ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING AND MIDWIFERY

ASSESSMENT OF NURSES' KNOWLEDGE AND PRACTICES REGARDING NOISE REDUCTION AND ASSOCIATED FACTORS IN NEONATAL INTENSIVE CARE UNITS IN ADDIS ABABA PUBLIC HOSPITALS, ETHIOPIA, 2025

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A RESEARCH PROPOSAL TO BE SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCE, SCHOOL OF NURSING AND MIDWIFERY, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTERS OF SCIENCE IN NEONATAL NURSING

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Title	Assessment of nurses' Knowledge and Practices Regarding Noise Reduction and Associated Factors in Neonatal Intensive Care Units in Public Hospitals, Addis Ababa, Ethiopia, 2025
Study setting	The Selected Addis Ababa Hospitals: St. Peter's Specialized Hospital, Gandy Memorial Hospital, St. Paul's Hospital, And Zewditu Memorial Hospital.
Duration of study	From January 20/2025 to February 20/2025
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APPROVAL SHEET

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I, Haymanot Mulugeta, the undersigned MSc student, declare that I have submitted my original work on the title Assessment of Nurses' Knowledge and Practices Regarding Noise Reduction and associated factors in neonatal intensive care units in public hospitals in Addis Abeba for requirement of MSc theses. All scholar materials that are included in the thesis have been given recognition through citation. I hereby certify that all sources cited and referenced in this document have been properly cited and referenced. Every effort was made to avoid plagiarism in the preparation of this thesis.

This thesis work has been submitted for examination with my approval as an advisor.

Approved by:

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ABBREVIATION AND ACRONYM

AAP	American Academy of Pediatrics
AOR	Adjusted odds ratio
CI	Confidence interval
COR	Crude odds ratio
CPAP	Continuous Positive Airway Pressure
dB	Decibel
EFCNI	The European Foundation for The Care of Newborn Infants
ETB	Ethiopian birr
GMH	Gandy Memorial Hospital
NICU	Neonatal Intensive Care Unit
PNIHL	Permanent Noise-Induced Hearing Loss
SPHMMC	St. Paul's Hospital Millennium Medical College
SPSH	St. peter's Specialized hospital
WHO	World Health Organization
ZMH	Zewditu Memorial Hospital

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ABSTRACT

Background: Noise, often described as unwanted or disruptive sound. It can adversely affect both mental and physical health, making it essential to minimize noise whenever possible. Excessive noise poses significant risks to the well-being of newborns. Many studies have reported that nurses in neonatal intensive care units (NICUs) have limited awareness and insufficient knowledge regarding noise, practices to reduce it. In resource-limited countries, such as Ethiopia, there is a particular lack of evidence on this subject.

Objective: The aim of the study was to assess nurses' knowledge and practice regarding noise reduction and associated factors in neonatal intensive care in public hospitals in Addis Ababa, Ethiopia

Methods: An institutional-based cross-sectional study was conducted involving 117 nurses working in the neonatal intensive care unit (NICU) from From January 20/2025 to February 20/2025. Data was collected using a self-administered questionnaire. then added to kobotoolbox to reduce manual errors. The data was transferred to SPSS then bivariable and multivariable logistic regression analyses were conducted to assess the effect of the independent variable on the dependent variable. The adjusted odds ratio was used to interpret the strength of the association, with a 95% confidence interval (CI). Statistical significance was established with a P-value of <0.05 in the multivariate analysis. The results were presented through figures, tables, and charts.

Results: The proportion of nurses having good knowledge and practice was 54.7% and 50.4% respectively. Knowledge was significantly associated with education level (AOR=5.821,95% CI: (1.039-32.5) p-value= 0.045), years of experience in the NICU (AOR= 0.537, 95%CI: (0.392-0.736) p-value = 0.09), and the challenges encountered in implementing noise reduction practices (AOR = 0.537, 95% CI: (0.392–0.736), p < 0.001).Practice was significantly associated with the presence of a noise meter (AOR=2.795, 95% CI 1.018 - 7.672, p-value 0.046) And NICU noise level (AOR= 0.08795, 95% CI 0.035 - 0.217, p-value 0.000).

Conclusion and recommendations: This study reveals a moderate level of understanding but inconsistent practices. Therefore, hospital administrations and supporting organizations should prioritize noise reduction training and ensure policies and guidelines are easily accessible.

Keywords: Noise reduction, knowledge, noise reduction, neonate in NICU

1. INTRODUCTION

1.1 Background

Noise is defined as an unwanted or disturbing sound, often associated with its loudness (1) . Noise can negatively affect both mental and physical health. It is an undesirable environmental factor that should be minimised as much as possible. The impact of sound on an individual varies based on several factors, including intensity, duration, frequency, age, clinical condition, sensitivity level, and fatigue (2) . Noise can also be continuous, fluctuating, or intermittent; however, all types of noise negatively affect human health, both in the short term and long term (3).

Measuring sound loudness as perceived by the human ear is challenging, which is why sound pressure is often used as a substitute. Sound pressure is expressed not in pascals but rather as a logarithmic conversion known as the decibel (dB). Decibels represent a ratio of sound pressure instead of true levels and are related to the threshold of human hearing, conveniently set at 0 decibels (4).

According to WHO guidelines, the average noise level should not exceed 45 decibels (dB) over an hour, with a maximum transient level of 65 dB. However, Noise levels in Neonatal Intensive Care Units (NICUs) frequently surpass the recommended standards set by the World Health Organization (WHO) (5).

The European Foundation for the Care of Newborn Infants (EFCNI) provides guidelines on managing the acoustic environment in neonatal intensive care units (NICUs). These guidelines focuses on the critical elements required to establish a safe and supportive acoustic environment for both newborns and healthcare staff in the NICU. The stratedies includes lowering alarm volumes to the minimum necessary, practicing a "quiet hour," adapting a noise-reduction culture, and offering training to nursing staff on managing the acoustic environment within the unit (6).

Hospitals are greatly affected by noise pollution, which can be risks to both patients and staff. And the excessive environmental noise can cause many health problems such as temporary issues like sleep disruption and delayed healing to long-term problems such as permanent noise-induced hearing loss (PNIHL). Additionally, research has shown that noise exposure can negatively impact the cardiovascular, endocrine, and nervous systems (5,7).

Exposure to high-frequency noise in the Neonatal Intensive Care Unit (NICU) is a critical concern because the newborns auditory systems are still developing. Prolonged exposure to such sounds may cause hearing impairment or permanent damage. Studies indicate that monitor alarms alone can elevate ambient noise levels to 57 dB, while routine medical procedures such as opening incubator doors or staff discussions can increase the noise levels from 82 and 114 dB. These conditions explain why strict noise control measurements are important in the NICU (8–10) . The continus exposure to high level of sound can cause challenges for newborns auditory developmet and can also affect their language and brain developments(10).

Effective noise management practices including reducing alarm volumes, implementing quiet hours, and training nursing staff on how keeping the nicu enviroment (11) . To assess nurses current knowledge and practices there should be further research as they have an importan role in reducing noise (6,12).

1.2 Statement of the problem

Noise levels in neonatal intensive care units (NICUs) often passes the recommended level of noise level of 45 decibels (dB) recommended by both the American Academy of Pediatrics (AAP) and the World Health Organization (WHO). The range in the actual practice is from 45 dB to 60 dB which is continuiously higher than the number putted on the guideline (13) . Excessive noise can affect the health and neurodevelopment of newborns and critically ill neonates. It may lead to increased stress, heightened muscle tension, and changes in vital parameters such as heart rate, respiratory rate, oxygen saturation, blood pressure, and intracranial pressure. And also noisy environments can disrupt sleep patterns, which can affect negatively on physiological stability, causing babies to become restless and irritable. Being exposured to loud noise can lead to hearing impairment, which is diagnosed in 2% to 10% of newborns, compared to only 0.1% of the general pediatric population (14,15).

Nurses as frontline caregivers in neonatal intensive care units (NICUs) they hold the primary responsibility for patient care and play an important role in implementing noise reduction protocols. These protocols helps the vulnerable preterms and high risk newborns for there growth and there recovery. The nurses use different stategies to maintain the appropriate sound level such as careful management of medical equipment, regulation of vocal volumes, and awareness campaigns to educate both healthcare teams and families about the harmful effects of excessive noise exposure on infant health outcomes (16). Nurses ensure that sound absorbing materials are used properly and that equipment is positioned correctly to create the approprate sound for the NICU. Their clinical experiance and dedication to practice research-based protocols are vital for reducing noise-induced stress, promoting restorative sleep cycles, and protecting the neurological development of vulnerable newborns. (17). However, gaps in their knowledge and practices can affect efforts to achieve quieter environments(4).

Research in the Western region has shown that nurses understanding and practice of noise reduction strategies in neonatal intensive care units (NICUs) are often poor and need

improvments(10,21–23). Often there are three challenges for managing noice in the NICU they are improper equipment handling, unchecked staff conversations, and ineffective alarm system protocols. These issues contribute to continuous noise pollution that often remains unsolved which affect the acoustic environment of the NICU (15,21,22).

In Ethiopia the issue about noise reduction in neonatal intensive care units (NICU) has not been studied yet. It is important to examine the knowledge and practices of nurses especially in low-resource settings where healthcare challenges are clear and noticable. Nurses have an important role in maintaing the approprate and suitable enviroment for the neonates so knowing there knowledge is very important and checking how they practice noise reduction can show as the gaps that affect the quality of their care.

1.3 Significance of the study

This study aimed to assess the knowledge and practices of nurses regarding noise reduction in Neonatal Intensive Care Units (NICUs) in the selected public hospitals in Addis Ababa. It can identified significant gaps in there knowledge and practices among NICU nurses. which can give insights for developing targeted training and interventions to increase their understanding and ability to manage noise. This can also improve the quality of neonatal care.

Excessive noise in NICUs can also have negative effects on the physiological and neurological development of neonates. By evaluating current noise reduction practices the study can contributes to efforts aimed at creating a safer and more nurturing environment for newborns, ultimately promoting better immediate and long-term health outcomes.

Additionally, this research can also help for future studies on similar subject on noise reduction, especially in resource-limited settings like Ethiopia. It adds to the literature on neonatal and nursing care, encouraging further investigation in this area. The findings can also inform national neonatal care policies by pinpointing the importance of environmental factors such as noise control. This could potentially lead to improved guidelines, policy reforms, and better allocation of resources to enhance NICU standards across the country. Through these contributions, the study plays a crucial role in advancing neonatal care in Addis Ababa and similar contexts.

