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Nursing personnel's knowledge and practice regarding infection control measures in neonatal intensive care unit-effectiveness of structured teaching programme

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Abstract

Background of the study: Neonatal nosocomial infections are an important cause of neonatal morbidity, which occurs frequently causes illness and possibly death. Neonates acquire nosocomial infections from other neonates, nursery personnel, their mothers, or contaminated supplies and equipment. So there is a need to stress upon strict adherence to aseptic protocols in neonatal units if infection rates are to be kept low.

Objectives: To assess the effectiveness of structured teaching program on knowledge and practice regarding Infection Control Measures in NICU among nursing personnel in selected hospitals, Tumkur, Karnataka. India.

Methodology: The pre-test and post-test pre-experimental design, the samples recruited by convenient sampling technique, consist of 60 nursing personnel in selected hospitals of Tumkur, Karnataka, India. A structured questionnaire was given to assess the knowledge and practice of Infection Control Measures in NICU followed by a structured teaching programme on Infection Control Measures in the NICU and administering the same questionnaire to assess the post-test.

Results: The overall mean post-test knowledge score on Infection Control Measures in Neonatal Intensive Care Unit 8.42 with the standard deviation of 1.11 was significantly higher than overall mean pre-test knowledge score on Infection Control Measures in Neonatal Intensive Care Unit 3.95 with a standard deviation of 1.84. And the obtained't' value 16.266 was significantly higher than the table value. Regarding the practice on Infection Control Measures in NICU the overall mean post-test score was 12.35±1.54 was significantly higher than the overall pre-test mean score 3.88±1.96. The obtained't' value 30.055 was significantly higher than the table value. There was no significant association found between the pre-test knowledge score with the demographic variable of the nursing personnel, and regarding the practice on Infection Control Measures in NICU. There was no significant association found between the pre-test practice score with the demographic variable except Experience in Neonatal Intensive care unit was significant.

Conclusion: It is very important to make awareness among nursing personnel regarding infection control measures in the NICU.

Keywords: effectiveness, structured teaching program, knowledge, practice, infection control measures, neonatal intensive care unit, and nursing personnel

Introduction

A productive environment in the hospital unit is essential as a pre-requisite when considering the services provided in the Neonatal Intensive Care Unit (NICU) provision for a safe and protective environment is a prior need [1]. The use of therapeutic procedures after birth and the use of an umbilical catheter or other invasive procedures increase the risk of infection [2]. Neonates who already have an anomaly such as tracheoesophageal fistula can easily acquire infection through these portals of entry for organisms [3]. Infections that are relatively harmless to an adult may be fatal to the newborn infant. Symptoms are often subtle in the early stages, the recognition of which can be crucial. Portal of entry is the respiratory tract, the gastrointestinal tract, the genitourinary tract, and breaks in the skin. The portal of existing is the same as those just mentioned. Nursing standards are developed and enforced by various health agencies such as the American Academy of Paediatrics, Hospital Accreditation Boards, and Local Health Agencies. Provisions governing space, control of temperature and humidity, lighting and safety from fire and other hazards are considered. Any common equipment is sterilized after each use [4].

According to a recent report in India, the neonatal infection rate is 44/1000 live birth. The reported incidence of nosocomial sepsis in neonates from India ranges from 1.5% to 37%. In contrast, surveillance reports from the USA have reported a rate of 0.9% to 7%. Neonatal infection in the NICU is a problem of developing and developed countries. Approximately 70% of infant discharged from community teaching hospital reported neonatal nosocomial infection rate of 0.9% to 1.1% in the United Kingdom. There is a need to stress upon strict adherence to aseptic protocols in neonatal units if infection rates are to be kept low [2]. In order to reduce the infant mortality rate and to contribute to the health for all by 2025 AD goal, it is the responsibility of each health care providers, to control and prevent neonatal infection especially in NICU, where care specialized is rendered to the citizens of tomorrow [2]

Infections are significant causes of morbidity and mortality

in the neonatal unit. Neonates, especially those of low and very low birth weight, are at particularly high risk for infection due to their immune status. Hospital-acquired infection results in an enormous burden of increased morbidity and mortality [1].

