

Knowledge, Attitude and Practice of Prevention of Surgical Site Infection Among Nurses in Federal Medical Centre (FMC), Owerri, Imo State, Nigeria

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Abstract

Surgical site infections (SSI) account for 20% of all hospital acquired infections in hospitalized patients and each SS1 is associated with approximately 7 – 11 additional postoperative hospital days. This descriptive survey was to identify the knowledge, attitude and practice of prevention of surgical site infection among nurses in Federal Medical Centre, Owerri, Imo State, Nigeria. Three (3) research objectives guided the study. A sample size of 125 nurses from a total population of 187 was used. A well validated questionnaire was the instrument used for data collection. The findings from descriptive analysis shows that 108 (86.4%) of the respondents clearly have a high knowledge of SSI, 103 (82.4%) of the respondents have positive attitudes towards the prevention of SSI. Majority, 78 (62.4%) of the respondents have good level of practice regarding the prevention of SSI. Gender has no significant influence on knowledge of SSI, attitude of nurses towards prevention of SSI and level of practice of prevention of SSI among the nurses. There is a statistically significant difference between years of experience and knowledge of SSI, attitude of nurses towards prevention of SSI and level of practice of prevention of SSI among the nurses. Professional education has no significant influence on knowledge of SSI, attitude of nurses towards prevention of SSI and level of practice of prevention of SSI among the nurses. Hospital administration should occasionally initiate capacity building programmes and in-service trainings for nurses on the prevention of surgical site infection.

INTRODUCTION

Surgical site infection (SS1) is a wound infection that developed postoperatively, it is considered as a complication of the surgical procedure or of the poor operative caring of the surgical site (1). It is one of the most occurring HAI with serious consequence for patient's general condition and survival after a successful surgical intervention. A surgical site infection can be superficial incision, deep incision or organ space infection. Up to 60% have been estimated to be preventable by using evidence- based guidelines. Despite this fact, surgical site infection are still the leading hospital acquired infections reported hospital – wide in low and middle – income countries(2). Patients with SS1 have a 2 – 11 times higher risk of death compared with operative patients without SS1, and 77% of deaths in patients with SS1, and 77% of

deaths in patients with SS1 are directly attributable to the infection (3).

According to a 2014 WHO report, the estimated prevalence of SS1s within the past two decades ranges to 19.6% in Europe and 20% in the United States of America (4). Similarly, in Africa, the incidence of SS1s ranges from 12% in Algeria to 31% in Nigeria (3). Qasem and Hweldiposited that surgical site infection is one of the most common healthcare associated infections, it accounts to 16% of all healthcare associated infections worldwide (1). The annual incidence of SS1 in general population was 14.7% in Japan, 16% in India and 20.3% in Nigeria. The annual incidence of SS1 in the Eastern Nigeria which Owerri is part of is up to 8.8% (5). A systemic review in Korea reported up to 19.7% incidence rate of SS1 and Nigeria study on patient following obstetric surgery revealed

a higher rate of 21.4% (6). SS1 were associated with intrinsic factors including advanced age, malnutrition, metabolic disease, smoking, obesity, hypoxia, immune-suppression and length of preoperative stay. Moreover, extrinsic factors like application of skin antiseptics, preoperative shaving, antibiotic prophylaxis, preparative skin preparation, inadequate sterilization of instruments, surgical drain, surgical hand scrubs and dressing techniques were among the most frequently reported risk factors (7).

Mengshaet *al*; indicated that all efforts of infection control among health care providers notwithstanding, that infections remain a major unwanted side effect of surgical operation. Also the major problem is not the lack of effective surgical precautions and evidence-based guidelines, but possession of knowledge, development of the right attitude and intention to carry out these guidelines to prevent surgical site infection (3).

Kolade, Abubakar, Adejumo, Funmilayo & Tijani opined that the nurses are important members of the surgical care team that stays with the patient round the clock (8). It is imperative for the surgical nurses to understand the basics of pre and post-operative wound infection prevention and control. The implementation of quality measure including antibiotic prophylaxis, hair removal using a clipper, tight control of pre and post-operative glucose levels and avoiding hypothermia are all recognized key quality measures in reducing infection (8). The timing of surgical prophylaxis is an agreed quality indicator and represents a significant intervention in preventing surgical site infection.

