

The Effectiveness of an Instructional Program on Nurses Knowledge and Practice Infection Control and the care of neonate

Oday Faris Washeel

College of Nursing/National University of Science
and Technology

Thi- Qar / Iraq

oday.alfartosy@nust.edu.iq

Ali Obaed Shnaishil Hassan

College of Nursing /Al-Bayan University

Thi- Qar / Iraq

ali.obaed@albayan.edu.iq

Sarah Talib Kadhim Colle

of Nursing /Thi-Qar
University

Thi- Qar / Iraq

sara-t@utq.edu.iq

Abstract— Analyze the impact of a newborn intensive care unit nurse education program on the nurses' infection control knowledge and practice.

Theoretical/Probabilistic (pre-test and post-test for the study group). Both Al-Mussawi Hospital and Bint Al-Huda Maternity Hospital in Nasiriya city housed two of Nasiriya's pediatric hospitals for the research. A total of 50 nurses were included in the research. A questionnaire and a checklist were used to gather the data (to measure practice). Analyses of the data were carried out utilizing SPSS version 19 (SPSS). The knowledge of nurses was significantly different between the pre- and post-tests ($P < 0.05$). 18 (36 %) of the nurses correctly answered the sterilization definition prior to attending the training, but 47 (94 %) correctly answered the definition after attending the program. Disinfectant, per dictionary definition After attending the session, 38 (78 %) of the nurses gave the proper definition of disinfectant, compared to 14 (28 %) of the nurses gave the correct response before attending the program. Use of personal protective equipment (PPE) is considered a common precaution in neonatal intensive care units (NICUs). Before the program, the percentage of nurses who properly answered questions concerning standard precautions and the use of personal protective equipment (PPE) in NICU care was lower than the increased percentage of nurses' answers following the course. After a pre- and post-test assessment, the mean value of nurses' replies to the first statement (definition of sterilization) was (0.69 ± 0.48) , which climbed to (0.89 ± 0.32) , with an enhanced understanding. A substantial difference in infection control behaviors was reported in the neonatal intensive care unit (NICU) after the posttest compared to the pretest ($P < 0.05$).

Following the implementation of the program, the educational program had a considerable influence on the nurses' knowledge and practice abilities.

It is possible to improve the quality of care for healthy and sick neonates, and administrators of hospitals should strive to create an organizational atmosphere in which adherence to recommended infection control practices is considered an integral part of providing high-quality care in the neonatal intensive care unit (NICU).

Keywords: neonate care, Infection control, Newborn

I. INTRODUCTION

Disease, immaturity of the immune system, and frequent use of invasive equipment put NICU patients at an increased risk for infection. Infection control measures, such as hand washing and disposing of dirty things, can be

enhanced or hindered by the architecture of the NICU. While the design of a new NICU is still being developed, the input of an infection control specialist may have a favorable impact on the health outcomes of newborns as well as the efficiency of the personnel. [1]. Everyone comes into contact with a newborn, including parents and caregivers, has an obligation to do so. On the other hand, infection control is the practice of reducing the risk of infection in a nursery or community. The majority of the 106 million fatalities caused each year by neonatal infection in underdeveloped nations are due to sepsis and meningitis. Antibiotic resistance is on the rise, and it's posing a significant challenge to efforts to reduce global infant mortality that have been shown to be effective. Barriers to neonatal care, such as hand washing, are examples of this [2]. Infection management is the most important element of infant care since their immunity is weak for the first week of life. The infant requires infection prevention after birth. Nurses care for infants have a big responsibility to keep them safe from infection [3]. Neonatal infection causes around 106 million deaths per year in underdeveloped nations, with sepsis and meningitis accounting for the majority of these deaths. Resistance to a routinely used antibiotic is increasing, and it is posing a little difficulty in the global effort to minimize infant death using proven effective measures. Hand washing, for example. Hand washing has been proved beneficial since the 19th century and should be introduced as a barrier to newborn units. Pathogens and the illnesses they cause can rapidly spread in a neonatal intensive care unit setting. Due to both their inherent vulnerability to infection and the intrusive treatments they undergo, newborns are particularly vulnerable to nosocomial illness [4].