2. LITERATURE REVIEW

Noise in Neonatal Intensive Care Units (NICUs) is a significant concern because it can harm the health and development of newborns. Excessive noise can disrub their sleep, increases stress levels, and interferes with both neurodevelopment and physiological stability. Nurses play an important role in implementing effective noise-reduction strategies in these units (23) . This chapter reviews recent literature and guidelines from databases such as PubMed, Semantic Scholar, Google Scholar, and other websites. From 75 articles, 44 relevant studies were selected based on their alignment with the study objectives, similar design, recent publication dates, and full-text availability. The review examines nurses knowledge, their practice on noise reduction, and factors influencing their practices.

2.1. Knowledge Of Noise Reduction

In 2023, a study conducted in Poland examined the knowledge of medical staff regarding acceptable momentary and transient sounds in the newborn unit. The findings revealed that only 36% of participants provided correct answers about these sounds. Furthermore, just 15% of the respondents demonstrated an understanding of the risks associated with high levels of sound in Hospitalized newborns within the neonatal intensive care unit (NICU). Notably, nurses with a master's degree provided the most accurate responses concerning the impact of noise on newborns, with correct answer rates of 35.4% and 50.8%, respectively, while those with lower qualifications had a correct response rate of only 13.8%. Also, respondents from the youngest age group and with the least work experience were more likely to have a high knowledge score than others, but it was not statistically significant (2).

A study conducted in Canada found that 32 nurses responded (49%). Of these respondents, 24 nurses (75%) were aware of the risks associated with excessive noise exposure on infants' neurodevelopmental outcomes. However, nearly half of the nurses believed that the noise meter was not an effective intervention for reducing noise levels(24).

In a study conducted in Palestine in 2022, the overall mean knowledge score was 42.26%. The mean score was higher among males but no significant difference between males and females in

their knowledge p=0.054, individuals under 30 years old had no significant difference in knowledge between the different age groups p=0.424., and those holding a master's degree or other advanced degrees compared to other groups p=0.539. Approximately two-thirds (64%) of the respondents had a poor knowledge score, while 36.1% achieved an average score (7).

In a study conducted in Qatar, 81% of the nurses lacked knowledge of the acceptable maximum decibel level for NICU noise (25) . in Brazil, all the nurses understood the effects of noise on newborns, as did 33 (91.7%) of the nursing assistants(26).

study in Jordan, the mean score for knowledge was greater among male nurses and lower among female nurses, with no significant difference between male and female nurses regarding their knowledge related to noise issues (p =0.89). However, a statistically significant positive correlation was found between the level of knowledge and years of nursing experience (p = 0.04) (19).

2.2 Practice on Noise Reduction

A study conducted in Canada on the use of silicone earplugs showed two outcomes that favoured the silicone earplugs group: more infants passed the auditory brainstem response test during their hospital stay, and at 18 to 22 months, the few infants who were followed demonstrated significantly better performance on the mental developmental index(15).

Nurses in Poland practice noise reduction by managing medical alarms. Out of the surveyed nurses, 49 (27%) reported controlling alarms, while 47 (26%) called security to remove visitors and patient companions from the departments. Additionally, 21 Nurses (12%) attempted to reduce the number of visitors and companions on their own. eleven nurses (6%) indicated that they closed the department doors and windows to minimize outside noise. only 5 nurses (3%) requested that medical staff remain calm during arguments or disputes(2).

A study conducted in Palestine found that the overall mean score for nurses' practices was 27.49%. Male nurses had a higher mean score for their practices, but there was no statistically significant difference between male and female nurses in their practice levels ($p = 0.063$). Among different age groups, nurses aged 30 to 37 performed better, and a statistically significant difference was observed in practice scores across age groups ($p = 0.006$). Additionally, nurses with bachelor's degrees had higher mean scores than those with other qualifications, with a significant difference based on the highest qualification obtained ($p = 0.021$). While nurses with more than 20 years of experience had higher practice scores than those with less experience, no significant difference was found regarding years of experience ($p = 0.824$) (7).

A Study Conducted in Switzerland explored the voice practices of nurses in the Neonatal Intensive Care Unit (NICU). The majority of nurses reported that they talk directly to infants during their routine care (N = 42, 82.4%). Approximately half of the respondents indicated that they whisper to infants (N = 27, 52.9%). A smaller proportion of nurses reported singing (N = 18, 35.3%) Or Humming (N = 13, 25.5%) to infants as part of their routine care. Additionally, some nurses indicated that they typically remain silent and do not use their voice with the infants (N = 14, 27.5%). When interacting with other adults during typical care, most nurses reported that they talk to them as well (n = 36, 70.6%), while a smaller proportion indicated that they whisper to other adults (n = 15, 29.4%) (27)

Currently, there are no studies available on this topic in Ethiopia, which means there is no local data for comparison.

2.3 Factors Associated with Noise Reduction

2.3.1 Socio-Demographic Factors

A study conducted in Portugal examined the perceptions of health professionals regarding noise in neonatology. The majority of health professionals surveyed were female (90.4%) and aged between 25 and 60 years. Notably, half of the participants were under 38 years old. The distribution of professional roles consisted of nurses (55.8%), doctors (26.9%), operational assistants (13.5%), and various other professionals/technicians (3.8%). Participants had varying

levels of professional experience, ranging from 2 to 39 years. Professionals with over 21 years of experience report greater perception of noise in the unit, although there are no statistically significant differences ($p = 0.833$) (28).

A study conducted in Brazil revealed that healthcare professionals who found the neonatal intensive care unit (NICU) to be very noisy comprised 44.9% of the participants. These individuals had an average of 7 years of experience working in the unit. In contrast, only 10.2% of participants perceived the environment as not very noisy, and they had an average of only 2 years of experience in the NICU. The data suggests a statistically significant association between the healthcare professionals' Perception of Sound Levels in the NICU and their length of service, with A P-value of 0.0013 (18).

A study conducted in Turkey investigated the effect of education on reducing noise and its impact on health personnel's knowledge levels and behavioural changes. The demographic characteristics indicated that a majority of the participants were female nurses, making up 80.8% of the group, while males comprised 19.2% (n=5). The average age of the participants was 28.81 years (SD ±6.58), and they had an average of 25.12 months (SD ±30.53) of professional experience in neonatal care (29).

Research findings from Poland revealed significant associations between healthcare workers' knowledge levels and certain demographic factors, particularly age, workplace setting, and residential location. The study primarily involved female participants, who made up 99% of the sample. Respondents' ages ranged from 21 to 58 years, with an average age of 36. The analysis indicated that more experienced and older personnel demonstrated superior knowledge compared to their younger counterparts. Additionally, nurses holding a master’s degree provided the most accurate answers about the impact of noise on newborns (2).

In a Turkish study, 80.8% of participants were female, and 19.2% were male. The mean age was 28.81 ± 6.58 years, and the mean working duration was 25.12 ± 30.53 months (29).

2.3.2 Environmental Factors and Institutional Factors

In A USA study, open bay rooms were found to be louder than pods or private rooms, which contributed to higher overall noise levels. The increased number of acoustic noise events in an open bay setup is due to the combined activities of patient care, visits, conversations, and alarm activations (30,31).

A Study Conducted in Brazil found that various sources of noise in the neonatal intensive care unit (NICU) can significantly impact the environment (73.0%) of subjects recognized the effects of environmental noise on the health of care professionals, while (27.0%) did not, and (1.0%) did not respond to the question. These noises include the functioning of medical devices and equipment, alarms, conversations among healthcare professionals, and the volume at which they speak. Other contributing factors are the opening and closing of doors, dragging objects or equipment, and opening and shutting hatches. External sounds, placing objects on top of incubators, the sound of high heels, and ringing telephones were also noted as sources of noise(26).

A Study Conducted in Spain found that noise levels in the neonatal intensive care unit (NICU) ranged from 46 dba to 50 dba, with incubators recording levels around 52 dba. These noise levels were largely attributed to external sounds, such as passing traffic outside the hospital. Additionally, noise levels were higher during visiting hours, feeding times, and shift changes, when nursing and monitoring are at their most intense and care activity is at its busiest. Conversely, the minimum noise levels were recorded during the night(32).

Studies In China reveal that NICUs with open-bay designs face particular challenges, as noise from alarms, conversations, and various activities often exceeds acceptable levels. Educational interventions alone typically do not result in sustained long-term noise reduction without the reinforcement of behavioural and environmental adjustments, such as the establishment of designated "quiet times" and the use of real-time noise monitoring systems. These measures have shown promise in reducing noise but require consistent implementation and adherence (33,34)

Research conducted in other countries has shown that installing a double glass partition to reduce noise from the hospital generator room next to the neonatal intensive care unit (NICU) has resulted in a decrease in noise levels, specifically, a reduction of 9.58 dB in the ventilator room and 2.09 dB in the extreme preterm room. Despite efforts to reduce noise levels, they still exceed the recommended limit of 50 dB even after updates to protocols (35).

Research in Bahrain showed that utilizing sound-absorbing or reflective tiles on ceilings and floors effectively reduced noise levels in NICUs. Additional covering the incubators with noise reduction materials and using an earplugs for the newbors have showen to be a successful strategies (15).

A study conducted in India found that noise levels within NICUs was higher than the recommended limits with measurements reaching 59 dB for Bubble CPAP and 69 dB for invasive ventilators (36).

2.3.3 Psychosocial Factors

A study conducted in the USA has identified different causes of noise in the NICU. These included abrupt, unexpected sounds like dropped objects or chairs being dragged, speaking loudly at the bedside, delays in silencing alarms, and forcefully opening and closing of doors. Furthermore, the study also explains that staff members often lack awareness of how their actions contribute to noise levels, viewing their work environment as part of their personal space rather than recognizing it as a sensitive area for vulnerable infants. To address these issues, the study recommended implementing staff reminders and improving staffing ratios to enhance noise reduction efforts (30).

A study conducted in India stated that to continue the culture of silence the awareness regarding noise reduction among the existing staff should gets passed on to the new staff ensuring they are familiar with this culture(17).

A study conducted in Bahrain found that lowering noise levels could enhance staff performance and increase parental satisfaction with care. Poor communication between nurses and doctors has been identified as a common contributing factor to challenges in healthcare settings. High noise levels are linked to a higher rate of errors and accidents, which leads to decreased staff performance in areas such as efficiency, focus, and communication abilities. Additionally, increased noise can elevate staff turnover rates, and job satisfaction has been found to be negatively correlated with noise-induced stress(15).

2.3.4 Policy and Structural Factors

In a study conducted in Turkey, the mean percentage of correct answers increased from 67.35±13.69% before the training program to 82.35±9.15% after the program (29) . In a study conducted in Iran, the level of knowledge among health personnel increased significantly after the training, with scores of 83.4±9.5 compared to 74.6±8.2 before the program. The current study indicates that the education program effectively increases the nurses' knowledge. However, repeated education may be effective in making the information permanent (21).

