An Exploratory Study to Assess the Knowledge Regarding Common Infections in Critically ill Clients Among Staff Nurses Working in Christian Medical College and Hospital, Ludhiana, Punjab.

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ABSTRACT

The present study was undertaken by the Investigator to Assess the Knowledge Regarding Common Infections in Critically ill Clients Among Staff Nurses Working in Christian Medical College and Hospital, Ludhiana, Punjab and to conduct a class on common infections in critically ill clients for staff nurses with a view of develop positive attitude and improve the knowledge. The study was conducted with objectives to assess the level of knowledge regarding common infections in critically ill clients among staff nurses, to ascertain relationship between the knowledge among staff nurses regarding common infections in critically ill clients with selected variables like age, gender, professional qualification, training institute, professional experience, area of work and source of information, to identify the deficit area of knowledge among staff nurses regarding common infections in critically ill clients, to prepare & conduct a class regarding common infections in critically ill clients among staff Nurses. Aim of the study is to gain insight about knowledge regarding common infections in critically ill clients among staff nurses and plan to conduct a class for Critical Care nurses to improve the knowledge. Quantitative research approach and non-experimental research was used to accomplish the state objectives. The conceptual framework was based on Fitts and Posner Theory (1967) of learning. Data was collected with the help of Self Structured Knowledge questionnaire. Subject were chosen by the purposive Sampling technique and sample size was 100.The data collected were analysed using descriptive and inferential statistics. The findings revealed that majority of staff nursing 55% were having average level of knowledge, followed by 23% having good level of knowledge ,18% of the staff nurses having below average level of knowledge and only 4% of staff nurses had excellent level of knowledge. The area of mean percentage of knowledge score among staff nurses was highest deficit 62.5% (rank1) regarding CAUTI, followed by 63.78 % (Rank 2) which was CLABSI. The lowest mean percentage of knowledge deficit score was 64.14% (rank 3) about VAP. Age, Training Institute, Professional Experience had significant impact on knowledge of staff nurses regarding Common Infections in Critically Ill clients. Based on assumption and to full fill the aim of study, Structured teaching was conducted for staff nurses to bring awareness on Common infections in Critically ill Clients.

Key: Knowledge, Staff Nurse, Common Infections in Critically ill Clients.

BACKGROUND OF STUDY

An observational research study was conducted on central line-associated bloodstream infections in Intensive care units on 58 ICU patients. A self-structured multiple-choice questionnaire was used. This study showed, male patients developed sepsis 43%, 37% had Staph. Aureus, and the fatality rate was 24.1 percent. Infection with CLABSI is best preventive rather than treated. It has a high mortality rate of 24.13 %. It might appear with varied degrees of sepsis severity. Organ failure, multi-organ involvement, TLC abnormalities, oliguria, altered mental status, and hypotension are all indicators of a bad prognosis. CLABSI infection prevention is best rather than cured. To establish guidelines, protocol to improve knowledge, treatment & prevention. **(Rode A, Bansod P.Y, Gujela A, Singh A, 2017)**[14]

An exploratory research study was conducted to assess 60 Critical Care nurses' knowledge of the Ventilator Care Bundle in the prevention of ventilator-associated pneumonia at Symbiosis International (Deemed University),

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Pune, India. These patients were anticipated to be cared for by nurses in an intensive care unit setting. The nurses should be well-versed in the various modalities of ventilation, as well as the evaluation and troubleshooting of ventilators, as well as the evaluation and care of patients who require mechanical ventilation. More than half of the staff nurses (56.7%) were found to have ineffective knowledge and 43.3 percent of them had good understanding of the ventilator care bundle, indicating that staff nurse knowledge and compliance with the ventilator care bundle have a substantial relationship. **(Dumbre DU, 2019)**[15]