II. METHODOLOGY:

Study Design: A Quasi-experimental study: Pre- and posttests for the same group were used to evaluate the impact of an educational program on neonatal intensive care unit infection control knowledge and practice. Between December 5, 2021, and March 6, 2022, the Al-Mousawi Hospital specialist pediatric hospital and the Bint Al-Huda Maternity Hospital conducted separate analyses of (50) nurses in this category.

Study Settings: The current study takes place in the Thi-Qar governorate, at Al-Mousawi Hospital, a specialized pediatric hospital, and Bint Al-Huda Pediatric and Maternity Teaching Hospital.

Study Sample: It was found that 50 neonatal intensive care unit nurses (either diploma nurses or faculty of nursing graduates, independent of their prior training level or experience year) from a pediatric hospital made up the sample (total number of nurses agreed to participate).

Questionnaire Interview Structured

This instrument was developed by the researcher after a thorough review of the available literature to gauge how well nurses in a neonatal intensive care unit understand infection management. Both the demographic data (age, education, years of experience) and the infection prevention knowledge of nurses were assessed using this instrument (usage of protective equipment, sterilization and disinflation definitions).

A. Checklist Observational

Infection management in the neonatal critical care unit was the focus of a study by the researcher. Included were (hand washing and the use of protective equipment).

Collection of Data:

Data was manually gathered, coded, and tabulated by the researcher prior to analysis.

Analysis of Data: Using the Chi-square (x2) test and numbers and percentages, the data was classified and arranged before being analyzed. Version 20 of the statistical application SPSS was used for the statistical analysis.

Ethical Considerations

Prior to the study phases, the following were taken into account: – Approval from the Al-Muthanna University College of Nursing; – Health authority approval and participant verbal agreement are required. People participated in the research were informed of the purpose of the study, their ability to withdraw, and the confidentiality of their personal information.

III. RESULTS:

TABLE (1) DISTRIBUTION OF THE STUDY SAMPLE ACCORDING TO SOCIODEMOGRAPHIC DATA

ACCORDING TO SOCIODEMOGRAPHIC DATA

No.	Items	Sub Item	Frequency	Percentage
1.	Age	> 40 years	6	12%
		31-40 years	18	36%
		20-30 years	24	48%
		<20 years	2	4%
Total			50	100%
2.	Qualification (Level of Education)	MSc, PhD	4	8 %
		Bachelor	9	18 %
		Diploma	22	44 %
		Secondary School of Nursing	15	30 %
Total			50	100%
3.	Years of experience.	> 10 years	7	14%
		6-10 years	15	30 %
		2-5 years	21	42 %
		2 years	7	14.%
Total			50	100%

Table (1) shows that age among study group, a majority of age from 20-30years (48%), while minority age less than 20 years old 4(8%) most of the study group has Diploma degree 22

(44%) while only 4(8%) have MSc degree. 21(42%) have 2-5 years of experience and 7(14%) more than 10 years.

Value=0.005< 0.05) pre- and post-test improvements in their knowledge. ICU nurses were quizzed on their understanding of the term disinfectant 28% before the presentation, only one nurse correctly answered the question "What is a disinfectant?" whereas the proper response was mentioned by another nurse 78%. Those nurses correctly answered that certain bacteria may live in disinfectants were rewarded them after

Table (2) Distribution and Comparison according to their knowledge of the subject matter of the study the Sterilization and Disinfectant definition N = 50.

