

Original Research Article

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Evaluation about the Response of Infection Control and Training Workshops among Nursing Students and Nursing Staffs in a Tertiary Care Hospital in Maharashtra

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ABSTRACT

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A study done to evaluate the level of knowledge and infection control practices followed by nurses was carried out in a tertiary care hospital. The data was collected by a pre-structured questionnaire and training. The mean knowledge of staff nurses regarding infection control measures was 52.3% which increased to 68% after conducting training, demonstration and follow-up audits on infection control related topics. This emphasizes on the importance of proper training of healthcare workers regarding infection control practices. Infection control training of healthcare workers is needed to improve knowledge and practice in infection control.

Introduction

“Prevention is better than cure”

- Dutch philosopher Desiderius Erasmus, 1500

Healthcare associated infections (HAI) or Nosocomial infections are the infections acquired in hospital by a patient admitted for another reason which is not present or incubating at the time of admission and the symptoms appearing 48 hours after admission (Apurba S. Sastry and Deepashree, 2019). There is increasing morbidity and mortality

of healthcare associated infections around the world and therefore it has become mandatory now for every healthcare facility to adopt infection control program (Apurba S. Sastry and Deepashree, 2019). It ensures patient safety and improvement of quality of the organisation (Apurba S. Sastry and Deepashree, 2019).

It has been reported that many such healthcare associated infections are caused by transmission of pathogens from one patient to another by contaminated hands of healthcare workers who have

not washed their hands between patients or healthcare workers who do not practice infection control practices such as maintaining proper hand hygiene, glove use etc. (Apurba S. Sastry and Deepashree, 2019). There are still nurses who have misconceptions regarding the infection control and prevention measures.

India is an emerging and developing country with a population of 1.4 billion. With the advent of COVID-19 pandemic there has been a major threat to the infection control practices. To combat the deficiencies in the healthcare facilities related to healthcare associated infection, infection control training programme has gained a major concern (Apurba S. Sastry and Deepashree, 2019).

If adequate infection control nurse are not available than ward nurses can act as infection control nurses (ICN). But before they start acting as infection control nurses they have to be trained regarding infection prevention and control practices, so that they can monitor infection control activities in their wards more efficiently (Ashwini and Sathish, 2016).

This training is useful to motivate the staff in wards. ICN can act as a bridge between hospital infection control committee (HICC) and hospital wards and intensive care units (ICU) (Apurba S. Sastry and Deepashree, 2019). These nurses should undergo competency assessment test at the beginning and then periodically to continue expand on their existing knowledge, understanding and skills (Sandeep Bhaskarrao Kokate, 2017).

The actions of a nurse who provides first-hand bedside care positively impacts the patient outcome if proper infection control and prevention practices are followed.

In order to decrease the infections in HCWs and ensure adequate patient safety it is necessary to improve infection control and hand hygiene practices of nurses by regularly conducting training sessions for early detection and control of infections.

Infection prevention and control (IPC) is a crucial

approach to control the transmission of healthcare associated infections. Education and training of the health care workers is a vital step to ensure safe and effective healthcare services.

Masterly execution of infection control practices is crucial to limit the transmission of HAIs in hospitals with high infection rates.

The study was conducted in our hospital with the intention of;

Drill the healthcare workers to raise infection prevention and control knowledge and skills among healthcare workers.

Enhance patient and workplace health and safety in healthcare facilities to deliver safe health services.

The drills encompass all important anchors of IPC including HAI Surveillance network, surveillance of bloodstream infections (BSI), surveillance of catheter associated urinary tract infection infections (CAUTI), transmission based precaution and standard precautions also taking into account hand hygiene measures and moments, donning and doffing of personal protective equipment (PPE), environmental cleaning and decontamination, waste management in healthcare facilities, safe injection practices and control of needle stick injuries.

Materials and Methods

It was a cross – sectional study. The training was undertaken in the Department of Microbiology, Government Medical College and hospital, Aurangabad. The Study included nursing staffs and nursing students who participated in 2 days training program in the year 2021-2022. A total of 256 trainees attended the training. After completion of the training periodic follow-up of the nurses in the respective wards were carried out.