JUSTIFICATION

An observational research study was conducted on central line-associated bloodstream infections in Intensive care units on 58 ICU patients. A self-structured multiple-choice questionnaire was used. This study showed, male patients developed sepsis 43%, 37% had Staph. Aureus, and the fatality rate was 24.1 percent. Infection with CLABSI is best preventive rather than treated. It has a high mortality rate of 24.13 %. It might appear with varied degrees of sepsis severity. Organ failure, multi-organ involvement, TLC abnormalities, oliguria, altered mental status, and hypotension are all indicators of a bad prognosis. CLABSI infection prevention is best rather than cured. To establish guidelines, protocol to improve knowledge, treatment & prevention. **(Rode A, Bansod P.Y, Gujela A, Singh A, 2017)**[14]

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Yeganeh Mohammadreza conducted a study to see how well intensive care unit nurses at Guilan University of Medical Sciences (GUMS) hospitals in Guilan Province, northern Iran, knew about evidence-based guidelines for preventing ventilator-associated pneumonia (VAP).219 Critical care nurses from intensive care units. The questionnaire covered the following topics: demographic data, nurses' awareness of evidence-based recommendations for the prevention of VAP, and obstacles to putting these recommendations into practise. In this research, 171 nurses had maximum score (78.1 percent). The knowledge scores of nurses did not significantly correlate with their position ($p = 0.168$), level of education ($p = 0.189$), or work history ($p = 0.327$). The amount of knowledge about VAP prophylaxis in this study seems to be insufficient. Although understanding the tenets of evidence-based treatment does not ensure that these tenets will be followed, a lack of understanding may make it difficult to adhere to the evidence-based recommendations for VAP prevention. **(Yeganeh M, 2019)**[16]

A descriptive study conducted regarding nurse's knowledge on prevention of Catheter Associated Urinary Tract Infection in a selected hospital at Mangaluru. Validated Knowledge questionnaire was used to assess the knowledge. In the findings of the study majority of nurses 80.85% had average knowledge ,11.2% nurses had low knowledge regarding prevention of CAUTI and 7.231% nurse had high knowledge, these found that Age and Educational Qualification had significant impact on the knowledge. It concluded that the nurses had the average knowledge and there is need to conduct the in-service education to improve the knowledge regarding the prevention of CAUTI. (**Benny A. M., Idiculla A.S, 2020)**[17]

A cross sectional study was conducted on Knowledge, attitude and practice in relation to catheter associated urinary tract infection (CAUTI) prevention at Malaysia. Data was collected with the help of validated questionnaire. Sample was 301 staff nurses form medical surgical department. The findings were staff nurses had good knowledge, positive attitude and practice regarding prevention of CAUTI.Nurse aged 30 year and who had more than 10-year experience have good knowledge. Need was emphasised that positive attitude rather than knowledge regarding CAUTI. This study was impact on patient outcomes that recommended in the future. **(Mong I, Ramoo V, 2021)**[18]

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A descriptive cross-sectional study was conducted in the intensive care unit on knowledge regarding prevention of ventilator-associated pneumonia (VAP) among nurses in Nepal. The study sample 51 staff nurses. The data was collected using a self-questionnaire, and the findings were analysed using descriptive and inferential statistics 41.2 percent and 86.2 percent of respondents were aware of the meaning and causal agent, respectively VAP's meaning and causal agent were known to them. VAP and VAP bundle risk factors accounted for 86.2 and 61.3 percent of the total risk variables, respectively. About 37% of respondents knew the necessity of oral care with chlorhexidine, 86.3 percent knew the ventilator circuit should be changed for each new patient, and 39.2 percent knew that a closed suction system prevents VAP. According to the findings of the study, 49.1% of respondents had great knowledge and 7.8% had medium understanding. There was no statistically significant link between respondents' VAP preventive knowledge and their employment experience (p=0.493) or education (p=0.459). It concluded that half of the staff nurses had a high level of awareness of VAP prevention. The staff nurses VAP prevention by Positioning, airway humidification and Suctioning and less knowledge found in components of VAP & Provide the guidelines to improve the knowledge. **(Ghimire S., & Neupane S., 2018)**[19]

