



# Factors Affecting Compliance to Preoperative Patient Care Guidelines among Nurses Working in Surgical Wards of a Tertiary Referral Hospital in Nairobi, Kenya

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## Abstract

### BACKGROUND

Worldwide, over 234 million surgical patients are operated on yearly with 3%-16% of them developing complications and other preventable surgical mistakes. To mitigate these negative surgical outcomes, pre-operative patient care guidelines (PPCG) have been developed. However, poor compliance with the guideline may lead to surgical errors. In Kenyatta National Hospital (KNH) 20% of surgical errors and 10% of cancelled surgeries are due to poor compliance with PPCG. Therefore, this study aimed to establish the level of compliance with PPCG and its associated factors among perioperative nurses at KNH.

### MATERIALS AND METHODS

This was an analytical cross-sectional study that was conducted at the KNH surgical wards. The census method was utilized to collect data among 103 nurses and analyzed using SPSS version 22. Bivariate analysis with Fischer's exact test was used for the correlation between the independent and dependent variables, with a p-value of <0.05 being considered to be statistically significant at a 95% confidence interval.

### RESULTS

Most [59(57.3%)] of the participants had low compliance to PPCG, with nurses' experience ( $p<0.001$ ), gender ( $p=0.02$ ), level of education ( $p<0.001$ ), having post-basic nursing training ( $p=0.02$ ), not having training in PPCG ( $p<0.001$ ) and knowledge on PPCG ( $p<0.001$ ) being significantly associated with compliance to PPCG.

### CONCLUSION

Most of the nurses have low compliance levels to PPCG, with nursing experience, nurses of the male gender, not having post-basic nursing training and not having training in PPCG use being the main contributing factors.

*Keywords: Factors, Preoperative Patient Care Guidelines, Compliance, Kenya.*

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## Introduction

Worldwide, over 234 million surgical patients are operated on yearly with 3%-16% of them developing complications and other preventable surgical mistakes[1].

Preoperative care is the preparation and management of a patient before surgery. The preoperative preparation includes signing informed consent, marking the surgical site before surgery, taking vital signs of the patients, confirmation of blood



products, other investigations and implants and confirming if preoperative teaching has been done by the nurses. The preparation also includes confirming procedures like bowel preparation, availability of intravenous access and catheter insertion [2].

Good preoperative preparation is vital to patients' safety and a key nursing role. Likewise, poor preoperative preparation of patients is associated with detrimental effects. A systematic review done between 1990 and 2010 on surgical errors, reported that 59% of the study participants suffered a temporary injury, 13.1% had the operation done on the wrong site, 33% had permanent injuries while wrongful death was documented in 6.6% of patients operated on [3].

Poor preoperative preparation leads to the cancellation of surgeries. On the same aspect, any interruptions in scheduled operations lead to dire consequences such as delayed turn-around time, wastage of money and other patient care resources [4]. According to a study done in Burkina Faso, 36.9% of the total surgeries booked in a teaching and referral hospital were delayed and 9.7 % were cancelled. Among these, 68.5% of the cancellations could have been avoided with proper preoperative preparation [6]. In the study, healthcare and nurse-related factors like gender and training on PPCG use were found to be associated with the cancellation or delay in the surgeries.

Compliance with the utilization of PPCG is varied in different parts of the world. In developed countries, compliance is high while in developing or underdeveloped countries it is low. For example among the developed countries, compliance in the United Kingdom was 93.0%, 92.5% in Sweden, 94% in Finland, 90.1% in Belgium and 94.9% in the Netherlands [7]. On the same note, in Sub-

Saharan Africa, compliance was 45.5%, 47.3%, 49.9%, 53.8%, 55.9% and 60.3% in Chad, South Sudan, Central African Republic, Botswana, Senegal and Namibia respectively [3]. Locally, a daily newspaper reported brain surgery that was performed on the wrong patient in KNH [4]. This could probably have been avoided if proper compliance with PPCG were followed. This and other possible undocumented cases prompted this study intending to determine the nurses' level of compliance to PPCG at the KNH surgical wards and the associated factors.

## **Materials and methods**

### ***Study design***

This was a quantitative analytical cross-sectional study that was conducted between October and December 2021 at the Kenyatta National Hospital Surgical wards. In this study, the census method was utilized to recruit all the nurses who were working in the surgical and orthopaedic wards at the time of the study.

