ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF QUALITY OF CARE IN TIKUR ANBESA SPECIALIZED TEACHING HOSPITAL NEONATAL INTENSIVE CARE UNIT, ADDIS ABABA, ETHIOPIA.

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ADVISOR MULUGETA BETRE (MD, MPH)

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES, ADDIS ABABA UNIVERSITY AS PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF PUBLIC HEALTH

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Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in this or another university and all the sources of materials used for the thesis have been fully acknowledged

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This thesis work has been submitted for the examination with my approvals as university advisor.

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Acronyms

AAU	Addis Ababa University
BAPM	British Association of Perinatal Medicine
CPAP	Continuous Pathway Airway Pressure
EDHS	Ethiopian Demographic and Health Survey
EPS	Ethiopian pediatrics society
FMOH	Federal Ministry of Health
MDG	Millennium Development Goal
NICU	Neonatal Intensive Care Unit
NMR	Neonatal Mortality Rate
SPSS	Statistical Package for Social Sciences
TASTH	Tikur Anbessa Specialized Teaching Hospital
TEF	Tracheo-Esophageal Fistula
UNICEF	United Nations International Children Economic Fund
VSO	Voluntary Services Overseas
VON	Vermont Oxford Network
WHO	World Health Organization

Abstract

Background: Despite the increasing population and unsatisfactory decline of neonatal mortality rate (NMR) less attention was given to Neonatal Intensive Care Unit (NICU) until recent years where a little effort is being made to improve the services provided. Currently there are 27governmental NICUs; Tikur Anbessa Specialized Teaching Hospital (TASTH) is one of these hospitals which serve as the main referral center. Regardless of the few number of NICUs there is complaints on the quality of care provided which might be due to a variety of reasons that are crucial for the survival of the neonates.

Objectives: To assess the quality of care in TASTH, NICU in Addis Ababa, Ethiopia.

Methods: Hospital based cross sectional study was used. The study has two categories of participants; primarily mother of the neonates who were available in the NICU during the data collection period and health professionals (n=35) working in the NICU. Sample size of the study on mothers was calculated using single population formula considering 50% prevalence which gives a total 384 participants. The unit was observed using inventory checklist from WHO Hospital Care for Mothers and Newborns: Quality Assessment and Improvement Tool. For the qualitative portion head of the unit (neonatologist), practicing neonatologist and the head nurse were included. Structured questionnaire was adopted from WHO Hospital care for mothers and new-born babies: quality assessment and improvement tool, and they were filled by the date collectors after obtaining an informed consent. Data was analyzed using SPSS version 20. P value of 0.05 was the cut off point for the level of significance. Adjusted odds ratio was used to show strength of association.

Result: The study found that the quality of care that is provided in the neonatal intensive care unit in TASTH is inadequate. Overall service satisfaction was found to be 96.4% and 47.1% for the clients and health professionals respectively. Clients whom their neonates shared bed with others were 6.6 times not satisfied than those clients whom didn't, AOR (95%CI) 6.612[3.604, 10.109] Health professionals who don't think that there are a sufficient number of staffs were dissatisfied 3.15 times compared to those who think the number of staff is sufficient. AOR (95%CI) 150[0.050, 5.611]

Conclusion and recommendation: Quality administration demands several strategies thus, it is fundamental to identify the problems, aiming at implementing effective actions, and monitoring the processes. The findings from this assessment would assist in scaling up of such units. More over the presence of national guideline which is specific to NICU would be a key to solve the problems associated with quality of care in NICUs.

1. Background

1.1 Introduction

Ethiopia has a population of more than 97 million, ranking 13th in the world and the second most populous country in Africa. There was a population growth rate estimate in 2008 as 2.23 % and the projected population estimate in 2025 is 107,804,235 million. The population grows at a rate of about 2.9% per annum. (1).Reducing newborn morbidity and mortality is a major government priority in Ethiopia. In line with the MDG while an impressive reduction has been made in child mortality, however, neonatal mortality is still on a plateau across Ethiopia. The annual mortality rate reduction for 1 up to 59 months is 5.5% where as only 2.4% for newborns. Every year 81,700 neonatal death occur which accounts for 33% of childhood mortality (2).

The newborn period is defined as beginning at birth and lasting through the 28th day following birth Neonatal intensive care units (NICUs) are those units that are specifically designed for premature and very ill newborns with different diagnoses. The neonatal intensive care unit is no exception that they are critical to premature, very sick and infants with malformation of the newborn period. (3)

1.2 Statement of the problem

Despite the increasing birth rate of 37.66 births /1,000 and unsatisfactory decline of neonatal mortality rate (NMR) less attention was given to NICU until recent years where a little effort is being made to improve the services provided. Currently there are 27governmental NICUs of which six are located in the capital Addis Ababa (2). Tikur Anbessa Specialized Teaching Hospital (TASTH) is one of these hospitals which serves as the main referral center that provide the NICU service. There is a problem with the existence of few NICUs in the country; moreover the quality of care that is crucial for the survival of the neonates is questionable.

Quality, because of its subjective nature and intangible characteristics, is difficult to define. However, quality may be viewed differently depending on who is assessing the quality. Assessing quality requires data about the system in which care is provided. So far as to our knowledge no published study is available on quality of care provided by the public NICUs, hence, The aim of the study is to assess the quality of care provided at the neonatal intensive care unit in TASTH as regards the various components of structure domain within the context of quality. Accordingly the result of the study will be used by FMOH along with other stakeholders to strengthen the system and maintain quality of care of these units in Addis Ababa and the country as large.

2.Literature Review

2.1 Definition of Quality of Health Care

Everyone agrees that high quality is a desired attribute of health care. However, defining what is truly meant by quality health care is controversial. In 1966, Avedis Donabedian introduced the conceptualization of quality components that has formed the basis of many, if not most, modern models of health care quality. He described quality as having three principal components: structure, process, and outcome. Structure refers to the attributes of the settings in which care is provided. It includes such elements as resources, staff and equipment. Process covers all aspects of delivering care and is related to interaction within and between practitioners and patients. Outcome focuses on the end result or the effect of the care provided (4-6).

Various approaches to quality assessment and quality improvement have been proposed over time. Many approaches focus on the availability if the essential infrastructure, equipment, commodities, and on the existence of written procedures and protocols, but fail to assess the actual case management. Evidence shows that even when all the necessary structural components are available the quality of care may still be poor, since what matters is the appropriate use of available resources to ensure effective case management (10-11).

The Institute of Medicine in 1990 defined quality as “quality of care is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge”. The institute once more tries to lay out six aims for the health care system, which are safe, effective, patient centered, timely, efficient and equitable ways of services (10-11).

The World Health Organization on the other hand agrees that there need to be a systematic, participatory, action oriented approach to quality improvement. Quality assessment alone cannot guarantee that any change will take place; use of information gathered during the assessment to develop an action plan is a necessary step in every quality improvement process (10, 27).

Despite the fact that the ultimate goal of health care is to improve or maintain health status, there are other aspects of care that are often considered important for quality. Patient

satisfaction and appropriate use of limited resources are often taken into account when determining if personal health care or public health services are of “high quality.” Patient satisfaction is commonly measured and many consider it an indicator of medical care quality. However, patients may be satisfied with poor quality care (19).

2.2 Global Situation of Neonatal Health

The global neonatal mortality rate ranges from as low as 1/1000 (e.g. Japan, Singapore) to as high as 53/1000 (e.g. Somalia, Afghanistan). Among the WHO regions, the African region has the highest average NMR (36/1000) and the European region the lowest average NMR (7/1000). (8-9) Neonatal mortality accounts for a high proportion of deaths among children aged younger than 5 years 38% globally and 24–56% at regional level. High-income countries have reduced neonatal mortality rates (NMRs) to an average of four per 1000 live births. By contrast, the overall NMR in middle-income and low-income countries (where 99% of neonatal deaths happen) is 33.1 (13).

Neonatal care can be analyzed from two ends of the spectrum: primarily, the sophisticated western world perspective, which comprises technological advancements supported by funding and resources in key areas of care (e.g. thermal care and ventilation) and education. Secondly, the resource limited model from developing countries where often basic care provision is limited or unavailable and where healthcare education particularly in specialties such as neonatal care is either under-resourced at best or not in existence (14).

2.3 Neonatal Health in Sub Saharan Africa

Globally, every year around 3.3 million babies die within their first month of life and the proportion of under-five child deaths that are now in the neonatal period (the first 28 days of life) has increased in all regions of the world and is currently estimated at 41%. Of these deaths, over 90% occur in low- and middle-income countries, and a third of all neonatal deaths occur in sub-Saharan Africa. Africa accounts for 11 percent of the world’s population but more than 25 percent of the world’s newborn deaths. Of the 20 countries in the world with the highest risk of neonatal death, 15 (75 percent) are in Africa (7).

In sub-Saharan Africa, recent health services assessments found only 15% of hospitals equipped to provide basic neonatal resuscitation. In the short term, intra partum-related

neonatal deaths can be substantially reduced by improving the quality of services for all childbirths that occur in health facilities, identifying and addressing the missed opportunities to provide effective interventions to those who seek facility-based care (7) .

A that aimed to assess the quality of care in NICU done in Egypt showed the compliance score percent of NICU to structure, process and outcome criteria was (47.5%), (51.6%), (83.3%) respectively. The satisfaction percentage was graded poor (30.3%) while the quality percent of the condition on discharge was (83.3% good) (16).

Another study done in Tanzania found the documentation of care for sick neonates hospitalized in peripheral health facilities showed significant deficits in areas which could have major health implications, not only for infant outcomes but also for program assessment and planning. Moreover lack of regular auditing, few highly trained staff, and low availability of equipment and laboratory facilities were among the contributing factors (20).

2.4 Neonatal Health in Ethiopia

In Ethiopia, about 120,000 babies die every year in the first four weeks of life. This accounts for 32% of all deaths in children younger than 5 years of age in Ethiopia. The 2005 Ethiopian Demographic and Health Survey (EDHS) indicated that primary causes of neonatal death are due to prematurity (17%), perinatal asphyxia (25%), sepsis (37%), tetanus (7%), diarrhea (3%), and congenital anomalies (4%) (21, 28).

A study done in 1995 on the survival of neonates in Addis Ababa resulted in 71.9% of neonatal mortality rate, 50.9% of early neonatal death and 20.9% late neonatal deaths. Shortness of breath (53.1%) and prematurity (17.8%) were the main reasons (22).

A study which assessed the quality of care for children in selected referral hospitals in Ethiopia reveled that none of the hospitals were practicing the standard triaging process by assessing children immediately on arrival for emergency and priority signs. All of them were not appropriately organized and fully equipped to handle pediatric emergencies effectively. Overall, the case management of common neonatal and childhood illnesses was not optimal. Generally, there was shortage of some essential drugs and lack of materials such as nasal prongs, infant and child size bag and masks, nebulizers, heaters and oxygen concentrators. Hygienic facilities were below the expected standard (23).

2.5 Neonatal Intensive Care Units (NICU)

Neonatal Intensive Care Units are larger intensive care units that provide the whole range of medical (and sometimes surgical) neonatal care for their local population and additional care for babies and their families referred from the neonatal network in which they are based, and also from other networks when necessary to deal with peaks of demand or requests for specialist care not available elsewhere (17-18).

Not all newborns necessitate NICU but there are some that require observation and care that is beyond the scope of a normal newborn nursery, these are called high risk neonates. These neonates require early intervention that should be delivered at neonatal intensive care unit (17-18). Which provides care to full spectrum of newborns ranging from extremely premature infants, to high risk and critically ill babies, to less critically ill babies who are recovering and maturing with increased emphasis is being placed on the need for standards of care, as well as mechanisms which address the barriers to provision and use of quality care (25).

A NICU is typically directed by one or more neonatologists and staffed by nurses, nurse practitioners, pharmacists, physician assistants, resident physicians, and respiratory therapists. Many other ancillary disciplines and specialists are available at larger units (17). NICUs are basically designated as:-

- ***Level 1*** Units provide Special Care but do not aim to provide any continuing High Dependency or Intensive Care. This term includes units with or without resident medical staff.
- ***Level 2*** Units provide High Dependency Care and some short-term Intensive Care as agreed within the network.
- ***Level 3*** Units provide the whole range of medical neonatal care but not necessarily all specialist services such as neonatal surgery.

2.6 Ethiopian Situation of Neonatal Intensive Care Units

In 2009 the FMOH with support from UNICEF and with technical assistance from Ethiopian Pediatric Society (EPS) piloted the newborn corner in 100 health facilities (50 health centers and 50 hospitals) in the country (26). Likewise the ministry trained Health Extension

Workers to treat common childhood illnesses such as diarrhea, pneumonia, malaria and severe malnutrition. However, severe cases with newborn complications need to be referred to health facilities for advanced care. There is a critical shortage of skilled neonatologists in the country, with only five academically trained neonatologists in Addis Ababa serving the entire country (28). To address the lack of referral institutions for sick newborns, the government of Ethiopia is striving to establish NICU indifferent parts of the region. As to 2014 there are 28 NICU's in all over the country (2).

A rapid assessment conducted in Ethiopia by voluntary services overseas (VSO) shown a clear difference in the number of neonatal mortality before and after the establishment of NICU in some hospitals like Arbaminch where the neonatal mortality was 175.4 per 1000 live birth compared to the nation's average 37 per 1000. In this report it was found that the inaccessibility to heater, phototherapy and respiratory support were the common causes for the high neonatal mortality. These activities are supposed to be delivered by the NICU however; there was a lack of knowledge and skills in neonatal resuscitation and newborn care among all health professional. Besides, staff felt that the pediatrics department lacked the ability to manage sick babies, so would not refer (24).

In Yirgalem, neonatal mortality fell from 18.5% to 6.45% in December 2012. Prior to NICU establishment, premature/LBW babies were not routinely referred. Babies with asphyxia or neonatal tetanus were also unlikely to be referred by the obstetric team (24).

Many factors could be attached to the poor quality of NICUs. One of these is lack of support for, or a delayed response, from the authorities in, the provision of essential health commodities for the NICU. Sometimes the hospital management appeared not to recognize the NICU as a separate unit from pediatric services and denied the necessary and critical support it needs (24). What is more, lack of continuous upgrading or updating of knowledge and skill in the management of newborn care since the initial training together with workload of the nurses, mainly due to shortage of trained NICU nurses added with shortage of equipment and supplies and, Small rooms with insufficient space to carry out standards practices are also the additional reasons reported (16, 23).

3.Objectives

3.1 General objective

To assess the quality of care of Neonatal Intensive Care Unit (NICU) at Tikur Anbessa Specialized Teaching Hospital. Addis Ababa, Ethiopia.

3.2 Specific objectives

1. To describe selected aspects of quality of care of NICUs at Tikur Anbessa Specialized Teaching Hospital NICU in terms of hospital support system, case management and policies and organizational services.
2. To assess client and health professionals perceived satisfaction
3. To assess factors that affects the quality of care at Tikur Anbessa Specialized Teaching Hospital NICU.

4. Methods

4.1 Study design

Hospital based descriptive cross-sectional study was used. The study involved both qualitative and quantitative method of data exploration.