Items	Pretest						Posttest						t value	Df	P value
	Correc answer		Incorrec t answer		Pretest		Correc answer		Incorrec answer		Post test				
	F.	%	F.	%	Mean	SD	F.	%	F.	%	Mean	SD			
Investigation Detect infection	7	14	43	86	0.63	0.47	46	92	4	8	0.86	0.33	-3.0	60	0.003
Sterilized of Incubator	8	16	42	84	0.66	0.46	43	86	7	14	0.91	0.27	-3.5	60	0.007
Disinfected Incubator	6	12	44	88	0.66	0.46	45	90	5	10	0.97	0.13	-5.0	60	0.001
Space(Distance) between Incubators in NICU	10	20	40	80	0.58	0.50	43	86	7	14	0.97	0.13	-6.0	60	0.006
Important of umbilical Cord Care for newborn baby is	9	18	41	82	0.83	0.36	47	94	3	6	0.96	0.17	-2.5	60	0.003
Important of Eye Care for Newborn is	4	8	46	92	0.75	0.42	46	92	4	8	0.97	0.12	-4.0	60	0.00
Replace of Peripheral IV Cannula should be	6	12	44	88	0.35	0.47	47	94	3	6	0.96	0.12	-9.7	60	0.002
Replace the Disposable west product should be	8	16	42	84	0.24	0.42	47	92	3	6	0.88	0.31	-9.2	60	0.001
Advice the mother about replace diaper of the baby	11	22	39	78	0.66	0.46	46	92	4	8	0.97	0.12	-5.0	60	0.003

Table (2) is based on the percentage of ICU nurses that correctly answer a question on sterilization prior to implementing the program's questions about their knowledge of sterilization. After attending the session, nearly all of them (94% of them) mentioned the correct response. The nurses properly answered the sterilizing process were rewarded (14%) in comparison to before the program (92%) following their participation in the program. Sterilization was defined by nurses as the process of sterilization (0.69 ± 0.48) prior to testing, which climbed to a level of (0.89 ± 0.32), T. value was (-2.7), pointing up the distinctions between the two (p.

attending the seminar (8%) in comparison to before the program (94%) The nurses properly identified breastfeeding as a disinfectant after attending the training were among those received awards (14%) in comparison to before the program (94%) of them in the wake of the show. Nurses were asked to define disinfection, and the mean value of their responses was (0.51 ± 0.50). During the Pre-Test Measurement rise by a factor of two at posttest (0.97 ± 0.18), T value was (-6.8), highlighting substantial discrepancies between the two groups (p. Value=0.001< 0.05) how much they've learned between the two tests

TABLE (3) COMPARISON OF THE RESEARCH SAMPLE BASED ON THEIR KNOWLEDGE OF CONVENTIONAL PRECAUTIONS AND THE USAGE OF A SPECIFIC TOOL PPE. N = 50

Variables	Pretest						Posttest						t.	Df	P. value
	Correc answer		Incorrec answer		Pretest		Correc answer		Incorrec answer		Post-test				
	F.	%	F.	%	Mean	SD	F.	%	F.	%	Mean	SD			
Sterilization definition	18	36	32	64	0.69	0.47	47	94	3	6	0.89	0.32	-2.7	60	0.005
Sterilization method	7	14	43	86	0.56	0.50	46	92	4	8	0.25	0.25	-0.50	60	0.002
Disinfection definition	14	28	36	72	0.51	0.50	39	78	11	22	0.97	0.18	-6.8	60	0.001
Microorganism live in Disinfectant fluid	4	8	46	92	0.64	0.48	47	94	3	6	0.95	0.22	-4.6	60	0.002
Breastfeeding of Baby as disinfectant	7	14	43	86	0.54	0.50	47	94	3	6	0.85	0.36	-3.8	60	0.001

Table (3) shows the nurses' answers to questions concerning their understanding of stander precautions and the usage of PPE in NICU care; 14 % most nurses correctly answer questions regarding what will be done if an infection is found before beginning the program. While the proper answer was mentioned, it was not mentioned 92 % following their participation in the training. accurate answers to when the incubator should be sterilized were rewarded (16%) in comparison to before the program 86% following their participation in the training. Before the training, the proportion of

nurses answered correctly regarding conventional precautions and the usage of personal protective equipment (PPE) in NICU care was lower than the greater percentage of their responses after the program. Nurses' replies to the first statement had a mean value of (0.65+0.49) prior to testing, which climbed to a level of (0.88+0.35), the t-value was (-3.0), pointing up the distinctions between the two (p. Value=0.003< 0.05) how much they've learned between the two tests

