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Nurses' Compliance with Surgical Site Infection Prevention Practices in Tripoli Teaching Hospitals

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Abstract: Surgical site infections (SSIs) remain a major healthcare-associated infection that contributes to increased morbidity, prolonged hospitalization, and higher healthcare costs. Nurses play a central role in implementing preventive measures in accordance with evidence-based guidelines. This study aimed to assess nurses' practices regarding SSI prevention in teaching hospitals in Tripoli, Libya, and to identify associated factors. A cross-sectional study was conducted from January to June 2025 using a validated self-administered questionnaire. A total of 80 registered nurses participated in the study. Descriptive statistics and logistic regression analysis were used to determine the associations between demographic variables and SSI prevention practices. High adherence was observed in antiseptic use (92.5%) and hand hygiene practices (87.5%). However, deficiencies were identified in training related to surgical hair removal, the timely administration of prophylactic antibiotics, and the assessment of body mass index. Professional experience and work department were significantly associated with better adherence to preventive practices ($p < 0.05$). The findings highlight the need for structured training programs and strengthened institutional infection control policies to improve compliance with evidence-based practices for the prevention of surgical site infections.

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التزام التمريض بممارسات الوقاية من عدوى موضع الجراحة في مستشفيات طرابلس التعليمية

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الملخص: تُعدّ عدوى موضع الجراحة من أكثر أنواع العدوى المرتبطة بالرعاية الصحية شيوعًا، ولا تزال تمثل تحديًا كبيرًا في الأنظمة الصحية نظرًا لما تسببه من زيادة في معدلات المرض، وإطالة مدة الإقامة في المستشفى، وارتفاع تكاليف الرعاية الصحية. ويؤدي الممرضون دورًا محوريًا في تطبيق التدابير الوقائية وفقًا للإرشادات المعتمدة المبنية على الأدلة. هدفت هذه الدراسة إلى تقييم ممارسات الممرضين المتعلقة بالوقاية من عدوى موضع الجراحة في المستشفيات التعليمية بمدينة طرابلس، ليبيا، بالإضافة إلى تحديد العوامل المرتبطة بهذه

الكلمات المفتاحية
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عدوى موضع الجراحة،
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الممارسات. تم إجراء دراسة مقطعية خلال الفترة من يناير إلى يونيو 2025 باستخدام استبيان ذاتي مُنظَّم ومُعتمد. شارك في الدراسة ما مجموعه 80 ممرضًا وممرضة مسجلين. تم تحليل البيانات باستخدام الإحصاءات الوصفية وتحليل الانحدار اللوجستي لتحديد العلاقة بين المتغيرات الديموغرافية وممارسات الوقاية من عدوى موضع الجراحة. أظهرت النتائج مستوى مرتفعًا من الالتزام باستخدام المطهرات (92.5%) وممارسات نظافة اليدين (87.5%). ومع ذلك، تم تحديد بعض أوجه القصور، خاصة في التدريب المتعلق بإزالة الشعر الجراحي، والتوقيت المناسب لإعطاء المضادات الحيوية الوقائية، بالإضافة إلى تقييم مؤشر كتلة الجسم. كما أظهرت النتائج وجود علاقة ذات دلالة إحصائية بين الخبرة المهنية وقسم العمل ومستوى الالتزام بالممارسات الوقائية الأفضل ($p < 0.05$). وتؤكد هذه النتائج على الحاجة إلى برامج تدريبية منظمة وتعزيز سياسات مكافحة العدوى على مستوى المؤسسات الصحية، من أجل تحسين الالتزام بالممارسات المبنية على الأدلة للوقاية من عدوى موضع الجراحة.

1. Introduction

Surgical site infections (SSIs) are among the most common healthcare-associated infections and remain a major challenge worldwide [1]. They occur in approximately 2–5% of surgical procedures and contribute significantly to increased patient morbidity and healthcare costs [2]. SSIs are defined as infections that occur within 30 days after surgery or within one year when a surgical implant is placed [3]. Patients who develop SSIs are at a greater risk of prolonged hospitalization and mortality compared with those who do not develop infections [4].

Nurses play a critical role in preventing SSIs through adherence to infection control protocols and the implementation of evidence-based practices [5]. However, several studies have reported gaps in knowledge and inconsistent compliance among nurses regarding SSI prevention measures [6,7]. Strengthening nurses' competencies through continuous education, training, and institutional support is therefore essential for reducing the incidence of SSIs [8-10].

This study aimed to assess nurses' practices related to the prevention of surgical site infections in teaching hospitals in Tripoli, Libya, and to identify demographic and professional factors associated with adherence to prevention guidelines.

2. The objectives of this study were to:

- Assess current nursing practices related to the prevention of surgical site infections in teaching hospitals in Tripoli.
- Determine factors influencing adherence to SSI prevention practices, including gender, educational level, and professional experience.
- Evaluate nurses' compliance with evidence-based measures for SSI prevention.
- Examine the association between demographic characteristics and adherence to SSI prevention practices.