A study in India established a noise reduction protocol to minimise noise exposure. This protocol included changes in behaviour, such as informing all staff about the harmful effects of noise on infants, avoiding shouting across distances, using low tones when speaking, turning off radios, alerting against the use of loudspeakers, and placing silent reminders in units and corridors. Additionally, it involved environmental changes, such as fitting rubber caps on the legs of furniture, replacing metal items with plastic ones, reducing the volume of device alarms, keeping doors closed, and minimising phone volume(10).

A study done out in Bahrain, which explained the oxygen satiouation levels improves when they practice quite hours than the normal time. The research also emphasized that sound levels in the NICU could be effectively reduced through intentional and thoughtful architectural design (15).

Summary

Research has shown that noise is a significant concern affecting the health and development of neonates in Neonatal Intensive Care Units (NICU) which can cause sleep disruption, elevated stress levels, and affect neurodevelopment. While nurses play a vital role in noise reduction efforts, studies indicate considerable variation in their knowledge and practices across different regions. Studies indicate significant gaps in understanding acceptable noise levels and the associated risks of excessive noise exposure. Generally, higher levels of knowledge correlate with advanced education and more experience. Effective practices for noise reduction, such as controlling alarms, limiting visitor numbers, and utilizing voice modulation, demonstrate varying degrees of success. Several factors influence noise reduction efforts, including socio-demographic characteristics, environmental design, institutional policies, and psychosocial elements. Effective strategies for mitigating noise involve educational interventions, structural modifications, and established noise reduction protocols.

Although several international studies have explored noise reduction practices in Neonatal Intensive Care Units (NICUs), there is a significant lack of data from Ethiopia. Most existing literature comes from high-income countries, which may not reflect the realities of low-resource settings. Additionally, no studies have specifically examined the awareness and behaviors of Ethiopian NICU nurses regarding noise reduction. This gap in context-specific evidence restricts the development of tailored interventions for Ethiopia's healthcare challenges. This study aims to provide baseline data from selected public hospitals in Addis Ababa to inform national policy and improve neonatal outcomes.

2.4 CONCEPTUAL FRAMEWORK

This Conceptual Framework is adapted and modified after reviewing different literature (4,7,17–19,21). this shows the effect of independent variables on dependent variables.

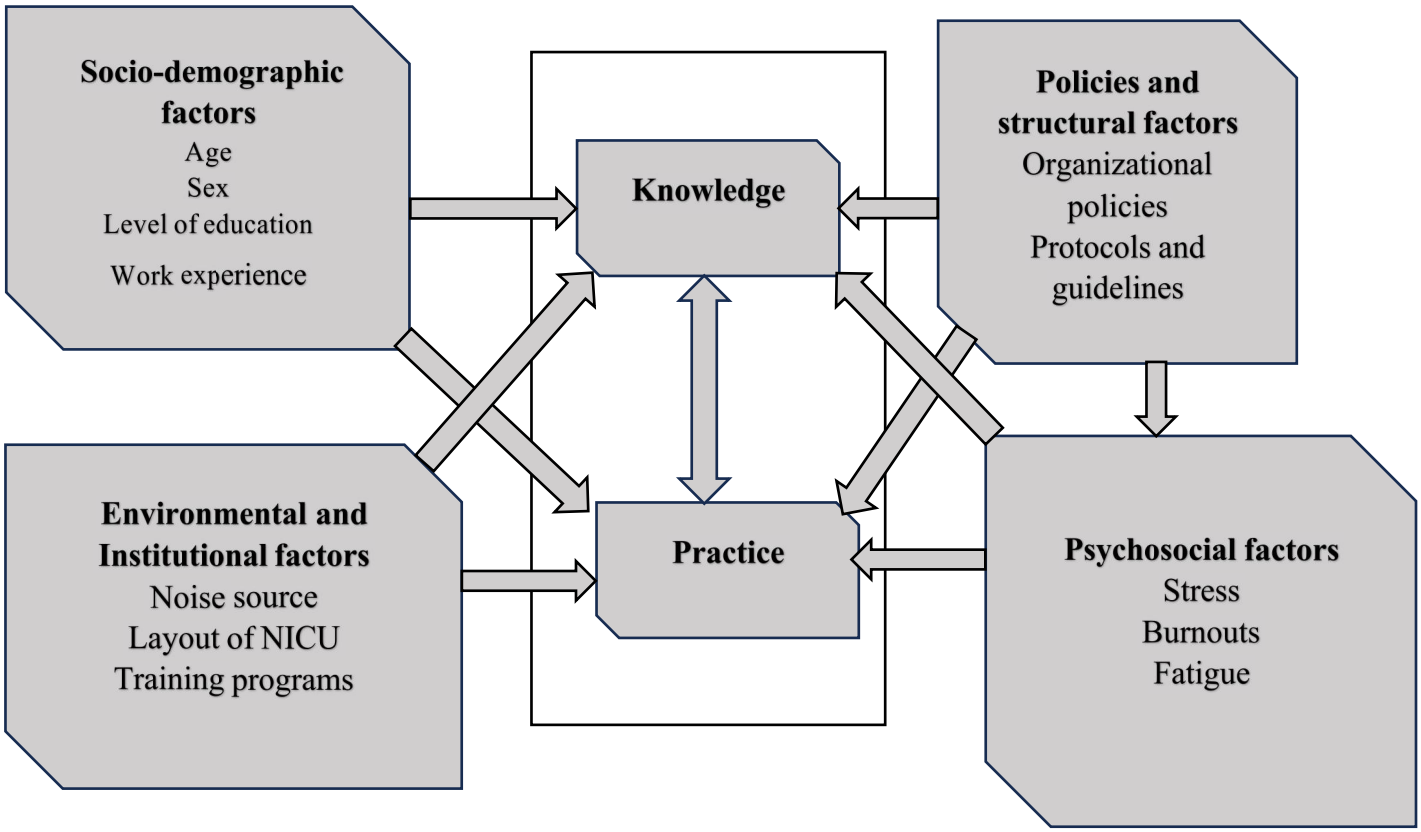

Figure 1: Conceptual Framework on Assessment of Nurses' Knowledge and Practices Regarding Noise Reduction and Associated Factors in Neonatal Intensive Care Units in Public Hospitals, Addis Ababa, Ethiopia, 2025

3. OBJECTIVES

3.1 General objectives

⇒ To Assess the NICU Nurses' Knowledge, Practice and Associated Factors Regarding Noise Reduction in Public Hospitals in Addis Ababa, Ethiopia, 2025

3.2 Specific Objectives

1, To Assess the NICU Nurses' knowledge level on noise reduction in public hospitals in Addis Ababa, Ethiopia, 2025

2, To Assess the NICU Nurse's practice level on noise reduction in public hospitals in Addis Ababa, Ethiopia, 2025

3, To identify factors associated with NICU nurses' practice and knowledge on noise reduction in public hospitals in Addis Ababa, Ethiopia, 2025

4. METHODOLOGY

4.1 Study Area and Period

Ethiopia's Capital City, Addis Ababa, covers an area of 540 square kilometers. The city's population is approximately 4.8 million. Contributing to slum conditions and overcrowding. The administrative region of Addis Ababa is divided into 11 sub-cities and 116 woredas (districts). According to a report from the Addis Ababa Health Bureau, the city has 49 hospitals: 13 are government-owned, 5 are operated by NGOs, and 31 are private. Additionally, there are 27 public health centers, 130 public health stations, and around 700 private clinics of various types throughout the city(37).

Among the 13 public hospitals serving the community In Addis Ababa Are Tikur Anbessa Specialized Hospital, ALERT Hospital, Amanuel Hospital, Yka Kotebe General Hospital, Saint Paulo's Hospital, St. Peter Hospital, And ABET Hospital, all of which are managed by the Federal Ministry Of Health. The Remaining Six Hospitals—Menelik Hospital, Zewditu Hospital, Yekatit 12 Hospital Medical College, Ras Dasta Hospital, Tirunesh Beijing Hospital, And Gandhi Hospital—Are Directly Overseen by The Addis Ababa Health Bureau(38).

Out of the 13 Public Hospitals, 11 Have a Neonatal Intensive Care Unit(39). The Study was be conducted in four Randomly selected Hospitals from From January 20/2025 to February 20/2025. The Selected Hospitals Are st.peter's Specialized Hospital, Gandy Memorial Hospital, St. Paul's Hospital, And Zeweditu Hospital.

St. Paul's Hospital Millennium Medical College was established in 1969 and is located in The Gulele Sub-City. Formerly known as St. Paul General Specialized Hospital until 2008, It is now called Saint Paul's Hospital Millennium Medical College. It is the second-largest referral Hospital In Ethiopia and has a Neonatal Intensive Care Unit (NICU) that has been operational for over eight years. currently, there are 50 nursing staff members working in the NICU(40).

St. Peter's Specialized Hospital in Addis Ababa has a Neonatal Intensive Care Unit (NICU) designed to provide specialized care for critically ill newborns. The NICU offers a

comprehensive range of services to address various neonatal conditions, including hyperbilirubinemia. Out of the hospital's 400 beds, 18 are dedicated to the neonatology department, which is equipped with 2 incubators and 2 phototherapy machines and has 35 nurses(41).

Gandy Memorial Hospital (GMH) Was Established In 1951 And Is Located in the Kirkos Sub-City. The Hospital Is governed by the Addis Ababa City administration Health Bureau and Specializes in Maternal and Neonatal Care. Currently, there are 38 nursing staff members working in the Neonatal Intensive Care Unit (NICU)(42).

Zewditu Memorial Hospital is one of six hospitals managed by the Addis Ababa Health Office. It features a dedicated neonatal care unit, functioning as a specialized team within the Inpatient Directorate. The hospital employs a total of 885 staff members, 580 of whom are health professionals. The pediatric and neonatal intensive care unit (NICU) has a capacity of 73 beds. This unit is supported by a dedicated team that includes one neonatologist, two general practitioners, 22 nurses, two porters, and three cleaners. Notably, about 55% of the nurses have received specialized training in neonatal intensive care.

4.2 Study Design

⇒ An Institutional-Based Cross-Sectional Study was done in public hospitals in Addis Ababa.

4.3 Population

4.3.1 Source Population

⇒ The nursing staff working in NICU in public hospitals in Addis Ababa, Ethiopia, 2025

4.3.2 Study Population

⇒ The nursing staff working in the neonatal intensive care unit in selected public hospitals in Addis Abeba, Ethiopia during the study period.

4.4 Eligibility Criteria

4.4.1 Inclusion Criteria

⇒ All full-time/permanent nurses who have been working in the NICU in the selected hospitals

4.4.2 Exclusion Criteria

⇒ Nurses who are on annual, sick or maternity leave at the time of data collection.

