ISSN: 2091-2889 (online)
2091-2412 (print)

Received: 18 Sep 2025
Accepted: 18 Oct 2025
Published: 31 Oct 2025

DOI: 10.54530/jcmc.1796

OPEN ACCESS

Maternal and foetal outcomes in referred obstetric cases at a tertiary care centre in Lumbini Province, Nepal

Jigyasa Subedi[1], Tara KC[1], Deepanjali Sharma[2], Manoj Lamsal[2], Hasina Banu[1], Sabnam Thakur[1], Vivek Chaube[1], Bekha Laxmi Manandhar[3]

[1]Lecturer, [2]Associate Professor, [3]Professor, Department of Obstetrics and Gynaecology, UCMS, Nepal

Peer reviewed

Abstract

Introduction: An effective referral system is essential for ensuring continuity of obstetric care to prevent maternal morbidity and mortality. This study was conducted with an objective to find out reasons for obstetric referrals, maternal and perinatal outcome in a tertiary care centre of Nepal.
Method: This descriptive, cross-sectional study was conducted at Universal College of Medical Sciences Nepal, from 01 Oct 2021 to 31 Mar 2022. The study analysed obstetric referral cases, focusing on referral indications, clinical examinations, investigations, and interventions performed. Referred antenatal and intrapartum cases of gestational age ≥28 weeks who delivered at study centre was included. Postpartum cases, gestation <28 weeks, undocumented referrals, follow-up cases booked at study centre, and gynaecological referrals were excluded. Data were analysed descriptively for frequencies, percentages, and means using SPSS-20.

Result: Out of 403 referred cases that met inclusion criteria (25.6% out of a total of 1573 deliveries), 191(47.3%) were in the age group of 20-24 years. The main reasons for referral were for better facilities (safe delivery) 115(28.6%), preterm labour 105(26.1%), preeclampsia 34(8.5%), and malpresentation 20(5%). Lower segment caesarean section was the common mode of delivery 202(50.1%). Postpartum haemorrhage 37(9.2%) was a common complication. Total of 79(19.6%) neonates required NICU admission. There were 3(0.7%) maternal deaths.

Conclusion: Better facilities, preterm labour, preeclampsia, and malpresentations were causes of obstetrics referrals. High caesarean rate and NICU admission rates reflect case severity. However, maternal deaths and stillbirths persisted despite of advanced care.

How to cite

Subedi J, KC T, Sharma D, Lamsal M, Banu H, Thakur S, Chaube V, Manandhar BL. Maternal and foetal outcomes in referred obstetric cases at a tertiary care centre in Lumbini Province, Nepal. Journal of Chitwan Medical College. 2025;15(55):84-92.

Correspondence

Dr. Jigyasa Subedi, Department of Obstetrics and Gynaecology, Universal College of Medical Sciences, Siddharthanagar, Rupandehi, Lumbini Province, Nepal.
Email: subedijigyasa407@gmail.com, Telephone: +977 9851234791

Introduction

Maternal, perinatal, and infant mortality are important health parameters for the human development index, health, and economic condition of a country.[1] In 2023, maternal mortality rate (MMR) was 142 deaths per 100,000 live births in Nepal, a 71% decline compared to 2000 AD.[2] This improvement has been credited mainly to safe motherhood program and female community health volunteer program.[3]

Sustainable development goal program targets MMR of <70 per 100,000 live births by 2030.[4] The program targets improving the skills and competencies of health workers, health facilities and accessibility through geographical coverage of services, referral system, provision of emergency referral vehicles, establishing maternity homes, supporting 24-hour availability of health facilities, promoting social and health system accountability, and ensuring the quality of protocols and clinical guidelines.[3]

The collaboration with medical colleges and public health institutions has been one of the important practices by the governments to implement national health plans.[5,6] Universal College of Medical Sciences and Teaching Hospital (UCMS) has been a potential tertiary referral obstetric centre in Lumbini Province of Nepal. This study aims to find out the main reasons and the patterns of referrals from other health institutions and the maternal and foetal outcomes.

Method

This was an observational, descriptive, cross-sectional study conducted at UCMS, a tertiary care hospital of Lumbini Province, Nepal, during 01 Oct 2021 to 31 Mar 2022. The study was approved by the institutional review committee (UCMS/IRC/165/21). All referred antenatal and intrapartum pregnant women after 28 weeks of pregnancy delivering at study centre were included. Written consent was obtained. Exclusion criteria were postpartum cases, pregnancy <28 weeks, lack of written referral, pregnancy on follow-up antenatal checkup in the study hospital after early referral, and gynaecological referral cases.

