

Operational Barriers in Providing Comprehensive Emergency Obstetric Care by Task Shifting of Medical Officers in Selected States of India

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Abstract

Background: A network of first referral unit (FRU) is set up to improve the availability and accessibility of comprehensive emergency obstetric care (CEmOC) services. To fill the gap of the scarcity of obstetricians and anesthetists at FRU, two short-term trainings in CEmOC and anesthesia were started for in-service medical officers. **Objective:** This study aimed to assess the operational status of FRU in providing CEmOC services by task shifting of trained medical officers in selected states of India. **Materials and Methods:** The study was done in seven states of India. A team of experts assessed conveniently selected health facilities designated as FRU by using a semi-structured, pre-designed, and pretested checklist for CEmOC functionality status. A total of 50 designated FRUs were assessed and data were systematically analyzed. **Results:** We documented the availability of five key elements for the operationalization of CEmOC services at FRU. Out of 50 facilities, 9 (18%) reported conducting operative delivery and 11 (22%) of the facilities were fully operational with all elements available. At 9 (18%) facilities, one element and, at 17 (34%) facilities, two elements were missing. The blood storage unit was the most important missing element (68%) followed by operative facilities (36%). The challenges of FRUs remained uniform across states. Barriers identified to operationalize FRU were the availability of trained doctors in cesarean section and anesthesia together, lack of operative facilities, and blood storage units. **Conclusions:** To operationalize the network of FRU for CEmOC services by task shifting of medical officer, it is important to ensure the availability of all five key elements together at all facilities.

Keywords: Comprehensive emergency obstetrics care, first referral unit, life-saving anesthetic skills, medical officer, task shifting

INTRODUCTION

Reducing maternal mortality is the first target of Goal-3 of the Sustainable Development Goals. It aims to reduce the global maternal mortality ratio (MMR) to <70 by 2030.^[1] MMR is widely considered as one of the most robust indicators of the functioning of the health system in any geographic area.^[2] In 2017, around 295,000 women died globally during pregnancy or childbirth.^[3] As per the latest reports, the MMR in India was estimated to be 122 per 100,000 live births. Besides, very wide inter-state variation in MMR is also observed. The combined MMR of Empowered Action Group states comprising Bihar, Jharkhand, Uttar Pradesh, Uttarakhand, Madhya Pradesh, Chhattisgarh, Rajasthan, Odisha, and the northeastern state of Assam was estimated to be 172 as compared to 72 for southern states combinedly.^[4]

Majority of the maternal deaths are preventable with the provision of good-quality antenatal, intranatal, and postnatal care services. Provision of safe institutional delivery, timely referral transport, availability, and accessibility of comprehensive emergency obstetric care (CEmOC) services are critical for saving the lives of women during childbirth.^[5] In India, a network of first referral unit (FRU) is established within existing public health systems for the provision of CEmOC services. The FRU is an existing public health facility

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located at the subdistrict or district level and equipped with the provision of all nine signal functions of CEmOC.^[6] An important requirement for FRU to be operational for CEmOC services is the availability of five critical elements. These elements are appropriate operative infrastructure, trained obstetricians, trained anesthetists, functional blood bank or storage unit, and round-the-clock referral transport. The availability of trained obstetricians and anesthetists is identified to be one of the most important bottlenecks for making FRU operational for CEmOC services, especially surgical intervention like cesarian section (CS).^[7]

Task shifting is a process of delegation whereby tasks are moved, where appropriate, to less specialized health workers.^[8] There is plenty of evidence from other parts of the world where task shifting was used for specifically trained doctors or nurse practitioners to harness their services for the provision of CEmOC.^[9-11] The Government of India (GoI) is also conducting a training program in CEmOC and anesthesia for CEmOC known as Life Saving Anesthetic Skills (LSAS) for serving medical officer posted at FRUs.^[12] These training are being implemented across the country, including north-eastern states. While CEmOC training is being conducted in 25 medical colleges and district hospitals (DHs), the LSAS training is being conducted in around 100 medical colleges across various states.^[13] The duration of CEmOC training is 16 weeks and the duration of LSAS training is 18 weeks. The objective of these two training is to harness the services of the trained medical officers to operationalize CEmOC services at designated FRUs.^[14,15] While these trainings are running for many years, the evidence on the actual outcome of training and operationalization of FRUs by task shifting of trained medical officers is rather very limited.^[15-17] Therefore, the current study was conducted to assess the operational status of FRUs for CEmOC services by task shifting of trained medical officers and to document the barriers in operationalization at selected FRUs in seven states of India.

