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Original Research Article

The study of indications, morbidity and mortality in patients delivered outside and referred to a tertiary care hospital

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ABSTRACT

Background: Emergency referral is critical to improving outcomes for time-sensitive conditions that underlie many unpredictable problems during pregnancy, delivery, and the postnatal period. This is especially true for poor, remote and rural populations where access to health services may be limited. So, this study evaluated the maternal and fetal outcomes in patients referred to a tertiary care hospital after delivery outside to note the commonest postpartum complications, morbidity and mortality indicators in terms of need of ICU, stay in hospital, need of dialysis, need of NICU. This paper described the application of a practical approach to the assessment of the burden of postpartum morbidity by means of postpartum referrals to tertiary centre.
Methods: The observational present study was done in department of obstetrics and gynecology, BJ Government Medical College, Sassoon Hospital Pune covering a period of 18 months in postpartum period.
Results: Study included 150 cases, out of these common reasons for referrals were pre-eclampsia/eclampsia (68%), post-partum hemorrhage (52.7%) and puerperal sepsis (26%) while anemia was observed in 70% cases.
Conclusions: This study underscored the significant impact that delivering outside of a tertiary care setting can have on maternal-fetal outcomes. Timely referral to tertiary care centers plays a pivotal role in reducing complications and improving survival rates. Enhancing the quality of care in peripheral healthcare facilities and ensuring prompt transfer protocols could prevent many of the adverse outcomes.

Keywords: Indication, Morbidity and mortality indicators, Multidisciplinary tertiary care, Stay in ICU, Timely referral

INTRODUCTION

The World Health Organization (WHO) defines the postpartum period, or puerperium, as beginning one hour after the delivery of the placenta and continuing until 6 weeks (42 days) after the birth of the infant.[1]

Postnatal care is an important part of maternal care as life-threatening complications can occur in the postpartum period. Reducing maternal mortality is a priority agenda of the national and international community as evidenced by the great interest in the millennium development goal (MDG).[2]

The Government of India is a signatory to the United Nations (UN) sustainable development goals (SDGs), which adopted a global maternal mortality ratio (MMR) target of fewer than 70 deaths per 100 000 live births by 2030.[3] This requires the reliable quantification of maternal deaths and trends and an understanding of the major causes of these deaths at the subnational level.

Maternal morbidity refers to complications that have arisen during the pregnancy, delivery or postpartum period. Severe acute maternal morbidity (SAMM) has been defined by the WHO as “a woman who nearly died but survived a complication during pregnancy, childbirth,

or within 42 days of pregnancy termination through care in health facilities".[4]

Emergency referral is critical to improving outcomes for time-sensitive conditions that underlie many unpredictable problems during pregnancy, delivery, and the postnatal period. This is especially true for poor, remote and rural populations where access to health services may be limited. The patients delivered outside as normal or caesarean delivery are commonly referred in complicated state for need of NICU, ICU, blood products, multi-disciplinary care, dialysis management, postpartum and intrapartum complications like postpartum hemorrhage, retained placenta, vaginal cervical perineal tear and laceration, wound gape, bladder bowel injury, etc. The common post-partum obstetric morbidities for which women seek tertiary hospital admission and treatment were postpartum hemorrhage (PPH) and sepsis.[5,6] These conditions were not only the important causes of severe maternal morbidity but also found to be the major killers of pregnant women in the studies published nationally and worldwide.[7,8]

The main point is to understand is the time taken between the referrals from point of delivery to final referred hospital and final time between symptoms, complication and cure.

In present hospital bases observational study, we aimed to find answers to these important questions. We aimed to find the indications and commonest complications with which patients delivered outside are referred to tertiary care hospital. We also wished to see the fetal-maternal outcome in terms of duration of hospital stay, ICU stay, need of hemodialysis, need of blood transfusions, maternal morbidity, near miss mortality, and mortality.

METHODS

Study type and study place

The present study was prospective observational Study, conducted in the department of obstetrics and gynecology, BJGMC and Sassoon General hospital, Pune.