Al Shameri F A conducted a study among 120 critical care nurses (CCN) with an objective to assess their knowledge of VAP in selected Hospital Khartoum. The researcher was uses non-probability purposive sampling strategy to identify 120 nurses who worked with mechanical ventilation patients. The findings revealed that, the majority of CCN were between the ages of 23 and 30, 71.7 percent of the participants were female, 86.7 percent had a bachelor's degree, and 47.6% had less than one year of experience. There are 40 elements in the VAP preventive knowledge set, which are divided into five categories. Regarding the basic understanding about VAP, architecture of lungs, Mechanical ventilation, Diagnosis and Treatment of VAP and International guidelines for VAP preventive aspects the obtained mean score were (2.46 from 6), (1.17 from30), (2.66 from 5), (2.20 from 6), (9.71 from 20) correspondingly. The total mean score of nurses' knowledges of VAP prevention was (18.22 out of 40), indicating that the majority of nurses had inadequate knowledge of VAP prevention. The All nurses should get enough information regarding VAP prevention through course or workshops to improve quality of health services. **(Al Shameri FA, 2017)**[20]

A descriptive study was done to assess 50 staff nurses' knowledge of ventilator associated pneumonia (VAP) among patients admitted to the critical care unit at a selected hospital, Jalandhar, Punjab, India. A self-structured Multiple-Choice Questionnaire was used. The findings revealed that only 6% nurses had good knowledge, that 28% nurses had average knowledge, and that 66% nurses had below average knowledge of VAP among staff nurses.It concluded that the staff nurses need to improve knowledge regarding VAP with the help of in-service education. **(Sharma A, 2019)**[21]

A descriptive study was conducted on the knowledge of emergency nurses about Ventilator-Associated Pneumonia in Iran. A total of 53 nurses took part in the study, and their knowledge was tested using the 9-item "Knowledge on Ventilator-Associated Pneumonia" questionnaire. The participants in the study were able to accurately answer all of the questions. The average knowledge score of the nurses was 4.8. The correct responses of nurses to these 9 items had a mean score of 4.4+1.6. The question concerning "Patients posture on the bed to lower the risk of pneumonia" had the highest mean score percentage (72.9%). The item concerning "How humidifier was changed?" received the lowest mean score percentage (1.9%). As a result, the emergency nurses had insufficient understanding about how to prevent ventilator-associated pneumonia. The researcher suggested for improve the knowledge provide the training course to strengthen of emergency nurses in area. **(Rafei H, Rahimi S, Shafaei M, Ommat mohammadi M, 2019)**[22]

A descriptive cross-sectional study was held on 93 staff nurses regarding knowledge towards prevention for catheter associated urinary tract infection in public hospitals at Arman city, Yemen. Self-questionnaire tool was used to collected the data. The result showed that, the nurses 65.6% female, belonged to age group between (25-30 years) 43.0%. The diploma degree was the most available qualification 88.2%, 81.7% between 1-5-year experience. Knowledge regarding prevention of CAUTI was average 72% & 18.3% had a good knowledge. There is need to conducting course training regarding CAUTI to improve the knowledge of nurses**. (Haza'a A., Al-Jaradi, A.& Odhah, M., 2021)**[23]

A cross -sectional study was conducted on Knowledge, attitude and practice on prevention of central line associated blood stream infections among nurses in Italy. Self -administered questionnaire tool was used. The

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nurses had lower level of knowledge ,36-50 years of age group having high in knowledge. The maximum score of staff nurses was 335.Edcuational interventions should be implemented regarding knowledge and practice of CLABSI and ensure the nurses use evidence-based prevention interventions**. (Esposito MR, Guillari A, 2017)**[24]

A review of the literature, the researcher's practice-based experience as a staff nurse, and the researcher's undergraduate and diploma training revealed that infections arise in critically ill patients, leading to a considerable increase in mortality and morbidity. In Critical Care Units' patients are prone to get infections. The researcher own experience gave an insight and felt the need for conducting this study. As it is necessary to assess the knowledge of staff nurses related Common Infections in Critically ill Patients. To find out the deficit areas & conduct a class on Common Infections in Critically ill Patients, to increase their Knowledge. So that they can provide quality care to patients & will help to decrease the mortality and morbidity rate.