### ***Study tools***

A self-administered questionnaire and an observational checklist were used to collect data. The observational checklist focused on observed compliance with PPCG. The parameters to be observed were extracted from the hospital preoperative checklist. The observational checklist comprised four columns that matched the preoperative checklist in the patients' files.

Data collection tools were pre-tested and adjusted where necessary. Cronbach alpha was performed to measure the internal consistency and reliability of the instruments.

### ***Study procedure***

The questionnaires were self-administered and observational checklist completed by the principal investigator and the research assistant as the nurses prepared patients for surgery. The participants were



observed twice to enhance the credibility of the data collected. Naturalistic observation was used to control for the Hawthorne effect.

### **Data analysis**

Data analysis was done using SPSS software version 22. The Kolmogorov-Smirnov test was used to test for the normality of data before analysis. Descriptive statistics were used to describe the level of compliance with PPCG among the nurses. A scoring system was applied for the responses to the checklist. A score of more than 70% was classified as high, a score between 50%-70% as moderate and a score below 50% as low. The scoring system for this study had a minimum attainable score of 0 and a maximum attainable score of 34. To get a percentage score, the researcher divided the attained

score from the PPCG adherence section by the maximum possible score of 34 and multiplied it by a hundred. Inferential statistics inform Fischer's exact test and ordinal logistic regression using odds ratio was used to test for association between nurse-related variables and level of compliance to PPCG among the nurses. P-values of <0.05 were considered significant at a 95% confidence interval.

### **Ethical consideration**

The study was approved by the Kenyatta National Hospital-University of Nairobi (KNH-UoN) ethical review committee and a licence the National Council of Science Technology and Innovation (licence number NACOSTI/P/20/12231). Additionally, the study was carried out in adherence to the requirements of the Declaration of Helsinki.

**Table 1:**  
Socio-demographic characteristics

	Frequency(n)	Percent(%)
<b>Age (years)</b>		
20-29	61	59.2
30-39	28	27.2
40-49	11	10.7
50-59	3	2.9
Total	103	100
<b>Gender</b>		
Male	43	41.7
Female	60	58.3
Total	103	100
<b>Highest Qualification</b>		
Certificate	10	9.7
Diploma	65	63.1
Degree	23	22.3
Masters	4	3.9
Doctorate	1	1
Total	103	100
<b>Training in PPCG</b>		
Yes	38	36.9
No	65	63.1
Total	103	100
<b>Post basic training</b>		
Yes	14	13.6
No	89	86.4
Total	103	100

## Results

### *Demographic characteristics*

As shown in Table 1, 61(59.2%) of the participants were aged between 20-29 years, with females accounting for 60 (58.3%) of the participants. Most, 65 (63.1%) of the participants had a diploma as the highest qualification, while about three-quarters 65(63.1%) of the participants were not trained in PPCG. The majority, 89(86.4%) of the participants did not have post-basic nursing training.

### *Adherence scores to PPCG*

Figure 1 shows that 4(3.9%) of the participants had high compliance with PPCG, 40(38.8%) participants had moderate compliance and 59(57.3%) had low compliance.

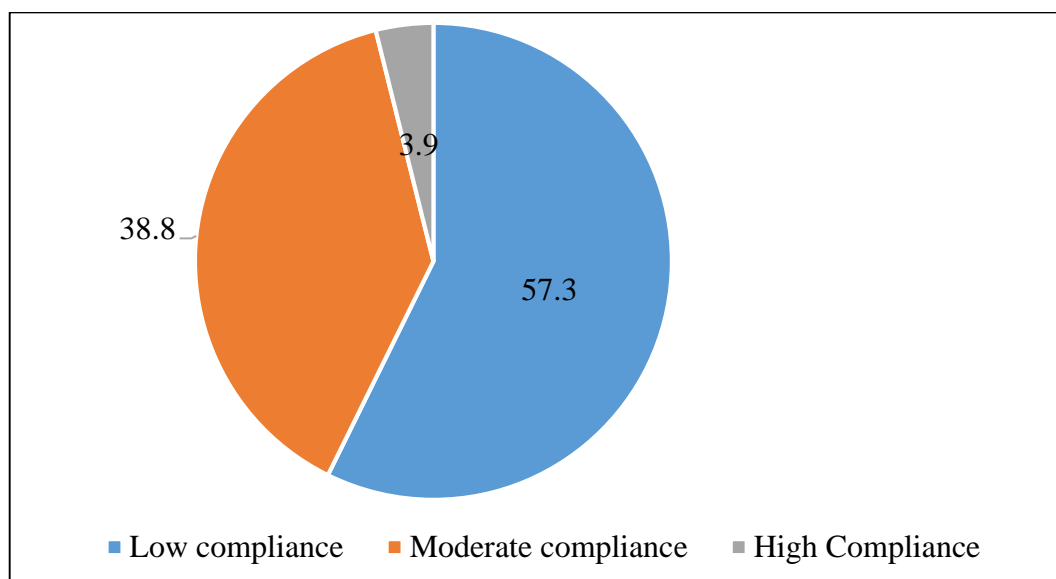
### *Bivariate analysis of factors associated with compliance to PPCG*

