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Original Research Article

Impact of essential newborn care education on knowledge and practice of new-born care among nurses in rural primary health centres in Ebonyi state of Nigeria

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ABSTRACT

Background: This study was designed to determine the level of knowledge and the extent of practice of the components of essential new-born care (ENC), and the effects of a training programme on the knowledge and practice of ENC among nurses in rural primary health cares (PHCs) in Ebonyi state Nigeria.
Methods: This study was a one group pre-test and post-test intervention design. The components of ENC considered were: New-born initiation of breastfeeding, thermoregulation, new-born cord care, newborn eye care, initiation of breathing and administration of vitamin K. A neonatal care knowledge and practice assessment (NCKPA) questionnaire tested for validity and reliability, with a Spearman's correlation coefficient of 0.81, was used for data collection among the (48) available nurses (All female).
Results: There was significant improvement in the level of knowledge and extent of practice of the components of ENC following the training programme. Despite the improvement, there were gaps in knowledge and practice of the components of ENC amongst the nurses in rural PHCs and affected were the level of knowledge of eye care 20 (41.6%) pre-intervention, and least knowledge of cord care 35 (72.9%) and eye care 45 (93.8%)-post-intervention.
Conclusions: Increase in knowledge corresponded with increase in good practice of ENC. The concern with knowledge transfer and translation of knowledge into practice could be achieved by pre-service and in-service education, update courses and workshops, and this will empower the nurses, getting them familiar with current trends and practices for improved child survival rate.

Keywords: ENC, Thermoregulation, Pre-intervention, Post-intervention, Female nurse

INTRODUCTION

The increasing birth rate and new-born mortality in Nigeria has necessitated the need to evaluate the situation of neonatal care. Neonatal mortality is a public health issue; within the first 28 days of birth about 3 million neonates die, and this is evident of high global neonatal mortality rate.[1,2] ENC may vary based on the baby's condition at birth and the rate of survival depends on the gestational age of the neonate at birth, and the subsequent care by healthcare workers, mothers and other caregivers at home.[3]

The ENC of neonatal care has been identified as a cost effective means of reducing neonatal diseases and the associated morbidity and mortality.[4] Essential care of a new-born includes immediate care of initiating breathing, thermoregulation (maintaining warmth), cutting and care of the cord, hygiene during delivery, early initiation of breastfeeding and exclusive breastfeeding, care of the eyes, and subsequent care that involves prevention of infection, recognition of danger signs and so forth. Expertise in ENC is necessitated by the vulnerability of the new-born, the need for skilful assessment and intervention to stabilize the new-born by health workers who are trained to administer neonatal care such as nurses.

The global rise in neonatal mortality was reported to be 41 to 46%.[6] This threatens the United Nation's sustainable development goals (SDG) target of 12 per 1,000 live births by the year 2030.[5,6] In Nigeria, neonatal mortality rate is estimated at 37 per 1000 live births which is about 54% of infant mortality.[7,8] This shows that more than half of the infant deaths occur in the neonatal period, presenting Nigeria as the second largest contributor in under-five mortality rate.[9] There are 44 deaths per 1000 live births in the rural area and 34 deaths in urban area in Nigeria.[10] The situation in the rural area mirrors the situation in Nigeria as a country, 34 neonatal deaths per 1,000 live births. The rural areas are likely to harbour the poorest of the citizens, within which is recorded 45 neonatal deaths per 1,000 live births. However, the situation has not improved among the richest households in Nigeria-30 deaths per 1,000 live births.[11,12] Also, the urban concentration of skilled attendants at birth of 80% and that of the rural area of 38% is an obvious indication of neglect in the rural area which has kept the neonatal mortality on the high side. New born care in the rural area is of 7.8% compare with the 25.4% in the urban areas (Nigeria demographic and health survey (NDHS), 2018). Care of new-borns within 2 days in the Southeast of Nigeria is about 17.3%.[13]

Causes of neonatal mortality (such as infection, prematurity, asphyxia and congenital anomaly) can be prevented if health workers are equipped with skills for early recognition, appropriate intervention and timely referral as identification and promotion of good practices are encouraged while bad practices are discouraged.[14]

Studies have shown that there is moderate knowledge of new-born care among rural health workers with recommendation for further training and evaluation of retained knowledge. Such trainings are commonly captured as continuing education programme (CEP). CEP refers to learning activities that see to update in knowledge for more meaningful care practices. In the rural setting, it is observed that training-on-the-job has improved practices even amongst the least educated of the healthcare workers.[15,16] Thus, training emphasis on neonatal (new-born) care will contribute to improved neonatal care practices and the consequently expected decline in neonatal death. Primary health centres which are situated in the rural area gives primary level care services to the rural dwellers. Therefore, there is need for studies on the training and practice of new-born care amongst rural health workers.