BJGMC, Pune is 180 bedded OBGY department with 15 bedded labour room and 4 operation theatres and two separate septic wards in a tertiary referral government medical college and hospital; situated in the Pune district. It gets a large number of referrals from maternity homes, primary health centers from rural parts of far Pune. Data regarding maternal mortality was collected from maternal mortality register.

Duration of study

Study was done 18 Months (February 2021 TO September 2022), by retrospective collection of records of postpartum women who had been referred and admitted in the department of obstetrics and gynecology, BJGMC and Sassoon General hospital, Pune.

Study population and selection criteria

The study comprised of all those women who required admission and treatment in the department of obstetrics and gynecology for obstetric complaints during post-partum period. For the purpose of this study, the WHO definition of the postpartum period (From delivery until 6 weeks after delivery) was used as the time period for inclusion criteria. We included the postpartum women admitted with postpartum problem, who were delivered in other hospital and referred for postoperative complications and further management, also included patients less than 20 weeks aborted in other hospital and patient delivered in ambulance or home and brought for further management. Women admitted for various non-obstetrical problems were carefully excluded and so were those admitted due to neonatal problems.

Ethical approval has been taken from institutional ethics committee (IEC) in February 2021.

Statistical analysis

A total of 150 subjects were studied and analyzed during this one and half-year period. A structured Performa was used to gather the information after managing and stabilizing the patients and taking verbal informed consent. Data included clinical diagnosis, demographic features, obstetrical records of index pregnancy, the complications, need of admission in NICU/ICU, blood transfusion, resuturing, surgical intervention, stay in hospital, duration of stay in ICU, blood transfusion, near miss mortality and maternal mortality and their feto-maternal outcome. Descriptive data were tabulated as absolute figures and percentages.

RESULTS

Figure 1 shows the demographic and obstetrical risk factors in our 116 subjects. Among them mean age of the referred cases was 22.7 years with 92% between the ages of 21 to 30 years. A total of 36.67% cases stayed in urban areas and 63.34% stayed in rural areas.

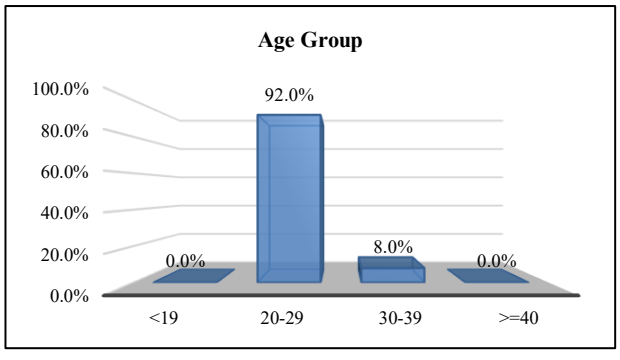

Figure 1: Distribution of study groups as per age.

Table 1: Distribution of study groups as per indication of referral.

Indications for referral		Number	Percentage
Post-partum hemorrhage	Atonic	70	46.7
	Traumatic	45	30
	Retained placenta (tissue)	31	20.66
	Others (coagulopathy)	2	1.3
Hypertensive disorders	Mild	59	39.3
	Severe preeclampsia	21	14.0
	Eclampsia	21	14.0
	HELLP	1	0.7
Puerperal pyrexia	fever (mostly dengue)	7	4.7
	fever (others)	20	13.3
	Cesarean wound discharge/dehiscence	27	18.0
	Episiotomy site discharge/dehiscence	12	8.0
Medical disorders	Anemia	105	70.0
	Heart disease	10	6.7
	Gestational diabetes mellitus	15	10.0
	Chronic kidney disease	13	8.7
Other medical disorders	Respiratory tract infection	8	5.3
	Urinary tract infection	6	4.0
	Acute renal failure	9	6.0
	Breast abscess	1	0.7
Post abortal	Fever	5	3.3
	Perforation	1	0.7
Non availability	NICU	41	27.3
	MICU	43	28.7
	Blood transfusion	97	64.67
	Anesthetist	17	11.3
	Skilled surgeons	65	43.3

Table 2: Distribution of study groups as per registration status and correlate with the indications of referral.