MATERIALS AND METHODS

This study was a part of a larger operational research project on quality monitoring of CEmOC and LSAS training in India. The study was conducted in seven selected states (Bihar, Odisha, Assam, Madhya Pradesh, Chhattisgarh, Jharkhand, and Maharashtra). In each state, the state nodal officer for training was requested to share the name of FRUs where a CEmOC or LSAS trained medical officer was posted. Finally, a team of experts selected FRUs from this list by convenient sampling. A total of 50 FRUs were assessed across seven states. The number of FRUs included from each state was variable and was guided by the list provided by the state nodal officer. In the final sample, there were 22 FRUs from Bihar, 11 from Madhya Pradesh, 6 from Maharashtra, 4 each from Assam and Odisha, 2 from Jharkhand, and 1 from Chhattisgarh.

Facility assessment was carried by a team of experts in public health, obstetrics, and anesthesia. A semi-structured, pretested

checklist was used for assessing the functionality of FRU. The checklist was designed to assess the availability and working condition of infrastructure, availability of human resources, and other key elements. Ethical clearance for the study was obtained from the institutional ethical committee of the medical college where the study was conducted. The quantitative data was managed and analyzed using the Epi Info 7 software (CDC, Atlanta).

Operational definitions used in this study

The operational definitions used in this study are based on the relevant guidelines of the GoI and the World Health Organization.^[7,18,19]

Medical officer

A medical officer was defined as a doctor serving the public health system and having a minimum qualification of bachelor of medicine and bachelor of surgery.

First referral unit

Any public health facility designated as the FRU for CEmOC services by the health department of the respective state government.

Functional first referral unit

A designated FRU, where all nine signal functions of CEmOC is being performed. These signal functions include the facility for administering parental antibiotics, uterotonic drugs (i.e., parental oxytocin), parental anticonvulsants for preeclampsia and eclampsia (i.e., magnesium sulfate), manual removal of placenta, remove retained products (e.g., manual vacuum extraction, dilatation and curettage), assisted vaginal delivery (e.g., vacuum extraction, forceps delivery), basic neonatal resuscitation (e.g., with bag and mask), surgery (e.g., cesarean section), and blood transfusion services.

Five key elements for functionality of first referral unit

As per the operational guidelines, we identified five critical elements for the functionality of CEmOC services at FRU: (1) obstetrician or a medical officer trained in CEmOC, (2) anesthetist or medical officer trained in LSAS, (3) functional operative facilities, (4) blood bank or storage unit, and (5) round-the-clock referral services.

RESULTS

Heterogeneous types of health facilities were designated as FRU. We grouped these designated FRUs into four groups, such as community health centers (CHC) or equivalent facility (block primary health center, primary health center, and civil hospital), subdistrict hospitals (SDHs), other stand-alone health facilities (civil hospital, area hospital, and municipal hospital), and DH. Out of the 50 FRUs assessed, 22 (44%) were CHC or equivalent, 6 (12%) each was SDH, and other health facilities and 16 (32%) were DH. The average population catered by an FRU was found to be 450,000 with a range of 150,000 to 1,500,000 [Figure 1].

An obstetrician or CEmOC-trained medical officer was posted at 41 (82%) of the FRU. Similarly, either an anesthetist or LSAS-trained medical officer was posted at 37 (74%) of the FRU. Both obstetricians or CEmOC-trained medical officers and anesthetists or LSAS-trained medical officers were posted together at 34 (68%) of the FRUs included in the study [Table 1]. Operation theater with minimum necessary equipment was available at 32 (64%) of the FRUs. Round-the-clock referral transport facility was available at 43 (86%) and a blood storage facility (either blood bank or blood storage unit) was available at 16 (32%) of the sampled FRUs [Table 2].

