Effectiveness Practice-intervention Based Project on Knowledge, Attitude and Practice Compliance to Infection Control Measures and Factors Predicting Non-compliance among Nurses Working in Tertiary Care Hospital, Mangalore, India

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Abstract

Introduction: Safety practice adherence by the nurses is the important aspect in patient care health facilities. Their knowledge, attitude for and compliance with infection control practice is the primary target in any healthcare system. The present study planned to survey the knowledge, attitude and compliance (KAP) in infection control practice among the nursing staff and to evaluate the effect of practice -intervention based project where besides direct training programme, one to one by infection control trained staff to other nurse could be speculated.

Method: This was an experimental study with pre-test post-test design that included 2 groups of nurses (30 – group I(core); 50 –group II(trainee)) working in a tertiary care hospital. Structured knowledge questionnaires were designed to assess various aspects of knowledge; Likert scale to measure attitude and infection control compliance in pre and post training tests. **Results**: Compared to pre-test, there was comparable and sustained significant improvement of knowledge attitude and practice compliance in the subsequent post test results among both groups of nurses. Higher age group (odds ratio (OR) 6.037, 95% CI 0.706-51.621),low knowledge (OR 4.985, 95% CI 1.562-15.910), poor attitude (OR 1.114, 95% CI 0.474-2.622), unavailable infection control measures (OR 1.066, 95% CI 0.369-3.077), less time since training (OR 13.145, 95% CI 1.929-89.564), and working in surgical department (OR 8.043, 95% CI 1.97-32.838) showed higher odds of non-compliance to infection control practices.

Conclusion: This study illustrated the need of target based educational training interventions in any form of either direct or trained group training the other nurses, to improve the KAP in infection control practices.

Keywords: *Practice-intervention based project, Knowledge, Attitude, Compliance, Infection Control Practices, Nurses.*

Introduction

Healthcare/hospital acquired infections (HAIs) otherwise called nosocomial infection is associated with increased morbidity and mortality and predisposes healthcare workers (HCWs) to an increased risk of infections. HAI has grown into a major problematic area of patient safety, with estimation of more than 1.4 million patients worldwide in developed and developing countries affected at any time.[1] An estimated 10%-25% of hospitalized patients in developed and developing countries develop HAIs, and subsequently results in adverse healthcare outcomes as increased hospital stay,

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economic burden, significant morbidity, and mortality.[2] Challenges of lack of standardized infection prevention program in healthcare settings, deficient infrastructures, limited resources and poor quality of care contribute towards burden of HAIs.[3-.5]

HAIs are infections that were not present or incubating at the time of admission but contracted by the patient during the process of care in health care facility like, Hepatitis B, C virus, HIV, mostly can be transmitted by failure to practice infection prevention measures.[6]

Patient safety is the central concern of current healthcare delivery systems,[7] and it is an important indicator of health care quality. Nurses, who are responsible for the constant care of in-patients, can be the most reliable persons to incorporate their knowledge, attitude and practice compliance on several health related aspects, healthy habits and care among the patients.[8] An assessment of the knowledge, attitude and practice (KAP) of standard precautions by healthcare workers is a prerequisite for initiating and implementing a successful infection prevention and control (IPAC) strategy in any health facility. There are numerous evidences, [9, 10] that have shown that HCW display capricious KAP of standard safety measures in keeping with their professional group and duration of professional experience, among other factors. More professional experience, awareness and training in standard precautions, and high risk perception have all been associated with improved compliance with standard precautions among health workers.[11]

Limitation in current knowledge and practice, lack of attitude, type of work shift, professional experience and training can predict noncompliance to infection control. Hence this study was designed to find the factors that can predict the noncompliance and adopt a reliable and sustainable practice based training programme by nurses as trainer themselves to fellow colleagues to improve infection control practice.

Materials and Method

Subjects and Study Setting: This is an experimental study with pre-test post-test design where 2 groups of nurses (30 and 50 in number respectively) working in a tertiary care hospital with 960 beds were included in the study after obtaining institutional ethical clearance and informed consent. The study population consisted of registered nurses with valid state council number. No specific inclusion and exclusion criteria were applied in this study to include the nurses. Seventy other health professionals included in the first phase only were-physicians, medical interns and post graduates. Only those who were willing were included in the study.

Research Tools and Data Collection: Structured knowledge questionnaire, Likert scale to measure attitude and practice compliance were designed by researchers. Questionnaires and scales were validated by subject experts and Cronbach's alpha was used to calculate the consistency of questionnaire, (r=0.9). A pre-test survey was done based on these questionnaires. 70 other health professionals including doctors, post graduates and interns were included only during pre-test survey. Practice-intervention based project was implemented to the group 1 nurses (core group) by researchers for 2 hrs/day, for a week. It was imparted by pedagogue, demonstration using multimedia devices and practicing under direct observation. Posters on infection control and hand hygiene were displayed in prominent places. The bundles included; nursing bundles-Blood Streamline Infections (BSI) Form-adapted from CDC center, Surgical Site Infections (SSI) checklist, Urinary Tract Infections (UTI) check list.

