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Newborn Service Readiness of Primary Level Health Facilities of Eastern Mountain Region of Nepal

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ABSTRACT

Background: Newborn service readiness is facility's observed capacity to provide newborn services and a prerequisite for quality. Newborn services are priority program of government and efforts are focused on infrastructure and supplies at peripheral health facilities. Study describes health facility readiness for newborn services in four domains of general requirements, equipment, medicines and commodities, and staffing and guidelines.

Methods: Convergent parallel mixed method using concurrent triangulation was done in public health facilities providing institutional deliveries of two randomly selected districts- Taplejung and Solukhumbu of Eastern Mountain Region of Nepal. Face to face interview and observation of facilities were done using structured questionnaire and checklist; in-depth interviews were done using interview guideline from November 2016 to January 2017. Ethical clearance was taken. Descriptive analysis and deductive thematic analysis were done.

Results: Mean score of newborn service readiness was 68.7 ± 7.1 with range from 53.3 to 81.4 out of 100. Domains of general requirement, equipment, medicine and commodity, supervision, staffing and guideline were assessed. The gaps identified in general requirements were availability of uninterrupted power supply, means of communication and referral vehicle. Clean wrappers and heater for room temperature maintenance were identified during interviews to be part of the readiness. All health facilities had trained staff while retention of skill was of concern. There was felt need of enforcing adequate training coverage to suffice the need of human resources in remote.

Conclusions: Efforts of improving transportation, heater for room temperature maintenance, trainings with skill retention strategy, utilization of guidelines, availability of skilled birth attendance could result increased and improved newborn service readiness.

Keywords: Eastern mountain region of Nepal; health facility readiness; newborn service readiness.

INTRODUCTION

Newborn service readiness (NSR) is facility's observed capacity to provide newborn services.¹ Despite government's efforts of addressing newborn health, newborn - mortality accounts for more than one third (69.7%) of infant mortality rate and one third (60.5%) of under-five mortality. The target of reducing neonatal mortality rate per thousand live births to 11 by 2035 is challenging to meet with differentials of neonatal mortality being 12.7 between mountain region and terai region besides the fact that terai is more populated than mountain.²⁻⁵ High proportion of fresh stillbirths (72.1%) resulted due to poor quality of service during delivery

and at birth.^{6,7} National studies revealed context of NSR only as part of emergency obstetric and newborn care assessment.^{8,9} This study describes NSR of primary level health facilities (HFs) in Eastern Mountain Region of Nepal. This information can be used to strengthen supply side and contribute to reducing delay in receiving care.

METHODS

Convergent parallel mixed method with concurrent triangulation study done in primary level HFs in two randomly selected districts of Eastern Mountain Region of Nepal- Solukhumbu and Taplejung.¹⁰ Primary level HFs providing institutional deliveries, its service providers-

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health care workers- medical officers, health assistant, auxiliary nurse midwives and auxiliary health worker and health facility office management committee members (HFOMC) were included in the study. There were total 27 HFs meeting inclusion criteria- 23 health posts with birthing centers and four primary health care centers. For qualitative part, data saturation was the point for sample size decision making and a total of 14 in-depth interviews (IDI) with service providers were done. Data was collected from November 2016 to January 2017 using semi-structured questionnaire, observation checklist and IDI guideline with help of four research assistants who were given one day thorough orientation by principal investigator. Questionnaire was based on demographic health survey comparative report on levels and trends in newborn care service availability and readiness.¹¹ For contextualization of tool experts in newborn health were consulted and national documents were reviewed and contextual modifications were done. Tool was translated in Nepali and back translated in English and was pretested in primary health care center and modification in flow of questions was done.

For quantitative part, data were obtained by face to face interview from HF incharge or senior most staff present at health facility during time of data collection. Check of completeness of collected data was done before leaving from HF. Data entry was done in EpiData version 3.1 and analyzed in Statistical Package for Social Sciences (SPSS) version 17.0. Mean, standard deviation, minimum, maximum for continuous data and frequency and percentage for categorical data was calculated.

For qualitative part, IDIs were done with health care service providers and members HFOMC ranging from 40 minutes to one hour. Participants were requested to share their ideas about health facility requirements for NSR. Strategies adopted for trustworthiness of data in this study were maintained by extensive literature review, triangulation of information, peer examination of transcripts, reframing of questions and indirect questions like last successful case of saving a newborn or a bad memory.¹² Field note and recording were labeled according to participants' type- health care service provider and HFOMC member and summary was transcribed in English. During thematic analysis, deductive approach was used to explain providers' perspectives of NSR according to Donabedian model of health care quality which included structure, process and outcomes domains.^{13,14} In subsequent reviews of transcripts, contents of IDI were coded into categories and categories were sorted according to predefined themes of analysis (Table 1).