4.2 Study area

The study was done in Addis Ababa the capital of Ethiopia. The population of Addis Ababa as of 2007 is 3,384,569 (1). Tikur Anbessa Specialized Teaching Hospital was established in 1964 for memorial of prince Mekonnen Duke of Harar, son of Imperial Haile silasie. It is located on 12300m.sq of land with 8 floors and 1262 rooms with 800 beds. The hospital provides a tertiary level health care service. Administered by Addis Ababa University the hospital is the largest and oldest teaching hospital in the country. It provides teaching for medical students and residents every year. It also provides teaching for Nursing and Midwifery, Radiology, Pharmacy and other allied health sciences. It offers diagnoses and treatment for approximately 370,000-400,000 patients per year in all the wards (21).

The hospital is classified in to different departments, NICU runs under the department of pediatrics. The neonatal ward is reported to be able to accommodate as many as 60 patients. Average census is 20-40 NICU patients daily and an additional 3-4 infants receiving Kangaroo Mother Care. There are on average 2000-3000 annual admissions. Fifty per cent of admissions are from outlying birth centres. Many referrals are premature and low birth weight infants. There is a facility for rooming in for mothers and a 5-bed Kangaroo mother care unit which serves as a teaching center for Kangaroo mother care for preterm babies. The maternity ward is located close to the NICU and delivers 4000-5000 babies annually. The NICU is covered by two neonatologist, several consulting paediatricians, medical students, and 20 NICU nurses (21). Currently the unit is one of the NICUs in the country (2). The study was conducted in the neonatal intensive care unit of this hospital.

4.3 Study population

The study have two categories of participants; primarily mothers of the neonates who are available in the NICU during the data collection period and health professionals working in the NICU.

The unit was observed using inventory checklist from WHO Hospital Care for Mothers and Newborns: Quality Assessment and Improvement Tool (10).

For the qualitative portion head of the unit (neonatologist), practicing neonatologist and the head nurse were included.

4.4 Sample size

One proportion population formula was used to determine the sample size of mothers who were to be included in the study. This formula was used because one of the objectives of the study was to assess client satisfaction and there was only one population, which are mothers of the neonates who are admitted in the ward. The study didn't involve any comparison between two populations thus this formula was found to be relevant.

$$n = \frac{(Z_{1-\alpha/2})^2 \times P(1-P)}{d^2}$$

Where:-

- n = required sample size based on sensitivity
- α= level of significance (1 – α is the confidence level)
- $Z_{1-\alpha/2}$ = standard normal deviate corresponding to the specified size of the critical region (α), then

  For x=0.05, $Z_{1-\alpha/2}$= 1.96

No study was found that directly assessed the quality of care of NICUs in Ethiopia, there for 50% prevalence is taken to calculate the sample size.

Therefore, $n = \frac{(1.96)^2 \times 0.50 \times (1-0.50)}{}$

$$(0.05)^2$$

$$n= 384$$

4.5 Sampling procedure

To assess client satisfaction, a total of 384 mothers in attendance who have their newborns discharged were asked for exit interview during the study period (April 9-May 8, 2015).

Concerning the health professionals the unit has a total of 35 health professionals; 20 staff nurses, 14 physicians (5 residents and 8 interns) and 1 clinical pharmacist, these health professionals all were interviewed given a self-administered questioner.

For the qualitative portion in-depth interview was conducted using interview guide with head of the unit (neonatologist), practicing neonatologist and the head nurse.

4.6 Variables of interest

Dependent variables

- Client satisfaction
- Quality of health care

Independent variables

- Socio demographic characteristics
- Hospital support system, case management and policies and organizational service
- Working conditions and staff incentives
- Equipment and supplies
- Career development

4.7 Data collection Procedure

After having the informed consent agreed, mothers were interviewed using a structured questionnaire totally adopted from WHO Hospital Care for Mothers and Newborns: Quality Assessment and Improvement Tool (10); which was filled at discharge. The tool has three categories [1= socio-demographic information (Residence urban is to mean present in Addis Ababa, rural is out of Addis Ababa and other government hospitals include Gandi Memorial hospital, Yekatit 12, St.Paul and Zewditu memorial hospital), 2= clients right and satisfaction and 3= overall satisfaction]. The questionnaire was first prepared in English then translated to local language Amharic and back again to English before enumeration. There were a total of 4 data collectors (B.sc nurses) working in the unit. The data collectors filled the questionnaire. Confidentiality was maintained.

Semi-structured open ended questionnaire adopted from WHO Hospital Care for Mothers and Newborns: Quality Assessment and Improvement Tool (10); in a way that fits the setup was used to collect data related to health professional's qualification and their satisfaction rate. The questions are composed of socio-demographic characteristics, professional details (interns are medical students to be qualified as general practitioners, resident ship* are physicians specializing in pediatrics), hospital support system, working conditions/ staff incentives, equipment and supplies and professional development. They were given the questionnaire and asked to fill it independently. Names were not asked rather codes were used to identify the respondents.

Qualitative part

An in-depth interview was conducted using interview guide with the participants (head of the unit (neonatologist), practicing neonatologist and the head nurse) permission. The questions include perception of quality, changes observed in the unit, challenges and things to be improved to give qualified service. Their response was transcribed by the investigator immediately.

Observation

Facility observation for the capacity to provide NICU service was assessed by the PI together with the Neonatologist using checklist adopted from WHO Hospital Care for Mothers and

Newborns: Quality Assessment and Improvement Tool (10), which is composed of 3 sections:

1. *Hospital support services* which includes an assessment of the physical infrastructure, staff, and availability of medicines, equipment and supplies.
2. *Case management* which assess essential case management practices, clinical monitoring and, evaluation of appropriateness of use medicines.
3. *Policies and organization of services which* includes assessing the existence, quality and use of relevant hospital policies and the organization of services. Policies to ensure infection prevention, guidelines development and dissemination, staff training, audit systems, access to hospital and continuity of care, and patient's rights in hospital are assessed.

Each criterion included in the check list is related to the study objectives in terms of its importance to the health of the neonates, its applicability to the type of care provided and, its effectiveness in leading to the quality improvement.

4.8 Standard definition

- **Neonate: -** is any infant aged less than 28^{th} day of life (2).
- **Neonatal intensive care unit (NICU):-** These are larger intensive care units that provide the whole range of medical (and sometimes surgical) neonatal care for their local population and additional care for babies and their families referred from the neonatal network in which they are based, and also from other networks when necessary to deal with peaks of demand or requests for specialist care not available elsewhere (18).
- **Quality of care: -** is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge (11).
- **Client satisfaction**: - overall client's perception towards the service provided (12).

4.9 Data quality management

Prior to data collection one day training on how to collect the information was given to the data collectors by the principal investigator. Data was collected after obtaining informed consent from each client. Confidentiality was maintained using codes; names of respondents were not used in any of the data. Similar procedure was followed to the data of health professionals. Each completed questionnaires was properly coded and double entered into an excel spreadsheet, cleaned, verified and then entered to SPSS version 20 for statistical calculation. Adjusted odds ratio was used to show strength of association.

Before conducting the in-depth interviews participants were asked for their consent (verbal). The interview was conducted in a room which can allow privacy. Their responses were transcribed carefully and immediately by the principal investigator.

The checklists for the unit and the hospital were filled by the PI together with the neonatologist (practicing in the unit); subsequently they were scored in accordance with the adopted WHO check list.

4.10 Data analysis procedure

After data collection, the structured questionnaires was checked, coded and then entered to SPSS version 20. Statistical significance was assessed using chi-square, binary and multiple logistic regression model. Variables found significant at p-value <0.05 in bivariate analysis was included in to multivariate logistic regression analysis.

The inventory check list used score. Each item is scored using 4 possible categories, with the following meaning: 3 = care corresponding to international standards, 2 = substandard care but no significant direct hazard to health or violation of human rights, 1 = inadequate care with consequent serious health hazards or violation of children's rights, 0 = very poor care with consequent systematic and severe hazards to the health of newborns. Total score for each category was calculated using arithmetic mean. (10)

The transcribed interview was analyzed in agreement to the result of clients and health professionals yet; some aspects of the interview were also analyzed in accordance to unit's checklist. Anonymity is maintained.

4.11Ethical consideration

The study was commenced after obtaining administrative permission and ethical clearance from AAU School of Public Health, Ethical Clearance Committee and from the participating hospital. Information sheet was provided with consent and, study participants were asked for their participation or not. Those who signed the written informed consent voluntarily were part of the study. Their personal information was kept confidential. They were also informed that, they can refuse to participate anytime if they don't want and that would not have any impact on their access to treatment.

4.12 Dissemination of result

The final result of the study will be submitted to Addis Ababa University School of Public Health. A copy will also be given to Tikur Anbessa Specialized Teaching Hospital. Besides there will be a presentation to the university community, concerned bodies and volunteers who are interested. The paper will be copied and given to the school's library. It will also be prepared and sent for publication to peer review journal.

5. Result

5.1 Unit's inventory check list result

The check list has three main categories (hospital support system, case management, and policies and organization of services) which assess the quality of the service provision in the unit. The mean score for all the categories was below 2, referring to the assessment tool it is interpreted as an inadequate care as indicated in Table 1.

5.1.1. Hospital Support System

The building of the hospital has 8 floors; NICU is located at the 6th floor next to the labour ward. A banner that holds the name 'NEONATAL INTENSIVE CARE UNIT (NICU)' is posted over the entry door. The admission policy of the ward is up to the age of 7days unless they are diagnosed as neonatal jaundice which is accepted up to 10 days. Newborns who are greater than 7 days are referred to the paediatrics emergency ward. A proper identification of patient is in place. At time of admission a tag which is the mother's name is written in both Amharic (local language) and English and neonate is labeled.

The ward has 21 rooms. There are 4 rooms where the new-borns are admitted in each with specific conditions. They are labeled as Room 1= preterm room, Room 2=very sick term's room, Room 3=stable term room and Room 4= procedure room. Another 4 rooms are labeled for mothers to rest with a total of 20 mother's bed. There are 3 rooms for toilet, only one has bath room with toilet. The remaining rooms are comprised of coordinators office, admission room, duty rooms (resident's, intern's and nurse's), 2 kitchens (one is milk preparation room), store, and x-ray room.

We used inventory check list of Equipment of WHO listed as mandatory for NICU was checked. There were 25 incubators (only 18 are in use due to space constraint), 11 photo-therapies, 3 warmers, 17 gauges for oxygen, 8 pulse-oximeters (only 4 were observed functional), and 10 non-invasive ventilation (CPAP's). From the list of equipment 6 infusion pumps (due to lack of maintenance), and one mechanical ventilator (skill problem, only one of the neonatologists is skilled on the function of the machine) are not functional at all. Multi

functions monitor is the one that is not available at all. Wall posted working thermometer that could control the room temperature was available but not functional.

Pharmacy management and medicine availability was observed, and the result shows 76% (26/34), of the medicines listed to be checked were available in the pharmacy, although medications like morphine, phenobarbitone (IV), and surfactant were not available.

Laboratory tests like C-reactive protein, electrolytes test, combs and rethicolcytes count, blood glucose, and blood gas analysis are not available in the hospital's laboratory. Otherwise 84% (27/32) of the tests listed in the WHO check list are available.

Concerning the ward infrastructure: wastes are collected properly and timely, cupboards and shelves are clean and arranged orderly though, problems with cleanness of toilets were not satisfactory. Nearly (93.5%) of clients also reported problems related to toilet and bath room. Some of the days unpleasant smells are also detected from the toilet. What is more is the insufficiency and inadequacy of the hygienic facilities, like number of toilets and bath rooms plus availability of water.

From the observation it was mostly at night that water was obtainable. There was a container observed where they collect water. Only one wash basin was observed in each room in addition to the one available at the entrance. If interruption in Electricity occurs the hospital has a generator, although some of the sockets and the lights were not functional during the check-up.

5.1.2. Case management

Setting for the care of premature and low birth weight infants is in place with a specific room set for pre-terms only. Cockroaches were observed specially in the preterm room, and they are often found around the newborns.

Clinical evaluation and monitoring is done every day with physicians round mostly carried out by senior residents followed by fellow residents and interns. Involvement of nurses on the round is limited to following orders from the physicians and carrying them out. There are specific guidelines which are used to evaluate neonatal conditions like hypoglycaemia, hypocalcaemia, neonatal jaundice, and neonatal sepsis. Nutrition is addressed following the

feeding protocol of the ward which is separate for preterm and term neonates; although the implementation is varying it is well practiced in the presence of senior neonatologists.

The health professionals were also asked if there was a guideline for the ward (NICU) and 52.9% confirmed the existence, while 20.6% replied ‘no’ and 26.5% didn’t know.

In terms of clinical records, documentation was observed inadequate. Patient charts, laboratory, x-ray and other investigation results are found here and there disorganized. Mothers (14.5%) were also able to identify this problem they mentioned that they were required to unnecessary expenses for repeated investigations. The ward has it is own patient chart in which progress is recorded on daily base.

Advanced new-born care is observed from different perspectives. Infection control is below the standard. A written protocol is available for antibiotic treatment in the guideline. Respiratory problems are mostly managed by supplying oxygen and antibiotics. Shortage of pulse oximeter restricts the continuous follow-up of those patients with respiratory distress. There is a room for x-ray in the ward but during the study period it was not functioning, the reason reported was shortage of skilled human resource and not problem related to the machine. Neonates were sent to other diagnostics clinics for x-ray outside the compound. Lack of mechanical ventilator and blood gas analysis were detected as an additional challenge for the effective treatment of respiratory problem.

Management of pain especially for pre and post operation patients is limited to pharmacological approach which is mostly limited the use of one medicine which is paracetamol (suppository). Non-pharmacological approaches are very minimal; sugar water and repositioning were observed for some post operation patients during the study period.

Follow up is done through appointing the neonate at discharge for the infant high risk clinic which is found separate to the NICU at the first floor of the hospital next to the paediatrics emergency ward. The remaining components of advanced new-born care which includes neonatal developmental care, effective communication with parents and transport of critical patients are still practiced very poor in the ward.

5.1.3. Policies and Organization of Services

Components listed under policies and organization of services has been checked likewise. Regarding laundry, soiled linens are stored separate from the clean once, although they are transported to the laundry with the same trolley to the laundry which is located at the basement of the building.

Standard aseptic precautions and infection prevention are practiced; use of gloves was found to be good there is no shortage; isolation for infectious patients is done in the procedure room since there is no special room for isolation. Strict aseptic techniques are not being practiced by all nurses especially at times of emergencies.

Audit and review process are in place in the hospital, there is a committee responsible for organizing the process. Regarding NICU there is a morning session three times a week. Case reviews are conducted to analyze and discuss cases of severe complications and deaths.

Coordination with other health facilities is not well communicated. Liaison office is in place which is responsible for the contact whether the required equipment like bed and oxygen is available or not with facilities before sending a new born to the hospital. Nevertheless majority of the admission come without contacting the office, this shows the poor communication between the institutions or the shortage of NICUs. Referral to a higher level of care is not practiced because the hospital is the highest and tertiary one; though, neonates with congenital anomalies (spinal bifida, hydro-cephaloues, and cleft lip/pallet) are sent to other hospitals which conduct the surgical procedures.

