

Scrub Nurse's Performance Concerning Surgical Aseptic Techniques at the Operating Room of Slemani Teaching Hospitals

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ABSTRACT

Background and aim: the study aims is to assess the level of performance among the scrub nurses concerning the surgical aseptic techniques at the operating room, describe the socio- demographic characteristics of the study sample, and to find out the relationship between the scrub performance and variables of some demographic characteristics such as (age, gender, level of education, marital status, and years of experience in operating room).

Materials and method: quantitative design, non - probability (purposive) sample of (70) male and female scrub nurses who worked at three teaching hospitals, which represent vital agencies in Slemani city (Iraqi Kurdistan rejoin), during the period of December 2009 up to the end of September 2010. Data were collected through two types of instruments (questionnaire and observational checklist); the researcher modified the study instrument to investigate the scrub nurses practices in the three teaching hospitals: It was based on extensive review of related literature and studies. The study instruments compressed of seven dimensions which include total of (91) items, the content validity of the instrument was established through penal of (20) experts. Reliability of the instrument was determined through the use of equivalence reliability, Inter- rater (Inter observer) approach, ($r=0.91$). Data were analyzed through the application of descriptive and inferential statistical analysis.

Results: the result of the study revealed that the most of the nurses are middle – aged, married female, with a low level of monthly income. The majority of the study sample is institute graduates and they have no long employment in operating room. Most of the study sample has poor skills in scrubbing practices. Furthermore, the study confirms that there is a significant relationship between the economic status and their practices.

Recommendations: based on the results of the study, the study recommended that job description have to be legislated to all nursing categories as one of job for better achievement and a periodic in service, educational program for operating room nurses and certified to identify the qualified ones. Further study should be carried out to be recommended to develop operating room work achievements.

Keywords: Scrub, Aseptic techniques.

INTRODUCTION

Infection is a process involving invasion of body tissues by micro-organisms, the multiplication of invading organisms, and the subsequent tissue damage. Infection refers to a specific process that causes tissue injury, and it is the end result of the invasion by organisms the major infectious agent are bacteria, viruses, fungi, protozoa, rickettsiae, helminthes and mycoplasma (Martinez, 2001).

There are specific sources of possible contamination that are a constant threat to an open incision, these sources are team members of the operating room (their skin, nose, throat, dress, breath, and soil, etc.), and surgical team malpractices such as ineffective surgical hand-washing , gowning , gloving ,draping , and other practices during surgery, the patient's all items used in the wound and on the sterile setup, water , dust in the air, and visitors in the operating room (Klevens and Edward, 2007).

Nosocomial infections are an important cause of increased morbidity, and mortality, prolonged hospitalization and higher health cost and nosocomial infections occur within a health care facility and may affect both the patient and the health care worker during surgery. Some of the risk factors for nosocomial infection include the behavior of operating room (OP) personnel regarding decontamination practices and hand hygiene (Ancheril, 2004).

Surgical site infections (SSI) remain common and they leads to reduce quality of life and long hospitalization and also one of the leading causes of death. The most basic and effective method of preventing cross-contamination is surgical hand washing. Soiled hands are the primary mode of transmission of nosocomial infection. Surgical hand antisepsis removes or destroys transient micro-organisms and confers a prolonged effect (Linton and Maebius, 2008).

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Aseptic technique is a set of specific practices and procedures performed under carefully controlled conditions with the goals of minimizing contamination by pathogens and to protect from infection and prevent the spread of infection (Kathy, 2003).

There are two types of asepsis: medical and surgical asepsis, medical or clean asepsis reduces the number of organisms and prevents their spread; surgical or sterile asepsis includes procedures to eliminate microorganisms from an area and is practiced by surgical technologists and nurses in operating theaters and treatment areas, aseptic technique is vital in reducing the morbidity and mortality associated with surgical procedures (Pratt *et. al.*, 2007).

The maintenance of sterile technique is the responsibility of everyone having duties or even being in the operating room during an operative procedure and it is important to the patient outcome, sterile technique cannot be maintained unless practiced by all team members. Asepsis may be thought of as a chain that is as strong as its weakest linking (Philips *et. al.*, 2000).

