

Influence of Patient Related Perioperative Risks on Surgical Outcomes among Patients Undergoing Elective Surgery at Chuka County Referral Hospital

Virginia Muthoni Mwangi¹, Lucy Gitonga², Henry Nyamu³,
Stephen. Kainga⁴

^{1,2,3,4}Department of Nursing and Public Health School of Nursing and Public Health, Chuka University, Kenya

Corresponding Author: Virginia Muthoni Mwangi

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ABSTRACT

The Purpose of this research was to determine how patient related perioperative risks influences surgical outcomes among patients undergoing elective surgery at Chuka County referral hospital. The study adopted a descriptive cross-sectional design. The target population consisted of 2005 patients who underwent elective surgery from the hospital records during the year 2021. A sample size of 202 patients was achieved through systematic sampling method. Both structured questionnaire and interview schedule were used to collect data. Quantitative information for each variable under examination was described using frequencies and percentages. At a 5% level of significance, a Chi square was employed to evaluate the association between patient related perioperative risks factors and surgical outcomes. The study revealed that the presence of comorbidities and the type of comorbidity, alcohol consumption and cigarette smoking had a statistically significance influence on surgical outcomes among patients undergoing elective surgery at 5% significance level. The study concluded that patient-related perioperative risks factors have adverse effects on surgical outcomes among patients undergoing elective surgery. Therefore, patients scheduled for elective surgical procedure that are found to have medical conditions, alcoholics and cigarette smokers that are known to increase perioperative risks, preoperative evaluation should include optimization or pre-habilitation. This will guarantee patients undergoing elective surgery positive surgical outcomes with minimal complications and reduced morbidity and mortality rates.

Keywords: Patient-related Perioperative Risks; Perioperative Risks; Elective Surgery; Surgical Outcomes

1.0 INTRODUCTION

Surgery is an important form of treatment with integral risk for even the healthiest patients hence all patients undergoing surgery are at risk for morbidity and mortality. Individual patient's physical status plays a critical role in surgical outcomes (Gabriel *et al.*, 2018). Perioperative risks are assessed prior to surgery by considering the patient's history, physical examination, and performing certain routine tests and others that may

deem necessary. The field of surgery remains a risky business therefore understanding risk assessment, risk stratification, and risk management is vital for surgical profession. It is important for surgeons, anesthetists, nurses and patients to understand the history of surgical risks and their mitigation which has evolved in 300 years and refined our modern surgery. The knowledge of surgical risks enables the surgical team to have a more honest and transparent discussion on the risks, their

prevention and benefits of surgical procedures as part of the preoperative informed consent (Stahel *et al.*, 2017).

Perioperative risk is the total risk of dying, developing a new disease or medical condition, or seeing an existing condition get worse in the early or late postoperative period and is directly related to receiving surgical care (Shaydakov, 2020). The core of the operation risk is typically attributed to a patient's overall health and reduced to a total number of unfavorable elements that are related to the patient. World Health Organization (WHO) indicated that more than 313 million surgical procedures are performed each year worldwide with surgical mortality and complications in developed countries estimated to range between 0.4%-0.8% and 3-17% respectively (Meara *et al.*, 2015). It was suggested that the assessment of high-risk surgical patients should calculate the risk of a negative outcome for each individual. This needs to be made apparent to the patient, thoroughly documented, and utilized to classify patients so that they receive the proper degree of treatment. It is wise to use caution when deciding whether to proceed with surgery at all when there is a significant risk of short-term mortality or severe morbidity.

Patient-related perioperative risks can be divided into categories of modifiable and non-modifiable risks. Since altering or removing risk variables can reduce overall preoperative risk and enhance results, this classification is of the greatest clinical importance. Some of the modifiable risks are cigarette smoking, harmful use of alcohol, malnutrition, comorbidity (respiratory disorders, cardiovascular disease, obesity and obstructive sleep apnea, diabetes mellitus, anemia and polypharmacy). Age, gender, genetics, family history of chronic obstructive pulmonary disease, past stroke or myocardial infarction, congestive heart failure, and chronic kidney disease are examples of non-modifiable risks (Shaydakov, 2020).

Cigarette smoking and harmful use of alcohol:

Cigarette smoking and alcohol are widely used by the global population especially male adults whereby 1.1 billion people worldwide smoke cigarette, WHO (2018). In both male and female, cigarette smoking and alcohol use are significant risk factors for perioperative morbidity in all elective and urgent surgeries (Lauridsen *et al.*, 2017). A number of adverse postoperative outcomes, including wound infections and cardiac problems, have been demonstrated to be dramatically decreased when intervention programs designed to quit alcohol and tobacco use begin 3–8 weeks before surgery. As a result, all patients who arrive for surgery should be asked about their use of tobacco and alcohol, and appropriate interventions for the surgical environment should be used.