Concerning rights of mother and new-born, there is no separate charter or policy specifically designed as it recommended in the check list. However there is patient right and they are assumed to be included in it, still these rights are not seen posted in the ward. Access to information is inadequate. None of the health professionals are trained in communication skills, but some still pay attention to the concerns of the mother.

Table 1 Summary of the Quality Assessment and Improvement tool inventory checklist of NICU, TASTH. 2015. Addis Ababa, Ethiopia. April 2015.

Hospital support system	Mean score =1.4
1.Physical structures, staffing and basic services	1
2.Pharmacy management and medicine availability	2
3.Equipment and supplies	1
4.Laboratory support	1
5.Ward infrastructure	2
Case management	Mean score =1.75
6.Care for pre mature newborns	2
7.Specific conditions	2
8.Advanced new born care	2
9.Monitoring and follow-up	1
Policies and organization of services	Mean score =1.63
10.Infection prevention	2
11.Hospital support service	1
12.Hand washing	1
13.Standard precautions	2
14.surgical patients	1
15.Guidelines and protocols	2
16.Continuous learning	2
17.Audit and case reviews	2
18.Access to hospital care and continuity of care	1
19.Mothers and newborn rights	0
20.Availability and accessibility of care	2
21.Acceptability and respect	2
Overall mean score	**1.5**

5.2 Socio demographic characteristics of the study population

All mothers (n= 384) interviewed were married (100%). The mean age of the respondents is 27.4 years. One hundred seventy five (45.5%) of the mothers income was less than 1500 Ethiopian birr per month. 39.8% of the mothers were having their first child, (153/384) while the rest (60.2%, 231/384) were having their 2^{nd}, 3^{rd} and 4^{th} children with the frequency of 147, 44, and 33 respectively (Table 2).

A total of 35 health professionals were given the self-administered questionnaires. (79.4%) of the health professionals were females. The mean age of the study subjects was 28.7 with 23 and 54 being the minimum and maximum age (Table 3).

Of the total 35 health professionals (58.8%) were registered clinical nurse practitioners, with 8 (23.5%) of them interns who are learning to be qualified clinicians and 5 (14.7%) of them were specializing in pediatrics. 41.2% had a work experience in the ward for 1-3 months, (this per cent accounts only for the interns and residents due to the fact that they rotate every 1-3 months). The work experience of the nurses range from 1-3 years (20.6%), 3-5 years (14.7%) and from 6-10 years (20.6%) to >11years (2.9%).

Table 2 Socio demographic characteristics of the study population (mothers), NICU, TASTH. Addis Ababa, Ethiopia. April 2015. (n=384)

Variables		Frequency	Per cent (%)
Age in years	22-25	188	**48.9**
	26-29	95	**24.8**
	≥30	101	**26.3**
Residence	Urban	327	**85.2**
	Rural	57	**14.8**
	Total	384	**100.0**
Education	Illiterate	51	**13.3**
	Primary	108	**28.1**
	Secondary	119	**31.0**
	Above secondary	106	**27.6**
Occupation	Government employee	57	**14.8**
	Housewife	192	**50.0**
	own business	135	**35.2**
Place of delivery	Tikur Anbessa	193	**50.3**
	Health centre	104	**27.1**
	Other government hospital	39	**10.2**
	Private MCH	**48**	**12.5**

Table 3 Socio demographic data of health professionals in NICU, TASTH. 2015. April 2015. Addis Ababa, Ethiopia.

Variables	Frequency	Per cent (%)
Age in years		
20-30	25	71.4
31-40	8	22.8
>41	2	5.8
Sex		
Male	7	20.6
Female	28	79.4
Marital status		
Single	19	52.9
Married	16	47.1
Educational status		
B.sc	20	55.9
Internship	8	23.5
Resident ship	5	14.7
Masters	2	5.9
Monthly income		
2000-3000 Eth birr	13	37.2
3000-5000Eth birr	10	28.5
>5000Eth birr	12	34.3

5.3 Indicators for Quality of Care in NICU

5.3.1. Health information given to clients

Of 384 mothers interviewed 38.3% replied that they were asked by the health professionals for their agreement before any procedure was to be conducted, while the rest, 61.7% were not. Approximately 94% of the respondents were able to get some type of information about their neonates. However, only 66.9 % (257) were satisfied by the responses of the Health Professionals. 78.4% were not informed about the health condition of their neonate unless they themselves asked. Close to 10.2 % of mothers replied that they were confused due to different health information from different health professionals whereas 90.6 % clients reported no specific complaint

5.3.2 Hospital support system

Twenty nine of the health professionals (85.3%) don't think that there is sufficient number of staff in the ward. More than half (52.9%) of the participants replied "no" to the question of "is there is a good combination of more and less experienced staff on duty at every shift?". large number of study subjects (26 /35) reported lack of particular professional, lack of nurses and interns take the largest percentage (44.1%). nurses only, neonatologists and (senior nurses and doctors) take the percentage of 23.5%, 5.9% and 5.9% correspondingly. Shortage of professionals at nights, holidays and week days take half of the percentage (50%),while shortage only at nights accounts for 35.3%. some 14.7% replied there was no shortage. Considering the fact that the hospital is a teaching hospital participants were asked if the presence of students could actually interfere with their work and 61.8% answered "yes". They were further asked in what way that the presence interfered with their work and 29.4% mentioned crowding, 23.5% mentioned their work time was shared and 8.8 % mentioned that cross contamination and infection rates increased.

5.3.2 Working conditions and staff incentives

Work place was far from their home for 70.6% of the study population (n=35). Around 41.2% of them responded that they had difficulties to reach their work place and 35.3% of the health professionals responded that it is both difficult and expensive in terms of transportation. To further understand the hospital's support system, they were asked if the hospital provided alternate transport means and 70.6% replied "no". Regarding their work

schedule 79.4% were not satisfied. A majority of 94.1% of them don't think they receive a fair salary. Nearly 23.5% of the interns have not yet got into the system of part-time salary but the remaining professionals (73.5%) replied they didn't receive their part time salary on time. All of the respondents (100%) replied "no" for the question "are there any rewards available to staff who perform particularly well?" On the contrary, there were some 23.5% who replied "yes" for the same question regarding punishment and all these mentioned warning as a type of punishment given.

5.3.4 Equipment and supplies

In terms of necessary equipment needed for laboratory tests to neonates, many professionals (97.1%) replied that they were not available in the hospital. The same percentage goes for equipment which was needed by the professionals. 97.1% of participants replied that their equipment needs were not fulfilled. Of the equipment reported to be lacking oxygen, naso-gastric tubes (NGT), face masks accounted for 35.3%, pulse-oximeters with their sensors took 17.6%, glucometer 14.7%, ventilator and perfuser shared 11.8% whereas neonates' bed, radiant warmer and photo-therapy accounted for 14.7% (Table 4). In terms of availability of medicines at all times 79.4% reported unavailability; and from the reasons given, 58.8% reported administrative problems which were related to timely distribution, while another 14.7% claimed cost as a reason. Inconsistent availability of water was also reported by 97.1% at all times while 64.7% was reported for inconsistent electricity at all times.

Similarly clients were also asked if they have had observed any shortages of equipment; 64.6% didn't observe any while the rest, 35.4% did observe some. For example 58.1% of the respondents stated that their neonates shared bed with other neonates, while the remaining 41.9% did not. They were further asked if neonates shared things other than bed; 4.7 % replied that oxygen was shared and 7.8% reported that photo-therapy was shared.

5.3.5 Professional development

This part was assessed by asking questions about carrier development, support from hospital's manager and colleagues. In terms of carrier development only 3(8.8%) out of 35 mentioned opportunities for progressing in their carrier. Conversely they said 'it is very limited and unfair and most of the time the chance that is available doesn't match with their interest'. Majority (91.2%) of the respondents didn't describe their feeling. Support from

hospitals management tends to be lower (47.1%) compared to support from colleagues (52.9%).

Table 4 Equipment not available as reported by health professionals. NICU, TASTH. 2015. Addis Ababa, Ethiopia. April 2015

Items	Frequency	Per cent (%)
Oxygen, naso-gastric tubes (NGT), face masks	12	35.3%
Pulse-oximeters with their sensors	6	17.6%
Gluco-meter	5	14.7%
Ventilator and perfusors	4	11.8%
Neonate's bed, radiant warmer and photo-therapy	5	14.7%
Total	32	94.1%

5.4 Overall service satisfaction

From the total of 384 clients only 25(6.5%) who were allowed to have visitors inside the NICU, when the remaining 359(93.5%) were not allowed. With respect to hospital food provision 33.9% of mothers were happy with the content and amount of food supplied while 51.8% did not consume the food provided by the hospital and 14.4% were not happy with the food and claimed that it was not sufficient for a breast feeding mother.

Regarding cost of medical expenses the majority (91.4%) of the respondents were able to afford, excluding those found outside the hospital's compound including laboratory investigations and pharmaceuticals.

The comments made by clients are categorized in to four groups ["keep it up (1); improve toilets and bathroom of the ward (2); high workload of professionals (3) and disorganization (4)]. The first category amounted to 41.6%. However, regarding the second category, 28.1% had complaints about the condition of the toilet and bath and they suggested that it has to be improved. Complaints included that toilets were unclean and uncomfortable especially for mothers who delivered by caesarean section, unavailability of water most of the times and lack of formal bath room for mothers (mothers usually take bath in the toilet).The third

category accounts for 15.6% and they remarked shortage of nurses, less supervision of interns and shortage of security staffs specially at duty hours (night and weekdays). The remaining 14.5% commented on disorganizations and they complained about poor handover between professionals, poor management of investigation results, the bored feeling of some of the professionals and unnecessary expenses such as repeated lab investigations due to misunderstanding between professionals and care givers.

The other question raised was about the availability of beds for mothers. Of the total 384 mothers 251(65.4%) were able to get bed both inside (NICU) and outside the NICU on the wards like gynaecology/obstetrics and labour ward. The rest 133(34.6%) were not provided bed and of those 28.6% and 1.3% used chairs and floor to spend the night, and the remaining 4.7% of them said they chose to come during the day time and return to their homes at nights. Overall satisfaction with the service provision was found to be 96.4%.

Satisfaction varied among professions. Mostly nurses were found to be not satisfied (5/20) with the service they provided followed by (6/20) who were less satisfied. General satisfaction of health providers by the service they provide is summarized.

5.5 Factors affecting quality of care in relation to client satisfaction

Significance association was traced by computing socio-demographic characteristics with client satisfaction using chi square. Educational status and income were found to be associated with client satisfaction Likewise client satisfaction was found to be associated with quality indicators like pre-procedure consent, counseling, bed sharing of neonates and cleanness of toilet and bath room. (P value < 0.05)

Multivariate analysis was performed: in terms of education those who are illiterate were 2.6 times satisfied than those who are above secondary level. AOR (95%CI) 2.3[1.143, 4.654] Clients whom their neonates shared bed with others were 6.6 times not satisfied than those clients whom didn't, AOR (95%CI) 6.612[3.604, 10.109] (Table 5)

Similarly quality indicators for health professionals like number of staff in the ward, salary, part time payment and career development were found to be associated significantly with their satisfaction. (P value < 0.05) Health professionals who don't think that there are a sufficient number of staffs were dissatisfied 3.15 times compared to those who think the number of staff is sufficient. AOR (95%CI) 150[0.050, 5.611] This (health professionals

data) should, however, be viewed with caution because the sample-size was too small to come to a conclusion (Table 6)

Table 5 Factors affecting quality of care in relation to client satisfaction NICU, TASTH. Addis Ababa, Ethiopia. April 2015.

Variable	Satisfaction		P value	COR (95%CI)	AOR (95%CI)
	No	Yes			
Education					
Illiterate	48(43.5%)	61(56.5%)	0.003*	2.625[1.480,4.658]	2.3[1.143,4.654]
Primary	27(22.7%)	92(77.3%)			
Secondary	14(13.2%)	92(86.8%)			
Above secondary	50(100%)	0(0%)		1.00	1.00
Income per month					
≤1500Eth birr	67(38.5%)	107(61.5%)	0.029*	0.492[0.260,0.930]	0.578[0.435,0.998]
1501-2900 Eth birr	44(37.2%)	73(62.9%)			
3000-5000Eth birr	28(56.0%)	22(44.0%)		1.00	1.00
Responses from clients					
Did staff ask your permission before carrying out clinical procedures for your baby?	No	128(54.2%)	0.002*	1.185[2.045,5.296]	5.08[2.654,9.753]
	Yes	109(45.8%)		1.00	1.00
Are the toilets and bath rooms** functional and clean?	No	238(66.5%)	0.001*	1.196[0.080,0.482]	3.383[1.143,10.011]
	Yes	120(33 %)		1.00	1.00
Have any of the staffs told about your baby's condition? Unless you asked them?	No	162(54.0%)	0.003*	6.297[3.122,9.876]	4.55[4.99,10.19]
	Yes	138(46 %)		1.00	1.00
Does your baby shares bed with others?	No	27(12.1%)	0.002*	16.44[9.735,27.779]	6.612[3.604,10.109]
	Yes	196(87.9%)		1.00	1.00

*N.B. * Significant at P<0.05, CI=confidence interval, COR (Crude Odd Ratio), AOR (Adjusted Odd Ratios)*

Table 6 Factors affecting quality of care in relation to health professional's satisfaction NICU, TASTH. April 2015. Addis Ababa, Ethiopia.

Variables	Satisfied (no/yes)		P value	COR (95%CI)	AOR (95%CI)
Do you think there is a sufficient number of staffs the ward?	No	6(75.0%)	0,002*	0.148[0.24,0.900]	3.150[0.050,5.611]
	Yes	2(25.0%)		1.00	1.00
Do you think you receive a fair salary?	No	18(56.2%)	0.003*	0.998[0.876,1,365]	1.45[0.749,2.434]
	Yes	14(43.8%)		1.00	1.00
Do you get your part time salary on time?	No	18(72.0%)	0.001*	2.939[1.158,7.459]	3.103[0.050,0.876]
	Yes	7(28.0%)		1.00	1.00
Are there any opportunities for progressing in your career in this hospital?	No	11(45.8%)	0.002*	0.170[0.029,0.990]	0.397[0.005,0.839]
	Yes	13(54.2%)		1.00	1.00

*N.B. * Significant at P<0.05, CI=confidence interval, COR (Crude Odd Ratio), AOR (Adjusted Odd Ratios)*

5.6 Qualitative part

The response for their perception of quality was different but all aiming the similar outcome. The unit's head and the head nurse described quality as; *'Quality is to give the utmost care with the acceptable ethical manner. It is to provide no harm for both the neonate and the mother with the available ability at hand'* While one of the neonatologists described it as *'Quality is a total process which starts from reception up to discharge. It includes the time consumed to get the service, capacity of the health professionals, the availability of equipments and follow ups.*

In terms of changes that happened in the ward all shared similar ideas. They witness a significant change. *'the way we do the rounds has changed a lot, in the old days only one team was responsible to round the whole unit but now we are divided in to two; the term and preterm side the nurses also have their rooms assigned, this helps in saving time and doing the work in effective manner.* The head nurse of the ward acknowledges the change to the environment. *'The ward was been refurnished by some volunteers it had under gone some*

changes and that has also helped a lot. These days some equipment like incubators is also being given to us from the hospital.'