In order to control infection there must be control over the sources of contamination, thus the emphasis is adherence to the ideal aseptic technique which is a set of specific practices and procedures performed under carefully controlled conditions to maintain asepsis and protect the patient from infection and prevent the spread of pathogens (Larwood, 2007).

The responsibility of the scrub nurse is to monitor and maintain the sterile field, and compliance with universal precaution (Kleinveck *et. al.*, 2000).

An infection – control professional can be a valuable resource for assisting nurse in controlling nosocomial infection (Marton and Nichols, 2001). Reducing infections can be taken in three phases of patient care: pre-operative, intra- operative and post-operative (Van Kasteren, 2003).

MATERIALS AND METHOD

Quantitative design, non-probability (purposive) sample of (70) male and female scrub nurses who worked at three teaching hospitals, which is obstetrics and gynecology Teaching Hospital, Slemani Teaching Hospital, Pediatric Teaching Hospital, these hospitals represent vital agencies in Slemani city, during the period of December 2009 up to the end of September 2010. Criteria of the sample are: All scrub nurses who work at the operating rooms of

three Teaching Hospitals, nurses with different categories (Intermediate school graduated, Secondary school graduate, institutional graduate), and both genders (male and female). Written official permission has been obtained from the ministry of health (Iraq Kurdistan Region) / Directory of health / Slemani city, to carry out this study.

Data were collected through two types of instruments (questionnaire and observational checklist); the researcher modified the study instrument to investigate the scrub nurses practices in these hospitals: It was based on extensive review of related literature and studies. The study instruments compressed of seven dimensions which include total of (91) items, which were distributed through demographic information sheet and observational check list which included (7) dimensions concerned on the scrubbing practices as preparation immediately before the scrub, involve (20) items; surgical hand washing practices involves (12) items; gowning practices involves (11) items; gloving practices, involves (7) items; draping practices, involves (6) items; practices during surgery, involves (21) items; and finally, operative room environment, involves (14) items. The items were rated and scored according to the following patterns: Three point type Likert Scale is used for rating the items as always, sometimes and never (Polit and Hungler, 1999). The three point type Likert Scale is scored as (3) for Always, (2) for Sometimes and (1) for Never. (95%) confidence interval for population, and (P value= 0.05).

The content validity of the instrument was established through penal of (20) experts. Reliability of the instrument was determined through the use of equivalence reliability, Inter-rater (Inter observer) approach, ($r=0.91$) Data were analyzed through the application of descriptive and inferential statistical analysis. Data was collected, organized, and coded into computer files by using the statistical package of social science (SPSS).

RESULTS

Table (1): Distribution of the study sample (70) nurses in operating room of Teaching Hospitals by their socio-demographic characteristics (Age, gender, level of education, marital status, monthly income, years of employment in nursing field, years of experience in operating room and participating in training).

| Age (years) | F | % |
|------------------------------|----|--------------|
| 21-30 | 3 | 4.3 |
| 31-40 | 55 | 78.6 |
| 41-50 | 8 | 11.4 |
| ≥ 51 | 4 | 5.7 |
| Total | 70 | 100 |
| Gender | F | % |
| Male | 4 | 5.7 |
| Female | 66 | 94.3 |
| Total | 70 | 100 |
| Level of education | F | % |
| Intermediate School Graduate | 20 | 28.6 |
| Secondary School Graduate | 23 | 32.9 |
| High institute Graduate | 27 | 38.6 |
| Total | 70 | 100 |
| Marital Status | F | % |
| Married | 55 | 78.6 |
| Single | 14 | 20. |
| Divorced | 1 | 1.4 |
| Total | 70 | 100 |
| Number of children | F | % |
| No children | 24 | 34.29 |
| 1-2children | 23 | 32.86 |
| 3-4children | 20 | 28.57 |
| 5-6children | 3 | 4.28 |
| Total | 70 | 100 |
| Monthly income | F | % |
| Sufficient | 1 | 1.4 |
| Barely Sufficient | 35 | 50 |
| Insufficient | 34 | 48.6 |
| Total | 70 | 100 |
| Years of employment in | F | (%) |

