

Assessment of the Setup of Delivery Room for Neonatal Resuscitation at Tikur Anbesa Hospital Ethiopia

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Abstract

Background: Neonatal mortality, is estimated to 5 million deaths worldwide each year. 98% of deaths occurred in developing countries. In sub-Saharan Africa recent health services assessments found only 15% of hospitals equipped to provide basic neonatal resuscitation. In Ethiopia neonatal mortality rate is 37 deaths among 1000 live births. And from all deliveries 15% were delivered by well trained and well-equipped hospital. Improving the quality of Neonatal care at health facilities is a challenge that must be undertaken to reduce neonatal deaths and enable developing countries to achieve their targets for MDGs by rendering standard neonatal care with well-organized and equipped facility and by attending deliveries with a trained staff.

Objective: The objective of this study was to assess the setup of delivery room for neonatal resuscitation at Tikur Anbesa Hospital.

Methods: A cross sectional descriptive study design with quantitative data collection method was employed at TASH delivery room health care provider and structured checklist and observation on the availability of materials and equipment.

Result: Out of the total health care providers (20), 7 (35%) were doctors and 3 (15%) and 10 (50%) were nurses and midwives respectively. From the total health care provider working in delivery room 50% were trained and 50% were not trained. From trained staffs 7 (35%) perform all level of NRP and 65% perform only the first three steps. All the respondents reported that birth corner lacks basic instrument to give standardized care at that set up.

Conclusion and Recommendation: Finding of this study indicated that there is gap regarding to the WHO NR Guideline and it influence the set up in order to render a standard care. Lack of instrument in private birth corner, lacks ongoing training and continuity of NRP and the trained professional not updated to the new guideline of NRP are some of the gaps. To minimize this existing gap government and stockholders provide ongoing and continuous program, help to update themselves to the updated guideline of NRP and providing basic instruments needed for neonatal assistance.

Keywords: Set Up; Delivery Room; Neonatal Resuscitation; Neonatal Resuscitation Program

Abbreviations

ANC: Antenatal Care; Bpm: Beat Per Minute; CPAP: Continuous Positive Pressure; CPR: Cardio Pulmonary Resuscitation; ET: Endotracheal Tube; EDHS: Ethiopian Demographic Health System; FHR: Fetal Heart Rate; HR: Heart Rate; LMA: Laryngeal Mask Airway; MDG: Millennium Goal Development; MSAF: Meconium Stained Aspirated Fluid; NICU: Neonatal Intensive; ND: Neonatal Death; NCC: Newborn Care Corner; NSC: Norfolk, Suffolk And Cambridge Shire Neonatal Network; NRP: Neonatal Resuscitation Program; NM: Neonatal Mortality; PNM: Post Neonatal Resuscitation; PNM: Pre Neonatal Mortality; PMTCT: Prevention of Mother to Child Transmission; PPV: Positive Pressure Ventilation; TAHS: Tikur Anbesa Specialized Hospital

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Introduction

More than 100 million babies are born annually worldwide. They have to make the transition from a fluid-filled environment in which the placenta serves as the gas-exchange organ for the fetus, to an air-filled environment in which the baby's own cardiopulmonary system has to independently function within minutes of birth for survival. Naturally at least 90% of neonates successfully make this transition without need of help. The remaining 10% of newborns require some assistance to begin breathing at birth, and 1% or more may require intensive resuscitative efforts [1].

Worldwide, approximately 19% of the 5 million neonatal deaths that occur annually are due to intrapartum related death [1]. Among this some studies shows over 40% of all deaths among children under five are estimated to occur during the first four weeks of life [2]. This could be due to low quality of care for newborns.

Currently more than half of all infants' death occurs during the first week of life largely as a result of poorly managed pregnancies and births, or because of the absence of a few simple life-saving gestures during the first critical moments of life, neither mother nor infant will need high technology interventions or expensive drugs or equipment. The benefits of ensuring joint care for them both accrue not simply for families but to society as a whole [2,3].

NR guideline recommended that health authorities strongly provide midwives and **non**-designed obstetrical site with equipment and supplies needed NR.