An array of studies reported significant drop in the rates of SS1s associated with increased awareness among healthcare workers (9, 3, and 4). On the other hand, lack of infection prevention and control awareness was found to be associated with poor practices of standard precautions by surgical ward nurses (10). It has been discovered that surgical site infection also causes increased health care cost resulting in financial constraints to both patients and health care system as a whole (11). Surgical site infection has significant impact on quality of life and economic status. Affected patients spent significantly more time in out-patient department visits, emergency room visits, investigation services, readmission in

hospital and other health care services than patients without surgical site infection. A study found that malnutrition rate was high in patients before undergoing gastrointestinal surgery due to nurses' lack of knowledge and ability to evaluate nutritional status of the patients (11). A survey study found that the nurses lacked potential knowledge and practice in respect of round care and also conducted poor management of wounds with inappropriate usage of dressing technique (12). Empirically, establishing the level of knowledge attitude and practices of surgical site infections prevention among nurses is therefore an important issue for inquiry. This study aimed to investigate knowledge, attitude and surgical site infection prevention practices among nurse in Federal Medical Centre Owerri.

MATERIALS AND METHODS

The study adopted a descriptive research design. Descriptive research design is a type of research design in which groups of people or subjects are studied by collecting and analyzing data from only a few subjects considered being a representation of the entire group using a questionnaire as a means of data collection (13). The study was carried out in Federal Medical Centre (FMC), Owerri, Imo State. Federal Medical Centre is the biggest tertiary hospital in Owerri. The centre became a training institution for both National and West African Post-graduate Medical College in 1999. It has residency training programs in surgery (general orthopedics, urology, obstetrics, and gynecology, general and family medicine, pediatrics, ophthalmology, ear, nose and throat (ENT), pathology (histopathology & hematology), radiology and internal medicine together with maternity. It was declared a centre of oncology and communicable disease in 2004. The target population were all nurses working in the surgical wards in Federal Medical Centre Owerri which are 187 nurses. A sample size of 125 was determined by Taro Yamane which were selected using simple random sampling technique. An open ended self-developed questionnaire was the instrument for data collection. Data analysis was through descriptive and non-parametric statistics of chi-square. Face and content validity was adopted and reliability was achieved through test retest which yielded a correlation coefficient of 0.92

RESULTS

Table 1. Socio-demographic data of the respondents (n = 125)

Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	42	33.6
	Female	83	66.4
Age in years	Below 20	Nil	-
	21-30	23	18.4
	31-40	40	32.0
	41-50	41	32.8
	51 years and above	21	16.8
Professional Educational Level	Diploma in Nursing	52	41.6
	BSC/BNSC in Nursing	63	50.4
	Masters in Nursing	10	8.0
	PhD in Nursing	-	-
Years of Experience	0-4 years	3	2.4
	5-9 years	18	14.4
	10-14 years	31	24.8
	15-19 years	31	24.8
	20 years and above	42	33.6

This table shows that many respondents (32.0% and 32.8%) fall under the age brackets of 31 – 40 and 41 – 50 respectively. As usual, females (66.4%) are more than males. A little above than half (50.4%) had BNSc./BSc. Degree, 33.6% had more than 19 years of experience.

Table 2. Knowledge of nurses regarding surgical site infection.

Variable	Options	Frequency (f)	Percentage %
What is surgical site infection?	Complication within 30 days of operation	29	23.2
	Infection that develops post operatively on the incision site within 30 days of operation	81	64.8
	Production of pus on the incision site after surgery	15	12.0
Ways of preventing surgical site infection (many responses)	Washing of hands before and after each wound dressing	125	100
	Careful use of antibiotics	120	96.0
	Proper hair removal	107	85.6
	Maintaining clean skin	125	100
	Controlled body temperature	87	69.6
	Use of sterile clothing	125	100
	Controlling blood sugar level	98	78.4
Approved method for pre-operative shaving	Razor shaving method	99	79.2
	Depilatory shaving method	15	12.0
	Clipping shaving method	11	8.8

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Best time to administer prophylactic antibiotics to surgical patients	30- 60 minutes before operation	63	50.4
	2 hours before operation	10	8.0
	15 minutes before operation	0	0.0
	Any time before operation	52	41.6

The data show that 29 (23.2%) answered that it is any complication within 30 days of operation; 81 (64.8%) correctly answered that it is any infection that develops post operatively on the incision site within 30 days of operation while 15 (12.0%) answered that it is production of pus on the incision site after surgery.