4.5 Sample Size Determination

Table 1: Selected public hospitals and the total number of Nurses in neonatal intensive care unit in each hospital in Addis Ababa, Ethiopia,2025

no	Name of hospitals	Number of nurses
1.	SPSH	35
2.	SPHMMC	50
3.	ZMH	22
4.	GMH	38
	Total	145

The sample size of this study was determined by using the formula for calculating a

Single Population Mean, = $ni=\frac{(z\alpha/2)2p(1-p)}{d2}$

Where ni = Initial Estimated Sample Size

Z = Normal Standard

P = prevalence rate = ***0.5*** **(50%)**, because there was no well-established research finding in Ethiopia, which can serve as baseline information.

d = Margin of Error

The following assumption was used to determine the sample size:

Thus: $n_o = \frac{(1.96)^2 \text{ X } 0.5(1-0.5)}{(0.05)^2} =$ ***384*** **N=*145***

Since, The Population is < 10,000; Using Correction Formula

$n_f = n_o \text{ X } N / n_o + N$

$n_f = 384 \text{ X } 145 / 384 + 145$

n_f= *106*

To Adjust for Non-Responses 10% Contingency of the calculated sample size was added to the N as

Follows: 106 X 0.1= 10.6 Then 106 + 10.6 = 116.6 Therefore, $n_f = 117$ Nurses. Hence, The

Minimum Sample Size Required for This Study Was 117 Nurses.

4.6 Sampling Procedure and Technique

There are 145 nurses currently found working in the neonatal intensive care unit of selected public hospitals in Addis Ababa, Ethiopia. the sample size was distributed for four hospitals by the probability proportion to sample size (PPS) sampling technique. For each hospital, the proportionate number of study subjects was determined by using **n=nf/N *ni** Where, ni= Number of nurses in each hospital, nf= Total sample size, N= Total number of nurses in public hospitals. Then, a Simple random sampling technique was used to select nurses after a proportional allocation of a sample size to each hospital.

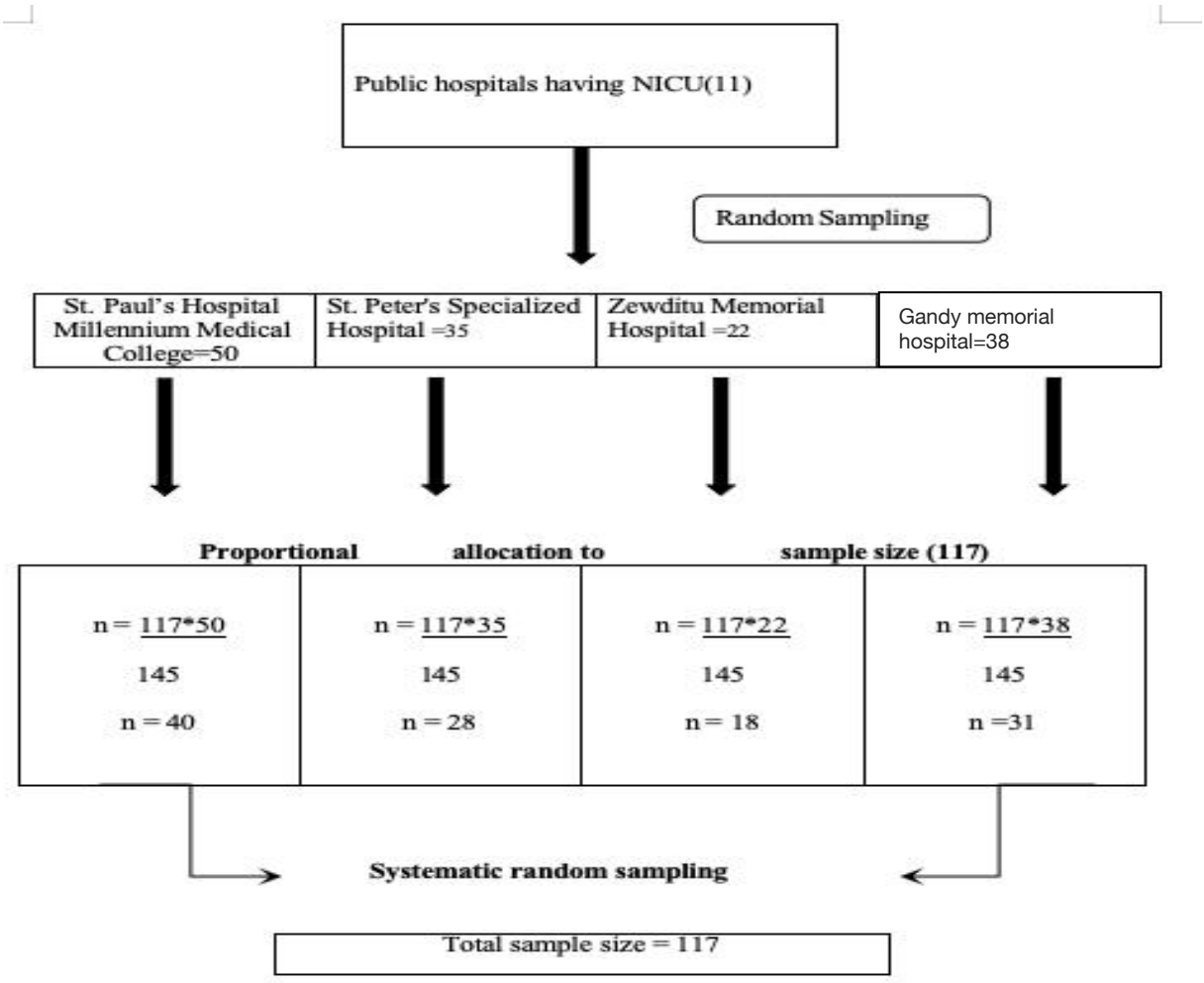

Figure 1 Schematic Presentation of The Sampling Procedure in Public Hospitals AA, Ethiopia, 2025

4.7 Study Variables

4.7.1 Dependent Variable

⇒ Knowledge related to noise reduction

⇒ Practice related to noise reduction

4.7.2 Independent Variable

⇒ Socio-demographic factors: Age, Sex, Level of Education, Work Experience.

⇒ Environment and institutional factors: presence of noise source, layout of NICU, provision of training.

⇒ Psychosocial Factors: Perception Of Importance, Staff rotation, Stress, Burnouts.

⇒ Policy And Structural Factors: Organizational Policies, Presence of Guidelines, Presence of Clear Standards, Presence of Protocols.

4.8 Operational Definition

Level Of Knowledge Among Respondents

Good Knowledge: is nurses' knowledge status when they score above or equal to the mean (43).

Poor Knowledge: is nurses' knowledge status when they score below or equal to the mean (43).

Level Of Practice Among Respondents

Good Practice: Refers to the level of performance demonstrated by nurses when they receive questions with high average ratings >3 on the Likert scale(44).

Poor Practice: Refers to the level of performance demonstrated by nurses when they receive questions with low average ratings <3 on the Likert scale (44).

4.9 DATA COLLECTION TOOL AND PROCEDURE

4.9.1 Data Collection Tool

Data was collected through structured and pre-tested self-administered questionnaires which was adopted from the literature (2,7,17,19,29,30) . The questionnaire was prepared in English and Amharic. the questions addressed four sections:

1. Socio-demographic characteristics of respondents contain 07 questions (such as age, gender, level of education, and work experience), which may influence their knowledge and practices.

2. Knowledge of respondents on noise reduction contains 06 questions in this part. The sum score was classified into 2 levels (good and poor knowledge). which Include the recommended noise level, awareness of the main sources of noise in NICUs, and their effects on neonates and nurses.

3. Practice-related questions toward noise reduction contain. 12 Likert scaled questions are included in this part. The sum score was classified into 2 levels (good practice and poor practice).

4. Factors influencing noise reduction include 13 questions that examine individual and organizational factors which facilitate and impede effective noise control practices in the NICU setting.

4.9.2 Data Collection Procedure

Data collection was conducted from January 20 to February 20, 2025, following approval from the selected hospitals. four data collectors, each holding a Bachelor of Science in Nursing (BSc) degree, undergone a 3-day training conducted by the principal investigator. The training was on the method of extracting the needed information, how to fill the information on a structured questionnaire and the ethical aspect in approaching the participants as well as the aim of the study and contents of the instruments. Therefore, data collectors were familiar with each question and know how to approach the participants politely and respectfully. The supervisors monitored the data collection process of the data collectors, and when a problem happens, they solved it or contact the principal investigator.

4.10 Data Quality Control

Before the actual data collection begins, A Pre-Test on 5% of the study Population two weeks before the Main Data Collection at Yekatit 12 hospital was conducted to assess clarity, length, reliability and feasibility. Each questionnaire was checked for completeness, missed values, and unlikely responses. The knowledge question was rearranged due to the inability to effectively capture the depth of information needed to assess knowledge and certain questions did not effectively differentiate between levels of knowledge, making it difficult as a result, the questionnaire was revised to shift the focus from general knowledge-based questions to more in-depth questions about associated factors.

4.11 Data Analysis and Processing

The collected data was checked visually for its completeness and the response was coded and entered into the computer using kobotoolbox. It is a digital platform that matching the questionnaire structure and it is used for data collection, analysis, efficient data storage and managing data. It can also used to reduces manual errors when Entereing responses manually. 5% of the respondents was selected randomly and checked for the consistency of data entry. Then the data was exported to Windows of Statistical Package for Social Science (SPSS) version 26 for data analysis for descriptive and inferential analysis. Descriptive statistics was used to provide a comprehensive and cohesive presentation and a description of the data. To analyze the data, both inferential and multivariate statistical techniques were employed. Initially, inferential tests, such as the chi-square test, were used to examine associations between nurses' knowledge, practices, and various influencing factors. These tests helped to identify which predictors had statistically significant relationships. Subsequently, a binary logistic regression analysis was conducted to explore the crude (unadjusted) associations between each independent variable and the dependent variables. Independent variables that demonstrated a P-value of less than 0.25 and fell within a 95% confidence interval during the bivariate analysis were then included in the multivariate logistic regression model. This approach allowed for the control of potential confounding variables and assessed the relative contributions and interactions of each factor. The strength and direction of associations between variables were quantified using odds ratios (OR) along with their corresponding 95% confidence intervals (CI). In all analyses, a P-value of less than 0.05 was considered statistically significant.

4.12 Ethical Approval

Ethical clearance for the study was obtained from the research and ethics review committee of the School of Nursing and Midwifery at Addis Ababa University. After receiving approval, an official letter was sent to SPSH, Gandy Memorial Hospital, Zeweditu Memorial Hospital, and St. Paul's Hospital Millennium Medical College and health bureo to obtain necessary permissions. additional ethical clearance was secured from the research and ethics committee of the School of Pediatric and Child Health at Addis Ababa University.

