

Effectiveness of Structured Teaching Programme (STP) on Knowledge and Practices regarding prevention of Surgical Site Infection (SSI) among Staff Nurses

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Abstract: The aim of the study was to assess the effectiveness of STP on knowledge and practices regarding prevention of surgical site infection among staff nurses. Quantitative research approach was used with quasi-experimental one group pre-test post-test design. Total 60 staff nurses working in selected wards of I.G.M.C & Hospital, Shimla (H.P.). A self-structured knowledge questionnaire and checklist for practices to assess the knowledge and practices regarding prevention of SSI. The self-structured knowledge questionnaire consists of 28 multiple choice questions and checklist to assess the practices consist of 25 statements regarding prevention of SSI. The study finding showed that the mean post-test knowledge score (24.1) was significantly higher than the mean pre- test knowledge score (13.62) which was statistically significant, whereas mean post-test practice score (21.12) was significantly higher than the mean pre-test practice score (15.53) which was statistically significant. It showed that a STP was effective in increasing knowledge and practices of the staff nurses. The study finding revealed that a structured teaching programme was highly effective to enhance the knowledge and change the practices regarding prevention of SSI among staff nurses. Keywords: Effectiveness; Structured Teaching Programme; Knowledge; Practice, Prevention; Surgical Site Infection.

Introduction

Infection is the entry and multiplication of an infectious agent in the tissue of host and causing signs and symptoms. If the pathogens multiply and cause clinical signs and symptoms, then it is symptomatic. Infection control is the discipline, which is mainly concerned with preventing nosocomial infections. It is an essential part of the infrastructure of the health care. It mainly addresses the factors related to the spread of infections within the healthcare settings including prevention and control of the spread of the infections within the healthcare settings. (GG, 2021)

Surgical site infection (SSI) can be defined as an infection that occurs up to 30 days after surgery if no implant is placed and within 1 year if the patient is placed with an implantable device. (Kumar & Rai, 2017)

Surgical Site Infection are a type of medical infection that occurs after an invasive (surgical) procedure. Postoperative wound infections have been shown to account for up to 20% of all medical-related infections. At least 5% of patients undergoing surgery develop postoperative wound infections. (Suresh, 2018). Surgical site infection (SSI) is one of the most common postoperative complications and causes significant postoperative morbidity and mortality. (King et al., 2025)

The WHO study has also shown that the highest prevalence of nosocomial infections occurs in intensive care units and in acute surgical and orthopedic wards. Infection rates are higher among patients with increased susceptibility because of old age, underlying disease, or chemotherapy. Surgical site infection is any purulent discharge, abscess, or spreading cellulitis at the surgical site during the month after the operation. (Brunner & Suddarth's Textbook of Medical-Surgical Nursing, n.d.2021)

It is estimated that 14% to 16% of all health associated infections are surgical site infection and 77% of surgical patients who die due to infection-related sepsis. (Mawalla et al., 2011)

Despite improvements in the operating room, instrument sterilization methods, better surgical techniques, and the best efforts of infection prevention practitioners, postoperative surgical site infection is a major cause of nosocomial infections. It is rising all over the world. In addition, in countries with limited resources, even basic life-saving surgeries such as appendectomy and caesarean section is associated with high infection and mortality rates. Therefore, in these countries, it makes sense to focus on the prevention of surgical site infection in the most frequently performed interventions or the interventions with the highest incidence of SSI. Patient, medical staff and hospital-aware, systematic and realistic approaches need to be applied to reduce the risk of in-hospital SSI in developing countries. (Feng et al., 2022). The objectives of the study were: 1. To assess the pretest knowledge and practices score regarding prevention of Surgical Site Infection (SSI). 2. To evaluate the effectiveness of Structured Teaching

Programme (STP) on knowledge and practices 3. To find out the co-relation between knowledge and practices score 4. To find out the association of level of knowledge and practices score with selected demographic variable.