Ethical clearance was taken from institutional review board (IRB) of Institute of Medicine (IOM) and permission was taken from respective district (public) health offices. Study involved observation of service areas and equipment being used at HFs, thus during data collection study team followed the infection prevention standards as per protocol at the health facilities. Informed consent was taken from participants prior to data collection and appointment taken on data collection day.

Table 1. Themes and categories of analysis of in-depth interviews.

Themes	Categories
1. Structure	Basic amenities Health infrastructure Air ambulance Skilled birth attendance for 24 hours Equipments Medicines Staffing
2. Process	Guidelines and their utilization Training and retention of skills Newborn resuscitation Availability of staff quarters Admission and referral of newborn Newborn patient flow
3. Outcomes	Newborn service readiness

Categorized information was then summarized and presented along with direct quotes. Triangulation of these findings was done in results with quantitative findings.

RESULTS

All were public HFs providing health facility delivery services in rural area. All HFs routinely practiced use of partograph to monitor and manage labor and dried and wrapped newborns immediately after birth to keep them warm. One third (33.3%) of health facilities reported to provide breast feeding within one hour of birth. In last three months prior to study, neonatal resuscitation was performed in five facilities (18.5%). And cases flow of newborn was closely related to number of deliveries conducted at health facility.

In domain of general requirement (Table 2), there were eight (29.6%) health facilities, with power supply from grid, functional back up and were with uninterrupted power supply in last seven days. During IDI, one of the health care service providers expressed, "We are not able to use available equipment like fridge and autoclave as there is no direct power supply."

Table 2. Availability of the general requirements for newborn services readiness in health facilities (n= 27).

General Requirements	Number (Percent)
Electricity supply	
Power grid	9 (33.3)
Functional back up	18 (66.7)
Uninterrupted supply in last seven days	25 (92.6)
Facility with power grid and functional back up	8 (29.6)
Water source	
Water supply from protected source (piped or spring)	26 (96.3)
Water outlet within 500 meters of health facility	9 (33.3)
Improved water source	9 (33.3)
Functional toilet for outpatient use	26 (96.3)
Emergency transport	
Support from other health facility	1 (3.7)
Skilled birth attendance for 24 hours	
Residential staff but no 24 hours roster	27 (100)

During IDI it was found that in areas where mobile networks were not functional, health care providers were in social isolation and faced difficulties during referral and treatment. Access to roads in mountain region having difficult topography and need of air ambulance was felt and there was trend of calling air ambulance (*heli*) for referral in emergencies. During IDI, one of the health care service providers of Taplejung stressed, “As you can see even if we have roads built here it is less probability that we have availability of ambulance unless bridge is constructed at Dobhan... It will need bridge for transportation one that connects Dobhan to rest part of Taplejung.”

Mean score of NSR in domain of equipment was 23.6±1.4 (Figure 1). All of the HFs were observed to have functional delivery bed, delivery pack with cord-clamp, partograph, blood pressure apparatus, mucus extractor, newborn resuscitation bag with mask size ‘0’ and ‘1’, sterilization equipment and latex gloves. During IDIs, delivery set, cord clamp, newborn resuscitation bag and mask, partograph, suction machines, incubators, oxygen concentrators, and infection prevention supplies like gloves were listed as equipment for newborn services. One of the health care service providers from Taplejung shared experience of handling case with retro positive with bare hands during immediate

newborn care. Besides these equipment, health care service providers mentioned wrappers provided as part of government intervention in *nyano jhola* as important part of equipment for NSR. Clean wrappers were felt to contribute to decreased risk of umbilical infection of newborns and assist in providing warmth to newborn by one of the health care provider during IDI. Similarly, maintenance of room temperature was felt to increase NSR. Device for room temperature maintenance like heater was felt as part of basic equipment for newborn services by three of ten health care service providers and all four HFOMC members during IDIs.

One of the HFOMC members mentioned from Solukhumbu, “There is supply of the heater for newborn which is appreciable as temperature here is too cold during winters. You have visited in early winters (November) and can imagine how cold can it be during the mid of winter.”