While Ebonyi State was reported to have highest neonatal mortality rate in the Southeast of Nigeria in 2020 by the WHO, in that same year, the Ebonyi State Ministry of Health employed and deployed health workers including nurses to the rural healthcare facilities especially the PHCs. This effort with quality training is expected to improve new-born care and reduce neonatal mortality in the state. According to a report by the WHO on new-born care in Nigeria, there is lack of availability of emergency obstetric and new-born care (EmONC) Services, while there are 1.6 nurses per 1000 population which is inadequate.[17,18]

Training of Nurses is expected to improve their knowledge and effectiveness of practice of ENC. Thus, this study aimed at evaluating and improving the level of knowledge and practice of ENC amongst nurses in the rural areas in Ebonyi State, Nigeria.

Since it is on record that in Ebonyi State, the neonatal mortality rate is 30 per 1000 live births, which is apparently the highest in South East Nigeria.[19,20] This recent update of high neonatal mortality necessitates a research to explore the current situation; the knowledge and practice of ENC in the state, and the determined knowledge and practice will inform the need for an intervention, a training programme to update the nurses on the ENC, hence this study was designed.

To determine the level of knowledge of ENC before intervention, considering its following components: Initiation of neonatal breathing, thermoregulation, initiation of neonatal cord care, neonatal eye care, early initiation of breast feeding and vitamin K administration.

Significance of the study

The outcome of this study is expected to benefit newborns, health educators, health care workers, health programme planners, state government and non-governmental organizations.

Components of essential newborn care

Initiation of breathing

When a baby is not able to initiate respiration, resuscitation is done to prevent birth asphyxia and its complications.[22]

Thermoregulation

Thermoregulation is the ability to balance heat production and heat loss in order to maintain body temperature within normal range.[23]

Umbilical cord care

The umbilical cord connects the fetus to the mother, a source through which the foetus receives nutrients inutero. After birth the cord is cut two fingers away from the baby as well as the clamped or tied with a clean suture.[24]

Eye care

About 40% of blindness and low vision are caused by ophthalmia neonatorium, use of traditional eye remedies, corneal scaring, vitaimin A, deficiency and cataract which in low income countries are avoidable.[25]

Immunization

This is the process whereby a person is made immune or resistant to an infectious disease by introducing a vaccine into the body to stimulate the body's own immune system to protect the person against infection.

First initiation of breastfeeding

Early initiation of breastfeeding within the first hour of birth, then exclusive breast feeding for 6 months of age continued with complementary feeds up to two years or beyond is the recommended standard according to world health organization (WHO, 2017).[26]

Administration of vitamin K

Vitamin K is administered for prevention of haemorrhage in the first hour after birth. There is absence of gut flora (bacteriodes) and low prothrombin level at birth, exposing new-borns to increased risk for haemorrhage. A single injection of vitamin k 0.5 gm to 1 gm after birth protects a baby for some months.[27]

Knowledge of newborn/neonatal care

Ngabonzima et al noted that one of the ways to improve neonatal care knowledge is by providing refreshment training, equipping health facilities, ensuring the use of national guidelines and mentoring.[28]

METHODS

Research design

This study utilised a pre-test-post-test intervention design. It was considered appropriate because this study was designed to determine in the study subjects, changes in dependent variables (level of knowledge and practice of ENC) due to an independent variable (an intervention) which is an ENC training programme.[29] The method described by Nyiringango in which an intervention, 'mentorship process 'was used to bring about a change in knowledge about and self-efficacy for neonatal resuscitation among Rwandan nurses and midwives was adopted for this study.[30]

The study was carried out in rural areas of Ebonyi State, one of the South-Eastern states in Nigeria from February 20th 2022 to August 20th 2022.

