International Journal of Research in Medical Sciences
Gautam A et al. Int J Res Med Sci. 2026 Oct;14(10):4782-4789
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20263553

Case Series

Comprehensive emergency obstetric and newborn care at a rural community health centre in Northern India: a case series and quality improvement experience

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Received: 30 July 2026
Revised: 04 September 2026
Accepted: 17 September 2026

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ABSTRACT

Maternal mortality remains a significant public health challenge in low- and middle-income countries. Maternal sepsis, severe anaemia, delayed referral, and inadequate access to emergency obstetric care continue to contribute to maternal and neonatal morbidity, particularly in rural India. Strengthening Comprehensive Emergency Obstetric and Newborn Care (CEmONC) services at Community Health Centres (CHCs) is essential for improving pregnancy outcomes and reducing preventable maternal deaths. This case series describes five representative maternal health interventions undertaken at Community Health Centre (CHC) Faridpur, Bareilly, Uttar Pradesh. The series includes emergency management of maternal sepsis with severe anaemia, life-saving emergency caesarean section in a critically ill pregnant woman following unsuccessful referral, implementation of a telephonic follow-up system for high-risk pregnancies, promotion of respectful maternity care through innovative discharge practices, and strengthening of institutional delivery services. Timely clinical assessment, multidisciplinary teamwork, adherence to evidence-based obstetric protocols, and patient-centred care resulted in favourable maternal and neonatal outcomes while improving continuity of antenatal care and community confidence in public health services. This case series demonstrates that strengthened emergency obstetric services, early recognition of high-risk conditions, coordinated multidisciplinary management, and innovative maternal health interventions can substantially improve maternal and neonatal outcomes in rural secondary healthcare settings. The experiences from CHC Faridpur provide a practical model for enhancing quality maternity care in resource-constrained environments.

Keywords: Maternal sepsis, Emergency caesarean section, High-risk pregnancy, Institutional delivery, Rural health, Respectful maternity care, Community health centre, Case series

INTRODUCTION

Maternal health continues to be one of the most important indicators of health system performance worldwide. Although significant reductions in maternal mortality have been achieved over the past two decades, nearly 95% of maternal deaths continue to occur in low and middle-income countries, where preventable complications during pregnancy and childbirth remain common. The leading direct causes of maternal mortality include postpartum haemorrhage, hypertensive disorders of pregnancy,

maternal sepsis, obstructed labour, unsafe abortion, and severe anaemia.[1]

India has achieved substantial improvement in maternal health through programmes such as the National Health Mission (NHM), Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram (JSSK), LaQshya, and the expansion of Comprehensive Emergency Obstetric and Newborn Care (CEmONC) services. These initiatives have contributed to increased institutional deliveries, improved antenatal care coverage, enhanced availability of skilled birth attendants, and better emergency referral systems. Consequently, India's Maternal Mortality Ratio (MMR) has declined considerably over the past decade.[2]

Despite these achievements, challenges remain in rural regions where delayed healthcare-seeking behaviour, transportation barriers, socioeconomic constraints, severe nutritional anaemia, infections, and inadequate awareness continue to increase maternal and neonatal risks. Secondary-level healthcare institutions such as Community Health Centres are often the first facilities capable of providing comprehensive emergency obstetric care, including emergency caesarean section, blood transfusion linkages, newborn resuscitation, and stabilization before referral.[3]

Community Health Centre Faridpur, Bareilly, Uttar Pradesh, has strengthened its emergency obstetric services through continuous quality improvement, availability of round-the-clock obstetric care, multidisciplinary teamwork, systematic follow-up of high-risk pregnancies, respectful maternity care initiatives, and community engagement. Alongside clinical management of obstetric emergencies, innovative interventions such as a dedicated maternal call-centre and patient-centred discharge practices have enhanced trust in public healthcare services and promoted institutional childbirth.

The present case series highlights five representative clinical and public health experiences from CHC Faridpur that collectively demonstrate the impact of comprehensive emergency obstetric care, evidence-based clinical decision-making, and health system innovations on improving maternal and neonatal outcomes in a rural Indian setting.