Mean score of NSR in domain of medicines and commodities was 16.1±2 (Figure 1) (Table 3). All HFs were observed to have injectable gentamycin, oxytocin and Magnesium sulphate. While less than one fifth (18.5%) of them had injection ampicillin and less than one-tenth (7.4%) had hydrocortisone.

Table 3. Availability of medicine and commodity for newborn service readiness in health facilities (n=27)

Medicine and commodities	Number (Percent)
Injection Gentamycin	27 (100)
Injection Ampicillin	5 (18.5)
Skin disinfectant	24 (88.9)
Chlorohexidine gel *(4.0%)	15 (55.5)
Injection Magnesium sulphate	27 (100)
Uterotonic (Injection Oxytocin)	27 (100)
Injection Hydrocortisone	2 (7.4)

Mean score of NSR in domain of staffing and guideline was 17.1±2.0 (Figure 1). (Table 4) Integrated management of newborn and childhood illness (IMNCI) guideline was observed in more than one-third (37.0%) HFs and maternal newborn update guideline in only one (3.7%) HF while skilled birth attendance reference manual was observed in none of the health facilities. During IDI it was mentioned by most of the health care service providers that IMNCI guideline was mostly followed and consulted for newborn services. But update in guideline mismatched supply as expressed by one of the health care service provider, “... updates in protocol and supply are not matching. For instance there is still use of cotrimoxazole despite of knowing that the first line drug is switched to amoxicillin.”

Table 4. Availability of guidelines, trained staff and external supervision for newborn service readiness in health facilities (n=27).

Variables	Number (Percent)
Guideline and protocol for newborn services	
Integrated management of newborn and childhood illness	10 (37.0)
Maternal and newborn health update	1 (3.7)
At least one staff trained (in last 24 months)	
Neonatal resuscitation	27 (100)
Early and exclusive breastfeeding	27 (100)
Newborn infection management including injectables	27 (100)
Thermal care of newborn	27 (100)
Cord care	27 (100)
Kangaroo mother care	27 (100)
External supervision with technical support	
At least once in six months	12 (44.4)

Display of important protocols like newborn resuscitation chart, importance of breast feeding, kangaroo mother care and cord care with chlorohexidine helped providing health education to families and referring during any confusion. One of the health care service providers mentioned (showing chart), “*Besides protocols, we have chart in labor room which has a beam balance showing chora chori barabari (gender equality).*”

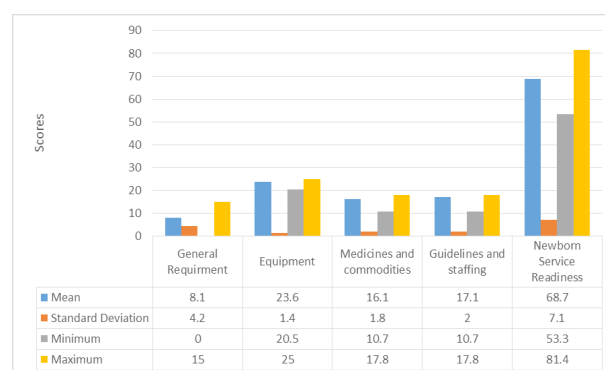
All HF's had at least one staff trained in relevant trainings for newborn services - early and exclusive breast feeding, newborn infection management including injectables, thermal care of newborn, cord care and kangaroo mother care. During in-depth interview, there was felt need of coverage of training such that there was no competition among staffs which discourages ritual of remote posting for trainings and transfers soon after being trained. Retention of skills after training was realized to be important and use of mannequin for practice was felt to improve skill retention. One of the health care service provider suggested, “*There is need of dummy (mannequin) like neonatalie could be an example as there is no much flow of the patients and retention of skill is all about practice.*”

During IDI staff quarters were felt to contribute to NSR. One of the HFOMC mentioned, “*... existing building is appreciable as it has facility of staff quarters.*”

During IDI it was shared that in facilities which had inpatient service, they usually provided first aid then referred them as parents hugely required guarantee of

service being given to cure newborn. Also there were cases of birth asphyxia that were successfully managed and were considered to be appreciable in remote setting. One of the HFOMC members mentioned, “*During meeting I came to know that they even saved newborn that was not breathing which is a miracle in remote place like ours.*”

Mean score of NSR was 68.7 ± 7.1 with range from 53.3 to 81.4 out of 100 (Figure 1). During in-depth interviews additional aspects of structure and process were described to result in NSR.