Neonatal intensive care units are vulnerable to outbreaks, and sporadic incidents of healthcare-associated infections are determined by the degree of the immaturity of the neonatal immune system. Invasive procedures involved, the etiological agent and its antimicrobial susceptibility pattern and above all, infection control policies practiced by the unit it is important to raise awareness of infection control practices in resource-limited settings since over-dependence upon the antimicrobial agent and co-existing lack of awareness of infection control is encouraging the emergence of multi-drug-resistant nosocomial pathogens [9].

India's recent surveys have indicated that the incidence of fungal infections has increased over the past few years, fungal infection is the most commonly recognized infection in a study conducted by Abide Malick *et al*., septicemia was found.

The commonest (90 percent) infection, which is in concordance with the result of other workers. A recent survey of fifteen major neonatal centers indicated that infants who developed late-onset sepsis had a significantly longer hospital stay and higher mortality than patients who were not infected [10].

So the Nursing personnel working in the neonatal unit should be knowledgeable and skillful in the prevention of neonatal infections. Nursing personnel is by the group and constantly working with the newborns in neonatal units. If nursing personnel fails to adopt the infection control techniques, it will lead to septicemia and neonatal death. To reduce the infant mortality rate, the nursing personnel should be knowledgeable and skillful in providing infection-free nursing care [12].

Methods and Materials

Design and setting

A pre-experimental, one group pre-test and post-test design study was conducted with an objective to assess the effectiveness of Structured Teaching Programme on Knowledge and Practice Regarding Infection Control Measures In Neonatal Intensive Care Unit among Nursing personnel in selected hospitals, Tumkur, Karnataka. India.

Sample and sampling techniques

A convenient sampling technique was used to take a total number of 60 nursing personnel**.** Age, Sex, Religion, Educational qualification, Type of hospital working, and Experience in Neonatal Intensive care unit were the demographic variables of the study. The structured teaching program was the independent variable, whereas knowledge and practice on Infection Control Measures in the NICU was the independent variable for the study, respectively.

Data collection

A pre-test was conducted on Knowledge and practice regarding Infection control measures in NICU using 26 items structured knowledge and practice questionnaire prepared by reviewing various research Infection control guidelines after checking the reliability of tool followed by administration of structured teaching programme on Infection control measures. A Post-test was conducted by using the same questionnaire by laps of 7 days.

Data analysis

After data collection, each questionnaire was checked for completeness, and data was entered and analyzed by using SPSS version 20 statistical package. Demographic proforma containing the sample characteristics were analyzed using frequency and percentage. The knowledge and practice regarding infection Control Measure in Neonatal Intensive Care Unit among the nursing personnel before and after the administration of a structured teaching programme was calculated by using mean, mean percentage, and standard deviation.

The significant difference between the mean pre-test and post-test knowledge and practice Scores were calculated using paired't' test. The association between selected demographic variables and the pre-test knowledge practice scores regarding infection Control Measures in Neonatal Intensive Care Unit among the nursing personnel was determined by chi-square test. Level of significance was set at a level of 0.001 to interpret the hypothesis and findings.

Ethical consideration

The study was approved by Rajiv Gandhi University of Health Sciences Bangalore Karnataka India. The written permission to conduct research was obtained from the concerned authorities of the Hospitals. Verbal and written consents were obtained from the study subjects after explaining the study objectives and procedures and their right to refuse to participate in the study any time they want to. For this purpose, a one-page consent letter was attached to the cover page of each questionnaire stating about the general purpose of the study and issues of confidentiality which was discussed by data collectors before filling the questionnaire and proceeding with the interview.