CASE SERIES

Case 1: Successful management of maternal sepsis with severe anaemia by emergency caesarean section

A 26-year-old multigravida at term gestation presented to the labour room of Community Health Centre (CHC) Faridpur with complaints of high-grade fever, generalized weakness, lower abdominal pain, decreased fetal movements, and progressive breathlessness. On examination, she appeared toxic, markedly pale, dehydrated, and tachycardic. Her pulse rate was 124 beats/minute, blood pressure was 90/60 mmHg, respiratory rate was 26 breaths/minute, and body temperature was 39°C. Obstetric examination revealed uterine tenderness, irregular uterine contractions, and fetal heart rate abnormalities suggestive of fetal compromise. Clinical findings were consistent with maternal sepsis complicated by severe anaemia.

Immediate resuscitation was initiated according to standard emergency obstetric protocols. Intravenous crystalloids, oxygen therapy, empirical broad-spectrum intravenous antibiotics, antipyretics, and continuous maternal and fetal monitoring were commenced. Laboratory investigations confirmed severe anaemia, while the overall clinical condition indicated a high risk of septic shock. Considering maternal instability and evidence of fetal distress, emergency lower segment caesarean section (LSCS) was planned after obtaining informed high-risk consent from the patient's relatives.

The operation was performed under close anaesthetic monitoring by a multidisciplinary team comprising obstetricians, anaesthetists, nursing officers, operation theatre staff, laboratory personnel, and newborn care providers. A live healthy neonate was delivered successfully with satisfactory Apgar scores. Intensive postoperative monitoring, continuation of intravenous antibiotics, haemodynamic support, correction of anaemia, nutritional rehabilitation, and breastfeeding counselling resulted in progressive maternal recovery. Both mother and newborn were discharged in stable condition after clinical improvement.

This case highlighted the importance of early recognition of maternal sepsis, prompt multidisciplinary intervention, adherence to evidence-based sepsis management protocols, and timely emergency caesarean delivery in preventing maternal and neonatal mortality. The successful outcome demonstrated that comprehensive emergency obstetric services can be effectively delivered at a rural Community Health Centre when supported by trained personnel and coordinated teamwork.

Case 2: Life-saving emergency caesarean section following delayed referral.

A 24-year-old pregnant woman with severe pallor, prolonged labour pain, and generalized weakness arrived at CHC Faridpur in a critically ill condition. She had received irregular antenatal care and was suspected to have severe nutritional anaemia. On examination, maternal tachycardia, hypotension, exhaustion, and poor uterine contractions were noted. The fetus demonstrated persistent heart rate abnormalities indicating impending fetal compromise.

Considering the high-risk clinical status, referral to a tertiary care hospital was advised. However, because of financial constraints, transportation issues, and reluctance of family members, referral could not be completed. During counselling, the patient's husband reportedly left

the healthcare facility, leaving relatives uncertain about further management. The obstetric team continued maternal stabilization while repeatedly counselling the family regarding the risks associated with delayed intervention.

Within a short period, maternal and fetal conditions deteriorated further, necessitating an immediate decision for emergency caesarean section. After obtaining informed consent from available relatives, the multidisciplinary emergency team proceeded with surgery. Despite the challenges posed by severe anaemia and haemodynamic instability, the procedure was completed successfully, resulting in the delivery of a healthy newborn.

The mother required close postoperative monitoring, intravenous antibiotics, haematinics, nutritional supplementation, and supportive care. Her recovery remained uneventful, and the neonate was discharged in good health. This case emphasizes the importance of timely clinical judgement, continuous counselling of family members, and availability of emergency surgical services in resource-limited rural settings. Delays in referral and treatment are well-recognised contributors to maternal mortality, and strengthening secondary healthcare facilities can substantially reduce preventable adverse outcomes.

Case 3: Maternal call-centre initiative for high-risk pregnancy follow-up.

Recognising that delayed antenatal follow-up contributes significantly to maternal complications, CHC Faridpur introduced an innovative maternal call-centre model for systematic monitoring of high-risk pregnancies. The initiative was designed to maintain continuity between antenatal registration and delivery by ensuring that high-risk women did not become lost to follow-up. Dedicated healthcare workers maintained regular telephonic communication with registered pregnant women throughout pregnancy and used these contacts to reinforce planned care and identify women who required further assessment.

Women identified with severe anaemia, hypertension, diabetes, previous caesarean section, advanced maternal age, adolescent pregnancy, multiple gestation, or other obstetric risk factors were included for periodic follow-up. During telephone contacts, healthcare workers reminded beneficiaries about scheduled antenatal visits, required laboratory investigations, iron and calcium supplementation, danger signs during pregnancy, institutional delivery, and birth preparedness. Missed appointments were actively followed up rather than waiting for the woman to return independently. Women reporting concerning symptoms or requiring urgent assessment were encouraged to report immediately to the health facility.

