

# A Study to Evaluate the Effectiveness of Structured Teaching Programme on Knowledge Regarding the Prevention of Nosocomial Infections in Children

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## ABSTRACT

**Aim:** In the present study, data were collected on knowledge regarding preventing Nosocomial infection in children.

**Objectives:** The objective of the study is to identify the knowledge of 3<sup>rd</sup> year G.N.M. students regarding the prevention of nosocomial infections in children and to determine the association between post-test knowledge scores with selected demographic variables.

**Methods:** The research method adopted for this study is the evaluative approach. The research design adopted for this study was a pre-experimental design with one group pretest and post-test design. A simple random technique was used to select the sample for the study. The sample consists of 60 3<sup>rd</sup>-year G.N.M. students of Nursing schools. The instrument used for the data collection is a structured questionnaire. Collected data were analyzed by using descriptive and inferential statistics.

**Results:** The results of the study showed that the pretest overall knowledge score regarding various aspects of prevention of nosocomial infection in children was a mean percentage of 46.86% and SD was 3.51. During the post-test overall knowledge score was 80.53% and SD was 2.98. Hence the difference between pretest and post-test over a knowledge score was 33.67. The results show that the difference between the pretest and post-test knowledge scores for the prevention of nosocomial infection in children is statistically significant

and this difference is due to S.T.P. in the prevention of Nosocomial infection in children.

**The conclusion:** The conclusion was drawn on the basis of the following findings of the study. This study shows that there was a significant improvement in the knowledge of prevention of infections in children among 3<sup>rd</sup> year G.N.M. students as evidenced and post-test knowledge scores.

**Keywords:** Effectiveness, Knowledge, Nosocomial Infections, pre, and post-test

## INTRODUCTION

A hospital-acquired infection is usually one that first appears three days after a patient is admitted to a hospital or other health care facility. Infections acquired in a hospital are also called nosocomial infections. About 5-10% of patients admitted to hospitals in the United States develop a Nosocomial infection. The Centers for Disease Control and Prevention (C.D.C.) estimate that more than two million patients develop hospital-acquired infections in the United States each year. About 90,000 of these patients die as a result of their infections. Hospital-acquired infections usually are related to a procedure or treatment used to diagnose or treat the patient's illness or injury. About 25% of these infections can be prevented by

healthcare workers taking proper precautions when caring for patients[1]

Hospital-acquired infections can be caused by bacteria, viruses, fungi, or parasites. These microorganisms may already be present in the patient's body or may come from the environment, contaminated hospital equipment, health care workers, or other patients. Depending on the causal agents involved, an infection may start in any part of the body. A localized infection is limited to a specific part of the body and has local symptoms. For example, if a surgical wound in the abdomen becomes infected, the area of the wound becomes red, hot, and painful. A generalized infection is one that enters the bloodstream and causes general systemic symptoms such as fever, chills, low blood pressure, or mental confusion. Hospital-acquired infections may develop from surgical procedures, catheters placed in the urinary tract or blood vessels, or material from the nose or mouth that is inhaled into the lungs. The most common types of hospital-acquired infections are urinary tract infections (U.T.I.s), pneumonia, and surgical wound infections [2].

All hospitalized patients are susceptible to contracting a Nosocomial infection. Some patients are at greater risk than others young children, the elderly, and persons with compromised immune systems are more likely to get an infection. Other risk factors for getting a hospital-acquired infection are a long hospital stay, the use of indwelling catheters, failure of healthcare workers to wash their hands, and overuse of antibiotics [3]. Urinary tract infection (U.T.I.) is the most common type of hospital-acquired infection. Most hospital-acquired U.T.I.s happen after urinary catheterization. Catheterization is the placement of a catheter through the urethra into the urinary bladder. This procedure is done to empty urine from the bladder, relieve pressure in the bladder, measure urine in the bladder, put medicine into the bladder, or for other medical reasons. The healthy urinary bladder is sterile, which

means it doesn't have any bacteria or other microorganisms in it. There may be bacteria in or around the urethra, but they usually cannot enter the bladder. A catheter can pick up bacteria from the urethra and allow them into the bladder, causing an infection to start[4].