Results

Demographic characteristics of the study participants: sixty nursing personnel participated in the study**.** The higher percentage 38.33% of the staff nurses are of the age group > 30 and 35% of the staff nurses are in the age group less than 25 and 26.67% of the staff nurses are in the age group of 25 to 30.higher percentage of the nursing personnel 81.67% are females and about 18.33% are males. Majority of the nursing personnel 41.67% belong to the Christian religion, whereas 36.67% belong to Hindu religion and a very low percentage of 21.67% belong to the Muslim religion. The higher percentage of the nursing personnel 66.67 % are GNM, and about 21.67 % are ANM and a very low percentage11.67% areB.Sc nurse. Distribution of the nursing personnel by the type of hospital they are working in depicts that about 51.67% of the nursing personnel are working in private hospitals, and about 48.33% are working in a government hospital. Majority 43.33%nursing personnel experience in NICU are ≤ 1 year, whereas about 31.67% of nursing personnel are about >1 year, and 25% of nursing personnel do not have experience in NICU (Table 1).

Table 1: Distribution of nursing personnel according to their baseline characteristics. N=60

	Variable	Frequency	Percentage
Age(in years)	< 25	21	35.00
	25-30	16	26.67
	>30	23	38.33
Sex	Male	11	18.33
	Female	49	81.67
Religion	Hindu	22	36.67
	Muslim	13	21.67
	Christian	25	41.67
Educational qualification	ANM	13	21.67
	GNM	40	66.67
	BSc (N)	7	11.67
Type of hospital working	Government	29	48.33
	Private	31	51.67
Nursing personnel based on experience in NICU	None	15	25.00
	≤ 1	26	43.33
	>1	19	31.67

Section II Analysis of pre-test scores of knowledge regarding Infection Control Measures in Neonatal Intensive Care Unit among nursing personnel

Table 2: Assessment of pre-test knowledge scores regarding Infection Control Measures in Neonatal Intensive Care Unit among nursing personnel (n=60)

Level of knowledge	The percentage range of score	Frequency	Percentage (%)
Inadequate	≤ 50 %	47	78.33
Moderately adequate	51-75 %	13	21.67
Adequate	>75 %	00	0.00

The data in Table 2 shows that majority of the respondents 47(78.33%) had inadequate knowledge regarding Infection Control Measures in Neonatal Intensive Care Unit, followed by 13(21.67) respondents who had moderately adequate knowledge and none of the respondents had adequate knowledge.

Table 3: Analysis of pre-test scores of knowledge regarding Infection Control Measures in Neonatal Intensive Care Unit among Nursing personnel (n=60)

Maximum possible score	Mean	Standard deviation	Mean percentage
10	3.95	1.84	39.50

Table 3 reveals that the total mean percentage of the pre-test knowledge score was 39.50 with total mean and standard deviation of 3.95 and 1.84, respectively.

Table 4: Analysis of pre-test scores of practice regarding Infection Control Measures in Neonatal Intensive Care Unit among Nursing personnel (n=60)

Level of Practice	The percentage range of score	Frequency	Percentage (%)
Inadequate	≤ 50 %	59	98.33
Moderately adequate	51-75 %	1	1.67
Adequate	>75 %	00	0.00

The data in Table 4 shows that majority of the respondents 59(98.33%) had inadequate practice regarding Infection Control Measures in Neonatal Intensive Care Unit, followed by 1(1.67) respondents who had moderately adequate practice and none of the respondents had adequate practice.

Table 5: Analysis of pre-test scores of practice regarding Infection Control Measures in Neonatal Intensive Care Unit among nursing personnel (n= 60)

Maximum possible score	Mean	Standard deviation	Mean percentage
16	3.88	1.96	24.27

Table 5 reveals that the total mean percentage of the pre-test practices score was 24.27, with total mean and standard deviation of 3.88 and 1.96, respectively.