MATERIAL AND METHODS

Data collection

A quantitative research approach was utilized, allowing for statistical measurement and analysis of variables. A quasi-experimental research design was chosen for this study. The study was conducted among staff nurses working in selected wards of Indira Gandhi Medical College and Hospital, Shimla, Himachal Pradesh. Staff nurses working in selected wards of Indira Gandhi Medical College and Hospital, Shimla, who were present during data collection were selected as a target population. A sample of 60 staff nurses working in selected wards was selected by using Yamane's formula: $n = N / 1 + N(e)^2$. Non-probability convenient sampling technique was employed. The tool consisted of three parts: Part I: Socio-demographic variables (age, total job experience, past job organization, work experience in a surgical ward, professional qualifications, and infection control training attendance). Part II: A self-structured questionnaire assessing knowledge regarding SSI prevention. It included 28 multiple-choice questions, each scoring one point for correct responses and zero for incorrect ones. Scores were categorized using Bloom's cut-off points: a) Adequate Knowledge: 80%-100% (23-28) b) Moderately Adequate Knowledge: 60%-79% (17-22) c) Inadequate Knowledge: <60% (0-16). Part III: A self-structured checklist assessing practices regarding SSI prevention. It contained 25 statements scored as one for correct practice and zero for incorrect. Scores were categorized using Bloom's cut-off points: a) Good Practices: 80%-100% (20-25) b) Average Practices: 60%-79% (15-19) c) Poor Practices: <60% (0-14). Ethical Consideration: Research proposal was approved by the research committees prior to the pilot and the main study. Permission was sought from the ethical committees of S.N.G.N.C, I.G.M.C, Shimla. Permission was sought from the concerned authorities of the hospital: • Medical Superintendent of I.G.M.C and Hospital, Shimla. • Nursing Superintendent of I.G.M.C and Hospital, Shimla.

Data analysis

Data were analyzed using IBM SPSS Statistics (Version 20) software. Frequency analysis was conducted to examine the characteristics of the respondents and Chi-square analysis was used to assess the relationships.

RESULT AND DISCUSSION:

SOCIO-DEMOGRAPHIC VARIABLE AMONG STAFF NURSES

This section describes the socio- demographic characteristics of the sample under study

TABLE 1: frequency and percentage distribution of among staff nurses based on socio- demographic profile

N=60

Socio Demographic Variables		F	%
Age	21-30 Years	17	28.3
	>30-40 Years	32	53.3
	>40-50 Years	11	18.3
	> 50 Years	0	0.0
Total Job Experience (in years)	<1-5 years	15	25.0
	>5-10 years	20	35.0
	>10-15 years	21	33.3
	>15 years	4	6.7
Job Organization In Past	Private	27	45.0
	Semi Government	8	13.3
	Government	21	35.0
	Unemployed	4	6.7
Work Experience In Surgical Ward	<1-5 years	40	66.7
	>5-10 years	15	25.0
	>10-15 years	5	8.3
	>15 years	0	0.0
Professional Qualification	General Nursing & Midwifery	24	40.0
	Post Basic B.Sc. Nursing	17	28.3
	(Basic)B.Sc. Nursing	17	28.3
	M.Sc. Nursing	2	3.3
Attended Infection Control Training Programme	Yes	60	100.0
	No	0	0.0
If Yes, Than source of information	Books	8	13.3
	Internet	13	21.7
	In-service Education	26	43.3

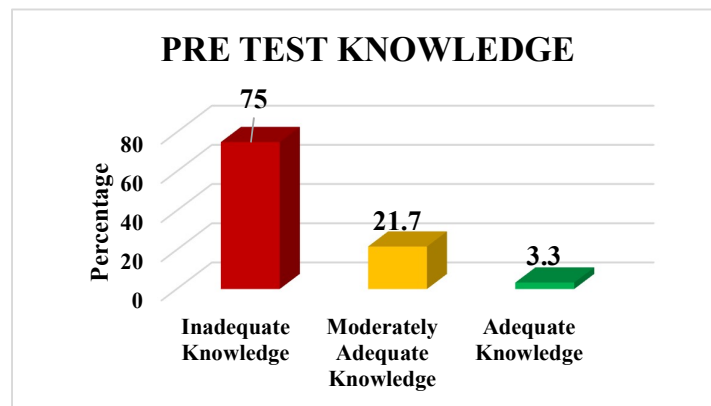
Effectiveness of Structured Teaching Programme (STP) on Knowledge and Practices regarding prevention of Surgical Site Infection (SSI) among Staff Nurses

	Workshop	13	21.7
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With

age, majority 53.3% of staff nurses were in age group of >30-40 years. In terms of total job experience, most of the i.e., 35% of staff nurses were having >5-10 years of total job experience. On the basis of job organization in past, majority 45.0% of staff nurses was in private job. With regards to work experience in surgical ward, majority 66.7% of staff nurses had <1-5 years of work experience. On the basis of professional education, majority 40.0% staff nurses were General Nursing & Midwifery. In terms of attended infection control programme, all the staff nurses i.e., 60 (100%) had attended infection control programme. According to Source of Information majority of staff nurses i.e., 26 (43.3%) had knowledge through in-service programme.