Population for study

This study focused on all the nurses that work at the PHCs in the rural areas of Ebonyi State. An official record of nurses in the State reported that there are 90 nurses working at the PHCs in the rural areas of the state (Ministry of health. human resource statistics Ebonyi State, 2018).

Sample size

A sample size of 73 nurses working at the PHC's in the rural areas of Ebonyi State was mathematically calculated using power analysis formula. While in the field, 48 nurses who were available and willing to participate in the study were used for the study.

Sampling procedure

Samples were selected by purposive and convenience sampling method. Nurses were purposively selected from many health workers in the rural PHCs, and 48 nurses were conveniently selected from 28 PHCs in the State.

Inclusion criteria

It included-nurses that conduct at least 10 deliveries per month. Nurses working at the rural PHCs in Ebonyi State. Nurses who have been part of at least a perinatal and postnatal service in the PHC, nurses who were willing and able to participate in the study and nurses who are mentally fit.

Instrument for data collection

The instrument for data collection was a modified questionnaire on the knowledge and practice of ENC, adopted from the United State agency for international development (USAID) knowledge and practice checklist on new-born care.[31]

Validity of the instrument

The instrument on knowledge and practice of new-born care among nurses was subjected to face and content validity tests. The face validity test is concerned with whether a measure seems relevant and appropriate for what it is assessing on face value. The content validity test measures if a test is a representative of all aspects of the subjects it aims to measure.

Reliability of instrument

The reliability of the instrument was established using the test-retest method. 10 copies of the questionnaire which is approximately 20% of the sample size were administered to nurses in the rural PHC's in Enugu State. After two weeks of first administration, second questionnaire was given to the same group. The result of both tests was collected and compared. The Spearman co-relation coefficient was used to correlate the scores because it measures relationship between two variables especially for a non-parametric function when Likert scale is used. Reliability coefficient of 0.81 was achieved. This showed a high reliability index that made it usable for collection of data in the different phases of the study.

Ethical consideration

The current study commenced after approval to go ahead was granted by the ethical committee of the Ebonyi state university Abakaliki with the Ref No. EBSU/DRIC/UREC/Vol.06/012

Method of data collection

Following ethical approval from the supposed authorities, the purpose of the study was thoroughly explained to the subjects. Their questions regarding the study were answered, and their oral consent for participation was obtained. Two final year students of Basic school of Midwifery Alex Ekweme federal university teaching hospital Abakaliki, were engaged as research assistants. They were trained and instructed on the method of collecting data and their roles during intervention programme. The perceived familiarities of the students with maternal and new-born care informed their involvement in the study as research assistants.

Pre-test: The base-line knowledge of the nurses in the selected PHCs was determined by the researcher and the research assistants using the questionnaire. The respondents were communicated through phone calls by using the list of their postings to schedule the place and time of meeting. For local government areas that have more than one PHCs, a central PHC was agreed for meeting for pre-test while those with one PHC were visited as a group. On the agreed day for pre-test, the purpose of the study was explained. The baseline knowledge and practice of respondents was ascertained using questionnaires which was filled and collected on the spot. Each interaction lasted for fifty minutes. The pre-test lasted for 4 weeks.

The intervention programme

The training was influenced by the outcome of the pre-test, literature review, and objectives of the study. Following the pre-test data collections, analyses of the data obtained showed the need for an (education) intervention programme at each local government area. Nurses from each local government area were made to gather at a chosen PHC in the area. The training happened in a PHC in each local government area between 10-12 noon lasting for a period of 12 weeks in all the local government.

The setting of the training was in the waiting room of the selected health centres because the training was scheduled on non-clinic days. Materials used were assembled together before the ENC intervention programme commenced.

Post intervention

The impact of the intervention training programme on the knowledge and practice of ENC was determined three weeks after the 12 weeks training, at each PHC. The post-test exercise happened three weeks after the training; however their knowledge of ENC was tested at the end of each training session, while the test for practice was determined at the end of the three weeks after the training. This was to allow them opportunity to experience more delivery session while they are expected to put into practice their obtained knowledge of ENC.

The nurses were given a paper containing the 'practice' aspect of the questionnaire, which was expected to be filled by the individual nurses at the end of the three weeks. It took the research assistants about three weeks to gather the filled questionnaires from all the PHCs.