The call-centre also provided an accessible communication channel for addressing patient concerns and reinforcing treatment compliance. This approach helped maintain communication with women living in rural and underserved areas, where transport difficulties, family circumstances, and other barriers can interfere with routine antenatal attendance. The intervention therefore functioned not only as a reminder system but also as a mechanism for early identification of follow-up needs and timely linkage with facility-based care. Improved communication between healthcare providers and beneficiaries strengthened continuity of antenatal care and confidence in public health services. The experience illustrates how a relatively simple telephonic system can be integrated with routine high-risk pregnancy surveillance at a rural secondary healthcare facility.

Recognising that delayed antenatal follow-up contributes significantly to maternal complications, CHC Faridpur introduced an innovative maternal call-centre model for systematic monitoring of high-risk pregnancies. Dedicated healthcare workers maintained regular telephonic communication with registered pregnant women throughout pregnancy.

Women identified with severe anaemia, hypertension, diabetes, previous caesarean section, advanced maternal age, adolescent pregnancy, multiple gestation, or other obstetric risk factors received periodic telephone reminders regarding antenatal visits, laboratory investigations, iron and calcium supplementation, danger signs during pregnancy, institutional delivery, and birth preparedness. Missed appointments were actively followed up, and women requiring urgent assessment were encouraged to report immediately to the health facility.

The call-centre also served as a platform for addressing patient concerns, reinforcing treatment compliance, and reducing delays in seeking care. Improved communication between healthcare providers and beneficiaries enhanced continuity of antenatal care and strengthened trust in public health services. Similar telehealth-based interventions have been shown to improve maternal health service utilisation, antenatal attendance, and timely referral of high-risk pregnancies, particularly in rural and underserved populations.

Case 4: Respectful maternity care and celebration of the birth of a girl child.

In addition to strengthening emergency obstetric care, CHC Faridpur adopted patient-centred initiatives aimed at improving the childbirth experience and promoting respectful maternity care. One such initiative involved celebrating the birth of a girl child as part of respectful care and community awareness activities. The intervention was incorporated into the institutional delivery and discharge process rather than being treated as a separate clinical service.

Following an uncomplicated institutional delivery, the mother and newborn received counselling before discharge on exclusive breastfeeding, newborn danger signs, immunisation, maternal nutrition, family planning, and postnatal care. The newborn was ceremonially welcomed, and the family was encouraged to celebrate the birth of the girl child in accordance with the principles of the Beti Bachao, Beti Padhao campaign. The approach was intended to create a positive and dignified childbirth experience while reinforcing the message that the birth of a girl child should be welcomed and valued.

The discharge process also recognised the family's participation in institutional delivery and used the interaction as an opportunity to reinforce positive community attitudes towards female children. By combining clinical counselling with a respectful and celebratory discharge experience, the facility sought to strengthen communication between healthcare workers and families and to build confidence in public maternity services. This experience demonstrates how respectful maternity care can be linked with locally relevant community messaging without compromising routine postnatal counselling and newborn care.

In addition to strengthening emergency obstetric care, CHC Faridpur adopted patient-centred initiatives aimed at improving the childbirth experience. One such innovation involved celebrating the birth of a girl child as part of respectful maternity care and community awareness activities.

Following an uncomplicated institutional delivery, the mother and newborn received comprehensive counselling on exclusive breastfeeding, newborn danger signs, immunisation, maternal nutrition, family planning, and postnatal care before discharge. The newborn was ceremonially welcomed, and the family was encouraged to celebrate the birth of the girl child in line with the principles of the Beti Bachao, Beti Padhao campaign.

The discharge process included recognition of the family's participation in institutional delivery and reinforcement of positive community attitudes towards female children. Such respectful maternity care practices improve patient satisfaction, enhance utilisation of institutional delivery services, and strengthen community confidence in public healthcare facilities. The World Health Organization recommends respectful, dignified, and woman-centred maternity care as an essential component of quality maternal health services.

Case 5: Strengthening institutional delivery services through comprehensive emergency obstetric care.

Over recent years, CHC Faridpur has strengthened institutional delivery services by improving the availability and coordination of Comprehensive Emergency Obstetric and Newborn Care services. The service model included continuous availability of skilled obstetricians, trained nursing staff, functional operation theatre services, newborn care facilities, systematic quality improvement initiatives, and coordinated teamwork. These components were integrated into routine maternity services so that women could receive assessment, stabilization, delivery care, emergency surgical intervention when required, and newborn support within the secondary-level facility.