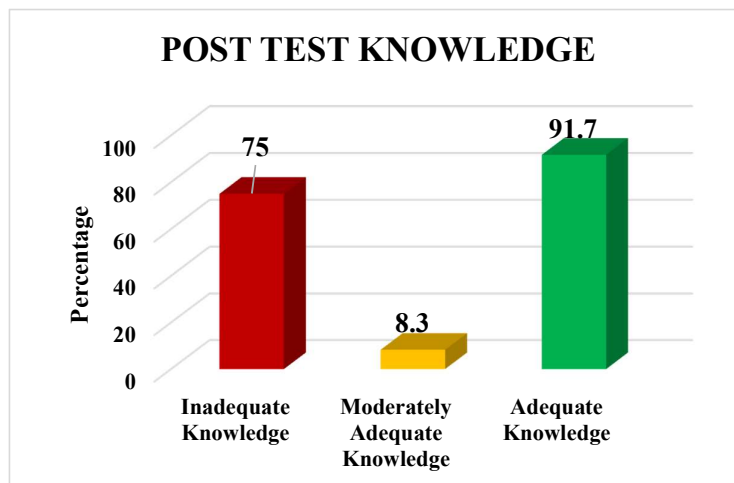
FINDING RELATE TO ASSESSMENT OF THE PRE- TEST AND POST-TEST KNOWLEDGE SCORE AND PRACTICES SCORE REGARDING PREVENTION OF SURGICAL SITE INFECTION AMONG STAFF NURSES



N = 60

Figure 1 Depicts bar diagram of the percentage distribution of pre-test knowledge score

It showed the frequency and percentage distribution of pre-test knowledge scores among staff nurses. Majority of staff nurses 45(75%) had inadequate knowledge. It concluded that there was need to enhance the knowledge regarding prevention of SSI among staff nurses.



N = 60

Figure 2: Depicts bar diagram of the percentage distribution of post-test level of knowledge

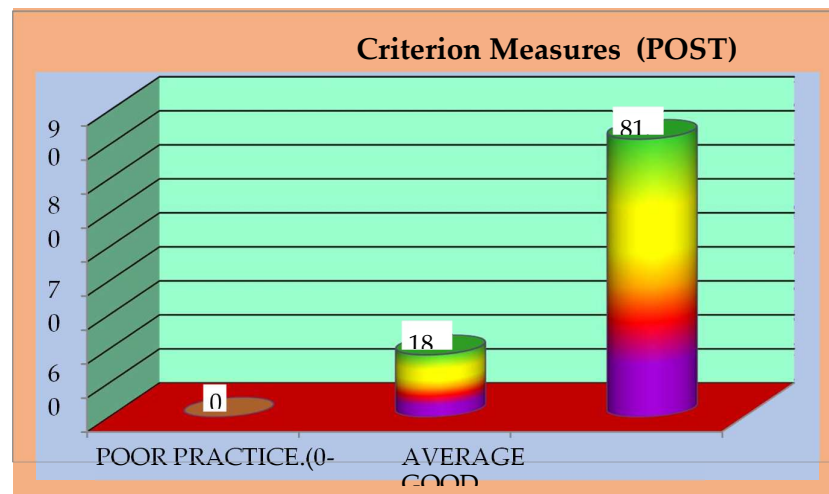
It showed the percentage distribution of post-test knowledge scores among staff nurses. Majority of staff nurses 55(91.7%) had adequate knowledge. It concluded that knowledge scores were enhanced after administration of STP.

