

A Study to Assess the Effectiveness of STP Regarding Protocol on Standard Precautions for the Prevention of Infection in Terms of Knowledge and Practice among Staff Nurses, Karad

Alpana Sagare¹, Sunita Tata², Simi Elsa Philip³, Sangeeta Deodhar⁴

¹ Nursing Supervisor, KH, Karad, Maharashtra, India

² Nursing Director, K.I.M.S. & KH,D.U. Karad, Maharashtra, India

³ Msc Staff Nurse, KH, Karad, Maharashtra, India

⁴ Nursing Supervisor, KH, Karad, Maharashtra, India

Abstract: ***Introduction:** Standard precautions are meant to reduce the risk of transmission of blood borne and other pathogens from both recognized and unrecognized. **Objective:** To assess the existing level of knowledge and practices to determine the effectiveness of structured teaching programme on the effectiveness of protocol on standard precautions for the prevention of infection among NICU staff nurses. **Methodology:** Evaluative approach with Quasi experimental one group pre test –post test design was used. 30 sample was selected with simple random sampling technique, who are working in NICU of Tertiary Care Hospital, Karad. A pre-test related to Protocol on standard precaution was followed by an structured teaching programme for the duration of 45 minutes. Post-tests using the same questionnaire were conducted after 7 days. **Result:** The study results showed that there was a significant improvement in nurses knowledge and practices towards standard precautions of infection after the intervention at the level of $P < 0.02$. **Conclusion:** This study shows that infection control knowledge among nurses is fairly good, but a wide range of improvements are needed.*

Keywords: Effectiveness, standard precautions, prevention, infection staff nurses

1. Introduction

The National Nosocomial Infection Surveillance System (NNIS) reports a rate of 14.1 nosocomial infections per 1000 patient days. The risk of nosocomial infection in neonates is the direct consequence of the severity of illness, prematurity, congenital defects, systemic diseases, level of invasive monitoring, indiscriminate use of antibiotics, lapses in sterilization and disinfection techniques and the nature of diagnostic procedures. Nosocomial infection is thus any infection causing illness that was not present, or in its incubation period, during the time of admission and includes those infections, which occur after 48 hours of admission to the hospital. These infections are a significant hazard in health care facilities, exacting a tremendous toll and causing increased morbidity, mortality and increased length of hospital stay and health care costs⁽¹⁾.

Nosocomial infections are one of the major causes of morbidity in the Newborn Intensive Care Unit (NICU). Known risk factors include birth weight, gestational age, severity of illness and its related length of stay, and instrumentation. Infections result in prolonged hospital stays and, consequently, increased hospital costs. As advances in medical technology improve mortality in the tiniest of infants, it is imperative that health care providers identify effective interventions to minimize the risks of nosocomial infections in the NICU⁽²⁾.

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patient days. The risk of nosocomial infection in neonates is the direct consequence of the severity of illness, prematurity, congenital defects, systemic diseases, level of invasive monitoring, indiscriminate use of antibiotics, lapses in sterilization and disinfection techniques and the nature of diagnostic procedures. The profile of these infections has kept changing, the past few decades showing emergence of ESBL producers and MRSA.⁽³⁾

The population of extremely low-birth weight (ELBW) infants who remain hospitalized for extended periods of time (and who undergo numerous invasive procedures) is most susceptible to nosocomial infections. Nosocomial infections are defined as those that occur beyond 48 hours after birth and are caused by pathogens that are not maternally derived. Such infections are 100 times more common than early-onset bacterial infections, which are caused by pathogens acquired in utero or perinatally. Recent data from the National Institute of Child Health and Human Development-sponsored "Neonatal Network" indicated that 29% of infants born at 25 to 28 weeks' gestation and 46% of infants born at less than 25 weeks' gestation experience a serious nosocomial infection during hospitalization in the NICU⁽⁴⁾.