Regular monitoring of high-risk pregnancies was combined with improved referral coordination and evidence-based labour room practices. The facility also emphasized preparedness for obstetric emergencies, infection prevention, availability of essential medicines, and adherence to Government of India maternal health guidance. Team-based functioning involving obstetric, anaesthesia, nursing, laboratory, operation theatre, ambulance, pharmacy, and newborn-care personnel supported rapid communication and decision-making when complications arose.

The strengthening of services was accompanied by community engagement and patient-centred initiatives designed to increase confidence in institutional childbirth. Women and families could therefore access emergency obstetric and newborn services closer to home, while high-risk pregnancies could be followed more systematically before delivery. The combined institutional experience was reflected in increased institutional delivery rates, improved management of obstetric emergencies, reduction in unnecessary referrals, enhanced neonatal survival, and greater patient satisfaction. The experience suggests that strengthening the readiness and coordination of a rural secondary healthcare facility can improve both emergency response capacity and routine utilisation of maternity services.

Over recent years, CHC Faridpur has demonstrated a consistent increase in institutional deliveries and emergency obstetric procedures through strengthening Comprehensive Emergency Obstetric and Newborn Care services. Continuous availability of skilled obstetricians, trained nursing staff, functional operation theatre services, newborn care facilities, systematic quality improvement initiatives, and effective teamwork contributed substantially to improved service utilisation.

Regular monitoring of high-risk pregnancies, improved referral coordination, implementation of evidence-based labour room practices, and adherence to Government of India maternal health guidelines enhanced the quality of obstetric care delivered at the facility. Community engagement activities, awareness programmes, and patient-centred innovations further increased public confidence in institutional childbirth. The combined impact of these interventions was reflected in increased institutional delivery rates, improved management of obstetric emergencies, reduction in unnecessary referrals, enhanced neonatal survival, and greater patient satisfaction. These experiences demonstrate that

strengthening secondary-level rural health facilities can contribute significantly to achieving national maternal and newborn health goals and reducing preventable maternal and neonatal morbidity and mortality.

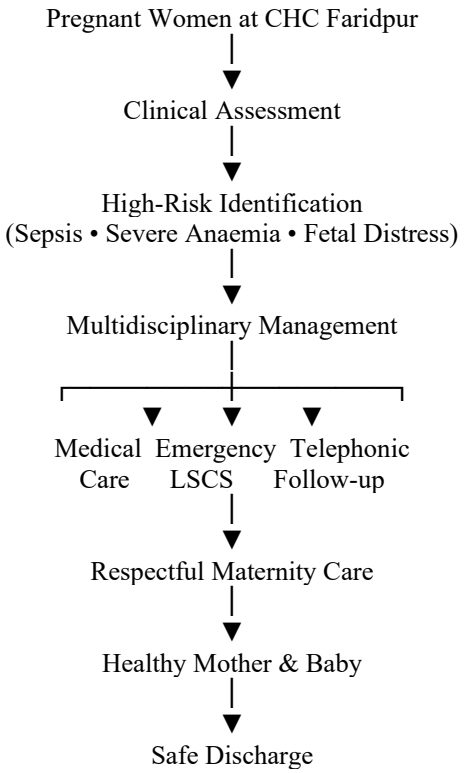

Figure 1: Overview of the case series.

This figure summarizes the clinical pathway followed for managing high-risk pregnancies at CHC Faridpur, from initial assessment and identification of obstetric complications to multidisciplinary management, respectful maternity care, and safe maternal and neonatal outcomes.

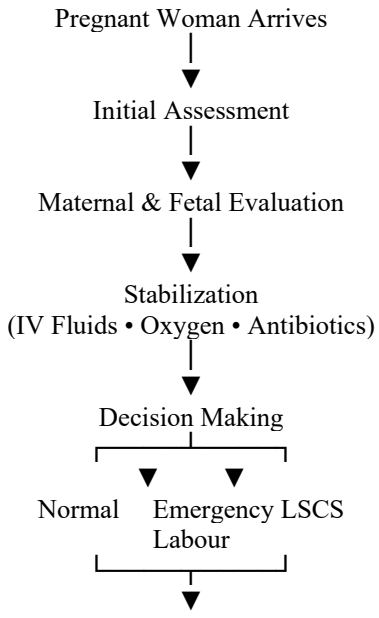

Figure 2: Emergency obstetric management algorithm.

