A Study To Explore The Need Of In-Service Education On Intravenous Catheter Related Infections (CRI) For Staff Nurses Working In Christian Medical College &Hospital, Ludhiana, Punjab.

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Abstract: Every health care agency is accountable to provide the best quality, safe and cost effective care to its clients. One of the indication of quality care is rate of Hospital Acquired Infections(HAI). The agency is responsible to ensure that all care providers specially nurse are taught to Know and use Practice-standards for strict infection control measures. The study was undertaken to explore the need of In-Service Education on intravenous Catheter Related Infections (CRI) for staff nurses working in Christian Medical College & Hospital, Ludhiana Punjab.

Objectives: To assess the knowledge level of staff nurses regarding intravenous Catheter Related Infections(CRI),to assess the practice-standards level of staff nurses regarding prevention of intravenous CRI, to find out the correlation between staff nurses' knowledge and practice-standards of intravenous CRI, to identify the relationship of staff nurses' knowledge and practice-standards with selected personal and professional factors i.e. gender, age group, professional experience, professional qualification, present working areas, In-service education and any presentation/study on intravenous CRI, to determine the need of In-service Education on intravenous Catheter Related Infections on the basis of deficits in staff nurses' knowledge and practice-standards. Evidence-based Practice model was used by the nurse researcher to conceptualize, gain insight of research question, plan, generate evidence and translate the findings for bringing a change. **Method:** A quantitative research approach and non-experimental exploratory research design was adopted for the study. Data was collected through self-developed, validated and reliable knowledge questionnaire and practice-standards checklist. The data collected from 100 nurses was organized, tabulated, analysed and interpreted using descriptive and inferential statistics. **Findings:** It revealed that majority (41%) of staff nurses had below average level of knowledge regarding intravenous CRI. Maximum knowledge is in the areas of concepts of I/V catheter related infections and least in the area of host related factors/complications. All the staff nurses (100%) did not meet the expected practice- standards related to intravenous CRI. A weak positive relationship was found between staff nurses' knowledge and practice-standards. Significant relationship was found between staff nurses' knowledge and professional qualification (at $p<0.05$). **Conclusion:** The staff nurses' knowledge and practice-standards of intravenous CRI did not meet the set criteria and deficits were found in tem analysis. Therefore, the investigator planned and conducted research-evidence based ISE programme on intravenous CRI with a view to improve staff nurses' knowledge and practice-standards for prevention of intravenous CRI and promote best quality, cost effective, safe care to the patients.

Key words: Intravenous Catheter Related Infections, staff nurses, Knowledge and Practices, In-service Education.

INTRODUCTION

"Neglect starts out as an infection then becomes a disease" -(Jim Rohn)[1]. Infection is the invasion and multiplication of disease causing agents, into a living organism's body tissues and the reaction of host tissues to these organisms and the toxins they produce (Webster's New world medical dictionary)[2]. A considerable proportion of critically ill patients acquire an infection during their stay in an intensive care unit and the frequency of these infections varies considerably in different population and clinical settings. Patient care is

provided in facilities which range from highly equipped clinics and technologically advanced university hospitals to frontline units with only basic facilities (Mayor-White RT, Ducel G, Kereselidze T, Tikomirov E, 1988)[3]. Transmission of infection within a health care setting requires three agents,a reservoir, susceptible host, and a mode of transmission. Patients' health care workers and visitors are susceptible host in the hospital environment. The complex interrelationship between a potential host and an infectious agent produces infection. The mode of transmission may vary by type of organism as some types of organism may be transmitted more than one route. The complex interrelationship between a potential host and an infectious agent produces infection (Siegel Rhinehart, Jackson, &Chiarello, 2007)[4]. Approximately, 90% of all patients entering the hospital environment for care have some form of intravenous therapy during their hospital stay. The duration of the intravenous site may range from minutes to months and should be the first criteria to consider when selecting an IV catheter. The primary goal of the healthcare provider is to select the appropriate IV device and initiate therapy with the shortest, smallest gauged catheter that is therapeutically and economically necessary to sustain the treatment effect safely. Reported incidences of phlebitis ranged from 10% to 90% of peripheral IV with symptoms occurring within eight hours of placement.

