

Study of Knowledge, Attitude and Practices of infection control measures among nursing staff in rural tertiary care hospital

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Abstract

Background: HAI is the major causes of death, functional disability, emotional suffering and economic burden among the hospitalized patients and increased length of hospital stay remains the main culprit^{1,2}. To prevent HAI, health care team relies mainly upon nurses as they are the heart and hands that comprise first line care providers to patients. Hence, this study was conducted to assess knowledge, attitude and practices of nursing staff so as to reduce HAI to minimal.

Aim: To assess Knowledge, Attitude and Practices of infection control measures among nursing staff in rural tertiary care hospital.

Materials & Methods: It is Cross sectional study with 1 yr period from department of Microbiology, JNMC and AVBRH, Sawangi, Wardha. Sample size included 150 nurses from ICUs and major wards. Data was collected from self-administered questionnaire, to assess knowledge, attitude and practices among nursing staff for infection control.

Result: Out of 150 nurses, maximum were female within 20 to 29 years age and most were GNM (51.33%). 15 nurses were incharge and 135 were staff nurses. 122 nurses had training in infection control. Most were within 3 to 10 years of working experience. Out of 150 nurses, 115 had good knowledge and attitude but 92 nurses had

fair practice. Compared to relationship of Practice score with designation, (42%) staff nurses showed poor practice scores, which is cause of concern. Poor practice score (96.4%) was seen in nurses who had not undergone training in Infection control practices and found highly significant ($p = < 0.05$).

Mean cumulative score for KAP was good (71.18) & average KAP score was (49.33%). There was significant positive correlation between knowledge & attitude but negative correlation between knowledge and practice.

Conclusion: Knowledge and attitude of nurses were satisfactory but poor practice levels.

Key words: Nursing staff, Knowledge, attitude, practices.

Introduction

Healthcare associated infection also called “hospital acquired infection” (HAI), or “nosocomial infection” is defined as the infection occurring in patients after admission at the hospital and the infection which was neither present nor incubating at the time of hospitalization and occurring after 48 hours after admission. Infections appearing during hospital stay or after discharge and also occupational infections among hospital staff are also included as HAI^{1,2,3}

World Health Organization (WHO) estimates around 7% - 12% of HAI globally, with more than 1.4 million patients acquiring infection during hospital stay.^{1,2,3} The INICC

conducted a prospective surveillance in 7 Indian cities, in 2007, so as to estimate the incidence of HAI. It was found that HAI incidence rate of 4.4% corresponding to 9.06 infections per 1000 ICU days.⁴

HAI is the major causes of death, functional disability, emotional suffering and economic burden among the hospitalized patients and increased length of hospital stay remains the main culprit.^{1,2} It has been reported that transmission of HAI frequently occurs during healthcare services, when these healthcare workers fail to follow standard precautions.^{4,5} Despite the availability of low-cost interventions for infection prevention and control, the compliance with standard infection control practices remains very low, particularly in developing countries.

To prevent HAI, health care team relies mainly upon nurses as they are the heart and hands and they comprise the first line care providers to the patients. Nurses must be aware of the ways to slow down or prevent transmission of infectious diseases and should be knowledgeable of its potential risk to the patients and other hospital staffs. Factors that contribute to non-compliance with the standard precautions include lack of understanding and knowledge among health care workers related to proper use of protective barriers, lack of time, lack of resources and lack of proper training.³

There is a great need to assess and evaluate nurse's knowledge regarding infection control on regular basis. More than this, need of the hour is to assess their practices regarding implementation of gained knowledge.⁴ Hence, the present study was conducted to assess knowledge, attitude and practices of infection control measures among nursing staff in our rural tertiary care hospital and to assess the relationship between infection control practice score with age, years of working experience, qualification, designation and training in infection control practices.

Material and Methods

This is Cross-sectional study, was conducted in the Department of Microbiology, Jawaharlal Nehru Medical College and AVBRH, Sawangi (Meghe), Wardha, for a period of 1 year, after approval from institutional ethics committee.

Study population included all nursing staff in ICUs [MICU, SICU, PICU, NICU] and the clinical departments of Medicine, Surgery, Orthopedics, Obs/gynec and Pediatrics.

Sample size was calculated using the formula for prevalence study^{6,7} with z , standard normal deviate, taken as 1.96 representing a 95% confidence interval, p as 13%, the proportion of nurses with good knowledge of standard precautions in a study carried out in Borno state *a desired precision of 5%*, and a 10% non-response rate⁸ Minimum sample size was calculated as 150.