Section III

Table 6: Analysis of post-test scores of knowledge regarding Infection Control Measures in Neonatal Intensive Care Unit among nursing personnel (n= 60)

Level of knowledge	The percentage range of score	Frequency	Percentage (%)
Inadequate	≤ 50 %	1	8
Moderately adequate	51-75 %	8	13.33
Adequate	>75 %	51	85.00

The data in Table 6 shows that majority of the respondents 51(85.00%) had adequate knowledge regarding Infection Control Measures in Neonatal Intensive Care Unit, followed by 8(13.33) respondents who had moderately adequate knowledge and 1.67(8%) respondents had inadequate knowledge.

Table 7: Analyses of post-test scores of knowledge regarding Infection Control Measures in Neonatal Intensive Care Unit among nursing personnel (n=60)

Maximum possible score	Mean	Standard deviation	Mean percentage
10	8.42	1.11	84.17

Table 7 reveals that the total mean percentage of the post test knowledge score was 84.17 with total mean and standard deviation of 8.42 and 1.11 respectively.

Table 8 Analysis of post-test scores of practices regarding Infection Control Measures in Neonatal Intensive Care Unit among Nursing personnel (n=60)

Level of practice	The percentage range of score	Frequency	Percentage (%)
Inadequate	≤ 50 %	00	0.00
Moderately adequate	51-75 %	35	58.33
Adequate	>75 %	25	41.67

The data in Table 8 shows that majority of the respondents 35(58.33%) had moderately adequate practice regarding Infection Control Measures in Neonatal Intensive Care Unit, followed by 25(41.67) respondents who had adequate practice and none of the respondents had inadequate practice.

Table 9: Analysis of Post-test scores of practice regarding Infection Control Measures in Neonatal Intensive Care Unit among nursing personnel (N=60)

Maximum possible score	Mean	Standard deviation	Mean percentage
16	12.35	1.54	77.19

Table 9 reveals that the total mean percentage of the post-test practices score was 77.19 with total mean and standard deviation of 12.35 and 1.54, respectively.

Section IV: Evaluationof the effectiveness of structured teaching programme on infection control measures in the neonatal intensive care unit among nursing personnel.

Table 10: Differences between pre-test and post-test scores of knowledge regarding infection control measures in the neonatal intensive care unit.

Area	Mean knowledge scores		Mean difference	Sd of difference	t value	Level of significance
	Pre-test	Post-test				
Knowledge on infection control measures	3.95	8.42	4.47	0.73	16.266	P<0.001

t (0.001, 59df)=3.46

The data presented in Table 10 shows that the mean post-test knowledge score regarding infection control measures in the neonatal intensive care unit was higher than the mean pretest knowledge scores. The obtained t value is also higher than the table value indicating a significant difference between the pre-test and post-test scores regarding knowledge on infection control measures in the neonatal intensive care unit.

Table 11: Difference between pre-test and post-test scores of practice regarding infection control measures in the neonatal intensive care unit.

Area	Mean knowledge scores		Mean difference	Sd of difference	t value	Level of significance
	Pre-test	Post-test				
practice on infection control measures	3.88	12.35	8.47	0.42	30.055	P<0.001

t (0.001, 59df)=3.46

The data presented in Table 11 shows that the mean post-test practice score regarding infection control measures in the neonatal intensive care unit was higher than the mean pre-test practice scores. The obtained t value is also higher than the table value indicating a significant difference between the pre-test and post-test scores regarding practice on infection control measures in the neonatal intensive care unit.

Section V: Association between pre-test scores of knowledge regarding infection control measures with selected demographic variables.

There was no significant association between pre-test knowledge scores regarding infection control measures infection control measures in the neonatal intensive care unit among nursing personnel with their selected demographic variables.

Section VI: Association between pre-test scores of practice regarding infection control measures with selected demographic variables. There was no significant association between pre-test practice scores regarding infection control measures in the neonatal intensive care unit among Nursing personnel with their selected demographic variables except Experience in Neonatal Intensive care unit was significant.

Discussion

In pre-test the majority of the respondents, 47(78.33%) had inadequate knowledge regarding Infection Control Measures in Neonatal Intensive Care Unit with the total mean percentage of the pre-test knowledge score was 39.50 with total mean and standard deviation of 3.95 and 1.84 respectively.