Nosocomial infections may not only be related to the patient's primary disease process, but also directly related to actions of health care workers.^[3,4,7] The first national point-prevalence survey of nosocomial infections in US NICUs showed that the prevalent use of therapeutic interventions, not only emphasized the intensity of care required by the population, but also was associated with infections. The

most common intervention associated with infection was the use of central intravascular catheters. It might be debated that nosocomial infections in the NICU environment are unpreventable in attempts to keep the smallest and sickest of babies alive. Some believe that nosocomial infections may be unavoidable even under the most optimal infection control measures. With the prevalence of infections in the most vulnerable patients, there is an urgent need for more effective prevention interventions. As there is limited control over birth weight, we must look to unit culture, environment, and procedures to reduce the risk for infections in the NICU.⁽²⁾

Standard precautions are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents. The term standard precautions is replacing 'universal precautions' as it expands the coverage of universal precautions by recognizing that any body fluid may contain contagious and harmful microorganisms. Standard precautions include hand hygiene, use of appropriate personal protective equipment (PPE), use of aseptic technique to reduce patient exposure to microorganisms and management of sharps, blood spills, linen, and waste to maintain a safe environment⁵The present study was undertaken to determine the effectiveness STP regarding protocol on standard precaution for the prevention of infection in terms of knowledge and practice among NICU Staff nurses.

A number of factors may influence adherence to infection control. A healthcare worker was more likely to be compliant if he/she had more experience on the job, was more knowledgeable about transmission of blood-borne pathogens and was strongly committed to a positive occupational safety climate A descriptive exploratory study conducted in Botswana amongst emergency department nurses identified resource constraints such as the lack of the necessary facilities, inadequate equipment and materials, inadequate staffing and the lack of sustainable in-service education as factors that could prevent them from complying with infection control measures⁶

Several studies conducted amongst doctors and nurses in Ethiopia, Nigeria, Thailand and Uganda concluded that the knowledge, understanding and interpretation of infection control measures are not adequate. This as a result adversely affected the implementation of the measures Although knowledge of standard precautions of infection control may improve adherence to the measures, other influencing factors which this study was not able to investigate such as attitude are equally important⁶ and Clinical Researcher herself is a NICU supervisor and observes the practice of aseptic techniques among junior staff nurses day to day and finds it is not up to the mark and there is need to refresh the knowledge and practices. So the investigator has chosen this study to find out the effectiveness of STP regarding protocol on standard precautions for the prevention of infection in terms of knowledge and practice among staff nurses.

2. Review of Literature

1) Namrata Dhanorkar, Shaila Mathew (2016)

Study to assess the existing knowledge and selected practices regarding Infection Control Measures among NICU staffs in selected hospitals of Sangli Miraj Kupwad Corporation area. The study adopted 'IdaJean Orlando nursing process' as the theoretical base for framework of the study. A self structured questionnaire and observation checklist was used. A non experimental exploratory study enrolling 60 NICU staffs was conducted during August and September 2013. Non probability purposive sampling technique was adopted. Result was found that majority of the staffs 56.7% were having good knowledge score, 38.3% were having excellent knowledge score. In assessment of hand hygiene technique it showed that that 51.7% had good hand hygiene practice, 45% were having average practices. It was found that 100% of samples used sterilized articles; only 55% washed their hands after entering the unit, 30% washed hands before handling the baby, and 55 % washed hands after handling the baby. It was found that there is significant association between designation and selected practice score as the Fishers exact value is 0.006 which is less than 0.0.⁽⁷⁾

2) Imad F, Ahmad A , Mahdiah .K, Safaa .H, Imad .T (2016)

The study aimed to assess the level of the compliance of standard precautions among the midwives and nurses in the Palestinian Hospitals. A cross sectional study was conducted from May to June 2015 on 81 midwives and nurses from Palestinian hospitals. The data were collected from labor rooms and Post partum departments of Palestinian hospitals .Data were collected using pretested questionnaire on 81 midwives and nurses selected by convenience sample .The current study showed that The average of standard precautions knowledge level and compliance are 74.6% and 83.8% respectively. There are an association between age, education, work experience, and compliance with standard precautions at $p < 0.05$ (0.000, 0.031, and 0.043) respectively. At the same time no significant association between training Courses and compliance to standard precaution at $p < 0.05$ (0.191).⁽⁸⁾

3) Hamed S, Abbas B , Nosratollah M , Ebrahim E (2016)

