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# Nurses' knowledge, attitudes and practices regarding the prevention of post-operative infections: a cross-sectional study at Wangata General Referral Hospital, DRC

**Moyenge Ngbango Excellente [1], Ngoy Bokolombe Pitsou [2], Angembi Simone [3], Bosako Manga Tonton [4]**

1. Master's degree in Nursing, specialising in internal medicine and surgery, DRC
2. Professor, Thesis Supervisor
3. Senior Lecturer, Co-supervisor
4. Assistant, Member of the supervisory team, https://orcid.org/0009-0006-8553-3456 , tontonbosako@gmail.com

## Abstract

**Introduction:** Postoperative infections (POIs) constitute a major patient safety issue in resource-limited countries. This study aimed to assess the knowledge, attitudes and practices (KAP) of nurses at the Wangata General Referral Hospital (DRC) regarding the prevention of POIs.

**Methods:** A cross-sectional survey was conducted among 102 nurses working in surgery, the operating theatre and intensive care. A structured questionnaire comprising 35 items was administered. Univariate, bivariate (Chi²) and multivariate (logistic regression) analyses were performed using SPSS 25.

**Results:** The mean age was 42.3 years (± 8.7); 56.9% were women. Whilst 100% were familiar with preoperative preparation, 68.6% were unaware of the pathogens responsible for postoperative infections. Knowledge of postoperative complications was lacking in 37.3%. Technical vigilance was cited by only 15.3% of respondents, compared with 30.8% for empathy. Seniority of ≥ 20 years (OR = 3.2; 95% CI: 1.5–6.8) and knowledge of pathogens (OR = 4.1; 95% CI: 1.9–8.9) were the main predictors of good practice.

**Conclusion:** Critical gaps persist in microbiological knowledge and technical vigilance. Targeted continuing education on nosocomial pathogens and aseptic bundles is required.

**Keywords:** Postoperative infections, prevention, knowledge, attitudes, practices, nurses, RDC.

## 1. Introduction

Patient safety in the perioperative period is a key indicator of the quality of care. Postoperative infections (POIs) are the second leading cause of healthcare-associated infections worldwide (World Health Organization [WHO], 2018). In sub-Saharan Africa, their incidence ranges from 8% to 30%, compared with 2% to 5% in high-income countries (Allegranzi et al., 2017).

Nurses play a central role in the prevention of PSIs: monitoring wounds, applying aseptic techniques, and educating patients (Anderson et al., 2020). However, several studies show that their knowledge and practices often remain inadequate (Labrague et al., 2019; Berhanu et al., 2021). In the Democratic Republic of the Congo (DRC), no study had previously assessed nurses' KAP in this area.

The aim of this study was to assess the knowledge, attitudes and practices of nurses at the Wangata General Hospital regarding the prevention of post-operative infections, and to identify the factors associated with good practice.

## 2. Methods

### 2.1. Design and setting

A descriptive cross-sectional study was conducted from January to March 2024 at the Wangata General Referral Hospital (Mbandaka, Tshopo, DRC). This public hospital performs approximately 80 surgical procedures per month.

### 2.2. Population and sample

The target population comprised all qualified nurses working in surgery, the operating theatre or intensive care for at least six months (n = 142). The sample size was calculated using Lorenz's formula (1996): n = 97, increased to 102 to account for refusals. A comprehensive sampling method was used.

### 2.3. Data collection instrument

A self-administered questionnaire comprising 35 items, based on tools validated by the WHO (2018) and Labrague et al. (2019), was distributed. Content validity was confirmed by a panel of experts; test-retest reliability yielded an intraclass correlation coefficient of 0.87.

### 2.4. Statistical analysis

The data were entered into Excel and then analysed using SPSS 25. Chi-square tests ($p < 0.05$) and logistic regression (95% CI) were used.

### 2.5. Ethical considerations

The Tshopo Provincial Ethics Committee approved the study (No. CE/TSH/003/2024). Each participant signed an informed consent form. Anonymity was guaranteed.