As shown in Table 2, nursing experience ( $p < 0.001$ ), gender ( $p = 0.02$ ), level of education ( $p < 0.001$ ), having post-basic nursing training ( $p = 0.02$ ), not having training in PPCG ( $p < 0.001$ ) and

knowledge on PPCG ( $p < 0.001$ ) had a significant inverse association with compliance to PPCG. Attitude towards PPCG ( $P = 0.883$ ) did not have statistical significance when compared with compliance with PPCG.

### *Multivariate analysis of factors associated with compliance to PPCG*

Nursing experience below 5 years [OR=84.92 CI 95% (43.197-166.96)  $p < 0.001$ ], the nursing experience of between 6-14 years [OR=75.4 CI 95% (3.96-1437.46)  $p = 0.04$ ] and nursing experience between 15-24 years [OR=19.38 CI 95% (1.059-354.6)  $p = 0.046$ ], male gender [OR=0.149 CI 95% (0.063-0.353)  $p < 0.001$ ], not being trained in PPCG [OR=0.069 CI 95% (0.017-0.282)  $p < 0.001$ ] and not having post basic nursing training [OR=0.036 CI 95% (0.012-0.106)  $p < 0.001$ ] had a significant association with compliance to PPCG. Level of education and Knowledge of PPCG was found to be a confounding variable (Table 3).



**Figure 1:**  
Compliance with PPCG scores among the participants



## Discussion

The findings showed that most (57.3%) of the participants had low compliance with PPCG. These findings correlate with other studies in Sub-Saharan Africa where compliance with PPCG is low. For example, compliance with PPCG was 45.5% in Chad, 53.8% in Botswana, and 60.3% in Namibia [3]. When compared to developed countries these results differ considerably since the compliance to PPCG was found to be high. For example, In the United Kingdom, compliance with PPCG was 93.0%, while in Belgium it was 90.1%

with the Netherlands having a compliance of 94.9% [7]. This could be attributed to more developed infrastructure and economic endowment in these countries. The results showed that there was a significant association between nursing experience and compliance with PPCG. This implies that nursing experience is more likely to affect compliance with PPCG. However, these findings are contrary to a study carried out in Taiwan whereby a nationwide study in various recognized clinics showed that PPCG were not utilized by nurses with an experience of 15 years and above [9].

**Table 2:**  
Nurse-Related Factors and Association with Compliance to PPCG

Variable	Cross-tabulation results for compliance with PPCG			$(\chi^2)$ Fischer's exact test	P-value
	High n(%)	Moderate n(%)	Low n(%)		
<b>Experience</b>					
Below 5 Years	0(0)	11(10.7)	50(48.5)		
6-14 Years	2(1.9)	17(16.5)	9(8.7)		
15-24 Years	0(0)	11(10.7)	0(0)		
Above 25 Years	2(1.9)	1(1)	0(0)	52.286	<0.001
<b>Gender</b>					
Male	2(1.9)	28(27.2)	13(12.6)		
Female	2(1.9)	12(11.7)	46(44.7)	23.011	0.020
<b>Level of Education</b>					
Certificate	0(0)	10(9.7)	0(0)		
Diploma	0(0)	25(24.3)	40(38.8)		
Degree	1(1)	5(4.9)	17(16.5)		
Masters	2(1.9)	0(0)	2(1.9)		
Doctorate	0(0)	1(1)	0(0)	34.887	<0.001
<b>Post-Basic Nursing Training</b>					
Yes	2(1.9)	30(29.1)	5(4.9)		
No	2(1.9)	10(9.7)	57(55.3)	14.041	0.020
<b>Training In PPCG</b>					
Yes	3(2.9)	10(9.7)	5(4.9)		
No	1(1)	30(29.1)	54(54.4)	50.587	<0.001
<b>Knowledge on PPCG</b>					
High	3(2.9)	1(1)	0(0)		
Moderate	0(0)	34(33)	4(3.9)		
Low	1(1)	5(4.9)	55(53.4)	87.875	<0.001
<b>Attitude Towards PPCG</b>					
Good	2(1.9)	20(19.4)	25(24.3)		
Moderate	2(1.9)	20(19.4)	33(32)		
Poor	0(0)	0(0)	1(1)	2.840	0.883

