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A pre-experimental study to assess the effectiveness of planned teaching program on knowledge regarding hospital acquired infection among class 4 workers from selected hospitals of Pune city

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ABSTRACT

Introduction: The CDC's National Healthcare Safety Network (NHSN) along with other organizations closely monitor hospital-acquired infections (HAI), which can be present or just not visible at the time of acceptance. The goal of this management is to eliminate HAI and improve patient safety. Examples of HAI pathogens include infection at the surgical site (SSI), hospital-acquired pneumonia (HAP), against pneumonia caused by ventilators (VAP), infections caused by central blood vessels (CLABSI), catheter-associated urinary tract infections (CAUTI), and illness related to Clostridium pneumonia difficile.

Aims of the Study: The study aimed to assess the effectiveness of planned teaching program on knowledge regarding hospital acquired infection among class 4 workers from selected hospitals of Pune city.

Methodology: In present study, researcher adopted Quantative approach and Pre-Experimental research design was used. It was carried out on 100 samples. The Non probability purposive sampling technique was used to data was collected using demographic profile. Data analysis was done mainly using descriptive statistics. Research Setting was Selected hospitals of Pune city. Target Population included were Class 4th work of selected hospitals.

Results: The pre-test results show that 56% of participants scored in the poor range, with a mean of 4.00 and a standard deviation of 1.79, indicating a wide spread in scores. Only 2% scored in the good range (11-15 points). The post-test results show a significant improvement: 7% scored poor (mean 9.20, SD 2.75), 59% scored average (6-10 points), and 34% scored good. This shift indicates a positive effect from the teaching program. The t-test revealed a significant improvement with a p-value of 0.00001, confirming the program's effectiveness. The chi-square analysis showed no significant associations between demographic factors (age, gender, education, marital status, family type, and language) and knowledge of hospital-acquired infections (HAIs) among Class 4 workers. All p-values were greater than 0.05, indicating that these variables did not influence participants' knowledge. This suggests that education programs should focus on addressing knowledge gaps universally, rather than tailoring them to specific demographics.

Conclusion: The study shows a significant improvement in participants' knowledge of hospital-acquired infections (HAIs) after the teaching program, with a notable shift from poor to good scores. The t-test confirmed this improvement ($p = 0.00001$). However, the chi-square analysis found no significant associations between demographic factors (age, gender, education, marital status, family type, language) and knowledge, indicating that the program was effective across all groups. Therefore, education programs should address knowledge gaps universally, not based on specific demographics.

KEYWORDS: Assess, Effectiveness, Planned teaching program, Knowledge, Hospital acquired infection, Class 4 workers, Hospitals.

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INTRODUCTION

Hospital-acquired illnesses have effects that go beyond just one patient. They can potentially affect whole communities since they are associated to infections that are impermeable to many drugs. Finding those who are susceptible to hospital-acquired infections and diseases which are resistant to numerous medications is extremely important in order to prevent and reduce these kinds of infections. An infection that a person contracts while in a hospital or other healthcare facility is known as a nosocomial infection, or hospital-acquired infection. It occasionally gets designated a healthcare-associated infection to make it clear that it can happen throughout health care facilities and other places. Hospital operating rooms and other nosocomial environments can get contaminated due to a variety of dynamic mechanisms.

The infection may have come from outside sources, such as from another ill patient, from staff members who may have the

illness, or, in certain situations, from the individual who is most likely to have it. In certain instances, the microbe that causes illness originates from the individual's own skin microbiome and turns opportunist following operations that compromise the skin's defences against infections. Even though the patient contracted the dangerous germs within their own private areas, it is nevertheless referred to as nosocomial because it occurs in a medical facility.