Three Post-test surveys were done at interval of one month for 3 months to check the sustainability of training. Similarly these trained nurses of group 1 (core group) trained 3-4 nurses(trainee group) each in their respective units. Infection control pamphlets were also displayed in prominent places of hospitals. The time take for the administration of tools and collection of data lasted for 15-20min for a subject.

Chi square test was used to analyse the difference between two groups of nurses, and differences in pre and post-test performances. Ordinal regression with plum analysis was used to find the factors predicting non-compliance.

Ethical Considerations: The study protocol was approved by the Institutional Ethics Committee (IEC/ Rev/22/2015-16). All subjects were informed about the purpose of the study and obtained written informed consent. The questionnaires were anonymous, and the confidentiality of study data was emphasised.

Results and Discussion

Out of 30, group-1 nurses, 50 group-2 nurses, 27 and 42 belonged to 20-30 years age group respectively. Twenty six group 1, 29 group 2 nurses worked in surgical and the rest in orthopaedics department. Twenty group

1 and 42 group 2 nurses had professional experience between 1-3 years and the rest had < 1 year experience. Twenty group 1 nurses and 44 group 2 nurses had alternate shift work pattern. All had participated in 1 day training programme in infection control prior to the study. Twenty seven group 1 and 44 group 2 nurses had participated in infection control workshop less than 6 months back; the rest more than 6 months back.

Table No. 1: Pre test vs. Post test of Knowledge, attitude and practice compliance in group 1 nurses.

Attribute (number of responses each item) Pre Test		Test Status (number of nurses in each group, n-30)				Chi Square	Sig
		Post Test 1	Post Test 2	Post Test 3	X^2	p	
Knowledge	Correct	40(33.3%)	114(95.0%)	114(95.0%)	112(93.3%)		
	Incorrect	707(57.5%)	45(3.7%)	89 (7.2%)	97(7.9%)	23.78	0.001***
Attitude	Strongly Disagree	72(9.2%)	6(0.8%)	3(0.4%)	2(0.3%)	143.08	<0.001***
	Disagree	95(12.2%)	0	0	0		
	Neutral	144(18.5%)	15(1.9%)	15(1.9%)	11(1.4%)		
	Agree	220(28.2%)	214(27.4%)	214(27.4%)	174(22.3%)		
	Strongly Agree	249(31.9%)	545(69.9%)	548(70.3%)	593(76.0%)		
Compliance	never	69(11.5%)	30(5.0%)	30(5.0%)	30(5.0%)	182.24	<0.001***
	seldom	93(15.5%)	0(0.0%)	0(0.0%)	0(0.0%)		
	sometimes	205(34.2%)	8(1.3%)	8(1.3%)	8(1.3%)		
	usually	117(19.5%)	91(15.2%)	91(15.2%)	91(15.2%)		
	always	116(19.3%)	471(78.5%)	471(78.5%)	471(78.5%)		

Table No. 2: Pre test vs. Post test of Knowledge, attitude and practice compliance in group 1 nurses.

Attribute (number of responses each item) Pre Test		Test Status (number of nurses in each group, n-30)				Chi Square	Sig
		Post Test 1	Post Test 2	Post Test 3	X^2	p	
Knowledge	Incorrect	1373(67.0%)	67(3.3%)	104(5.1%)	102(5.0%)	15.35	0.018*
	Correct	677(33.0%)	1983(96.7%)	1946(94.9%)	1948(95.0%)		
Attitude	Strongly Disagree	158(12.2%)	15(1.2%)	7(0.5%)	3(0.2%)	267.52	<0.001***
	Disagree	47(3.6%)	0(0.0%)	6(0.5%)	0(0.0%)		
	Neutral	329(25.3%)	25(1.9%)	45(3.5%)	10(0.8%)		
	Agree	362(27.8%)	343(26.4%)	305(23.5%)	241(18.5%)		
	Strongly Agree	404(31.1%)	917(70.5%)	937(72.1%)	1046(80.5%)		
Compliance	never	115(11.7%)	50(5.0%)	50(5.0%)	48(4.8%)	197.05	<0.001***
	seldom	121(12.1%)	0(0.0%)	0(0.0%)	2(0.2%)		
	sometimes	252(25.2%)	42(4.2%)	29(2.9%)	29(2.9%)		
	usually	210(21.0%)	149(14.9%)	113(11.3%)	113(11.3%)		
	always	300(30.0%)	759(75.9%)	808(80.8%)	808(80.8%)		

Table No. 3: Pre-test survey results of knowledge, attitude and practice compliance in nurse and other health professionals