Structured validated self administered questionnaire was used after extensive literature search. The questionnaire was divided into IV parts:

- Part I -- focused on socio-demographic characteristics (age, gender, qualification, years of service, working department, designation and training on infection control practices, etc.)
- Part II – consist of 15 questions to ascertain the level of *knowledge* about infection control, with possible response of “Yes or No”. [Yes- 1 M and No – 0 M]

Scores for each respondent was summed up and graded as Poor Knowledge – (< 50 %), Fair Knowledge – (50 – 75 %), Good Knowledge – (> 75 %).

- Part III – consist of 15 questions regarding *attitude* which was taken on “Likert's scale” as Strongly disagree (1M), Disagree (2M), Neutral (3M), Agree (4M), Strongly agree (5M).
- Part IV comprised 25 questions regarding *practice* on standard precaution measures including hand-washing

(7Q), use of gloves (4Q), use of mask (3Q) , sharps practices (7Q) & use of gown/apron (4Q).

Maximum possible score for practice was (50); 2 marks for always response, 1 M for sometimes response and 0M for never response.

Respondents were graded for assessment of compliance as Poor – (< 50 %), Fair – (50 – 75 %), Good – (> 75 %).

Other statistics was applied accordingly.

Results

Table: 1 Socio-demographic characteristics

Socio-demographic characteristics	Number of nurses	Percentage (n=150)
Age (years)		
20- 29	67	44.66%
30- 39	52	34.66%
More than 40	31	20.66%
Gender : Male	13	8.66%
Female	137	91.33%
Educational status		
GNM	77	51.33%
RGNM	66	44.00%
Bsc nursing	7	4.66%
Designation		
Incharge nurse	15	10.00%
Staff nurse	135	90.00%
Working experience (years)		
< 1	3	2.00%
1 to 3	27	18.00%
3 to 5	42	28.00%
5 to 10	42	28.00%
10 to 15	21	14.00%
15 above	15	10.00%
Training in Infection control received		
Yes	122	81.33%
No	28	18.66%

Maximum nursing staff were female (91.33%). Most of them were in age group between 20 to 29 years (44.66%). Regarding education of nurses, there were (51.33%) nurses having GNM degree than RGNM degree (44.00%) and Bsc nursing (4.66%). Around 15 (10.00%) nurses were holding the post of incharge and rests were staff

nurses (90.00%). 122 nurses had received educational training in infection control practices. Their working experience was calculated on a scale of less than 1 to maximum 15 years and around 42 nurses (28.00%) were found within 3 to 5 years and 5 to 10 years of working experience (28.00%). Maximum number of nursing staff was from surgery ward (22.67%) followed by orthopedics ward (20.00%) and medicine ward (14.00%)

Table 2 Assessment of knowledge (15 questionnaires with Yes/No response)

Number of knowledge questionnaires	No. of nurses (n=150) (YES)
1) Hand hygiene questionnaire : (5Q)	119
2) Personnel Protective Equipments questionnaire : (1Q)	122
3) Safety measures for prevention of needle prick injuries : (1Q)	132
4) Hospital acquired infections questionnaire: (5Q)	125
5) Hospital infection control policy questionnaire : (5Q)	106

Table 3 Grading of Knowledge score about infection control practices

Level of knowledge	Total Score (15 marks)	Number of nurses (n=150)
Poor Knowledge –(< 50 %)	< 7.5	29
Fair Knowledge –(50– 75%)	7.5 – 11.2	06
Good Knowledge – (>75%)	>11.2	115

Assessment of Attitude level (15 questionnaires on Likert’s scale)

The 15 questionnaire were divided into five parts. Hand hygiene carrying (1Q), personnel protective equipment (1Q), safety measures for prevention of needle prick

injuries (2Q), hospital acquired infections (6Q) and hospital infection control policy (5Q), respectively

It is observed that for fourteen questions, most of the nurses had given response as Agree and Strongly Agree (4 and 5 marks) and except for one question (Believe - needles should be recapped after use), maximum nurses had given strongly disagree and disagree response, which is expected.

Assessment of Practice level (25 questionnaires)

Response was divided into Always, sometimes and never with 2, 1 and 0 marks respectively. Always response was considered in our study and 2 marks was given to each 'Always' response. Therefore total score was 50

Table 4 Grading of Practice score about infection control practices

Level of Practice	Total Score (50 marks)	Number of nurses (n=150)
Poor Practice (< 50 %)	< 25 M	08
Fair Practice (50-75 %)	25- 37.5 M	92
Good Practice (> 75 %)	>37.5 M	50

Table 5 Cumulative (KAP) Knowledge, attitude and practice scores of nurses

	Knowledge	Attitude	Practice	Cumulative KAP score
No of respondents	150	150	150	450
Total marks	15	75	50	140
Minimum marks	1	24	10	35
Maximum marks	15	71	48	134
Mean Score	11.94	59.54	35.30	106.78
Percentage %	7.96	39.69	25.53	71.18
Standard Deviation	4.24	8.48	6.00	18.72

The mean score for knowledge was 11.94 (7.96%) with SD ± 4.24, for attitude the mean score was 59.54 (39.69%) with SD ± 8.48 and for practice mean score was 35.30

(25.53%) with SD ± 6.00. This indicates that scores for knowledge and attitude was good as compared to poor score in practices. Mean cumulative KAP score was good (71.18%) by considering their knowledge and attitude score but their practice score was comparatively lacking.