We also analyzed simultaneous of five key elements for CEmOC functionality by task shifting of doctors at sampled FRUs. The first key element an obstetrician or medical officer trained in CEmOC was available at 41 of the total sampled FRUs. Out of these, anesthetist or LSAS-trained medical officer was available at 34 facilities, operative facilities were available at 23 facilities, blood storage facility was available at 15 facilities, and round-the-clock referral transport was available at 34 facilities. Similarly, 37 FRUs where anesthetists or LSAS-trained medical officer was available, other key elements such as an obstetrician or general physician trained in CEmOC were present at 34 facilities, operative facilities were available at 22 facilities, the blood storage facility was available at 14 facilities, and round-the-clock referral transport was available at 30 facilities [Table 2].

All five key elements for CEmOC functionality were available together at 11 (22%) of the total FRUs. These FRUs were fully operational to provide CEmOC services. One key element was missing at 9 (18%) of the FRUs. At 17 (34%) of sampled health facilities, two key elements were missing with the blood storage unit being the most common missing element. Three key elements were missing at 8 (16%) of the health facilities, out of which blood storage facility was missing at all eight facilities. At five health facilities, four key elements were missing [Table 3].

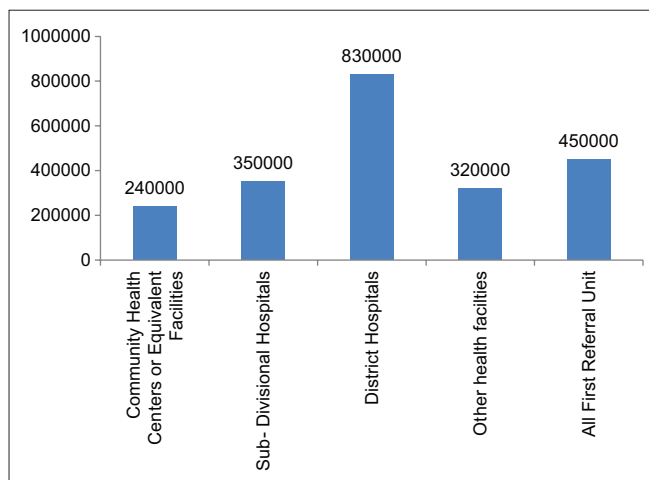


Figure 1: Average population catered by first referral unit (n = 50)

We also conducted a state-wise analysis for FRU functionality by from task shifting of the trained medical officers. In Maharashtra, out of the 6 FRUs included in the study, all five elements were available at one FRU. One of these six FRUs reported performing CS during the preceding month of data collection. In Assam, out of the four FRUs assessed, one was equipped with all key elements, while two other facilities were equipped with four key elements. Two out of these four FRUs reported conducting CS. Out of 22 FRUs in Bihar included in the study, 14 were DH. Seven out of 22 FRUs in Bihar were found to be equipped with all five elements, all of which were DH. Other FRUs reported one or more key elements missing at the facility. Only one of 22 FRUs reported conducting CS. In Chhattisgarh, one FRU included in the study had four elements in place but no CS was performed. In Jharkhand, each of the two FRUs included in the study did have three key elements in place. Out of these two FRUs, one was a DH. Neither of the two FRUs reported conducting CS. In Odisha, out of four FRUs, two were found to have three key elements in place. None of the four FRUs reported conducting CS. In Madhya Pradesh, out of 11 FRUs, two reported having all five elements in place, out of which one was DH. One facility had four key elements and six facilities had three key elements in place. Five out of 11 FRUs in Madhya Pradesh reported conducting CS. In total, nine (18%) of the FRU reported conducting CS during the preceding month [Table 4].