| nursing field | F | % |
|------------------------------------|-----|--------------|
| 1-5 | 3 | 4.3 |
| 6-10 | 17 | 24.3 |
| 11-15 | 19 | 27.1 |
| 16-20 | 18 | 25.7 |
| ≥21 years | 13 | 18.6 |
| Total | 70 | 100 |
| Years experience in operating room | (F) | % |
| Less than 5 years | 17 | 24.285 |
| 5-9 Years | 19 | 27.14 |
| 10-14 | 12 | 17.143 |
| 15-19 | 12 | 17.143 |
| 20-24 | 5 | 7.143 |
| ≥ 24 | 5 | 7.143 |
| Total | 70 | 100 |
| Participating in training | (F) | % |
| Yes | 0.0 | 0.00 |
| No | 70 | 100 |
| Total | 70 | 100 |

F = Frequencies % = Percentage

Table (2): Level of practices of the sample (70nurses) in operating room of all Teaching

| Scales | Always | | Sometimes | | Never | | M.S | Severity |
|---|--------|------|-----------|------|-------|-------|-----|----------|
| | F | % | F | % | F | % | | |
| 1. Preparation immediately before the scrub | 505 | 37.2 | 214 | 15.8 | 639 | 47 | 1.8 | M |
| 2. Surgical hand washing | 223 | 36.2 | 26 | 4.22 | 367 | 59.57 | 1.1 | L |
| 3. Gowning | 262 | 34.7 | 113 | 15 | 380 | 50.3 | 1.8 | M |
| 4. Gloving | 267 | 54.5 | 37 | 7.6 | 186 | 38 | 2.2 | M |
| 5. Draping | 229 | 54.5 | 52 | 12.4 | 139 | 33 | 2.2 | M |
| 6. Practices during surgery | 330 | 36.6 | 337 | 37.4 | 679 | 75.3 | 1.6 | L |
| 7. Operating room environment | 202 | 20.5 | 136 | 13.8 | 644 | 71.4 | 1.5 | L |

Hospitals with three levels of scales by Frequency, Percentage, Mean of Scores and severity regarding indications of aseptic technique / M.S = Mean of scores

Table (3): Association between ages of the sample (70 nurses) and practices regarding surgical aseptic technique in Operating room of all Teaching Hospitals.

| Ages groups of sample | Practices of Surgical aseptic technique | | | | | | Total |
|---|---|------|-----------|------|-------|------|-------|
| | Always | | Sometimes | | Never | | |
| | F | % | F | % | F | % | |
| (21 – 30) Years | 77 | 35 | 32 | 14.5 | 111 | 50.5 | 220 |
| (31 – 40) Years | 1409 | 29.9 | 794 | 16.8 | 2512 | 53.3 | 4715 |
| (41 – 50) Years | 176 | 30 | 84 | 14.3 | 327 | 55.7 | 587 |
| ≥ 51 Years | 107 | 31.6 | 47 | 13.9 | 185 | 54.6 | 339 |
| Total | 1769 | | 957 | | 3135 | | 5861 |
| X^2 obs = 6.99 df = 6 X^2 crit = 12.59 P ≤ 0.05 | | | | | | | |

This table shows that there is no significant association between age and practices at (p) value 0.05.
 X^2 obs = observed chi square / df = degree of freedom / X^2 crit = critical chi square

Table (4): Association between Gender of the sample (70 nurses) and practices regarding surgical aseptic technique in Operating room of all Teaching Hospitals.

| Gender | Association between practices of Surgical aseptic technique of the sample with their gender. | | | | | | Total |
|---|--|-------|-----------|-------|--------|-------|-------|
| | Always | | Sometimes | | Never | | |
| | Scores | % | Scores | % | Scores | % | |
| Male | 97 | 30.5 | 55 | 17.29 | 166 | 52.2 | 318 |
| Female | 1525 | 29.25 | 1010 | 19.37 | 2677 | 51.36 | 5212 |
| Total | 1622 | | 1065 | | 2843 | | 5530 |
| X^2 obs = 0.874 df = 2 X^2 crit = 5.99 P ≤ 0.05 | | | | | | | |