Malnutrition:

Adequate nutrition is among the key factors that enhance wound healing. After elective surgery, increasing postoperative morbidity and death are strongly associated with nutritional risk. Malnutrition or deficiency of macro- or micronutrients affects all the three phases of wound healing process including inflammation, proliferative and remodeling phases. The major causes of malnutrition during perioperative period include vitamin and mineral deficiencies. Malnourished patients have been shown to experience more difficulties and stay in the hospital for longer (Ferhatoğlu *et al.*, 2020). Other studies have associated malnutrition with numerous adverse perioperative patient outcomes. Therefore, nutritional support, food planning, nausea and vomiting medication, early detection and intervention of malnutrition, and may all help to avoid the development of perioperative problems (Latiff *et al.*, 2016).

Comorbidities:

Common medical conditions that have been reported to increase the risk of perioperative mortality and morbidities include respiratory and cardiovascular diseases. For patients with COPD and bronchial asthma, which have been linked to a higher risk of perioperative problems, airway responsiveness is still a significant concern during the recovery

period (Fernandez-Bustamante *et al.*, 2017). Optimum hemodynamic status is essential for uneventful perioperative period. Patients with cardiovascular disorders including hypertension, coronary artery disease, and heart failure have higher relative risks of perioperative complications related to hemodynamic abnormalities, (Aronson, 2014). Therefore, maintenance of optimum hemodynamic function is a major consideration perioperatively.

Morbid obesity and obstructive sleep apnea (OSA) have been established as important risk factors for perioperative problems. According to studies, patients who are morbidly obese have more illnesses than their non-obese peers, (Gumidyala and Selzer, 2022). Additionally, OSA patients are at a significant risk for serious, maybe deadly postoperative complications if they are not properly controlled and monitored (Singh *et al.*, 2021).

Gender: There are conflicting reports of perioperative risks based on patients' gender. Some studies document that women may have increased risk of morbidity and mortality compared to men during cardiac surgery because women requiring cardiac surgery are generally older and smaller than their male counterparts. Moreover, female patients have relatively more preoperative comorbidities, such as diabetes mellitus and anemia (Fukui *et al.*, 2015). In other studies, male sex has been associated with higher risks for major postoperative complications due to relatively higher incidence of cigarette smoking and alcohol consumption. Additionally, male patients' smaller pelvises can technically complicate surgery for malignancies in this area (Klose *et al.*, 2018).

This study assessed the perioperative risks and surgical outcomes among patients undergoing elective surgery. Surgical outcomes were measured after patient had undergone elective surgery. Interventions should then be tailored towards mitigating perioperative risks and improving health systems in order to reduce morbidity and mortality rates, reduce readmission rates, shorten length of hospital stays thus reducing on the cost of surgery. Reports

from Chuka County Referral Hospital records department showed that elective surgeries often experienced delays and cancellations. This was due to lack of preoperative patient preparation, lack of adequate staffing and inadequate surgical supplies. In 2021, 2005 patients underwent elective surgery at CCRH, 526 patients were readmitted due to surgical site infections while 6 patients died after surgery (Chuka County Referral Hospital records department, 2021). Therefore, the purpose of this study was to establish the influence of patient related perioperative risks on surgical outcomes among patients undergoing elective surgery at Chuka County referral hospital

2.0 Theoretical Framework

The Neuman Systems Model (NSM) was used in this study. It is a grand theory that has been developed for nearly fifty years having been founded in 1970. In this approach, each person or group is viewed as a distinct, open system that receives constant information intake, processes it, and produces an output or feedback. Each client is a dynamic, constant energy that varies depending on the surroundings. It is founded on a person's reaction to stress. Stress, homeostasis, and the patient are the three main ideas in this approach (Neuman & perception Fawcett, 2002). The Neuman System Model offers a unifying lens through which to tackle a variety of issues. A system can be characterized as a social issue that serves as a border for one client, one group, or numerous groups. The realm of nursing issues is defined by the client system's interactions with the environment. The client variables include those related to their physiology, psychology, socioculture, growth, and spirituality. A fundamental or core structure that is guarded by lines of resistance makes up the client system. The typical defense line is recognized as being guarded by a flexible line of defense (Neuman & Fawcett, 2002). Stressors are intra-, inter-, and extra-personal in nature and arise from internal, external and created environment. In this thesis, perioperative risk factors are the stressors which influence the outcome of elective surgery. When