Sample size was calculated by using the Cochran's formula, $n=Z^2xpx(1-p)/e^2$ where n is the sample size, Z confidence interval (1.96), e margin of error (5%), p prevalence of 0.478.[7] With an additional 5% attrition, the sample size was 403.

A detailed history from patient was taken. All the referral notes and summary papers were analysed. A thorough examination and investigations performed as per this hospital's protocols. Socio-demographic profile, timing of referrals, duration of stay, causes of referral, and mode of delivery were documented. Maternal outcome was assessed for morbidities and mortality. In this study, term "better facilities" was considered for those cases with no obvious documented reason, but only for safe delivery.

Neonatal outcome was assessed by birth weight, term or preterm, live birth, stillbirth, congenital anomalies, APGAR score at 5 m, need for resuscitation (suction and stimulation, bag and mask ventilation, chest compression and intubation), neonatal intensive care unit (NICU) admission, and neonatal death within 72 hours.

Structured proformas were used to collect data from referral papers, patients' files, and hospital records. Data were tabulated in Microsoft Excel and analysed in SPSS-20. Descriptive statistics such as frequencies, percentages, and means were calculated.

Result

Out of 403 referred obstetric cases that fulfilled the inclusion criteria (total 1573 deliveries), indicating 25.6% obstetric referrals from other health facilities.

In this study, majority 191(47.3%) were in the age group of 20-24 y, and few in extremes of age i.e. 17(4.2%) aged ≥35, and 16(3.9%) ≤19 y, Figure 1.

Gravidity analysis showed that 203(50%) were primigravida, 164(41%)) multigravida and 36(9%) grand multigravidas.

In terms of education status, 256(63.6%) were illiterate, and 17(4.2%) graduation and above, Table 1. Among the various comorbidities, most common was anaemia in 106(26.3%), while 216(53.6%) did not have any medical comorbidities, Table 1.

Timing of referrals was equally distributed, with 195(48.3%) between 7 am to 7 pm and 208(51.7%) between 7 pm to 7 am. District hospitals referred 182(45.2%) and private hospitals 30(7.3%). Most referred patients, 185(45.9%) stayed for more than 3 days. Delivery outcomes included lower segment caesarean sections (LSCS) 202(50.1%), and exploratory laparotomy with repair of ruptured uterus 1(0.2%), Table 2.

The documented obstetric causes of referral were better facilities (safe delivery) 115(28.6%), preterm labour 105(26.1%), and requiring NICU facilities 13(3.2%), Table 3.

Maternal outcomes showed that 397(98.6%) of referral cases were discharged, and 3(0.7%) expired, 2(0.5%) were referred to another centre, and 1(0.2%) was shifted to another department. Postpartum haemorrhage (PPH) occurred in 37(9.2%) of referral cases, need of blood transfusion in 32(8%), prolonged catheterization 21(5.2%), surgical site infection 17(4.2%), postpartum eclampsia 13(3.2%). However, 269(66.8%) of referred cases did not have any complication, Table 4.

Neonatal outcomes indicated that low birth weight was 156(38.7%) and appropriate for gestational age were 247(61.3%), and that of term births were 241(59.8%), preterm births 157(39%), and post term births were 5(1.2%). There were 399(99%) live births, APGAR score less than 7 in 5 m was in 83(20.6%), whereas 79(19.6%) of neonates required NICU admission and various findings regarding liquor (colour and amount), cord around the neck, Table 5.