They were asked to mention some of the challenges. The main challenge that they all mentioned is the issue if human resource specially the number of nurses. The head nurse said *'specially at night duty and weekends we face problem on assigning an equal amount of nurses like the day shifts, and this brings an increased workload to them as a result they focus on the routines and the quality issue is overlooked.'*

Having no digitalized data system is a another challenge reported by the unit's head he said *'we do not have an organized and computerized data system had it been in place we would have known how much we have worked, how many lives we have saved how many we have lost, why we lost them and so many. It would have been very helpful, and a reasonable work could have been done. What is more is oxygen delivery system which is very poor we once had started to blend oxygen but now the system is not functional. Giving oxygen directly from the tank is risky for new born and again there is no ophthalmic check-up so the risk due to prolonged use of oxygen is not identified.'*

One of the two neonatologists from the ward told that *'Bed sharing has been and is still a challenge for us so as not to provide a quality service. With sharing of bed cross contamination has been routine and this exposes neonates who were kept for observation are exposed to for undesired antibiotics. Nosocomial infection as a result is very high; drug resistance is also noticed in some patients. Those who were on ampicillin and gentamycine are forced to go to cefotaxime and sometimes to vancomycine and ceftazidine*.
The unit's head said *'Communication with the administrative staff is very challenging a simple example can be time wasted to purchase milk for the ward; it normally takes more than a month, they are not cooperative'*

Summarized form their responses the things they want changed are increased human resource (nurses), system of data management in place, provision of blended oxygen, decreased turnover of nurse by increasing their job satisfaction, better working space improved communication with referring health facilities to decrease the admission rates and continued training to staff.

6.Discussion

The study using WHO's Hospital care for mothers and new-born babies: quality assessment and improvement tool, found that the quality of care that is provided in the NICU in TASTH is inadequate on the overall.

In terms of the physical structure, NICU is located at the 6th floor next to the labour ward which is recommended because new-borns are easily transferred when they are in need of NICU. The study from Jordan and India also found that NICUs were adjacent to labour wards in their set up (16, 34). However, the fact that the building is located at the 6th floor and the elevator is not functioning at all times, it is challenging for some of the emergency cases to come across the steps carrying oxygen and the neonate. What is more is the difficulty encountered by the mother who comes with her pain and with her sick new-born mostly right after delivery. This indicates that the placement of the ward in the hospital needs to be considered again.

It is recommended that each NICU should be well appointed with the necessary materials and equipment. The study showed that some of the basic equipment for NICU like mechanical ventilator, multi functions monitor, and perfusers, were not available. Each Unit providing Neonatal Intensive Care should have a policy prepared in consultation with a Department of biomedical engineering and agreed with management. There should be maintenance, replacement and upgrading of equipment for neonatal care, which complies with national standards. Such a policy should also extend to appropriate training of clinical staff as well as record keeping of the usage of equipment and quality assurance (17). A study from Jordan also showed similar results; that equipment were lacking in the ward either for lack of maintenance or, lack of skills (16). The same result goes for some of the laboratory investigations tests reported unavailable are important investigations as to the recommendation of WHO; as a specialized hospital and mandatory they would be in place in the meantime (10). Investigations C-reactive protein, electrolytes test, combs and rethicolcytes count, blood glucose are also overpriced when done outside the compound in private investigation clinics.

In terms of clinical records, documentation is seen very poor. Patient charts, laboratory, x-ray and other investigation results were found here and there dis organized. Mothers (14.5%)

were also able to identify this problem they mentioned to this reason they were subjected to unnecessary expenses for repeated investigations.

The shortage of bed with the increased flow of patients makes the control of infection challenging. Neonates sharing beds with increased workload aggravates the risk of cross contaminations which again increase the rates of nosocomial infections (30). Approximately 58.1% of the respondents stated that their neonates shared bed with other neonates, while the rest 41.9% did not. All of them were not happy with the sharing but they did not have any option since they were not asked for their consent to put another neonate on the same bed. What is more is the problem related to hand washing even in the presence of water the practice needs to be improved. Alcohol hand rubs are observed to be practiced better; they are placed at each bed. The finding indicates intensive effort needs to be done on health education about hygienic practices and hand washing for care givers mainly mothers. The response from the interview is in strong agreement with this finding; one of the two neonatologists from the ward stated that

> *'Bed sharing has been and is still a challenge for us to provide a quality service. With sharing of bed cross contamination has been routine and this exposes neonates who were kept for observation for undesired antibiotics. Nosocomial infection as a result is very high; drug resistance is also noticed in some patients. Those who were on ampicillin and gentamycine are forced to go to cefotaxime and sometimes to vancomycine and ceftazidine*.

Moreover, despite the periodic spray of insecticide, there are still a number of cockroaches observed specially in the preterm room, and they are often found around the new-borns. Cockroaches could play a vector role for nosocomial infections in NICU. Multi drug resistance is reported by the study done on the same unit to 12 antimicrobials where resistance to cephlosphorines was shown to be high (29). Similar finding was revealed in paediatrics ward on the same unit where resistance to ampicillin was about 90% (30).

Components listed under policies and organization of services has been checked likewise. Regarding laundry, soiled linens are stored separate from the clean once, although they are transported to the laundry with the same trolley to the laundry which is located at the basement of the building. This could be one route for nosocomial infection. Finding is

contrary to the recommendation of WHO which says that separate trolleys are needed to take and bring the soiled from the clean ones (10).

Considering the standard, preparation of IV fluid is doesn't always follow aseptic techniques. Amount of fluid preparations from the factory doesn't consider neonatal needs, fluids are available in 500 and 1000 ml; neonates fluid prescriptions are usually less than 300ml, to carry out the orders and to get the prescribed amount nurses are forced to empty one bag and then fill it with the other in the meantime transmission of infection can happen. This could be the one reason why aseptic technique is not maintained. The factory's medicinal preparation should similarly need to be considered for blood and some medication like Aminophyline (10ml) and calcium gluconate (10ml) which are available in large amounts. Blood transfusions are given in lesser amounts usually not more than 50 ml but they are offered in 350-450ml, the remaining is discarded and this is a lot of wastage considering how valuable blood is.

As to the daily rounds in the ward it was observable that participation of nurses is limited to only carrying out orders. According to British Association of Perinatal Medicine (BAPM) team work is recommended in NICU, particularly the views of the nurses should be heard and incorporated in the decision making process, because it is a fact that nurses are the key elements in critical care (18, 25). This is similar in case review process; those who discuss the cases are only physicians, whereas the tasks are carried out by the nurse. Involvement of nurses is not observed; at times, the head nurse will be present but still participation on the discussion is limited. This discourages the team sprit which is assumed to be practical in wards particularly in intensive care units (3).

Majority (96.3%) of clients were satisfied with the general service provision. This could be due to the interview being held at exit and mothers are taking their newborns condition improved so, it is certain that their reply is yes to the total service provision. However, clients' satisfaction varied on some of the parameters used to assess quality like consent before procedures, health information, and cleanness of toilet and their neonates sharing bed. Of 384 mothers interviewed 38.3% replied that they were asked by the health professionals for their agreement before procedure like to draw blood and lumbar puncture while the rest, 61.7% were not. Those who were not asked permission were nearly 5 times dissatisfied than those asked. AOR (95%CI) 5.08[2.654, 9.753] According to WHO guideline parents should

be notified before doing any procedure for their newborns but, in our setting this is not practiced except for major procedures like operation and blood exchange (10).

Mothers need to know the situation of their new born. The result showed that 94% of the respondents were able to get information about their neonates however, only 66.9 %(257) were satisfied by the responses of the Health Professionals to their question. In addition more than half of the clients (78.4%) were not informed about the condition of their neonate unless they themselves asked. A study from Tanzania also showed that mother in the NICU received insufficient information about their new born condition (20). There is a wrong perception about NICU in our society. It is commonly known as 'muket kefel'/heating room/, therefore majority of clients think that their newborn has come to the unit to get warmth and no other illness. To change this perception it is very crucial and would be appropriate to counsel about the newborn's condition on arrival at time of admission.

The study area is a teaching hospital, due to this fact, there are many number of medical students visiting the ward. Hence, there is a chance that a client can ask these students about the condition of their neonates. It is assumed that the chance of getting different answers could be high. However the result didn't support the assumption, it was only 10.2 % of mothers who replied that they were confused by different health information from different health professionals. There was no significant relation (p value 0.801) between having different replies and client satisfaction

The analysis found that the conditions of toilet and bath room are very poor. Majority, (93.5%) reported problems related to toilet and bath room (23). Mothers recommendation also supports this finding 28.1% had complaints about the condition of the toilet and bath and they suggested that it has to be improved. Complaints include unclean and uncomfortable toilets, especially for mothers who delivered by caesarean section, unavailability of water most of the times and lack of formal bath room for mothers (mothers usually take bath in the toilet). A significant association with p value of 0.01 was found between cleanness of toilet and client satisfaction. It was also a major factor affecting quality of care provided in the unit. Mothers who said that toilets were not clean were approximately 3.34 times dissatisfied compared to mothers who said it was clean. AOR (95%CI) 3.383[1.143,10.011] This is similar to the study done in Ethiopia in selected referral hospitals which assessed the quality of care of sick under-five children. The study showed that toilets and hand washing areas are in poor condition.

According to our study, out of the total (n=384) mothers who have their new-borns admitted in the unit only 251(65.4%) were able to get bed for themselves. The rest 133(34.6%) were not provided bed and of those 28.6% and 1.3% used chairs and floor to spend the night respectively, and the remaining 4.7% of them said they chose to come during day time and return to their homes at nights. This is due to the shortage of beds in the ward; there are 20 beds for mothers where priority is given for critical and surgical patients. This finding is in agreement to the study done in the south central Ethiopia; their finding also showed that 88.8% of the reproductive health centres don't have adequate beds for mother and the new-born (32). In Ethiopian culture it is assumed that mother after labour have to take rest; they are visited by their relative, neighbours and are given the social care. When they are in the hospital they miss the entire companionship, because some of the mothers are still coming from home to feed and look after their new-born. Mothers with episiotomy and C-section are also in so much pain and need to rest while carrying for their new-borns.

It is only the nurses who are relatively considered as permanently staying in the ward because the interns and residents are rotating; having this thought the nurses should be given additional trainings on NICU since they all are clinical nurses in qualification. Over recent years evidence is emerging that the chances of survival of the smallest and most preterm infants relates not only to nurse staffing ratios but also to the specialist levels of education and experience of nurses delivering care (31). The current study shows that it is only 4 out of 20 nurses who are trained in basic NICU trainings. It is suggested that neonatal nursing requires knowledge and skills not already developed by registered nurses to the specialty thus; all nurses working in the NICU should undertake an induction program which relates specifically to the essential care of the neonate (18).

As to the recommendation, nurse to patient ratio in a NICU should be 1:1-1:4, this could be very ideal in our setup but at-least it shall be improved in an acceptable way. On average there are 45 new-borns admitted at any given time in the ward the nurse ton patient ratio then becomes 1:4,1:10,and 1:10 in the three shifts (morning, afternoon, and night) accordingly. It was observed that, unless at the day shift where there are relatively good amount of nurses, room division is not possible in the afternoon and night shifts. There are only 4 nurses assigned at these shifts for the whole number of neonates admitted. This was with significant association with their service satisfaction (p value 0.02), those professionals who believed that the number of staffs was insufficient were nearly 3 times dissatisfied with the service

provision AOR (95%CI) 3.150[0.050, 5.611] Our study is in agreement to the study done in Jordan which showed shortage of nurses in the afternoon, night and holiday shifts in the NICU, and nurse to patient ratio is far from the recommendation (16).

Regarding to the combination of health professionals, NICU as to the recommendation of BAMP is expected to include professionals like neonatologist, neonatal nurse, respiratory therapist, pharmacist, dietician, lactation consultant, and physiotherapist (17, 18). However, the findings of the current study are not in agreement to the recommendation and are scored as sub-standard. Staffs (health professionals) reported as those currently working in the ward during the observation were 2 neonatologists who are usually working at the morning shifts only, 20 clinical nurses where 10, 4 and 4 are assigned for morning, afternoon and night shifts respectively, 8 interns for morning and afternoon shifts and 2 are assigned for night duty, there are 5 residents and only one is assigned for night and weekdays and 1 pharmacist (only at the morning shifts). Auxiliary staffs include 1 security which is working only at the day shift, 2 ladies who are responsible for preparation of milk, and 6 cleaners. A study from Tanzania, Kenya, Jordan and India also found that the staffs available in NICU were distant from the references (20, 35, 16, and 34).

As regards to salary and part-time payment the study revealed that health professionals were not satisfied and the part time especially was not given on time.(p value 0.001) A study which assessed the quality of health care at Gimbe Adventist hospital also publicized similar result (33). Ensuring professional's job satisfaction is important to maintain quality service and decrease turn overs especially in units like NICU where acquired skills are very vital.

The hospital's support system mainly from the administration was found to be poor. Rather support and relation was better with supportive staff in enhancing team work and experience sharing. The response from the qualitative study is also in support of this finding. The unit's head said

> *'Communication with the administrative staff is very challenging a simple example can be the time wasted to purchase milk for the ward; it normally takes more than a month, they are not cooperative'*

Maintaining and improving neonatal care requires active involvement of everyone in health care system, in order to meet the needs for evaluating health care in its totality as well as to identify whether effective and appropriate care has been provided. Education and training are

potential means for implementing effective nursing care at NICU, as they alter perception, increase knowledge, and in turn change work practice. (25) The current study figured out that, most of nurses didn't attend any previous in-service training program related to neonatal care. This finding may be owing to the absence of continuing education department in the hospital and lack of motivation for training, as well as increased workload in NICU. The findings of the current study are in line with BAPM which stated that "a lack of trained staff may lead to care that is unsafe" (17, 18).

7.Conclusion

Quality of care is multi-dimensional, different groups have used different approaches to assess quality of health care services. The current study used WHO's Hospital care for mothers and new-born babies: quality assessment and improvement tool to assess the quality of care provided by the NICU in TASTH (10). The finding of this study showed that quality of care is in inadequate on the over all.

Patient satisfaction is commonly measured and many consider it as an indicator of medical care quality. In the current study despite the inadequate quality of care of the unit majority of the clients were satisfied with the total service provision. However, as seen from other studies patients may be satisfied with poor quality care (11). Health professional's satisfaction was found to be 47.1%.

From clients perspective the study findings showed that quality of care was affected by inadequate health information, cleanness of toilets and bath rooms and sharing of neonatal bed, whereas the health professionals stated number of staff, salary, part-time payment and career development as factors for quality of care.

In summary, quality administration demands several strategies thus, it is fundamental to identify the problems, aiming at implementing effective actions, and monitoring the processes, hence this assist to achieve the ideal standard of quality excellence. The findings from this assessment would assist in improving such units with quality of newborn care facilities in other similar settings.

