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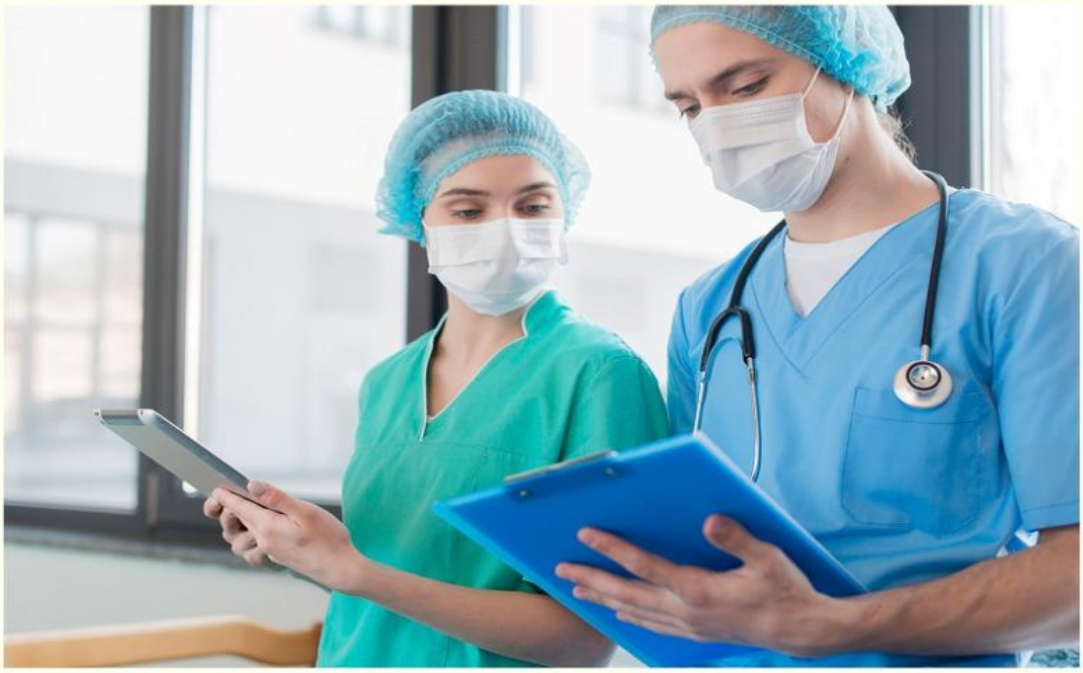

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Evaluating the Impact of a Structured Teaching Programme on Staff Nurses' Knowledge of Nosocomial Infections in Newborns: A Study in Labour and Paediatric Units of Selected Hospitals in Tumkur District

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Abstract

This research aims to assess the effectiveness of a structured teaching program on knowledge regarding nosocomial infections in newborns among staff nurses working in pediatric and labour units of selected hospitals in the Tumkur district. The author conducted a comprehensive literature search on neonatal nosocomial infections and carried out a quasi-experimental study involving 60 staff nurses to thoroughly scrutinize the effectiveness of the structured teaching program. The study also evaluated the level of knowledge regarding nosocomial infections in newborns among staff nurses and determined the association between pre-test knowledge scores on nosocomial infections in newborns and selected baseline characteristics. Analysis was conducted using various tools such as frequency and percentage, mean, standard deviation, paired 't' test, and chi-square test. The results indicated a significant difference with a (paired) 't' value of 23.413 at ($p < 0.001$) levels, revealing a substantial gain in knowledge among staff nurses following the structured teaching program on nosocomial infections in newborns. If the structured teaching program is effectively implemented, it has the potential to enhance the skills of staff nurses in preventing hospital-acquired infections, particularly in newborns.

Keywords: Neonatal nosocomial infection; Effectiveness of structured teaching program on HAI; Prevention and control of HAI.

1. Introduction

Nosocomial infections also referred to as hospital-acquired infections, emerge during or as a consequence of hospitalization, not existing at the patient's admission. This category of infection manifests between 48 hours and four days after admission to a hospital or healthcare facility, and it can be caused by bacteria, viruses, fungi, or parasites. These microorganisms may originate from the patient's body, the environment, contaminated hospital equipment, healthcare workers, or other patients.