Table 2 Depicts descriptive statistics of pre-test and post-test level of knowledge

							N=60
Descriptive	Mean	S.D.	Median Score	Maximum	Minimum	Range	Mean%

Statistics							
PRETEST KNOWLEDGE	13.62	4.235	14	25	7	18	48.60
POSTTEST KNOWLEDGE	24.10	1.763	24	27	17	10	86.10

It was found that the pre-test mean value was 13.62, medianscore was 14, maximum score was 25, minimum score was 7, range of score was 18 and mean percentage was 48.60 % whereas after provision of structured teaching programme post-test level of knowledge was found that the mean value was 24.10, median score was 24, maximum score was 27, minimum score was 17, range of score was 10 and mean percentage was 86.10%.



N=60

Figure no.4: Depicts cylindrical diagram of the percentage distribution of pre-test Practice

N=60

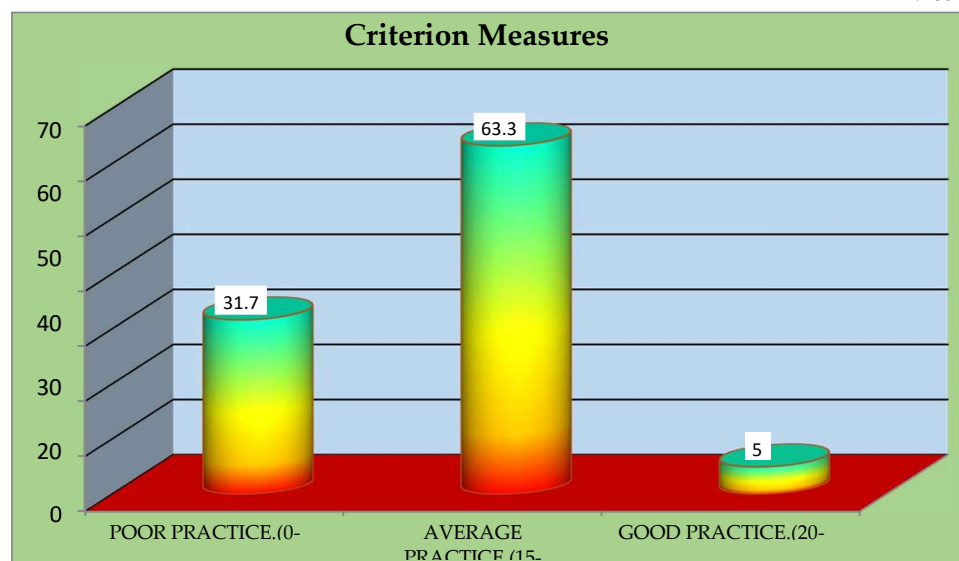


Figure 5 Depicts cylindrical diagram of the percentage distribution of post-test Practice

Figure 5 showed the frequency and percentage distribution of post-test practices scores among staff nurses. Majority of staff nurses 49(81.7%) had good practices, where else 11(18.3%) had average practices.

Table 3 Descriptive statistics of pre-test and post-test level of practices

N=60

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	Mean	S.D.	Median Score	Maximum	Minimum	Range	Mean%
PRETEST PRACTICE	15.53	2.480	15	21	9	12	62.10
POSTTEST PRACTICE	21.12	1.869	21	25	15	10	84.50

Table 3: Represents the descriptive statistics of pretest level of practices. It was found that the mean value was 15.53, median score was 15, maximum score was 21, minimum score was 9, range of score was 12 and meanpercentage was 62.10 % whereas in posttest level of practices, it was found thatthe mean value was 21.12, median score was 21, maximum score was 25, minimum score was 15, range of score was 10 and mean percentage was 84.50%.

COMPARISON OF PRE-TESTAND POST-TEST KNOWLEDGE SCORE AND PRACTICES SCORE AMONG STAFF NURSES TO DETERMINE EFFECTIVENESS OF STP

Table-4: Comparison of descriptive statistics of pre-test and post-test Scores of knowledge
N=60

Paired T test	Mean $\pm$ SD	Mean %	Range	Mean Diff.	Paired T Test	P Value	Table Value at 0.05
PRETEST KNOWLEDGE	13.62 $\pm$ 4.235	48.60	7-25	10.480	19.369*Sig	<0.001	2.00
POSTTEST KNOWLEDGE	24.1 $\pm$ 1.763	86.10	17-27				

** Significance Level 0.005, Maximum=28 Minimum=0

Table 4: Showed the comparison of pre-test and post-test knowledge score to determine the effectiveness of structure teaching programme. The calculated value for paired T test is 19.369, which is greater than the table value, 2.00. Hence it is considered as significant at the level of 0.05 level of significance. Hence, Hypothesis H1 i.e., there will be significant difference between mean pre-test and post-test knowledge scores regarding prevention of surgical site infection among staff nurses, was accepted.