## 3. Results

### 3.1. Sociodemographic characteristics (n = 102)

**Table 1** – Distribution by age group

| Age group (years) | Number (n) | Frequency (%) | Cumulative percentage (%) |
|---|---|---|---|
| **24–29** | 6 | 5.88% | 5.88% |
| **30–34** | 10 | 9.80% | 15.68% |
| **35–39** | 14 | 13.73% | 29.41% |
| **40–44** | 25 | 24.51% | 53.92% |
| **45–49** | 19 | 18.63% | 72.55% |
| **50–54** | 11 | 10.78% | 83.33% |
| **55–59** | 8 | 7.84% | 91.17% |
| **60–64** | 6 | 5.88% | 97.05% |
| **65–69** | 3 | 2.95% | **100.00%** |
| **Total** | **102** | **100.0%** | - |

**Comment:** The 40–44 age group predominates (24.5%), indicating a mature working population. Those under 30 and over 65 are under-represented.

**Table 2 –** Breakdown by gender

| Gender | Number (n) | Percentage (%) |
|---|---|---|
| Female | 58 | 56.9 |
| Male | 44 | 43.1 |
| **Total** | **102** | **100.0** |

**Comment:** A slight predominance of women in the services (56.9%) is observed, comparable to data from the African literature.

**Table 3 –** Breakdown by level of education

| Level of education | Number (n) | Percentage (%) |
|---|---|---|
| Bachelor's degree (L2) | 58 | 56.86% |
| Graduate (A1) | 36 | 35.29% |
| Secondary (A2) | 8 | 7.85% |
| **Total** | **102** | **100.0%** |

**Comment:** More than half of the staff (56.9%) hold a bachelor's degree, which is encouraging in terms of a solid educational foundation.

**Table 4 –** Breakdown by length of service

| Length of service (years) | Number of staff (n) | Percentage (%) |
|---|---|---|
| 1–10 years | 44 | 43.14% |
| 11–20 years | 38 | 37.25% |
| 21 years and over | 20 | 19.61% |
| **Total** | **102** | **100.0%** |

**Comment:** The majority of nurses (80.4%) have between 1- and 20-years' experience, ensuring a certain level of clinical expertise.

### 3.2. Knowledge

**Table 5 –** Knowledge of preoperative preparation

| Knowledge | Number of respondents (n) | Percentage (%) |
|---|---|---|
| Yes | 102 | 100.0% |
| No | 0 | 0.0% |
| **Total** | **102** | **100.0%** |

**Comment:** The unanimity on this point is excellent, but may reflect a social desirability bias.

**Table 6 –** Knowledge of the pathogens responsible for IPOs

| Knowledge of pathogens | Number of respondents (n) | Percentage (%) |
|---|---|---|
| Yes | 32 | 31.37% |
| No | 70 | 68.63% |
| **Total** | **102** | **100.0%** |

**Comment:** Nearly 70% of nurses are unaware of the microbial agents involved, a critical shortcoming for targeted prevention.

**Table 7 –** Pathogens cited (by the 32 experts)

| Germs mentioned | Number (n) | Percentage (%) |
|---|---|---|
| Staphylococci | 24 | 75.0% |
| Streptococci | 8 | 25.0% |
| **Total** | **32** | **100.0%** |

**Comment:** Staphylococci are correctly identified, but the absence of any mention of Enterobacteriaceae or anaerobic bacteria is a cause for concern.

**Table 8 –** Knowledge of surgical complications

| Knowledge of complications | Number of respondents (n) | Percentage (%) |
|---|---|---|
| Yes | 64 | 62.75% |
| No | 38 | 37.25% |
| **Total** | **102** | **100.0%** |

**Comment:** More than a third of respondents are unaware of potential complications, which undermines clinical vigilance.

**Table 9 –** Knowledge of the aetiologies of POIs

| Knowledge of aetiologies | Number of respondents (n) | Percentage (%) |
|---|---|---|
| **Yes** | 94 | 92.16% |
| **No** | 8 | 7.84% |
| **Total** | **102** | **100.0%** |

**Comment:** Awareness of the causes is good (92.2%), in contrast to the lack of knowledge about germs.

### 3.3. Attitudes

**Table 10 –** Dominant professional attitude reported

| Attitude | Number of respondents (n) | Percentage (%) | Cumulative percentage (%) |
|---|---|---|---|
| Empathy and dedication | 32 | 31.37% | 31.37% |
| Quality of welcome | 30 | 29.41% | 60.78% |
| Kindness | 24 | 23.53% | 84.31% |
| Vigilance and caution | 16 | 15.69% | 100.00% |
| **Total** | **102** | **100.0%** | - |