Information on knowledge of ways of preventing SSI shows that all the respondents noted washing of hands before and after each wound dressing, maintaining clean skin and use of sterile clothing. While 96.0% agree with careful use of antibiotics; 85.6% agree with proper hair removal; 69.6% ticked controlling body

temperature and 78.4% of the respondents ticked controlling blood sugar level.

Information on approved method of pre-operative shaving shows that 99 (79.2%) of the respondents go with razor shaving method; 15 (12.0%) ticked “depilatory” method while 11 (8.8%) of the respondents ticked “clipping” shaving method.

A little above half (50.4%) and 41.6% of the respondents indicated that the best time to administer prophylactic antibiotics to surgical patients was 30-60 minutes before operation and any time before the operation respectively.

Table 3. Overall knowledge of respondents on SSI

Level of knowledge	Frequency (f)	Percentage%
High knowledge	108	86.4
Low knowledge	17	13.6
Total	125	100

Note: the knowledge questionnaire section was given a maximum score of 22 points and respondents with 10 points and below have low knowledge levels while those with 11 points and above have high knowledge levels.

The table indicated that 86.4% of the respondents clearly have a high knowledge of SSI.

Table 4. Attitude of nurses regarding prevention of surgical site infection

Statements	SA	A	D	SD	Mean	Remark
1. Necessary to wash hands before and after each wound dressing	100	11	14	-	3.68	Positive
2. Use of sterile materials to clean and cover wounds	80	21	22	22	3.59	Positive
3. Recommending health institutions to organize service training related to SSI prevention	27	41	14	43	2.41	Negative
4. Vital to change damp sterile dressing often	101	10	9	5	3.65	Positive
5. Important to wear hand gloves and other protective gears during surgical wound dressing	105	20	-	-	3.84	Positive
Cumulative mean					3.43	Positive

NB: SA – Strongly Agree, A – Agree, D – Disagree, SD – Strongly Disagree

The mean scores for items 1, 2, 4 and 5 on the likert scale are 3.68, 3.59, 3.65 and 3.84 which are signify positive attitudes. Only item 3 has a mean mark of

2.41 which signifies negative attitude. The cumulative mean is given as 3.43 which implies that majority of the respondents have positive attitudes towards prevention of surgical site infection.

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Table 5. Overall attitude of nurses towards prevention of surgical site infection

Level of attitude	Frequency (f)	Percentage%
Positive	103	82.4%
Negative	22	17.6%
Total	125	100%

The table shows that 103 (82.4%) of the respondents have a positive attitudes towards the prevention of SSI while 22 (17.6%) have a negative attitude towards prevention of SSI.

Table 6. Level of practice of prevention of SSI among nurses

S/N	Statements	A	S	R	N	Mean	Remark
1.	I administer preoperative prophylactic antibiotics within one hour before surgery	40	23	7	45	2.40	Poor Practice
2.	I maintain aseptic technique during surgical wound dressing	68	40	9	8	3.34	Good Practice
3.	I use sterilized wound dressing materials for cleaning surgical wound dressing	41	30	15	39	2.58	Good Practice
4.	I advise an immune deficiency disorder patient to maintain personal hygiene	31	20	25	49	2.26	Poor Practice
5.	I advise malnourished patients to take nutritious diet	47	20	26	32	2.65	Good Practice
	Cumulative mean					2.64	Good Practice

A – Always, S – Sometimes, R – Rarely, N – Never

The mean scores for items 2, 3 and 5 on the likert scale are 3.34, 2.58 and 2.65 respectively which are good practice whereas items 1 and 4 have mean scores of 2.40 and 2.26 respectively which are poor practice. Judging with the cumulative mean of 2.64, it shows that a good number of the respondents have good level of practice regarding prevention of SSI.

Table 7. Overall practice level of nurses regarding prevention of surgical site infection

Level of practice	Frequency (f)	Percentage%
Good practice	78	62.4
Poor practice	47	37.6
Total	125	100

The table shows that 78 (62.4%) of the respondents have good practice levels regarding the prevention of SSI while 47(37.6%) have poor practice levels towards SSI.

Ho₁: There is no significant relationship between knowledge of SSI and socio demographic variables (gender, years of experience and level of professional education).