NEED OF THE STUDY:

Intravenous (IV) catheters are now reported to be the single most common source of bacteremia and fungemia. Central Venous Catheters (CVC) and other Intra Venous Catheter are widely used in critically ill patients throughout the developed world. Approximately 5millions CVCs are used in United States each year. Each year approximately 80,000 CVCs associated blood stream infection occurs in patients in ICU and up to 250,000 occurs throughout the health care system. There are two major source of blood stream infection associated with any intravascular device. **(Warren DK, Cosgrove SE, Diekema DJ, et al,2006)[11]**

A descriptive study of nosocomial infection in critically ill patients was conducted in Christian Medical College and Hospital, Ludhiana, Punjab. The study revealed that out of 26 patients, Pseudomonas aeruginosa was found in 8(30.77%) patients, E. coli in 6(23.07%) patients, Acinetobacter baumannii in 12 (46.15%) patients, MRSA in 3 (11.54%) patients, Entercocci in 2 patients and Klebseilla in 9(34.62%) patients. There were 10 patients who had more than one organism. Only 1(1.67%) patient had candida albicans infection.26 (43.33%) had respiratory tract infection followed by other localized/wound infection 15(25%) than urinary tract 5(8.33%) and GI tract 2(3.33%). Out of 60 CIP, 41(68.33%) had system wise infection followed by generalized infection, 19(31.67%). Out of these 41 patients, 7 patients had more than one manifestation. Nosocomial infection occurrence had significant relationship ($p<0.05$) with low immunity, antimicrobial resistance, fomites lying on the bedside, invasive procedures and presence of open wounds/ulcers/impaired skin integrity**. (Kumari Bandana,2014)[20]**

RESEARCH METHODLOGY

The study is conducted on staff nurses working in Christian Medical College and Hospital, Ludhiana. The hospital was established in the Year 1894 by a Christian Missionaries under the principal ship of Dr. Edith M. Brown, primarily to provide medical education in Christian environment for Christian Women. It is a leading mission and teaching institution in Punjab. In this study target population refers to all staff nurses (NT=750) working in Christian Medical College and Hospital, Ludhiana, Punjab. Accessible population was staff nurses working in purposively selected areas of CMC&H, Ludhiana. (NA=350) and sample size was 100 staff nurses.

Research approach: Quantitative research approach.

RESEARCH DESIGN: Exploratory research design.

THEORITICAL FRAMEWORK: The researcher adopted Evidence Based Practice described by John's Hopkins in 2015 for conceptual framework.

SETTING OF THE RESEARCH STUDY: The sample of the study was s collected from medical ward, surgical ward, ICUs, HDUs, ICCU, Neurosurgery, Labor room at Christian Medical College and Hospital, Ludhiana, Punjab.

TARGET POPULATION: Staff Nurses working at CMC&H, Ludhiana ($N_{T=750}$).

ACCESSIBLE POPULATION: Staff Nurses working in purposively selected areas at Christian Medical College and Hospital, Ludhiana, Punjab (N_A=350).

SAMPLE SIZE: 100 Staff Nurses.

SAMPLING TECHNIQUE: Non-probability purposive sampling technique.

TOOLS OF DATA COLLECTION: A structured 'Need for ISE Assessment Performa (NIAP) was developed comprising of:

Part I Personal and Professional factors Part II: knowledge questionnaire was constructed to assess the staff nurses knowledge on intravenous Catheter Related Infections (CRI) with areas. Part III: Practice standards checklist.

Assessment: The staff Nurses knowledge was assessed using knowledge questionnaire and the practice-standards was assessed by a non-participatory observation along with the interrater using practice checklist.

Intervention: In-service education on intravenous Catheter Related Infections for the staff nurses' working in Christian Medical College & Hospital was planned and implemented in order to ensure patient safety and quality assurance in health.

DATA ANALYSIS: Descriptive and Inferential statistics.

RESULTS: The raw data collected and organized, entered in master sheet, tabulated, analyzed and interpreted as per the objectives. The data was analyzed by using descriptive statistics (percentage, mean, standard deviation) and inferential statistics (Karl Pearson's coefficient of correlation, ANNOVA, t test).

Table: 1 Frequency and percentage distribution of staff nurses in the sample according to personal and professional characteristics.