In sub-Saharan Africa recent health services assessments found only 15% of hospitals equipped to provide basic neonatal resuscitation [2]. Studies 2012 showed in Ethiopia there are 27,347 health care worker which are trained with NRP but still only 10% of deliveries are conducted in health care facilities [3,15]. Moreover, over fifteen year neonatal death was 54 death among 1000 live birth per year but there are a little beat decrease in the number of death over five years it is 37 death among 1000 live birth it means 31% decrement was shown from the previous year from 2011 EDHS [4]. Therefore, neonatal death among rural and urban residence was 41and 43 respectively, among region in Addis Ababa the ND was 21 and in region 3 i.e. in Amhara ND 54 among 1000 live birth [4]. Hence that difference among mortality between region and residence is visible because of socioeconomic status, trained health care provider, delivery facility and organization situation and adherence to the NRP guidelines. Standard organized and equipped delivery room, trained staff were provide successful resuscitation and should prevent a large proportion of these deaths, as well as mitigate the outcomes of surviving neonate and prevent post resuscitations complication [3,4].

In Ethiopia neonatal mortality decreased by 31% from 2005 to 2011. over five years it was 37 death among 1000 live births it means 31% decrement was shown from the previous year from 2011 EDHS [4]. Despite the decrement in order to achieve the Millennium Development Goal by halving child mortality by 2015 by means of a wide scale implementation of cost-effective interventions and implementing the NRP guideline [5]. In Tikur Anbessa specialized hospital 4000 - 5000 babies were born annually [7]. Thus, the study were conducted to assess the setup of this organization delivery room for NR to found out the setup for NR that have been a great contribution to decrease a large proportion of neonatal deaths, as well as improve survival of neonate and prevent post resuscitations complications [4].

Materials and Methods

Study area and design

A cross-sectional descriptive study was conducted at Tikur Anbessa specialized central referral hospital, situated in Addis Ababa, Ethiopia from January to February 2013 G.C.

Addis Ababa is the capital city of Ethiopia and Africa. According to the 2007 Population and Housing Census of Ethiopia, the total population of Addis Ababa is estimated to be 2,739,551 of which 1,434,168 are females and 1,305,387 are males. In Addis Ababa there are about 28 hospitals. Among these hospitals 6 of them are owned by Addis Ababa city administration, 5 hospitals' by federal ministry of health, 2

by NGOs, 3 by defense and police and 12 by private owner. There are 26 health centers which are owned by the city administration. TASH is one of owned by federal ministry of health and under supervision of Addis Ababa University in which both under graduate and post graduate students have been enrolled. It is the only specialized hospital and it is under the control of Addis Ababa University, as referral hospital it rendered various services including NICU, ANC, PNC, PMTCT, delivery services and other services. In this hospital 4000 - 5000 babies born annually where large number of deliveries take.

Study population

All nurses worked at study area presents during study period and set up of birth corner.

Newborn corner care: This is a space within the delivery room in any health facility where immediate care is provided to all newborns at birth. This area is mandatory for all health facilities where deliveries are conducted.

Sample size determination and sampling technique

For the quantitative data purposive quota sampling technique were employed. At the time of research they were 20 health professionals (nurses, midwives and obstetrics and gynecology residents) assigned at delivery room. And instruments of the birth corner where observed by WHO standardized checklist.

Data collection instrument and methods

Data were collected using questioner developed by reviewing different literatures relevant for the study objective. The questionnaire were arranged in such a way it can address relevant information and other independent variables as well as the dependent variables. A standard check list were employed to observe the birth corner.

Semi-structured questionnaire were employed on 20 health care professionals assigned in the delivery room and standard check list were employed for instruments that are found birth corner of labor ward. An informed consent was obtained to assure the confidentiality. The semi-structured questioner all were multiple choice contain two tools. Tool: 1. Services given by the organization regarding NRP, Tool: 2 Staff profile and the standard checklist include the equipment and supply needed by each birth corner developed by WHO.