Objectives of the study:

To assess the level of knowledge regarding Common infections in Critically ill clients among staff nurses.

To ascertain relationship between the knowledge among staff nurses regarding Common infections in Critically ill clients with selected seven variables that include age, gender, professional qualification, training institute, professional experience, area of work and source of information.

To identify the deficit area of knowledge among staff nurses regarding common infections in Critically ill clients.

To prepare & conduct a class regarding common infections in critically ill Clients among staff Nurses.

Assumption

Staff nurses do have some knowledge related to Common infections in Critically ill patients and knowledge may be influenced by age, gender, professional qualification, professional experience, area of work, training institute and source of information.

OPERATIONAL DEFINITIONS

Common Infections in Critically ill Client: - Infections is common in critically ill patients and often results due to the severity of the patient's illness. Several specific infections in critically ill patients include, central line associated blood stream infection, catheter associated urinary tract infection, ventilator associated pneumonia, Surgical site infections various fungal infections, gastrointestinal infections due to clostridium difficile, of all the infections these VAP, CAUTI & CLABSI are common & preventable infection by nursing intervention. For the present study the following Common infections were included; VAP, CAUTI & CLABSI.

Catheter Associated Urinary Tract Infection (CAUTI): - Catheter associated Urinary tract infection (CAUTI) refers to the infection involving urethra, bladder, ureter and kidney, when a urinary catheter is inserted to drain urine from the bladder leading to fever, pain & burning in urethra.

Central Line-Associated Bloodstream Infections (CLABSI): - A central line-associated bloodstream infection (CLABSI) refers to the entry of microorganisms (bacteria, viruses) into the blood stream through the central line inserted into the patient's larger vein. It leads to systemic effects as pain, swelling and high-grade fever.

Ventilator associated pneumonia (VAP): -Ventilator associated pneumonia (VAP) refer to the lung infection in a patient who is intubated and ventilated. It results from the invasion of the lower respiratory tract and lung parenchyma by microorganism leading to compromised integrity of oropharynx, trachea and allowing entry to gastric secretion in lower airway.

Critically ill clients: - Critical illness is a life-threatening multisystem process that can result in significant morbidity or mortality. It is related to those patients who are admitted in the Neuro medicine ICU, Emergency

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trauma /Triage, Neuro surgery ICU, Medicine ICU, Respiratory ICU, Surgical ICU, CTVS, Recovery Room /step down, ICCU/Step down, Burns unit, Bone Marrow Transplant (BMT) of CMC & Hospital, Ludhiana.

Knowledge: - It refers to the act of recalling factual information and state as a response from staff nurse in critical units about common infections of critically ill patients through structured knowledge questionnaire.

Staff Nurses: - It refers to the registered nurses (male or female) who have undergone four-year degree/three-year diploma course, two yr. Post Basic B.sc nursing and working in adult critical care areas of Christian Medical College and Hospital, Ludhiana, Punjab.