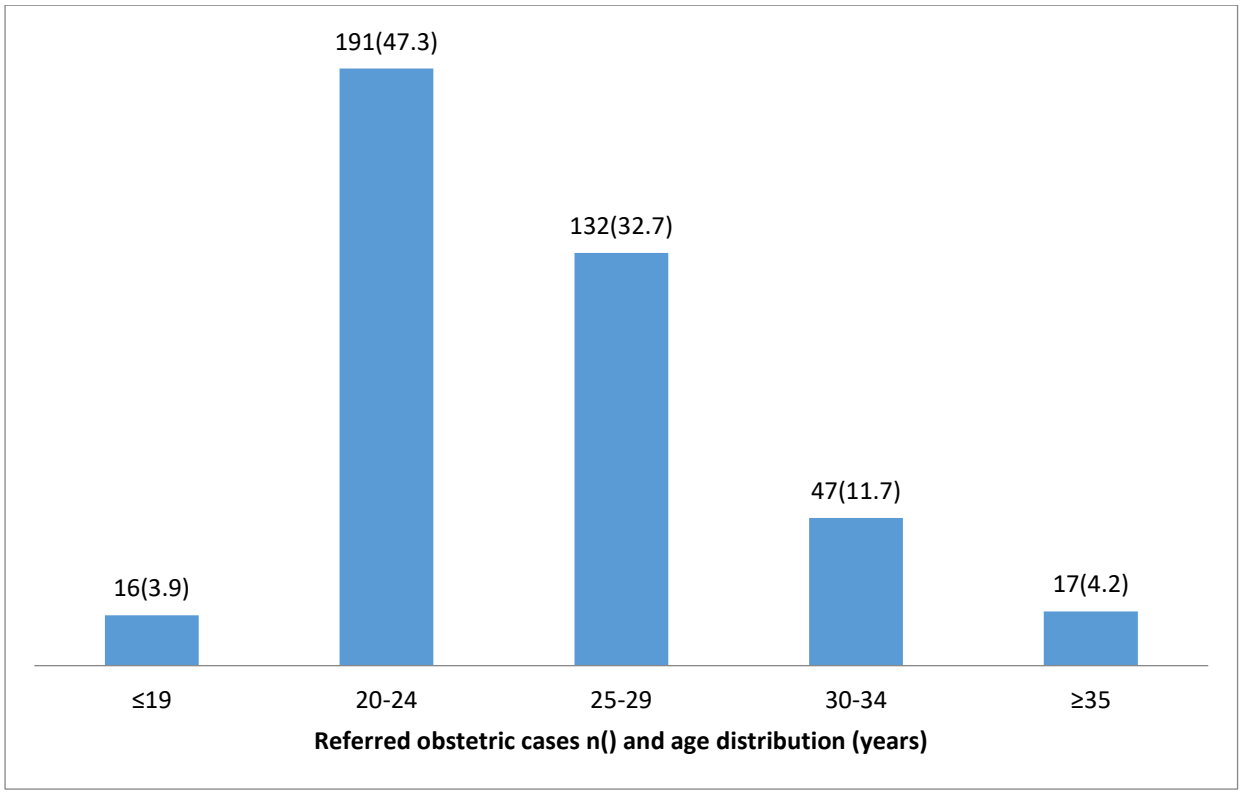

Figure 1. Age distribution of referred obstetric cases, n=403

Table 1. Distribution of referred obstetric cases according to education status and medical co-morbidities, n=403

	n(%)
Education status	
Illiterate	256(63.6)
Primary	98(24.3)
Secondary	32(7.9)
Graduation and above	17(4.2)
Medical co morbidities	
Anaemia	106(26.3)
Hypothyroidism	42(10.4)
Heart disease	7(1.7)
Diabetes mellitus	15(3.7)
Infection	17(4.3)
None	216(53.6)

Table 2. Distribution of referred obstetric cases according to timing, referral level, duration of hospital stays, and mode of delivery, n=403

	n(%)
Timing of referral	
7 a.m.-7 p.m.	195(48.3)
7 p.m.-7 a.m.	208(51.7)
Referral level	
Provincial hospital	143(35.5)
District hospital	182(45.2)
Health post	48(12)
Private hospital	30(7.3)
Duration of hospital stays	
24 h	165(40.9)
≤3 d	185(45.9)
4-7d	45(11.2)
>7 d	8(2)
Mode of Delivery	
Vaginal	173(43)
Instrumental vaginal delivery	6(1.5)
Assisted vaginal breech delivery	14(3.5)
Caesarean section (LSCS)	202(50.1)
Vaginal birth after caesarean (VBAC)	7(1.7)
Exploratory laparotomy with repair of ruptured uterus	1(0.2)

Table 3. Distribution of referred obstetric cases according to causes of referral, n=403