Bacteria from the intestinal tract are the most common type to cause U.T.I.s. Patients with poorly functioning immune systems or who are taking antibiotics are also at risk for infection by a fungus called *Candida*. Pneumonia is the second most common type of hospital-acquired infection. Bacteria and other microorganisms are easily brought into the throat by respiratory procedures commonly done in the hospital. The microorganisms come from contaminated equipment or the hands of health care workers. Some of these procedures are respiratory intubation, suctioning of material from the throat and mouth, and mechanical ventilation. The introduced microorganisms quickly colonize the throat area. This means that they grow and form a colony but do not yet cause an infection. Once the throat is colonized, it is easy for a patient to inhale the microorganisms into the lungs[5]. Patients who cannot cough or gag very well are most likely to inhale colonized microorganisms into their lungs. Some respiratory procedures can keep patients from gagging or coughing. Patients who are sedated or who lose consciousness may also be unable to cough or gag. The inhaled microorganisms grow in the lungs and cause an infection that can lead to pneumonia.

WHO reported that every minute a mother dies from complications in pregnancy and child birth which means 1400 mothers die every day. More than half a million mothers die every year. The birth of a baby is a momentous occasion in a couple's life. The aim of modern management of labor should be to ensure optimum conditions for the mother and the fetus during and after delivery as well as emotional satisfaction for all involved. The place of delivery plays an important role in

child survival and safe motherhood. A child born with an unhygienic condition is more to get the infection. A properly assisted delivery with skilled personnel and following aseptic precaution is highly advantageous to both mother and fetus during delivery[6]. Health can neither be demanded nor given, it can neither be bought nor sold, but the circumstances and services that are prerequisites to health can centrally be demanded and received as right. A protective environment in the hospital unit is essential as a prerequisite, particularly when considering the services provided in the labor room provision for a safe and protective environment is a priority need[7].

Healthcare-associated infections (HAI) are defined as infections not present and without evidence of incubation at the time of admission to a healthcare setting. To better reflect the diverse healthcare settings currently available to patients, the term healthcare-associated infections replaced old ones such as Nosocomial, hospital-acquired, or hospital-onset infections. Within hours after admission, a patient's flora begins to acquire the surrounding bacterial pool characteristics. Most infections that become clinically evident after 48 hours of hospitalization are considered hospital-acquired. Infections that occur after the patient is discharged from the hospital can be considered healthcare-associated if the organisms were acquired during the hospital stay[8].

### **NEED FOR THE STUDY**

Today's Nursing students are tomorrow's staff nurses who can contribute themselves more in the field of treatment. But today, this nursing curriculum doesn't give much importance to infection control measures. Thus, students have less exposure to that field makes them vulnerable to knowledge. Educating these students and creating awareness in help them to learn more about the control of Nosocomial infections in children, and they will be able to control the infection in the pediatric

hospital. In 2010 M.M.R. was reduced to less than 100. The suggestion was three antenatal check-ups, three postnatal check-ups, and clean, safe delivery given by the national health and family welfare department. Service to make motherhood safe includes care by skilled health personnel, aseptic delivery before, during, and after childbirth, health education for women, their families, and decision-makers; most maternal deaths and pregnancy complications can be prevented if efficient care is given during child care [9].

Surgical procedures increase a patient's risk of getting an infection in the hospital. Surgery directly invades the patient's body, giving bacteria a way into normally sterile parts of the body. An infection can be acquired from contaminated surgical equipment or from healthcare workers. Following surgery, the surgical wound can become infected. Other wounds from trauma, burns, and ulcers may also become infected [10]. Many hospitalized patients need a steady supply of medications or nutrients delivered to their bloodstream. An intravenous (IV) catheter is placed in a vein, and the medication or other substance is infused into the vein. Bacteria transmitted from the surroundings, contaminated equipment, or healthcare workers' hands can invade the site where the catheter is inserted. A local infection may develop in the skin around the catheter. The bacteria also can enter the blood through the vein and cause a generalized infection. The longer a catheter is in place, the greater the risk of infection. Other hospital procedures that put patients at risk for Nosocomial infection are gastrointestinal procedures, obstetric procedures, and kidney dialysis. Fever is often the first sign of infection. Other symptoms and signs of infection are rapid breathing, mental confusion, low blood pressure, reduced urine output, and a high white blood cell count. Patients with a U.T.I. may have pain when urinating and blood in the urine. Symptoms of pneumonia may include difficulty breathing and coughing. A localized infection causes

swelling, redness, and tenderness at the site of infection[11].

