

Nurse's Knowledge and Practice Regarding Nosocomial Infection at Tertiary Care Hospital in Bangladesh

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Abstract

Background: The prevalence and impact of nosocomial infections, the importance of infection control measures, and the role of nurses in preventing and managing these infections. It could also discuss previous research on the topic and identify gaps in knowledge or areas for further investigation. Nosocomial infections challenge healthcare and cause prolonged recovery and death if untreated. Bacteria, fungi, and viruses can cause these infections. **Objective:** The study also aimed to highlight the importance of continuous education for registered nurses to improve their efficiency in preventing nosocomial infections. **Material and Method:** This descriptive observational study was conducted at Rajshahi Medical College Hospital, Rajshahi, in Bangladesh, from July to November 2019. The relationships between nurse's knowledge and practice, with a sample size of 200 nurse's. The age range of the participants was 30-35 years (40%), 36-40 years (20%), 41-45 years (16%), 46-50 years (16%), and 50+ years (8%). Females constituted 89% of the sample, with 76% having a diploma in nursing and midwifery, 12% having a B.Sc. in nursing, and 12% having an M.Sc./MPH. **Result:** According to a survey of nurse's, 86% knew about nosocomial infections, with 74% citing improper sterilization as the main cause and 66% aware of risk factors. Most believed they spread in hospitals (64%), and poor health status was a primary risk factor (64%), with 92% received health education, and 98% received help with investigations. Tuberculosis was the most common organism responsible (60%) followed by *Candida albicans* (26%). Primary risk factors were poor health status (64%) and surgical drains (10%). Disinfection of patient equipment (72%) was the most effective barrier, and urinary tract infections (66%) were the most common complication. Environmental changes (70%) were considered the best prevention method. **Conclusion:** The study highlights the need for registered nurses to stay up-to-date with infection control and sterile technique principles to prevent nosocomial infections. To effectively care for both the mother and the newborn, it is necessary to determine the best approach to them both for the entirety of the pregnancy.

Keywords: Neonatal Nosocomial Infection, Nurses Knowledge, Practice.

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INTRODUCTION

Infections contracted while receiving medical care in a hospital or other similar facility are called nosocomial infections. These infections often manifest within 48 hours of hospital admission or 30 days after release [1]. The spread of nosocomial diseases has long been an issue in the healthcare industry. When they aren't caught and treated quickly, they might postpone a patient's recovery or possibly cause death. Nosocomial infections can be caused by a wide variety of microorganisms, including bacteria, fungi, and viruses [2].

In hospitals all around the world, scientists have isolated several microbial species [3]. Patients, especially those with immunosuppression, face a challenge from these opportunistic microorganisms, even though some of them were previously unknown as causes of resistant nosocomial infections. Urinary tract infections, pneumonia, TB, gastroenteritis, legionnaire's disease, and infections caused by Vancomycin-resistant Enterococci are common nosocomial diseases [4]. Microorganisms usually implicated in these infections include among others *Pseudomonas aeruginosa*, *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella*

species, *Mycobacterium tuberculosis*, and *Clostridium difficile*, which are rapidly gaining resistance because of the broad-spectrum antibiotics used in an attempt to control them.

Most of these microorganisms are pollutants found on common items, including doors, beds, equipment, and healthcare personnel. They can quickly spread from one patient to another if proper hygiene is not consistently practiced. These hospital-acquired illnesses are especially common in critical care unit patients [5]. Nosocomial infections are on the rise despite efforts by hospital administration to curb them via measures like increased attention to cleanliness and hygiene and more prudent antibiotic prescribing. This research aims to learn more about the antibiotic resistance profiles of various strains of these microorganisms. This will add to our information on the effectiveness of antibiotics against nosocomial bacteria.

Nosocomial infections, often known as hospital-acquired infections, are clinical infections that were neither present nor incubating at the time of the patient's admission to the hospital. It is also possible for nosocomial infections to manifest themselves after a patient is released from the hospital, particularly if the patient is still in the incubation phase at the time of release [6].