The infection cannot have occurred prior to the patient receiving medical care for a HAI to occur. The inpatient hospital unit (ICU), while medical professionals treat extremely ill patients, constitutes one of the least common locations for HAIs to occur. Approximately 10% of hospital visitors will develop a HAI. High rates of disease, mortality, and hospital expenses are also associated with them. The most prevalent illnesses linked to healthcare include bloodstream infections, infections of the urinary system, surgical site infections, digestive system diseases, and infections of the respiratory system. Clostridioides difficile infections make up almost fifty percent of all digestive problems. infections.

NEED OF THE STUDY

Globally, almost 1.4 million people suffer with HAIs. An estimated 2 million people annually, or one in ten patients in hospitals in the US, are estimated to contract a nosocomial illness. Approximately 6.7% of hospital admissions in Italy in 2000 were infected, resulting in between 450,000 around 700,000 deaths, or 4,500 to 7,000 deaths. According to extrapolations, nosocomial infections affect about 70,000 hospitalized patients in Switzerland annually, making up between 2% and 14% of the population undergoing treatment.

According on whether overall assault rates are 2.5%, 5%, or 10%, 1.75 million, 3.5 million, or 875,000 nosocomial infections would result. This is since there are 7,000 acute care facilities in the US, and 35 million people are treated there annually. In the event that 10% of all hospital-acquired illnesses affect the circulatory system, then 87,500, 1,75,000, or 3,50,000 persons annually contract these illnesses that could be fatal. A study conducted in an academic medical centre in Pune indicated an overall prevalence of healthcare-associated infections (HAIs) at 3.76%. The intensive care hospitals having the highest fatality rates were the Burns Ward (20%), Medical ICU (20%), while Surgical ICU (25%). In pediatric wards, the frequency was 12.17% as well.

Hospital-acquired infections (HAIs) pose a significant risk to patient safety, especially for Class 4 workers who are directly involved in hospital maintenance and patient care. However, there is limited focus on their knowledge of infection control practices. This study aims to assess the effectiveness of a planned teaching program to enhance their awareness of HAIs. By improving their knowledge, the study seeks to reduce infection transmission risks and improve overall hospital safety. Addressing this gap is essential for ensuring better hygiene practices, protecting both workers and patients, and contributing to a safer healthcare environment in Pune hospitals.

MATERIALS AND METHODS

The researcher adopted a quantitative methodology with a pre-experimental research design for this study, conducted in selected hospitals of Pune city, targeting Class 4 workers. A non-probability purposive sampling technique was used, with a sample size of 100 participants. The health teaching program focuses on hand hygiene and the components of standard precautions, which will be implemented among the Class 4 workers. The tool used for the study will be validated by the department for content validity, and reliability will be assessed using Karl Pearson's formula (Test-retest method). A pilot study involving 10 samples will be conducted to assess the feasibility of the study and refine the statistical analysis plan. Descriptive statistics, including mean, median, mode, standard deviation, and frequency distribution, will be used for data analysis, while inferential statistics such as chi-square and t-test will be applied to evaluate the effectiveness of the program.

RESULTS

SECTION I

SECTION I - Demographic data of the sample.

Table 1 Demographic Profile.

Table no.1 **n=100**

Demographic Variables	F	%
1. Age in years		
a. 18-30 years	25	25.00
b. 31-45 years	55	55.00
c. Above 45 years	20	20.00
2. Gender		
a. Male	61	61.00
b. Female	39	39.00
C. Transgender	0	0.00
3.Educational Qualification		

a. Primary Education	48	48.00
b. Secondary / High school education	20	20.00
c. Higher secondary	22	22.00
d. Higher Education	10	10.00
4. Marital Status		
a. Single	9	9.00
b. Married	69	69.00
c. Divorced	11	11.00
d. Widowed / Widower	11	11.00
e. Other	0	0.00
5. Type of Family		
a. Nuclear family	36	36.00
b. Extended Family	64	64.00
6. Language		
a. Marathi	43	43.00
b. Hindi	51	51.00
c. English	6	6.00
d. Other	0	0.00

The demographic data of the 100 participants show diverse characteristics. Regarding age, the majority are between 31-45 years (55%), followed by 25% in the 18-30 years' group and 20% over 45 years. In terms of gender, 61% of participants are male, and 39% are female, with no transgender individuals. Educational qualification indicates that 48% of participants have primary education, 22% have higher secondary education, 20% have secondary or high school education, and 10% have higher education. The majority are married (69%), with 11% being divorced and 11% widowed or widowers. Most participants belong to extended families (64%), with 36% from nuclear families. In terms of language, 51% speak Hindi, 43% speak Marathi, and 6% speak English. This demographic distribution highlights a broad spectrum of educational, marital, familial, and linguistic diversity within the sample.