This algorithm outlines the standardized approach to emergency obstetric care, emphasizing rapid assessment, stabilization, timely decision-making, emergency caesarean section when indicated, and comprehensive postoperative care.

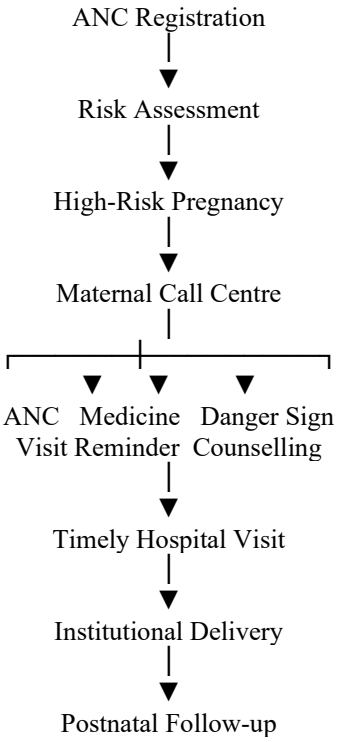

Figure 3: High-risk pregnancy follow-up model.

This figure illustrates the telephonic follow-up model implemented for high-risk pregnancies, highlighting risk identification, regular counselling and reminders, timely hospital visits, institutional delivery, and postnatal follow-up.

DISCUSSION

Maternal mortality remains a significant public health challenge despite considerable improvements in obstetric care over the past two decades. According to the World Health Organization (WHO), approximately 287,000 women died from pregnancy and childbirth-related complications globally in 2020, with nearly 95% of these deaths occurring in low and middle-income countries. Most maternal deaths are preventable through timely diagnosis, skilled obstetric care, appropriate referral systems, and access to emergency surgical interventions.[1]

India has made substantial progress in reducing maternal mortality through the National Health Mission (NHM), Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram (JSSK), LaQshya programme, and strengthening of Comprehensive Emergency Obstetric and Newborn Care (CEmONC) services. The Sample Registration System (SRS) has demonstrated a marked decline in the Maternal Mortality Ratio over recent years, reflecting improvements in institutional deliveries and access to skilled birth attendants.[2] Nevertheless, rural populations continue to experience disparities due to delayed health-seeking behaviour, transportation barriers, severe nutritional anaemia, infections, poverty, and shortages of specialist services.

The present case series demonstrates how strengthening emergency obstetric services at a rural Community Health Centre can substantially improve maternal and neonatal outcomes. Although each case differed clinically, several common themes emerged: early recognition of obstetric complications, rapid multidisciplinary response, evidence-based management, continuous monitoring, patient-centred counselling, and community engagement.

The first case illustrates the successful management of maternal sepsis complicated by severe anaemia. Maternal sepsis remains among the leading direct causes of maternal mortality worldwide. Early administration of broad-spectrum antibiotics, haemodynamic stabilisation, source control, and timely delivery are recognised as the cornerstones of management. Delayed treatment significantly increases the risk of septic shock, disseminated intravascular coagulation, multiorgan failure, stillbirth, and maternal death.[3,4] In the present case, immediate resuscitation followed by emergency caesarean section resulted in favourable maternal and neonatal outcomes despite limited resources.

The second case highlights another important contributor to maternal mortality delay in accessing definitive obstetric care. The "Three Delays Model," proposed by Thaddeus and Maine, explains that maternal deaths frequently occur because of delays in deciding to seek care, delays in reaching an appropriate health facility, and delays in receiving adequate treatment after arrival.[5] In this patient, financial constraints and inability to complete referral could have resulted in catastrophic consequences. Availability of emergency caesarean section services at the Community Health Centre enabled immediate intervention and avoided potentially fatal delays.

Another notable finding from this case series is the effectiveness of systematic follow-up through the maternal call-centre initiative. High-risk pregnancies require close surveillance to ensure timely antenatal visits, compliance with iron and calcium supplementation, early recognition of danger signs, and appropriate referral. Telephonic follow-up strengthened communication between healthcare providers and beneficiaries, reduced missed antenatal appointments and promoted institutional delivery. Similar digital and telemedicine-based interventions have demonstrated improved utilisation of maternal health services in resource-constrained settings.[6]

The respectful maternity care initiative focusing on celebration of the birth of a girl child represents an innovative approach to improving patient satisfaction while simultaneously promoting gender equity. Respectful maternity care has become an integral component of quality obstetric services. WHO recommends that every woman should receive dignified, respectful, and compassionate care throughout pregnancy and childbirth.[7] Positive childbirth experiences increase trust in healthcare institutions, improve future utilisation of institutional delivery services, and strengthen community participation in maternal health programmes.