LITERATURE REVIEW

Holistic view of health is an expression of wholeness in physiological, mental, spiritual, social and financial terms and not the mere absence of morbidity. A person is said to be in a state of health if they are able to express all of their distinct potentialities linked to the health determinants in their surroundings and these are physiological, mental, social and spiritual health. The health status of the population comprise of individuals that are all situated on a graded scale or continuous spectrum spanning from wellness and optimal functioning in every element of one's life, at one end, to morbidity resulting in mortality or application of public health measures that prevent, protect, promote, rehabilitate and pallitate. Both health and morbidity are dynamic processes. **(Svalastog AL, 2017)1**

The most common infections acquired in an ICU pneumonia (47%), other infections of the lower respiratory tract (18%), infections of the urinary tract (18%) and infections of the blood-stream (12%). Illness is a state in which a person's physical, intellectual, emotional, social or spiritual functioning is diminished or impaired in comparison with the previous experience. **(Potter & Perry, 2014)2**

Critical illness is a life-threatening multisystem process that can result in significant morbidity or mortality. In most Clients, critical illness is preceded by a period of physiological deterioration, but evidence suggests that the early signs of this are frequently missed. Early warning system are an important part of this and can help identify Clients' risk of deterioration and serious adverse events. Assessment of the critically ill Clients should be undertaken by an appropriately trained clinician and follow a structured airway, breathing, circulation disability and exposure format. The skills to recognize the criticallyill Client and instigate appropriate initial management **(Laura C Robertson, 2012)**3

A Study was conducted on epidemiology of nosocomial infections in hospitals Medical Surgical intensive care units (ICUs) at the United States National Nosocomial Infection Surveillance (NNIS) System. Surveillance data following the NNIS Intensive Care Unit protocol representing 152 participating NNIS.Infections at three major sites accounted for 68% of all infections reported (nosocomial pneumonia, 31%; urinary tract infections (UTIs), 23%; and primary bloodstream infections (BSIs), 14%): Mechanical ventilation was linked to 83 percent of nosocomial pneumonia episodes, 97 percent of UTIs in catheterized Clients, and 87 percent of primary BSIs in Clients with a central line. Coagulase-negative staphylococci were found in 39% of Clients with initial BSIs. **(Richards MJ, Edwards JR, Culver DH, Gaynes RP,2021)10**

METHODOLOGY

Research approach

The quantitative research approach was used to assess the knowledge regarding common infections in Critically ill Clients among staff nurses working in Christian Medical College & Hospital, Ludhiana, Punjab.

Research design

The Non-experimental exploratory research design was used to assess the knowledge of staff nurses regarding common infections in critically ill Clients among staff nurses working in Christian Medical College & Hospital, Ludhiana, Punjab.

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Research Setting:

The study was conducted in Christian Medical College & Hospital in Ludhiana, Punjab. It is one of the pioneer teaching institute in North India. It is one of the leading private and teaching mission hospital having bed strength of 750. It caters to preventive, promotive and curative aspects of people's health not only in the city of Ludhiana but also throughout Punjab and neighbouring states. This institution consists of Medical college, Dental college, College of Nursing, Collège of Physiotherapy and Institute of Allied Health Science, making tremendous contribution in the field of medical education. The present study was on staff nurses who worked in adult Critical care Units of Christian Medical College & Hospital, Ludhiana, Punjab. The sample was collected from critical care areas which were classified as Critical Care Units of Medicine: Respiratory ICU, ICCU & Stepdown, Neuromedicine ICU, Medicine ICU, Critical Care Units Surgery: Neurosurgery, CTVS & Stepdown, Recovery Room, ICU, Burns, BMT, Surgical HDU, Emergency, Trauma & Triage.

- **Target Population:**

Target population for the present study comprised of all the registered staff Nurses working in adult Critical Care areas of Christian Medical College & Hospital, Ludhiana, Punjab.

- **Sample and Sampling Technique:**

Samples were selected by using non-probability purposive sampling technique, the sample for the study was 100 registered staff nurses who were willing to participate in the adult Critical Care Units. of Christian Medical College & Hospital, Ludhiana, Punjab.

PRESENTATION OF DATA

The analysis and interpretation of data obtained from a sample of 100 staff nurses working in adult critical care units of Christian Medical College & Hospital, Ludhiana, Punjab. The analysis is a process of organizing and synthesizing data so as to answer research questions.

