

The Effect of Training Program on Nurses Competencies regarding Prevention / Control of Neonatal Sepsis in Selected Governmental Hospitals, North Kurdufan State - Sudan, 2023

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Abstract: *Background:* Neonatal septicemia is responsible for deaths of more than half percent cases annually around the globe. Nurses represent the cornerstone in maintaining and saving the lives of the neonates. Educating nurses on sepsis is crucial to enhancing the safety and delivery of basic newborn care, because nurses have the power to impact a neonate's prognosis. *Aims:* This study aims to evaluate the effectiveness of educational program on nurses' knowledge regarding prevention and control of neonatal sepsis, to determine the practice of nurses regarding neonatal sepsis in pre and post the training program as well as to correlate the outcomes of the educational program with selected demographic variables. *Methods:* This is a quasi - experimental interventional study was conducted on ninety nurses recruited through convenience sampling. Data was obtained using a questionnaire and observational checklists. SPSS version 26 was used to analyze the data and ANOVA test. Comparisons of knowledge and performance in nurses with different educations in pre and post intervention were examined through person correlation test. Correlate between knowledge and practice scores with education level both pre and post educational sessions were examined in bivariate regression. *Results:* 90 nurses were recruited to this study, 93.3% of them are female around 50% of them were had above ten years' experience. Study revealed 93.3%, 92.2%, 90% of nurses had good knowledge about umbilical care, indication and duration of hand washing and incubator care respectively after application of the program. Post implementation of the training program the practice of nurses was improved up to 95.6%, 96.7%, 100% regard hand hygiene, umbilical stump and incubator care respectively. On the other hand, the overall mean of nurses' knowledge and practice scores improved strongly after the educational program compared to the pre - education, and the regression reached the highest peak ($R - \text{Square } 1.000$). *Conclusion:* The current study reflected that the educational program was effective in increasing knowledge and improving performance of nurses. There is significant relationship between level of education and knowledge and practice after educational program with ($R - \text{square } 0.8$)

Keywords: neonatal sepsis, nurses, educational training, knowledge and practice

1. Introduction

The highest rate of mortality in humans is still neonatal mortality (NM), of which 50–60% occur within the first week of life and are linked to preventable causes. According to World Health Organization data, 7.3 million newborn deaths occur each year, with 300, 000 of those occurring in advanced countries. The remaining 7 million deaths occur in nations with greater poverty. (Mekonnen, et al 2018). Treatment of neonatal sepsis is difficult; therefore, the focus should be on prevention. (Patro, P., et al 2016). Neonates are at high risk of sepsis, however data on neonatal sepsis incidence is scarce. Newborns are particularly sensitive to sepsis, and incidence numbers for this age differ are unavailable in many countries. (Fleischmann et al., 2021) Neonatal infection vulnerability due to physiologic immaturity, environmental, and human factors. Infection prevention, and control are critical cornerstones in health care, it may be more economical if the focuses on effective infection control measures to deal with changing infection patterns and limit antibiotic use. All health care personnel must have a basic awareness of infectious microorganisms/control and evidence - based practice. (Ahmed A. et al 2020). According to the world health

organization (WHO, 2020) around 84% of neonatal deaths could be prevented through early recognition, diagnosis, and accurate management. Effective training for nurses can detect the clinical signs of newborn sepsis, which helps to emphasize the need of early diagnosis and prompt care. (Das, S. R., et al, 2020). Based on the last global report on the epidemiology and burden of sepsis, severe infections, including neonatal sepsis, signify a big cause of neonatal mortality and long - term morbidity (WHO, 2020). Every year, 7.3 million infants die, lower - and middle - income nations account for almost 99% of newborn mortality, the remaining 1% of deaths happened in resource - rich countries. Researchers, administrators, and other major players neglected to pay enough attention to death in these countries. Actually, a large number of them occur at home and are frequently unrecorded, especially in African countries (Amare D, et al, 2019).

2. Problem Statement

In Sudan, the prevalence of neonatal sepsis was 17.5% (Ahmed, et al.2020). According, the results of study conducted by Fadul et al 2022 in North Kurdufan state they found neonatal sepsis is the second leading cause of deaths

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in newborn admitted to Neonatal Intensive Care Unit (NICU).

Justification

Newborn sepsis as an urgent globally health issue, with low - and middle - income countries (Popescu, et - al 2020) The International Confederation of Midwives (ICM) suggested enhancing nurse and midwife education and training, ongoing staff development, and policies to raise the standard of care for women and newborns. (Fullertone et al., 2011). Moreover, according to WHO guidelines 2020 must be adopted in order to increase funding for nurse’s education and training.

3. Material & Method

Study Design: A Quasi - experimental pre - posttest cross sectional hospital was adopted to study the effect of training program regarding infection prevention and control of neonatal sepsis in governmental hospitals.

Study Area/ Setting: The research was conducted in North Kordofan State, which is located in western Sudan and has an estimated area of 190840 square kilometers and a population of around 2920992 million people. It is 414 kilometers from the capital city of Khartoum. The study was mainly carried out in the teaching hospitals in Elobied, Bara, and Umrwabah.