N=100

Personal & Professional characteristics	N=100 staff Nurses	
	n	**%**
1. Gender		
a) Male	33	33
b) Female	67	67
2. Age Group		
a) Young adult (21-30years)	71	71
b) Early middle age (31-50years)	29	29
c) Late middle age (above 50years)	0	0
3. Professional experience		
a) Newly appointed/fresher(<1year)	0	0
b) Junior staff(1-5years)	56	56
c) Senior staff(>5years)	44	44
4. Professional qualification		
a) GNM diploma	65	65
b) B.sc Nursing	30	30
c) Post basic B.sc Nursing	5	5
d) Any other specialization	0	0
5. Present working area		
a) Medical ward	32	32
b) Surgical ward	17	17
c) HDU's	6	6
d) ICU's	14	14
e) Cardiology ward	11	11
f) Labour room	7	7
g) Neurosurgery ICU	13	13
6. In-service education		
a) Received	64	64
b) Not received	36	36
7. Presentation/study on IV/CRI		
a) Done		
b) Not done		

	33 67	33 67

Table 1 depicts the distribution of staff nurses according to their personal & professional characteristics. i.e., gender, age group professional experience, professional qualification, present working area, In-service education on CRI, presentation/study on intravenous Catheter Related Infections (CRI). According to gender, majority of nurses were females 67(67%) and 33(33%) were males. According to age, majority of nurses were in the young adult age 71(71%) followed by the early middle age 31-50 years 29% and none in the late middle age. Most of them (56%) had the experience of >5years,56(56%) were junior staff nurses and 44(44%) were senior staff nurses. The finding shows that out of 100 nurses, 65% did GNM ,30%nurses did Basic B.Sc. Nursing and only 5% nurses did Post.Basic.Bsc nursing training. Majority 64% nurses received In-service education on CRI where 36% did not receive. The staff nurses who did presentation/study on IV/Catheter Related Infections were 33% and 67% has not done any study/presentation on the topic.Hence, it can be concluded that the study sample comprised of mostly female nurses, who were young adults and junior nurses having 1-5years of professional experience. Majority of them received In-service education on infection control/ CRI and majority had not done presentation/study on IV/CRI.

Table 2: Percentage distribution of staff nurses according to level of knowledge regarding intravenous Catheter Related Infections (CRI).

	staff nurses (N=100)	
Knowledge levels related to i/v CRI	**Score range**	**% of f**
Very good	>38	0
Good	32-38	20
Average	25-31	39
Below average	<25	41

Maximum score=50
Minimum score=0

Table 2 indicates 41% nurses having below average knowledge level (score <25) followed by 39% at average level (score range 25-31), only 20% gave evidenced of good knowledge (score range 32-38) and none of them (0%) at excellent level (score >38).Hence, it was concluded that majority of staff nurses exhibited below average knowledge level regarding intravenous Catheter Related Infections (CRI). Therefore there was a need for improvement in knowledge.

Table 3: Frequency and percentage distribution of staff nurses according to practice-standards level regarding intravenous I/V Catheter Related Infections (CRI)

		Staff nurses (N=100)	
Practice standards related to i/v CRI	**Score**	**f**	**%**
Standards Met	≥36	0	0
Standards Not met	<36	100	100

Maximum Score=40

Minimum Score= 0

Table 2 depicts that all the staff nurses in the sample (100%) had 'standard not met' (score <36) level of practice and none of the staff nurses (0%) met the expected standards of practice (score ≥36) related to intravenous Catheter Related Infections (CRI).Hence, it was concluded that majority of the staff nurses in the hospital were not meeting the expected practice-standards related to intravenous Catheter Related Infections and there was need for improvement.

Table 3: Mean, Standard Deviation and coefficient of correlation between scores of staff nurses' knowledge and practice-standards domains regarding intravenous Catheter Related Infections (CRI)

N=100

Domains	**Staff nurses' knowledge and practice- standards score**				
	Max. score	Mean score	Mean %	SD	r
Knowledge	50	25.91	51.82	6.74	0.24
Practice-standards	40	27.06	67.65	2.06	

Table 3 depicts staff nurses' mean knowledge score (25.91/51.82) and mean practice standards score (27.06/67.65%) related to intravenous Catheter Related Infections. The correlation between the two domains was 0.24, showing a weak positive correlation between knowledge and practice standards scores of staff nurses regarding intravenous Catheter Related Infections (CRI).Hence, it was concluded that staff nurses' knowledge and practice-standards of I/V CRI are positively correlated indicating that increase or decrease in score of one domain (knowledge) directly influences increase or decrease in the other domain (practices) to some extent.