Post-test revealed that majority of the respondents 51(85.00%) had adequate knowledge regarding Infection Control Measures in Neonatal Intensive Care Unit with the total mean percentage of the post-test knowledge score was 84.17 with total mean and standard deviation of 8.42 and 1.11 and the obtained t value was 16.266 which is higher than the table value.

Regarding the practice in pre-test the majority of the respondents 59(98.33%) had inadequate practice regarding

Infection Control Measures in Neonatal Intensive Care Unit, the total mean percentage of the pre-test practice score was 24.27 with total mean and standard deviation of 3.88 and 1.96 respectively.

Post-test revealed that that majority of the respondents 35(58.33%) had moderately adequate practice regarding Infection Control Measures in Neonatal Intensive Care Unit the total mean percentage of the post-test practice score was 77.19 with total mean and standard deviation of 12.35 and 1.54 and the obtained t value was30.055 which is higher than the table value.

And the study findings also revealed that there was no significant association between pre-test knowledge scores regarding infection control measures in the neonatal intensive care UNIT among Nursing personnel with their selected demographic variables and also There was no significant association between pre-test practice scores regarding infection control measures in the neonatal intensive care unit among Nursing personnel with their selected demographic variables except Experience in Neonatal Intensive care unit was significant.

Recommendations

- A similar study can be conducted on a large sample to generalize the study findings.
- Mass and individual education in regional languages to enlighten the nursing personnel's can be organized at all the level of health facilities.
- The comparative study may be conducted to find out the similarities or differences in knowledge between the nursing personnel working in government hospitals as well as in private hospitals
- A similar study can be conducted on nursing personnel with different qualifications.
- A study can also be conducted on nursing students studying in various nursing colleges.

Implications of the study

The findings of the study have the following implications in the areas of nursing practice, nursing education, nursing administration, and nursing research.

Nursing practice

The nursing personnel's play a major role in preventing the transmission of various kinds of diseases as well as in the cure of the neonates in the intensive care unit. Hence if they have adequate knowledge regarding infection control measures in the neonatal intensive care unit they can protect themselves as well as the neonates from various infections as well as the death of neonates by following the universal precaution while taking care of the neonates. It is the primary responsibility of the nursing tutors to assess the knowledge and practice of the nursing personnel regarding infection control measures. By a well-planned structured teaching programme we can enhance the knowledge and practice of the nursing personnel regarding infection control measures and thus prevent the spread of the disease.

Nursing Education

Nursing education helps the nursing personnel to acquire adequate knowledge and skills and to fulfill their duties and responsibilities in the nursing field. The awareness of infection control measures should be emphasized to prevent the spread of this disease not only among the health professional but also the general public. Students should have up to date knowledge infection control measures in the neonatal intensive care unit. This can be achieved only through structured teaching programme or through self-instructional health module prepared by the health professionals. All in-service education program should include what is infection, types of infection, causes of infection, hospital-acquired the infection, prevention of infection.

Nursing Administration

Nursing health administration should make the public awareness about prevention of infection among the neonates. In-service education and continuing, nursing education should be initiated for nurses to update the knowledge on infection control measure in a neonatal intensive care unit. More information in the form of booklets, pamphlets, etc should be given to nursing personnel in order to enhance their knowledge and practice.

Nursing Research

In India, only a few research studies have been done on the assessment of knowledge and practice on infection control measures in the intensive neonatal care unit. All nursing personnel must join hands to provide scientifically tested material or programs to evolve a time-bound plan for infection control measures. This study revealed that there is a deficit in knowledge among the nursing personnel's hence the neonates are at a high risk of contracting the disease, so there is a need for extended nursing research on infection control measures.

Conclusion

This research revealed that the nursing personnel had improved their knowledge and practice after administering a structured teaching programme. Since infection control measures play an essential role in the prevention of infection the nurse who work in neonatal intensive care unit to be given continuous training on infection control measures.

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