Neonates in hospitals face a significant risk of nosocomial infections, contributing to neonatal morbidity and mortality. The extensive use of medical devices, antimicrobial drugs, and an immature immune system heightens the susceptibility of newborns to these infections. According to the World Health Organization (WHO), approximately 5 million neonatal deaths occur annually, with 98% transpiring in developing countries. Out of these deaths, 1.6 million are attributed to neonatal infections, a substantial portion of which are hospital-acquired or healthcare-associated infections (HAI).

Reported incidence rates of nosocomial infections in neonates in India vary from 1.5% to 37%, reflecting non-uniform reporting possibly due to inadequate surveillance and limited studies. Systemic infections accounted for 18.6% of neonatal deaths in the National Perinatal Database (NNPD) for the year 2002-03. India, with 20% of the world's annual newborns and 30% of neonatal deaths, faces a considerable burden of neonatal nosocomial infections, with sepsis alone constituting 61.5% of systemic infections. The Center for Disease Control and Prevention's National Nosocomial Infections Surveillance (NNIS) system found that 89% of infants with perinatally acquired infections displayed symptoms within the first 48 hours of life. In developing countries like India, the NNIS system reports a nosocomial infection rate of 14.1% per 1000 patient days.

Nosocomial infections encompass various types, including bloodstream infections, ventilator-acquired pneumonia, urinary tract infections, meningitis, secondary skin infections, abscesses, and eye, ear, nose, or throat infections. The causative organisms can be bacterial, viral, or fungal. Surgical wound infections, respiratory infections, genitourinary infections, and gastrointestinal infections are among the most common types. Nosocomial infections often involve drug-resistant organisms due to the frequent use of antimicrobials, leading to the emergence of multi-drug-resistant strains.

The risk of nosocomial infections in neonates is influenced by factors such as the severity of illness, prematurity, congenital defects, systemic diseases, invasive monitoring, unscientific antibiotic use, lapses in sterilization, disinfection techniques, and the nature of diagnostic procedures. These infections result from breaches in infection control practices, non-sterile environments, and unclean surfaces. Nurses, as essential members of the healthcare team, play a crucial role in preventing nosocomial infections through adherence to preventive measures and infection control protocols.

Nurses, being at the forefront of patient care, must be knowledgeable about infection control practices and specific

guidelines. Adequate and well-trained nursing staff are imperative for effective infection control. Continuous education programs, along with periodic evaluations of knowledge and practices, are vital for reducing nosocomial infections. During clinical experiences in pediatric units, observations revealed a lack of knowledge and skills among staff nurses regarding nosocomial infection prevention. This study aims to assess and enhance the knowledge and practices of staff nurses in preventing nosocomial infections in newborns.

2. Related Work

Several studies have delved into the realm of nosocomial infections, shedding light on the knowledge, practices, and challenges faced by healthcare professionals. A notable contribution comes from Agarwal M and Thomas P. (2003), who examined the knowledge and practices of prevention of hospital-acquired infections among trained nurses in surgical wards. Findings indicated that 98% of nurses were aware of nosocomial infections, yet only 78% practiced preventive measures. Hindrances included poor working environments (26%), inadequate knowledge (10%), and a lack of resources (58%), emphasizing the gap between awareness and effective implementation.

Arslan U, et al. (2009) conducted a comprehensive study on nosocomial infections in a Dutch Neonatal Intensive Care Unit, revealing that bloodstream infections (14.9/1000 patient-days) and pneumonia (7.5/1000 patient-days) were prevalent. Coagulase-negative staphylococci were identified as the cause in 59% of bloodstream infections, showcasing the significance of understanding specific pathogens.

Chia-Jung WW, et al. (2009) undertook a quasi-experimental study focusing on nursing students, evaluating the effectiveness of an educational program in enhancing knowledge and practice of infection control precautions. The intervention group exhibited significant improvement in knowledge ($F(2, 180) = 13.53$, $P < 0.001$) and confidence in handling infection-related issues, emphasizing the positive impact of targeted education.

Couto RC, et al. (2007) conducted a 10-year prospective surveillance of nosocomial infections in neonatal care units, revealing primary bloodstream infections (45.9%) as the most frequent, followed by conjunctivitis (12.1%), skin infections (9.6%), and pneumonia (6.8%). This study provides valuable insights into the prevalence of different nosocomial infections in neonatal care settings.