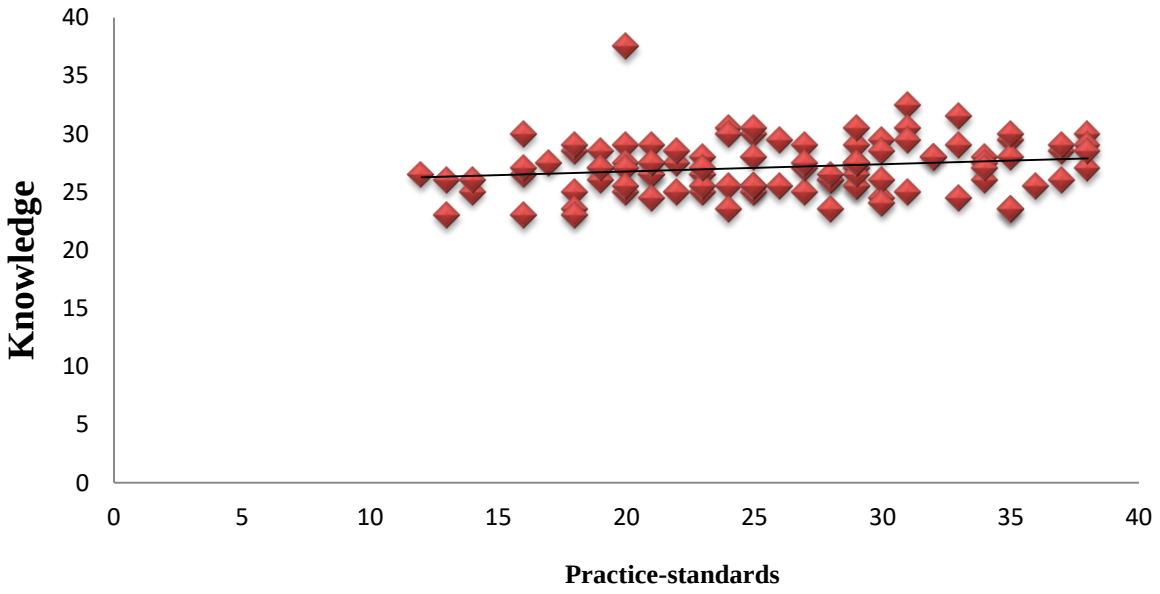

Figure:1 Correlation between knowledge and practice-standards scores of staff nurses related to intravenous Catheter Related Infections

Table 4: Mean, Standard Deviation and Z test of knowledge score of staff nurses regarding intravenous Catheter Related Infections according to personal factor: Age group

N=100

Personal factor:	**staff nurses' knowledge score**			
Age group	**N**	**Mean**	**SD**	**Z**
a. Very young (21-30Years)	71	26.66	6.86	2.04*
b. Young adult (31-40Years)	29	23.86	5.92	
c. Middle age (>40 Years)	0	-	-	

Table 4. depicts the frequency, mean, standard deviation, Z test of staff nurses mean knowledge score. According to age group young adults (21-30 years) obtained higher mean score (26.66) than those who were in early middle age group (31-50years) (23.86). The calculated Z value (2.04) is more than the table value (2). The difference in mean was found to be statistically significant at $p<0.05$ level.Hence, it can be concluded that difference in age group of staff nurses has a significant relationship with knowledge regarding intravenous Catheter Related Infections.