Table No:-1 Frequency and Percentage Distribution of Staff Nurses according to Personal and Professional Characterstics N=100

Staff Nurses		
Personal & Professional Characteristics	**f**	**Percentage (%)**
1) Age (in year)		
a. 21-30	35	35
b. 31-40	41	41
c. 41-50	14	14
d.>50	10	10
2) Gender		
a. Male	39	39
b. Female	61	61
3) Professional Qualification		
a. GNM Course	46	46

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b. B.Sc Nursing	45	45
c. Post Basic B.Sc. Nursing	9	9
4) Training Institution		
a. CON, CMC & Ludhiana	41	41
b. Other than CON, CMC & Ludhiana	59	59
5) Professional Experience		
a. 6 months-1year	9	9
b. 1.1year-5 years	23	23
c. 5 .1years-10 years	16	16
d. >10 years	52	52
6) Area of Work		
a) Critical Care Units of Medicine	56	56
b) Critical Care Units of Surgery	32	32
c) Emergency trauma /Triage.	12	12
7) Source of information		
a) Books/printed material/Journals	20	20
b) Clinical practice	7	7
c) Seminar/ workshop/ conference	9	9
d) Internet	64	64

Table 2. Frequency and Percentage Distribution of Staff Nurses according to levels of knowledge regarding Common infections in Critically ill Clients. N=100

Staff Nurses			
Levels of knowledge	**Score**	**f**	**%**
Excellent	>34	4	4
Good	28-34	23	23
Average	21-27	55	55
Below average	≥20	18	18

Maximum score = 42

Minimum score = 0

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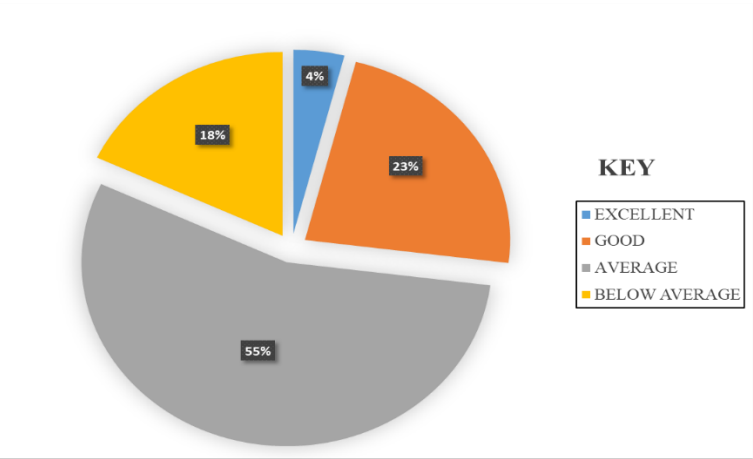

Fig 2:- Percentage Distribution of Staff Nurses according to Levels of Knowledge regarding Common Infections in Critically ill Clients.

Table 3(a): Mean, Standard Deviation, ANOVA & t-test of Knowledge Score of Staff Nurses regarding Common Infections in Critically ill Clients According to Age. N=100

KNOWLEDGE SCORE				
Age (in years)	**n**	**Mean**	**SD**	
a) 21-30	35	27.77	4.62	
b) 31-40	41	26.15	5.17	
c) 41-50	14	25.21	2.75	
d) >50	10	26.90	4.91	
Source of Variation	**df**	**Sum of Squares**	**Mean Squares**	
Between groups	3	83.88	27.96	3.273*
Within groups	96	2108.55	21.96	
Total	99	2192.44		
	df	**t**		
a & b	74	1.992		
a & c	47	**2.014***		
a & d	43	1.681		
b & c	53	**2.005***		
b & d	49	**2.009***		
c & d	22	1.717		

Maximum Score = 42 *Significant at p<0.05 level

Minimum Score = 0

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Table 3(d): Mean, Standard Deviation& t- test of knowledge score of Staff Nurses regarding Common Infectionsin Critically ill Clients according to Training Institute. N=100