Data processing and analysis

Data were checked for its completeness and edited. The data analyzed by EXCEL. The data were summarized by descriptive statistics for all variables. Frequency and table were used to present the data.

Definition of terms and operational definition

Neonatal resuscitation program: For effective implementation neonatal resuscitation procedure 100% of health care professional have to be trained with the NRP training and perform all steps of NRP. If the health care professionals found in delivery room were not scoring the above result labeled as ineffective NRP.

Birth corner: The corner contain all supplies and instruments required by WHO checklist if not labeled as incomplete for NRP.

According to this study set up of delivery room for neonatal resuscitation means that availability trained personnel and presence of birth corner equipped with supplies and equipment represented by yes and if not represented by no.

Ethical clearance

Ethical clearance were obtained from the institutional ethical committee and administrative permission. An informed consent was obtained to assure the confidentiality from the health care provider.

Result

Health service facility of Tikur Anbesa hospital delivery room

Tikur Anbesa Specialized Hospital is the only tertiary specialized Hospital in Ethiopia. This hospital provides neonatal care and delivery service for 24 hours. Its delivery room contains private birth corner. But this corner does not include the necessary equipment

needed for immediate neonatal resuscitation at delivery room. In this corner: birth register, postpartum care register were available and they conduct neonatal and prenatal audits. In this health facility skin to skin care is initiated for all deliveries and all level of neonatal resuscitation given if needed.

Clinical staff attending at delivery room respondents

A total of 20 health care provider (professionals) assigned in the delivery room of study area and all are interviewed. The response rate is 100%. The largest group of the respondent were with the profession of midwives 10 (50%) while doctors i.e. resident of obstetrics and gynecology 7 (35%) and the rest of the respondents were nurses 3 (15%) (Table 1).

Variable	Frequency	Percent (%)
Staffs (profession)		
Doctor	7	35
Nurse	3	15
Midwife	10	50
Training of neonatal resuscitation		
Doctor		
Yes	3	15
No	4	20
Nurse		
Yes	0	
No	3	15
Midwife		
Yes	7	35
No	3	15
Duration of receiving neonatal resuscitation training		
1 years before	2	20
2 years back	5	50
3 years back	3	30
Giving Neonatal assistance in working area		
Yes	20	100
No	0	
Kind of neonatal assistance given		
Doctor		
Initial step		
Chest compression		
Positive Pressure Ventilation		
Endotracheal Intubation		
Medication		
All steps are done	7	35

Midwife		
Initial step	10	50
Chest compression	10	50
Positive Pressure Ventilation		
Endotracheal Intubation	0	
Medication	0	
Nurse		
Initial step	3	15
Chest compression	3	15
Positive Pressure Ventilation		
Endotracheal Intubation	0	
Medication	0	
Initial step Given for all new born	0	
Yes	20	100
No	0	
Person responsible for further neonatal assistance		
Doctor	7	35
Pediatrician	13	65
Neonatologist	0	
Midwife nurse	0	
Nurse	0	
Do you think that birth corner contain all necessary equipment for neonatal assistance		
Yes		
No	20	100

Table 1: Clinical staffs attending in delivery room at Tikur Anbesa Hospital (n = 20).

Concerning receiving neonatal resuscitation training among doctor respondents 3 (15%) received the training and 4 (20%) reported that not receive the training. But all doctors respondents 7 (35%) reported that they give all steps of neonatal resuscitation i.e. Initial steps, Chest compression, PPV, EI, Medication. Out of the midwife respondent 7 (35%) reported that they receive the training and 3 (15%) were reported that they are not received the NRP. But all midwives respondents gave neonatal assistance and they gave only the first three steps i.e. Initial step, chest compression and PPV. Among nurse respondents reported that no one received the training but they respond that they gave neonatal assistance and they gave the first three steps of NR. Totally 10 (50%) staff were received training.

Concerning the respondent's duration of time after received the training. Out of all respondents 2 (20%) reported that they received the training before one year; 5 (50%) took 2 years back and 3 (30%) received 3 years back.