Nursing personnel working in the pediatric ward should be knowledgeable and skillful in the prevention of nosocomial infection. If the nursing personnel fails to adopt the infection control technique, it may lead to septicemia and children's deaths. In order to prevent I.M.R., the nursing students (at the base level) should be knowledgeable in providing infection-free nursing care. The nurse concerned with the care and prevention of infection occurring through all the sources holds a responsible involvement position. They have an important role in the prevention of infection in a pediatric hospital. The nursing student has to be knowledgeable regarding preventive measures in controlling nosocomial infections[12].

Hospitals and other healthcare facilities have developed extensive infection control programs to prevent nosocomial infections. These programs focus on identifying high-risk procedures and other possible sources of infection. High-risk procedures such as urinary catheterization should be performed only when necessary, and catheters should be left in for as little time as possible. Medical instruments and equipment must be properly sterilized to ensure they are not contaminated. Frequent handwashing by healthcare workers and visitors is necessary to avoid passing infectious microorganisms to hospitalized patients. In 2003, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) announced it would make the prevention of Nosocomial infections a major goal in 2004 and the coming years. JCAHO, the body that inspects hospitals for quality and accredits them accordingly, issued an alert stating that hospital-acquired infections are seriously underreported[13].

The Study on the Efficacy of Nosocomial Infection Control Project (SENIC) from 2005 showed Nosocomial rates could be reduced by 32% if infection surveillance were coupled with appropriate

infection control programs.<sup>[3]</sup> In 2005, Continued surveillance and sound infection control programs led to decreased healthcare-associated infections and better prioritization of resources and efforts to improve medical care. Healthcare-associated infections are of important wide-ranging concern in the medical field. They can be localized or systemic, involve any body system, and be associated with medical devices or blood product transfusions[14].

The investigator observed that many times nursing students have adequate knowledge of aseptic techniques in a pediatric hospital. Hand washing, the single most measure in prevention and spread of infection from one person to another, is not being done often. Another important area of concern is that nursing students should be careful in doing the vaginal examination, conducting delivery, aseptic precaution is very important to prevent the introduction of infection to the mother. The recognition of ignorance is the beginning of wisdom. To understand the degree of knowledge to help in future improvement thus, the investigator felt the need to take up the study such as it could assess the knowledge among III year G.N.M students in selected Nursing schools.

## **OBJECTIVES**

The main objectives of the present study are mentioned here

### **Objectives of The Study**

- To evaluate the pretest knowledge regarding the prevention of Nosocomial infections in children.
- To educate the students with a structured teaching program on the prevention of Nosocomial infections in children among 3<sup>rd</sup> year G.N.M. students.
- To evaluate the effectiveness of a structured teaching program on the prevention of Nosocomial infection among 3<sup>rd</sup> year G.N.M. students in terms of knowledge.

- To determine the association between post-test knowledge scores with selected demographic variables.

## OPERATIONAL DEFINITIONS

**Assessment:** It is the organized, systematic, and continuous process of collecting data the regarding prevention of Nosocomial infections in children.

**Effectiveness:** In this study, it refers to the extent to which the structured teaching program on the prevention of Nosocomial infections in children has achieved the desired effect in improving the knowledge of 3<sup>rd</sup> year G.N.M as evident from the gain in knowledge score.

**Knowledge:** It refers to the level of awareness among selected subjects regarding the prevention of Nosocomial infections in children.

**Nosocomial infection:** An infection acquired in the hospital by a patient who was admitted for a reason other than that infection.