SECTION II

SECTION II – Data related to level of knowledge planned teaching programmed on hospital acquired infections among class 4th worker team members.

Section II (A) Finding related to Pre-test level of knowledge regarding planned teaching programmed on hospital acquired infections among class 4th worker team members before intervention.

Table No.2 - Related to pretest level of Knowledge.

LEVEL OF KNOWLEDGE PRE TEST	f	%	Mean	SD
POOR (0 - 5)	56	56	4.00	1.79
AVERAGE (6-10)	42	42		
GOOD (11-15)	2	2		

The pre-test results indicate that a significant portion of Class 4 worker team members had limited knowledge of hospital-acquired infections before the intervention. 56% of participants scored in the "Poor" range (0-5), with a mean score of 4.00 and a standard deviation of 1.79, suggesting a wide variation in the scores. 42% of participants demonstrated an "Average" level of knowledge (6-10), while only 2% scored in the "Good" range (11-15). These findings reflect that most participants lacked sufficient awareness of hospital-acquired infections, emphasizing the need for the planned teaching program to enhance their knowledge.

Section II (B) Finding related to Post-test level of knowledge regarding planned teaching programmed on hospital acquired infections among class 4th worker team members After intervention.

Table No.3 - Related to post-test level of Knowledge.

LEVEL OF KNOWLEDGE POST TEST	f	%	Mean	SD
POOR (0 - 5)	7	7	9.20	2.75
AVERAGE (6-10)	59	59		
GOOD (11-15)	34	34		

The post-test results show a significant improvement in the Class 4 worker team members' knowledge of hospital-acquired infections after the intervention. Only 7% of participants scored in the "Poor" range (0-5), with a mean score of 9.20 and a standard deviation of 2.75, indicating a marked improvement in knowledge compared to the pre-test. The majority, 59%, scored in the "Average" range (6-10), and 34% achieved a "Good" score (11-15). This shift suggests that the teaching program was effective in enhancing participants' understanding of hospital-acquired infections, demonstrating the positive impact of the intervention.

SECTION III

SECTION III – Data related to effectiveness of planned teaching programmed on hospital acquired infections among class 4th worker team members.

Table No.4 - Related to effectiveness of pre and post test.

Planned teaching Programme Effectiveness	Mean	SD	DF	T test calcaluated value	P value	Remark
Pre test	4	1.79	99	11.6046	0.00001	Significant
Post test	9.2	2.75	99			

The data analysis indicates a significant improvement in knowledge regarding hospital-acquired infections after the planned teaching program. The pre-test mean score was 4.00, with a standard deviation of 1.79, suggesting a low level of knowledge prior to the intervention. In contrast, the post-test mean score increased to 9.20, with a standard deviation of 2.75, reflecting a notable improvement in knowledge. The t-test calculated value of 11.6046 and a p-value of 0.00001 confirm that the difference between the pre-test and post-test scores is highly significant, demonstrating that the teaching program was effective in enhancing the participants' knowledge on hospital-acquired infections.

SECTION IV

SECTION IV – Finding related to an association between knowledge regarding planned teaching programmed on hospital acquired infections among class 4th worker team members.