Causes of referral	n(%)
Preterm labour	105(26.1)
Preeclampsia	34(8.5)
Better facilities (safe delivery)	115(28.6)
Premature rupture of membranes (PROM)	5(1.3)
Malpresentation	20(5.0)
Eclampsia	17(4.2)
Oligohydramnios	18(4.5)
Prolonged labour	7(1.7)
Obstructed labour	8(2.0)
Rupture uterus	1(0.2)
History of LSCS in labour	4(1.0)
Meconium stained liquor	13(3.2)
Bad obstetric history	11(2.3)
Neonatal ICU	13(3.2)
Post term	8(2.0)
Cervical polyp	1(0.2)
Intrauterine foetal death	2(0.5)
Decreased foetal movement	8(2.0)
Antepartum haemorrhage	3(0.7)
Heart Disease	3(0.7)
Polyhydramnios	3(0.7)
Big baby	1(0.2)
Busy operation room	3(0.7)

Table 4. Distribution of referred obstetric cases according to maternal outcome, n=403

	n(%)
Maternal outcome	
Discharge	397(98.6)
Shift to another department	1(0.2)
Expired	3(0.7)
Referred to another centre	2(0.5)
Maternal Complications	
Postpartum haemorrhage	37(9.2)
Postpartum eclampsia	13(3.2)
Prolonged catheterization	21(5.2)
Surgical site Infection	17(4.2)
Need of blood transfusion	32(8)
Pulmonary oedema	5(1.2)
Acute kidney injury	4(1)
Perineal tear (3^{rd} and 4^{th} degree)	5(1.2)
None	269(66.8)

Table 5. Foetal outcomes of referred obstetric cases, n=403

	n(%)
Birth weight	
<2500gm	156(38.7)
>2500gm	247(61.3)
Gestational age	
Preterm	157(39)
Term	241(59.8)
Post term	5(1.2)
NICU Admission	
Yes	79(19.6)
Observation	51(12.7)
No	273(67.7)
Status of foetus	
Live birth	399(99.0)
Still birth	2(0.5)
IUFD	2(0.5)
Congenital anomalies (grossly)	0
Liquor	
Clear	335(83.1)
Meconium	63(15.7)
Haemorrhagic	5(1.2)
Amount	
Adequate	287(71.2)
Scanty	104(25.8)
Excessive	12(3)
Apgar Score	
Normal at 5 m	320(79.4)
<7 in 5 m	83(20.6)
Cord around the neck	
No	316(78.4)
Yes	87(21.6)
Resuscitation	
No	298(73.9)
Yes	105(26.1)

Discussion

The referred cases to the study centre accounted for 25.6% i.e., 403 cases out of a total of 1573 deliveries. Referrals included mainly preterm labour, preeclampsia, malpresentations, and case severity evident from high caesarean rate and NICU admissions. The referral rates in other studies ranged from 47.8%[7] and 16.4%[8] as reported from India.

In Nepal, healthcare facilities are categorized into three tiers: primary, secondary, and tertiary care. In this study, the majority of referrals were from district hospitals 182(45.2%) and provincial hospitals 143(35.5%), while only 48(12%) came from primary health centres. A similar trend was observed in another study where high-risk pregnant women were referred mostly from primary health care centres 82(49%), followed by district hospitals 56(33.5%), and medical college hospitals 29(17.3%).[9] This reflects the government's "upfront referral" strategy in maternal and child healthcare. However, primary facilities often bypass intermediate levels, directly referring to tertiary centres, possibly due to limited capacity or confidence.

The mean age of referred patients was 25±4.2 years, with primigravida accounting for 203(50.4%). In contrast, an Indian study noted a similar mean age but a higher proportion of multigravida (59.4%).[8] High-risk age referrals included 17(4.2%) above 35 years and 16 cases (3.9%) below 20 years, comparable to Indian[8,10]

studies (16.4% and 18.3%) and a Nepalese[11] study (26%).

Analysis of the timing of referrals showed a roughly equal distribution between 7 a.m. to 7 p.m. 195(48.3%), and 7 pm to 7 am 208(51.7%) which is consistent with findings from another study reporting 48.2% of referrals between 8 am and 8 pm, and 51.2% between 8 pm and 8 am.[12]

In our study, 115(28.6%) were referred for better facilities, as 24-hour high-risk obstetrics and neonatal care facilities are available in the hospital, highlighting the ongoing inadequacies in district and private hospitals. This finding aligns with a Nepalese study where the lack of perinatal care facilities was the leading cause of referrals.[13] Similarly, a study from Pakistan noted that only 61% of referrals were due to obstetric complications, while the rest were linked to coexisting medical conditions.[14]

Regarding timing, referrals can occur at any point in the antenatal period. One Indian study reported that 56.3% of referrals were antepartum, 37.9% intrapartum, and 4.5% postpartum.[8] Our study included only cases after 28 weeks' gestation who delivered during the index admission to ensure consistency in clinical management and outcome assessment.