**GNM students:** It refers to those students who have passed the 2<sup>nd</sup> year successfully and studying in the 3<sup>rd</sup> year G.N.M in selected Nursing schools.

## VARIABLES

**Dependent variable:** In this study knowledge of 3<sup>rd</sup> year G.N.M on prevention of Nosocomial infections in children will be the dependent variable.

**Attribute variable:** In this study Age, gender, Religion, Type of family Occupation of the father and sources of information on the prevention of Nosocomial infections in children are attribute variables.

## ASSUMPTIONS

- Students of 3<sup>rd</sup> year G.N.M may have inadequate knowledge on prevention of Nosocomial infections in children.
- 3<sup>rd</sup> year G.N.M. students may utilize the S.T.P. on prevention of Nosocomial infections in children.

- A carefully prepared structured teaching programme may enhance the knowledge of 3<sup>rd</sup> year G.N.M students on prevention of Nosocomial infections in children.

## HYPOTHESIS:

**H<sub>1</sub>:** There will be significant difference in the pretest and post knowledge score of 3<sup>rd</sup> year G.N.M students regarding prevention of Nosocomial infections in children.

**H<sub>2</sub>:** There will be a significant association between the post-test score with the selected demographic variables.

## LIMITATIONS

- The study is limited to only the selected school of Nursing at Chitradurga.
- Students who are available at the time of data collection.
- The sample size is limited to 60 3<sup>rd</sup> year G.N.M students from selected Nursing schools at Chitradurga

## RESEARCH METHODOLOGY

**Research Approach:** The researcher found that the **evaluative approach** is best suited and adopted for the present study.

**Research Design:** The present study's pre-experimental one group pretest and post-test design were selected.

**Setting Of The Study:** The study was conducted at the school of Nursing setup.

**Population:** The population of the present study comprises selected Nursing schools at Chitradurga. The accessible populations are those available at the time of conducting the study.

**Sample:** In the present study, 60 students of 3<sup>rd</sup> Year G.N.M. studying in various school of Nursing, were selected.

**Sampling Technique:** The sampling technique adopted to select the study samples was **simple random technique**.

## SAMPLING CRITERIA

### Inclusion Criteria

- Students who are willing to participate in the study.

- Both male and female students are included.
- 3rd year G.N.M. students studying at the selected Nursing schools at Chitradurga.

#### **Exclusion Criteria**

- Students who are in internship.
- Students who are not available at the time of the study.

### **METHOD OF DATA COLLECTION**

#### **Data Collection Instruments.**

The present study is aimed at assessing the knowledge of students on the prevention of Nosocomial infections in children. Thus, a structured knowledge questionnaire to assess the knowledge was prepared and used for data collection.

#### **Development of Tool**

A structured knowledge questionnaire was developed for assessing the knowledge on the prevention of Nosocomial infections in children.

The tools were prepared on the basis of the objectives of the study.

#### **Description of the Tool**

##### **Structured Knowledge Questionnaire**

The structured knowledge questionnaire consists of two sections

##### **Part - I**

This section includes a demographic background of the students i.e. Age, Gender, Permanent area of residence, Previous academic performance, Religion, and Sources of information on infection control.

##### **Part -II**

This section is the second part of self-structured questionnaire, which consists of the following headings

**Section - A:** Consists of questions assessing knowledge about prevention of Nosocomial infections in children.

There is total 30 Multiple Choice Questions in section A, Item number 1-8 inquire general information on Nosocomial infections in children, and 8-13 are related to measures used in the prevention of

Nosocomial infections in children, 14-25 asepsis and barrier techniques.

There are total of 30 questions in section B, of which are positively stated

#### **Scoring**

The 30 questions in section- A are Multiple-choice questions and for the correct option, the score is 1 and other options 0.

The 30 questions in Section- B are closed-ended dichotomous questions.

In positively stated items the score for Yes is 1 and for No is 0. In negatively stated items the score for Yes is 0 and for No is 1.

#### **Data Collection Procedure**

Prior to data collection permission was obtained from the concerned authorities. Further, the investigator obtained consent from the subjects. Confidentiality was maintained during data collection.