The purpose of the study was clearly explained to the nurses, and those who agreed to participate provided written consent. To ensure participants' anonymity and confidentiality, all collected data was kept strictly confidential and accessible only to the principal investigator. Participants were assured that their information would be used solely for the study and handled with the highest level of privacy. Instead of using personal identifiers, code numbers were assigned to the questionnaires, which were sealed after data collection at each hospital. Raw data was securely stored in locked, password-protected files, with no names recorded in the study records. Additionally, data was reported in a manner that prevented the identification of participants. After data has been entered, thoroughly analyzed, and stored in an aggregated form the data can be securely destroyed.This process can take place when there is no further need for re-analysis, or upon the conclusion of the study, ensuring that all privacy and ethical standards are upheld.

4.13 Presentation and dissemination of the data

The research findings of this study will be presented to Addis Ababa University College of Health Sciences School of Nursing and Midwifery. It will be presented at the annual research conference and it will also be shared or submitted to SPSH, Gandy Memorial Hospital, Zeweditu Memorial Hospital, SPHMMC AND Addis Abeba health bureau. Finally, the result of the study will be attempted to be published in a reputable journal.

5. RESULTS

5.1 Socio-demographic characteristics of nurses

A total of 117 structured questionnaires were distributed to nurses working in the Neonatal Intensive Care Unit (NICU), resulting in a response rate of 99%. Among the respondents, 92 (78.6%) were female. The mean age of the participants was 30.49 years, with a standard deviation of 3.46 years. In terms of age distribution, 75 respondents (64.1%) fell within the 20-30 year age range. Regarding marital status, 63 respondents (53.8%) identified as single. Educationally, 70 participants (59.8%) held a bachelor's degree. In terms of work experience, 59 respondents (50.4%) had between 1 to 5 years of total work experience, while 91 (77.8%) had 1 to 5 years of experience specifically in the NICU. Additionally, 103 respondents (88%) reported having attended zero training sessions on noise management (Table 2).

Table 2: Response of nurses on Socio-demographic characteristics of nurses in the NICU at Public hospitals, Addis Ababa, Ethiopia, 2025 (n=117)

Variables		Frequency	Percent%
sex	Male	25	21.4
	female	92	78.6
Age	20-30	75	64.1
	31-40	41	35
	41-50	1	0.9
Marital Status	Single	62	53.0
	Married	53	45.3
	Divorced	2	1.7
	Widow	0	0
Educational level	Bachelors degree in nursing	70	59.8
	Masters degree or higher	14	12.0

	post basic program	33	28.2
Total years of work experience	1-5	60	51.3
	6-10	57	48.7
Total years of work experience in NICU	1-5	94	80.3
	6-10	23	19.7
Number of training sessions attended on noise management	None	108	92.3
	Once	5	4.3
	Twice	4	3.4

5.2 The overall Knowledge of participants

Nurses were asked six knowledge questions about noise reduction. Respondents who scored above the mean were classified as having good knowledge, while those who scored below the mean were classified as having poor knowledge. Among the 117 respondents, 64 (54.7%) demonstrated good knowledge, while 53 (45.3%) exhibited poor knowledge in noise reduction. The overall mean score was 3.6 ± 1.24 (Figure 2).

Table 3: Response of nurses on knowledge on noise reduction in the NICU at Public hospitals, Addis Ababa, Ethiopia, 2025 (n=117)

Knowledge assessment questions	Incorrect responses		Correct responses	
	N(117)	%	N(117)	%
What is the recommended noise level in NICUs according to WHO or international guidelines?	113	82.5	4	2.9
Do you know the effects of excessive noise on neonates?	10	8.5	107	91.5
what are the potential effects of excessive noise on neonates?	5	4.3	112	95.7
Do you think excessive noise can affect nursing staff in NICUs?	55	47.0	62	53.0
what are the potential effects of excessive noise on nursing staff?	67	57.3	50	42.7
What are the main sources of noise in your NICU?	34	29.1	83	70.9

Figure 2: Levels of Knowledge of NICU nurses regarding noise reduction in selected public Hospitals, Addis Ababa, Ethiopia, 2025

5.3 Nurses' Practices On Noise Reduction

Nurses were asked to score 12 questions on a five-point Likert scale related to noise management practices. The mean score for these practices was 3.04 with SD=0.706. Respondents who scored above the mean were classified as having good practice, while those who scored below the mean were classified as having poor practice in noise management. Among the 117 respondents, 59 (50.4%) demonstrated good practice, while 58 (49.6%) exhibited poor practice regarding noise reduction (Figure 3).

Table 4: Response of nurses on Practice on noise reduction in the NICU at Public hospitals, Addis Ababa, Ethiopia, 2025 (n=117)

No	practice	Never (5) N(%)	Rarely (4) N(%)	Sometimes (3) N(%)	Often (2) N(%)	Always (1) N(%)	mean	SD	Decision
1.	Speak quietly in the unit	15 (12.8)	16 (13.7)	26 (22.2)	37 (31.6)	23 (19.7)	2.68	1.291	Poor practice
2.	Close incubator doors gently	2 (1.7)	23 (19.7)	26 (22.2)	36 (30.8)	30 (25.6)	2.41	1.123	Poor practice
3.	Placing objects on incubators	8 (7)	25 (21.9)	25 (21.9)	39 (34.2)	17 (14.9)	2.72	1.171	Poor practice
4.	Use a noise meter to monitor noise levels	92 (78.6)	13 (11.1)	3 (2.6)	5 (4.3)	4 (3.4)	4.57	0.985	Good practice
5.	Educate caregivers on noise reduction	6 (5.2)	24 (20.9)	55 (47.8)	27 (23.5)	3 (2.6)	3.08	0.873	Good practice
6.	Immediately respond to alarms	1 (0.9)	11 (9.4)	32 (27.4)	36 (30.8)	37 (31.6)	2.17	1.043	Poor practice
7.	Turn down the volume of electronic	1 (0.9)	15 (12.9)	36 (31)	32 (27.6)	32 (27.6)	2.32	1.043	Poor practice

	devices								
8.	Drag things in the unit or corridors	5 (4.3)	23 (19.8)	40 (34.5)	35 (30.2)	13 (11.2)	2.76	1.035	Poor Practice
9.	Wear noisy shoes and slippers in the unit or corridors	22 (18.8)	44 (37.6)	28 (23.9)	17 (14.5)	6 (5.1)	3.50	1.111	Good Practice
10.	Make noise while cleaning the newborns bed	15 (12.8)	19 (16.2)	37 (31.6)	39 (33.3)	7 (6)	2.97	1.121	Poor Practice
11.	Close windows or doors to minimize outside noise	17 (14.7)	23 (19.8)	32 (27.6)	28 (24.1)	16 (!3.8)	2.97	1.261	Poor Practice
12.	Practice Quite hours	66 (56.4)	33 (28.2)	12 (10.3)	2 (1.7)	4 (3.4)	4.32	0.972	Good Practice

Figure 3: Practice distribution of nurses on noise reduction working in NICU in Selected Public Hospitals, Addis Ababa, Ethiopia, 2025

5.4 Factors on noise reduction

The study identified several critical challenges hindering effective noise reduction in NICUs. Nearly 88.9% (n=104) of nurses reported a lack of training or awareness as the most prominent barrier. In terms of existing noise control measures, 66.7% (n=78) of respondents stated that no measures were in place to control noise. Noise monitoring was largely absent, with 78.6% **(n=92)** confirming no regular noise assessments and 73.5% (n=86) reporting no formal noise reduction policies. Perceptions of noise levels further underscored the problem, with 38.5% **(n=45)** describing their NICUs as "more or less noisy". Despite 88.9% (n=104) of nurses recognizing the importance of noise reduction training, only 10.3% (n=12) had actually received such training. 76.9%(n=90) of respondents think the number of nurses per shift affects the noise in the NICU. and 29.9%(n=35) of the respondents think the noise is higher during the round time.

Table 5: Response of nurses for factors assossiated with knowledeg and practice on noise reduction in the NICU at Public hospitals, Addis Ababa, Ethiopia, 2025 (n=117)

variables		frequency	Percent%
What are the challenges you face in implementing noise reduction practices?	Lack of raining or awareness	104	88.9
	Absence of noise monitoring tools	80	68.4
	High workload or staffing shortages	91	77.8
	Lack of institutional support	83	70.9
	Difficulty in enforcing quiet policies	54	46.2
Are there regular assessments of noise levels in your NICU?	Yes	6	5.1
	No	92	78.6
	I don't know	19	16.2
What measures are currently in place for noise control in your	Use of sound absorbing materials	24	20.5
	Quiet hours or periods	29	24.8

NICU?	Staff education programs	27	23.1
	Installation of noise meters	20	17.1
	None	78	66.7
Does the infrastructure of your NICU contribute to noise reduction	yes	12	10.3
	No	105	89.7
Level of noise in NICU	Quite	30	25.6
	More or less noisy	45	38.5
	Very noisy	42	35.9
Do you have policy or guideline regarding noise	yes	31	26.5
	No	86	73.5
Are there guidelines or protocols in your NICU for noise reduction	Yes	14	12
	No	68	58.1
	I don't know	35	29.9
Is a noise meter available in your NICU for	Yes	8	6.8
	No	73	62.4
	I don't know	36	30.8

monitoring sound levels			
Do you think training on noise reduction is important to improve noise in NICUs	Yes	104	88.9
	No	13	11.1
Have you received training on noise reduction in NICU	Yes	12	10.3
	No	105	89.7
How effective was the training?	Very effective	3	2.6
	Somewhat effective	9	7.7
	Not effective	0	0
Do you think the number of nurses per shift affects noise in the NICU?	Yes	90	76.9
	No	27	23.1
When do you	Lunchtime	20	17.1

think noise is higher in the NICU?	Midnight	1	0.9
	Morning	33	28.2
	Round time	35	29.9
	Shift change	28	23.9

5.4.1 Factors associated with nurses' knowledge and practice regarding noise reduction

A bivariate and multivariate variables of binary logistic regression model were used to analyze the relationship between dependent and independent variables. A p-value of less than 0.05 indicates statistical significance for both types of regression. The binary logistic regression was used to select variables at a cutoff of 0.25; then the variables were included in the multivariable binary logistic regression.

5.4.2 Factors associated with nurses' knowledge regarding noise reduction

In a bivariate logistic regression analysis, four variables were found to be significantly associated with nurses' knowledge of noise reduction; NICU work experience, High worload or staff shortages, use of sound, absorbing matereials, opening/closing drawers or doors, using telephone/mobile in the NICU. However, in the multivariate analysis, only four factors showed a significant association with nurses' knowledge of noise reduction: NICU work experience, High worload or staff shortages, use of sound, absorbing matereials, and using telephone/mobile in the NICU. Nurses with less NICU work experience had about 85% lower odds of having good knowledge compared to those with more experience (AOR = 0.151, 95% CI: 0.033–0.695, p = 0.015). Nurses working under conditions of high workload and staff shortage were about 79%

less likely to practice effectively compared to those with better staffing and workload conditions (AOR = 0.207, 95% CI: 0.062–0.691, p = 0.010). The use of sound-absorbing materials in the NICU was associated with over 11 times higher odds of having good knowledge compared to those where such materials were not used (AOR = 11.032, 95% CI: 2.997–40.605, p < 0.001). Nurses who reported using telephones or mobile phones in the NICU were significantly less likely to have good knowledge about noise reduction practices. Their odds of having good knowledge were reduced by approximately 88% compared to those who did not use phones in the NICU (AOR = 0.122, 95% CI: 0.036–0.416, p = 0.001).