Inclusion and Exclusion criteria: Nurses with at least one year of experience who are available during data collection and willing to participate in the study. Nurses working on a part - time basis and internship students were excluded.

Data Collection Tools: Data were collected by using two tools; Self - administered questionnaire and observational checklists.

Ethical Consideration

Permission was taken from IRB. University of Bahri, the research ethical committee at the Ministry of Health in the North Kordofan State as well as the agreement from Elobied pediatric and maternal hospitals, Bara and Umrwabah hospitals. The researcher introduced herself to the nurses who fulfilled the criteria for inclusion. The goal of the study was explained to them, and they were informed that they had the right to refuse, enroll, or discontinue without punishment. The researcher obtained informed consent from each participant. By not having respondents' names signed on the questionnaire forms, confidentiality was maintained. This was done to ensure that responders could freely answer all questions. Their agreement was used for collecting samples.

4. Result

A total of 90 nurses who were working in obstetric and pediatric care units at selected teaching hospitals were recruited in this study. 87 (96.7%) of them females. Regarding the level of their education, 83 (92.3%) nurses have a diploma, and only 7 (7.7%) of them have a bachelor's degree. The majority of the nurses ranged in age from 30 to

39 years old. (figure 1). 37.8 % of nurses their experience was more than 10 years (figure 2). The majority of nurses (86.7%, 88.9%, 85.6%) had a good understanding of the nurses - patient ratio, the advantages of breastfeeding, and shearing of equipment, compared to the previous educational sessions, when the results were determined to be 16%, 16%, 12%. The study revealed that nurses gained knowledge about common complications of newborn sepsis (50%) compared to prior education only (3%). According to study, the majority of nurses (88.9%) had sufficient knowledge about medical management, as shown in Figure 3. The study clarified that all most of nurses (95%) were good knowledge about NICU design and policy (figure 4). The majority nurses' awareness of hand hygiene changed from poor to good after the intervention, with significant (P value 0.01). In terms of umbilical cord care, most of nurses (93.3%) had good understanding of the signs of cord infection, and nearly (50 %) of nurses had good knowledge of the substances used in umbilical cord management. The study demonstrates a significant relationship between the educational level of nurses and their knowledge and practice regard newborn sepsis, with an influence of educational level on dependent variables is (R - Square 0.8), 58.5%