TABLE (4) INCUBATOR CARE METHODS (INCLUDING HAND WASHING) WERE USED TO DISTRIBUTE AND COMPARE THE STUDY'S SAMPLE
N= 50

Items	Pre-test						Post-test						t. Value	Df	P. value
	Correc answer		Incorrec answer		Pre-test		Correc answer		Incorrec answer		Post-test				
	F.	%	F.	%	Mean	SD	F.	%	F.	%	Mean	SD			
1. Hand washing before any procedure	8	16	42	84	0.25	0.43	41	82	9	18	0.96	0.18	-11.50	60	0.005
2. Hand washing after procedure	7	14	43	86	0.24	0.42	45	90	5	10	0.94	0.26	-10.75	60	0.006
3. Aseptic technique Use during vein puncture and taking sample-	4	8	46	92	0.15	0.37	46	96	2	4	0.93	0.29	-12.69	60	0.005

Table (4) displays the nurses' responses to questions on infection prevention in NICU care: (16%) right in their assessment done hand washing before procedure at pretest, while the percentage of the nurses who does this procedure correctly at posttest was (82%), the nurses correctly done the second procedure were (14%) at pretest measure compared to (90%) of them at posttest measure, the nurses who correctly done the other procedures were lower

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Percentages at pretest measure compared to the higher percentages of the nurses who correctly done these procedures at the posttest measure. in the first operation, the average of the nurses' accurate practice scores

(0.25±0.43) prior to testing, which climbed to a level of (0.96±0.18), the t-value was (11.50), pointing up the distinctions between the two ($p=0.005 < 0.05$) between the pre- and post-testing phase.

TABLE (5.1) DISTRIBUTION AND INCUBATOR CARE PROCEDURES ARE COMPARED TO THE STATISTICAL SIGNIFICANCE OF RESEARCH SAMPLES (EQUIPMENT) N = 50

Items	Pretest						Posttest						t	Df	P. value
	Correct answer		Incorrec answer		Pre-test		Correc answer		Incorrec t answer		Post-test				
	F.	%	F.	%	Mean	SD	F.	%	F.	%	Mean	SD			
4.Wearing the Gloves when Suctioning Neonate	14	28	36	72	0.22	0.42	40	80	10	20	0.95	0.23	-12.35	60	0.001
5.Wear gloves when replaced diaper	5	10	45	90	0.27	0.45	39	78	11	22	0.97	0.19	-11.50	60	0.005
7.Use Protective equipment when handling newborn baby	1	2	48	98	0.21	0.41	42	84	8	16	0.96	0.22	-12.91	60	0.002
9.Using correct technique in sterilization after finish procedure	3	6	46	96	0.21	0.41	40	80	10	20	0.92	0.29	-11.58	60	0.001
10.Adequate Spacing between cote and incubator	3	6	46	96	0.16	0.37	41	82	9	18	0.96	0.22	-14.99	60	0.002
11.Use special equipment for each infant	29	58	22	44	0.17	0.38	45	90	5	10	0.93	0.29	-12.69	60	0.005
19.Disinfected oxygen mask	15	30	35	70	0.39	0.49	44	88	6	12	0.94	0.26	-7.94	60	0.008

Table (5.1) illustrates the replies of the nurses concerning their Practices related Incubator Care, equipment; 14 (28 %) of the nurses give correct answer about Wearing the Gloves when Suctioning Neonate before doing the whole thing. However, the proper response was provided by 40 (80 %) following their participation in the training, to use gloves when changing a diaper, nurses were reward ed for their accurate responses 5 (10%) in advance of the program, as opposed to 39(78%) following their participation in the training. As a result of attending this class, a smaller number of nurses correctly answered

items concerning the use of protective equipment when caring for newborns in incubators and other procedures. Wearing the Gloves When Suctioning