8.Strength and limitations

Strength of the study

- The study used both qualitative and quantitative methods
- It was conducted in the country's largest referral hospital offering NICU service

Limitations of the study

- Non response rate was not calculated in determining sample size, assuming 100% response rate.
- Sampling was not random for the interest of time
- Data collectors were only B.Sc. nurses working in the unit which might bring bias
- Case management did not include the review of patient's chart

9.Recommendations

❖For the hospital

- An organized system of documentation and data management should be in place.
- Continuous supply of equipment and materials which are necessary for the unit should be fulfilled with their proper maintenance.
- Hygienic conditions in particular the conditions of toilets and bath rooms require improvement.
- Collaborative effort has to be applied to minimize favourable conditions for transmission of infections which require monitoring of infection prevention strategies.
- System and opportunities for continuous training and career development should be organized for staffs working in the unit.
- It would be very convenient to increase professional human resource and design ways to reduce turnover of staffs.
- Effective communication and collaboration has to be laid between the hospital's NICU and allied health facilities.

❖For FMOH

- Combined effort needs to be done with the integration of all possible stakeholders to make the unit a center of excellence.
- National guideline which specifically focuses on NICU needs to be prepared.

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Annex I information sheet

Title of the research: - Assessment of the Quality of Care in Neonatal Intensive Care Unit, Tikur Anbessa Specialized Teaching Hospital.

Name of principal investigator: Redeat Workneh

Name of the organization: - Addis Ababa University, Faculty of Medicine, School of Public Health

Name of the sponsor- self sponsor

Introduction

This information sheet and consent from is prepared to explain the study you are being asked to join. Please listen carefully and ask any questions about the study before you agree to join. You may ask questions at any time after joining the study.

Purpose of the research project

The purpose of this research is to assess the quality of care in Tikur Anbessa Specialized teaching hospital Neonatal Intensive Care Unit. The results of the study will be very help full to point areas that need improvement in order to achieve the required quality of care. It will also serves as a springboard for subsequent studies in the country.

Procedure

To assess the quality of care in Tikur Anbessa Specialized teaching hospital Neonatal Intensive Care Unit. We invite you to take part in this study. If you are willing to participate in this study, you need to understand and give us your written consent. Then after, you will be interviewed by the data collector to give your response. You do not need to tell your name to the data collector and all you response and the results obtained will be kept confidential by using coding system where no one will have access to your response.

Risk/ discomfort

By participating in this research, you may feel that it has some discomfort especially on wasting time about 5-10 minutes. We hope you will participate in this study for the sake of the benefit. There is no risk in participating in this project.

Benefits

Participants in this study will receive no direct benefit from the study and they are voluntarily participating; there will be no inducement. However, the outcomes of the study will be indirectly beneficial in improving the quality of service that is being provided by the neonatal intensive care unit.

Incentives

You will not be provided any incentive or payment to take part in this project.

Confidentiality

The information collected from this research study will be kept confidential and information about you that will be collected by this study will be stored in a file, without your name, but a code number assigned to it, and it will not be revealed to anyone except the investigators and will be kept locked with a key.

Right to refuse or withdrawal

You have full right from participating in this research. You can choose not to respond to some or all questions if you don't want to give your response. You have also the full right to with draw from this study at any time you wish, without losing any of your right.

Person to contact

This research project will be reviewed and approved by the ethical clearance committee of the school of public health, Addis Ababa University. If in case you want to know more information about the research and its undertakings, the committee through the address of the advisor and /or the principal investigator below.

1. S/r Redeat Workneh. Tikur Anbessa Specialized Teaching Hospital.
Tel +2511921238546 e-mail redugold@gmail.com

2.Dr Mulugeta Betre. Addis Ababa University, School of Public Health,
Tel +251920812800 e-mail Mulugeta. Betre @aau.edu.et

Annex II Questionnaire and consent sheet for Mothers whose neonates are admitted in the NICU

Code Nº _____

Addis Ababa University, Faculty of Medicine, school of public health.

Questionnaire for the Assessment of Quality of Care in Neonatal Intensive Care Unit, Tikur Anbesa Specialized Hospital. Addis Ababa, Ethiopia.

Consent form

My name is _____. I am a student in Addis Ababa university school of public health. Currently I am doing a research on the Assessment of Quality of care in Tikur Anbesa Specialized Hospital Neonatal Intensive Care Unit. Addis Ababa. I am doing the study as part of fulfillment of masters' degree of public health. The research include mothers of neonates who have their babies admitted in the NICU since you are one of them I am going to ask you some questions about the quality of the service that you are getting from the ward, which is very important for the study. It won't take more than 5 minutes.

Thank you for your participation.

Are you willing to participate?

1. Yes
2. No

Date _____

Name and signature of data collector _____

Part 1 socio demographic data		
S.N	Questions	Response and coding
01	Age	
02	Residence	1.Urban(A.A) 2.Rural (outside A.A)
03	Marital status	1.Married 2.Single 3.Divorce 4.widow
04	Educational status	1.can't read and write 2.primary school 3.secondary school 4.above secondary
05	Occupation	1.government employee 2.non government employee 3.merchant 4.farmer 5.housewife 6.other, specify_____
06	Monthly income	1.< 1500 Eth Birr 2.2000-3000 Eth Birr 3.3000-5000 Eth Birr 4.> 5000 Eth Birr
07	Is this your first baby? If no how many children do you have?	1.No, number of children_____ 2.Yes

Part 2 Maternal satisfaction and respect for rights		
08	Did staff ask your permission before carrying out clinical procedures for your baby?	1.No 2.Yes
09	Have any procedures been carried out without your consent? If yes, please describe:	1.No 2.Yes,_____
010	Have you asked the staff any questions about your health or your baby's health? If yes: ➢ Could you understand their answers? ➢ How was their attitude towards you?	1.No 2.Yes 3.No 4.Yes
011	Have you ever felt confused because different members of staff have given you conflicting advice or information?	1.No 2.Yes
012	Have any of the staffs told about your baby's condition?	1.No 2.Yes
013	Do you know how and where to complain if you feel that you were not treated with respect and dignity?	1.No 2.Yes
Part 3 Overall satisfaction		
014	Have you been allowed to have visitors?	1.No 2.Yes
015	Are the toilets and showers functional and clean?	1.No 2.Yes
016	If you had hospital food, was it enough and was it good?	1.No 2.Yes

017	Has it been/is it expensive for you to have your baby in this hospital? Did you have to borrow money?	1.No 2.Yes
018	Have you noticed shortage of equipments in the ward? If yes which equipment is mostly not available?	1.No 2.Yes,_____
019	Does your baby shares bed with others? if yes what do you feel?	1.No 2.Yes
020	From your observation is there anything other than bed that babies share in the ward? If yes what other things?	1.No 2.Yes._____
021	How long have you stayed in the ward?	
022	Do you have room (bed)? If No where are you staying at the night?	1.No,_____ 2.Yes
023	Overall, do you feel you have received enough help by staff in taking care of yourself during your stay?	1.No 2.Yes
024	Overall, do you feel you have received enough help by staff in taking care of your baby?	1.No 2.Yes
025	Do you have any other comments or suggestions on how care can be improved for mothers and babies in this hospital?	

የጥናቱ /ምርምሩ/ ርዕስ: - Assessment of Quality of Care in Neonatal Intensive Care Unit, Tikur Anbesa Specialized Hospital. Addis Ababa, Ethiopia

ምርምሩን የሚያማክረው ስም:- **ዶ/ር ሙሉጌታ በትረ - አዲስ አበባ ዩኒቨርሲቲ ሕብረተሰብ ጤና ትምህርት ቤት**

የተቋሙ ስም:- **አዲስ አበባ ዩኒቨርሲቲ ፋኩሊቲ ኦፍ ሜዲስን የሕብረተሰብ ጤና ዲፓርትመንት**

የስፖንሰር ስም:- **በግል**

መግቢያ

ይህ የመረጃ ሰነድ እናየ ስምምነት ወረቀት የተዘጋጀው እርስዎ እንዲሳተፉ ስለተጠየቁት ጥናት ለማብራራት ነው፡፡ እባክዎ በጥንቃቄ ያንብቡ እና ማንኛውም ጥያቄ ካልዎት ከጥናቱ በፊትም ሆነ ጥናቱን ከተቀበሉት በኋላ ባለው ማንኛውም ሠዓት መጠየቅ ይችላሉ፡፡

ቅደም ተከተል

በጥቁር አንበሳ ስፔሻላይዝድ ሆስፒታል ውስጥ ያለው የጨቅላ ሕጻናት እንክብካቤ ክፍል ጥራት ለመገምገም እርስዎ በዚህ ጥናት ተሳታፊ እንዲሆኑ ተጋብዘዋል፡፡ በጥናቱ ላይ ለመሳተፍ ፈቃደኛ ከሆኑ ቅድሚያ ፈቃደኛነትዎትን የሚያሳይ በጽሑፍየ ተዘጋጀ የስምምነት ቅጽ ያስረክባሉ፤ በመቀጠልም በመረጃ ሰብሳቢው አማካኝነት ቃለመጠ ይቅያደርጋሉ፡፡ ለመረጃ ሰብሳቢው ስምን መናገር አያስፈልግዎትም፣ የሚሰጡት ምላሽ በጠቅላላ በምስጢር ሚያዝ ይሆናል፤ ምስጢራዊነቱም በኮድ መስጠት ይረጋገጣል፡፡

የጥናቱዓላማ

የዚህ ጥናት ዓላማ በጥቁር አንበሳ ስፔሻላይዝድ ሆስፒታል ውስጥ ያለው የጨቅላ ሕጻናት እንክብካቤ ክፍል ጥራት ለመገምገም ነው፡፡ የጥናቱ ውጤት /ግኝት/ መሻሻል ያለባቸው ሁኔታዎች ለማስተካከልና በአጠቃላይ የሚፈለገው የጨቅላ ህጻናት እንክብካቤ ለማምጣት በእጅጉ ይጠቅማል፡፡ ከዚህ በተጨማሪም በሀገሪቷ ለሚካሄዱ ለሌሎች ተመሳሳይ ጥናቶች እንደ መነሻ ሆኖ ያገለግላል፡፡

አሉታዊነን /Risk

በዚህ ጥናት ውስጥ በሚሳተፉበት ወቅት ውድ ሰዓትዎን ከ5-10 ደቂቃ ሊያጠፉ ይችላሉ፤ ለዚህ ጥናት መሳካት ካለው ጥቅም አንጻር በትዕግስት ይሳተፉሉ ብለን እናምናለን፡፡ በዚህ ጥናት በመሳተፍዎ ሊደርስብዎት የሚችል ምንም አይነት ጉዳት የለም፡፡

ጥቅም

በዚህ ጥናት የሚሳተፉ ሰዎች በቀጥታ የሚያገኙት ጥቅም አይኖርም፡፡ በፈቃደኝነት ይሳተፋሉ፡፡ የጥናቱ ግኝት በተዘዋዋሪ የጨቅላ ሕጻናት እንክብካቤ ክፍልን የሚሰጠውን አገልግሎት ጥራት ያሻሽላል፡፡

ጥቅማጥቅም

በዚህ ጥናት ውስጥ ሲሳተፉ ምንምየ ሚከፈል ክፍያ አይኖርም፡፡

የመረጃ ምስጢራዊነት

በዚህ ጥናት ወቅት የተሰበሰበው መረጃ በምስጢር የሚቀመጥ ሲሆን፤ እርስዎ የሰጡት መረጃም በምስጢር የእርስዎ ስም ሳይሰፍርበት ይቀመጣል በኮድ ይሰየማል፡፡ ከዋና ገምጋሚው በስተቀር ለማንም አይታይም፡፡

የመሳተፍ ወይም ያለመሳተፍ መብት

በዚህ ጥናት ውስጥ የመሳተፍ ሙሉ መብት የተጠበቀ ነው፡፡ በሙሉ ወይም ለአንዳንድ ጥያቄዎች ምላሽ የመስጠት ወይም ያለመስጠት መብት የተጠበቀነ ው፡፡ በፈለጉት ሰዓት ከጥናቱ ተሳትፎ ውጪ መሆን ይችላሉ መብትዎ እንደተጠበቀ፡፡

ለበለጠ መረጃ

ይህ ጥናት በሕብረተሰበ ጤና ትምህርት ቤት የስነምግባር ኮሚቴ የሚታይ እና የሚጸድቅ ነው፡፡ ስለ ጥናቱና አካሄዱ የበለጠ መረጃ ከፈለጉ ይህን ኮሚቴ በዋና ገምጋሚው ናበጥናቱ ባለቤት አድራሻ ማግኘት ይችላሉ፡፡

1.ሲ/ር ረድኤት ወርቅነህ - ጥቁር አንበሳ ስፔሻላይዝድ ቲቺንግ ሆስፒታል
ስልክቁጥር +251921238546 ኢ-ሜይል redugold@gmail.com

2.ዶ/ር ሙሉጌታ በትረ - አዲስ አበባ ዩኒቨርሲቲ ሕብረተሰብ ጤና ትምህርት ቤት
ስልክቁጥር +251920812800 ኢ-ሜይል

ተ.ቁ	ጥያቄ	መልስእናኮድቁጥር
1	ዕድሜ	
2	መኖሪያ ቦታ	1.ከተማ /አ.አ/ 2.ገጠር /ከአ.አ ውጪ/
3	የጋብቻ ሁኔታ	1.ያገባ 2.ያላገባ 3.የተፋታ 4.ባል/ሚስት የሞተበት
4	የትምህርት ደረጃ	1.ማንበብ መጻፍ የማይችል 2.የመጀመሪያ ደረጃ 3.ሁለተኛ ደረጃ 4.ከሁለተኛ ደረጃ በላይ
5	የሥራ ሁኔታ	1.የመንግሥት ሰራተኛ 2.የግል ሰራተኛ 3.ነጋዴ 4.ገበሬ 5.የቤት እመቤት 6.ሌላ ካለ ይግለጹ
6	ወርኃዊ ገቢ	1.<1500 2.2000-3000 3.3000-5000 4.>5000
7	ይህ የመጀመሪያ ልጅዎ ነው? ካልሆነ ምን ያህል ልጆች አሉዎት?	1.የልጅ ብዛት 2.አዎ

ክፍል ሁለት - የእናቶች እርካታ እና የመብት መከበር

ተ.ቁ	ጥያቄ	ምላሽ
08	የክፍሉ ሰራተኞች ልጅዎን ወደ ህክምና አገልግሎት ከመውሰዳቸው በፊት ፈቃድ ይጠይቆታል ወይ?	1.አዎ 2.አይ
09	ከእርስዎ ፈቃድ ውጪ የተደረገ ህክምና አገልግሎት አለ ? ካለ እባክዎ ያብራሩ	1.አዎ 2.አይ
10	ስለ ራስዎ እና ስለልጅዎ ጤንነት ሁኔታ የክፍሉ ሰራተኞች ጠይቀው ያውቃሉ? መልስዎ አዎ ከሆነ የተሰጠው ምላሽ ይገባዎት ነበር? ለእርስዎ የነበራቸው አመለካከት እንዴት ነበር?	1.አዎ 2.አይ
11	የተለያዩ የክፍሉ ሰራተኞች የተለያየ እና የሚጋጭ አስተያየት ወይም ምክር ሰጥተዎት ግራ ተጋብተው ያውቃሉ?	1.አዎ 2.አይ
12	ስለልጅዎ ሁኔታ ነግሮዎት የሚያውቅ የክፍሉ ሰራተኛ አለ?	1.አዎ 2.አይ
13	በአክብሮት እናያ ለአግባብ ካልተስተናገዱ የት እንደ ሚያመለክቱ ያውቃሉ?	1.አዎ 2.አይ