Table -5 : Comparison of descriptive statistics of pre-test and post-test Scores of Practices among staff nurse regarding prevention from surgical site infection

N=60

Paired T test	Mean $\pm$ SD	Mean %	Range	Mean Diff.	Paired T Test	P Value	Table Value at 0.05
PRETEST PRACTICE	15.53 $\pm$ 2.48	62.10	9-21	5.590	14.422*Sig	<0.001	2.00
POSTTEST PRACTICE	21.12 $\pm$ 1.869	84.50	15-25				

** Significance Level 0.005, Maximum=28 Minimum=0

Table 5: Showed the comparison of pre-test and post-test practice score to determine the effectiveness of structure teaching programme. The calculated value for paired T test is 14.422, which is greater than the table value, 2.00. Hence it is considered as significant at the level of 0.05 level of significance.

CORRELATION BETWEEN KNOWLEDGE AND PRACTICES REGARDING PREVENTION OFSURGICAL SITE INFECTION AMONG STAFF NURSES

Table 6: Depicts correlation between pre-test knowledge and pre-test practices regarding prevention of surgical site infection among staff nurses

Pearson's Correlation	Knowledge	
	Pre-test Knowledge	Pre-testPractice
Mean	13.616	15.533
SD	4.235	2.480
N	60	
Correlation	0.154	
Table Value	0.254	
P Value	0.241	
Result	Not Significant @ $p < 0.05$	

Table 7: Depicts correlation between post-test knowledge and post-testpractices regarding prevention of surgical site infection among staff nurses

Pearson's Correlation	Knowledge	
	Post - test Knowledge	Post -testPractice
Mean	24.1	21.117
SD	1.763	1.869
N	60	
Correlation	0.094	
Table Value	0.254	
P Value	0.474	
Result	Not Significant @ $p < 0.05$	

ASSOCIATION OF KNOWLEDGE SCORES REGARDING PREVENTION OF SURGICALSITE INFECTION

Table 8: Depicts association of pre-test knowledge score regarding prevention of surgical site infection with demographic variables.

Variables	Opts	Knowledge			Chi Test	p Value
		ADEQUATE	MODERATE	INADEQUATE		
Age	21-30 Years	0	2	15	4.542	0.338 ^{NS}
	>30-40 Years	1	7	24		
	>40-50 Years	1	4	6		
	> 50 Years	0	0	0		
Total Job Experience (in years)	<1-5 years	0	1	14	9.313	0.157 ^{NS}
	>5-10 years	0	7	14		
	>10-15 years	2	5	13		
	>15 years	0	0	4		
Job Organization In Past	Private	0	4	23	7.907	0.245 ^{NS}
	Semi-Government	0	3	5		
	Government	2	6	13		
	Unemployed	0	0	4		
Work	<1-5 years	1	9	30	0.811	0.937 ^{NS}

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Variables	Opts	Knowledge			Chi Test	p Value
		ADEQUATE	MODERATE	INADEQUATE		
Experience In Surgical Ward	>5-10 years	1	3	11		
	>10-15 years	0	1	4		
	>15 years	0	0	0		
Professional Qualification	GNM	1	3	20	3.993	0.678 ^{NS}
	Post Basic B.Sc. Nursing	1	5	11		
	(Basic) B.Sc. Nsg	0	5	12		
	M.Sc. Nursing	0	0	2		
Attended Training Programme	Yes	2	13	45		N.A
	No	0	0	0		
If, Yes Then Source of Information	Books	0	0	8	4.396	0.623 ^{NS}
	Internet	1	3	9		
	In-service education	1	7	18		
	Workshop	0	3	10		

Table 8: There is no significance association between the level of knowledge scores and other demographic variables such as Age, Total Job Experience (In Years), Job Organization In Past, Work Experience In Surgical Ward, Professional Qualification, Attended Infection Control Training Programme And If, yes then source of information.