Method of data analysis

The analysis was simply intended to determine and give a picture of the situation of the knowledge and practice of ENC among the nurses as a group among the health workers in the PHCs. Data obtained was analyzed by descriptive statistics (frequency and percentages) to determine the situation pre-and post-tests, using the statistical packages for social sciences (SPSS) version 25. The inferential statistics of Pearson correlation and chi-square with p=0.05 was used to test the hypothesis. The decision rule for hypothesis testing were that probability (significant) value greater than the set p deemed the hypothesis accepted, and vice versa.

RESULTS

Figure 1 which comprised two sections (figure and percentage) showed characteristics of the nurses working

in the PHCs in the rural areas of Ebonyi state, Nigeria. They were all 48 female nurses. There was no male nurse in the PHCs. Considering their years of practice, 27 (56.25%) nurses had practiced for about 1 to 10 years, 16 (33.33%) nurses had practiced for about 11 to 20 years while only 5(10.42) nurses had practiced for more than 21 years. For the number of raining, majority 29 (60.4%) of the nurses had training on ENC once while 5 (10.4%) never went for training. Considering the last year of training, only 12 (25%) had ENC training in the last 1-2 years while 5 (27.1%) had last training from 5 years and above.

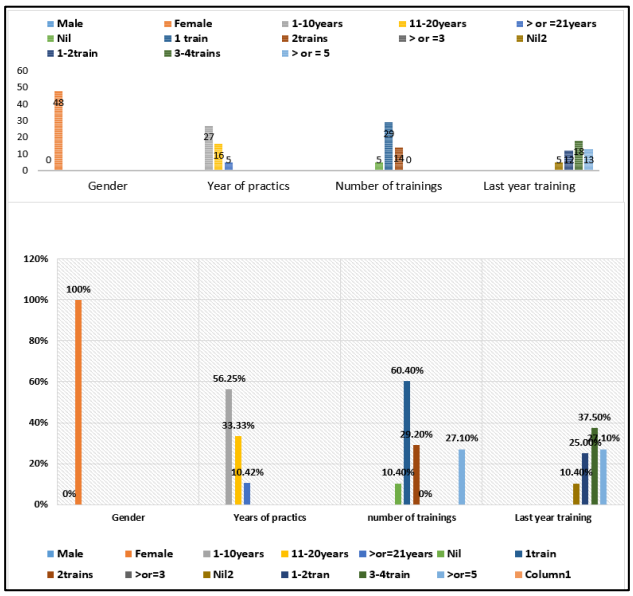

Figure 1: Characteristics of the subjects both in figures and percentage.

Table 1 showed knowledge of the nurses on the selected component of ENC. The figures present the number of nurses that are knowledgeable of the corresponding components of the ENC.

However, for pre-intervention (results):

Item statement 1-neonatal care/ENC: All the respondents knew that ENC services are rendered to new-born, while 17(35.4%) [(that is post-pre intervention) (48-31=17) and (100%-64.6%=35.4%)], 13 (27.1%), 10 (20.8%) respondents were not aware that neonate care is for all new-born, seems not knowledgeable about alert signs of early infection, and did not know the duration of neonatal period, respectively.

For item 2-New-born eye care: 25 (52.2%), 35 (72.1%), and 21 (43.7%) respondents did not know reason a child should receive eye care at birth, the type of eye treatment recommended at birth and signs of eye infection, respectively.

For item 3-New-born breathing: 36 (75%), 12 (24.2%), 30 (62.5%), 9 (17.9%) and 6 (12.5%), 33(68.8%) respondents got it wrong about time within which new-born is supposed to initiate and sustain breathing, how to stimulate first breathing, did not know that initial neonatal respiration is shallow and irregular, that a neonate that cannot initiate respiration requires resuscitation, the time to initiate intervention after breathing fails to start after birth in new-born, and one of the complications of resuscitation, respectively.

Item statement 4-vitamin K administration: 19 (38.8%), 19 (39.6%), 8 (16.7%) and 8 (16.7%) respondents got it wrong about the time for initiation of vitamin K administration, the recommended dosage of vitamin K for new-born, the route of vitamin K administration in new-born, and the reason for vitamin K administration in new-born, respectively.

