

## Nurses' Knowledge and Performance regarding Prevention of Abdominal Drains Placements' Infection for Postoperative Patients

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### 1.ABSTRACT

In many surgical procedures, surgical drains have involved several critical steps in draining the abdominal and thoracic cavities. Therefore this study aimed to assess the nurses' knowledge and performance regarding prevention of abdominal drains placements' infection for postoperative patients at the Gastroenterology Surgical Center affiliated with Mansoura University. So a descriptive cross-sectional study design was utilized to conduct this study on 50 on-duty nurses, with two structured self-administrated questionnaires to assess socio-demographic and occupational characteristics, knowledge, and an observation checklist to assess performance. Results of the current study showed that 66.0% and 64.0% of the nurses had fair, and incompetent total levels of knowledge and performance respectively. Based on the study results the researcher concludes that two-thirds of nurses have fair total knowledge level, and almost two-thirds have an incompetent total performance level regarding prevention of abdominal drains placements' infection for postoperative patients. The researcher recommends designing and implementing educational programs for nurses to achieve competency regarding prevention of abdominal drains placements' infection for postoperative patients.

**Keywords:** *Surgical drains, surgical site infection, surgical wound care*

### 2.Introduction

In many surgical procedures, Draining the abdominal and thoracic cavities with surgical drains has required a number of crucial processes. Following trauma, it is more imperative to drain any anticipated or unanticipated collections that may develop after surgery **Belgaumkar, James & Patel, 2019**). There are varieties of surgical drains: open and closed. Open drains are in contact with the atmosphere and enable peritoneal drainage of the peritoneum to external through capillary and passive action (e.g., Penrose drain, corrugated drain) **(Chincarini et al., 2019)**.

Closed drains allow fluid to drain externally into a sealed container and offer a number of advantages over open drains, it was shown that there is a lower risk of infection with closed drains, protect the patients' skin by keeping fluid away from it, they are easier to care for and help to provide an accurate assessment of fluid drainage **(Ward, 2018)**.

Drains can lead to a number of complications, including migration and breakage, they can cause fever, and they can perforate the intestine **(Guo, Liu, Jing, Tian & Yang, 2020)**.

retrograde infection, hollow viscus decubitus, pain, discomfort, foreign body reaction, and prolonged hospital stays can all be brought on by abdominal drains **(Brazzale, & Pedrazzoli, 2020)**.

Infections at the surgical site are referred to as surgical site infections (SSIs) that is a local inflammatory and systemic response to microbial colonization. These infections can affect the skin and/or subcutaneous tissue (superficial incisional infection), soft, deep tissues (e.g., fascia, muscle, bone: deep incisional infection), and/or any part of the deep anatomy (i.e., organs and spaces). They develop within 30 days of the surgical procedure **(Carvalho et al., 2020)**.

Low- and middle-income countries have a substantially higher incidence rate of SSIs **(Abdali et al., 2020)**, even in high-income nations, it can affect up to 30% of surgical patients, it is still the second most common kind of healthcare-acquired infections (HAIs) and accounting for more than 20% of all HAIs (HAIs) **( Aljohani et al., 2020)**.

There are broad sets of risk factors that are useful in the prediction of SSIs; general risk factors include common preoperative clinical and

demographic factors such as age, surgery time, surgical duration, glucose level, length of stay, smoking status, and comorbid diabetes (Cheng, Kosty, Nasser, Shah & Wang, 2018). Therefore the nurses' knowledge and performance regarding prevention of abdominal drains placements infection for postoperative patients are a worthwhile issue.

### 2.1 Aim of the Study

To assess the nurses' knowledge and performance regarding prevention of abdominal drains placements' infection for postoperative patients at the Gastroenterology Surgical Center (GSC) affiliated with Mansoura University.

### 2.2 Research Questions

1. What is the nurses' knowledge regarding prevention of abdominal drains placements' infection?
2. What is the nurses' performance regarding prevention of abdominal drains placements' infection?

### 3. Materials and Method

#### 3.1 Design

A descriptive cross sectional study design was used to conduct this study.

#### 3.2 Setting

The study was carried out in surgical wards, Gastroenterology Surgical Center affiliated with Mansoura University, GSC consists of two inpatient floors each one contains three main rooms with seven beds in each, two rooms for male patients and the other for female patients. Patients stay in those rooms for a day for pre-operation preparations and then back to rooms post-operation. The length of stay post-operation depends on the type of operation. Patients came back after two weeks from discharge to the outpatient department for follow-up, Nurses to patients' ratio at those wards is a nurse to eight patients.

#### 3.3 Participants and Sampling

On-duty nurses under the following criteria: both genders, assigned to give direct care to patients, different qualifications, and at least one year of experience. The total number of nurses with the previous eligible criteria was 50 recruited conveniently.