ክፍል -3 አጠቃላይ የአገልግሎተ እርካታ

14	ጠያቂ እንዲያስገቡ ተፈቅዶሎት ያውቃል?	1.አዎ 2.አይ
15	መጸዳጃ ቤት የገባ መታጠቢያ ቤቶች አገልግሎት ሰጪ እና ንጹሕ ናቸው?	1.አዎ 2.አይ
16	የሆስፒታሉን ምግብ ተመግበው ከሆነ ጥሩ እና በቂ ነው?	1.አዎ 2.አይ
17	ልጅዎን በዚህ ሆስፒታል ማስተኛተ ውድ ሆኖቦት ነበር? ገንዘብ መበደር አስፈልግዎት ነበር?	1.አዎ 2.አይ
18	በዚህ ክፍል ውስጥ የመገልገያ ዕቃ እጥረት አስተውለዋለ? ካስተዋሉ የትኞቹ ዕቃዎች ናቸው አብዛኛውን ጊዜ የሚያጥሩት?	1.አዎ 2.አይ
19	የእርስዎ ልጅ ከሌላ ልጅ አልጋ ይጋራል? እርስዎ በዚህ ምን	1.አዎ

	ይሰማዎታል?	2.አይ
20	ልጅዎ ከአልጋ በተጨማሪ ከሌላ ልጅ ጋር የሚጋራው ምን አለ?	1.አዎ 2.አይ
21	በዚህ ክፍል/ ዋርድ/ ምን ያህል ጊዜ ቆይተዋል?	
22	እርስዎ አልጋ ክፍል አሎት? ከሌልዎት የት ይተኛሉ?	1.አዎ 2.አይ
23	በአጠቃላይ በቆይታዎ ወቅት ከክፍሉ አባላት በቂ አገልግሎት እና እርዳታ አግኝቻለው ብለው ያምናሉ?	1.አዎ 2.አይ
24	በአጠቃለይ በቆይታዎ ወቅት ከክፍሉአባላት ልጅዎን ከመንከባከብ አንጻር በቂ አግልግሎትና እርዳታ አግኝቻለው ብለው ያምናሉ?	1.አዎ 2.አይ
25	በዚህ ሆስፒታል ውስጥ ለእናቶች እና ለሕጻናት በሚሰጠው አገልግሎት እና አጠቃላይ አስተያየት ካልዎት ይግለጹ	
26	በዚህ ሆስፒታል ውስጥ ለእናቶች እና ለሕጻናት የሚሰጠው አገልግሎት የሚሻሻልበት መንገድ ላይ አስተያየት ወይም ሃሳበ ካለዎት ይግለጹ?	

Annex III. Questionnaire and consent sheet for health professionals

Code Nº _____

Addis Ababa University, Faculty of Medicine, School of Public Health.

Questionnaire for the Assessment of Quality of Care of Neonatal Intensive Care Unit, Tikur Anbesa Specialized Hospital Addis Ababa, Ethiopia.

Consent form

My name is _____. I am a student in Addis Ababa University School of Public Health. Currently I am doing a research on the Assessment of Quality of Care in Tikur Anbesa Specialized Hospital Neonatal Intensive Care Unit. Addis Ababa. I am doing the study as part of fulfillment of masters' degree in public health. The research include health professionals who are working in the neonatal intensive care unit, since you are one of them I am going to ask you to fill this questionnaire which is very important for the study. It won't take more than 5 minutes.

Thank you for your participation.

Are you willing to participate?

1. Yes
2. No

Date _____

Name and signature of data collector _____

Part 1. Socio demographic data			
S.N	Questions	Response and coding	Skip/go
001	Age		
002	sex	1.Female 2.Male	
003	Marital status	5.Married 6.Single 7.Divorce 8.widow	
004	Educational status	1.diploma 2.first degree 3.master's degree 4.currently learning, specify_____	
005	Monthly income(without the part time fee)	5.< 1500 Eth Birr 6.2000-3000 Eth Birr 7.3000-5000 Eth Birr 8.> 5000 Eth Birr	
Part 2 professional details			
006	In what field did you obtain you professional qualification?		
007	Have you obtained any further professional special qualification?	1.No 2.Yes, specify_____ _	
008	How long have you been working in the NICU?		

Part 3 Hospital support systems			
009	Do you think there is a sufficient number of staff the ward?	1.No 2.yes	
010	Is there a good combination of more and less experienced staff on duty at every shift?	1.No 2.yes	
011	Is there a lack of any particular type of professional?	1.No 2.Yes Specify (e.g. nurse, doctor….) _____	
012	Is there a shortage of staff? If yes at what times?	1.No 2.Yes 2.1 Night 2.2 Holidays 2.3 Weekends Other_____	
013	As a teaching hospital, do you think there is a sufficient number of staff to support students adequately?	1.No 2.yes	
014	Does the appearance of students interfere with your work? If yes in what way?	1.No 2. Yes, specify_____	

Part 4 Working conditions/staff incentives			
015	Is work far from your home? *If yes,* is your travel difficult or expensive?	1.No 2.Yes,_____	
016	Does the hospital provide you alternate means of transportation like service?	1.No 2.Yes	
017	Are you satisfied with your work schedule and shift patterns?	1.No 2.Yes	
018	Do you think you receive a fair salary?		
019	Do you get your part time salary on time? If no how long does it stay?	1.No,_____ 2.Yes	
020	Are there any rewards available to staff who perform particularly well? If yes: Please describe:	1.No 2.Yes,_____	
021	Are staffs who don't perform well punished in any way? If yes: Please describe:	1.No 2.Yes_____	
Part 5 Equipment and supplies			
022	Are the necessary laboratory tests for neonates and their mother available in the hospital?	1.No 2.Yes	
023	Are the necessary equipment fulfilled for you to work? If No can you specify which equipment you lack	1.No ,_____ 2.Yes	

024	Are Medicines available at all the times? If NO please give the reasons	1.No ,_____ 2.Yes	
025	Are Water and electricity available at all the time?	1.No 2.Yes	
026	Are there enough amounts of clothes for neonates and mothers?	1.No 2.Yes	
Part 6 Professional development and working conditions			
027	Are there any opportunities for progressing in your career in this hospital? *If yes:* please describe. How do you feel about this?	5.No 6.yes,_____	
028	Do you feel supported by your managers and colleagues? *If yes:* in what way do they support you?	1.No 2.yes,_____	
029	Do you feel supported by members of other professions? *If yes:* in what way do they support you?	1.No 2.yes,_____	
030	Is there any guide line for the ward?	1.No 2.Yes 3.don't know	
031	Do you regularly rotate between different clinical areas/wards? *If yes,* how often do you rotate?	1.No 2.yes,_____	
032	If you rotate, do you like this system? If No why?	1.No,_____ 2.yes	
033	In general are you satisfied with the service you provide?	1.not satisfied 2. Less satisfied 3. satisfied 4. highly satisfied	

Annex IV In depth interview guide

Identification of the respondent

Position of the respondent

1. Would you please tell how you understand quality of health care?
    - Components of quality of care
2. How would you explain quality of care in your facility?
    - Determinants of ,quality of care
    - Changes observed, positive and negative
3. How do you explain the quality of NICU in your facility?
    - Determinants of ,quality of care in NICU
4. Can you tell major challenges that affect the quality of NICU in your facility?

    Probe
    - Shortage of human resource
    - Lack of equipment and supply
    - Lack of skill
5. In your opinion what do you think should be done to improve the quality care in NICU in your facility?

Annex V InventoryCheck List

Section 1 Hospital Support System (Physical structures, staffing, and basic services)

Table 1 Evaluate existing facilities

Number of rooms? ____ □ Number of beds in total? ____
□ Up to which age are babies admitted to the special care unit? Age in months _____
□ Is there is a separate ward or room for admitting out-born babies. *If yes,* how many cots/beds? _____
□ Mothers of sick newborns are allowed to stay with their babies. *If yes,* how many beds for these mothers? _____

Table 2 Number and type of staff

Staff type	**Total No**	**Shifts**			**Division by department s/units**
		Morning	**Afternoon**	**Night**	
Neonatologists					
Paediatricians					
Specialist in training: Paediatric/ Neonatologist					
Non specialist doctors					
Nurses dedicated to newborn care					
Other clinical Staff (specify):					
Pharmacy staff(specify) Qualified Other					
Laboratory staff (specify) Qualified Other					

Table 3 availability of basic services

Describe the system in place, including existing back-up systems	**Any problems in availability of service during the last year?**	**If any problem, describe**
Power	Yes: ___ No: ___	
Water	Yes: ___ No: ___	
Heating (if relevant)	Yes: ___ No: ___	
Cooling (if relevant)	Yes: ___ No: ___	

Section 1.1Health Management Information Systems and Medical Records

Table 4 Pharmacy management and medicine availability

4.1 An essential medicine list exists and is used	**Score**
□ WHO list of essential medicines □ National list of essential medicines or other list (check if the list includes all medicines for the management of common conditions)	
4.2 Medication storage areas are orderly, clean and secure and with proper system	**Score**
□ General medication storage is at room temperature unless there is a specific requirement for a particular medicine □ Direct sunlight is avoided, there is sufficient light to read labels □ Storage of medicines in high humidity rooms is avoided □ Cupboards and containers are available for storage □ Medications are not stored on the floor or touching walls to protect from dampness and insects and rodents □ Ventilation in/outlet is covered with nets □ Internal use and injectable medications are separated from disinfectants or toxic medication □ Medication are properly secured from theft, no free access, door with lock □ Narcotics are kept in a separate locked cupboard □ Medications remain in original package or are labelled adequately □ Medications are stored with proper systems o In alphabetical order o By International Common Denomination (ICD) o By Groups (classes or administration)	
4.3 Cold chain is maintained for specific medications	**Score**
□ Medication refrigerator temperature are maintained within acceptable limits □ There are working thermometers in all refrigerators □ Storage temperature is recorded in a log at least daily □ There is a backup power supply	
4.4 Pharmacy has current and accurate records of medicine storage and usage	**Score**
□ There are clear and well maintained records of supplies received and dispensed □ There are written purchase procedures □ Donation are separately recorded from purchases □ There are clear and well maintained in-out records of narcotics □ There are no stock-outs (no stocks of an essential medicine) □ There are no overstocks □ There are no expired products □ There are procedures to dispose of expired or damage pharmaceutical products □ There are written procedures on how supplied to the ward (check if supply is per named patient, or with standard ward stocking, or by other systems)	
4.5 System is in place to track adverse medicines reactions and medication error	**Score**
□ Written procedures exist and are followed	
1.3.6 Suitable medicines are available in the hospital pharmacy	
□ Check Table 7.2 to asses medicines availability	

Table 5New born Equipment

1. Incubators	**Score**
➢ Number of incubators present in neonatal units _____ ➢ Number is adequate for birth rate	
➢ Number of incubators properly functioning: _____	
Process of effective maintenance exists: ➢ Scheduled calibration ➢ spare parts and repair available if needed ➢ Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of incubators ➢ Written procedures for cleaning exist ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice ➢ Only one baby in each incubator ➢ No use of hot water containers to maintain heat ➢ Cleanliness (internal water tanks) ➢ Temperature (control, probes, records) ➢ Alarms used, distance from 'nurses station' ➢ Facilitation of mother access ad breastfeeding ➢ Incubator is not used when maternal skin to skin contact can provide adequate warmth	
2. **Radiant warmer, other heating systems**	**Score**
➢ Number of warmers present in the neonatal units _____ ➢ Number is adequate for birth rate	
➢ Number of warmers properly functioning: _____	
Process of effective maintenance exists: ➢ Scheduled calibration ➢ Spare parts and repair available if needed ➢ Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of warmers ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice • Cleanliness • Temperature (control, probes, records) • Alarms used, distance from 'nurses station' • Warmer is not used when maternal skin to skin contact can provide adequate warmth • Pre-use heating of the warmer when used at the birth	
3. Phototherapy lamps	**Score**
➢ Number of phototherapy lamps present in the neonatal units _____ ➢ Number is adequate for birth rate	
➢ Number of phototherapy lamps properly functioning: ___	
Process of effective maintenance exists: ➢ Scheduled calibration ➢ Spare parts and repair available if needed ➢ Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of phototherapy lamps ➢ The staff knows how to properly use the equipment	

➢ The equipment is correctly used in clinical practice ➢ Distance between lights and skin: depending on equipment (usually 45-60cm) ➢ Monitoring baby's hydration and temperature ➢ Monitoring time of use of lamps (check if still effective) ➢ Check whether medicines without proven efficacy for reducing jaundice are used, together with phototherapy ➢ Facilitation of mother's access and breastfeeding	
4. Glucometer	**Score**
➢ Number of glucometers present in the neonatal units_____ ➢ Number is adequate for birth rate	
➢ Number of glucometers properly functioning: _____	
➢ Consumable supplies are available(sticks)	
Process of effective maintenance exists: ➢ Scheduled calibration ➢ Spare parts and repair available if needed ➢ Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of glucometers ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice ➢ The results are reported in medical records	
5. Equipment for the delivery of oxygen	
➢ Number of different types of devices (oxygen bomb, compressor present in the neonatal units _____ ➢ Number is adequate for birth rate	
➢ Number of devices properly functioning: _____	
➢ Consumable supplies are available	
Process of effective maintenance exists: ➢ Scheduled maintenance, turnover of tubes	
➢ Spare parts and repair available if needed ➢ Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of oxygen delivery devices ➢ humidification methodology and hygiene ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice o Cleanliness of water tanks	
6. Pulse-oximeters	**Score**
➢ Number of pulse-oximeters present in the neonatal units____ ➢ Number is adequate for birth rate	
➢ Number of pulse-oximeters properly functioning: _____	
➢ Process of effective maintenance exists: • Scheduled calibration • Spare parts and repair available if needed • Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of pulse-oximeters ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice ➢ Appropriate positioning of probes, alarms used ➢ Recording checked	

➢ Clear target value for the oxygen saturation specific for gestational ages ➢ Nurses are allowed to change FiO2 following the guidelines ➢ If a pulse-oximeters is available, it must be in use on a baby in O2 therapy	
7. Multi-functions monitors	**Score**
➢ Number of monitors present in the neonatal units _____ ➢ Number is adequate for birth rate	
➢ Number of monitors properly functioning: _____	
➢ Process of effective maintenance exists: • Scheduled calibration • Spare parts and repair available if needed • Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of monitors ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice ➢ Appropriate positioning of leads, alarms used ➢ Recording checked	
8. Infusion pumps: peristaltic and syringe (neonatal)	**Score**
➢ Number of infusion pumps present in the units _____ ➢ Number is adequate for birth rate	
➢ Number of infusion pumps properly functioning: _____	
➢ Consumable supplies are available	
Process of effective maintenance exists: ➢ Scheduled calibration ➢ Spare parts and repair available if needed ➢ Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of pumps ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice ➢ Alarms used ➢ Clinical records include prescription, liquid balance, weight, glycaemia, etc.	
9. Non-invasive ventilation (CPAP or other)	**Score**
➢ Number of CPAP or other devices in the units _____ ➢ Number is adequate for birth rate	
➢ Number of CPAP devices properly functioning: _____	
➢ Consumable supplies are available	
Process of effective maintenance exists: ➢ Scheduled calibration ➢ Spare parts and repair available if needed ➢ Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice ➢ Observe nursing sequence; medical prescriptions. ➢ Presence and functionality of the medical air source	
10. Mechanical ventilators	**Score**
➢ Number of ventilators present in the units _____ ➢ Number is adequate for birth rate	