Table 8. chi-square (χ^2) analysis of significant difference between knowledge of SSI and socio-demographic variables

Variable	High knowledge	Low knowledge	Total	df	X ²	p- value
Gender						
Male	35 (32.4)	7 (41.2)	42			
Female	73 (67.6)	17 (58.8)	83	1	0.506	0.477

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Years of experience						
0-4	1 (0.9)	2 (11.8)	3			
5-9	8 (7.4)	10 (58.8)	18			
10-14	28 (25.9)	3 (76.8)	31	4		
15-19	29 (26.9)	2 (17.6)	31		42.52	0.000*
20 and above	42 (38.9)	-	42		0	
Professional Education						
Diploma in Nursing	47 (43.5)	5 (29.4)	52			
BSc/BNSc. in Nursing	52 (48.1)	11 (64.7)	63	2	1.612	0.447
M.Sc. in Nursing	9 (8.3)	1(5.9)	10			

The results reveal that there is no significant difference between gender and knowledge of SSI (the p value is 0.477 which is $p > .05$). This means that gender has no influence on the knowledge of surgical site infection.

There is a significant difference between years of experience and knowledge of SSI ($p = 0.000$) which implies that nurses who had more years of experience had higher knowledge level. There is no

significant difference between professional education and knowledge of SSI (the p-value is 0.447 which is $p > .05$).

Ho₂: There is no significant relationship between attitude of nurses towards SSI and socio demographic variables (gender, years of experience and level of professional education).

Table 9. chi-square (χ^2) analysis of significant difference between attitude of nurses towards prevention of SSI and socio-demographic variables

Variable	Positive attitude	Negative attitude	Total	df	X ²	p- value
Gender						
Male	33 (30.8)	9 (36.0)	42			
Female	70 (69.2)	13 (64.0)	83	1	0.249	0.618
Years of experience						
0-4	1 (0.9)	2 (11.8)	3			
5-9	7 (7.4)	11 (58.8)	18			
10-14	27 (25.9)	4 (76.8)	31	4	31.510	0.000*
15-19	28 (26.9)	3 (17.6)	31			
20 and above	40 (38.9)	2 (12.3)	42			
Professional Education						
Diploma in Nursing	47 (43.5)	5 (29.4)	52			
BSc/BNSc. in Nursing	49 (48.1)	14 (64.7)	63	2	1.351	0.227
M.Sc. in Nursing	7 (8.3)	3(5.9)	10			

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The results revealed p-value of 0.618 between demographic variables and gender which means that there is no significant difference between gender and attitude to SSI prevention ($p > .05$). The p-value for relationship between years of experience and attitude is given as 0.000 which means that there is a significant difference between years of experience and attitude towards prevention of SSI ($p < .05$). There is no

significant difference between professional education and attitude toward prevention of SSI as seen by a p-value of 0.227 ($p > .05$).

Ho₃: There is no significant relationship between the level of practice of nurses towards surgical site infection and socio demographic variables (gender, years of experience and level of professional education).

Table 10. Chi-square (χ^2) analysis of significant difference between level of practice and socio-demographic variables

Variable	Good Practice	Poor Practice	Total	df	X ²	p- value
Gender						
Male	30 (38.5)	12 (25.5)	42			
Female	48 (61.5)	35 (74.5)	83	1	0.933	0.271
Years of Experience						
0-4	0	3 (6.4)	3			
5-9	10 (12.8)	8 (17.0)	18			
10-14	10 (12.8)	21 (44.7)	31	4		
15-19	22 (28.2)	9 (19.2)	31		36.112	0.000*
20 and above	36 (46.2)	6 (12.7)	42			
Professional Education						
Diploma in Nursing	37 (43.5)	15 (29.4)	52			
BSc/BNSc. in Nursing	32 (48.1)	31 (64.7)	63	2	1.832	0.341
M.Sc. in Nursing	9 (8.3)	1(5.9)	10			

In the test between gender and practice, the p-value is given as 0.271 which is greater than 0.05 ($p > .05$). This means that there is no significant difference between gender and level of practice of prevention of SSI among nurses. There is a significant difference between years of experience and level of practice of prevention of SSI among the nurses as this is shown by a p-value of 0.000 which literally means that nurses who had more years of experience had more of good practice levels than those with fewer practice years. There is no significant difference between professional education and level of practice of prevention of SSI among the nurses (the p-value is 0.341 which is $p > .05$).

DISCUSSION

Nurses Level of Knowledge of Surgical Site Infection (SSI)

Findings revealed that 81 (64.8%) of the respondents correctly answered that SSI is any infection that develops post operatively on the incision site within 30 days of operation. Summarily 108 (86.4%) of the respondents clearly have a high knowledge of SSI while 17 (13.6%) have low knowledge. The reason for this finding of a great number of nurses having high knowledge of SSI could be hinged on the fact that the procedure for prevention of surgical site infections are clearly taught in the nurses' formative years.