Table 9: Depicts association of post-test knowledge score regarding prevention of surgical site infection with demographic variables.

Variables	Opts	Knowledge			Chi Test	P Value
		ADEQUATE	MODERATE	INADEQUATE		
Age	21-30 Years	17	0	0	2.988	0.225 ^{NS}
	>30-40 Years	29	3	0		
	>40-50 Years	9	2	0		
Total Job Experience (in years)	<1-5 years	14	1	0	1.839	0.606 ^{NS}
	>5-10 years	19	2	0		
	>10-15 years	19	1	0		
	>15 years	3	1	0		
Job Organization In Past	Private	25	2	0	0.615	0.893 ^{NS}
	Semi-Government	7	1	0		
	Government	19	2	0		
	Unemployed	4	0	0		
Work Experience In Surgical Ward	<1-5 years	37	3	0	0.982	0.612 ^{NS}
	>5-10 years	14	1	0		
	>10-15 years	4	1	0		
	>15 years	0	0	0		
Professional Qualification	GNM	22	2	0	0.578	0.902 ^{NS}
	Post Basic B.Sc. N	16	1	0		
	(Basic) B.Sc. Nsg	15	2	0		
	M.Sc. Nursing	2	0	0		
Attended Infection Control Training	Yes	55	5	0		N.A
	No	0	0	0		

If, Yes Then Source of Information	Books	7	1	0	1.720	0.632 ^{NS}
	Internet	11	2	0		
	In-service education	25	1	0		
	Workshop	12	1	0		

NS – Not Significant @ $p < 0.05$

Table 9 There is no significance association between the level of knowledge scores and other demographic variables such as Age, Total Job Experience (In Years), Job Organization In Past, Work Experience In Surgical Ward, Professional Qualification, Attended Infection Control Training Programme And If, yes then source of information. ASSOCIATION OF PRACTICESCORES REGARDING PREVENTION OF SURGICAL SITE INFECTION AMONG STAFF NURSES WITH SELECTED DEMOGRAPHIC VARIABLES

Table 10: Depicts association of pre-test practice score regarding prevention of surgical site infection with demographic variables.

		PRACTICE				
Variables	Opts	GOOD	AVERAGE	POOR	Chi Test	P Value
Age	21-30 Years	0	11	6	2.332	0.675 ^{NS}
	>30-40 Years	2	19	11		
	>40-50 Years	1	8	2		
	> 50 Years	0	0	0		
Total Job Experience (in years)	<1-5 years	1	9	5	12.085	0.060 ^{NS}
	>5-10 years	0	15	6		
	>10-15 years	2	14	4		
	>15 years	0	0	4		
Job Organization In Past	Private	0	18	9	19.261	0.004* ^{Sig}
	Semi-Government	2	6	0		
	Government	1	14	6		
	Unemployed	0	0	4		
Work Experience In Surgical Ward	<1-5 years	1	25	14	3.346	0.502 ^{NS}
	>5-10 years	1	10	4		
	>10-15 years	1	3	1		
	>15 years	0	0	0		
Professional Qualification	General Nursing & Midwifery	1	13	10	7.060	0.315 ^{NS}
	Post Basic B.Sc. Nsg	2	9	6		
	(Basic) B.Sc. Nsg	0	14	3		
	M.Sc. Nursing	0	2	0		
Attended Infection Control Training Programme	Yes	3	38	19		N.A
	No	0	0	0		
If, Yes Then Source of Information	Books	1	6	1	6.093	0.413 ^{NS}
	Internet	1	6	6		
	In-service education	0	19	7		
	Workshop	1	7	5		

NS – Not Significant @ $p < 0.05$

Table 10 shows that there is significance association between the pre-test practice score level and demographic variables such as Job Organization In Past regarding prevention of surgical site infection ($p=0.004$). The calculated chi-square values were more than the table value (12.592) at the 0.05 level of significance. There is no significance association between the practice scores and other demographic variables such as age, total job experience (in years), work experience in surgical ward, professional qualification, attended infection control training programme and If, Yes

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Then Source of Information. Here the calculated chi-square values were less than the table value at the 0.05 level of significance.

Table 11: Depicts association of post-test practices score regarding prevention of surgical site infection with demographic variables.