**Comment:** Interpersonal attitudes predominate (84.3%), with technical vigilance being cited by only a minority.

### 3.4. Practices and associated factors

**Table 11 –** Relationship between length of service and knowledge of germs

| Length of service (years) | Aware of germs (n) | Percentage (%) | Not familiar (n) | Percentage (%) | Total (n) |
|---|---|---|---|---|---|
| 1–10 years | 10 | 22.7% | 34 | 77.3% | **44** |
| 11–20 years | 12 | 31.6% | 26 | 68.4% | **38** |
| ≥ 21 years | 10 | 50.0% | 10 | 50.0% | **20** |
| **Total** | **32** | **31.4%** | **70** | **68.6%** | **102** |

**Comment:** Knowledge of bacteria increases significantly with length of service ($p < 0.05$).

**Table 12 –** Practice of systematic wound monitoring by length of service

| Duration (years) | Monitors systematically (n) | Percentage (%) | Rarely monitors (n) | Percentage (%) | Total (n) |
|---|---|---|---|---|---|
| **1–10 years** | 20 | 45.5% | 24 | 54.5% | **44** |
| **11–20 years** | 23 | 60.5% | 15 | 39.5% | **38** |
| **aged 21** | 16 | 80.0% | 4 | 20.0% | **20** |
| **Total** | **59** | **57.8%** | **43** | **42.2%** | **102** |

**Comment:** Seniority significantly improves local wound monitoring ($p < 0.01$).

**Table 13 –** Practice of strict aseptic technique according to knowledge of pathogens

| Knowledge of germs | Strict aseptic technique (n) | Percentage (%) | Inadequate aseptic technique (n) | Percentage (%) | Total (n) |
|---|---|---|---|---|---|
| **Yes** (n=32) | 28 | 87.5% | 4 | 12.5% | **32** |
| **No** (n=70) | 34 | 48.6% | 36 | 51.4% | **70** |
| **Total** | **62** | **60.8%** | **40** | **39.2%** | **102** |

**Comment:** Knowledge of germs is strongly correlated with better aseptic technique ($p < 0.001$).

### 3.5. Multivariate analysis (logistic regression)

**Table 14 –** Factors associated with good preventive practice (score ≥7/10)

| Risk factor / Variable | Adjusted OR | 95% CI | p-value | Significance |
|---|---|---|---|---|
| Length of service ≥20 years | 3.2 | [1.5 – 6.8] | 0.003 | Highly significant |
| Bachelor's degree (L2) | 2.8 | [1.3 – 6.0] | 0.008 | Significant |
| Knowledge of germs | 4.1 | [1.9 – 8.9] | < 0.001 | Highly significant |
| Female | 1.4 | [0.7 – 2.8] | 0.320 | Not significant |

**Comment:** Knowledge of germs is the strongest predictor of good practice, followed by length of service and level of education.

## 4. Discussion

This study highlighted significant gaps in nurses' microbiological knowledge (68.6% were unaware of the pathogens), a finding similar to that reported in Tanzania (71%) by Ling et al. (2019) and in Ethiopia (65%) by Berhanu et al. (2021). This lack of knowledge is concerning because "without correct identification of pathogens, prevention measures remain ineffective" (WHO, 2022, p. 45).

The attitude of technical vigilance is cited by only 15.3% of respondents, compared with 84.3% for relational attitudes (empathy, a welcoming manner, kindness). This paradox has already been observed in Cameroon by Mbah et al. (2022), who noted that "African nurses spontaneously associate prevention with kindness rather than with protocol". However, Anderson et al. (2021) point out that without technical rigour, empathy alone does not reduce IPO rates.

Multivariate analysis shows that knowledge of germs (OR = 4.1) and seniority ≥20 years (OR = 3.2) are the main predictors of good practice. These results are consistent with those of Labrague et al. (2019) in the Philippines (OR = 2.9 for university education) and Schweizer et al. (2018) (a 7% increase in compliance per year of experience).

Limitations include social desirability bias and the lack of direct observation of practices. Nevertheless, this study provides the first CAP assessment in this region of the DRC.

## 5. Conclusion

Nurses at Wangata General Hospital demonstrate acceptable theoretical knowledge of the causes of post-operative infections, but critical gaps regarding the causative pathogens and complications. An empathetic attitude is valued, but it does not compensate for a lack of technical vigilance. Continuing professional development focused on microbiology and aseptic bundles, as well as mentoring of junior staff by senior staff, are priorities.


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## Conflicts of interest

None.


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