Item statement 5-cord care: 6 (12.5%), 17 (32.5%), 25 (52.1%), 10 (20.9%), 8 (16.7%) respondents got it wrong about how often the cord is cared for daily, substance used for cleaning umbilical stump, the WHO recommended application on umbilical stump, how umbilical cord is handled, covered or close? and how long to wait before clamping the cord at birth, respectively.

Item statement 6-breast feeding: 3 (6.3%) and 1 (2.1%) respondents got it wrong about time of initiation of exclusive breastfeeding and the function of the first breast milk a new-born takes.

Item statement 7-thermoregulation: all the respondents knew how soon after birth that a new-born is dried up, while 18 respondents did not know how long after delivery that a new-born should be given first bath.

Post-intervention (results)

All the nurses became knowledgeable of the components of ENC, except 3 (6.3%), 1 (2.1%), 2, 1 (2.1%), 1 (2.1%), 1 (2.1%), 3 (6.3%), 1 (2.1%), 13 (27.1%), 3 (6.3%) respondents who need improvement in knowledge, specifically on the reason a child should receive eye care at birth, the type of eye treatment recommended at birth, signs of eye infection, how first breathing can be stimulated, what could be done to a new-born that cannot initiate respiration, the time for initiation of Vitamin K administration, the recommended dosage of Vitamin K for new-born, substances used for cleaning umbilical stump, the WHO recommended application on umbilical stump, and how umbilical cord is handled, covered or close?, respectively.

Figure 1 showed that the knowledge regarding new-born care was classified into two categories namely adequate/good knowledge (≥50%) and inadequate/poor knowledge (<50%). The findings of the study revealed that the knowledge for component 1, 3, 4,5,6,7 were good whereas item 2 showed poor knowledge in the pre intervention stage.

Table 1: Knowledge of the components of ENC among the nurses; pre-and post-interventions.

Variables		Pre-intervention (%)	Post-intervention (%)
Neonatal/ essential new-born care	What is neonatal care?	31 (64.6)	48 (100)
	Duration of neonatal period	38 (79.2)	48 (100)
	Immediate ENC services rendered to neonates	48 (100)	48 (100)
	An alert sign of early infection	35 (72.9)	46 (95.8)
New-born eye care	Reason a child should receive eye care at birth	20 (41.6)	45 (93.8)
	The type of eye treatment recommended at birth	12 (25)	47 (97.1)
	Signs of eye infection	25 (52.1)	46 (95.8)
New-born breathing	A newborn is supposed to initiate breathing within	12 (25)	48 (100)
	First breathing can be stimulated by	35 (72.9)	47 (97.1)
	The initial neonatal respiration is	18 (37.5)	48 (100)
	A New-born that cannot initiate respiration requires	38 (79.2)	47 (97.1)
	Time to initiate intervention after breathing fails to start after birth in neonates	42 (87.5)	48 (100)
	One of the complications of resuscitation	15 (31.25)	48 (100)
Vitamin K administration	Time for initiation of vitamin K administration	28 (58.3)	47 (97.1)
	The recommended dosage of vitamin K for newborn	26 (54.2)	45 (93.8)
	The route of vitamin K administration in newborn	40 (83.3)	48 (100)
	Reason for vitamin K administration in newborn	40 (83.3)	48 (100)
Cord care	How often is the cord cared for daily	42 (87.5)	48 (100)
	Substance used for cleaning umbilical stump	31 (64.6)	47 (97.1)
	WHO recommended application on umbilical stump	10 (20.8)	35 (72.9)
	How umbilical cord is handled, covered or close?	35 (72.9)	45 (93.8)
	How long do you wait before clamping the cord at birth	40 (83.3)	48 (100)
Breast feeding	Time of initiation of exclusive breastfeeding	45 (93.8)	48 (100)
	The function of the first breast milk a child takes	47 (97.1)	48 (100)
Thermo-regulation	How soon after birth is newborn dried up?	48 (100)	48 (100)
	How long after delivery do you give newborn first bath?	30 (62.5)	48 (100)

Researcher's field work, 2023

Table 2: The pre-intervention and post- intervention practice of the selected components of the ENC.