For evaluation of the effectiveness of the training tests were conducted before the commencement of the training and after the ending of the training session to appraise the understanding, gain of

knowledge and applications of basic knowledge for infection prevention in hospitals. The dissimilarity between the pre-test and post-test scores was evaluated for the assessment of effectiveness of the drill. The test was conducted using a pre-tested, pre-evaluated and structured questionnaire. The questionnaire contained 40 multiple choice questions involving the various areas of infection control and prevention practices which are and should be routinely followed in all the hospital settings. The questions were validated by the experts of Department of Microbiology. The contents of the training programme are included in Table No I

For evaluation of the effectiveness of the training programme all the participants were asked to fill a feedback form for the training programme demonstrated in Participants Feedback form.

The poll for feedback form was developed using guidelines of WHO (2010) and Centre for Disease Controls and Prevention (2019). The poll requested trainees to rate the overall quality of the workshop as “excellent”, “good”, “average”, “poor” or “very poor”. The poll also included open ended space for comments regarding beneficial aspects of the training, space of correction, and implementation of training in practice and other feedback.

Results and Discussion

Total number of trainees attending the drill was 256. Out of trainees 80 were male (31.25%) and 176 were female (68.75%). The average pre-test score was 16.07% and the average post-test score was 38.34% which manifest a substantial increase in knowledge from the touchstone value.

Table No II shows distribution of trainees according to their demographic features. The table shows that maximum participants are in the age group of 20-25 years (62.50%). Next most common age group is

25-30(17.18%). The table also shows male to female participants in the training to be 1:2.2. Thus there is female predominance among the attending participants. The total number of staff nurses attending the training was 56(21.87%). Nursing students attending the training was 200(78.12%).

Table No IV shows pre-test and post-test marks in various sections of infection prevention and control and there is significant increase in the marks. Though the staff nurses were in service for last 15 years but still their knowledge about phlebotomy practices were only 50.32% which increased to 75.23% post training. The training was conducted in the Centre of Excellence (COE).

Along with phlebotomy practices needle stick injury management was also shown and performed in front of the trainees. They are also told about post-exposure prophylaxis to be taken after needle stick injury. The trainees also were asked about their history of taking HBsAg vaccination. Those who have already taken booster dose of the vaccination they were asked to do their HBsAg titre to see the level of antibody in their body. And those trainees who have not taken vaccination they were advised to take vaccination immediately.

The participants were also made aware of the spill management technique by demonstration and direct observation of their skill to manage spill management. There was considerable increase seen in the skill of spill management post demonstration.

Table No V shows rating of the training programme by the participants by doing a poll at the end of the training session. The poll was filled in by 256 participants. Out of those participants 220 (85.94%) graded the training as “Excellent”, 36(14.06%) graded the training as “Good”, 0 (0%) graded it as “Average”. No trainees graded the training as poor or very poor.

Table.1 Training Topics

TOPIC	CONTENTS
HAI Surveillance network: Introduction	<p>Introduction and discussion about HCAI</p> <ul style="list-style-type: none"> • IPC precautions to break the chain of transmission
Personal Protective Equipment and Infection Prevention and Control	<ul style="list-style-type: none"> • Discuss importance and types of PPE • Donning and doffing of PPE • Hand hygiene techniques and WHO 5 moments of hand hygiene. • Measures to control infection by incorporating standard and contact precautions for infectious diseases.
Needle stick injury (NSI) prevention and management	<ul style="list-style-type: none"> • Risks & prevention of blood-borne infections among healthcare workers • Management of sharps injuries and management in case of exposure to blood and body fluids. • Post exposure Prophylaxis (PEP) of HBV, HCV and HIV
Surveillance and Demonstration of Blood Stream Infection	<ul style="list-style-type: none"> • Definition of bloodstream infection • Definition of CLABSI and CRBSI • Routes of prevention of infection transmission. • Bundle care technique by audio-visual representation and on site demonstration.
Surveillance and Demonstration of SSI	<ul style="list-style-type: none"> • Definition of SSI. • Risk factors associated with SSI. • Wound class types and classifications of SSI. • Management of SSI.
Surveillance and Demonstration of CAUTI	<ul style="list-style-type: none"> • Definition of CAUTI. • Risk factors associated with CAUTI. • Management of CAUTI.
Surveillance and Demonstration of VAP	<ul style="list-style-type: none"> • Definition of VAP. • Risk factors associated with VAP. • Management of VAP.
Phlebotomy	<ul style="list-style-type: none"> • Demonstration of Phlebotomy practices. • Do's and Don'ts related to Phlebotomy • Maintenance of asepsis.
Environmental Cleaning and Spill Management	<ul style="list-style-type: none"> • Environmental Cleaning techniques • Everyday preparation of 4% and 5% Hypochlorite solution and its storage • Large and small spill management