Table 6 Cumulative KAP scores of nurses

Category	Number of nurses	Percentage
Below Average (KAP<70%)	56	37.33
Average (KAP 70-80%)	74	49.33
Good (KAP 81-90%)	20	13.33
Very Good (KAP >90%)	0	0
Total	150	100

It was observed that maximum number of nurses had 'Average KAP' score of (49.33%), followed by below average score of (37.33%), followed by good score of (13.33%); while none of these nurses had very good KAP (>90%) score.

Table 7 Pearson's Correlation Coefficient between knowledge, attitude and practice score of nurses

		Knowledge	Attitude	Practice
Knowledge	r-value	1	0.689**	-0.402**
	p-value		0.0001,S	0.0001,S
	N	150	150	150
Attitude	r-value	0.689**	1	-0.232**
	p-value	0.0001,S		0.008,S
	N	150	150	150

There was positive (0.689) & highly significant (p= < 0.01) correlation between knowledge and attitude scores; indicating that nursing staff with higher knowledge has better attitude towards infection control. Significant (p= < 0.01) but negative correlation was found between knowledge and practices scores (r = -0.402) & attitude and practices scores (r = -0.232) of nurses for infection control .This shows that inspite of better knowledge and attitude

these nurses are significantly lacking at their practice level.

Table 8 Relationship of Practice score with Age groups

Age group (Years)	Practice score			Total
	Poor (< 25)	Fair (<25 to37.5)	Good (> 37.5)	
20 to 29	26 (38.8%)	32 (47.8%)	9 (13.4%)	67 (100%)
30 to 39	7 (13.5%)	19 (36.5%)	26 (50.0%)	52 (100%)
More than 40	1 (3.2%)	16 (51.6%)	14 (45.2%)	32 (100%)
Total	34 (22.7%)	67 (44.7%)	49 (32.7%)	150 (100%)

($X^2 = 29.912$; $p < 0.00$)

Good practice score (>37.5) was more in age group of 30 to 39 years(50%); this association between age group and practice score was statistically found highly significant.

Table 9 Relationship of Practice score with Education status

Education	Practice score			Total
	Poor (< 25)	Fair (25 to 37.5)	Good (> 37.5)	
Bsc nursing	1 (14.3%)	3 (42.9%)	3 (42.9%)	7 (100%)
RGNM	19 (28.7%)	30 (45.4%)	17 (25.7%)	66 (100%)
GNM	14 (18.2%)	34(44.2%)	29(37.7%)	77(100%)
Total	34 (22.6%)	67 (44.7%)	49 (32.7%)	150 (100%)

($X^2 = 7.948$; $p= 0.443$)

There was no significant association between education status and practice scores

Table 10 Relationship of practice score with duration of working experience

No. of years	Practice score			Total
	< 25(Poor)	25 to 37.5 (Fair)	>37.5 (Good)	
Less than 1	0(0%)	0(0%)	0(0%)	0(0%)
1 to 3	1(3.33%)	28(93.33%)	1(3.33%)	30(20%)
3 to 5	1(2.38%)	29(69.05%)	12(28.57%)	42(28%)
5 to 10	0(0%)	22(51.16%)	21(48.84%)	43(28.67%)
10 to 15	0(0%)	14(66.67%)	7(33.33%)	21(14%)

>15	0(0%)	6(42.86%)	8(57.14%)	14(9.33%)
Total	2(1.33%)	99(66%)	49(32.67%)	150(100%)

($X^2 = 22.44$; $p= 0.004$)

Good practice score was found highest in nurses with working experience more than 15 yr (57.14%) & lowest in nurses with working experience between 1 to 3 yr (3.33%). Relationship of practice score with duration of working experience was found highly significant ($p<0.05$).

Table 11 Relationship of Practice score with designation of nurses

Designation	Practice score			Total
	Poor (< 25)	Fair (25 to 37.5)	Good (>37.5)	
Incharge	0	10 (66.7%)	5 (33.3%)	15 (100%)
Staff nurses	57 (42%)	34 (25.4%)	44 (32.8%)	135(100%)
Total	57 (44.7%)	44 (29 %)	49 (32.7%)	150(100%)

($X^2 = 6.949$; $p = 0.33$)

Nearly same good practice score was seen in both, Incharge sisters (33.3%) and staff nurses (32.8%) and this association was not found significant ($p= >0.05$). No poor practice score was seen in incharge sisters but 42% staff nurses showed poor practice scores, which is cause of concern.