DISCUSSION

Task shifting is one of the evidence-based strategies to ensure essential services in resource-constrained settings.^[8] Evidence from other parts of the is in abundance success of task shifting of general physicians, paramedical health workers, and nurse practitioners for surgical obstetric procedures and anesthesia.^[9-11] Considering this, the decision to train and certify medical officers in CEmOC and LSAS to harness their services to

Table 1: Availability of health-care providers at first referral unit (n=50)

Health care provider	Number of FRU (%)
Obstetrician	18 (36)
CEmOC-trained medical officer	23 (46)
Obstetrician or CEmOC trained medical officer	41 (82)
Anesthetist	9 (18)
LSAS-trained medical officer	28 (56)
Anesthetist or LSAS trained medical officer	37 (74)
Both obstetrician or CEmOC-trained medical officer or Anesthetists or LSAS-trained medical officer	34 (68)
Other health care providers	Average number posted at FRU (range)
Medical doctors	9 (2-25)
Staff nurse	6 (0-14)
Auxiliary nurse midwives (assistant nurses)	7 (0-15)

FRU: First referral unit, CEmOC: Comprehensive emergency obstetric care, LSAS: Lifesaving anesthetic skills

Table 2: Availability of key elements of comprehensive emergency obstetric care functionality at first referral unit (n=50)[#]

	Obstetrician/ medical officer trained in CEmOC	Anesthetists/ medical officer trained in LSAS	Operative facilities*	Blood storage unit	Round the clock referral facility
Obstetrician/medical officer trained in CEmOC	41	34	23	15	34
Anesthetists/medical officer trained in LSAS	34	37	22	14	30
Operative facilities*	23	22	27	14	22
Blood storage unit	15	14	14	16	15
Round-the-clock referral facility	34	30	22	15	45

[#]Bold numbers correspond to primary key elements being examined. Other numbers in the row show availability of other key elements in those facilities,

*All necessary equipment for operative procedures. CEmOC: Comprehensive emergency obstetric care, LSAS: Lifesaving anesthetic skills

Table 3: Missing key element at first referral unit (n=50)

Missing element	Key elements					Total facilities
	Obstetrician/medical officer trained in CEmOC	Anesthetists/medical officer trained in LSAS	Operative facilities*	Blood storage unit	Round the clock referral facility	
No element	-	-	-	-	-	11 (22)
1 element	-	1	2	5	1	9 (18)
2 elements	2	3	10	16	3	17 (34)
3 elements	3	4	6	8	3	8 (16)
4 elements	4	5	5	5	1	5 (10)

*All necessary equipment for operative procedures. CEmOC: Comprehensive emergency obstetric care, LSAS: Life saving anaesthetic skills

Table 4: State-wise number of first referral unit covered, availability of key elements, and functionality

State	Number of FRU covered	5 elements	4 elements	3 elements	2 elements	1 elements	Number of FRU where CS was conducted during last month
Nonhigh focus state							
Maharashtra	6	1	1	2	1	1	1
High-focus state							
Assam	4	1	2	-	1	-	2
Bihar	22	7	4	5	3	3	1
Chhattisgarh	1	-	1	-	-	-	0
Jharkhand	2	-	-	2	-	-	0
Odisha	4	-	-	2	1	1	0
Madhya Pradesh	11	2	1	6	2	-	5

FRU: First referral unit, CS: Caesarian section

operationalize FRUs is an important step by the GoI.^[7] Still, there is very limited evidence on harnessing the services of trained manpower in operationalizing FRU. Some available evidence addresses issue of training, but none of them have analyzed the impact of such training on the operationalization status of FRU.^[15-17] Therefore, is pioneer evidence on the functionality of FRU by task shifting of trained medical officers.

Health in India is a state subject; thus, the structure of the health system varies widely from state to state. We also found variation in the type of facilities designated as the FRU in different states. In some states, within some of the districts, only DH was designated as FRU. As per the United Nations (UN) process indicators for CEmOC services, at least one CEmOC facility should be available for every 500,000 population.^[19] The average population catered by each type of FRU in our

sample was 450,000, but the range varied from 240,000 to 830,000. In the district where the DH was only FRU designated as a CEmOC facility, the population coverage was far more than the recommended level.

One of the most important barriers identified in our study was not deploying obstetricians or CEmOC-trained medical officers and anesthetists or LSAS-trained doctors simultaneously as one FRU. Only 68% of the sampled health facilities reported the deployment of both the types of human resources together. Blood transfusion facility and adequate operative infrastructure was another important bottleneck for ensuring CEmOC services. Earlier evidence also found these issues as major bottlenecks in operationalizing CEmOC services at FRUs.^[15-17] The nonavailability of all five key components for FRU functionality together at the same facility was the most common reason for the nonoperationalization of CEmOC services at

FRU. As per our findings, 22% of the FRUs were fully but 18% reported to be functional as these facilities conducted at least one CS in the month preceding data collection.