Indications	Registration status	Number	Percentage
PPH	Registered	18	27
	Unregistered	132	88
Hypertensive disorders	Registered	51	34
	Unregistered	99	66
Puerperal pyrexia	Registered	63	42
	Unregistered	87	58
Anemia	Registered	23	15.33
	Unregistered	127	84.67

39.3% cases were primipara while 60.7% were multipara whose gravida 2 were 50.54%, gravida 3 were 33%, and gravida more than 4 were 12%. Majority of the cases were not registered during the ANC period (88%). Amongst the ones registered 5% were graduates and educated 7% up to secondary school, while the unregistered patients were 56% illiterate and 32% with primary education status.

Table 1 shows that most patients came with one or more than one of combined indications of referral. Most common indications for referrals were pre-eclampsia/eclampsia (68%), post-partum hemorrhage (52.7%) and puerperal sepsis (26%) while anemia was observed in 70% cases. Another important aspect was non-availability of blood transfusion facilities (64.67%), skilled surgeon (43.3%), MICU (28.7%), NICU (27.3%) and anaesthetist (11.3%).

Amongst causes of postpartum hemorrhage, there were 46.7% with atonic causes, 30% with traumatic causes, 20.67% with retained placenta and 1.3% with other causes.

Table 2 shows those who were unregistered cases, amongst the indications of referral were- 88% due to PPH, 66% due to hypertensive disorders, 58% due to puerperal pyrexia and 84.67% due to anaemia.

This implies that the antenatal care and information to get registered once pregnant was lacking amongst women hence leading to anemia, preeclampsia, PPH, fever, etc. Reason for non-registration were overlapping and were as follows- lack of accessibility to the health services (48.7%), lack of funds (38%), lack of awareness (34%), lack of attendee (36.7%) and family problems (21.3%). These all were found due to illiteracy and superstitious beliefs yet in modern India in some parts of country.

Most patients had primary education 77.3%, most of which were unregistered (88%) and most with multigravidas neglecting the upcoming antenatal care due to funds, family problems and lack of attendee.

Table 3 shows that a total of 12% cases were delivered by untrained person, 7% by skilled birth attendant, 21.3% by nurses, while only 24% and 18.7% deliveries were conducted by ayurvedic doctors (BAMS/BHMS) and obstetricians respectively. The mortality of patients in our study was due to PPH, puerperal sepsis, hypertensive disorders complicated by acute renal failure were due to delivery at home, Ayurvedic practitioners and obstetricians respectively.

Table 3: Distribution of study groups as per delivery personnel and based on that percentages of patients landing into near miss mortality and mortality.

Delivered by	N (%)	Near miss mortality (33.3%)	Mortality (4%)
Untrained person /home	18 (12.0)	9.2	1
Skilled birth attendant	7 (4.7)	7.3	0
Nurse	32 (21.3)	6.4	0
Ayurvedic doctors (BHMS/BAMS)	36 (24.0)	5.1	1
MBBS doctors	29 (19.3)	3.3	0
Obstetrician	28 (18.7)	2	1
Total	150 (100.0)		

Table 4: Distribution of study groups as per duration of referral and tertiary care.

Duration between referral to tertiary care	N (%)	Blood transfusion requirement %	Intensive care unit requirement
<1 hour	39 (26.0)	12.1	No
1-3 hours	74 (49.)	28.5	No
>3 hours	37 (24.7%)	59.4	Yes
Total	150 (100.0)	100	

Table 5: Distribution of study groups as per interventions given.