The data collection procedure was carried out for a period of six weeks. After obtaining permission from the authorities of a school of Nursing Principal at Chitradurga. The data collection was carried. After obtaining formal permission from the school of Nursing and from the participants, data were collected from 10 nursing students selected by a simple random sampling technique.

The investigator selected the Nursing students from Suraksha School of Nursing and S.S School of the selected school of Nursing at Chitradurga and administered the structured questionnaire to each of the 3<sup>rd</sup>-year G.N.M students.

It took about 1 hour to collect the data. The responses were recorded in the space provided in the questionnaire itself followed by a structured teaching program for the samples.

### **RESULTS**

Analysis and interpretation of the information collected through a structured questionnaire from 60 3<sup>rd</sup> year G.N.M students of selected Nursing schools at Chitradurga. The present study was

designed to assess the effectiveness of S.T.P. on knowledge prevention of Nosocomial infections in children among collected data were coded, tabulated organized, analyzed, and interpreted using descriptive and inferential statistics.

### Organizations of findings

The data collected from the 3rd year G.N.M. students were organized, analyzed and presented under the following headings.

- ✓ Section I: Description of sample characteristics
- ✓ Section II: Assessment of pre-existing knowledge.
- ✓ Section III: Evaluating the effectiveness of S.T.P.
- ✓ Section IV: Association of Post-test knowledge with selected demographic variables.

### Section-I Demographic Characteristics of the Samples

It depicts that the majority of 47% were between the age group of 21-22yrs. Similarly, the remaining 26% of students were between the age group of 23-24 years, 18% of students were between the age group of 19-20yrs, and 8% were 24yrs and above. Gender shows that most nursing students were female, 58% and 42% were males. The majority of students, 53% were Christian, 23% students were Hindus, 17% were Muslims, and the remaining 7% of

students belonged to some other religion. Family depicts that the majority of 3<sup>rd</sup>-year G.N.M. students were 47% from a joint family, 28% from a nuclear family, and the remaining 25% were from extended family. Works depict that the majority of students' fathers were, 28% were homemakers, 27% were private employers, 23% were self-employ, 18% were daily wages, and the remaining 3% had a government job. In the majority of 3rd years, students gained knowledge 58% from their teachers/tutors, 35 % from mass media and 7% from health articles.

### Section-II Assessment of knowledge on prevention of Nosocomial infection in children

It shows that all 60, 53(88.3 %) had inadequate knowledge, 7(11.7 %) had moderate knowledge and adequate knowledge was zero. Table.1 summarizes statistical outcomes of knowledge on preventing nosocomial infection in children was 14.06 with SD 3.519 before S.T.P. The mean score percentage was computed, and it was 46.86%. The results found that the sampled subjects had inadequate knowledge regarding the prevention of Nosocomial infection in children. Thus from the statistical significance, it may be confirmed that knowledge of the prevention of Nosocomial infection in children increased after S.T.P.

**Table.1 shows the knowledge score after a structured teaching program.**

Knowledge	Mean	S. D	Mean %	't' value	Result
Pretest	14.06	3.519	46.86%	20.215	HS
Post -test	24.16	2.985	80.53%		P<0.05

### Section-III

Evaluating the effectiveness of S.T.P. overall pretest and post-test mean knowledge on preventing Nosocomial

infection in children. Table. 2 shows the pre and post-test knowledge of preventing Nosocomial infection.

**Table.2: Pre and post-test knowledge of prevention of Nosocomial infection.**

Aspects	Max. score	Respondent's knowledge			Paired 't-test
		Mean	SD	Mean (%)	
Pre-test	40	14.06	3.519	46.86%	20.215
Post-test	40	24.16	2.985	80.53%	