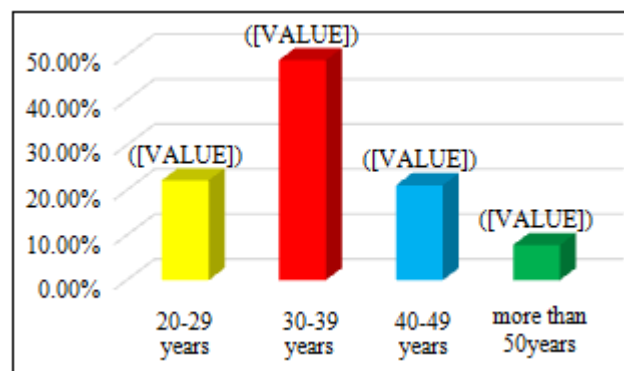


Figure 1: Shows the age distribution of nurses

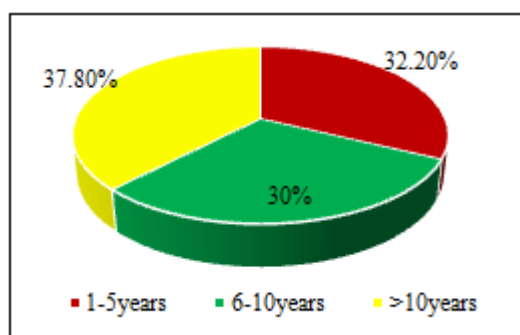


Figure 2: Shows the experience of nurses

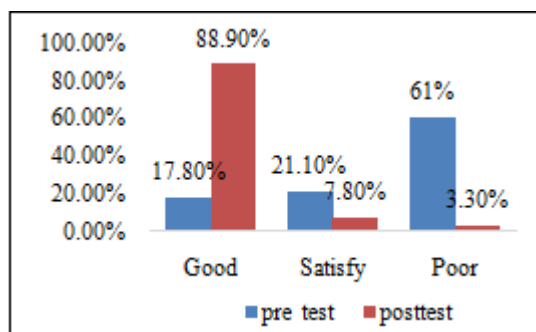


Figure 3: Knowledge of nurses about medical management

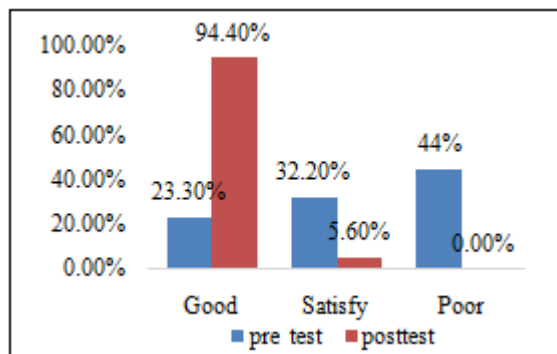


Figure 4: Knowledge of nurses about NICU design and policy

5. Discussion

Sepsis responsible for up to one - third of all neonatal deaths globally each year, particularly in low - and middle - income countries (Popescu et al., 2020), management of neonatal sepsis is complicated because clinical indications are nonspecific and there are no definitive diagnostic tests, nurses are playing critical role in preventing and saving the lives of newborns by providing basic newborn care and controlling the spread of sepsis through the application of specific infection control measures. The ultimate goal of this study is to evaluate the effectiveness of an educational program on nurses regarding the prevention and control of neonatal sepsis. The study found the majority of nurses had a diploma degree and more than ten years of experience, but only 7.7 of them have a bachelor's degree. A three - year nursing education degree program at the Health Science Academy is insufficient to prepare nurses to deal with newborn sepsis. While the small number of bachelor's nurses may be linked to frequent immigration of bachelor nurses, low salaries in the government sector, and a lack of job opportunities. Most nurses working in developing countries, particularly in Eastern Africa, hold a diploma in nursing. This is in agreement with the findings of a study conducted in three East African countries by Ndirangu et al., 2021, they discovered that the majority of nurses had a diploma. According to Mohamed et al.2022, 68.8% of nurses have less than five years of experience. Which contradicts the study's results. The majority of the nurses ranged in age from 30 to 39 years old. Nurses that work in pediatric units should be young, as they must put in a lot of effort and face the burdens and difficulties of their jobs for long periods of time. In regard to neonatal sepsis risk factors, the majority of nurses' knowledge was improved after the educational program, which is evident from the (p value 0.035). When nurses are equipped with risky babies they can be alert to provide care with proper handling. In regards to diagnosis of neonatal sepsis, the study revealed that most (96.6%) of nurses had a good or satisfactory knowledge about clinical signs after application of the educational program. Whenever nurses are able to recognize the clinical features of neonatal sepsis, it can be helpful in early intervention and management, this finding is in line with the results of a study conducted by Hewamalage et al., 2019 in Sri Lanka, which found most (98.7%) of nurses had expertise in the signs and symptoms of newborn sepsis. In the context of neonatal sepsis complications, more than one - third of nurses became knowledgeable after implementing an educational program,

with significant is (p. valve 0.01), it means that nurses improve their understanding of complications so as to give priority to this problem while dealing with neonatal septicemia. Based on newborn sepsis management the results showed that most of nurses had good knowledge post educational program in comparison to pre education. Which means that early newborn care and family education on the recognition of maternal risk factors of sepsis by trained health care providers can help in reducing the incidence of newborn sepsis. This finding was supported by a study conducted by Arba et al.2020 in Wolaita Zone Ethiopia's, they discovered healthy pregnancy and prompt medical care can reduce newborn mortality 50%, and continuing delivery of neonatal care can prevent 75% of newborn deaths at this time. Regarding hand washing, the all most of nurses' awareness was changed from bad to good in the post intervention compared to pre - intervention. The most effective way to minimize infection transmission among neonates is to adhere with meticulous hand hygiene. in regard to umbilical cord care, the all most of study nurses had good knowledge about signs of cord infection, nearly 50% of nurses had a good knowledge on the substances used to manage the umbilical cord following intervention. Which indicating that nurses still require more up - to - date information on the management of umbilical cord substances. The findings in the context of incubator care revealed that most (90%) nurses have increased their knowledge after training program compared to before was (25.6%), incubators are the main reservoirs for the growth of microorganisms, inadequate care contributes to the spread of neonatal sepsis. This result is augmented by the results of Washeel, 2023 who discovered that nurses' awareness of incubator care improved from 16% to 86% after training. Regarding the data obtained from nurses through observational checklists, the researcher focuses on the practice of hand hygiene, personal protective equipment, umbilical cord and incubator care, the study showed clear improvement in nurses' performances in practicing after demonstration sessions with significant (p value 0.01). This is important finding in the study, highlighting the need for more education courses in hand hygiene and umbilical cord care, as they are considered to be the most critical steps in the prevention of newborn sepsis. finally, the overall mean of nurses' knowledge was satisfactory (53.03), significantly greater than before the intervention (28.15), whereas the overall mean of nurses' practice had improved significantly (P - value 0.001) after the training session, changing from a poor to good score. This outcome is consistent with a research done in 2020 by Arba et al. in Ethiopia, they discovered 57.9% of nurses had good knowledge of essential newborn care.

6. Conclusion

Continues education of nurses has direct impacts on newborn care as well as increasing nurse knowledge and improve nursing practice are essential to enhance the high quality of neonatal care. Inadequate hand hygiene by health staff was seen to be a major behavioral factor that exposes babies to sepsis in the hospitals. It is necessary for nurses to adhere to aseptic protocols. The most common factors hinder nurses to reduce neonatal sepsis prevalence are lack of resources such as disinfectants, hand washing sinks, water

supply, poor environment and understaffing as well as lack of continues education and poor infrastructure.

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