Intervention	Number	Percentage
Non surgical		
Balloon tamponade	4	2.7
Dialysis	14	9.3
ICU Care	27	18.0
Drugs for reducing BP	103	68.7
Uterotonic	142	94.7
Wound culture swab	30	20.0
Surgical		
Tear repair	89	59.3
Evacuation of retained placenta	27	18
Manual removal of placenta	43	28.66
Resuturing gape wound	21	14.0
Reposition of inverted uterus	2	1.3
Hematoma drainage	18	12.0
Laparotomy	39	26.0
Hysterectomy	18	12.0
Bowel/bladder repair	8	5.3

Table 6: Distribution of study groups as per maternal complications.

Maternal complications	N	%	Most common place referred from	ICU required
Atonic PPH	54	36.0	PHC (29%)	No
Eclampsia	18	12.0	SDH (9%)	Yes
Wound gaping	11	7.3	DH (5.6%)	No
ARF + anemia	9	6.0	PRIVATE (3.4%)	No
Diabetes	9	6.0	DH (4%)	No
Pulmonary edema	9	6.0	DH (4.4%)	No
Shock	9	6.0	PHC (5.1%)	No
DIC + anemia	8	5.3	DH/PVT (4.7%)	Yes
Heart disease	5	3.3	SDH (2.8%)	No
Heart disease + pulmonary edema	3	2.0	SDH/DH (1.5%)	Yes
DIC + ARF + pulmonary edema + anemia	1	0.7	SDH/DH (0.4%)	Yes
None	86	57.3		
Total	150	100.0		

Table 4 shows that a total of 26% cases were referred within one hour of delivery while 49.3% and 24.7% were referred between 1 to 3 hours and after more than 3 hours of delivery.

In our study the more the referral time more was the requirement of blood products 59.4% (if >3 hours) of transport time, 28.5% if (1-3 hours) and 12.1% (<1 hour). This shows the delay 2 in our study of patients delivered outside if transit time increased need of ICU care was also required owing to the increase in severity of signs and symptoms and non availability of immediate postpartum care to patient.

Most of the cases were visited at least one health facility before being referred to our hospital 66.7% while first time referrals were 23.3% cases.

Table 5 shows that cases were managed as per the indication for referrals and condition of patients. Uterotonics (94.7%) were given for control of bleeding while anti-hypertensives were given to control blood pressure (68.7%). Intensive care (ICU) was required in 18% cases while dialysis was required in 9.3% cases. Tear repair was done in 59.3% cases while evacuation of retained placenta/manual removal of placenta was done in 18% and 28% respectively. Laparotomy was done in 26% cases of which hysterectomy was required in 12% cases.

Table 6 explains the maternal complications occurred in 42.7% cases. Most common maternal complications were atonic PPH (36%), eclampsia (12%), pulmonary edema (8.7%), ARF (6.7%) and DIC (6%). The maternal complications are linked to place of referral, by means of lack of sources in the center which lead to complications and not managing them, referring to delay 1 of referral.

Most commonly, referrals from district hospital were present as these complications required ICU care as they were labelled in near miss mortality and maternal mortality category.

Most of the cases require hospital stay of 2 weeks or less (92%) while in 8% cases, hospital stay was more than 2 weeks.

The stay for more than 14 days was mainly in cases of puerperal pyrexia and maternal complications such as acute renal failure complicating preeclampsia-requiring dialysis, HELLP, disseminated intravascular coagulation, mostly referred from district hospital and above, required intensive care treatment.

Incidence of maternal near miss was 33.3% while maternal mortality was seen in 2.7% cases. The patients who were discharged had antenatal visits present in nearby SDH/DH/PVT hospital, while ones with near miss mortality had lesser ANC visits in PHC/rural hospitals, hence quality antenatal care was lacking leading to morbidity and mortality in patients as the symptoms and signs weren't detected leading to anemia, preeclampsia, and other late diagnosis of medical disorders

The cause of near miss mortality in patients delivered outside and were referred to tertiary care hospital were 30% due to PPH, 44% due to hypertensive disorders mostly eclampsia, 18% due to puerperal fever due to long hospital stay, 6% due to medical disorders and co-morbidities, 2% were post-abortal cases.