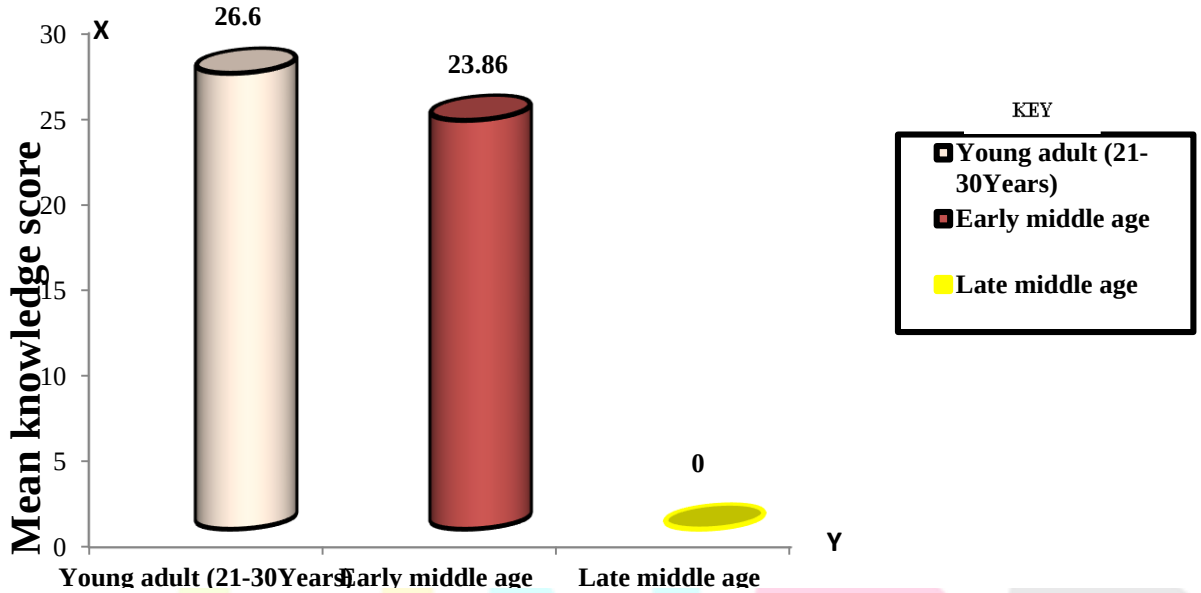

Figure 2: Mean knowledge score of staff nurses regarding intravenous Catheter Related Infections according to personal factor: age group.

Table 5 :Mean, Standard Deviation and t test of staff nurses Knowledge Score regarding intravenous Catheter Related Infections (CRI) according to professional factor: professional Experience.

N=100

Professional factor	**Staff Nurses Knowledge Score**			
Professional Experience (in years)	**n**	**Mean**	**SD**	**Z**
a) Newly appointed (<1year)	0	-	-	
b) Junior (1-5years)	56	27.25	6.39	2.44*
c) Senior (>5years)	44	24.06	6.22	

Maximum score=50 * Significant at p<0.05level
Minimum score=0

Table 5 depicts that the mean knowledge score was higher (27.25) among staff nurses with professional experience (1-5) years followed by those with >5years of experience (24.06). Analysis was done with Z test. The calculated Z value (2.44) is more than the table value (2). Hence it is statistically significant at p<0.05 level. Hence, it can be concluded that years of professional experience had an impact on staff nurses' knowledge about intravenous Catheter Related Infections.

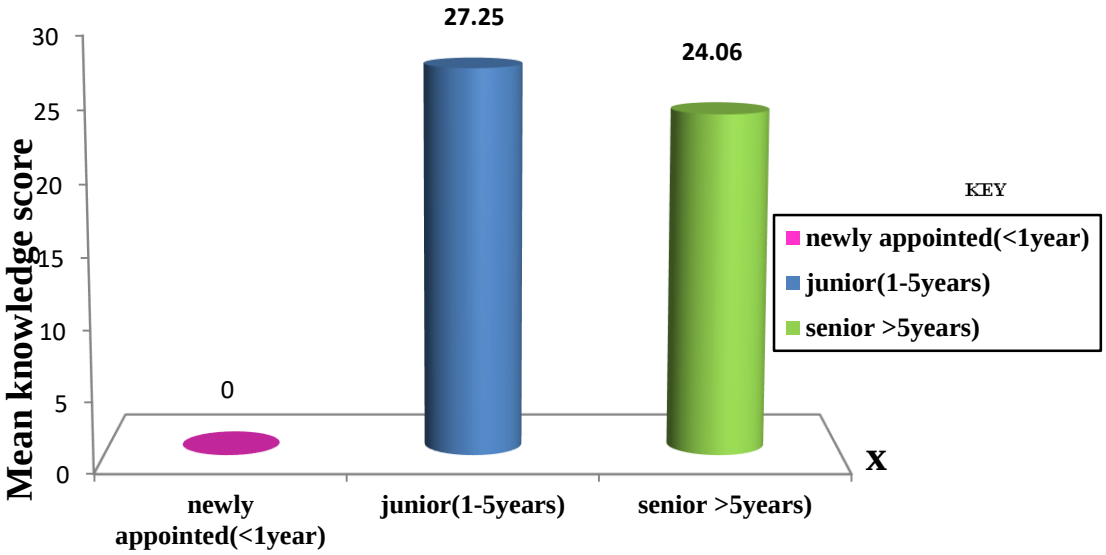

Figure 3: Mean knowledge Score of staff nurses' regarding intravenous Catheter Related Infections (CRI) according to professional factor: professional experience.