The obstetric causes of referral were better facilities (safe delivery) 115(28.6%), preterm labour 105(26.1%), preeclampsia 34(8.5%), malpresentation 20(5%), oligohydramnios 18(4.5%), and meconium-stained liquor 13(3.2%). The most common causes enlisted were pregnancy induced hypertension, preterm labour, and foetal causes by a previous study.[14] hypertensive disorder of pregnancy, previous LSCS, and PPH in an Indian[12] study and previous LSCS, hypothyroidism, and gestational diabetes in a Nepalese study.[11]

Common medical morbidities noted were anaemia 106(26.3%), hypothyroidism 42(10.4%), infection 17(4.3%) diabetes 15(3.7%) and heart disease 7(1.7%). These differ from other studies, a Nepalese[13] study reported heart disease (20%) and hypertensive disorders (17%), while a Pakistani[14] study highlighted viral infections (27%), and an Indian[8] study noted a high prevalence of anaemia (78.4%).

Regarding mode of delivery, 202(50.1%) underwent LSCS, which is lower than 69% in a Pakistani[14] study and 78% in a Nepalese study. Patients were encouraged for vaginal deliveries, accounted 173(43%), assisted vaginal breech deliveries 7(3.5%), VBAC 7(1.7%), instrumental deliveries 6(1.5%), Exploratory laparotomy with repair of ruptured uterus 1(0.2%). Maternal mortality was low, with 3 deaths (0.2%), consistent with other studies from Southeast Asia (1.3%, 0.5% and 0.8%[13]).[8,12,13] Most patients 185(45.9%) were discharged within 72 hours, while 8(2%) required prolonged hospitalization due to complications such as PPH, postpartum eclampsia, surgical site infection, blood transfusion, AKI, and perineal tears.

Regarding neonatal outcomes, 156(38.7%) were low birth weight, higher than 13.9% in a Nepalese[11] study and 27.7% in an Indian[8] study. Preterm births were 157(39%), compared to 28.2%[8] in another study. Low APGAR scores were seen in 83(20.6%) and NICU admissions in 79(19.6%), lower than 42% reported in a Nepalese study.[13] The live birth rate was 399(99.0%) with 2(0.5%) stillbirths, similar to stillbirth rates in a study from Nepal[13] at 4% and from India[8] at 6.8%.

There was a high level of illiteracy 256(63.6%) among referred patients. Previous studies have shown that illiteracy, lack of awareness, and poor infrastructure contribute significantly to adverse pregnancy outcomes.[12] As noted in other Indian and African studies, social interventions, community education, and improved referral communication, such as mobile technology, referral slips, and the use of triage checklists, can enhance timely and appropriate referrals.[15,16] In Nepal, the implementation of rural obstetric ultrasound programs has improved early detection and reduced complications through timely referrals.[17] The study demonstrates the High-risk obstetric case load and emphasizes the importance of timely and well-documented referrals with clear clinical information to improve maternal and neonatal outcomes, particularly in resource-limited settings.

Conclusion

This study highlights the significant burden of high-risk obstetric conditions among referred cases, with preterm labour (26.1%), preeclampsia (8.5%), and malpresentation (5%) being the leading causes for referral. The high rate of lower segment caesarean sections (50.1%) reflects both the severity of maternal and foetal conditions, necessitating timely referral and intervention. A high rate of NICU admission (19.6%) of newborns indicates prompt referral and management for better outcomes. Despite the availability of modern medical infrastructure present study encountered maternal mortality (0.7%, 3 cases), and stillbirths (0.5%, 2 cases).

Author contribution

Conception, design: JS, TKC; Data acquisition: JS, DS; Data analysis, interpretation: JS, ML; Drafting: JS, HB; Revision: JS, TKC, ST, VC; Final approval of the version to be published: JS, TKC, DS, ML, HB, ST, VC, BLM; Agreement to be accountable for all aspects of the work: JS, TKC, DS, ML, HB, ST, VC, BLM

Acknowledgment

We thank Associate Professor Mr. Chetkant Bhusal for advice on statistical analysis.

Conflict of interest

None

Funding

None

Supplementary material

Data and supplementary material that support the findings of this study are available from the corresponding author upon reasonable request.

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