Fetal complications were seen in 12% cases. 25.3% cases were low birth weight. NICU admission was required in 18.7% cases while incidence of IUFD and neonatal death were 2.7% and 4.7% respectively.

DISCUSSION

It has been repeatedly observed that in developing countries, a large population of pregnant females do not

receive any form of antenatal care; this holds true for postpartum care, as less than one-third females receive any form of postnatal care.

In our study out of 150 patients who were delivered outside and referred to Sassoon hospital 88%were unregistered. Despite various programs and schemes started by the Government, we still have a large proportion of women who deliver at home in the hands of untrained attendants.

Srivastava observed that among 210 referred cases, majority (97.6%) of were unbooked. All cases were post-delivery.[9]

In our study, the mean age of the referred cases was 22.7 years with 92% between the ages of 21 to 30 years. Most of the cases were either educated till primary (77.3%) or illiterate (7.3%). Only 15.3% cases were educated till secondary level. A total of 36.67% cases stayed in urban areas and 63.34% stayed in rural areas. A total of 39.3% cases were primi-para while 60.7% were multi-para, of which, gravida 2 were 50.54%, gravid 3 were 33%, gravid more than 4 were 12%.

Charu reviewed the referred obstetric cases for reasons of referral and to study the maternal and perinatal outcome. Most of the cases were in the age group of 21 to 30 years and multi-para.[10]

In our study, majority of the cases were not registered during the ANC period (88%). Srivastava observed that among 210 referred cases, majority (97.6%) of were unbooked. All cases were post-delivery.[9]

Most common indication for referrals were pre-eclampsia/ eclampsia (68%), post-partum haemorrhage (52.7%) and puerperal sepsis (26%) while anaemia was observed in 70% cases. Most common presenting symptom was PV bleed (58%), fever (22.7%), pain in abdomen and foul-smelling discharge (22% each). Most common signs were pallor (74%), raised blood pressure (20%) and hypotension (18%).

Charu et al study observed that majority of the cases were referred for hypertensive disorders of pregnancy (26%), preterm labour (26%), and medical disorders complicating pregnancy (21%). Anemia was present in 46% of all patients.[10]

Bibi et al reported that the most common conditions responsible for life threatening complications were PPH (50%), preeclampsia and eclampsia (30%) and puerperal pyrexia 14%. Anemia was associated problem in 100% of cases.[6]

Srivastava observed common morbidities among the postpartum women for which they sought medical services were postpartum hemorrhage (49%), puerperal pyrexia/sepsis (25.6%), followed by preeclampsia/eclampsia (11%). Commonest type of postpartum hemorrhage was atonic, seen in 57.2% followed by traumatic type which accounted for 36.8% of total PPH cases.[9]

In our study, almost a third of the deliveries (32.7%) took place in PHC, while 21.3% and 17.3% took place in rural hospital and private health facilities respectively. A total of 13.3% and 12% delivered in district hospital and home. Most common site of referrals were from PHC (32.7%), rural hospital and sub district hospital (18.7% each). In our study the more the referral time more was the requirement of blood products 59.4% (if >3 hours) of transport time, 28.5% if (1-3 hours) and 12.1% (<1 hour). This shows the delay 2 in our study of patients delivered outside if transit time increased need of ICU care was also required owing to the increase in severity of signs and symptoms and non availability of immediate postpartum care to patient.

Charu observed that 67% patients were from urban area and 33% from rural area. Patel et al observed that 41% of cases were referred from PHCs from sub-urban areas within a 50 km radius of the city. PHCs and UHTCs within city limits referred 28% of the cases while a minority of cases was referred from rural PHCs. 27% patients were referred from private hospitals.[10]

Our study shows that the patients falling to near miss mortality were 9.2% due to untrained person/home delivery lacking antenatal registration and monitoring of hemoglobin, urine, foetal and maternal growth and blood pressure, 7.3% near miss due to skilled birth attendant, 6.4% by nurses, and 5.1%, 3.3%, 2% by ayurvedic doctors, MBBS doctors and obstetricians respectively.