**Figure 1. Scores of domains and newborn service readiness of health facilities.**

DISCUSSION

NSR enables environment for providers to ensure quality of care to newborns. It contributes to saving newborn lives by setting facility ready to tackle with common killers of newborn like hypothermia, birth asphyxia. In recent years, Ministry of Health and Population of Nepal has also been putting efforts for the overall readiness and availability of services at different level of public health facilities and rolling out Minimum Service Standards as a checklist for gap identification to improve quality of care at service delivery point.

In general requirement domain, this study shows major gaps related to interrupted electricity supply in 19 (70.4%) health facilities which was lower than national average where for mountain region, 68.5% health facilities and 70.1% birthing centers have electricity.^{8,9} This may be because health facilities in this study which didn't have central power supply and those having primary source as solar or generator are considered to have interrupted power supply. Only one (3.7%) health facility in the study is ensured with ambulance service which is lower than study findings where one-third of facilities in Bangladesh and Haiti had emergency transport.¹¹ Reasons found in this study are that in mountain region availability

of means of transportation is dependent upon other factors like access to roads in the region, having difficult topography and need of air ambulance is felt for referral in case of emergencies.

During IDI in this study regarding communication service, landline telephone is available in one out of eight (12.5%) health facilities, which is similar to findings of national survey for mountain region.⁹ IDI in this study reveals social isolation is felt and difficulties are faced during referral and treatment in areas without mobile networks.

For presence of equipment for NSR, findings are similar to national survey report which shows equipment were present in most of the HFs ranging from (74-100%).⁸ But there are reported incidences of having handled infective cases like retro positive to be common in remote setting thus government should ensure routine provision of personal protective equipment throughout the year. Also, participants of the study remarked clean wrappers, part of *nyano jhola*, to be important for NSR contributing to thermal protection and decreased risk of umbilical infection.¹⁵

Since low room temperature of delivery rooms can cause hypothermia to newborns by convection and conduction.¹⁶ Health care service providers in this study, used coal and firewood to keep room warm. This device for room temperature maintenance like heater is suggested as basic equipment for NSR.

Related to guidelines and manuals for NSR, IDI reveals least utilization of guideline even when it is present in HF which is similar to finding of study in Myanmar.¹⁵ Availability of guidelines and their utilization help increase adherence to standard treatment protocol and need to be part of technical supervision to HFs. Displaying protocols like newborn resuscitation chart, importance of breast feeding, kangaroo mother care and cord care help in providing health education to families and reference during any confusion and thus these must be promoted in similar settings.

In this study 7.4% HFs have hydrocortisone while report of Nepal health facility survey 2015 doesn't mention about this indicator.⁹ The findings of this study is less than that of study done in Myanmar which shows 85% of hospitals have hydrocortisone.¹⁶ This may be due to difference in level of HF as in this study all are below hospital level. Findings of study on newborn intervention and challenges for implementation in Nepal in 2016 and synthesis of maternal and newborn intervention in 2014 that there is need of development of appropriate policy

guidelines for antenatal corticosteroids and kangaroo mother care services.^{7,17} In this study there are cases of birth asphyxia that are successfully managed and is mentioned as "miracle" to have saved a non-breathing baby as survival on referral is a rare case. In this study need of skill retention after training and use of mannequin for practice are suggested. Use of mannequin is done in our context only during monitoring and assessment of HFs at national level.^{8,9} While training and retention of skill on newborn resuscitation should be ensured by government at remote settings to increase newborn survival, there is equally posed challenge for utilization of services as reported in this study most cases are referred by providing first aid where parents of newborns hugely required guarantee of service being given to cure newborn.

The limitations of this study were that it cannot capture newborn mortality rate at health facilities as in study done by Winter and colleagues as data of live births within duration of study couldn't be assessed accurately.¹¹ However, experience of one still birth delivered at health facility is revealed in this study. Tool cannot portray adequacy of staffing based on training received as it doesn't cover health worker line listing form as used in national surveys, however all HFs have at least one health care worker trained in relevant newborn training in this study.^{8,9}

CONCLUSIONS

Newborn Service Readiness can be increased by ensuring availability of uninterrupted electricity supply, room temperature maintenance, and communication and referral services. Adequate supply of medicines for treatment of newborn infections, equipment for newborn resuscitation and thermal protection, adopting measures for skill retention and availability of skilled birth attendance can help in timely service provision for newborn.

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