Neonates: The Mean Value of Nurses' Correct Practice Scores (0.22± 0.41) prior to testing, which climbed to a level of (0.96±0.24), t-value was (-12.34), showing substantial variations ($P=0.001 < 0.05$) before and after the procedure's

TABLE (5.2). DISTRIBUTION & INFECTION CONTROL PROCEDURES OF THE RESEARCH PARTICIPANTS ARE COMPARED (SHARP TOOLS) N = 50

Mother about Infection control	6	12	44	88	0.35	0.47	44	88	6	12	0.94	0.21	8.67	60	0.002
13.Doing Care of Eye	9	18	41	82	0.42	0.49	39	78	11	22	0.96	0.17	-7.96	60	0.003
14.Doing Care of Umbilical	3	6	47	94	0.61	0.48	44	88	6	12	0.94	0.21	-4.78	60	0.004
15.Enough clean linen available	1	2	49	98	0.55	0.49	42	84	8	16	0.94	0.21	-5.63	60	0.007
16.Redrictd Visitor	2	4	48	96	0.53	0.49	43	86	7	14	0.94	0.21	-5.83	60	0.008

Table (5.2) illustrates the answers of the nurses about their practices regarding infection control (sharp tools) at NICU care; 2 (4%) before beginning the program, only one of the nurses correctly stated that the needles should be recapped after each usage. However, the proper response was provided by 43(86 %) following their participation in the training. All of the nurses answered "proper needle handling" properly 2(4%) in advance of the program, as opposed to 47(94%) following their participation in the training. Before attending the session, the percentage of nurses correctly answered the questions

regarding replacing disposable waste product every 8 hours and properly disposing of sharp equipment in NICU

care was lower than after attending the program. When it came to replacing a disposable waste product, nurses' scores on right practice were on average (0.25 ± 0.45) at the time of pretest measurement, which grew to (0.98 ± 0.17), t value was (-11.50), showing substantial variations ($P=0.002 < 0.05$) pre- and post-assessment techniques differ from person-to-person no.8,17,18 in this table.

TABLE (5.3). DISTRIBUTION & ANALYSES OF THE RESEARCH PARTICIPANTS' INFECTION -CONTROL METHODS (DAILY ROUTINE PRACTICE) N=50.

Items	Pretest						Posttest						t.	Df	P. value
	Correct answer		Incorrec t answer		Pretest		Correct answer		Incorrec t answer		Post test				
	F.	%	F.	%	Mean	SD	F.	%	F.	%	Mean	SD			
6.The Recapped of needle after use	2	4	48	96	0.25	0.45	43	86	7	14	0.98	0.17	-11.50	60	0.005
8.Proper handling of Sharp needle	2	4	48	96	0.35	0.47	47	94	3	6	0.88	0.33	-6.70	60	0.003
17.Replaced disposable west product every 8 hours	12	24	24	48	0.42	0.50	46	92	4	8	.094	0.24	-7.37	60	0.002
18.Proper disposable of sharp instruments	24	48	26	52	0.38	0.48	42	84	8	16	0.98	0.17	-8.54	60	0.003

Table (5.3) illustrates the answers of the nurses about their infection control (daily routine practice) before beginning the program, one or more nurses must provide an accurate response to the question of how to educate a woman about infection management and its implications on her health. While the right answer was referred to, 44(88%) After attending the workshop, several of them they were the eye and umbilical care nurses had the correct answers 9(18%), 3(6%) pre-program at NICU care; 6 (12%)

IV. DISCUSSION:

Patients, even those are asymptomatic, are assumed to be potentially infectious, and all patients should be treated with the same safe standards of care to avoid exposure to blood, body fluids, secretions, excretions, mucous membranes, non-intact skin, or soiled items, as well as the spread of microorganisms, according to routine practice. Prevention and control of germ transmission in all health care settings requires standard procedures related to infection prevention and control that should be implemented with all patients at every level of

treatment. The efficiency of an infection control educational program for nurses working in neonatal critical care units was tested at two pediatric hospitals in Thi-Qar governorate.