All respondents 20 (100) were reported that initial step of NR were given for all newborns. Concerning the responsibility of a person in case of need of further neonatal assistance 7 (35%) of the respondents reported that Doctors are responsible and 13 (65%) reported pediatrician is responsible.

Concerning the birth corner equipment’s 20 (100%) respondents reported that birth corner were not include the necessary equipment for neonatal resuscitation.

Available equipment for neonatal resuscitation found in the delivery room of Tikur Anbessa Hospital

As we mentioned on the above TAH have a birth corner contain equipments necessary for neonatal resuscitation. Equipments were checked by myself together with the head nurse of the unit. Among WHO listed equipments TAH include Hand washing poster, Firm padded resuscitation surface, Overhead warm, source of medical air and O₂, Warmed towels, stethoscope, suction catheter with different size, O₂ supply with flow meter and tubing, Portable O₂ cylinders, O₂ masks to supply free flow oxygen, face masks with different size, Laryngoscopes with straight blade spare bulbs and batteries, Birth register, Endotracheal tubes with different diameter and ET stylet, Mygill forceps, Tapes for fixing ET, Feeding tubes for gastric decompression, syringes with various size needles, Drugs like epinephrine and Intravenous cannulae (Table 2).

Equipments not found at birth corner of this study area which is listed on WHO check list Light, Clock with timer in second, Polyethylene bag, Oropharyngeal airways, PPV devices (self-inflating bag), End tidal CO₂ monitoring device, Umbilical vein catheterization set with umbilical catheter, Pulse oximeter, Equipment list, Resuscitation flowchart and incubation for transportation (Table 2).

Name of Equipment	Yes	No	Remark
Hand washing poster	✓		
Firm, padded resuscitation surface	✓		
Overhead warmer	✓		Not functional
Light	✓		Not functional
Source of medical oxygen	✓		
Source of medical air (if possible)		✓	
Clock with timer in seconds		✓	
Warmed towels	✓		
Polyethylene bag or “Glad Wrap”		✓	
Stethoscope	✓		
Suction catheters (6F, 8F, 10F, 12F)	✓		
Oxygen supply with flow meter and tubing	✓		
Portable oxygen cylinders if needed for transporting to Nursery	✓		
Oxygen masks to supply free flow oxygen	✓		
Face masks of various sizes	✓		
Oropharyngeal (Guedel) airways		✓	
Positive pressure ventilation device (“Neopuff”, or Self-inflating Bag-Valve-Mask)		✓	
Laryngoscopes with straight blade (00, 0, 1), spare bulbs, and batteries Birth register	✓		
Endotracheal tubes (size 2.5 mm to 4 mm internal diameter)	✓		
ETT stylet or introducer	✓		
Magill forceps	✓		
Tapes for fixing ETT	✓		
End-tidal CO ₂ monitoring device	✓		
Meconium suction device	✓		
Feeding tubes for gastric decompression	✓		
Umbilical vein catheterization set with umbilical catheters (5Fr)		✓	
Syringes with various size needles	✓		
Intravenous cannulae	✓		
Pulse oximeter		✓	
Drugs like Epinephrine	✓		
Equipment list		✓	
Resuscitation flowchart		✓	
Incubator for transportation		✓	

Table 2: Check list for equipment neonatal resuscitation that are found in the delivery room of Tikur Anbessa Hospital.

Discussion

This study assessed the setup of delivery room of TAH for neonatal resuscitation, such as equipments, organization and staffs involved in assisting neonate.

Among health service facility of Tikur Anbesa hospital delivery room its tertiary, hospital, have 24 hr service of NICU and delivery services. There are 20 health care providers working in the delivery room. The delivery room has a birth corner, with in the birth corner there are birth register, PNC, death and birth audits and equipments for neonatal resuscitation. This facility when compared to Royal Prince Hospital, Australia general hospitals which provide secondary level of newborn care don't have units for intensive care. Newborns from risk pregnancy are transported in to tertiary level of health care. Generally, WHO guideline is applied by health care providers in general hospitals with obstetrics departments and delivery room and in University Hospital for Gynecology and Obstetrics This study area also apply the guideline of WHO as a general hospital.