#### 3.4 Study Tools

The researcher developed three tools based upon reviewing related literature to gather the data of the study which are as the follows:

**Tool (I) Nurses' socio-demographic and occupational characteristics self-administrated questionnaire.** The researcher used this questionnaire; which is composed of eight questions; concerned with the nurses' age, gender, marital status, residence, education level, year of experience, year of experience at surgical wards, GSC, and number of training courses for prevention of abdominal drains' placement infection.

**Tool (II) Nurses' knowledge regarding prevention of abdominal drains placements' infection care self-administrated questionnaire.** The researcher developed this questionnaire based on Amin and Jinni, (2017); Chang et al., (2021); Cheng, Kosty, Nasser, Shah and Wang, (2018); Meyerson, (2016); Ward, (2018) to assess nurses' knowledge regarding prevention of abdominal drains placements' infection. the researcher constructed the questionnaire in Arabic, which covered six parts; that included 20 multiple choices questions as the flowing: general concepts of the digestive system and wound site infection, general concepts of abdominal drains, abdominal drains classification, concepts of abdominal drains placements' infection for postoperative patients, postoperative nursing care procedures for abdominal drains, and complications resulting from the abdominal drains and its causes.

**Nurses' knowledge scoring system.** The researcher scored the correct response for each question as "1" and the incorrect as "0". The score was converted into percentage by the researcher. The higher scores indicated that the participants knew more. For interpretation, the researcher divides the transformed scores into three levels according to McDonald, (2002), and modified by the researcher as:

*Incompetent.* Scores less than 60% of the total (12 marks)

*Fair.* Scores from 60% to less than 85% of the total (12 to < 17 marks)

*Competent.* Scores from 85% and more from the total ( $\geq 17$  marks)

**Tool (III) Nurses' performance regarding prevention of abdominal drains placements' infection observational checklist.** The researcher developed this observational checklist based on Williams and Wilkins, (2015) to assess nurses' performance regarding prevention of abdominal drains placements' infection. The researcher constructed the checklist in English, which covered eight parts; that included 101 statements as the flowing: managing surgical wounds, removing old

bandages, caring for the wound, donning a new gauze dressing, dressing a wound with a drain, special consideration for surgical wound, surgical drain removal and special considerations for wound drainage.

**Nurses' performance scoring system.** The researcher scored "0" for not done, "1" for not applicable, "2" for done incorrectly, and "3" for done correctly. The researcher transformed the score into a percentage. The higher scores indicated a higher level of performance. To be interpreted, the researcher divides the transformed scores into three levels according to McDonald, (2002), and modified by the researcher as:

*Incompetent.* Scores less than 60% of the total (181.8 marks)

*Fair.* Scores from 60% to less than 85% of the total (181.8 to < 257.5 marks)

*Competent.* Scores from 85% and more from the total ( $\geq 257.5$  marks)

### **3.5 Procedure**

**Preparation phase.** it included the following:

**Administrative process.** An official letter was sent from the Faculty of Nursing Mansoura University to the GSC manager affiliated with Mansoura University to permit the researcher to conduct the current study.

**Ethical Consideration** The researcher obtained approval from the Research Ethics Committee, Faculty of Nursing, Mansoura University. As well. The researcher also got oral informed consent from the participants, assuring them that their participation in the study was voluntary and that the information gathered would be kept private and used only to enhance healthcare services. The researcher informed participants that they were free to ask any study-related questions and to withdraw from the study at any time, without any responsibility and without providing a reason.

**Literature review.** The researcher studied national and international literature on the various elements of abdominal drains placements' infection, and their preventive methods using scientific published articles, online searches, and textbooks. This review was a guide for creating the study tools.

**The validity of the study tools translation.** The researcher translated tools I, and II into Arabic and the validity of the translation was evaluated by backing the translation technique to confirm the validity of translated tools.

**Face validity.** Experts included two professors and three lecturers in medical surgical

nursing, Faculty of Nursing, Mansoura University, and two physicians, and nursing staff from the previously mentioned setting tested study tools for appropriateness and had relevant items and carried out required modifications.

**Pilot study.** It was carried out on 10% of the sample that equal to five nurses of the total number of the sample (50 nurses) in the previously mentioned setting, to evaluate clarity, ambiguity, applicability, objectivity, relevance, and feasibility, as well as to identify any problems associated with administration of the tools, modifications were done accordingly.

**Tools reliability.** The Cronbach's Alpha test was used to evaluate the research tools' reliability. This an international measure of reliability, has a maximum value of 1.0, which denotes the highest level of reliability, and a minimum accepted value of 0.65, below this value, indicates an unreliable tool. Cronbach's alpha values were: 0.893 for the nurses' knowledge domain, and 0.869 for the nurses' performance domain.