OBJECTIVES

- Evaluating Nosocomial Infection Awareness and Prevention Among Nurses.
- To examine the nurse's knowledge about the spread of nosocomial infection.
- Investigate the nurse's knowledge concerning current international and national policies and recommendations regarding nosocomial infection.
- Examine the nurse's knowledge about the risk factor of nosocomial infection.

MATERIALS AND METHODS

The descriptive correlational design was used to explore the nurse's knowledge and practice regarding Nosocomial infection at Rajshahi Medical College

Hospital, Rajshahi. In addition, the relationships among nurse's knowledge and practice were examined.

Inclusion Criteria

- **Employment Status:** Participants must be employed as a full-time staff nurse at one of the ten studied wards.
- **Job Responsibilities:** Participants must have roles and responsibilities that involve direct patient care, such as administering medications, monitoring vital signs, and providing patient education.
- **Education Level:** Participants must have completed at least three years of diploma education in nursing.
- **Work Experience:** Participants must have at least six months of working experience in the respective units being studied.

Data Collection Procedure

The researcher consulted the nursing superintendent to help choose the nurses who participated in the study. The research described the study's goals to the participants and requested their participation. Participants in this study gave their verbal and written informed permission (Appendix A) after the researcher explained the study's goals.

Ethical Consideration

Before the initiation of the trial, the procedure of the following study was approved by the Ethical Review Committee (ERC) of Rajshahi Medical College. The respondents' informed consent was taken by describing the objectives and purpose of the study. They were also given the freedom to withdraw themselves from the study whenever they wanted and were ensured that the information obtained from them was kept confidential.

RESULTS

The age of who was 30-35 years was 40%, 36-40 years was 20%, 41-45 years was 16%, 46-50 years was 16%, and nurses of age 50+ were 8%. Among the nurses, 16% were male, and 84% were female. Among professional qualifications, 76% were diploma in nursing and midwifery, B.Sc in Nursing 12% and MPH-12% (Table 1).

Table 1: Demographic information of the participated nurses (N=200).

Variable	Parameters	N=200	%
Age (year)	30-35	80	40
	36-40	40	20
	41-45	32	16
	46-50	32	16
	50	16	8
Gender	Male	32	16
	Female	168	84
Professional qualification	Diploma in Nursing & Midwifery	152	76
	Diploma in Orthopedic	-	-
	BSC in Nursing	24	12
	M.P.H/ M.Sc.	24	12