This descriptive study was conducted on 170 nurses worked in medical surgical wards, pediatric wards, dialysis units of two teaching hospitals in Zabol city, Iran, in 2014. The sample population was selected through simple random sampling. The data collection instrument is composed of a researcher-made questionnaire titled "Hospital-acquired infection Control" based on precautions posited by the World Health Organization (WHO) and the United States Centers for Disease Control and Prevention (CDC).. The results show that 43% of the participants in this study had poor knowledge, 42% had average practice, and 37% had a moderate attitude about hospital infection. There was a significant relationship between knowledge and gender ($r = 00.8$ $p = 0.02$). However, the variables of age, marital status, employment, work experience, education, and place of work did not establish a significant relationship with the independent variables ($p > 0.05$)⁽⁹⁾

3. Research Methodology

Research approach and design : Evaluative approach with Quasi experimental one group pre-test-post-test design was used

Study setting: The study has been conducted in the Neonatal intensive care unit (NICU) of tertiary care hospital Karad.

Population: The population under study is staff nurses working in NICU unit, tertiary care hospital, Karad

Sample and Sampling Technique

The sample consisted of 30 staff nurses working in NICU of tertiary care hospital ,Karad . The subjects were selected using simple random sampling technique

4.1 Description of Tool

A self reported questionnaire on knowledge and practices assessment regarding the effectiveness of protocol on standard precautions for the prevention of infection in terms of knowledge and practice among NICU Nurses were prepared. It comprises of three sections.

Section A: Demographic sheet

It has 5 items pertaining to demographic information of Nurses including age, religion, marital status, educational qualification and year of work experience.

Section- B: Questionnaires regarding knowledge on protocol of standard precautions for the prevention of infection

It has 10 items in which questions related to Knowledge on protocol of standard precautions for the prevention of infection were included. Right answer was given score '1' and wrong '0'. So the total score of knowledge on organ donation ranged between 0 – 10

Section C: Questionnaires on practices on protocol of standard precautions for the prevention of infection

It has 15 items in which questions measures practices on protocol of standard precautions for the prevention of infection were included. Right answer was given score '1' and wrong '0'. So the total score of practices ranged between 0 – 15

4.2 Method of Data Collection

In total of 30 Nursing staff who were working in NICU of tertiary Care hospital, Karad in 2017 were simple randomly selected. The methods and aims of the study were explained to them and ensured them that the individual information will be kept confidential and after they signed consent forms.

Inclusion criteria

Staff nurses who are:

- Working in NICU at tertiary care Hospital ,Karad
- Willing to participate in the study
- Not undergone similar specific training in the past

Exclusion criteria

- Staff nurses who are absent during data collection

4.3 Development of Tool

After obtaining administrative permission from the Krishna Institute of Medical Sciences Deemed to be University Karad. Data was collected from study participants using a self-administered questionnaire distributed as hard copy. The Subject will be identified according to the inclusion and exclusion criteria, by simple random sampling technique the researcher made attempts to reach all 30 NICU staff Nurses at their duty posts, explained the purpose of the study to those who could be reached and obtained consent for the questionnaire to be filled anonymously and returned within 30 minutes. The responses of study participants were treated confidentially. Pre-test was conducted on all nurses followed by structured teaching programme for 45 minutes and also clarified their doubts. After 7 days post-test was given with same questionnaires and data analyzed .The study conducted quasi experimental one group pre-test-post-test design.

The questionnaire comprised three categories of questions: (1) demographic data (2) knowledge questionnaires on standard precautions (3) practices questionnaires on standard precautions.

4. Results

Section – I

This section deals with demographic details of subjects under study. . A total of 30 eligible subjects returned the pre and post test questionnaire.

Table 1: Demographic Data of participants Presented in terms of Frequency and Percentage

Demographic Variables	Frequency	Percentage
Age		
20-25	15	50
Above 26	15	50
Religion		
Hindu	25	83
Other	5	17
Marrial Status		
Married	14	47
Unmarried	16	53
Education		
R.GNM	21	70
BSC/P.BSC	9	30
Experience		
< 1Y	10	33
1Y-3Y	11	37
>3Y	9	30

From the table its is revealed that Among 30 , subjects equally distributed 15 (50 %) of them are in the age group of 20-25 years and 15 (50 %) of them are in the age group of above 26 years .Most of the subjects 16(53%) are married and, maximum subjects 25(83 %) of them are belongs to Hindu by religion , most of the subjects 21 (70 %) having educational qualification of R.GNM with maximum subjects 11 (37 %) of them were having 1- 3 years of experience , followed by 10 (33%) having less than

1 year of experience and minimum subjects 9 (30%) were having more than 3 years of experience in NICU

Section II

This section deals with assessment of effectiveness of the structured teaching programme on knowledge and practice on standard precautions for prevention of infection among nurses.