Rationale deployment of critical human resources in health facilities could resolve issue of posting of trained manpower and resulting bottleneck in the functionality of FRU. Moreover, a well-articulated posting and transfer policy and career progression pathway can motivate human resources. Other published evidence has argued the need to have a posting and transfer policy and its proper implementation in improving the organizational performances.^[20] Performance-based financing and incentives can be another innovative approach to keep human resources motivated.^[21] Nonmonetary incentives, such as an opportunity for career progression and higher education, can also be an important carrot for ensuring the motivation of human resources needed to operationalize FRU.

Among the challenges in infrastructure, the availability of a functional blood storage unit was one of the most critical bottlenecks. Other available evidence also suggests the availability of blood storage units in the remote areas to be quite weak. It recommended strengthening the network between blood banks and blood transfusion services in remote areas.^[22] The functionality of existing blood storage units can also be improved by training the available human resources in blood storage and transfusion techniques. For ensuring functional operative infrastructure and incessant supply of necessary drugs and consumables, professional procurement and supply chain process should be in place. Proper referral linkage is often compromised due to local managerial issues or poor service by private providers engaged in running referral transport system under the public–private partnership. This warrants stringent monitoring of contracts under public–private partnership to ensure round the clock services.

We also observed a vicious cycle for the nonfunctionality of an FRU. An FRU without trained human resources could not utilize available physical infrastructure, thus resulting in the equipment becoming nonfunctional after some time. Similarly, a facility with trained workforce but inadequate infrastructure and equipment was also nonfunctional, thus restricting the opportunity to practice skills learned during training and finally losing confidence of performing CEmOC services. To avoid such fragmentation, the rational approach is to focus on operationalizing one FRU at a time. In a district, first, the DH should be fully equipped to provide round-the-clock CEmOC services. Once this is achieved, efforts should be made to operationalize the second FRU within a district based on population and geographic considerations. The guiding principle for such an effort should be to ensure functionality at one facility before expanding the number of FRUs.

Among the seven states covered in our study, six are the high-focused states with a higher proportion of maternal mortality and one state is from the nonhigh-focused group with comparatively lower maternal mortality. However, as per our findings, the operational challenges for FRU functionality for

CEmOC services are almost similar across states. However, in states such as Bihar, Madhya Pradesh, and Jharkhand, even the DHs included as FRU were not fully functional with all five key elements. Therefore, state-specific action plan for operationalizing CEmOC services as per the UN process indicators must be prioritized.

This study also faces the limitations common to any embedded health systems or operational research. First, we had to use convenience sampling for selecting health facilities due to programmatic considerations. Second, the sample size was not adequate to provide detailed state-wise analysis and recommendations. Third, the heterogeneity in the type of facility classified as FRU resulted in a skewed average due to a few outliers. Fourth, we could not ascertain the functionality of a facilities as this can be only be done by process documentation on human resources availability and service deliveries round the clock. We recommend need to prioritize further qualitative, ethnographic study, and process documentation to document such challenges. Nevertheless, the findings of this study have direct implications for improving the utilization of CEmOC and LSAS training for operationalizing FRU and for improving overall CEmOC services in the public health system in India.

CONCLUSIONS

We recommend the state governments to ensure the availability of all five key elements together at FRU to ensure CEmOC functionality by task shifting of trained medical officers. The designated FRUs should be equipped with infrastructure and supporting human resources before posting the trained doctor. To achieve this, proper human resource policies, posting and transfer guidelines, training in blood transfusion and storage, professional procurement and supply chain, and proper monitoring of referral transport services are some of the key issues to be addressed.

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Conflicts of interest

Authors declare no conflict of interest.