Jyoti Bala (2007) investigated the knowledge and practices of staff nurses regarding infection control in the MCH area of a selected hospital in Ludhiana, Punjab. Results indicated that a significant portion of staff nurses had adequate knowledge (56.66%), but unsatisfactory practices (61.66%) prevailed, emphasizing the need for targeted interventions.

Mireya UA, et al. (2007) explored nosocomial infections in the neonatal intensive care unit of a university hospital in Barcelona. The study identified a high incidence rate (74.3 infections per 100 admissions) and highlighted bacteremia as the most frequent episode, with Gram-positive bacteria comprising 72.7% of isolates.

Pawa AK et al. (1997) focused on the nosocomial infection profile and risk factors at the neonatal unit of Maulana Azad Medical College and Hospital in New Delhi. The study unveiled a multidrug-resistant 'Klebsiella species as a common culprit, underlining the importance of understanding specific pathogens and associated risk factors.

Rubina (2001) conducted a comparative study to assess the knowledge of nosocomial infections in student nurses at Mangalore, revealing significant variations in scores between students and staff nurses. This underscores the importance of ongoing education and knowledge transfer.

Saini R, Kaur N (2009) performed a descriptive study to assess the knowledge and practice of staff nurses regarding the prevention of nosocomial infections. The findings indicated a high mean knowledge score but an average mean practice score, emphasizing the need for targeted interventions to bridge the gap between knowledge and implementation.

Suchitra JB and Lakshmi Devi N (2006) delved into the impact of education on knowledge, attitudes, and practices among various categories of healthcare workers on nosocomial infections. The results advocated for continuous education as a means to enhance retention of knowledge, attitudes, and practices across all healthcare categories, thereby contributing to the reduction of nosocomial infections.

3. Research Methodology

The research methodology employed a structured approach to evaluate the knowledge of staff nurses regarding nosocomial infections in newborns through a quasi-experimental design. Here is an overview of the key components of the research methodology:

Study Instruments: The respondents were provided with a structured questionnaire containing eight items related to demographic variables and forty-six items covering aspects such as the meaning, causes, spread, prevention, and complications of nosocomial infections in newborns. Each correct response was scored as one mark.

Objectives of the Study: The primary objective was to assess the effectiveness of a structured teaching program on knowledge concerning nosocomial infections in newborns among staff nurses. Additional objectives included evaluating the overall level of knowledge among staff nurses and determining any associations between pre-test knowledge scores and selected baseline characteristics.

Scope of the Study: The research primarily focused on the impact of a structured teaching program on staff nurses' knowledge of nosocomial infections in newborns. Additionally, the study delved into the identification and analysis of various factors influencing nosocomial infections among newborns.

Limitations of the Study: The study had limitations, including a sample size restricted to sixty staff nurses in the labour and pediatric units of selected hospitals in the Tumkur district. The study specifically targeted qualified and registered nurses, and the duration was limited to six weeks.

Problem Statement: The research addressed the effectiveness of a structured teaching program on knowledge related to neonatal nosocomial infections among staff nurses working in labour and pediatric units of selected hospitals in the Tumkur district. It followed a quasi-experimental approach to assess the impact of the intervention.

Research Approach: An explorative approach was employed, allowing for an in-depth investigation into the effectiveness of the structured teaching program and its influence on staff nurses' knowledge regarding nosocomial infections in newborns.

Research Design: The research design adopted was quasi-experimental, specifically a one-group pre-test and post-test design. This design aimed to evaluate the effectiveness of the structured teaching program on staff nurses working in pediatric and labour units of selected hospitals in the Tumkur district.

Setting of the Study: The study was conducted at selected hospitals in Tumkur District where staff nurses in pediatric and labour units were involved in the research.

Variables:

Independent Variable: The independent variable was the structured teaching program on nosocomial infections in newborns.

Dependent Variable: The dependent variable was the knowledge of staff nurses regarding nosocomial infection in newborns.

Demographic Variables: Demographic variables included age, gender, profession, total years of experience, area of experience, and previous exposure to neonatal nosocomial infection information sessions.

Population: The population under consideration comprised sixty staff nurses working in pediatric and labour units of selected hospitals in the Tumkur district.

Sampling Technique: Convenient sampling was utilized for data collection, allowing for a practical selection of samples based on availability and willingness to participate.