This table shows that there is no significant association between Gender and practices at (p) value 0.05.
 X^2 obs = observed chi square / df = degree of freedom / X^2 crit = critical chi square

Table (5): Association between Educational level of the Sample (70 nurses) and pattern of their Practices in operating room.

| Educational level of sample | Practices of Surgical aseptic technique | | | | | | Total |
|--|---|-------|-----------|-------|--------|-------|-------|
| | Always | | Sometimes | | Never | | |
| | Scores | % | Scores | % | Scores | % | |
| Nursing Intermediate school graduate. | 546 | 31.61 | 272 | 15.74 | 909 | 52.63 | 1727 |
| Nursing Secondary school graduate | 620 | 29.6 | 371 | 17.7 | 1106 | 52.74 | 2097 |
| Nursing Institute graduate. | 790 | 30.5 | 463 | 18.11 | 1303 | 50.97 | 2556 |
| Total | 1956 | | 1106 | | 3318 | | 6380 |
| X^2 obs = 5.81 df = 4 X^2 crit = 9.49 P ≤ 0.05 | | | | | | | |

The results of this table show that there is no significant association between educational level and Practices at (p) value 0.05.
 X^2 obs = observed chi square / df = degree of freedom / X^2 crit = critical chi square

Table (6): Association between the Marital Status of the sample (70 nurses) and Pattern of their practices in operating room.

| Marital status of Sample | Association between Practices of Surgical aseptic technique with their marital status of sample. | | | | | | Total |
|---|--|------|-------------|------|-------------|-------|-------------|
| | Always | | Sometimes | | Never | | |
| | Scores | % | Scores | % | Scores | % | |
| Single | 385 | 32.5 | 207 | 17.5 | 593 | 50.04 | 1185 |
| Married | 1540 | 38 | 880 | 21.5 | 2676 | 65.33 | 5096 |
| Divorced | 32 | 35.2 | 16 | 17.6 | 43 | 47.3 | 91 |
| Total | 1957 | | 1103 | | 3312 | | 6372 |
| $X^2 \text{ obs} = 3.76$ $df = 4$ $X^2 \text{ crit} = 9.49$ $P \leq 0.05$ | | | | | | | |

This table shows that there is no significant association between Marital Status and Practices at (p) value 0.05

$X^2 \text{ obs}$ = observed chi square / df = degree of freedom / $X^2 \text{ crit}$ = critical chi square

Table (7): Association between the Numbers of Children of the Sample (70 nurses) and their Practices in operating room.

| Number of children | Practices of Surgical aseptic technique | | | | | | Total |
|--|---|-------|-----------|-------|--------|-------|-------|
| | Always | | Sometimes | | Never | | |
| | Scores | % | Scores | % | Scores | % | |
| No child | 698 | 35 | 351 | 17.6 | 939 | 47.2 | 1988 |
| 1-2 child | 622 | 32.53 | 349 | 18.25 | 941 | 49.21 | 1912 |
| 3-4 child | 581 | 34.9 | 280 | 16.8 | 805 | 48.31 | 1666 |
| 5-6 child | 87 | 35 | 38 | 15.3 | 123 | 49.6 | 248 |
| | 1988 | | 1018 | | 2808 | | 5814 |
| $X^2 \text{ obs} = 4.98$ $df = 6$ $X^2 \text{ crit} = 12.59$ $P \leq 0.05$ | | | | | | | |

This table shows that there is no significant association between Number of Children and practices at (p) value 0.05.