➢ Number of ventilators properly functioning: _____	
➢ Consumable supplies are available	
Process of effective maintenance exists: ➢ Scheduled calibration ➢ Spare parts and repair available if needed ➢ Record of maintenance exists	
Appropriate use ➢ Guidelines are available on appropriate use of pumps ➢ The staff knows how to properly use the equipment ➢ The equipment is correctly used in clinical practice ➢ Observe the nursing sequence for aspiration procedures, use of alarms ➢ In the clinical records check the clarity of medical prescriptions and clinical notes, parameters recording, use of medicines for sedation	

Table 7 Ward infrastructure

7.1 Hygienic conditions	**Score**
➢ Ward is clean with no visible soil ➢ Toilets and washing areas are clean and warm ➢ Waste are collected properly ➢ Cupboard, shelves and trolleys are clean and orderly	
7.2 Beds are adequate	**Score**
➢ Each mother has her own bed with mattress that is large enough for safe co-bedding with her infant ➢ Beds are safe, clean and well maintained ➢ Bed linen is provided by the hospital ➢ Each bed is protected by a mosquito net (insecticide) ➢ Each infant in the neonatal unit has their own cot ➢ Each infant cot (neonatal unit) is protected by a mosquito net (insecticide)	
7.3 Specific area is dedicated to the most seriously ill or infectious women or new born	**Score**
➢ High need beds are close to the nurse station ➢ Single room for infectious patients ➢ Emergency management area in or near to the ward	
7.4 The room temperature is controlled	**Score**
➢ No cold draught are presents ➢ Air conditioner or heater and/or fans are used ➢ Wall working thermometer is available ➢ Windows are protected from sun or cold	
7.5 Hygiene facilities are sufficient and adequate	**Score**
➢ Easily accessible facilities ➢ Adequate number and type of toilet ➢ Adequate number and type of showers ➢ Adequate sources of water for hand washing ➢ Safe surface for washing and for changing baby's nappy ➢ Hot water available continuously ➢ Privacy is respected ➢ Separate from the staff services	
7.6 Hospital accommodation	**Score**
➢ Food is provided at least 3 times a day ➢ If food is not provided, a clean dedicated area to prepare food is available ➢ Washing facilities for women and baby clothes ➢ Visitors are allowed ➢ Relatives are allowed to stay overnight with woman/infant to provide care, if needed ➢ Space exists for staff to talk to mother/family in privacy, if needed ➢ Space exists for clinical treatment to be given in privacy	
7.7 Ward pharmacy	**Score**
➢ Cupboard is clean ➢ No expired medicines ➢ Medicines in their original package ➢ Narcotics or dangerous medicines are locked ➢ No access to medicine cupboard by unauthorized staff ➢ There is a fridge were to store medicines that need refrigeration	
7.8 A proper system for the identification of patient is in place.	**Score**
➢ The newborn/mother couple are clearly identified ➢ Patient is identified prior to interventions (e.g. blood test, therapy, surgical procedure)	

Section 2 Case Management

Table 8 Care for premature newborns

8.1 Setting for the care of premature and low birth weight (LBW) infants	**Score:**
□ Existence of a dedicated area to facilitate closer observation □ 'Rooming-in' is continuous with their mothers □ Heat loss is minimized by kangaroo-care; babies wearing a cap on their head and socks □ Attention to environment (avoid overheating, draughts, cold air, etc.) □ Infants are protected from animals and insects	
8.2 Nutrition of premature and LBW infants	**Score:**
□ There are guidelines in use to prevent, detect and treat neonatal hypoglycaemia, and they are followed □ There are no restrictions on the frequency or length of breastfeeding □ If the infant is unable to feed at the breast, the mother is supported to start expressing within 4-6 hours of the birth, and given information on effective techniques □ Expressed milk is given by cup or nasal-gastric tube when the infant is unable to feed or if the mother cannot stay with the infant all the time □ Mother is supported to establish and maintain her milk supply by milk expression, and assistance with positioning and attachment for her infant's individual situation □ Sterile containers for expressed milk are provided by the hospital and mothers have facilities to express in a clean and comfortable area □ If breast pumps are used they are good quality, functioning, instructions how to use, a process for cleaning, and pumps are not shared unless they are designed to be adequately decontaminated (and are decontaminated) between users □ Infant formula, glucose water, water or other fluids or foods are not given to the infant unless there is an evidenced based medical need □ If any exception to exclusive breastfeeding is recommended by the staff, the reason and the amount to be given is recorded in the infant record and signed □ Intravenous feeding is not used as a substitute for enteral feeds unless for very specific medical indications	
8.3 Clinical evaluation and monitoring	**Score:**
□ All items included in the healthy newborn list should be checked □ In addition: □ Use an individual infant record for LBW infants □ Heart rate and breathing rate are checked and recorded Temperature is recorded at least every 8 hours, according to the clinical situation □ Weight is recorded at least daily (twice daily in Very Low Birth Weight)	
8.4 Information and counseling at discharge	**Score:**
□ Information and discussion should focus on the situation of this individual sick infant: o Wellness o Feeding and nutrition o Care o Prophylaxis, vaccination o Planned follow-up	

Table 9 Specific Conditions

9.1 Hypoglycaemia, hypocalcaemia and jaundice	**Score:**
□ Guidelines for prevention of hypoglycaemia in LBW, small for gestational age, large for gestational age and in infants of diabetic mothers are available and implemented □ Guidelines for recognition and treatment of hypoglycaemia are available and implemented □ In case of "convulsions" or "lethargy" blood glucose ('Gluco test') and, if possible, calcium and magnesium are checked and corrected, if needed □ Procedures are in place to check the bilirubin level □ Phototherapy equipment and guidelines when to use it are available and adequate hydration is monitored □ Facilities for exchange transfusion are available, or there are guidelines when to transfer a seriously jaundiced baby	
9.2 Neonatal sepsis	**Score:**
□ Neonatal sepsis is suspected in neonates with signs such as difficulty feeding, pathological breathing patterns, hypotonia, lethargy, or with no other otherwise explanation for abnormal temperature □ Appropriately investigation plan is prescribed (e.g. cell blood count, blood culture, search for foci of infection) □ Lumbar puncture is done to rule out or confirm meningitis □ Newborn babies receive oxygen if cyanotic or in severe respiratory distress □ Effective antibiotics are given according to age and weight of the baby □ Temperature, capillary refilling time, and white cells count are monitored □ The clinical status and the response to treatment is reassessed regularly	
9.3 Monitoring and treatment for resuscitated infants	**Score:**
□ No routine separation from the mother □ There is a plan for monitoring heart rate, breathing rate, SatO2, temperature, blood glucose, and urine output □ Special attention to fluid balance is included in the clinical plan and recorded	
9.4 Oxygen therapy	**Score:**
Guidelines for the use and monitoring of oxygen therapy in newborns are available and implemented □ No routine use of oxygen in preterm infants without medical need □ Oxygen need is assessed using a pulse-oximeter before starting O2 therapy □ Infants on oxygen therapy have SatO2 monitored routinely	
9.5 Unnecessary use of medicines and treatments	**Score:**
□ No routine medications or treatments are given without specific indications that they are needed for the treatment of clinical conditions or diseases □ No routine medications or treatments are given without evidence of benefit for the infant	

Table 10 Advanced Newborn care

10.1 Clinical records for Neonatal Intensive Care Unit (NICU)	**Score**
There are 'intensive care' records, specifically designed for NICU; possibly with distinct parts for nursing care notes and medical notes • Records are appropriately filled in and indicate that: • The baby's clinical records routinely include a complete perinatal history • Weight and fluid intake are checked at least daily in infants with any severe illness; twice if Very Low Birth Weight Infants (VLBW) • Specific growth charts for preterm infants are used throughout hospital stay There is an adequate information transfer between shifts of personnel including written information transfer	
10.2 Enteral nutrition	**Score**
➢ There are protocols or guidance documents on nutrition of newborns in NICU ➢ Records are appropriately filled in and indicate : • Daily records of enteral fluid intake • Daily calculation and recording of caloric intake • If there is no contraindication, minimal enteral feeding, started within the first 72 hours, with own mother's milk used as optimal • Use of infant formula is only on specific medical indication • The minimum caloric intake at the end of 1st week in preterm infants is 90-100 Kcal/kg/day • No provision of Na, K, Cl in the first 48 hours of life in term infants, in the first 48 to 72 hour in preterm infants • The amino acid supply for preterm infants starts soon after birth and gradually increases achieving an intake of 3 or 4 g/kg from the 4th day • For infants < 1500 grams: availability of human milk fortifier or preterm formulas (80 Kcal/100 mL)	
10.3 Parenteral infusions, Total Parenteral Nutrition	**Score**
➢ There are written protocols for the appropriate parenteral intakes for weight and gestational age, and they are followed in practice • Fluids and caloric intakes are recorded daily • Parenteral amino acid solution is available • Parenteral lipids solution is available • Written protocols for placement and proper tip position of central catheters are used • Written protocols for management of central lines are used • Disposable materials (e.g. catheters and lines) are available • The parenteral infusion is prepared by trainedstaff	

10.4 Nutritional outcome indicators	**Score**
Use the following indicators to assess the quality of nutrition care in the NICU: • Percentage of weight loss at any point during the hospital stay is greater than 10% for infants of birth weight 1500-2499g *(weight loss in less than10% of infants: 'good', in greater than 50%: 'poor performance')* • Number of cases (%) of Necrotizing Entero-colitis (NEC) in infants <1500g cared for NICU. Review the statistics for the previous year or check the Unit logbook for discharge diagnosis and causes of death. *(less than 5% of children: 'good', greater than 20%: 'poor performance')*	
10.5 Infection control and treatment	**Score**
Written protocols are available for antibiotic treatment for specific infections (early-onset and late-onset sepsis) □ Records are appropriately filled in and indicate: ○ Protocols are always implemented ○ Antibiotic treatment is modified according to clinical response, and to antibiotic sensitivity tests when available ○ Blood culture (1-2 mL) is done prior to starting any antimicrobial ○ Empiric antibiotic treatment is discontinued within 48-72 hours if blood culture is negative (if blood culture available) ○ Lumbar puncture is routinely performed to rule out or confirm meningitis in infants with signs/symptoms suggesting bacterial meningitis and in late-onset sepsis ○ Microbiological testing is available within a timeframe suitable for decision making: clarify with the Laboratory □ Rate and type of nosocomial infection are monitored (from the hospital files)	
10.6 Treatment of respiratory problems	**Score**
□ Check infant clinical records and by observation to assess if care of infants with respiratory distress syndrome includes: ○ Pulse oximeter routinely used for monitoring ○ Respiratory rate, heart rate, and possibly blood pressure are checked and recorded at least every 3 hours ○ Weight and fluid intake are checked at least daily ○ X-rays results and interpretation recorded ○ In case of mechanical ventilation the ventilator setting is reported in the baby's file ○ Blood Gas Analyser is available: ventilation settings are modified according to results of blood gas analysis □ Instructions for use of all equipment are immediately available and near the equipment □ Availability of equipment for needle aspiration or chest tube drainage of pneumothorax	

10.7 Other specific conditions	**Score**
□ There are written protocols, which are followed, for: ○ Assessment of patent ductusarteriosus (clinical and/or echocardiography criteria) ○ Assessment and treatment of neonatal seizures ○ Acute and late preterm anaemia ○ Transfusion of blood components	
10.8 Appropriate use of medicines	**Score**
Only medicines of proven efficacy are used □ Medicine dosages are appropriate for age and weight ○ Use the table 7.2 at the end of this chapter to asses if use is appropriate	
10.9 Pain avoidance and control	**Score**
Painful procedures are kept to a minimum □ Non pharmacological and pharmacological approaches to reduce pain are used	
10.10 Neonatal developmental care	**Score**
Postural care is routine (nesting or other approaches aimed at promote baby wellbeing and development) □ Environmental stress to babies (light, noise, etc) is minimized □ Physiotherapy for babies with long term admission and at risk of motor/muscular tone disorders is available □ Kangaroo care is implemented for LBW infants	
10.11 Communication with parents	**Score**
Parents are involved in the care of the babies to the extent the clinical condition allows this care □ There is a place close to ward where the parents can rest during the day when visiting their infant □ Information and options for treatment are discussed with parents □ Privacy is provided for parents to discuss their infants health with medical staff	
10.12 Transport of critical infants	**Score**
There is a written check-list to organize the transport □ There is a format for the clinical report and the documentation to accompany the referred infant □ There are written protocols to define in-hospital and inter-hospital transfer of infants, including back transfer □ Regional or inter-hospital transports are monitored and evaluated	
10.13 Discharge procedures	**Score**
□ Records are appropriately filled in and indicate: ○ The final diagnosis, written in the medical record, is complete and clear ○ Pre-discharge information has been discussed with the parents on 'danger signs', feeding, care, prophylaxis, vaccination, and follow-up that is specific to the individual infant	

□ Written documentation given to parents includes at a minimum: type of birth, gestational age, weight at birth, weight at discharge, any diagnosis and follow-up details □ The Unit provides follow-up for high-risk infants or has a clear referral system for follow-up	
10.14 Quality improvement and audit	**Score**
Nursing and medical procedures are periodically (yearly) reviewed □ Organizational issues are periodically discussed by the whole team In each case of perinatal death (critical events) audits are held	

Table 11 Monitoring and follow-up

11.1 Monitoring of individual progress	**Score**
□ A standard monitoring chart is used with the following information: women/infant details; vital signs; clinical signs depending on condition; treatments given, feeding, and outcome □ At the time of admission, a monitoring plan is prescribed according to the severity of the infant's condition	
11.2 Reassessment and monitoring by nurses	**Score**
□ Key risk signs are monitored and recorded by the nurse twice a day and at least 4 times a day for critically ill infants □ Doses and time of administration are recorded by the nurse in the medical records for each medication given to each infant □ If IV fluids or medicines are given, the following relevant information are recorded in the medical recorded: type of infusion, total amount, infusion speed, time of start and time of end of infusion □ Additional special monitoring is performed and recorded appropriately when needed to follow the progress of particular conditions □ Nurses use the results of infant monitoring to alert the physicians of problems or changing status warranting their attention	
11.3 Reassessment by doctors	**Score**
□ infant are re-assessed by a doctor after admission and reviewed at least once a day, twice for seriously ill woman/infant (if there is a specific policy, this professional could be an experienced nurse)	
11.4 Follow up after discharge	**Score**
□ If needed, follow up is arranged before discharge in the health facility closest to the woman/infant's home that can provide the necessary follow up treatment □ Every infant receives a discharge note providing information on the condition and on the hospitalisation period	