Table 6: Mean, Standard Deviation, Z test of practice score of Staff Nurses regarding intravenous Catheter Related Infections (CRI) according to Personal factor: gender N=100

Professional factor	Staff Nurses			Practice Score
Gender	n	Mean	SD	Z
Male	33	27.9	1.60	3.05*
Female	67	26.6	2.50	

Maximum Score=40 * Significant at p<0.05level
Minimum Score=0

Table 6 depicts the mean, standard deviation and Z test, depicts the frequency, mean, and standard deviation, and Z value. Male Staff nurses obtained highest mean score (27.9) followed by female Staff nurses (26.6). Difference in mean score was analysed with Z test. The calculated Z value (3.05) is more than the table value (2). Hence it is statistically significant at p<0.05 level. Hence, it can be concluded that gender had significant impact on practice score of staff nurses' regarding intravenous Catheter Related Infections.

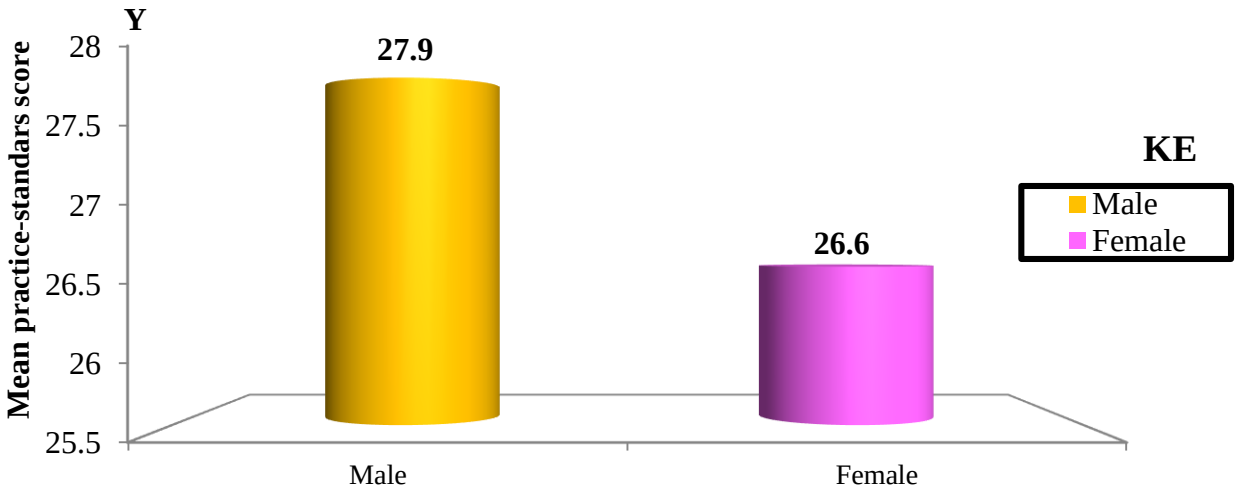

Figure: 4 Mean, score of staff nurses practice-standards regarding intravenous Catheter Related Infections (CRI)according to personal factor gender.

Table 7: Mean, standard Deviation, Z test of staff nurses practice score of Staff Nurses regarding intravenous Catheter Related Infections (CRI) according to Professional factor: age group

N=100

Professional factor	**Staff Nurses Practice Score**			
Age group	**n**	**Mean**	**SD**	**Z**
a)Very young adult(21-30)	71	27.3	2.04	2.06*
b) Young adult (31-40)	29	26.4	1.98	
c)Late middle age (>40)	0	-	-	

Maximum Score=40 * Significant at p<0.05level
Minimum Score=0

Table 6 depicts the frequency, mean, standard deviation, Z test. Staff nurses who were (21-30 years) has obtained highest mean score (27.3) followed by those who were (31-50years) (26.4). Difference in mean score was analyzed with Z test.The calculated Z value (2.06) is more than the table value (2). Hence it is statistically significant at p<0.05 level. Hence, it can be concluded that age group had significant impact on practice score of staff nurses' regarding intravenous Catheter Related Infections.