Variables		Interventions	Always (%)	Sometimes (%)	Never (%)
Neonatal cord care	Clamp cord immediately at birth	Pre	8 (16.7)	2 (4.12)	38 (79.12)
		Post	1 (2.1)	0 (0)	47 (97.9)
	Clamp cord within 3 minutes after birth	Pre	33 (68.8)	7 (14.6)	8 (16.7)
		Post	48 (100)	0 (0)	0 (0)
	Umbilical cord is cut with sterile blade	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Umbilical cord is cut with cord scissor/blade	Pre	38 (79.12)	10 (20.8)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Umbilical stump is cleaned within 1st day of birth	Pre	11 (22.9)	9 (18.8)	28 (58.33)
		Post	0 (0)	0 (0)	48 (100)
	Umbilical stump is cleaned daily	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Uses clamp on the umbilical stump	Pre	30 (62.5)	15 (31.25)	3 (6.25)
		Post	48 (100)	0 (0)	0 (0)
Neonatal eye care	Eye care is a routine for babies	Pre	28 (58.33)	9 (18.8)	11 (22.9)
		Post	40 (83.33)	5 (10.42)	3 (6.25)
	Instils eye drop within 1st day of birth	Pre	28 (58.33)	12 (25)	8 (16.67)
		Post	48 (100)	0 (0)	0 (0)
	Antibiotic for eye care is always available	Pre	10 (20.8)	1 (2.08)	37 (77.1)
		Post	11 (22.9)	8 (16.7)	29 (60.42)
	Eye care is for babies with discharge	Pre	36 (75)	0 (0)	12 (25)
		Post	8 (16.67)	0 (0)	40 (83.33)

Continued.

Variables		Interventions	Always (%)	Sometimes (%)	Never (%)
Initiation of breastfeeding	Gives breast milk within 1st hour after birth	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Gives water to baby first at birth	Pre	10 (20.8)	8 (16.7)	30 (62.5)
		Post	0 (0)	0 (0)	48 (100)
	Insists on giving baby 1st breast milk	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Supervises initial breastfeeding of babies	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Emphasizes exclusive breastfeeding	Pre	34 (70.8)	5 (10.42)	9 (18.8)
		Post	48 (100)	0 (0)	0 (0)
	Gives artificial milk to babies at birth	Pre	0 (0)	0 (0)	48 (100)
		Post	0 (0)	0 (0)	48 (100)
Initiation of breathing	Cleans baby's face of mucus during delivery	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Sucks every newborn at birth	Pre	15 (31.25)	4 (8.33)	29 (60.42)
		Post	0 (0)	2 (4.12)	46 (95.8)
	Turn babies upside down to remove secretions	Pre	10 (20.8)	5 (10.42)	33 (68.8)
		Post	0 (0)	0 (0)	48 (100)
	Apply spirit or the water on baby's body to the initiate respiration	Pre	6 (12.5)	3 (6.25)	39 (81.25)
		Post	0 (0)	1 (2.08)	47 (97.9)
	Gives injection on babies to initiate breathing	Pre	20 (41.67)	5 (10.42)	23 (47.9)
		Post	0 (0)	0 (0)	48 (100)
Administration of vitamin K	Administers vitamin K to newborn babies routinely	Pre	30 (62.5)	8 (16.7)	10 (20.8)
		Post	48 (100)	0 (0)	0 (0)
	Administers vitamin K within 24 hours of birth	Pre	38 (79.12)	8 (16.7)	2 (4.12)
		Post	48 (100)	0 (0)	0 (0)
	Administers oral vitamin K	Pre	3 (6.25)	10 (20.8)	35 (72.9)
		Post	3 (6.25)	15 (31.25)	30 (62.5)
	Administering vitamin K is not necessary	Pre	0 (0)	13 (27.08)	35 (72.9)
		Post	0 (0)	0 (0)	48 (100)
Thermo-regulation	Delivers baby on a mat on mother's abdomen	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Dries baby after delivery	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Delivers baby in warm room	Pre	15 (31.25)	0 (0)	33 (68.8)
		Post	20 (41. 7)	8 (16. 7)	20 (41.7)
	Allows skin to skin contact to prevent baby from cold	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)
	Baths baby within 1st day of birth	Pre	20 (41.67)	16 (33.33)	12 (25)
		Post	0 (0)	0 (0)	48 (100)
	Nurses baby separate from mother	Pre	48 (100)	0 (0)	0 (0)
		Post	48 (100)	0 (0)	0 (0)

Table 3: Chi-square summary on the effects of the intervention (education programme) on the knowledge of ENC amongst the nurses.