Section 3 Policies and Organization of Services

Section 3.1 Infection Prevention

Table 12 Infection prevention

12.1 Infection control policies	Score
□ National or regional infection control programme is implemented in the hospital □ Infection control committee is in place □ Key data are collected, such as % infection, infection site, and a proper definition is given for indicators that are monitored □ Infection control policies are developed and disseminated □ There are clearly defined procedures/protocols for cleaning and disinfection □ A system is in place for incident monitoring (accidental exposure, needle puncture, etc) □ Environmental sampling is not performed routinely □ Regular staff training and supervision on infection prevention occurs □ Staff health check-up policy is in place □ There is a policy for staff personal hygiene (nails, uniforms, shoes) □ Policies do not contain ineffective and resources wasting procedures, such as: o Ultraviolet lamp for disinfection o Restriction of family visits o Routine policy of changing clothing and footwear when entering intensive care units	

Table 13 Hospital support services

13.1 Laundry	**Score**
□ Clean linen is stored separately from soiled linen □ Clean linen is transported separately from soiled linen □ Used linen (sheets, cotton blankets) are washed in hot water (70°C to 80°C) with detergent and disinfectant	
13.2 Management of wastes	**Score**
□ Clearly defined procedures and protocols for collection and handling of wastes are applied □ Waste is transported in a dedicated trolley which is not used for any other purpose and is cleaned regularly □ Incinerator is functioning □ Sharps are collected and stored in sharps containers (plastic or metal box, lid closed, marked with appropriate label) □ Waste storage areas are clearly identified	
13.3 Sterilization	**Score**
□ Steam or heat sterilization is available □ Instruments/equipment are cleaned or decontaminated before sterilization □ Sterilized instruments and equipment are stored protected from dust, moisture, humidity, insects, animals □ Storage system clearly indicates which items are sterile □ Sterilization system is used in proper way: o Time o Temperature o Packing o Monitoring and tracking o Quality control	

Table 14 Hand washing

14.1Hand washing	**Score**
Hand washing written procedure or flow chart is attached near or above washing basins (WHO, National/Regional, local language) □ Adequate facilities and supplies for proper hand washing: o Clean water o Soap bar and soap rack which drains o Soap dispenser cleaned thoroughly on regular basis o Waterless, alcohol based hands rub o Disposable towels or clean towels □ Hand washing is performed by health staff o Before and after medical and nursing procedures o Between patient contact □ Plain soap is used for routine hand washing (not a disinfectant)	

Table 15 Standard precautions

15.1 Use of gloves	**Score**
□ Non sterile gloves are available □ Non sterile gloves are used in a proper way: o Separate pair for each patient o When handling soiled instruments o When touching blood, body fluids o No touching "around" with dirty gloves □ Sterile gloves are available □ Sterile gloves are used for aseptic techniques □ Double gloving if high risk of gloves perforation or in presence of high prevalence of HIV, HBV, HCV	
15.2 Isolation	**Score**
□ A specific area is dedicated for infectious patients □ Isolation precautions are used following evidence based guidelines □ Dedicated containers to separate infectious waste and linen are marked with appropriate label/colour	
15.3 Catheter associated urinary tract infection	**Score**
□ Urinary catheter (U.C.) used only as necessary with appropriate indications □ U.C. inserted using aseptic technique and sterile equipment □ U.C. removed as soon as possible (preferably within 24 hrs) □ A close drainage system is used □ Peri-urethral area is not cleaned with antiseptic when U.C. is in place	
15.4 Prevention of nosocomial pneumonia	**Score**
□ Hand powered resuscitation (e.g. Ambu bag) is sterilized or subject to high level disinfection between uses on different patients □ Ventilator circuit with humidifiers are changed at least every 48 hrs □ Sterile water is used for humidifiers □ Endotracheal suction is performed using aseptic technique*:* • gloves • close system • single use catheter • no normal saline instillation	
15.5 Intravenous catheter related infection	**Score**
□ Aseptic technique is maintained when inserting and caring for central catheter □ IV fluid/therapy is prepared using aseptic technique (no-touch) □ Topical antibiotic ointment or cream are not used on umbilical catheter insertion site □ Daily care of insertion site is recorded □ Any intravascular catheter is promptly remove when no longer essential	

Table 16 Surgical patients

16.1 Surgical patients	**Score**
□ Patients are required to bath or shower, using soap, either the day before or the operative day □ Hair is not routinely removed □ Mechanical bowel preparation (enema) is not used routinely □ Antibiotic prophylaxis is administered only when indicated □ Antibiotic for surgery patients is selected by efficacy, published recommendation, timing and pharmacokinetics □ Postoperative incision is protected with sterile dressing for at least 24 hours	

Section 3.2Guidelines and protocols

Table 17 Guidelines and protocols

17.1 Guidelines are available	**Score**
□ Guidelines and protocols are available on an appropriate range of topics □ Job aids or other material to assist implementation to clinical practice are available	
17.2 Guidelines are used	**Score**
□ Guidelines and protocols are printed, distributed, and easily available for use in the area where they are relevant □ Staff has been trained on the guidelines and protocols, or adequate mechanisms have been putted in place to ensure guideline diffusion among the staff □ New staff are orientated to key guidelines and protocols when the commence work □ There is a committee (group of people) responsible for periodical review and update of protocols and job aids	

Table l8 Continuous learning

18.1 Learning resources are available	**Score**
□ At least one recent neonatal textbook is readily available (not older than 5 years) □ At least one recent general nursing textbook is readily available (not older than 5 years)	
□ There is a computer with a working internet connection to ensure access to update health care literature and sources of e-learning □ There is a computer which can be used to access to the WHO - guidelines and recommendation	
10.2.2 In service training occurs	Score
□ There is an overall programme for in service training for all relevant staff □ Training update sessions related to practice take place regularly: include drills (simulated practice), use of emergency charts, equipment etc. □ Training includes practical sessions such as role plays □ There is a period of supervision or mentoring for newly appointed staff	
10.2.3 Continuous professional education occurs	score
□ There is a national continuous education and professional development program endorsed by the hospital □ Doctors, nurse and midwives are actively encouraged by the administration of the facility to follow national continuous education and professional development program	
10.2.3 Team working is encouraged	score
□ Regular staff meetings are held to discuss organizational aspects of care □ All staff are involve are involved in these meetings o Nurses and midwives o Doctors o Other health workers □ Nurses and midwives and other specific disciplines run their own periodic meetings	

Table 19 Audit and Case Reviews

19.1Audit and review process is in place	**Score**
□ A policy or protocol requires regular audits and reviews to take place □ There is a committee (group of people) responsible for organizing audits and case reviews: o as routine o in response to an incident or concern	
19.2 Audit and case reviews are conducted	**Score**
□ Case reviews are conducted to analyse and discuss all cases of deaths □ Case reviews are conducted to analyse and discuss cases of severe complications □ Case reviews involve all team members including nurses □ Case reviews are conducted based on updated, evidence-based clinical guidelines and local protocols □ Case reviews are conducted in a setting of confidentiality and no-blame □ Case reviews discuss contributing factors and causes of substandard care □ Recommendations from reviews are developed and implemented □ A quantitative method is used to evaluate adherence of clinical management of cases to evidence based guidelines	

Section 3.3Access to hospital care and continuity of care

Table 20Access to hospital care and continuity of care

20.1 Coordination with primary health care (PHC)	**Score**
□ There are explicit guidelines/procedures agreed with PHC on case referral, including: o Explicit criteria for case referral to the hospital and other health services o Use of referral note (i.e. a note specifying reasons for referral and treatment given) o Adequate information to women/families regarding services available, opening times, cost, and where services are located o Criteria and procedures for hospital transport o Hospital procedures to asses/triage referred cases □ Systems are in place to provide regular communication with PHC (e.g. meetings are organised with PHC to discuss statistics on case referral and to audit specific cases, such as all mortality/severe cases) □ The hospital management, or specific departments/units (such as ob/gynae or paediatrics) carry out activities (training and or supervision, development of protocols) aimed at improving the quality of case management at PHC level and of referral from PHC facilities	
20.2 In hospital continuity of care	**Score**
□ There are systems in place to ensure appropriate communication among clinical staff members on case management, (e.g. procedure to ensure communication on staff shifts; clinical meetings, etc.) both for doctors and nurses □ There are system in place to ensure communication among different clinical services in the hospital for integrating case management of newborn □ There are systems in place to ensure communication among different health services, e.g. clinical services with social services	
20.3 Referral to a higher level of care or to other health services	**Score**
□ There are explicit guidelines/procedures agreed with other hospitals/health services on case referral, including: o Explicit criteria for case referral (including for referral to social services) o Use of referral note (i.e. a note specifying reasons for referral and treatment given) o Adequate information to women/families regarding services to where the case is transferred, cost (if any), and where services are located o Criteria for hospital transport o Hospital procedures to asses/triage referred cases □ Lack of transport is not a barrier to referral (including a cause of delayed referral) □ Cost for transport is not a barrier to referral (including a cause of delayed referral) □ Fees or other costs are not a critical barrier to referral □ Systems are in place to provide regular communication with other hospitals/health services (e.g. meetings are organised with other hospital and health services to discuss statistics on case referral and to audit specific cases, such as all mortality/severe cases)	

□ Continuity of care is not compromised by separation of service provision based on age (e.g. newborn older than 1 month), or common condition (e.g. patients with diarrhoea are referred to infectious disease hospital)	

Section 3.4 Mother and newborn rights

Table 21 Mother and newborn rights

21.1 Charter is implemented	**Score**
□ The management has adopted a charter or policy that specifies the rights of the mother and of the newborn □ The adopted charter is based on international standards □ The charter was developed with a participatory approach, involving hospital staff and management as well as representation of other interest groups (Ombudsman, patients' rights groups, NGOs, etc) □ Staff is aware of the existence of the charter, the contents and their role in implementing the charter □ A process exists to regularly monitor implementation of the charter, examine breaches of the charter, act on breaches, and update charter as needed □ The full charter, or a summary, is written to be understandable to service users including literacy level and the use of local language □ The full charter is available in all areas that serve mothers and newborns (in a file) □ The full charter or a summary of the main points is posted visibly in the wards. Areas with summary visibly posted in the NICU	

Table 22 Availability and Accessibility of Care

22.1 Services are available	
Care is provided both for the mother and for the newborn □ Appropriately trained staff is available at all times □ Necessary medicines, equipment and supplies are available at all times	
22.2 Continuity of care is available	
□ Functioning links exist between primary care services and the hospital for maternal and newborn care: o From primary care to this hospital o From this hospital to primary care o From this hospital to higher level hospital □ Results of tests and diagnosis are shared between services to avoid re-testing and delays in care □ Mothers hold basic information on their health and care and that of their infant (baby card or book, mother's book, or similar)	
22.3 Care is physically accessible	
□ Out-patient services are open at times that facilitate easy access □ Waiting times are monitored to avoid excessive waiting: o Waiting time to get an appointment o Waiting time at clinic o Waiting time for referral appointment □ If the newborn has any health problem, the mother (or other family member) is offered a place to stay in the hospital	
22.4 Care is economically accessible	
□ Hospitalization, treatment, and transport do not require significant costs for the family (costs that wouldbe a barrier to care) □ If there are costs, there are mechanisms to provide free care for those unable to afford these costs □ Clear information is provided regarding services that are free of cost, and services that have a cost (including hospitalization, laboratory tests, medicines, food, bed linen etc for the mothers and the newborn) □ Unofficial payments to individual staff or hospital are prohibited	
22.5 Access is non-discriminatory	
□ Care is provided without limitation by age, race, ethnicity, cultural or religious belief □ Attention is given to providing information in ways that are inclusive of those with literacy or language differences	

22.6 Access to information, discussion and support is provided	**Score**
□ Health personnel are trained in communications skills □ Health personnel listens to the mother's perceptions of the problems and needs □ Information is provided in a way that allows for discussion of how the information can be used by the individual □ Opportunities to ask questions or for further information are encouraged □ The mother receives information regarding the care of her infant and regarding her own health at appropriate times: o Admission o Discharge □ Mothers know and are able to recognize signs and symptoms related to their newborn that require contact with health services □ Information and support is provided in a way that is cultural appropriate and easy to understand □ Mothers likely to have additional needs receive particular attention to information and support: o Physical or sensory needs o Intellectual needs o Psychological needs o Adolescent mother o Very poor social or economic conditions o Infant with health conditions or special needs	

Table 23Acceptability and Respect

23.1 Privacy, confidentiality and respect is given	**Score**
□ Care is person-centred and adapted to the individual situation □ Cultural and religious beliefs and practices are respected □ If beliefs and practices are likely to result in risks to health or safety (of mother or infant or others) these beliefs are discussed with the mother in an informed and supportive manner □ Access to patient files and information is limited to only those staff requiring this access □ Information is not shared with family members without the permission of the women □ Special attention is given to women with special need, such as women victim of violence □ Staff have the skills to respond to the physical and emotional concerns of women and families □ Effective treatments, as based on international standards are provided at the highest attainable level □ There are processes in place to monitor and improve quality of health care	
23.2 Pain is avoided and correctly managed	**Score**
□ Painful procedures are avoided when less invasive alternatives are available □ Procedures are planned so to minimize pain and discomfort: o Blood testing (frequency of blood draws and number of separate draws) o Quiet times are provided for sick infants (reduced lighting and noise, no routine procedures) o Fasting for procedures is kept to a minimum During painful procedures and situations, pain is managed o Pain evaluation is done regularly o Pain relief is provided o Non-pharmacological pain management is supported	
23.3 Unnecessary procedures and treatments are avoided	**Score**
□ Unnecessary hospitalization are avoided □ Unnecessary long hospitalizations are avoided □ Unnecessary investigations and treatments are avoided □ Unnecessary medicines are not prescribed □ Movement is not restricted unless there is a medical need for restriction □ Unrestricted access of parents to their infant is facilitated	

23.4 Participation in care is encouraged	**Score**
□ The health personnel ask the mother about her condition and about the infant's condition and value the viewpoint of the mother □ The mother is encouraged to ask for staff assistance in caring for herself and for her infant □ If a mother is too ill to care for herself or her infant, a family member is encouraged to be in the hospital to provide non-medical care and support □ The involvement of the woman in decision making is routine, such as when discussing different options for care □ The father or other support person is encouraged to stay with the mother and with the newborn as needed during the hospital stay,. □ If the newborn has any health problem that requires hospitalization, the mother is offered a place to stay in the hospital and encouraged to be involved in the care of her infant □ If the mother is unable to remain with her hospitalized infant another family member is encouraged to stay with the infant □ Clear information is provided regarding the organization of care (such as documents needed for the hospitalization, hospitals rules, access to services and facilities) □ Informed consent is obtained for major interventions and procedures □ Procedures are in place to capture user's views	

Annex VI Conceptual frame work for Assessment of Quality of Care Adopted from WHO Hospital Care for Mothers and Newborns: Quality Assessment and Improvement Tool.2014.