		Pre Test in Multiple Groups			Total X^2	Chi Square	Sig
		Group 1 Nurse n-30 (%)	Group 2 Nurse n-50 (%)	Other Health Professionals		p	
K	Incorrect Response	707 (57.5%)	1373(67.0%)	880(34.9%)	2960	2.01	0.73
	Correct Response	523 (42.5%)	677 (33.0%)	1640 (65.1%)	2840		
	Total	1230	2050	2520	5800		
ATT	Strongly Disagree	72 (9.2%)	158 (12.2%)	35 (2.1%)	265	60.99	<0.001***
	Disagree	95 (12.2%)	47 (3.6%)	85 (5.1%)	227		
	Neutral	144 (18.5%)	329 (25.3%)	166 (9.9%)	639		
	Agree	220 (28.2%)	362 (27.8%)	411 (24.5%)	993		
	Strongly Agree	249 (31.9%)	404 (31.1%)	983 (58.5%)	1636		
	Total	780	1300	1680	3760		
C	never	69 (11.5%)	117 (11.7%)	0	186	7.276	0.201
	seldom	93 (15.5%)	121 (12.1%)	0	214		
	sometimes	205 (34.2%)	252 (25.2%)	0	457		
	usually	117 (19.5%)	210 (21.0%)	0	327		
	always	116 (19.3%)	300 (30.0%)	0	416		
	Total	600	1000	0	1600		

Legend to Table.No.3, P<0.05-sig;<0.01-highly significant;<0.001-very highly significant; HH(Hand hygiene) K (Knowledge) C(Compliance) ICM(Infection control measure) ICP(Infection control practice) ATT(Attitude)

Table No. 4: Factors predicting noncompliance to infection control amongst nurses

	Non-Compliance	Sig	OR	95% CI		X^2 walds
				UL	LL	
Age in years	41-50	.836	1.291	.116	14.418	.043
	31-40	.101	6.037	.706	51.621	2.696
	20-30		1	-	-	-
Area of work	Medical	NA	-	-	-	-
	Surgical	.004*	8.043	1.970	32.838	8.436
	Ortho					
Experience in years	<1	.046*	3.436	1.022	11.549	3.982
	1-3		1	-	-	-
	3-6	NA	-	-	-	-
	>6	NA	-	-	-	-

	Non-Compliance	Sig	OR	95% CI		X^2 walds
				UL	LL	
Work shift	Alternate	.467	1.843	.355	9.565	.530
	nightshift	.836	.724	.034	15.468	.043
	long day		1	-	-	-
Time since training in months	>12	NA	-	-	-	-
	6-12	.009**	13.145	1.929	89.564	6.923
	<6		1	-	-	-
Knowledge	Incorrect	.007*	4.985	1.562	15.910	7.360
	Correct		1			
Attitude	Not agree	0.804	1.114	.474	2.622	0.061
	agree		1	-	-	-
ICM Available	Not	.907	1.066	.369	3.077	.014
	Some extent	1	-	-	-	

Legend to Table No.4, ICM-Infection control measures, P<0.05-sig;<0.01-highly significant;<0.001-very highly significant;

According to the present study results, nurses' knowledge of infection control was low at the pre-intervention phase of study.[12] The study demonstrated significant improvement in knowledge regarding all the areas of infection control, attitude towards infection control and practice compliance in both group 1 and group 2 nurses after training. A similar improvement in infection control measures of nurses was testified in similar studies.[13,14] This improvement was sustained during the next 3 consecutive post-tests that were conducted at one month intervals (Table No. 1 and 2).

Other health professionals (physicians, interns and postgraduates) had better knowledge and attitude though not significant, when compared with both group of nurses in some areas (Table No. 3).[15] Other health professionals positively associated with a better knowledge & attitude for compliance practices compared to nurses, this could be explained by the heterogeneity of both the subject groups, their higher educational qualification (level) and training programmes they had undergone.[16] This result is in contrast to study done at Amhara region, and this difference might be due to the sampling size, study participants.[17.]

Age group higher than 30 years has more odds of being non-compliant when compared younger one. Interesting to notice nurses working in surgical departments had significantly higher odds of being non-compliant when compared with others. Nurses with professional experience of less than 1 year had significantly higher odds of non-compliance compared with more experienced nurses which is in line with the study in Bahirdar city.[18] Maybe with increasing work experience in clinical setting was their motivation for further self-learning.

Nurses with alternate shifts in working had higher odds of non-compliance, because of the irregular pattern with the disturbed working pattern showed to impact on the patient care and the safety practices due to mental fatigue, which was in hand with similar study assessed impact of working of nurses on patient safety.[19]

Moreover, this study showed that when infection control measures guidelines were not available, nurses had higher odds of non-compliance (Table no. 5) which was in line with the study conducted in Nigeria [20]and Australia.[21] Findings in this study also depicts, nurses with incorrect knowledge and poor attitude had poor compliance suggesting that all these factors are interlinked to some extent and invariably impact the patient safety.

It is interesting to note that young nurses showed a better knowledge, attitude and compliance to practice compared to other elder nurses who are recently trained. This can be addressed by routinely conducting training programmes to these groups of nurses comprising of seminars, Continue Nursing Education sessions. They should be encouraged to interact with other less skilled nurses in the unit thereby exert a positive influence on their knowledge, attitude towards practice compliance.

Conclusion: as the practice based intervention was indeed effective to enhance the knowledge, compliance of nurses' in infection control, identified dome predictors for the poor compliance among nurses. This study illustrated the need of educational training interventions to improve the KAP practice compliance among the nurses and one to one training method effectively be implemented.

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