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This finding of high knowledge of SSI among nurses however, is debunked by the findings of Sickler who reported a very low knowledge of SSI among nurses in Bangladesh (11). Also debunking the researcher's finding is that of Teshager, Engeola and Worku who recorded that more than half of their participants in a study on knowledge and practice of prevention of SSI in Ethiopia had very poor knowledge of surgical site infection (6).

Attitude of Nurses Regarding Prevention Of Surgical Site Infection

Findings revealed that the mean scores for items on the attitudinal likert scale are 3.68, 3.59, 3.65 and 3.84 which are above the 2.50 cut off mean. Only item 3 had a mean mark of 2.41 which is below the 2.50 cut off mean. The cumulative mean is given as 3.43 which is above 2.50. The implication of this finding is that majority of the respondents have a positive attitude towards prevention of surgical site infection as most of the responses tilted towards the positive side. Summarily, 103 (82.4%) of the respondents have a positive attitude towards the prevention of SSI while 22 (17.6%) have a negative attitude towards prevention of SSI.

This finding is supported by the findings of Chisanga (2017) who reported that majority of nurses in Zambia have a positive attitude towards prevention of surgical site infection in hospitals (14). However, Kolade et al debunked this finding as they reported a negative attitude towards prevention of SSI among nurses in a tertiary health institution in North-Central Nigeria (8).

Level of Practice of Prevention of Surgical Site Infection Among Nurses

Findings revealed that the mean scores for items on the level of practice likert scale are 3.34, 2.58 and 2.65 which are above the 2.50 cut off mean. However, two items out of the five items in the scale have mean marks of 2.40 and 2.26 which are below the 2.50 cut off mean. The cumulative mean was given as 2.64 which is above 2.50. Judging with the cumulative mean, it was deduced that a greater number of the respondents have good level of practice regarding prevention of SSI. From the individual scores of the respondents, it was revealed that 78 (62.4%) of the respondents have good practice levels regarding the prevention of SSI while 47 (37.6%) have poor practice levels towards prevention of SSI.

This finding is supported by the findings of Sickler who in a similar study reported that nurses in Bangladesh had high level of practice of prevention of surgical site infection (11).

Hypotheses

The corresponding hypotheses revealed that gender had no significant influence on knowledge of SSI, attitude of nurses towards prevention of SSI and level of practice of prevention of SSI among the nurses. This by implication means that knowledge, attitude and practice of prevention of surgical site infection is not hinged on nurses' gender. This is in line with the finding of Kolade et al who reported that gender has no significant role to play on nurses' knowledge and practice of prevention of SSI (8).

Also, results showed a statistically significant difference between years of experience and knowledge of SSI, attitude of nurses towards prevention of SSI and level of practice of prevention of SSI among the nurses. In other words, the higher the nurses' years of experience, the more positive their attitude, higher level of knowledge and higher level of practice. This is supported by VIJ, Williamson and Gupta who reported that years of experience plays a significant role in the knowledge, attitude and level of practice of prevention of SSI among nurses in hospitals (15).

CONCLUSION

The incidence of surgical site infection in hospitals cannot be over emphasized as it leads to serious complications and sometimes death on the part of the patient. In the light of the danger of SSI, it has become pertinent to educate and continually re-educate health workers especially nurses on the best ways to prevent occurrences of surgical site infection in different hospitals.

Various factors however, have been seen to impede nurses' knowledge, attitude and practice of prevention of

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surgical site infection. These factors include, but not limited to: inadequate capacity building among nurses on surgical site infection; insufficient/half-baked teachers at nurses' formative stage, nonchalant attitude of nurses towards prevention of surgical site infection etc.

Despite these constraints, more ways to avoid surgical site infection in hospitals are to be made known and continuously emphasized as this is synonymous to prolonged life and good health of patients who undergo surgery.

Recommendation

The researcher recommends the following:

1. Hospital administration should occasionally initiate capacity building programmes and in training services for nurses on the prevention of surgical site infection.
2. The government, through the hospital boards, should provide ample materials necessary for surgical dressing for every surgical session.
3. Nurses and doctors should ensure that the materials and gears used during surgery are all sterilized adequately to avoid post operation complications and infections.

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