$X^2 \text{ obs}$ = observed chi square / df = degree of freedom / $X^2 \text{ crit}$ = critical chi square

Table (8): Association between Economic status of the sample (70 nurses) and pattern of their practices regarding surgical aseptic technique in Operating room of all teaching hospitals.

| Economic status of sample | Association between Practices of Surgical aseptic technique with their economic status of sample. | | | | | | Total |
|---|---|-------|-------------|-------|-------------|-------|-------------|
| | Always | | Sometimes | | Never | | |
| | Scores | % | Scores | % | Scores | % | |
| Sufficient | 35 | 43.75 | 15 | 18.75 | 41 | 45.05 | 80 |
| Barley sufficient | 871 | 28.67 | 561 | 18.47 | 1605 | 51.8 | 3037 |
| Insufficient | 991 | 31.12 | 527 | 16.55 | 1666 | 52.32 | 3184 |
| Total | 1897 | | 1103 | | 3301 | | 6301 |
| $X^2 \text{ obs} = 15$ $df = 4$ $X^2 \text{ crit} = 9.49$ $P \leq 0.05$ | | | | | | | |

This table reveals that there is a significant association between Economic Status and practice at (p) value 0.05.

$X^2 \text{ obs}$ = observed chi square / df = degree of freedom / $X^2 \text{ crit}$ = critical chi square

Table (9): Association between the Years of Experience in Nursing Field of the Sample (70 nurses) and pattern of their Practices in operating room.

| Years of employment in Nursing field | Practices of Surgical aseptic technique | | | | | | Total |
|--|---|-------|------------|-------|-------------|-------|-------------|
| | Always | | Sometimes | | Never | | |
| | Scores | % | Scores | % | Scores | % | |
| 1-5 | 91 | 33 | 27 | 9.8 | 158 | 57.24 | 276 |
| 6-10 | 489 | 31.2 | 229 | 14.9 | 821 | 53.34 | 1539 |
| 11-15 | 568 | 32.4 | 247 | 14.10 | 936 | 53.45 | 1751 |
| 16-20 | 553 | 33.4 | 223 | 13.5 | 881 | 53.16 | 1657 |
| ≥ 21 | 422 | 35.34 | 136 | 11.4 | 636 | 53.3 | 1194 |
| Total | 2123 | | 862 | | 3432 | | 6417 |
| $X^2 \text{ obs} = 13.1$ $df = 8$ $X^2 \text{ crit} = 15.51$ $P \leq 0.05$ | | | | | | | |

This table shows that there is no significant association between Years of experience in Nursing field and practice at (p) value 0.05.

$X^2 \text{ obs}$ = observed chi square / df = degree of freedom / $X^2 \text{ crit}$ = critical chi square

Table (10): Association between the Years of Experience of the Sample (70 nurses) and pattern of their practices in operating room.

| Years of experience in Operating room | Practices of Surgical aseptic technique | | | | | | Total |
|---|---|-------|-------------|-------|-------------|-------|-------------|
| | Always | | Sometimes | | Never | | |
| | Scores | % | Scores | % | Scores | % | |
| 5years | 479 | 31 | 268 | 17.32 | 800 | 51.7 | 1547 |
| 5 - 9 years | 522 | 26.8 | 331 | 17 | 1094 | 56.18 | 1947 |
| 10 - 14 | 325 | 29.73 | 188 | 17.2 | 580 | 53.06 | 1093 |
| 15 -19 | 336 | 30.7 | 184 | 16.8 | 575 | 52.5 | 1095 |
| 20 - 24 | 147 | 32.30 | 66 | 14.50 | 242 | 53.18 | 455 |
| ≥25 | 147 | 32.5 | 66 | 14.6 | 240 | 53 | 453 |
| Total | 1656 | | 1103 | | 3531 | | 6590 |
| $X^2 \text{ obs} = 15.8$ $df = 10$ $X^2 \text{ crit} = 18.31$ $P \leq 0.05$ | | | | | | | |

The results of this table show that there is no significant association between Years of Experience and practice at (P) value 0.05.

$X^2 \text{ obs}$ = observed chi square / df = degree of freedom / $X^2 \text{ crit}$ = critical chi square.