Key: n, number, ( $\chi^2$ ), Fischer's exact test, %, percentage



The study results also showed that male nurses were 85.1% [OR=0.149 CI 95% (0.063-0.353)  $p < 0.001$ ], less likely to be non-compliant to PPCG. However, the discrepancy could be explained by the fact that most of the participants were females. The study results also demonstrated that having post-basic training in nursing and training in PPCG had a significant association with compliance with PPCG. This is supported by a study done in the United States of America which showed that perioperative nurses and those nurses who were knowledgeable about PPCG identified

patients correctly using three identifiers (three names, inpatient number and age). The authors also established that the physiological and sociological needs of the patient were well taken care of among the nurses who were trained in perioperative nursing. Furthermore, the study demonstrated that nurses who said that they were knowledgeable about PPCG helped plan care for each patient using the nursing process, coordination of nursing interventions and evaluation of the outcome to maintain the health and welfare of patients preoperatively [8].

**Table 3:**  
Logistic Regression Analysis for Factors Associated with Compliance to PPCG

Variable	Cross tabulation results			AOR	P-value	95% CI for AOR	
	High n(%)	Moderate n(%)	Low n(%)			Lower	Upper
<b>Experience</b>							
Below 5 years	0(0)	11(10.7)	50(48.5)	84.92	<0.001	43.197	166.96
6-14 years	2(1.9)	17(16.5)	9(8.7)	75.4	0.04	3.96	1437.46
15-24 years	0(0)	11(10.7)	0(0)	19.38	0.046	1.059	354.6
Above 25 years	2(1.9)	1(1)	0(0)	Ref.			
<b>Gender</b>							
Male	2(1.9)	28(27.2)	13(12.6)	0.149	<0.001	0.063	0.353
Female	2(1.9)	12(11.7)	46(44.7)	Ref.		0.063	0.353
<b>Level of education</b>							
Certificate	0(0)	10(9.7)	0(0)	1	1	0.018	55.295
Diploma	0(0)	25(24.3)	40(38.8)	8.98	0.269	0.183	442.2
Degree	1(1)	5(4.9)	17(16.5)	13.8	0.196	0.259	740.729
Masters	2(1.9)	0(0)	2(1.9)	1	1	0.09	108.397
Doctorate	0(0)	1(1)	0(0)	Ref.			
<b>Post-basic nursing training</b>							
Yes	2(1.9)	30(29.1)	5(4.9)	0.036	<0.001	0.012	0.106
No	2(1.9)	10(9.7)	57(55.3)	Ref.			
<b>Training in PPCG</b>							
Yes	3(2.9)	10(9.7)	5(4.9)	0.069	<0.001	0.017	0.282
No	1(1)	30(29.1)	54(54.4)	Ref.			
<b>Knowledge on PPCG</b>							
High	3(2.9)	1(1)	0(0)	0.000	0.994	0.000	.
Moderate	0(0)	34(33)	4(3.9)	0.000	0.995	0.000	.
Low	1(1)	5(4.9)	55(53.4)	Ref.			

Key: AOR, adjusted odds ratio, CI, confidence interval, n, frequency, %, percentage





## Implications of the findings

### *Practical implications*

Training in PPCG and having post-basic nursing training had a significant effect on compliance with the preoperative preparation of a patient. This can be attributed to increased knowledge of patient care. Additionally, an increase in nursing experience leads to the consolidation of nursing competencies required to take care of preoperative patients.

### *Policy implication*

The study findings showed that post-basic training in nursing leads to more likelihood of complying with preoperative patient care. Therefore, institutions should have policies that promote post-basic training in specialized nursing e.g. perioperative nursing.

## Conclusion

The level of compliance with PPCG among the nurses was low. Nursing experience, nurses of the male gender, being trained in PPCG, and not having post-basic nursing training were the main nurse-related factors that affected compliance to PPCG in KNH.

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