3. Significance of the study (brief narrative)

This study addresses an important local evidence gap by documenting nurses' practices related to SSI prevention in teaching hospitals in Tripoli and identifying specific areas that require improvement.

The findings highlight key deficiencies, particularly in surgical hair removal training, timely administration of prophylactic antibiotics, and routine body mass index (BMI) assessment. The observed association between professional experience, work department, and higher adherence suggests the potential value of mentorship programs and targeted training initiatives, including staff rotation between departments, to promote the sharing of best practices. Furthermore, the study supports the need for stronger infection prevention and control (IPC) policies, the use of standardized clinical checklists, and the implementation of regular audit and feedback systems. Improving these practices may contribute to reducing SSI rates, shortening hospital stays, decreasing patient morbidity, and lowering healthcare costs. Additionally, the findings provide an important baseline for future interventions and research in similar healthcare settings, particularly in low-resource environments.

4. Methodology

A cross-sectional study was conducted between January and June 2025 in teaching hospitals located in Tripoli, Libya. The study included registered nurses working in the General Surgery and Central Operations departments. Data were collected using a structured self-administered questionnaire adapted from relevant literature. The instrument assessed nurses' adherence to SSI prevention practices as well as demographic and professional characteristics. The reliability of the questionnaire was evaluated and demonstrated high internal consistency, with a Cronbach's alpha coefficient of 0.864.

Data were analyzed using descriptive statistics and logistic regression analysis to identify factors associated with adherence to SSI prevention practices. Statistical significance was set at $p < 0.05$. Ethical approval was obtained from the appropriate institutional review board, and informed consent was obtained from all participants prior to their participation in the study.

5. Results

5.1. Reliability

The questionnaire showed high internal consistency (Cronbach's alpha = 0.864).

5.2. Demographic Characteristics

A total of 80 nurses participated in the study, resulting in a response rate of 100%. Most participants were female (75%), and the majority were aged 30 years or older (73.8%). Nearly half of the participants held a university degree (48.8%), and 67.5% had more than five years of professional experience.

5.3. Adherence to SSI Prevention Practices

Overall, nurses demonstrated high adherence to several key SSI prevention measures. Approximately 92.5% reported regular use of antiseptics, 87.5% performed hand hygiene before and after dressing changes, 88.8% used sterile techniques during wound care, and 91.3% followed appropriate procedures for the disposal of contaminated waste.

Despite these strengths, several important gaps were identified. Many nurses reported limited training in proper surgical hair removal techniques. In addition, the timely administration of prophylactic antibiotics was inconsistent, routine BMI assessment was often overlooked, and mask use during wound care was not consistently practiced.

5.4. Factors Associated with Practice

Professional experience and department of work were significantly associated with better adherence to SSI prevention practices ($p < 0.05$). Nurses working in the General Surgery department demonstrated higher compliance with recommended preventive measures compared with those working in the Central Operations department.

Table (1). Reliability statistics for the SSI prevention questionnaire

Cronbach's Alpha	Number of Items
0.864	21

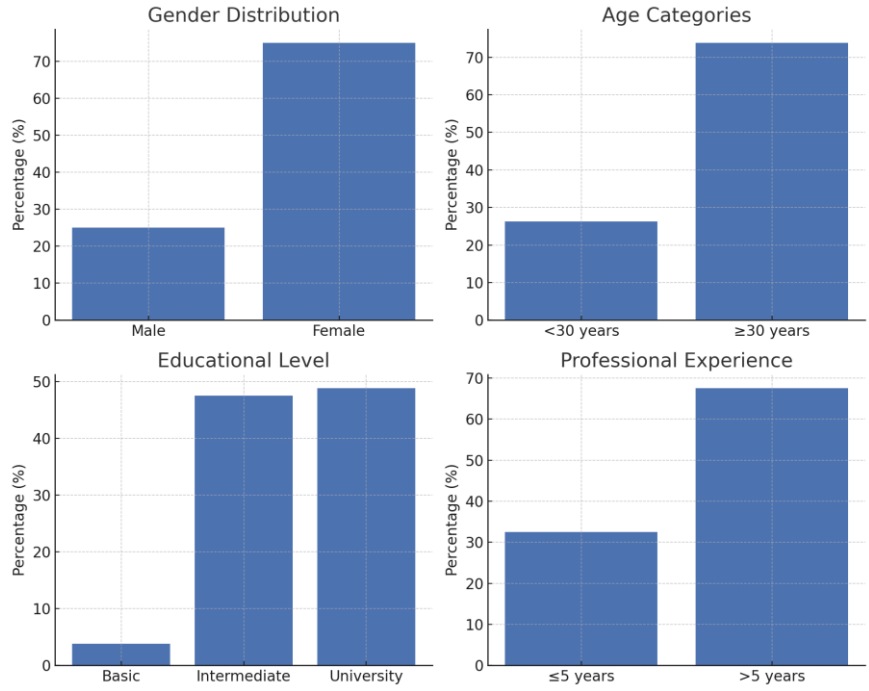

Figure (1). Demographic Characteristics of Nurses in Tripoli City Public Hospital (n = 80)

6. Discussion

The findings of this study indicate a moderate level of adherence to surgical site infection (SSI) prevention practices among nurses working in teaching hospitals in Tripoli. High levels of compliance were observed in key practices such as hand hygiene and the use of antiseptics. These results are consistent with international infection prevention and control guidelines, which emphasize the importance of proper hand hygiene and antiseptic application as fundamental measures in preventing SSIs [11].