Variables	Value	Significance
Neonatal/ENC		
What is neonatal care?	133.16	0.001*
Duration of neonatal period	70.28	0.001*
Immediate ENC services rendered to neonates	86.7	0.001*
An alert sign of early infection	78.19	0.006*
New-born eye care		
Reason a child should receive eye care at birth	87.38	0.001*
The type of eye treatment recommended at birth	104.06	0.001*
Signs of eye infection	84.05	0.001*

Continued.

Variables	Value	Significance
New-born breathing		
A newborn is supposed to initiate breathing within	104.77	0.001*
First breathing can be stimulated by	85.5	0.001*
The initial neonatal respiration is	126.61	0.001*
A new-born that cannot initiate respiration requires	138.00	0.001*
Time to initiate intervention after breathing fails to start after birth in neonates	104.13	0.001*
One of the complications of resuscitation	137.29	0.001*
Vitamin K administration		
Time for initiation of vitamin K administration	91.36	0.001*
The recommended dosage of vitamin K for newborn	132.58	0.001*
The route of vitamin K administration in newborn	92.86	0.001*
Reason for vitamin K administration in newborn	84.26	0.001*
Cord care		
How often is the cord cared for daily	89.33	0.001*
Substance used for cleaning umbilical stump	112.92	0.001*
The WHO recommended application on umbilical stump	79.38	0.001*
How umbilical cord is handled, covered or close?	80.47	0.001*
How long do you wait before clamping the cord at birth	97.23	0.001*
Time of initiation of exclusive breastfeeding	89.33	0.001*
The function of the first breast milk a child takes	112.92	0.001*
Breast feeding		
Time of initiation of exclusive breastfeeding	125.73	0.001*
The function of the first breast milk a child takes	111.20	0.001*
Thermoregulation		
How soon after birth is newborn dried up?	106.93	0.001*
How long after delivery do you give newborn first bath?	88.45	0.001*

P significant at p<0.05. Keys: N=48; X^2=Pearson's chi-square. *= significant at p<0.05. Researcher's field work, 2023.

Table 4: Chi-square summary on effects of intervention on practice of ENC amongst nurses.

Variables	Value	Significance
Neonatal cord care		
Clamp cord immediately at birth	84.04	0.001*
Clamp cord within 3 minutes after birth	124.78	0.001*
Umbilical cord is cut with sterile blade	38.82	0.001*
Umbilical cord is cut with cord scissor/blade	14.11	0.001*
Umbilical stump is cleaned within 1st day of birth	8.26	0.004*
Umbilical stump is cleaned daily	75.65	0.001*
Uses clamp on the umbilical stump	7.24	0.007*
Eye care		
Eye care is a routine for babies	36.09	0.001*
Instils eye drop within 1st day of birth	100.26	0.001*
Antibiotic for eye care is always available	133.37	0.001*
Eye care is for babies with discharge	54.84	0.001*
Initiation of breast feeding		
Gives breast milk within 1st hour after birth	4.41	0.036*
Gives water to baby first at birth	19.94	0.001*
Insists on giving baby 1st breast milk	4.87	0.027*
Supervises initial breastfeeding of babies	25.49	0.001*
Emphasizes exclusive breastfeeding	14.14	0.001*
Gives artificial milk to babies at birth	23.64	0.001*
Initiation of breathing		
Cleans baby's face of mucus during delivery	88.27	0.001*
Sucks every newborn at birth	115.76	0.001*
Turn babies upside down to remove secretions	124.53	0.001*
Apply spirit or water on baby's body to initiate respiration	145.39	0.001*
Gives injection on babies to initiate breastfeeding	4.53	0.033*

Continued.