Srivastava observed that58.6% women had home delivery whereas 26.7% delivered at private health facility, 13.7% women had delivered at public health facility and 1% women delivered on the way to the hospital. 59.1% deliveries were conducted by untrained birth attendants whereas 40.9% women were delivered by trained attendants or doctors.[9]

In our study, cases were managed as per the indication for referrals and condition of patients. Uterotonics (94.7%) were given for control of bleeding while anti-hypertensives were given to control blood pressure (68.7%). ICU care was required in 18% cases while dialysis was required in 9.3% cases. Tear repair was done in 59.3% cases while evacuation of retained placenta/ manual removal of placenta was done in 18% and 28% respectively. Laparotomy was done in 26% cases of which hysterectomy was required in 12% cases.

Charu study observed that 42% patients required blood or blood product transfusion while ICU care was required in 8% cases. Subtotal hysterectomy was performed in 1% of patients for PPH. The authors observed mortality rate as 7 cases (7%). The time interval between referral and arrival was 12-24 hours in 4 (57.2%) patients and more than 24 hours in 3 (42.8%) patients.[10]

Maternal complications occurred in 42.7% cases. Most common maternal complications were atonic PPH (36%), eclampsia (12%), pulmonary edema (8.7%), ARF (6.7%) and DIC (6%). The maternal complications are linked to place of referral, by means of lack of sources in the centre which lead to complications and not managing them, referring to delay 1 of referral. In our study, PCV transfusion was required in 74.7% cases while FFP was required in 71.3% cases.

Srivastava observed that 79 patients (37.6%) were managed surgically and 62.3% underwent nonsurgical management. Genital tract injuries were repaired in 15.7%, evacuation of retained products in 9%, manual removal of placenta in 5.7%, exploratory laparotomy and hysterectomy done in 4 patients (1.9%), laparotomy. A total of 113 women (53.6%) received blood transfusion, 1-3 units of blood was given in 44.7% of cases, 4-6 units blood was given in 7.1% of cases and more than 6 units of blood was given in 2% of cases. 25 (12%) women required ICU admission. Most common maternal complications were PPH (33.3%), sepsis (24.2%), eclampsia (18.2%), and DIC (12.1%). They reported maternal mortality as 15.7%.[9]

Most of the cases require hospital stay of 2 weeks or less (92%) while in 8% cases, hospital stay was more than 2 weeks. Incidence of maternal near miss was 33.3% while maternal mortality was seen in 2.7% cases. Cause of death was severe pre-eclampsia, ARF and DIC combination in 2 cases while one case each expired due to PPH and sepsis. In 3 out of 4 maternal deaths, the time interval for referral was delayed for over 3 hours and all of them visited another health facility before arriving at our hospital. The cause of near miss mortality in patients delivered outside and were referred to tertiary care hospital were 30% due to PPH, 44% due to hypertensive disorders mostly eclampsia, 18% due to puerperal fever due to long hospital stay, 6% due to medical disorders and co-morbidities, 2% were post-abortal cases. In our study, reasons for near miss mortality included lack of ANC care in form of non-detection of anemia, de-worming, anemia management, lack of blood pressure monitoring, lack of perineal care, lack of postoperative care and intra-operative aseptic precautions, lack of detection, lack of proper expertise.

Kaur reported similar trends in maternal mortality ratio in a tertiary referral hospital. They found that hemorrhage (24.12%) and sepsis (18.96%) were the two most common direct cause of deaths followed closely by pregnancy induced hypertension including eclampsia (15.5%). DIC was the cause of death in 8.6% of cases and amniotic fluid embolism and pulmonary embolism were the suspected causes in 1.72% and 5.17% of cases respectively.[11]

Jakhar observed most common cause of maternal morbidity as anemia in 188 cases (51.09%) followed by postpartum haemorrhage (PPH) which was seen in 67 (18.20%) and vaginal wall tear was seen in58 (15.77%) cases. There were 9 maternal mortalities (2.44%), 3 maternal deaths were due to IHS + PPH + DIC (disseminated intravascular coagulation). Secondary PPH + DIC + shock caused 2 deaths.[12]