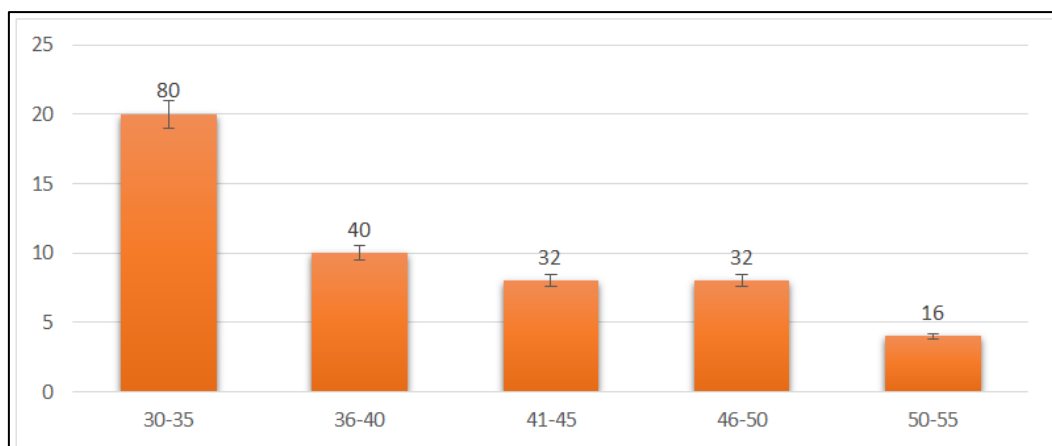


Fig. 1: Graph depicting the age distribution of nurses who responded

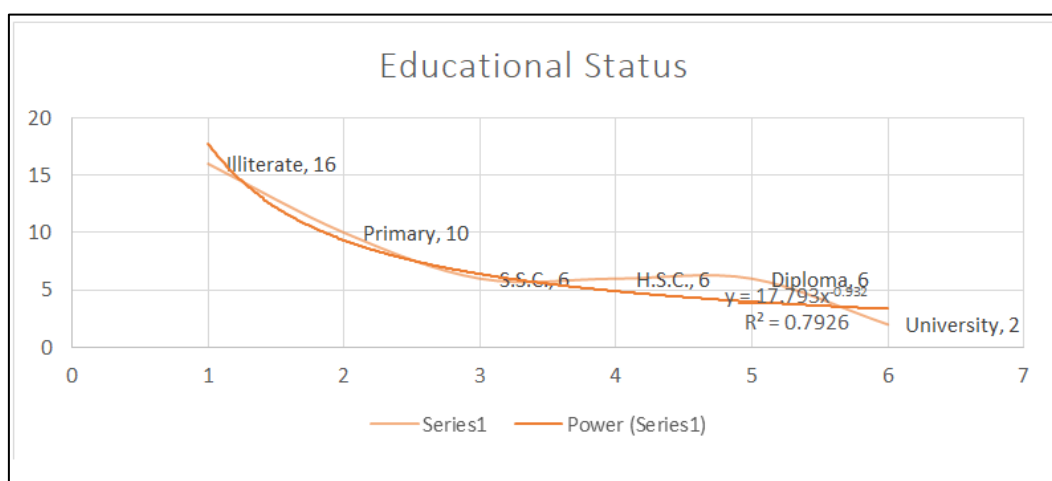


Fig. 2: Providing evidence of the educational attainment of the sampled patients

Table 2: Knowledge related questions to the nurses (N=200)

No	Question	Variable	Number of patients	%
1	Do you know where it is spread in nosocomial?	Hospital	128	64
		Ward	44	22
		Home	20	10
		Village	8	4
2	Do you know what the causes of nosocomial infection are?	Do not proper sterilization	128	64
		Catherlization	4	2
		Other	48	24
		Do not know	20	10
3	Do you know the responsible organism for nosocomial infection?	Candida albicans	52	26
		Tuberculosis	120	60
		Syphilis	0	0
		Gonorrhoea	0	0
		Do not know	28	14
4	Do you know what the risk factor of nosocomial infection is?	Poor state of health	128	64
		Surgical drains	20	10
		Do not know	16	8
		Other	36	18
5	Do you know about the barrier of nosocomial infection?	Isolation	8	4
		Personal hygiene	36	18
		Smoking	12	6
		Disinfection of patient equipment	144	72
6	Which is the complication of nosocomial infection?	Urinary tract infection	132	66
		Bloodstream infection	12	6
		Kala-azar	8	4

No	Question	Variable	Number of patients	%
		Do not now	48	24
7	Do you know how can be prevented nosocomial infection?	Behaviour	20	10
		Practice	28	14
		Exercise	0	0
		Bad environment	140	70
		Do not know	12	6

DISCUSSION

According to Archibald, L. K. [7], It is conceivable for antibiotic-resistant germs to be spread from one hospital patient to another due to the widespread usage of these drugs. In the three hospitals studied, *P. aeruginosa* and *E. coli* were isolated from the floor, beds, door handles, female, male and Paediatric wards and wastewater from drainages (Table-1). The two bacteria studied in this project, *P. aeruginosa* and *E. coli*, are important bacteria commonly implicated in many nosocomial diseases [8]. Patients and healthcare workers are equally at risk when resistant strains of these two bacteria are present in hospitals and the surrounding environment.