Table 2: Comparison of means and standard deviation between pretest and post test level of knowledge and practices on standard precautions for prevention of infection

N=30						
		N	Minimum	Maximum	Mean	Std. Deviation
Knowledge	Pre total	30	7	10	9.26	0.784
	Post total	30	8	10	9.43	0.817
Practices	Pre total	30	6	13	8.6	1.86
	Post total	30	7	14	10.36	1.62

The comparison of pretest and post test level of knowledge, samples minimum score was 7 and maximum score was 10 as compared with post test, minimum score was 8 and maximum score was 10. The pre test mean score 9.26 with standard deviation of 0.784 and the post test mean score was 9.43 with standard deviation of 0.817 and 't' value is 2.714. The analysis revealed that, the post test level of knowledge is higher than the pretest level of knowledge and is significant at P 0.087

The comparison of pretest and post test level of practices score, in pretest, samples minimum score was 6 and maximum score was 13 as compared with post test, minimum score was 7 and maximum score was 14. The pre test mean score 8.6 with standard deviation of 1.86 and the post test mean score was 10.3 with standard deviation of 1.62. The 't' value was imparted=3.904 and is significant at P <0.002 level. The analysis revealed that, the post test level of practices score is higher than the pretest level of practices score. This indicated that structured teaching programme was effective.

Table 3: Pretest and Post test scores of knowledge on protocol of standard precautions for the prevention of infection, N=30

Knowledge Score		Pre Test		Posttest	
		Frequency	Percentage	Frequency	Percentage
Good	≥10	13	43.3	19	63.3
Average	9	13	43.3	7	23.3
Poor	≤8	4	13.3	4	13.3

From table 3 it revealed that in pretest, 13 (43.3%) subjects scores in range of good ≥10, 13 (43.3%) subjects scores in range of average 9 and 4(13.3%) subjects scores in the range of poor ≤8. And in the post test score, majority of the subjects 19(63.3%) scores in the range of good ≥10, 7 (23.3%) subjects scores in the range of average 9 followed by 4 (13.3%) scores in the range of poor ≤8. This result shows that after structured teaching programme there is significant improvement in the scores of knowledge in the subject and this may be knowledge gained through the structured teaching programme

Table 4: Pretest and post test scores of practices on protocol of standard precautions for the prevention of infection, N=30

Practices Score		Pre Test		Posttest	
		Frequency	Percentage	Frequency	Percentage
Good	≥10	7	23.3	21	70
Average	8-9	13	43.3	8	26.6
Poor	≤7	10	33.3	1	3.3

In this table 4 it is observed that, Pretest teaching 10 (33.3%) subjects scored in the poor of range ≤7, 13 (43.3%) subjects scored in the average range of 8-9 and 7 (23.3%) samples scored in the good range of ≥ 10 comparing the result with posttest scores the data shows that only 1 (3%) subject scored in the poor of range ≤7, 08(26.6%) samples scored in the average range of 8-9 and that 21 (70%) samples scored in the range of ≥10.

Section III: Association of demographic data with pretest and posttest mean score of knowledge and practices

Chi Square test was used to compare categorical variables. The analysis revealed that in the present study no significant association was found between demographic variables such as age, gender, religion, educational qualification and year of experience (p<0.05). Hence we conclude that there is no significant association between the pretest knowledge scores of nurses with demographic variables.

5. Discussion

Nurses are on the front line to answer questions from patients and families when the media report outbreaks of exotic infectious diseases and the development of new super Pathogens associated with health care. The most common infections acquired in the hospital setting and focus on the nurse's role in prevention. There are practice recommendations for nurses that are prominent in delivering safe health care in the modern era.¹ Prevention and control of nosocomial infection are essential parts of nursing care.