Table.2 Distribution of study participants according to their demographic features:

	Frequency	Percentage (%)
Age group(in years)		
18-25	160	62.50
26-33	44	17.18
34-41	30	11.71
42-50	22	8.59
Gender	Number(n)	Percentage(%)
Male	80	31.25
Female	176	68.75
Occupation		
Staff nurse	56	21.87%
Nursing students	200	78.12%

Table.3 Table showing increase in the pre-test and post-test marks according to the respective areas of work of the nursing staffs and students.

Department	Total number of trainees	Pre-test marks	Post test marks
Medicine	15	241.5	324
Surgery	21	338.1	455
Pediatrics	10	161	216
Obstetrics and Gynaecology	10	161	216
Students	200	3220	4322

Table.4 Marks obtained by the trainees in pre and post screening test.

Components of training	Pre test marks	%	Post test marks	%
Phlebotomy	1030.55	50.32%	1541	75.23%
Ventilator associated pneumonia	513	40.08%	647	50.52%
Bundle branch care and Central line care	646	50.50%	906	70.75%
Surgical site infection(SSI)	779	60.86%	965	75.36%
Biomedical waste management(BMW)	359	46.66%	510	66.37%
CAUTI Surveillance	209	40.69%	263	51.30%
Hand Hygiene(HH)	581	75.65%	701	91.30%

Table.5 Rating of the training programme by the participants.

Rating of training		
Rating	Number(n)	Percentage (%)
Excellent	220	85.94
Good	36	14.06
Average	0	0
Missing	0	0
Total	256	100

In this questionnaire based study to evaluate the response of training programme on the awareness and effectiveness about infection control practices among nursing staffs there was a significant rise in knowledge and awareness about blood collection practices, infection control measures and transmission based precautions (Saba Savul *et al.*, 2021).

After the training programme one Infection control nurse (ICN) was appointed in respective wards who were given the responsibility to train other staffs and class IV employees in the hospital. (Apurba S. Sastry and Deepashree, 2019) Most of the trained ICN has already given 15 years service to health sector. Along with this the nursing students were trained before their entry into their service so that they can ensure a better infection control rate in the coming future. ⁽¹⁾ Along with questionnaire based the trainees were also given lectures, practical demonstration, judgement of their practical skills were evaluated. All these staff nurses and ICN trained are followed up periodically in their respective wards. There was a substantial increase in the post test marks obtained by the trainees.

The study showed a significant increase of hand hygiene practices awareness from 75.65% to 91.30% (Dipti D. Mulay *et al.*, 2019). This awareness in very much essential for the prevention of hospital acquired infection in the wards.

Along with this hand hygiene audits were conducted after the training session in the respective wards which show significant increase in hand hygiene adherence rate. Again there was a significant

increase in the skills of infection control such as proper donning and doffing of PPE, biomedical waste disposal (BMW) which was done by giving them a case based scenario and observing their practical skills on site.

There was increase in the post test marks from 46.66% to 66.37%. After the training BMW training was conducted in every ward and departments to evaluate if proper disposal of BMW was carried out in every wards and it showed satisfactory results.

Thus we can say that better knowledge and awareness about infection control practices can significantly influence the healthcare delivery system in various ways. Though the study was significant in its way but our major limitation was only including nurses and nursing students.

We did not include doctors, residents, and class IV employees but they also contribute a major portion in the increase of infection in the hospital settings. (Dipti D. Mulay *et al.*, 2019) This may be in the form of improper phlebotomy practices, improper central line and catheter site maintenance or improper biomedical waste disposal practices in the wards.

Though there was significant increase in the application of infection control and prevention practices after the training but still it was not the best. Therefore periodic training of the healthcare workers is required to maintain this knowledge and to improvise their skills which will help to decrease the healthcare associated infections in the coming future.

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