The sustained increase in institutional deliveries observed at CHC Faridpur further supports the importance of strengthening secondary-level health facilities. Community confidence increases when women receive safe deliveries, emergency surgical care, newborn services and compassionate treatment close to their homes. Reduced unnecessary referrals also decrease financial burden on families while improving timely access to emergency care.

The success observed in these cases was largely attributable to coordinated multidisciplinary teamwork involving obstetricians, anaesthetists, nursing officers, laboratory personnel, pharmacists, operation theatre staff, ambulance services, and newborn care providers. Effective communication among team members facilitated rapid decision-making during obstetric emergencies. Similar multidisciplinary approaches have consistently been associated with improved maternal and neonatal outcomes in emergency obstetric care.[8]

This case series also highlights the role of continuous quality improvement within rural health systems. Establishment of standard treatment protocols, regular emergency drills, improved labour room preparedness, adherence to infection prevention practices, availability of essential medicines, systematic monitoring of high-risk pregnancies, and supportive leadership contributed to improved clinical outcomes. These quality improvement measures align with Government of India initiatives under LaQshya and the National Quality Assurance Standards (NQAS), which emphasise respectful maternity care, emergency preparedness, patient safety, and evidence-based clinical practices.[9]

Strengths

The present case series demonstrates real-world implementation of comprehensive emergency obstetric care in a rural secondary healthcare facility. It combines clinical management of life-threatening obstetric emergencies with health system innovations, including telephonic follow-up of high-risk pregnancies, respectful

maternity care initiatives, and strengthening of institutional delivery services. These interventions are practical, reproducible, and applicable to similar resource-constrained settings across India.

Limitations

This report describes experiences from a single Community Health Centre and therefore may not be generalisable to all healthcare settings. Detailed laboratory parameters and long-term maternal and neonatal follow-up were not available for every case because the manuscript was developed from hospital records and documented institutional experiences. Future prospective studies involving larger numbers of patients would provide stronger evidence regarding the effectiveness of these interventions.

CONCLUSION

This case series demonstrates that comprehensive emergency obstetric and newborn care can be successfully delivered at a rural Community Health Centre through timely recognition of obstetric emergencies, multidisciplinary teamwork, evidence-based clinical management, and patient-centred innovations. Successful management of maternal sepsis, emergency caesarean section in critically ill patients, systematic follow-up of high-risk pregnancies, respectful maternity care, and strengthening of institutional delivery services collectively contributed to favourable maternal and neonatal outcomes.

The experiences from CHC Faridpur highlight that investment in secondary-level emergency obstetric services can substantially reduce preventable maternal and neonatal morbidity while strengthening community confidence in public healthcare facilities. Similar models may be replicated in comparable rural settings to support India's ongoing efforts toward achieving Sustainable Development Goal 3 and further reducing maternal mortality.

Recommendations

Early recognition of maternal sepsis should be prioritized, with prompt initiation of appropriate antibiotics, resuscitation, and definitive management. Emergency caesarean delivery should not be unnecessarily delayed when there is evidence of maternal or fetal deterioration. Multidisciplinary teams should be involved in the timely assessment and management of obstetric emergencies. Telephonic follow-up should be incorporated into the care of high-risk pregnant women, particularly those living in rural or remote areas. Healthcare facilities should promote respectful maternity care to improve patient satisfaction and encourage institutional deliveries. Community Health Centres should be strengthened with adequate staffing, essential medicines, diagnostic facilities, and emergency obstetric services to improve access to quality maternal healthcare in rural India.

ACKNOWLEDGEMENTS

The authors acknowledge the Chief Medical Officer Bareilly, obstetric, anaesthesia, nursing, laboratory, operation theatre, newborn care, and National Health Mission teams of Community Health Centre Faridpur, Bareilly, for their commitment to providing quality maternal healthcare services.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: None required

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Cite this article as: Gautam A, Gautam K, shrives R, Yajurvedi VK. Comprehensive emergency obstetric and newborn care at a rural community health centre in Northern India: a case series and quality improvement experience. Int J Res Med Sci 2026;14:4782-9.