

Efficacy of Orientation Training on the Knowledge of Infection Control Practices Among Nursing Staff in A Periurban Hospital in North India



Microbiology

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ABSTRACT

Hospital associated infections (HAIs) are major causes of death and increased morbidity. Lack of sufficient knowledge is likely to affect the desirable performance of healthcare workers. A questionnaire based evaluation on the efficacy of training on the knowledge of infection control practices (ICP) was conducted among 80 nurses covering 4 areas viz hand hygiene, care bundles, biomedical waste management (BMWM) and general infection control practices (GICP). There was wide variation in the pre training level of knowledge in terms of average score of correct response with minimum level in the area of GICP (mean \pm SD as 2.70 \pm 1.47) and maximum for BMWM (mean \pm SD as 4.86 \pm 1.02). There was significant improvement in the level of knowledge in all the areas of ICP following the training with nearly 90% of the participants responding correctly to 50% or more of the questions regardless of the area. The improvement was most marked in the area of GICP. The present study suggest the need for an ongoing educational programs on prevention and control of infection for healthcare workers.

Introduction

Hospital acquired infections (HAIs), defined as infections acquired during the patients' stay in hospitals, constitute a major worldwide public health problem despite advances in our understanding and control of these infections.¹ Over 1.4 million people worldwide suffer from HAIs with 5- 10% of patients admitted to modern hospitals in the developed world acquiring one or more of these infections. The risk of HAI in developing countries is 2- 20 times higher than in developed countries,² the magnitude of the problem in terms of expenditure and human suffering being enormous.

It has been estimated that more than 40% of these infections are preventable under routine working conditions can be significant.^{3,4} A review study found a minimum reduction effect of 10% to a maximum of 70% depending on the setting, study design, baseline infection rates and type of infection.⁵ A key barrier in implementing good infection control practices(ICP) is the lack of trained infection control personnel.⁶

While the need to develop innovative educational programs in order to bring perceptible changes in knowledge and behaviour among healthcare workers has been emphasized, to the best of our knowledge, there is hardly any comprehensive study to evaluate the role of training on the knowledge related to HAI covering identified areas viz hand hygiene, care bundles, biomedical waste management (BMWM) and general infection control practices (GICP).

Material and methods

The present study was based on assessment of knowledge on HAI and infection control practices (ICP) among the nursing staff of SGT Medical college and Hospital, a periurban hospital in the outskirts of Delhi, India. A total of 80 nurses (28 males and 52 females) were enrolled in this study. After the informed consent, demographic profile of the study population as well as the duration of professional experience in terms of the period (years) of working in the hospital was recorded from each participant. Thereafter, the study participants were given a questionnaire which included 24 multiple choice questions with 6 questions each in four identified areas viz hand hygiene, care bundles, BMWM and GICP. An orientation training in the form of a series of lectures was given to the participants covering all the four areas using audio visual aids. Following the training, the outcome of the training on the knowledge of ICP on the identified areas was measured in terms of similar evaluation conducted prior to the training using the same questionnaire.

The pre and post training performance of each participant was evaluated simultaneously. A scoring system was adopted with one mark assigned for each correct answer. Responses were evaluated in terms of proportion of nurses responding to the correct answer in each area comprising of 6 questions, with a cut off level of 50% or more.

Statistical analysis : The continuous variables were compared using students t-test while the categorical variables were compared using chi-square test. Fisher's exact test was applied in case of any cell with value less than five. *P*-value less than 0.05 was considered as significant

Results

A total of 80 participants in the age group between 20 and 40 were enrolled in our study with the duration of experience of working in the hospital upto maximum 3 years. Majority were in the age group of 21-30 years, and were predominantly females. More than two third of study participants were found to be working in the hospital for more than a year. Majority of the participants were found to have received atleast one session of training in the area of BMWM only while there was no definite information on training in other areas of infection control practices (Table 1)

Table 1 Demographic profile of the study population

Characteristics		Number
Age (Years)	21 – 30	70 (87.5%)
	31 – 40	10 (12.5 %)
Sex	Male	28
	Female	52
	M:F	1:1.9
Duration (Years) of Professional experience*	< 1	26 (32.5%)
	1 - 2	46 (57.5%)
	>2 - 3	08 (10%)
Training in area of infection control practices (atleast one session) Area**	BMWM	65 (81.2%)

*Professional experience indicates experience of working as nurse in the hospital under study

**Information on training was available in the area of BMWM only

There was wide variation in the baseline (pre training) level of knowledge in terms of average score of correct response in various areas of ICP with the minimum level in the area of GICP

and maximum for BMWM. There was significant improvement in the level of awareness in terms of scores in all the areas of ICP following the training, the range of average score not varying much in each area.(Table 2)

Table 2 Effect of teaching on the status of knowledge in infection control practices among nursing staff

Areas of Infection control practices (No.of questions)	Pre training score*(mean ± SD)	Post training score *(mean ± SD)	Significance (p- value)
Hand hygiene (6)	3.92 ± 1.58	5.40 ± 0.63	< 0.001
Care bundles (6)	3.80 ± 1.84	5.25 ± 0.63	< 0.001
BMWM (6)	4.86 ± 1.02	5.78 ± 0.57	< 0.001
GICP (6)	2.70 ± 1.47	4.64 ± 1.23	< 0.001
Total (24)	15.28 ± 3.20	21.07 ± 2.28	<0.001

***Score was determined in the scale of 0 - 6, 1 mark each for each correct answer out of maximum 6 correct answers in each area**