Twenty-three years old was the median age of the study's participants, with 48% of them falling between the ages of 20 and 30, and just 12% falling under the age of twenty-one (4 %). In the poll, 22 (44%) of the nurses had a Diploma degree, while just 4(8%) had an MSc degree. The vast majority of nurses have worked in the field for two to five years. 42 percent of the time, but only over a period of more than 10 years (7 years total) (14 %).

Nursing staff in the neonatal intensive care unit (NICU) have increased their understanding of sterilization as a consequence of the educational program, with the mean response to the concept of sterilization rising from (0.69±0.47) to (0.89±0.32) at posttest. According to data from a previous study conducted at Cairo University Hospital to evaluate the impact of an educational program on nurses' knowledge and attitudes in the pediatric intensive care unit, showed that after an educational session was presented to the nursing staff sterilization in NICU care, there was still room for further development of knowledge and attitude (P<0.001) (5).

Other study done in Mysore University, Mysore - 570 006, Karnataka, India proved that early education program on nosocomial infections and its prevention will help in the retention of knowledge, attitudes and practices among the various categories of HCWs [6-7].

In this study, nurses' knowledge increased significantly as a result of the training. There was a substantial (P = 0.001) difference between the pretest and posttest in the mean value of nurses' definitions of disinfection, rising from (0.51±0.50) at pretest to (0.97±0.18) at posttest with a t value of (-6.6). Researchers at Hacettepe University's Infection Control Unit showed that the nurses' knowledge of disinfection increased considerably (p=0.001) after implementing a new cleaning protocol [8-9]

A significant increase in nurses' knowledge of standard precautions and the use of PPE in NICU care was found after the program, with the mean value of nurses' answers regarding their first statement increasing from (0.64±0.48) at pretest to (0.87±0.34) at posttest, with a t value of (-3.0), indicating significant differences (P=0.003). Rates of pre-intervention bloodstream infection were substantially higher than the median prevalence of 3.5 infections per 1000 catheter days in the United States, according to a recently published research. For PICUs reporting to the National Healthcare Safety Network that are interdisciplinary [10].

It has been shown that nurses' proper practices improved considerably after implementing the program, with a mean score of (0.26±0.44) at pretest rising to (0.97±0.18) at posttest, showing an improvement of (-11.51) in their practices between pretest and posttest (P=0.005). Nursing and other staff had more positive feelings than physicians in the past, according to previous study (P.001). Guidance generally, but not the Hand

Hygiene Guideline in particular. When asked if they had followed the guidelines and washed their hands with an alcohol product, those with higher positive views were more likely to reply yes (P.001) and P =.002.

According to the data, the majority of employees were aware of the CDC's Hand Hygiene Guideline. There was a strong correlation between higher levels of self-reported guideline adoption and a more favorable attitude among the staff regarding guidelines for clinical practice. For the sake of ICU staff education and socialization, these findings might have a substantial impact on the adoption and implementation of evidence-based practice standards. There was a lot of diversity in nurses' reported practices and municipal policies, according to another Australian-New Zealand research. Before and after the training, all elements of hand washing behaviors, such as duration and extent of hand washing, type of solution, and manner of drying, were found to change. [11-12]

V. CONCLUSION

1. Improvement in practical skills and knowledge after the educational program was given to the nursing staff was significant statistically.

2. The importance of an infection control education program in the neonatal critical care unit is enhanced by its presence there.

3. In all elements of the investigation, there were significant differences between pre-test and post-test (P <0.05).

4. Among all participants in the research, there was a significant rise in the practical abilities of nurses following implementation of the program. 1)

Recommendations

1. Improvement the quality of care to healthy and sick neonate will be achieved.

2. Neonatal mortality and morbidity have grown over the last several years, and administrators of hospitals should try to develop a culture where adherence to recommended infection control practices is viewed as an essential element of providing high-quality NICU care.

3. Basic infection control procedures are critical in lowering pediatric mortality and morbidity and increasing the quality of pediatric care, and hospitals must demonstrate their commitment to this goal by making these resources readily available to educational programs and prevention.

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