal care facilities. 77.3% were low birth weight babies of less than 2500 g in contrast to 56% LBW babies in Rathi et al. 51% were male babies and 48% female neonates (2 born to public and 22 born to private) succumbed to prematurity, respiratory distress, hypoxic ischemic encephalopathy and sepsis. The perinatal mortality rate is 14.63. There were 11 neonatal deaths in babies of multifetal gestation. In Devineni et al, total number of live births were 73 (78.5%) among which 28 (30%) required neonatal admission and 5 (5.3%) had early neonatal death.³⁴ As in Khatoun A, et al, 26.5% neonates were transferred to NICU and perinatal mortality was 41%.³⁶

CONCLUSION

This study concluded that wide spectrum of complicated obstetric cases were referred to this hospital. Specific guidelines for “whom to refer”, “how to refer” “when to refer” and “where to refer” would be helpful in making timely referral. Improved competencies of staff for management of labour will improve patient management and reduce unjustified referrals. Treatment during transit in referrals should be stressed. More stringent documentation in the referral slips and more co-ordination between the referral unit and the higher centers with simultaneously developing and instituting obstetric referral guidelines, monitoring of referrals will escalate the benefit in developing a strong health system. In India.

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