**Operational phase.** It included the following steps:

**Sampling.** The participants who met the eligibility requirements and agreed to participate in the study were interviewed and observed by the researcher to gather the necessary data once the relevant approvals were granted to to proceed with the proposed study.

**Data collection period.** The researcher visited surgical wards; GSC affiliated with Mansoura University, collected data three days a week (Saturday, Monday, and Wednesday). The researcher gave the nurses a brief explanation of the study's purpose and methodology after making an introduction to them.

The data collection consumed three months, the study was conducted from the beginning of November (2021) to the end of January (2022). The following themes were covered.

The researcher interviewed nurses according to their work schedule individually in the nurses' room to distribute the knowledge questionnaire, the required time ranged from 15-20 minutes per each to fulfill it.

The researcher observed nurses' performance indirectly by assessing three shifts (morning, afternoon, and night) by using tool III. The researcher observed from one to two nurses per day with an indirect attitude to avoid nurses' anxiety, fear, and stress; the required time ranged from 15-20 minutes to observe each nurse.

**3.6 Statistical Analysis**

SPSS (Stands for Statistical Product and Service Solutions) for Windows version 20.0 was used to conduct all statistical analyses (SPSS, Chicago, IL). Continuous data had a normal distribution, and were expressed in mean and standard deviation (SD). Categorical data were expressed in numbers and percentages, the reliability (internal consistency) test for the questionnaires used in the study was calculated. statistical significance was set at  $p < 0.05$ .

**4. Results**

Table 1 shows that; 64.0% of nurses age less than 30 years with a mean of 29.1 (5.9). as regards, gender, marital status, and residence 70.0%, 50%, and 66.0% of nurses were women, married, and residents in rural areas, respectively. A bachelor's

degree in nursing was a level of education for 34.0%.

Table 2 indicates that; 70.0% of the nurses had less than 10 years of experience in total and 76.0% of the nurses had less than 10 years of experience at surgical wards, GSC. finally, 52.0% of nurses attended training courses for the prevention of abdominal drains' placement infection with 61.5% out of them less than four times.

Table 3 demonstrates that only 10% of nurses were competent in total knowledge regarding prevention of abdominal drains placements' infection for postoperative patients.

Table 4 declares that 64% of nurses were incompetent in total performance regarding prevention of abdominal drains placements' infection for postoperative patients.

**Table 1** Nurses' socio-demographic characteristics (N=50)

| Items                    | N          | %    |
|--------------------------|------------|------|
| <b>Age (years)</b>       |            |      |
| < 30                     | 32         | 64.0 |
| ≥30                      | 18         | 36.0 |
| $\bar{x}$ (SD)           | 29.1 (5.9) |      |
| <b>Gender</b>            |            |      |
| Male                     | 15         | 30.0 |
| Female                   | 35         | 70.0 |
| <b>Marital Status</b>    |            |      |
| Single                   | 15         | 30.0 |
| Married                  | 25         | 50.0 |
| Widow/ Divorced          | 10         | 20.0 |
| <b>Residence</b>         |            |      |
| Urban                    | 17         | 34.0 |
| Rural                    | 33         | 66.0 |
| <b>Educational level</b> |            |      |
| Secondary school         | 10         | 20.0 |
| Technical institute      | 13         | 26.0 |
| Bachelor                 | 17         | 34.0 |
| Postgraduate             | 10         | 20.0 |

**Table 2** Nurses' occupational characteristics (N=50)

| Items  | N  | %    |
|--|----|------|
| <b>Total years of experience</b>   |    |      |
| < 10   | 35 | 70.0 |
| ≥10  | 15 | 30.0 |
| <b>Years of experience at surgical wards, Gastroenterology Surgical Center</b>                     |    |      |
| < 10   | 38 | 76.0 |
| ≥10  | 12 | 24.0 |
| <b>Number of training courses for prevention of abdominal drains' placements' infection (n=26)</b> |    |      |
| < 4  | 16 | 61.5 |
| ≥4   | 10 | 38.5 |

**Table 3** Nurses's total knowledge score levels regarding prevention of abdominal drains placements' infection for postoperative patients (N=50)

| Total knowledge score levels |    |      | Mean ±SD  |
|------------------------------|----|------|-----------|
|                              | N  | %    |           |
| Incompetent                  | 12 | 24.0 | 13.6 ±3.9 |
| Fair                         | 33 | 66.0 |           |
| Competent                    | 5  | 10.0 |           |

**Table 4** Nurses' total performance score levels regarding prevention of abdominal drains placements' infection for postoperative patients (N=50)

| Total performance score levels |    |      | Mean ±SD    |
|--------------------------------|----|------|-------------|
|                                | N  | %    |             |
| Incompetent                    | 32 | 64.0 | 176.6 ±17.9 |
| Fair                           | 15 | 30.0 |             |
| Competent                      | 3  | 6.0  |             |

## 5. Discussion

Surgical wounds can represent a simple or severe problem of an organ (such as the skin) or a tissue and can spread to other tissues and anatomical structures (e.g., subcutaneous tissue, muscles, tendons, nerves, vessels, and even to the bone). inappropriate repair process can result in significant injury, like the loss of skin, the start of an infection with subsequent impairment to the surrounding tissues and even systemic ones (Grumezescu & Negut, 2018).