Table 6: Bivariate and Multivariate analysis of factors associated with nurses' knowledge regarding noise reduction in public Hospitals, Addis Ababa, Ethiopia, 2025 (n=117).

variables	Poor Knowledge	Good knowledge	P-value	COP 95% CI	p-value	AOR 95% CI
NICU work experience	53(45.3%)	64(54.7%)	**0.002***	2.31(1.376-3.877)	**0.015***	0.151(0.033-0.695)
High worload or staff shortages	35(29.9%)	56(47.9%)	**0.005***	12.55 (2.163-72.87)	**0.010***	0.207 (0.062-0.691)
use of sound absorbing matereials	15(12.8%)	9(7.7%)	**0.000***	0.006 (0.000-0.087)	**0.000***	11.032 (2.997-40.605)
opening/closing drawers or doors	20(17.1%)	47(40.2%)	**0.000***	18.876 (4.458-79.93)	-	-
using telephone/mobile in the NICU	30(25.6%)	57(48.7%)	**0.015***	7.715 (1.495-39.8)	**0.001***	0.122 (0.036-0.416)

5.2.3 Factors associated with nurses' Practice regarding noise reduction

In the analysis of bivariate logistic regression, five variables were found to be associated with the dependent variable at a significance level of $p \leq 0.25$. These variables include education level, nurses who recived training, noise level, presence of a noise meter, and practicing quite hour. Among these, four variables, Nurses who had received training or awareness were significantly more likely to demonstrate good practices. In fact, they were 16 times more likely to have good knowledge compared to those without training (AOR = 16.035, 95% CI: 1.812–141.89, p = 0.013). Nurses working in NICU environments with higher noise levels were significantly less likely to have good practice about noise reduction. The odds of having good practice were reduced by approximately 89% compared to those in lower-noise settings (AOR = 0.111, 95% CI: 0.024–0.513, p = 0.005). Nurses who practised Quiet Hour in the NICU were 8 times more likely to have good noise reduction practices than those who did not AOR = 7.941, 95% CI: 1.586–36.769, p = 0.012).

Table 7: Bivariate and Multivariate analysis of factors associated with nurses' Practice regarding noise reduction in public Hospitals, Addis Ababa, Ethiopia, 2025 (n=117).

Practice						
Value	Good practice	Poor practice	P-value	COP	P-value	AOR
Education qualification	59(50.4%)	58(49.6%)	**0.006***	0.132 (0.031-0.565)	**0.024***	5.119 (1.243-21.085)
Training or awarness	52(44.4%)	52(44.4%)	**0.006***	0.022 (0.001-0.325)	**0.013***	16.035 (1.812-141.89)
NICU Level of noise	59(50.4%)	58(49.6%)	**0.000***	14.113 (4.723-42.175)	**0.005***	0.111 (0.024-0.513)
Presence of noise meter	59(50.4%)	58(49.6%)	0.048	2.767 (1.011-7.376)	0.046	2.795 (1.018-7.672)
Quiet hours or peroids	6(5.1%)	23(19.7%)	**0.034***	0.113 (0.015-0.85)	**0.012***	7.941 (1.586-36.769)

6. DISCUSSION

6.1 Introduction

The primary aim of this research was to examine nurses' overall knowledge and practices related to noise reduction, as well as the factors associated with it. Both nationally and internationally, there are limited studies specifically addressing these issues. This study seeks to fill that gap by assessing the level of knowledge and practice regarding noise reduction and identifying the factors that influence them.

6.2 Socio-demographic information

The socio-demographic characteristics of the study participants revealed that the majority of respondents working in the Neonatal Intensive Care Unit (NICU) were female nurses, accounting for 78.6% of the sample. This gender distribution is consistent with findings from similar studies conducted in Iran and Turkey, which reported female dominance at 98.3% and 80.8%, respectively (21)(29).

In terms of age, the current study found that a substantial proportion of participants (64.1%) were within the age range of 22–35 years. This is comparable to a study from Iran where 68.2% of participants also fell within this age range (5) indicating that younger professionals constitute a significant portion of NICU staff.

Regarding educational attainment, 59.8% of the nurses held a Bachelor's degree in nursing. Although this reflects a relatively high level of academic qualification, it is lower than the figure reported in a similar Iranian study, where 91.9% of the respondents possessed a Bachelor's degree(5).

When examining training in noise reduction practices—a key concern in the NICU environment 92.3% of participants reported having received no formal training. This is slightly better than the situation in Jordan, where 98.5% of nurses had not undergone any such training (19). The high percentage of untrained personnel in both contexts highlights a critical gap in professional

development that may impact the quality of care provided to neonates, especially considering the sensitivity of neonates to environmental stressors like noise.

6.3 Knowledge on noise reduction

The study revealed that 54.7% of nurses possessed a good level of knowledge about noise reduction practices in the Neonatal Intensive Care Unit (NICU), whereas 45.3% had poor knowledge. This finding reflects a slightly higher level of knowledge compared to studies conducted in Jordan and Palestine, where 54.1% and 36.1% of nurses, respectively, demonstrated good knowledge in this area (19)(7) .

However, when assessing nurses' knowledge of the World Health Organization (WHO) recommended noise levels for NICUs, only 2.9% of participants in the current study were aware of the correct standards. This is lower than similar study done in poland where 36% of nurses correctly answered the recommended noise level.

In contrast knowledge about the effects of noise on neonates were higher in this study which were 91.5% of the participants compare to study done in polish. This indicates that while general awareness of the harmful effects of noise is relatively strong among NICU nurses, specific knowledge of established guidelines and technical standards remains limited. These findings tell us the need for targeted education and training to reduse the gap(2).

In this study nurses explain that the main sourse of noise in the NICU is medica equipment alarms (90.5%), newborns crying (84.5%), and staff conversations (79.3%). these results focuse on the presence of technological and human-related noise within the NICU setting.

Interestingly, these percentages are higher than those study done in Iran, where only 21.6% of nurses stated medical equipment alarms, 43.9% identified newborn crying, and 27.7% mentioned staff conversations as major sources of noise. The difference between the two studies may reflect

differences in clinical practices, staff to patient ratios, equipment types, or levels of awareness regarding noise pollution in healthcare settings (5)

6.4 Practice on noise reduction

In this study 45.3% of nurses were reported to have poor practices related to noise reduction in the NICU. Although this indicates room for improvement, it is substantially better than findings from a study conducted in Palestine, where 100% of nurses demonstrated poor noise reduction practices (10). This contrast may be due to differences in institutional policies, training opportunities, or awareness levels between the two healthcare systems (7).

In a study conducted in Brazil, nurses reported using various strategies to avoid noise in the Neonatal Intensive Care Unit (NICU). They mentioned talking quietly (61.5%), opening and shuting the doors of the rooms with care (17.7%) and handling the incubator with care (36.5%) as effective methods. Additionally, they stated that they respond rapidly to alarms when they go off (25.0%). In contrast, the findings of this study indicated that only 3.4%,13.7%, 25.6%, and 31.6% of nurses reported these practices, respectively(18).

One specific practice assessed was how nurses handled incubator doors—a critical factor in controlling noise exposure for neonates. In the present study, only 30.8% of nurses reported consistently closing incubator doors gently, which is considerably lower than the 59% reported in a study from Poland, where nurses indicated they never slammed incubator doors. This practice is important for reducing sudden and disruptive noise that can negatively impact the health and development of newborns.

6.5 Associated factors of noise reduction

The current study revealed that 38.5% of nursing staff rated their NICU environment as moderately to significantly noisy. This perception rate appears substantially lower than comparative studies, with Iranian nurses reporting noise concerns at 66% and Portuguese nurses

at 44.9% (6) (18). The lower percentage in this study may suggest differences in environmental awareness, institutional culture, or the actual acoustic conditions in the unit.

A study conducted in Iran indicated that telephone rings were identified as the main source of noise in the NICU, accounting for 59.5%. In contrast, this study found a higher percentage of 74.4% (5).

The study revealed that most nurses (62.4%) indicated their NICUs lacked noise monitoring devices, impairing objective noise assessment and control. This finding aligns with similar research in Poland, where an even greater percentage (86.5%) of nurses reported the absence of sound measurement equipment in their units (2).

7. Limitations and Strengths of the Study

7.1 Limitations:

1. The study employed a cross-sectional approach, which limits the ability to establish causal relationships between knowledge, practices, and associated factors.
2. The study was confined to selected public hospitals, and the findings may not be generalizable to private institutions or federal hospitals.
3. Questionnaires may have introduced response bias, with participants potentially overestimating their knowledge or reporting socially desirable practices. Additionally, without direct observation, there may be discrepancies between reported behaviors and actual practices in the NICU.
4. Although sufficient for the statistical analysis conducted, a larger sample size might have yielded more solid results and allowed for subgroup analyses.

7.2 Strengths

1. The study addresses a critical yet under-researched issue in neonatal care, providing evidence that may inform policy and practice improvements.
2. By focusing on actual NICU environments in public hospitals, the study reflects practical challenges and opportunities for intervention.

3. As limited data exist on this topic in the regional context, this study serves as a foundation for future local and national initiatives on environmental control in NICUs.

8. CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

This study highlights a moderate level of knowledge and inconsistent practice among NICU nurses regarding noise reduction, despite widespread recognition of the issue's importance. Key factors associated with better knowledge and practices include higher educational attainment, greater experience, and participation in training programs. The findings focuse on the importance of ongoing education and institutional support to effectively implement knowledge in practice.

Reducing noise level doesn't mean only following clinical guidelines but also bringing cultural and oranizational change. by solving those problemes we can significantly imptove the quality of care for the neonates and increase their health outcome.

8.2 Recommendations

Based on the findings of this study, I propose the following recommendations:

For Healthcare Institutions:

1. Starting regular training programes on how to reduce noise in the NICU and helping them understan the effect of noise on the new borns.

2. Developing policies and protocols designed for NICU ward and installing noise maters.

3. Encouraging the stuffs to mointer their behaviors and to start practicing quiet hour.

For Policy Makers:

1. Adding noise management into national neonatal care guidelines.

2. Making resources available for environmental changes like sound-aborbing materials and infrastructural improvement

For Future Researchers:

1.using longitudinal stuies and interventional studies for better understanding of the relationship between education, prractice and the outcome of the neonates.