stressors get beyond the first level of protection, the system is infiltrated and the lines of resistance are turned on. Three types of prevention are used in nursing interventions: primary prevention, which takes place before the stressor enters the system, secondary prevention, which takes place after the system has responded to the stressor, and tertiary prevention, which takes place after secondary prevention has been established (Neuman & Fawcett, 2002). This thesis mainly concentrated on the primary prevention of the model whereby it is useful for patient assessment and intervention by identifying and reducing possible or actual perioperative risk factors. The role of the perioperative nurse is to focus on the factors influencing the individual's response to stress and protecting the patients' from the relevant risk factors. In order to construct a sustainable system, the nurse forges a connection between the patient, environment, and health. To increase patient stability, the nurse must assess the patient's perceived stressors throughout the perioperative period. The model takes into account the whole patient in a systematic manner making it useful in identifying perioperative risks among patients undergoing elective surgery.

3.0 RESEARCH METHODOLOGY

3.1 Study Area

The study was carried out at Chuka County Referral Hospital (CCRH) in Tharaka-Nithi County. CCRH is a public health facility located along Meru-Nairobi Road in Chuka Igambang'ombe constituency, Chuka division. The hospital is considered for this study because it provides curative, preventive and promotive services as well as specialized surgical procedures. The hospital is the largest in the county offering referral services to peripheral facilities thus having a high flow of patients.

3.2 Study Design

A descriptive cross-sectional survey was used to collect data on perioperative surgical risks among patients at the hospital's surgical units. The design was preferred since it helped in collecting exact data on the current state of the scenario (perioperative risks) and thereafter used

that data to develop conclusions. It also enabled a proper procedure for detailed gathering of facts that were both quantitative and qualitative in nature.

3.3 Study Population

The study targeted a population of 2005 patients undergoing elective surgery annually at Chuka County Referral hospital. This is in line with information from the hospital records during the year 2021 where 2005 patients underwent elective surgery (Chuka County Referral Hospital records department, 2021).

3.3.1 Eligibility Criteria

Inclusion criteria

In this study only adult patients undergoing elective surgery at Chuka County Referral hospital were considered.

Exclusion criteria

This study excluded the patients who were critically ill and children at the time of study

3.4 Sample Size Determination and Sampling Procedure

3.4.1 Sample Size Determination

A total population of 2005 patients undergoing elective surgery at CCRH was used for this study. The study sample size was calculated according to Nassiuma (2000), a population-based coefficient of variance of 30% is considered appropriate for the majority of surveys.

$$n = \frac{Nc^2}{c^2 + (N-1)e^2} = \frac{2005(0.3)^2}{(0.3)^2 + (2005-1)(0.02)^2} = 202$$

Where; n = desired sample size; N = Estimated population from which sample is taken; e = Standard error of 0.02; C = Coefficient of variation of 30%;

3.4.2 Sampling Procedure

Purposive sampling method was employed to select key participants for the study among patients undergoing elective surgery. Systematic sampling was then used to

sample 202 patients undergoing elective surgery at the hospital. In this procedure, a subject was picked after every 3rd count from a list of patients undergoing elective surgery for a period of three months until a sample of 202 patients was achieved. This study also targeted all the health workers (nurses) working in the surgical wards, theatres and surgical outpatient clinics who provided critical information on the subject of the study during the period.

3.5 Research Instruments

Research administered structured questionnaire was used for data collection.

3.6 Data Analysis

There was collection of both quantitative and qualitative data. Statistical Package for Social Sciences (SPSS) version 27 was used to clean, code, and analyze quantitative data. Descriptive statistics such as frequencies and percentages were used to describe patients' perioperative risks factors and to examine their effect on surgical outcomes. Inferential statistics such as chi-square analysis was employed to evaluate the association between surgical outcomes and perioperative risks factors among patients undergoing elective surgery. The findings from the study were displayed using bar graphs, narratives, frequency and percentage tables.

4.0 RESULTS AND DISCUSSION

4.1 Response Rate

A total of 202 questionnaires were distributed to the patients undergoing elective surgery at Chuka County Referral Hospital (CCRH). Out of which, 146 questionnaires were fully completed and returned. The sample response rate was 72.3%. This is an acceptable rate and could be attributed to the fact that the questionnaires were physically delivered to the patients at the surgical outpatients then followed to the surgical wards.

4.2 Demographic Characteristic of the Respondents

The finding indicates that most of the respondents (56.2%) were male while 43.8% were female. In addition, 65.8% of the patients undergoing elective surgery were aged between 36-50 years while 34.2% were aged 18-35 years. This shows that more men between the ages 18-50 years undergo elective surgeries and this could be attributed to men being more involved in trauma cases such as injuries from car accidents, falls from heights and involvement in fights.