It was revealed that the training resulted in nearly 90% of the participants responding correctly to 50% or more of the questions regardless of the area with all the participants scoring at the same level in the area of BMWM. The improvement was most marked in the area of GICP.(Table 3)

Table 3 Range of scores achieved by the study participants in relation to effect of teaching (n=80)

Areas of Infection control practices	Range of correct answers (out of total 6 in each category)	No.(%) of participants in respective strata of score		Significance χ^2 p value
		Pre teaching	Post teaching	
Hand hygiene	≥ 3	56 (70)	74 (92.5)	13.3 <0.001
	< 3	24(30)	6 (7.5)	
Care bundles	≥ 3	56 (70)	70 (87.5)	7.7 <0.01
	< 3	24 (30)	10 (12.5)	
Biomedical waste management	≥ 3	79 (98.8)	80 (100)	1.006 NS
	< 3	1 (1.2)	0	
General infection control practices	≥ 3	47 (58.8)	75 (93.7)	27.06 <0.001
	< 3	33 (41.2)	5 (6.3)	

Discussion

HAIs are the leading markers of quality of patient care and safety. Despite the advances in health care system, the threat of HAIs persists, which has a direct impact on the health and well being of patients. Nurses have more intimate contact with patients and this increases their potential to serve as sources of cross-transmission, lack of awareness and inadequate knowledge regarding ICP in them, resulting in deleterious effects on the health of patients. Periodic assessment and feedback on the knowledge can go a long way in improving compliance of nurses and eventually reducing prevalence of HAIs in hospitals.

In the present study majority of the participants were young (20 - 30 years) with their working experience not more than 3 years in contrast to a similar study from the city of Delhi, India where the mean age of the nurses was 35.8 years and mean duration of professional experience as 9.2 years.⁷

In our study only about 24% and 91% of participants scored more than 75% and 50% of the correct answers at baseline prior to training. In a similar study from India among nurses working in intensive care unit showed better performance where 82% of nurses scored average and above average positive

responses with a cut off level of 70 % without any exposure to training.⁸ The difference could be the reflection of shorter duration of work experience among the nurses in our study as well as inclusion of nurses from all departments in the hospital in contrast to the nurses attached with the intensive care unit in the later study.

In a study from a tertiary care hospital in India carried out to evaluate the effects of lecture based training on the prevalence of HAI, a significant decline in the HAI rates was seen after conducting the training.⁹

In the present study significant improvement in the knowledge could be recorded following the training in all the areas which is in accordance with the study of Saini R et al where marked improvement in the knowledge was seen after the structured teaching program compared to the group undergoing no teaching.¹⁰

Hand hygiene is considered one of the most important infection control measures for preventing HAIs. The World health organization has designated improvement of hand hygiene within healthcare facilities worldwide as a priority and chose this topic for its first Global Patient Safety Challenge under the banner 'Clean Care is Safer Care'.¹¹ However compliance rates with recommended hand hygiene practices in hospitals remain low. Previous literature on ways to improve hand hygiene practices has focused on USA and Europe whereas studies from developing countries are less.¹² In our study significant improvement could be recorded in the knowledge on hand hygiene in terms of average score as well as proportion of participants responding to 50% or more correct answers following training. In a study from North India, the nurses were reported to perform very well in terms of compliance to recommended practices on hand hygiene as a result of continuing education courses on nosocomial infections preventive measures. In another study carried out to assess the awareness of infection control practices, 82-84.8% nursing staff were found to be aware of recommended practice of hand hygiene.⁷ It was reviewed in other studies also that hand cleansing is the primary action to reduce HAIs and cross-transmission of antimicrobial resistant pathogens.¹³ In a study by Pittet et al the status on hand hygiene practice improved significantly among nurses and nursing assistants following implementation of a hand hygiene campaign although it continued to remain poor among doctors.¹⁴

There are various studies focusing individually on various sub-areas in the area of care bundle viz Ventilator associated pneumonia, catheter associated urinary tract infection.^{15,16} Our study included questionnaire on a wider spectrum of sub areas in the area of care bundle by including additional question on surgical operative care.

In our study a very high level of score (nearly 100%) could be recorded in the area of BMWM before the training providing little scope of improvement following training compared to other studies where much lower performance were reported.^{17,18} This could be because of at least one orientation training received by all the participants in the area of BMWM and the influence of hospital policy and procedures on the prevailing knowledge among the nurses.

Awareness of GICP was relatively poor among nursing staff in our study in terms of knowledge of commonest HAI, commonest mode of transmission of HAIs, universal precautions, rationale behind isolation precautions and indications of gloving and other barrier techniques. Even after lecture session, our study participants could not score much. This could be a matter of great concern since this problem has not been found to confined only in developing countries, it is also encountered in developed countries in various components of GICPs.¹⁹ In a study from Uganda, correct knowledge of nurses was present only in 51.4% nurses regarding transmission of HIV.²⁰ Similarly in a study, knowledge of nurses was observed suboptimal in this area in relation to general infection control practices as 76.4% nurses did not clean their hands between patient contacts,

52.3% used to re sheath used needles and 59.3% fail to apply isolation precautions.²¹ Only 58.4% agreed that masks should be changed between patients.¹⁹

Regardless of the status of knowledge on various aspects of HAIs, recorded at baseline have ample scope of improvement which can be achieved by good quality training in the form of educational programs and sessions based on lectures and workshops which can motivate staff.

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