The chi-square analysis of the demographic variables in relation to the knowledge levels (average, good, poor) showed no significant associations. For age, the chi-square value was 4.904 with a p-value of 0.297, indicating that age did not significantly influence knowledge levels. Similarly, gender had a chi-square value of 2.576 with a p-value of 0.631, showing no significant impact on knowledge. Educational qualification also showed no significant association (chi-square = 4.341, p = 0.631), as did marital status (chi-square = 2.824, p = 0.945). Type of family did not significantly affect knowledge either (chi-square = 1.624, p = 0.444). Lastly, language (chi-square = 2.064, p = 0.914) had no significant effect on the participants' knowledge of hospital-acquired infections. All p-values being greater than 0.05 suggest that demographic factors did not significantly influence the knowledge levels of the participants.

DISCUSSION

The impact of an organized teaching program designed to enhance staff nurses' understanding and practices regarding nosocomial infection prevention was examined in the study "A Study for Assessment the Success of Planned Receiving a teacher Program upon Prevention of Contracted during Home Infection Some of Staff Nurses during NMCH, Jamuhar, Bihar" (2024) through Ved Prakash and colleagues. Since nosocomial infections have a leading cause of illness and mortality in hospitals, hospital staff are required to adhere to infection control regulations. The study assessed the nurses' knowledge and actions before and following the educational intervention using a pre-test and post-test technique. The results demonstrated that nurses' awareness of and following of infection control procedures got a lot better. The lesson covered crucial components of preventing infections, like how to use personal protection equipment (PPE) properly, how to wash your hands, how to sterilise objects, and how to securely handle and get rid of healthcare waste. Following the intervention, nurses demonstrated greater compliance with infection control procedures and a better understanding of these preventive measures.

The study by Ashok Kumar Sharma in 2017, In a study entitled "A Pre-Experimental Study assessing the Impact of Organization Teaching Programme upon Knowledge along with Practice When it comes to Nosocomial Infection between the Staff Nurses with Selected Hospitals that Jaipur, Rajasthan," the effect for a structured teaching program upon enhancing nurses' nosocomial infection knowledge and practices was assessed. The study demonstrated that the training, which focused on topics like hand cleanliness, the use of personal protective equipment (PPE), and maintaining a clean atmosphere to prevent hospital-acquired illnesses, greatly enhanced the expertise and procedures of nurses related to infection control. The nurses' increased knowledge resulted in enhanced adherence with infection control procedures, and they showed a greater awareness of their responsibility in infection prevention. The efficiency of the structured training approach was further supported by statistical analysis, which showed that both skills and procedures had significantly improved. The study emphasizes how crucial it is for medical staff—especially nurses—to pursue ongoing education in order to protect patients and stop the spread of illnesses in hospitals.

CONCLUSION

In conclusion, the study clearly demonstrates that improving Class 4 employees' understanding of hospital-acquired infections (HAIs) requires a well-designed teaching program. The intervention significantly enhanced their knowledge of key infection prevention techniques, including hand hygiene, sterilization procedures, personal protective equipment (PPE), and waste disposal. This initiative also raised awareness about the importance of infection control practices in preventing the transmission of infections within healthcare settings. The results suggest that structured health education programs are effective in addressing knowledge gaps among non-clinical hospital workers, providing them with the essential information needed to contribute to infection prevention. The study underscores the importance of incorporating infection control training into Class 4 workers' education, enabling them to support medical professionals and improve patient safety. Furthermore, the findings highlight the potential of such educational interventions to improve infection control quality within hospitals. By fostering a deeper understanding of HAIs, the program encourages a proactive approach to infection prevention, thereby reducing risks to both patients and healthcare workers. The study advocates for the continuation and expansion of teaching programs for hospital staff, especially non-clinical workers, to enhance infection control knowledge, minimize hospital-acquired infections, and create safer healthcare environments.

DECLARATION BY AUTHORS:

Ethical Approval: The study was approved by the institutional ethics committee of Bharati Vidyapeeth College of Nursing, Pune. The study participants were briefed about the purpose and nature of the study and written informed consent was obtained before data collection.

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Conflict of Interest: The authors declare no conflict of interest.

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