KNOWLEDGE SCORE					
Training institute	**n**	**Mean**	**SD**	**df**	**t**
a) CON, CMC & H, Ludhiana	41	27.83	5.08	98	2.10*
b) Other than CON, CMC& H, Ludhiana	59	25.85	4.29		

Maximum Score = 42 *Significant at p< 0.05 level

Minimum Score = 0

Table no: 4 (a): Mean, Mean percentage & Rank order of Knowledge Score of Staff Nurse regarding Common infections in Critically ill Clients. N=100

KNOWLEDGE SCORE				
Common infections score	**Total**	**Mean score**	**Mean %**	**Rank order**
VAP	14	8.98	64.14	3
CAUTI	14	8.75	62.50	1
CLABSI	14	8.93	63.78	2

Maximum score = 42

Minimum Score = 0

DISCUSSION

It can be inferred that maximum number of staff nurses were in the age group of 31-40 years, were females with B.Sc. (N) training Programme, were trained from other than CON, C.M.C & H, Ludhiana, Punjab & having more than 10 years of professional experience & maximum number of staff nurses worked in Medicine ICU & Most of the staff nurses gained information related to Common infections in Critically ill Clients through internet. The frequency and percentage distribution of staff nurses according to level of knowledge. It shows majority of staff nurses 55% had average knowledge and 23% of staff nurses had good knowledge, while 18% of the staff nurses had below average knowledge and only 4% of staff nurses had excellent knowledge regarding Common infections in Critically ill Clients. Hence, it can be inferred that the majority of staff nurses had average knowledge regarding Common infections in Critically ill Clients. The age group 21-30 years had maximum mean knowledge score 27.77, while26.90 was among <50 years of age group followed by 26.15 among the age group of 31-40 years & 25.21 was among 41-50 years of age group. Based on ANOVA, the difference in mean knowledge score was found statistically significant at p<0.05 level, F calculated value was 3.273 and which was more than table value (2.70). It was further analyzed by t-test and found Statistically significant between a & c, b & c, b & d.

Hence, it is concluded that, age had significant impact on knowledge among staff nurses regarding Common infections in Critically ill Clients. The staff nurses who were trained from C.O.N, C.MC & H, Ludhiana had higher mean knowledge score i.e. 27.83 than the staff nurses who were trained from other than C.O.N, C.M.C & H, Ludhiana, which was 25.85. The calculated t value was 2.10, which was more than the table value (1.96). So, difference in the mean was found statistically significant at p<0.05 level. Hence, it can be concluded that

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training institute had significant impact on knowledge of staff nurses regarding Common infections in Critically ill Clients.

Mean percentage of knowledge score among staff nurses was highest deficit 62.5% (rank1) regarding CAUTI followed by CLABSI 63.78 (Rank 2). The lowest mean percentage of knowledge deficit score was 64.14% (rank 3) about VAP.

Hence there is a need for the enhancement of knowledge of staff nurses regarding Common infections in Critically ill Clients.

CONCLUSION

The majority of staff nurses had average knowledge regarding Common infections in Critically ill clients & has deficit knowledge in the area of CAUTI & hence there is a need to enhance their knowledge by giving them teaching on Common infections in critically ill clients.

- Based on the findings of the study following recommendations are made:

  - The study could be replicated on a large sample to validate and generalize the finding.
  - To assess the perception and attitude of Staff Nurses regarding Common infections in Critically ill Clients.
  - The tool used for assessing the Knowledge of Staff Nurses regarding Common infections in Critically ill Clients can be further modified and tested for standardization.
  - Workshops and seminar should be done for nurses as a part of in-service education, so the nurses should have knowledge regarding of Common infection in Critically ill Clients.
  - Study on effectiveness of multimodal intervention for improving knowledge of staff nurses can be done.

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