Variables	Opts	PRACTICE			Chi Test	P Value
		GOOD PRACTICE	AVERAGE PRACTICE	POOR PRACTICE		
Age	21-30 Years	14	3	0	0.009	0.995 ^{NS}
	>30-40 Years	26	6	0		
	>40-50 Years	9	2	0		
Total Job Experience (in years)	<1-5 years	13	2	0	5.232	0.156 ^{NS}
	>5-10 years	14	7	0		
	>10-15 years	18	2	0		
	>15 years	4	0	0		
Job Organization In Past	Private	22	5	0	1.501	0.682 ^{NS}
	Semi-Government	7	1	0		
	Government	16	5	0		
	Unemployed	4	0	0		
Work Experience In Surgical Ward	<1-5 years	31	9	0	1.837	0.399 ^{NS}
	>5-10 years	13	2	0		
	>10-15 years	5	0	0		
Professional Qualification	GNM	23	1	0	7.239	0.065 ^{NS}
	Post Basic B.Sc. Nsg	13	4	0		
	(Basic) B.Sc. Nursing	11	6	0		
	M.Sc. Nursing	2	0	0		
Attended Training Programme	Yes	49	11	0		N.A
	No	0	0	0		
If, Yes Then Source of Information	Books	6	2	0	10.678	0.014* ^{Sig}
	Internet	13	0	0		
	In-service education	23	3	0		
	Workshop	7	6	0		

Table 11: Showed association of post-test practices scores regarding prevention of surgical site infection among staff nurses with selected demographic variables was determined by using Chi-square test. The Chi- square value shows that there is significance association between the post-test practice score level and demographic variables such as If, Yes Then Source of Information regarding prevention of surgical site infection ($p=0.014$). The calculated chi- square values were more than the table value (7.815) at the 0.05 level of significance. There is no significance association between the practice scores and other demographic variables such as Age, Total Job Experience (In Years), Job Organization In Past, Work Experience In Surgical Ward, Professional Qualification, Attended Infection Control Training Programme. Here the calculated chi-square values were less than the table value at the 0.05 level of significance.

DISCUSSION

The findings of the study have been discussed in the accordance with the objectives of the study and previously reviewed literature.

This study finding showed that the mean post-test knowledge score (24.1) was significantly higher than the mean

pre- test knowledge score (13.62) which was statistically significant, whereas mean post-test practice score (21.12) was significantly higher than the mean pre-test practice score (15.53) which was statistically significant. It showed that a STP was effective in increasing knowledge and practices of the staff nurses.

The present study was supported by Feng Wen, Sae-Sia Wipa (2022) conducted a descriptive correlational study to assess the knowledge, attitude, and practice of surgical site infection prevention and their relationships among OT staff nurses in Guizhou Province, Southwest China. The sample size was 999 staff nurses. The sample were selected by convenience sampling technique. Data was collected by using the self-structured questionnaires. Result of the study showed that 43.5% of participants had low level of knowledge, and 59.5% had a positive attitude toward surgical site infection prevention. In addition, 38.8% had a high level of surgical site infection prevention practice. The study concludes that staff nurses still had inadequate knowledge regarding surgical site infection prevention, but they had a positive attitude and high level of practice. There is need to provide updated knowledge or guideline, closed supervision, and in-service training on surgical site infection prevention for operating room nurses.

CONCLUSION:

By providing structured teaching programme regarding prevention of surgical site infection among staff nurses, the researcher felt that it would be possible to enhance knowledge and change practices regarding prevention of surgical site infection. Keeping this view, the present study was to assess the effectiveness of structured teaching programme (STP) on knowledge and practices regarding prevention of surgical site infection (SSI) among staff nurses working in selected wards of Indira Gandhi Medical College and Hospital, Shimla, Himachal Pradesh was undertaken.

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DECLARATION OF CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FUNDING INFORMATION

No funding was received for this work.

AUTHOR CONTRIBUTION

All authors have accepted responsibility for the content of the manuscript, reviewed all results, and approved the final version. Conceptualization: **MS, K.R.**; data collection: Statistical analysis: **RT.; US.**; Manuscript editing and reviewing: **I, SS.**

DATA AVAILABILITY STATEMENT:

The datasets generated during the current study are not publicly available due to confidentiality and anonymity of the client but are available from the corresponding author on reasonable request.

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