All the *P. aeruginosa* isolates obtained in this study were resistant to ampicillin. This result is similar to a study conducted by Strateva *et al.* [9] in Europe where more than 90% of *P. aeruginosa* isolates were resistant to ampicillin. Resistance to ampicillin is largely due to the bacteria' production of extended spectrum β -lactamase (ESBL) enzymes. Resistance to ampicillin by *P. aeruginosa* could also be due to a combination of mechanisms, such as the expression of chromosomal Amp C cephalosporinases and over expression of active efflux systems [10].

Gentamicin, cumulatively, was the most potent antibiotic against the *P. aeruginosa* isolates within the hospitals with 33.29% susceptibility. A similar observation has been reported in Brazil where *P. aeruginosa* isolates were more sensitive to gentamicin (53.2%) compared to ciprofloxacin Kiffer *et al.* [11]. The percentage resistance of *P. aeruginosa* isolates to gentamicin in this study was similar to that of Newman *et al.* [12], where a total of 42% of the isolates were resistant to gentamicin. Bacterial resistance to gentamicin is mainly due to an enzymatic modification of the antibiotic. For example, adenylyl or acetyl groups are added respectively to the hydroxyl and amino moieties of the antibiotic. This could be the reason why *P. aeruginosa* resistance (38.6%) to gentamicin was high, even though its use in Ghanaian hospitals is limited [13]. The resistance level (38.6%) of the *P. aeruginosa* isolates to ceftriaxone registered in this study was close to results obtained by [12], who registered resistance of 29% by *P. aeruginosa* isolates obtained from nine regions of Ghana to ceftriaxone. Resistance of gram-negative bacteria is due to the production of extended-spectrum of beta-lactamases. The responsible for producing ESBL is widespread among various bacterial populations and is acquired

more quickly in the population of *P. aeruginosa* [14]. *P. aeruginosa* thrives very well at habitats with an adequate amount of moisture.

This study showed that most of the *P. aeruginosa* isolates (36.8%) were from drainage samples collected from the hospitals. Door handle samples gave the next highest proportion of isolates (26.3%). In hospitals and all other places of human habitation, door handles are the most common article of contact by people. It is, therefore not surprising that it also gave very high *P. aeruginosa* isolates since people with wet hands (water or sweat) may easily come into contact with it. The places with the least number of isolates were the benches and wards, which are likely to be dry most of the time in the hospitals.

The slow movement to the development of resistance by *P. aeruginosa* isolates to all antibiotics is supported by the relatively large frequency of intermediate responses. Microorganisms can become resistant to antibiotics either by receiving effective levels of the drug in a short amount of time or from receiving sub-therapeutic concentrations of the drug for an extended length of time [15]; any of these theories may support the results of this study as people with this resistant mutant end up in the hospitals due to antibiotic treatment failures. Resistance of *E. coli* strains to ampicillin is mainly due to the production of β -lactamases. In Ghana, many people employ ampicillin for various infectious diseases and even as growth promoters in animal husband [16]. These excessive uses and abuses could have exerted high selection pressure on microorganisms, including *E. coli* to develop resistance as observed in this study. Co-trimoxazole is also largely misused in the country; hence, it is not surprising that many of the *E. coli* strains isolated in the study were resistant to it. Out of 97 *E. coli* isolates, 78 (80.41%) were resistant to at least three different classes of antibiotics while among the *P. aeruginosa* isolates 32 (56.14 %) out of 57 exhibited this kind of multi-drug resistance (Table-2) as defined by [17].

CONCLUSION

Hospital-acquired infections, or nosocomial infections, are preventable and curable. In order to manage and minimize the infection rate, the staff must be made aware of the occurrences inside the hospital and the steps that are essential to adopt. Sterile technique and other infection control concepts can be used to prevent and minimize nosocomial infections. Even if it's as basic as hand washing and wearing masks

and hats in the operating room complex, registered nurse's must be cautious about any progress in minimizing and managing infections. In order for registered nurse's to be more effective in preventing nosocomial infections, they must stay up-to-date on any new breakthroughs in infection control and sterile technique principles.

CONFLICT OF INTEREST

None declared

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