Sampling Size: Sixty staff nurses were included in the study, representing the targeted population in the pediatric and labour units of selected hospitals in the Tumkur district.

Sampling Criteria: Inclusion criteria involved registered staff nurses willing to participate, working in the specified units and available during data collection. Exclusion criteria included those not available during data collection, who attended educational programs on neonatal nosocomial infections within the past 6 months, and those unwilling to participate.

Conceptual Framework: Ernestine Wiedenbach's "The Helping Art of Clinical Nursing" served as the conceptual framework, providing a systematic approach to guide the study. This prescriptive theory was chosen for its relevance in conceptualizing desired situations and the means to achieve them.

Content Validity of the Tool: The tool's content validity was confirmed through consultation with nine experts, resulting in a content validity index of 0.85.

Testing the Reliability of the Tool: Reliability was established using the test-retest method, with a calculated coefficient of 0.80, indicating high reliability.

Administration of Pre-test: Prior permission from hospital authorities was obtained, and informed consent was secured from participants before conducting the pre-test.

Structured Teaching Program: A forty-five-minute teaching program was delivered, covering aspects such as the introduction to nosocomial infections, causes, risk factors, etiology, mode of transmission, common types, prevention, and precautions.

Data Analysis: Data analysis involved both descriptive and inferential statistics. The data were organized, and subjects' characteristics were presented in terms of frequency and percentage. Mean, standard deviation and mean percentage of

knowledge scores were used to evaluate the effectiveness of the structured teaching program. The association between knowledge scores and selected baseline characteristics was analyzed using paired 't' tests and Fisher's exact test or chi-square test.

This comprehensive research methodology ensured a systematic and rigorous investigation into the effectiveness of the structured teaching program on staff nurses' knowledge regarding nosocomial infections in newborns.

4. Analysis and Interpretation of Data

The analysis and interpretation of data in this study are rooted in the knowledge assessment of staff nurses in pediatric and labour units. Employing a one-group pre-test and post-test quasi-experimental design, the structured teaching program's effectiveness was evaluated. Data were collected both before and after the program, then organized, tabulated, and analyzed using descriptive and inferential statistics.

The majority of respondents (78.33%) were female staff nurses, with varying age and experience levels. About 60% had previous knowledge of nosocomial infections, primarily acquired through awareness programs (53.33%).

The pre-test showed varying levels of knowledge, with 6.67% having poor knowledge, 40% with average, and 53.33% with good knowledge. In the post-test, 65% achieved very good knowledge, 33.33% had good knowledge, and none had poor knowledge.

Area-wise mean percentage of knowledge score revealed significant improvements post-structured teaching. For instance, in the area of nosocomial infections, the mean percentage increased from 54.07% in the pre-test to 91.11% in the post-test.

The paired 't' test value was -23.413 at df= 89, significant at 0.001 levels, indicating a significant increase in knowledge scores from pre-test to post-test.

Table 5 illustrates the associations of demographic variables with pre-test knowledge levels. Age and previous knowledge show significant associations, while gender and year of experience do not.

5. Nursing Implications

The findings bear implications for nursing practice, administration, education, and research:

Nursing Practice:

Nurses play a crucial role in disease prevention and health promotion.

Health information can be disseminated through various channels like mass media, lectures, and structured teaching programs.

Results suggest the need for nurses to update their knowledge, focusing on the causes, spread, prevention, and complications of nosocomial infections.

Nursing Education:

Nurse educators can use the structured teaching program to orient recruits, enhancing their knowledge.

Such programs should be included in the nursing curriculum's introductory sections, providing foundational knowledge on infection control.

Nursing Administration:

Hospitals should consider including induction classes for newly joined staff nurses, and incorporating structured teaching programs into in-service and continuing nursing education.

Nursing Research:

The study contributes to understanding nurses' knowledge levels in Hospital-Acquired Infections (HAI).

The developed tool can be tested in various settings for further research.

6. Conclusion

This research demonstrates the effectiveness of a structured teaching program on staff nurses' knowledge of nosocomial infections in newborns. The study reveals significant improvements in knowledge levels post-program, highlighting the importance of ongoing education for nurses. The findings emphasize the need for targeted interventions in nursing practice, education, and administration to enhance infection control knowledge among staff nurses.

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