Variables	Value	Significance
Vitamin K administration		
Administers vitamin K to newborn babies routinely	33.69	0.001*
Administers vitamin K within 24 hours of birth	63.83	0.001*
Administers oral vitamin K	170.07	0.001*
Administering vitamin K is not necessary	(34.25)	0.001*
Thermoregulation		
Delivers baby on a mat on mother's abdomen	48.28	0.001*
Dries baby after delivery	26.45	0.001*
Delivers baby in are warm room	41.25	0.001*
Allows skin to skin contact to prevent baby from cold	30.53	0.001*
Baths baby within 1st day of birth	40.64	0.001*
Nurses baby separate from mother	6.93	0.008*

P-value is significant at $p<0.05$. Keys: N= 48; X^2 = Pearson's Chi-square, % = percent. *= significant at $p<0.05$. Researcher's field work, 2023.

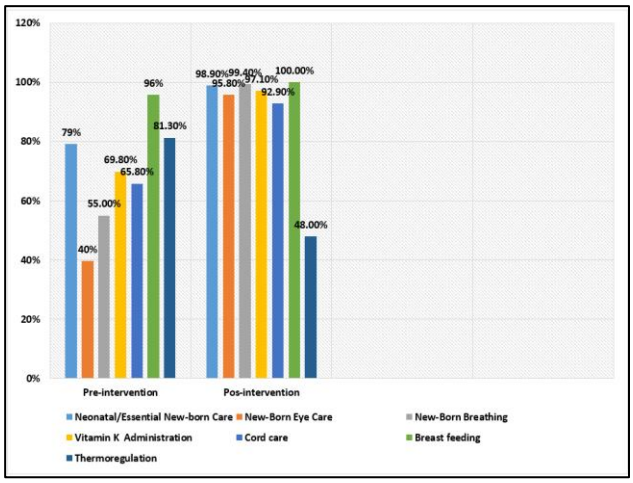

Figure 2: Distribution of knowledge regarding new-born care in the rural PHCs in Ebonyi state.

DISCUSSION

This study was conducted using 48 nurses (all females) who were working at rural PHCs in the 13 local government areas of Ebonyi State, South-East of Nigeria. Majority of the nurses (27) were in their 1-10 years of nursing practice. More than half of the nurses 29 (60.4%) have received training on ENC at least once and less than half had training in the past 2 years. This study assessed the pre-intervention knowledge and practice of the components of ENC amongst the nurses. It also assessed

the post intervention knowledge and practice of rural PHC nurses following ENC training programme and the relationship between the knowledge and practice. The components of ENC considered were initiation of breathing, thermoregulation, cord care, eye care, initiation of breast feeding and vitamin k administration.

Based on the result of this study, up to half of the total number of the nurses have no good knowledge of eye, cord and breathing care of the ENC. They (58.3%) did not know the reason a child should receive eye care at birth and the type of eye treatment recommended at birth; did not know the time within which a new-born should initiate and sustain breathing (75%), that a neonate that cannot initiate respiration requires resuscitation (62.5%) and the complications of resuscitation (68.8%); did not know of the WHO recommended application on umbilical stump (79.2%). There was least knowledge on recommended application on the umbilical stump 35 (72.8%). This may result from the cultural belief and influence from the community members on the nurses. Overall, there is limited knowledge of the components of ENC amongst the nurses.[32]

However, this study also revealed that 66.7% of nurses practiced initiation breastfeeding of the new-born within 1st hours after.

Also, majority of the nurses deliver babies in rooms not described as 'warm', though there was slight inconsistency in practice (16.67%), post intervention.

Only 12 (25%) nurses knew how to treat new-born eye issues.

There was significant improvement in the components of the initiation of breathing amongst the nurses.

CONCLUSION

The study has demonstrated that the Nurses from the rural PHCs significantly improved their knowledge and practice on ENC after participating in the intervention/training course. While there was improvement in each of the considered components of ENC, there was need for further improvement on the components. The most affected of the components were eye care, administration of vitamin K, and thermoregulation, and the situation is perceived to be due to poor supplies of resources/working materials and poor physical structure (building). Nevertheless, since it is proved that such training will improve ENC practices, there is need for intermittent update meeting with rural health workers (nurses) in order to refresh their minds on the expected responsibilities and current trends.

This study contributed to the body of knowledge because of the gap in literature it filled as there were no studies on nurses in rural areas especially in South East Nigeria and Ebonyi State in particular. The study established the effectiveness of intervention training programme on nurses with evidence of improved knowledge and practice of essential newborn care components.

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