Table 12 Relationship of Practice score with training in Infection control practices.

Training in Infection control	Practice score			Total
	Poor (< 25)	Fair(25 to 37.5)	Good (>37.5)	
No	27 (96.4%)	0	1 (3.6%)	28 (100%)
Yes	7 (5.7%)	67(54.9%)	48(39.3%)	122 (100%)
Total	34 (22.7%)	67(44.7%)	49(32.7%)	150 (100%)

($X^2 = 1.069$; $p = 0.00$)

Good (39.3%) and fair (54.9%) practice score was found more in nurses who had undergone training in infection

control practices. While, poor practice score (96.4%) was seen in nurses who had not undergone training in Infection control practices and found highly significant ($p < 0.05$)

Table 13 (ANOVA) Relationship of work experience with cumulative KAP scores

Work Experience	N	Mean	Variance	Sum
Less than 1	0(0%)	0	0	0
1 to 3	30(20%)	89.83	18.43	2695
3 to 5	42(28%)	101.40	19.48	4259
5 to 10	43(28.67%)	117.04	15.83	50.33
10 to 15	21(14%)	113.71	16.03	2388
>15	14(9.33%)	116.78	16.74	1635
Total	150(100%)	106.73	20.32	16010

By using One way ANOVA test, statistically significant variation was found in mean KAP score among nurses with different working experience ($F= 12.36, P= 0.0001$)

Discussion

In present study, overall knowledge level of nurses towards infection control practices was found to be good; Johnson et al, Vaz et al and Labrangue et al^{8,9,10} also found that the nurses had good knowledge about infection control practices.

In present study, attitude level of nurses towards infection control practices was good. Hamed S et al¹¹ and Kelemua G et al¹² also noted good attitude level of nurses. Practice level of nurses towards infection control measures was lacking. Allah-Bakhshian et al¹³ also noted low level of Practice of nurses. In present study 92 nurses had fair practice level (50-75%) and 50 nurses had good practice level (>75%) and 08 nurses had poor practice level (<50%). Moghaddasian et al¹⁴ also noted that practice level of the nurses was at fair level. In present study, Mean cumulative KAP score of nurses was good (71.18) by considering their knowledge and attitude scores, but their practice score was comparatively lacking. Johnson et al, Vaz et al, Labrangue et al^{8,9,10} also observed good knowledge and attitude scores contrary to low practice

score. In present study, maximum number of nurses had an average KAP score (49.33%), followed by below average score (37.33%) and good score (13.33%). Abdurraheem et al¹⁵ who also found average grade of KAP score in nurses.

In present study, Pearson's Correlation Coefficient showed positive and significant correlation between knowledge & attitude scores; but significantly negative correlation between knowledge & practice score of nurses; attitude & practice score of nurses.

Figuroa et al¹⁶ showed that 85% of nurses, despite having good knowledge had poor practice levels. Mahmoudi and Hassani¹⁷ & Lou et al¹⁸ also showed that the mere having of knowledge does not lead to good practice. In present study, relationship of practice score was compared with age groups, working experience & training. And it was found significant ($p < 0.05$). Imad Fashafsheh et al¹⁹ also noted significant relationship between age groups, working experience, designation & training in infection control. In present study, no significant association was found between practice scores and education status & designation. Hamid et al²⁰ also reported no significant association between education status & designation and practice score of nurses.

In present study, ANOVA test showed significant variation in mean KAP score among nurses with different working experience ($F= 12.36, P= 0.0001$). Mean KAP score of nurses was not increasing in accordance with their working experience. Abdurraheem et al¹⁵, Johnson et al, Vaz et al, Labrangue et al^{13,14,15} also noted such significant variation in mean KAP score among nurses with different working experience.

Limitations

1. In our study, for convenience of data collection, those nurses (in specific wards and ICUs) who had voluntarily given consent were included in study.

Study involving all nurses working in all wards and ICUs will be more appropriate.

2. We had given questionnaire for infection control practice. Instead, direct observation of their practice will be more appropriate for true assessment of their practice levels.

Conclusion

- We found that although overall knowledge and attitude of nurses were satisfactory, there was gap in their practice levels. Hence it is essential to conduct structured training sessions for nurses addressing these gaps.
- There was significant relationship between practice score and nurses demographic characteristics such as age, duration of working experience and training in infection control practices but no significant relationship was found between practice score and education status & designation.

Recommendations

Based on results, the study recommended the following:

1. Regular educational training of nurses in infection control practice should be conducted to improve the practice levels.
2. Regular monitoring of infection control practice of staff nurses by infection control nurse with the help of checklist in monthly audit tool.
3. Those who are lacking in infection control practices after training courses; reinforce them and motivate them.
4. Activating the principle of rewards and punishment for nurses.

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