The study shows that the pretest findings depict that the pretest knowledge of preventing nosocomial infection in children, such as incidence and cause aspect of prevention of nosocomial infection, the mean score is 28.63%. Pattern and route of transmission of nosocomial infection mean score is 28.33%, prevention of nosocomial infection in children mean score is 37.60%. The mean combined score for preventing Nosocomial infection in children is 33.05% and SD is 3.519. In post-test knowledge of preventing Nosocomial infection in children, such as incidence and cause, the mean score is 52%. Pattern and route of transmission of nosocomial infection mean score is 50.66%. Prevention of nosocomial infection in children's mean score is 82.65%.and combined mean score of prevention of nosocomial infection in children means the score is 67.02%, and SD is 2.985. Improvement of knowledge

regarding the prevention of Nosocomial infection in children, such as the general aspect of incidence and cause mean score, is 23.37%. Pattern and route of transmission mean score is 23.33%. Prevention of Nosocomial infection in children's mean score is 45.05%, the combined mean score of environmental hazards affecting the outcome of pregnancy mean score is 33.97%, and SD is 6.50. Paired 't' value of preventing Nosocomial infection in children, combined paired 't-test is 20.21.

#### Section-IV- Association of Post-test knowledge with selected demographic variables

Chi-square results of socio-demographic and post-test knowledge prevention of nosocomial infection in children among 3<sup>rd</sup>-year G.N.M students are shown in Table.3.

Table.3 Chi-square results for sample (n=60)

Sl no	Characteristics	Chi-square Value	Results	P' value
1	Age	2.891	Non-Significant	>0.05
2	Gender	0.17	Non-Significant	<0.05
3	Religion	3.723	Non-significant	>0.05
4	Type of family	1.835	Non-significant	>0.05
5	Father's occupation	2.860	Non-Significant	>0.05
6	Source of information	6.25	Significant	<0.05

Health can neither be demanded nor given. It can neither be bought nor sold, but the circumstances and services that are prerequisites to health can centrally be demanded and received as right. A protective environment in the hospital unit is essential, particularly when considering the services provided in the pediatric wards. Providing a safe and protective environment is a priority need. The present study was designed to assess the effectiveness of structured teaching program knowledge regarding preventing Nosocomial infections in children among 3<sup>rd</sup>-year G.N.M students of a selected school of nursing at Chitradurga. The data findings have been organized and discussed based on the objectives and hypothesis.

The majority of students belong to the age group 21-22, i.e., 47% and 58% of students were female. 53 % of students belonged to Christianity, and a maximum of 47 % of them were from joint families. 28% of the sample's fathers were housemakers, and 58.5% of the samples were getting the source of information regarding the prevention of Nosocomial infections from their teachers. The overall mean score percentage of knowledge is 46.86%; the current study investigator concludes that the selected student's knowledge regarding the prevention of Nosocomial infection in children was inadequate. The knowledge of students was influenced by the source of information. The calculated chi-square value for association of knowledge with the source of information was (Highly significant). The ability of students was also



influenced by demographic variables such as a source of health information.

In the majority of 3<sup>rd</sup> years, students have inadequate knowledge about the incidence, causes, pattern of transmission and prevention of nosocomial infections in children. Education of students in these aspects is essential for the effective prevention of nosocomial infections in children. It aims to provide students with knowledge on identifying and avoiding trigger factors, maintaining asepsis and regular use of barrier techniques to safeguard children. Thus it may decrease the duration of hospital stay and provide comprehensive nursing care. It was found that the majority of 3<sup>rd</sup>-year G.N.M students' knowledge prevention of nosocomial infections in children was inadequate. It needs education in identifying and avoiding triggers, sterilization and disinfection, and strict asepsis for proper preventive measures to be implemented in pediatric wards. The structured teaching program is beneficial to the nursing students in preventing nosocomial infections. This reduces mortality and morbidity associated with nosocomial infections.

## CONCLUSION

The structured teaching program's efficiency in preventing nosocomial infection in children has improved significantly among 3<sup>rd</sup>-year G.N.M. students. The pretest revealed that 3<sup>rd</sup> G.N.M. students' understanding of Prevention of Nosocomial Infection in children was lacking in all categories. It emphasizes the significance of regular in-service education sessions to keep students up to date on the latest developments in the prevention of nosocomial infection in children. The post-test scores showed an improvement in knowledge after S.T.P. was administered. Hence it was concluded that S.T.P. was an effective strategy for improving the knowledge of the 3<sup>rd</sup> year G.N.M. students.

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