The installation of infection, most frequently in the event of chronic wounds, is the most frequent and inevitable barrier to wound healing ,Wound dressings are conventionally only used to protect the wound from external contamination, but they could also be functionalized with different therapeutic complexes to be delivered to wound sites (Grumezescu & Negut, 2018).

Abdominal drains are used to prevent the accumulations of inflammatory substances, infection debris, blood, pus, and other body fluids at the surgical site . By performing the first and second roles, drainage of already-formed collections may lessen bacterial invasion and colonization at the surgical site and thus decrease the incidence of surgical site infection. The insertion of an abdominal drain may have some drawbacks or disadvantages like the drain becoming blocked or obstructed with consequent failure of its function (Abdulhamid & Sarker, 2018).

Particular care must be taken to manage and remove surgical drains since they might be a source of ascending infection , The usage of drains has drawbacks as they require a high level of maintenance when drainage is prolonged, The timing of drain removal could significantly affect how long a patient stays in the hospital and how



much it will cost to treat them (**Bakshi, Kaushal, Panda, Sood, & Verma, 2015**). The association between the use of surgical drains and SSI depends on several factors including the duration, type, location, and number of drains used (**Coslovsky et al, 2019**).

The quality of wound care in the units is very important for the rapid and uncomplicated healing of surgical incisions. Thus, one of the essential components of nursing care is the wound care provided in the surgical units. Turkey's nursing regulations state that the nurse must mechanically clean, irrigate, and dress the wound, create practise registration forms for the wound and update knowledge about wound care principles and products (**Çürük, Kartın & Sürme, 2018**).

The results of this study show that only five nurses out of fifty have a competent total level of knowledge regarding prevention of abdominal drains placements' infection for postoperative patients, these results are congruent with **Abo-El-Ata, Abou Zaid, Mohamed, Morshed, and Shahin, (2020)**, the study carried out at Mansoura University, and Emergency Hospitals, revealed that more than half of the nurses under study had unsatisfactory knowledge of the wound and the technique of its care. in addition, **El-soudany, (2018)**, the study revealed that The majority of the nurses who participated in the study had insufficient levels of knowledge about wound healing, they lacked the basic knowledge about a wound in general and especially in postoperative wound infection.

According to the researcher, these findings can be related to; first: the younger age of nurses which is linked with relatively shorter years of experience. second: graduation of twenty-three nurses from either secondary school or technical institute of nursing. both two factors contribute to incompetent knowledge and highlight the importance of on-duty training sessions.

Results of the present study indicate that only three nurses out of fifty have a competent total performance level regarding prevention of abdominal drains placements' infection for postoperative patients. These results are in matching with **Argaw, Beletew, Mengesha, Tewfik, and Wudu, (2020)**. examined the level of nurses' performance regarding the prevention of SSIs and indicated that more than half of the nurses were practicing poorly. In addition to **Demis, Desalew, Geda, and Mengistie, (2019)**, a study conducted in the government hospitals of the Dire Dawa city Administration and the Harari Regional State in Eastern Ethiopia, the degree of self-

reported SSI prevention practice was found to be poor.

A study by **Novelia and Songwathana, (2017)**. Explored some factors assumed to affect nurses' level of practice regarding the prevention of SSI. Firstly, the working environment might affect nursing practice in the wards. Nurses can function well if they have access to resources including water, a wash station, gloves, masks, and hand soap. Secondly, the hospital's infection control department may have an impact on how well nurses prevent SSI. If nurses are under clinical supervision, they frequently do well. Clinical supervision gives nurses the chance to improve patient care with an opportunity to improve nursing care especially in maintaining standards of care. Another contributing factor based on the findings of the current study only twenty-six nurses out of fifty attended training courses on the prevention of abdominal drains' placement infection.

## 6. Conclusion

Based on the study results the researcher concludes that two-thirds of nurses have fair total knowledge level, and almost two-thirds have an incompetent total performance level regarding prevention of abdominal drains placements' infection for postoperative patients.

## 7. Recommendations

- Design, and implement educational programs for nurses to achieve competency regarding prevention of abdominal drains placements' infection for postoperative patients.
- Equip, and supply health care settings with all necessary supplies to apply, and to ensure strict adherence to surgical site infections prevention guidelines.

## 8. Acknowledgement

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