2. Using observational methods to assess how the staff practice noise rediction in the NICU.

3. Asking the view of the parentes about the noice in the NICU.

4. Using qualitative approache to have deeper understanding on the knowledge and practice related to noice reduction in the NICU.

4. And also using mixed-methods research that combines quantitative data with qualitative analysis could provide more explanation on knowledge and practices regarding noise reduction.

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ANNEX

ANNEX I: INFORMATION SHEET

Addis Ababa University, college of health sciences, school of nursing and midwife.

Participant Code _____. Date: DD/MM/YY _____/_____/_____.

My name is Haymanot Mulugeta. I am a postgraduate student at AAU. I will be conducting a study on Assessment of nurses' Knowledge and Practices Regarding Noise Reduction and Associated Factors in Neonatal Intensive Care Units in Addis Ababa Public Hospitals for a partial fulfilment requirement of an MSc degree in Neonatal Nursing. I would appreciate your participation in this study. so you are kindly requested to respond to all statements or questions based on the instruction given. Your information is used only for research purposes and is kept confidential.

The following is some general information about the study.

Objectives of the study: This study aimed to assess nurses' knowledge and practice regarding noise reduction and associated factors in neonatal intensive care in public hospitals in Addis Ababa, Ethiopia 2025

Confidentiality: All information obtained from you will be kept private and will not be shared with any third parties; your name will not be recorded on the question sheet, ensuring that you will not be known for any reason.

Benefits of the study: You will not be paid or given any preferential benefits because of your involvement in the study; however, by participating in the study and providing your honest information, you will be helping to change nurses' knowledge and practices about noise reduction in the NICU.

Risks of the study: The study procedure does not bear any physical or psychological trauma. Furthermore, you are not forced to respond or give information that you do not know.

Consent: Your willingness to take part in the study will determine your participation. You have the option to either not participate at all or to stop participating at any time after you have begun.

Rights as a participant: Please feel free to contact me or my data collectors if you have any questions about the study. It is entirely up to you whether you participate in this study. In addition, I hope you will take part in this survey because your opinions are extremely valuable.

Annex II. Consent form

In signing this document, I am giving my consent to participate in the study entitled Assessment of Nurses' Knowledge and Practices Regarding Noise Reduction and Associated Factors in Neonatal Intensive Care Units in Public Hospitals, Addis Ababa, Ethiopia with the aim of assessing the NICU nurses' knowledge, practice and factors associated regarding noise reduction. I have been informed of the purpose of this research project and I understand that I am selected to participate in this study randomly. I have been informed that my participation in this study is willing full and voluntary, I have the right to refuse or interrupt the filling of the questionnaire and my name will not be mentioned on the questionnaire. I, the undersigned, have understood the purpose of the study & fully agree to participate in the study.

Signature of the participant---------- Date ----------

Thank you and have a nice day!

Name of investigator- Haymanot Mulugeta

Address of investigator: phone no- +251923187811,

Email: himemulu@gmail.com

ANNEX III: QUESTIONNAIRY

Date _____ Hospital code _____ .

Instruction: Read each question carefully and tick [√] against the option that best suits your response.

PART I: Socio-Demographic Information

1. **Age (in years): _____**
2. **Gender:**

   Male
   Female

3. **Marital Status:**

   Single
   Married
   Divorced
   Widowed

4. **Educational Qualification:**

   Diploma
   Bachelor's Degree in Nursing
   Specialized Neonatal Nursing Training
   Master's Degree or higher

5. **Total years of work experience: _____years.**
6. **Total years of experience in NICU: _____years.**
7. **Number of training sessions attended on noise management in NICUs:**

   None
   Once
   Twice
   More than twice

PART 2: Knowledge Assessment

1. What is the recommended noise level in NICUs according to WHO or international guidelines?

<35 dB
35–45 dB
45–65 dB
I don't know

2. what is the level of noise in the NICU?

Quite
more or less noisy
very noisy
other specify _____.

3.Do you have policy or guideline regarding noise in the NICU?

Yes
No

4.Do you know the effects of excessive noise on neonates?

Yes
No

5. If yes, what are the potential effects of excessive noise on neonates? (Select all that apply)

Sleep disturbances
Stress and irritability
Hearing loss
Impaired growth and development
Changes in vital signs (e.g., heart rate, oxygen saturation)
Increased risk of infections
other specify_____.

6.Do you think excessive noise can affect nursing staff in NICUs?

Yes
No

7. If yes, what are the potential effects of excessive noise on nursing staff? (Select all that apply)

Stress
Burnout
Fatigue
Headaches
Hearing problems
Reduced concentration and work efficiency
Other specify _____.

8. What are the main sources of noise in your NICU? (Select all that apply)

Medical equipment alarms
Staff conversations
Opening/closing drawers or doors
Placing objects on incubators
Telephones/mobile phones
Newborn crying
Dragging objects/equipment
Round time
other specify_____.

9. Are there guidelines or protocols in your NICU for noise reduction?

Yes
No
I don't know

10. Is a noise meter available in your NICU for monitoring sound levels?

Yes
No
I Don't Know

11.Do you think training on noise reduction is important to improve noise in NICUs?

Yes
No

12. Have you received training on noise reduction in NICUs?

Yes
No

13. If yes, how effective was the training?

Very effective
Somewhat effective
Not effective

14. Do you think the number of nurses per shift affects noise in the NICU?

Yes
No

15. When do you think noise is higher in the NICU?

Morning

Round time

Lunchtime

Shift change

Midnight

PART 3: Practice Assessment

How Often Do You Perform the Following Noise Management Practices?

No	practice	Never	Rarely	Sometimes	Often	Always
1.	Speak quietly in the unit					
2.	Close incubator doors gently					
3.	Placing objects on incubators					
4.	Use a noise meter to monitor noise levels					
5.	Educate caregivers on noise reduction					
6.	Immediately respond to alarms					
7.	Turn down the volume of electronic devices such as the telephone, radio and monitor					
8.	Drag things in the unit or corridors					
9.	Wear noisy shoes and slippers in the unit or corridors					
10.	Make noise while cleaning the newborns bed					
11.	Close windows or doors to minimize outside noise					
12.	Practice Quite hours					

PART 4: Factors associated with noise reduction

1. What are the challenges you face in implementing noise reduction practices? (Select all that apply)

Lack of training or awareness
Absence of noise monitoring tools
High workload or staffing shortages
Lack of institutional support
Difficulty in enforcing quiet policies

2. Are there regular assessments of noise levels in your NICU?

Yes
No
I don't know

3. What measures are currently in place for noise control in your NICU? (Select all that apply)

Use of sound-absorbing materials
Quiet hours or periods
Staff education programs
Installation of noise meters
None

4. Does the infrastructure of your NICU contribute to noise reduction (e.g. soundproofing, layout)?

Yes
No

THANKYOU VERY MUCH!

I: የመረጃ መረቀት
በአዲስ አበባ ዩኒቨርሲቲ፣ ጤና ሳይንስ ኮሌጅ፣ የነርሲንግ እና ሚዴዋይፍሪ ትምህርት ክፍል ።።
የተሳታፊ ኮድ _____ ቀን፡ ቀን/ወር/ዓመተ ዓመት _____/_____/_____
ሃይማኖት ሙሉጌታ እባላለሁ። በአዲስ አበባ ዩኒቨርሲቲ፣ ጤና ሳይንስ ኮሌጅ፣ የነርሲንግ እና ሚዴዋይፍሪ የትምህርት ክፍል የፖስት ግራጁዌት ተማሪ ነኝ። ይህ ጥናት የኒዮኔታል ነርስ ማስትርስ ዲግሪ ከፊል ማጠናቀቂያ መስፈርት በመሆኑ በአዲስ አበባ የህዝብ ሆስፒታሎች በሚገኙ የኒዮኔታል የክትትል ክፍሎች (NICU) የድምፅ መቀነስን በተመለከተ የነርሶችን እዉቀት ልምድ እና ተዛማጅ ምክንያቶችን በተመለከተ ጥናት እያካሄድኩ ነው። በዚህ ጥናቴ ውስጥ ተሳትፎ በማደረገ መረጃ ለሚሰጡኝ ሁሉ ከፍተኛ አድናቆት እንዳለኝ እየገለጽኩ ከዚህ በመቀጠል ለተዘጋጁት መጠይቆች በተሰጠው መመሪያ መሰረት መጠይቁን እንዲሞሉ በአክብሮት እጋብዛለሁ። የእርስዎ መረጃ ለዚህ ጥናት ዓላማ ብቻ የምጠቀምበት ሲሆን ሚስጥራዊነቱም ሙሉ በ ሙሉ የተጠበቀ ነዉ።።
የጥናቱ ርዕስ፦
የጥናቱ አላማ: ይህ ጥናት በአዲስ አበባ የህዝብ ሆስፒታሎች በሚገኙ የኒዮኔታል ክትትል ክፍሎች (NICU) ውስጥ የድምፅ መቀነስን በተመለከተ የነርሶችን እውቀት፣ ልምድ እና ተዛማጅ ምክንያቶችን ለመገምገም የተዘጋጀ ነው።።
ሚስጥራዊነት: ከእርስዎ የሚሰበሰበው ሁሉም መረጃ የግል ይሆናል ፣ ከሶስተኛ ወገኖች ጋር አይጋራም።። ስምዎን በጥያቄ ወረቀቱ ላይ አይፃፍም፣ ስዚህም ለማንኛውም ምክንያት ሊታወቁ አይችሉም።።
የጥናቱ ጥቅሞች: በዚህ ጥናት ውስጥ ተሳትፎ ስላደረጉ ክፍያ ወይም ልዩ ጥቅም አይሰጥዎትም።። ሆኖም፣ በጥናቱ በመሳተፎ እና እውነተኛ መረጃዎን በመሰጠቶ በNICU ክፍል ውስጥ የድምፅ መቀነስ በተመለከተ የነርሶች እውቀት እና ልምድ ለመለወጥ ለማሻሻል እየረዱ ነው።።
ሊሎች የጎነዮሽ ጉዳቶች: በዚህ ጥናት በመሳተፎ ምንም ዓይነት አካላዊ ወይም ስነልቦናዊ ጉዳት አያስከትልም።። በተጨማሪም፣ ፈቃደኛ ያልሆኑበትን መረጃ እንዲሰጡ አይገደዱም።።
የውሳኔ መብት: በጥናቱ መሳተፍ በፍጽም ፍቃደኝነትዎ ላይ ይመሰረታል።። ሙሉ በሙሉ የመሳተፍ ወይም ከጀመሩ በኃላ በማንኛውም ጊዜ የማቆም አማራጭ አለዎት።።