Verma et al observed maternal mortality rate as 2.5% among the referred cases (n-3). Cause of death was PIH + DIC in 2 cases while one case succumbed to death due to postpartum haemorrhage with shock.[13]

In our study, foetal complications were seen in 12% cases. A total of 25.3% cases were low birth weight. NICU admission was required in 18.7% cases while incidence of IUFD and neonatal death were 2.7% and 4.7% respectively.

Charu observed that out of total births 90% of births were live births while 9.1% were stillbirths. Of the total live born neonates 62.37% required nursery-care while 37.67% were shifted with mother after delivery. Neonatal mortality in this study was 16%.[10]

The limitations of this study were the poor maternal outcome was observed to be more in cases with delayed referrals. The need to focus on the quality of postpartum care is equally important as prenatal care is quite sometimes not addressed well. The first referral units should be equipped to provide round-the-clock services for emergency obstetric and newborn care which many times is lacking. Postpartum counselling for women and reg flag signs for referral should be made aware to patient and skilled birth attendant. Maternal mortality audits are taken lightly in rural areas.[15]

CONCLUSION

Present study aimed to evaluate the pattern and indications of patients delivered outside and referred at tertiary care hospital and see the maternal and foetal outcome in such cases. The study highlighted the need to focus on the quality of postpartum care is equally important as prenatal care. Quality antenatal care in means of early antenatal registration, follow-up and getting women to hospitals for registration is work of the ASHA worker so that home deliveries are minimized. The two pointers to be checked during antenatal visit is blood pressure and haemoglobin, to decide the course of preeclampsia or anaemia in a patient and timely treatment and follow-up can improve intra-partum and postpartum wellbeing in form of improved maternal and foetal outcome. The first referral units should be equipped to provide round-the-clock services for emergency obstetric and newborn care. There should be blood products availability, availability of anaesthetist, intensive care unit (ICU), skilled obstetrician in these first referral units to treat complications of delivery in the golden hour itself. The importance of post-partum care should be emphasized. Efforts to decrease maternal mortality and morbidity should focus on high-risk mothers not only during pregnancy and delivery but also during the postpartum period. WHO recommends that a woman not be discharged before 24 hours after birth.

Many complications can occur in the first 24 hours. If the birth was at a facility, mother and baby should receive a postnatal examination before discharge and early referral if needed. Postpartum counselling for women and skilled birth attendant to refer cases like increased per vaginal bleeding, fits, fast/difficulty in breathing, fever, malaise, severe headaches with blurred visions, calf pain, chest pain, swollen/tender breasts, problems of urination, increased pain/infection in perineum, infection in area of wound, smelly vaginal discharge, severe depression, such red flag signs and symptoms should alert for referral to tertiary care to avoid further complications. Also, timely referral, avoiding delays, providing appropriate transport, noting the place of delivery and referral time and place, time taken between referrals should be noted so as to improve maternal and neonatal outcome. Maternal mortality audits should be held, attended by the whole staff involved in the care of pregnant women, particularly in preventable cases and accountability should be discussed to avoid future mishaps. Since postpartum haemorrhage was the most frequent cause of admission in our study and many others, prevention and detection of this condition is of utmost importance. Another extremely important factor, particularly in the developing countries, is an action on the modifiable variables, such as illiteracy and malnutrition, as they contribute indirectly but majorly to the postpartum maternal complications. Also, antenatal steroids and tocolysis to mother in first referral unit itself can minimize the preterm births, need of neonatal ICU and hence decrease neonatal morbidity and mortality. In improving postpartum care, effective programs for health education and iron supplementation are also very important. However, ensuring that all deliveries are conducted by skilled birth attendants is most important so that timely and appropriate identification and management of obstetric complications or referral to centres which can manage the complications can be done.

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