REFERENCES

1. World Health Organization. Sustainable Development Goal. Available

- from: <https://www.who.int/sdg/targets/en/>. [Last accessed on 2020 Jun 30].
2. Wilmoth JR, Mizoguchi N, Oestergaard MZ, Say L, Mathers CD, Zureick-Brown S, *et al.* A new method for deriving global estimates of maternal mortality. *Stat Politics Policy* 2012;3:2151-7509.
 3. Trends in Maternal Mortality 2000 to 2017: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2019. Available from: <https://apps.who.int/iris/bitstream/handle/10665/327595/9789241516488-eng.pdf?ua=1>. [Last accessed on 2020 Jun 30].
 4. Registrar General of India. Special Bulletin on Maternal Mortality in India 2015–17. New Delhi: Office of the Registrar General; 2019.
 5. Paxton A, Maine D, Freedman L, Fry D, Lobis S. The evidence for emergency obstetric care. *Int J Gynaecol Obstet* 2005;88:181-93.
 6. Ministry of Health and Family Welfare, Govt. of India. National Programme Implementation Plan: RCH Phase 2-Programme Document. New Delhi: Government of India; 2005.
 7. Ministry of Health and Family Welfare, Govt. of India. Guidelines for Operationalizing First Referral Units. New Delhi: Government of India; 2004.
 8. World Health Organization. Task Shifting: Global Recommendations and Guidelines. Geneva: World Health Organization; 2008.
 9. Mavalankar D, Sriram V. Provision of anaesthesia services for emergency obstetric care through task shifting in South Asia. *Reprod Health Matters* 2009;17:21-31.
 10. Pereira C, Mbaruku G, Nzabuhakwa C, Bergström S, McCord C. Emergency obstetric surgery by non-physician clinicians in Tanzania. *Int J Gynaecol Obstet* 2011;114:180-3.
 11. Pereira C, Cumbi A, Malalane R, Vaz F, McCord C, Bacci A, *et al.* Meeting the need for emergency obstetric care in Mozambique: Work performance and histories of medical doctors and assistant medical officers trained for surgery. *BJOG* 2007;114:1530-3.
 12. Desai S, Bhatt P, Bhardwaj A. Operational Plan-EmOC. New Delhi: FOGSI, MOHFW, Government of India; 2006.
 13. Ministry of Health and Family Welfare, Govt. of India. Annual Report: 2012-13. New Delhi: Government of India; 2014.
 14. Saksena R. Life Saving Anesthetic Skills for Emergency Obstetric Care: Training Programme for MBBS Doctors. New Delhi: MOHFW, Government of India; 2002.
 15. Garg BS, Khan R, Shri BS. Review of Training of MBBS Doctors in Anesthesia for Emergency Obstetric Care. New Delhi: DFID, UNICEF, Ministry of Health and Family Welfare-Government of India; 2008.
 16. Evans CL, Maine D, McCloskey L, Feeley FG, Sanghvi H. Where there is no obstetrician – increasing capacity for emergency obstetric care in rural India: An evaluation of a pilot program to train general doctors. *Int J Gynaecol Obstet* 2009;107:277-82.
 17. Mavalankar D, Callahan K, Sriram V, Singh P, Desai A. Where there is no anesthetist – increasing capacity for emergency obstetric care in rural India: An evaluation of a pilot program to train general doctors. *Int J Gynaecol Obstet* 2009;107:283-8.
 18. Ministry of Health and Family Welfare, Govt. of India. Maternal and Newborn Health Toolkit. New Delhi: Government of India; 2013.
 19. WHO, UNICEF, UNFPA, AMDD. Monitoring Emergency Obstetrics Care; A Handbook. Geneva: World Health Organization; 2009.
 20. Purohit B, Martineau T, Sheikh K. Opening the black box of transfer systems in public sector health services in a Western state in India. *BMC Health Serv Res* 2016;16:419.
 21. Eichler R, Agarwal K, Askew I, Iriarte E, Morgan L, Watson J. Performance-based incentives to improve health status of mothers and newborns: What does the evidence show? *J Health Popul Nutr* 2013;31:36-47.
 22. Ramani KV, Mavalankar DV, Govil D. Study of blood-transfusion services in Maharashtra and Gujarat States, India. *J Health Popul Nutr* 2009;27:259-70.