Based on findings of the present study, among 30, subjects equally distributed 15 (50%) of them are in the age group of 20-25 years and 15 (50%) of them are in the age group of above 26 years. This findings is similar to findings reported by G. Alrubaiee (2017) where he majority of the Yemeni participating nurses were 25 years old and above (71.8%).⁽¹⁰⁾

Further it was observed that, no significant association was found between the pretest knowledge scores of nurses and demographic variables such as age, gender, religion, educational qualification and year of experience (p<0.05). These was contrary to the findings from H. Sarani(2014), However, the variables of age, marital status, employment, work experience, education, and place of work did not establish a significant relationship with the independent variables (p>0.05)⁽¹¹⁾. As well Ahmad A et al (2015) The study reported no relationship between knowledge or practice regarding infection control and age, years of experience, and training course of the studied group.⁽⁸⁾

Present study revealed the majority of the study group had received hepatitis B vaccine. The findings is consistent with

Ahmad A et al (2015) , both the studies emphasizing the hospitals policies to be vaccinated when employed new nurses to deal with exposure to blood borne pathogens and needle stick.

The current study reveals after implementing a structured teaching plan on protocol on standard precautions for the prevention of infection the findings reveals that there was improvement in most aspects of standard precautions practices in the post intervention from 7 (23.3%) to 21 (70%) these findings was contradict to previous studies by Barbara C.C , Josephene L. (2004) there was improvement in most aspects of hand-washing technique in the post intervention stage. The health care-associated infection rate decreased from 11.3 to 6.2 per 1000 patient-day⁽¹²⁾. Similar findings was also reported by W. Picheansathian were after implementing a hand hygiene promotion programme, compliance with hand hygiene among nursing personnel improved significantly from 6.3% before the programme to 81.2% 7 months after the programme⁽¹³⁾. Based on findings of the studies, it can be concluded that in spite of having good practice level regarding infection control, nurses had fair knowledge level. Updating knowledge and practice of nurses through continuing in-service educational programs; emphasizing the importance of following latest evidence-based practices of infection control in continuing education / training program is important.

In this study, result shows that after structured teaching programme there is significant improvement in the scores of knowledge by 13 (43.3%) to 19 (63.3%) scored in range of good and 13 (43.3%) to 7(23.3%) scored in the range of average . This observation is comparably with the findings of study done by Alin T . C (2017) findings revealed that the mean post-test knowledge level (51.2 %) was higher as compared with the pre-test score (14.10)⁽¹⁴⁾.

This study result was also similar to the findings Ahmad A et al (2015) conducted research on Knowledge & Compliance of Nursing Staff towards Standard Precautions in the Palestinian Hospitals and results shows that the current study revealed that 78 (38.2%) had fair knowledge, and 77(37.8%) had good knowledge of standard precautions. All the results revealed that there was a significant improvement in nurse's knowledge and practices towards standard precautions of infection after the intervention

6. Limitation

The study is limited to staff nurses working in NICU & limited in Number and nurses only.

7. Recommendations

The current study recommends the following:

- Updating knowledge and practice of nurses through continuing in-service educational programs.
- Emphasizing the importance of following latest evidence-based practices of infection control in continuing education / training programs.
- Providing training programs for newly nurses about infection control and at regular intervals.

- A replication of this study using observation checklist should be done to assess the level of practice.

8. Conclusion

Based on the findings of the study, the following conclusions were drawn. This study was conducted in NICU on nursing staffs at a tertiary care hospital to assess their knowledge and perception regarding infection control practices. This study confirms findings that infection control knowledge among nurses is fairly good, but a wide range of improvements is needed. Regular educational programs on infection control, standard and transmission-based precautions and ward-based teaching programs on various care bundles must be included

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Mrs. Alpana Sagare is working as Nursing supervisor with 20 years of experience in Krishna Hospital, Karad, Maharashtra, India

Mrs. Sangeeta Deodhar is working as Nursing supervisor with 27 years of experience in Krishna Hospital, Karad, Maharashtra, India

Author Profile



Dr. Sunita. H. Tata - B.A. (Hon’^s) R.N.R.M, M.Sc.(Child Health Nursing) PhD. (Community health nursing) Associate Professor & Nursing Director, **Having 29 years of clinical, administrative and teaching experience.** In the Krishna Institute of

Medical Sciences & Krishna Hospital Deemed University Karad, Maharashtra, India



Miss. Simi Elsa Philip has done Msc in child health nursing. She is working as Msc staff Nurse in Krishna Hospital, Karad, Maharashtra, India