የተሳታፊ መብቶች: ስለ ጥናቱ ማንኛውም ጥያቄ ካለዎት፣ ነፃነት ተሰምቶት የመረጃ ሰበሰቢዎቼን ሊጠየቁ ይችላሉ። በዚህ ጥናት ውስጥ መሳተፍ ወይም አለመሳተፍ ሙሉ በሙሉ በእርስዎ ፍቃድ ላይ ይመሰረታል። በተጨማሪም፣ አስተያየትዎ እጅግ ጠቃሚ ስለሆነ በዚህ የምርምር ስርአት ተሳትፎዎ በፈቃዷኝነት የሰጡት እንደሆነ አምናለሁ።

አባሪ II: የውሳኔ ቅጽ

ይህን ሰነድ ፊርማዬን በመፈረም፣ በአዲስ አበባ የህዝብ ሆስፒታሎች በኒዮኔታል የክትትል ክፍሎች (NICU) ውስጥ የድምፅ መቀነስን በተመለከተ የነርሶችን እውቀት፣ ልምድ እና ተዛማጅ ምክንያቶችን ለመገምገም የተዘጋጀውን "Assessment of Nurses' Knowledge and Practices Regarding Noise Reduction and Associated Factors in Neonatal Intensive Care Units in Public Hospitals, Addis Ababa, Ethiopia" የሚለው ጥናት ውስጥ ተሳትፎ እንደማደርግ እገልጻለሁ። የዚህ ጥናት አላማ በተመለከተ በሙሉ ተረድቻለሁ። በዚህ ጥናት ውስጥ ተሳትፎዬ በፍቃዴ መሠረት እንደሆነ ተነግሮኛል። የጥያቄ ወረቀቱን ሙሉ በሙሉ የመመለስ ወይም በማንኛውም ጊዜ የማቆም መብት አለኝ። ስሜ በጥያቄ ወረቀቱ ላይ አይፃፍም። ከዚህ በታች የፈረምኩት ፊርማ፣ የጥናቱን አላማ ሙሉ ገብቼ በጥናቱ ውስጥ ተሳትፎ እንደማደርግ እገልጻለሁ።

የተሳታፊ ፊርማ _____ ቀን _____/_____/_____

አመሰግናለሁ መልካም ቀን ይሁንልዎ!

የጥናቱ ተመራማሪ ስም - ሃይማኖት ሙሉጌታ

አባሪ III: የጥያቄ መለያ

ቀን: _____ የሆስፒታል ኮድ: _____

መመሪያ: እያንዳንዱን ጥያቄ በጥንቃቄ ያንብቡ እና በሚስማማዎት ምላሽ ምልክት [✓] ያድርጉ።

ክፍል I: ማህበራዊ-የህዝብ መረጃ

1. ዕድሜ (በዓመት): _____

2. ጾታ:

- ወንድ

- ሴት

3. የጋብቻ ሁኔታ:

- ያላገባ

- ያገባ

- የተፋታ

_ የተለያየ

4. የትምህርት ደረጃ:

- ዲፕሎማ

- የባችለር ዲግሪ በነርሲንግ

- የኒዮኔታል ነርሲንግ ልዩ ስልጠና

- ማስተርስ ዲግሪ ወይም ከዚያ በላይ

5. ጠቅላላ የስራ ልምድ (በዓመት): ___

6. በNICU ውስጥ ያለዎት ጠቅላላ የስራ ልምድ (በዓመት): ___

7. በNICU ውስጥ የድምፅ አስተዳደር ስልጠና የተገኙት ብዛት:

- የለም

- አንድ ጊዜ

- ሁለት ጊዜ

- ከሁለት ጊዜ በላይ

ክፍል II: የእውቀት ግምገማ

1. በWHO ወይም ዓለም አቀፍ መመሪያዎች መሰረት በNICU ውስጥ የሚመከር የድምፅ መጠን ስንት ነው?

- <35 dB

- 35–45 dB

- 45–65 dB

- አላውቅም

2. በNICU ውስጥ ያለው የድምፅ መጠን እንዴት ነው?

- ጸጥተኛ

- በአንዳንድ ሁኔታ የሚረበሽ

- በጣም የሚረበሽ

- ሌላ (እባክዎ ይግለጹ) ___

3. በNICU ውስጥ የድምፅ መቀነስ በተመለከተ ፖሊሲ ወይም መመሪያ አለ?

- አዎ

- አይ

4. በኒዮኔታል ሕፃናት ላይ ከመጠን በላይ ድምፅ የሚያስከትላቸው ተጽዕኖዎች ያውቃሉ?

- አዎ

- አይ

5. አዎ ከሆነ፣ ከመጠን በላይ ድምፅ በሕፃናት ላይ ሊያስከትላቸው የሚችሉ ተጽዕኖዎች ምንድን ናቸው? (ሁሉንም ተገቢዎቹን ምረጡ)

- የእንቅልፍ ችግር

- ጭንቀት እና ቁጣ

- የማዳመጥ ችግር

- የእድገት እና ልማት ችግር

- በሕዋሳት ላይ ለውጥ (ልብ ምት፣ ኦክስጅን መጠን ወዘተ.)

- የበሽታ አደጋ መጨመር

- ሌላ (እባክዎ ይግለጹ) ___

6. ከመጠን በላይ ድምፅ በNICU ነርሶች ላይ ተጽዕኖ ሊያሳድር ይችላል ብለው ያስባሉ?

- አዎ

- አይ

7. አዎ ከሆነ፣ ከመጠን በላይ ድምፅ በነርሶች ላይ ሊያስከትሎቸው የሚችሉ ተጽዕኖዎች ምንድን ናቸው? (ሁሉንም ተገቢዎች ምረጡ)

- ጭንቀት

- የስራ ፍላጎት ማነስ

- ድካም

- የትኩረት ማንስ

- የማዳመጥ ችግሮች

- የስራ ብቃት መቀነስ

- ሌላ (እባክዎ ይግለጹ) ___

8. በNICU ውስጥ ዋና የድምፅ ምንጮች ምንድን ናቸው? (ሁሉንም ተገቢዎቹን ምረጡ)

- የህክምና መሣሪያ ማንቂያዎች

- የሰራተኞች ውይይት

- መያዣ/በሮችን መክፈት/መዝጋት

- እቃዎችን በኢንኩቤተር ላይ ማስቀመጥ

- ስልክ/ሞባይል ድምፅ

- የአዲስ ልደት ሕፃን ለቅሶ

- እቃዎችን መጎተት

- የቡድን የስብሰባ ጊዜ

- ሌላ (እባክዎ ይግለጹ) ___

9. በNICU ውስጥ የድምፅ መቀነስ መመሪያዎች ወይም ዘዴዎች አሉ?

- አዎ

- አይ

- አላውቅም

10. በNICU ውስጥ የድምፅ መጠን ለመከታተል የድምፅ ሜትር አለ?

- አዎ

- አይ

- አላውቅም

11. የድምፅ መቀነስ ስልጠና በNICU ውስጥ ድምፅን ለማሻሻል አስፈላጊ ነው ብለው ያስባሉ?

- አዎ

- አይ

12. በNICU ውስጥ የድምፅ መቀነስ ስልጠና ተቀብለዋል?

- አዎ

- አይ

13. አዎ ከሆነ፣ ስልጠናው ምን ያህል ውጤታማ ነበር?

- በጣም ውጤታማ

- በተወሰነ ውጤታማ

- ውጤታማ አይደለም

14. በእያንዳንዱ ፈረቃ የሚሠሩ ነርሶች ብዛት በNICU ውስጥ ድምፅን ይጎዳል ብለው ያስባሉ?

- አዎ

- አይ

15. በNICU ውስጥ ድምፅ መጨመሱ የበለጠ የሚከሰተው መቼ ነው?

- ጠዋት

- በጉብኝት ጊዜ

- የምሳ ጊዜ

- ፈረቃ ሲቀየር

- ሌሊት

III: የተግባር ግምገማ

የሚከተሉትን የድምፅ መቀነሻ ተግባራት ያከናውናሉ?

| ተ.ቁ. | ተግባር | ፈፅሞ አይደለም | በተወሰነ | አንዳንዴ | ብዙ ጊዜ | ሁልጊዜ |

|---|---|---|---|---|---|---|

| 1 | በክፍሉ ውስጥ በዝግታ መናገር | | | | | |

| 2 | የኢንኩቤተር በሮችን በዝግታ መዝጋት | | | | | |

| 3 | እቃዎችን በኢንኩቤተር ላይ ማስቀመጥ | | | | | |

| 4 | የድምፅ ሜትር በመጠቀም ድምፅን መከታተል | | | | | |

| 5 | ለሕክምና ሰጪዎች የድምፅ መቀነስ ማስተማር | | | | | |

| 6 | ለማንቂያዎች ወዲያውኑ ምላሽ መስጠት | | | | | |

| 7 | የኤሌክትሮኒክ መሣሪያዎች ድምፅ መቀነስ | | | | | |

| 8 | እቃዎችን በክፍሉ ወይም መስመር ላይ መጎተት | | | | | |

| 9 | ጫጫታ የሚያስከትሉ ጫማዎችን መልበስ | | | | | |

| 10 | ሕፃናትን ሲያጠቡ ድምፅ መፍጠር | | | | | |

| 11 | የውጪ ድምፅ ለመቀነስ መስኮቶችን መዝጋት | | | | | |

| 12 | የጸጥታ ሰዓቶችን መፈጸም | | | | | |

ክፍል IV: ከድምፅ መቀነስ ጋር ተያያዥ ምክንያቶች

1. በድምፅ መቀነስ ሂደት ውስጥ የሚጋጩት እንቅፋቶች ምንድን ናቸው? (ሁሉንም ተገቢዎቹን ምረጡ)

- የስልጠና እና የዕውቀት እጥረት

- የድምፅ መጠን መከታተያ መሣሪያዎች አለመኖር

- ከፍተኛ የስራ ጫና ወይም የሰራተኞች እጥረት

- የተቋም ድጋፍ አለመኖር

- የጸጥታ ፖሊሲዎችን ማስፈጸም አለመቻል

2. በNICU ውስጥ የድምፅ መጠን በየጊዜው ይገምግማል?

- አዎ

- አይ

- አላውቅም

3. በአሁኑ ጊዜ በNICU ውስጥ ለድምፅ መቆጣጠር የተወሰዱ እርምጃዎች ምንድን ናቸው? (ሁሉንም ተገቢዎቹን ምረጡ)

- የድምፅ መጠቆሚያ ቁሶች መጠቀም

- የጸጥታ ሰዓቶች

- የሰራተኞች ስልጠና ፕሮግራሞች

- የድምፅ ሜትሮች መጫን

- ምንም

4. የNICU መዋቅር (ለምሳሌ፣ የድምፅ መከላከያ መሳሪያዎች፣ አቀማመጥ) ድምፅን ለመቀነስ ያስችላል?

- አዎ

- አይ

በጣም አመሰግናለሁ!!!!