Despite these strengths, notable gaps were identified in several important areas, particularly in preoperative preparation and the timely administration of prophylactic antibiotics. These deficiencies are concerning, as both measures are widely recognized as critical components of effective SSI prevention strategies [12,13]. Inconsistent adherence to these practices may increase the risk of postoperative infections and negatively affect patient outcomes.

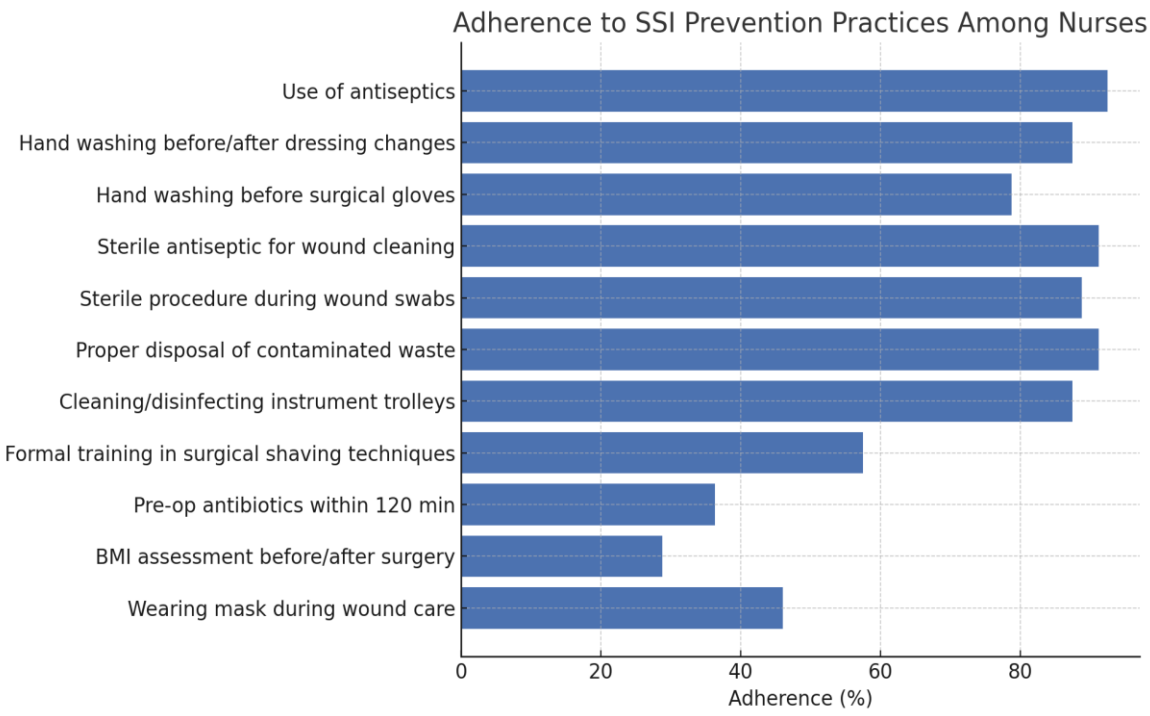

Figure (2). Adherence rates for each SSI prevention practice.

The study also found that professional experience was positively associated with adherence to SSI prevention practices. This finding is consistent with previous research suggesting that greater clinical experience enhances nurses' ability to apply infection control measures effectively, likely due to increased exposure to clinical situations and accumulated practical knowledge [14].

In addition, differences in adherence were observed between departments. Nurses working in the General Surgery department demonstrated higher compliance compared to those working in Central Operations. This variation may be attributed to differences in clinical responsibilities and levels of exposure to postoperative wound management and infection prevention protocols [15].

Overall, these findings highlight the importance of continuous professional education, regular monitoring of clinical practices, and stronger enforcement of institutional infection prevention guidelines. Strengthening those areas could contribute to improving adherence and ultimately reducing the incidence of surgical site infections.

7. Conclusion

This study found that nurses working in teaching hospitals in Tripoli demonstrate acceptable adherence to several key surgical site infection prevention practices, particularly in hand hygiene and antiseptic use. However, important gaps remain, especially in preoperative preparation procedures and the timely administration of prophylactic antibiotics. Addressing these deficiencies requires targeted educational programs, ongoing professional training, and stronger institutional support for infection prevention and control policies. Implementing these measures may improve nurses' compliance with evidence-based practices and contribute to reducing the incidence of surgical site infections in healthcare settings.

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