AHA guideline 2010 reported that Initial step is done for all baby [9] and this study area perform initial steps for all baby.

This studies shows a little increment in number of trained staff 50% of the staff are trained and attending the delivery, when compared to studies in Ethiopia 2005 10% trained personnel worked in delivery room services and it is comparable study done in Malaysia showed that 40% certified nurse were work at delivery room [16]. Where births occur in facilities, it is a priority to ensure that all birth attendants (100%) are competent in resuscitation.

Among training experience of the respondent's only 50% of the respondents who attend the delivery were received the NR training from them only 7 (35%) of the respondents have an experience to do all level of NR procedure the other 13 (65%) have an experience to do the first three step. Based on the original objective of the NRP, the proportion of certified personnel in attendance of delivery should be 100% and perform all step of NR procedure. NSC guideline recommended that skill in performing or assisting with effective resuscitation of the newborn requires adequate training and preparation of staff as acute cardio-respiratory compromise at the time of birth cannot be predicted [14]. Some studies shows in Ethiopia only 10% were attended by trained health care provider but this study shows that better result 50% of the health care worker is trained by NPR.

Among birth corner of the delivery room study area it contain 70% of the equipment for neonatal resuscitation that are recommended by WHO and NPR guideline but as all respondents mentioned that even those these equipment's are available they are not fully functional, not maintained appropriately, lacks daily cross checking and continuous supply. WHO recommended that a birth attendant needs to be prepared for newborn resuscitation at every birth in any case, as a substantial proportion of newborns who need resuscitation don't have any maternal risk factor [17]. Before birth the necessary resuscitation equipment needs to be available, functioning and clean. In general, all the equipment necessary for complete resuscitation must be in the delivery room and routinely checked for proper functional because delivery is uneventful [14].

In this study health care provider duration of time after taking the NPR were only 20% took before one year and 80% were took 2 year back but the provincial advisory subcommittee recommended that authorities should the initial (NRP course) and ongoing educational needs monthly or quarterly of the multi professional to insure that the neonatal resuscitation guiding principles are consistent met [17,18]. In general each NRP provider should ready access to the most current version of the NRP text book and the most current version of NRP materials [18].

Conclusion

This study assessed the setup of delivery room of TAH for neonatal resuscitation and it showed that the setup of delivery room have gaps to implement the NRP.

The gaps are not single, more than one gap were contributed to influence the set up in order to implement NRP from those gaps lack of instrument in private birth corner, lacks ongoing training and continuity of NPR and the trained professional were not updated to the new guideline of NRP.

From those the most frequent gap mentioned by the study participants were lack of instruments, and its maintenances, they are not supplied continuously and lacks ongoing training of NRP.

The result also show some health care provider were not received the NRP however they were giving neonatal assistance without basic knowledge just by experience of long time exposure this were interfere with quality of care that are given.

Recommendation

Government

Programs would be better focus on increase the number of trained health care provider with NRP, providing ongoing program that help to update themselves the guideline of NRP.

One of the important factors contributing to high level of Child Mortality was neonatal death. Programs would be aimed to reduce neonatal death by focusing on all identified gaps and provide basic instruments and supplies, continuous monitoring, maintenance of the existing instruments that would be needed for neonatal assistance.

Health care providers would be give appropriate neonatal care by applying the guideline i.e. by following the steps of NRP, the equipment must ready and check for the functioning before delivery for all delivery, by updating themselves to the updated recommendations and working in collaboration with the other team that are attended in the delivery room.

Researcher

Further studies would be needed to assess the set up and to identify further gaps of the study area to render NRP.

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Competing Interests

The author (s) declare that they have no competing interests.

Authors' Contributions

Hana Abera Hailemariam, Banchialem Demise conceptualized the study, designed the study instrument and conducted the data analysis and wrote the first draft and final draft of the manuscript. Palermo University approved the research proposal with some revisions, participated in data analysis, revised subsequent drafts of the paper and involve in critical review of the manuscript. All authors read and approved the final manuscript.

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