DISCUSSION

After the analysis of demographic characteristics as shown in table (1), the findings of the present study reveals that the majority of the study sample (94.3%) were female with age (31-40) years (78.6%). This finding comes along with the result of McRae (2003) who stated that from the beginnings of the nursing profession, its practitioners are women. Women consider the natural caregivers from birth. After the industrial revolution, more factory jobs become available to men. Men were also drawn into big business, public administration and the military, thus

leaving room for women to dominate nursing (McRae, 2003). Regarding the level of education Aiken *et al.* (2008) identifies a clear link between higher levels of nursing education and better patient outcomes. The findings agree with the results of the present study (table 1) which represents that the higher percentage of the educational level (38.6%) were institute graduate. On the other hand, Benner (2009) found that high-prepared nurses have a positive impact on lowering mortality rates. The present findings reveal a healthy indicator that most of

the nurses are graduated from institutes that which is better for their development abilities.

Regarding the number of children and through the course of data analysis, the findings reveals that (34.29%) of the sample had no children, (32.86%) had 1-2 children. Concerning monthly salary, the majority of the study sample suffer from low level of monthly income (Barely sufficient) (50%) and insufficient monthly income(48.6%)The majority of the study sample were married and their salaries are not enough for their needs. Unfortunately, result of study done by Maragos *et. al.*, (2009) does not agree with the present study findings, they stated that sufficient income is considered a supportive component of the job that motivates people to offer good quality of services to their patients.

In relation to employment in nursing field the findings show that (27%) of the sample have (11-15) years and (27.14%) of the sample have (5-9) years' experience in operating room and all of them do not have any participation in training courses.

The researcher believes that the actual period in operating room is considered as a period of surgical experience and practice that make nurses competent to work. Unfortunately, they move from one health field to another. Nurses need continuous experience and training to develop their surgical practice for better achievement in each field.

Regarding the continuous education and training in operating room field, the findings show that the entire sample have not attended any special training in operating room field course. While Van and Nederlof (2003) declared that the operating department environment is ever- changing because of new advances in technology instrumentation or procedures, and this necessitates additional educational requirements.

A research done by Fort and Voltero (2004) on 285 nurses to identify factors affecting performance, emphasizes that all nurses need to be trained to assign in nursing areas then in turn they need periodic continuous training to develop their capacities and competencies because operating room is a special unit that needs urgent actions so it highly needs well – trained nurses. Their results show that education and training are essential for improving performance of nurses.

In relation to level of practices of the study sample in all the teaching hospitals (Table 2), the results indicated that is low in surgical hand washing, practice during surgery and the

operating room environment. The researcher believe that there is no available antiseptic solution and anew theaters furthermore almost all the scrub nurses have low experience in the operating rooms and precipitating in continuous education and training in operating room field. Regarding (table 3), there is no significant relationship between age and practices, in relation to this finding, it is mentioned that almost the study sample have not any significant skills to make them well prepared at operating room because after their graduation there is no special training course arranged for them, also they do not have periodic training or continues education.

The study refers the situation to the absence of job description to sort the nurses up on their level of education (Table 5). Unfortunately, our situation is not compatible with the study done by Gruendemann and Mangum (2001), who stated that scrub nurse, should complete continuing education to remain current in their knowledge including review of the policies of the health care facility. So they feel frustrated and they have no stimuli to work hard.

Regarding economic status (Table 8) the researcher believe that monthly salary is considered one of the right and supportive components of the job that motivates people to offer good quality of services to their patients. All international literatures state that nursing profession is a hard work, which needs big support and motivation, which enable the nurse to work willingly and efficiently in the hospital and particularly in the vital units in which nurses may face stress periods.

Table (9 and10) shows that there is no significant relationship between years of employment in nursing field, years of experience in operating room and practice. Although working in operating room is considered as employment in nursing field but there is difference in nature of working in operating room and the other nursing field (Firlit, 2002). The researcher believe that this is due to increasing work load, absence of follow up and evaluation in their practices besides of absence of periodic training courses and annual review of the policies of the health care facility.

RECOMMENDATIONS

The study recommends that create a full satisfaction among scrub nurses about importance of their role regarding surgical aseptic technique. In addition, Job descriptions

have to be legislated to all nursing categories as one right of job for better achievements. Moreover, Special constructed work -shops must be held routinely for each newly employed nurse before starting her work in operating room. Supplying written guidelines and instructions of standards of care in operating room which have to be distributed to them showing what is done in the developed countries. Finally, further studies have to be recommended to develop operating room work achievements.

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