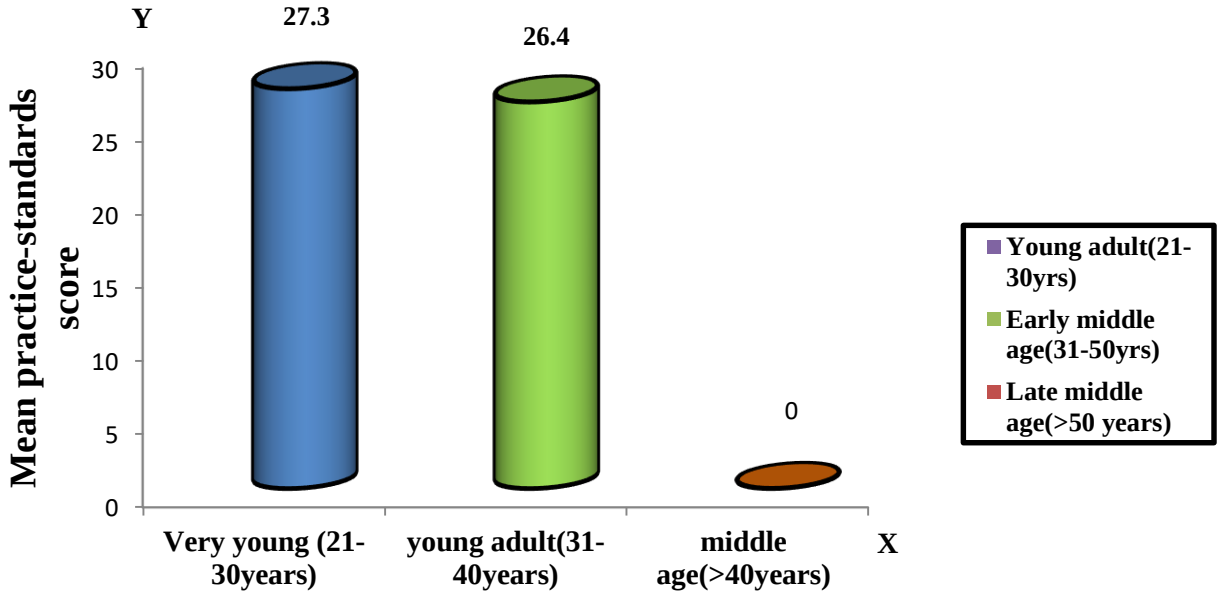

Figure: 5 Mean practice-standards score of staff nurses regarding intravenous Catheter Related Infections (CRI) according to Personal factor: age group.

DISCUSSION

The analysis of data according to sample characteristics revealed that according to gender, majority of nurses were females 67(67%) and 33(33%) were males. According to age, majority of nurses were in the young adult age 71(71%) followed by the early middle age 31-50 years 29% and none in the late middle age. Most of them (56%) had the experience of >5years,56(56%) were junior staff nurses and 44(44%) were senior staff nurses. The finding shows that out of 100 nurses, 65% did GNM ,30%nurses did Basic B.Sc.Nursing and only 5% nurses did Post.Basic.Bsc nursing training. Majority 64% nurses received In-service education on CRI where 36% did not receive. The staff nurses who did presentation/study on IV/Catheter Related Infections were 33% and 67% has not done any study/presentation on the topic.

The analysis of data according to the objectives reveals that staff nurses (41%) had below average knowledge level followed by 39% at average level(score range (25-30), only 20% evidenced good knowledge score(33-38) and none (0%)had excellent level regarding intravenous Catheter Related Infections(CRI) and (100%) staff nurses had standard .The above discussion on major findings related to knowledge and practices of staff nurses regarding intravenous Catheter Related Infections(indicates CRI) clearly indicates that nurses do lack expected level of knowledge and practices. Therefore, there is a need for In-service education on intravenous CRI.s not met level of practice.

CONCLUSION

The present study was undertaken by the investigator to assess the level of knowledge and practices of staff nurses working in Christian Medical College & Hospital, Ludhiana, Punjab. The main aim was to gain insight into the staff nurses' knowledge and practices regarding intravenous Catheter Related Infections with a view to find the deficits and plans an In-service education programme. The study design and methodology was conceptualized on the basis of John Hopkin's evidence-based practice with the assumption that staff nurses' knowledge and practices is not up to the expected excellent standard, putting patients' safety at risk. Demanding immediate attention of nursing educators and administrators.

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