In terms of education level, 57.5% of the respondents had attained secondary level education and only 20.5% had attained college level education. In total, 78% of the respondents had an education level of secondary and above. This implies that the respondents were in good position to understand instructions given before, during and after an elective surgery. A learned respondent is capable of following directions and adhere to instructions pertaining the surgical procedure thereby influencing many decisions making.

Moreover, the study found that 63% of the respondents were married while 34.2% were single. This suggests that majority of the patients undergoing elective surgery could receive moral support from their partners. Also, the results revealed that 98.6% of the respondents were Christians while the rest were of Islamic faith. In addition, 97.3% of the respondents reported to be residents of Tharaka Nithi County. This could be attributed to the fact that Chuka County Referral Hospital is located in Tharaka Nithi County and is the largest public hospital in the area offering surgical services. Unfortunately, majority of the patients had no NHIF insurance cover. This implies that patients undergoing elective surgery may be facing financial constraints which could attribute to prolonged stays in the hospital or cancellation of surgical procedures. This could in turn lead to deterioration of the surgical conditions.

Table 1: Demographic Characteristics of the Research Participants

Demographic Characteristics	Frequency	Percent
Gender		
Male	82	56.2
Female	64	43.8
Age Bracket (Years)		
18-35	50	34.2
36-50	96	65.8
Education Level		
Primary	32	21.9
Secondary	84	57.5
College	30	20.5
Employment Status		
Farming	66	45.2
Self	68	46.6
Formal	12	8.2
Marital Status		
Single	50	34.2
Married	92	63.0
Separated/Divorced	4	2.7
Religion		
Christian	144	98.6
Muslim	2	1.4
County		
TharakaNithi	142	97.3
Meru	2	1.4
Embu	2	1.4
Health Insurance Type		
Cash	110	75.3
NHIF	36	24.7

4.3 Patient-Related Factors

The study sought to establish the patients related risk factors for patients undergoing elective surgery at CCRH.

4.3.1 Descriptive Statistics of Anthropometry

Table 2: Descriptive Statistics of Anthropometry of the Research Participants

Anthropometry	N	Mean	SD
Height (cm)	146	167.33	5.14
Weight (kg)	146	71.64	9.38
BMI	146	25.27	3.90
Waist Circumference(cm)	146	93.37	11.69
Waist to Height Ratio	146	0.56	0.07
Hip Circumference(cm)	146	101.23	11.90
Waist to Hip Ratio	146	0.92	0.06

The results in Table 2 revealed that on average the patient undergoing elective surgery had a Body Mass Index (BMI) of 25.27 (SD=3.9). This suggests that the patients were deemed overweight. However, some of these patients were found to be underweight with a BMI of <18 which could be attributed to inadequate nutrition and could affect wound healing process. Malnourished patients have been shown to experience increased morbidities and prolonged stays in hospitals (Feratoglu *et al.*, 2020). In addition, other studies have associated malnutrition with numerous adverse surgical outcomes. Therefore,

nutritional support, food planning, as well as nausea and vomiting medication may help to avoid the development of perioperative problems (Lattif *et al.*, 2016). Also, the patients undergoing elective surgery had a Waist-to- Height ratio of 0.56 (SD=0.07). This ratio is above the recommended threshold of 0.5 (NICE guidelines, 2022). In addition, the patients had an average Waist-to-Hip ratio of 0.92(SD=0.06). This figure suggests that patients undergoing elective surgery had an increased central adiposity indicating increased health risks (NICE guidelines, 2022).

4.3.2 Descriptive Statistics of Physiologic Status (Pre-operative)

Table 3: Descriptive Statistics of Physiologic Status of the Research Participants

Physiologic Status	N	Mean	Std. Deviation
BP	146	126/74	8.81
RBS	146	6.45	4.57
SPO ₂	146	96.73	1.70
Respiratory Rate	146	19.23	4.09
Pulse Rate	146	79.12	6.26
Temperature	146	36.33	0.27

The results in Table 3 indicate that patients undergoing elective had an average BP of 126/74mmHg. This implies that the patients had normal BP prior to surgery. Other physiological status of the patients such as

SPO₂ (96%), Temperature 36.3), pulse rate (79), respiratory rate (19) and RBS (6.45) were considered normal before surgery. This could be attributed to preoperative optimization or pre-habilitation which is carried out by a collaborative team often involving nurses, anesthetists and medical officers. Chaplin (2021) recommends that all patients with risk factors should undergo extensive evaluations before being approved for surgery. If found with perioperative risks, the collaborative team create a safe plan to carry out the procedure or postpone the procedure until the patient is deemed fit for the surgery.

4.3.3 Determinants of Patient-Related Perioperative Risk Factors

Table 4: Patient Related Factors

Patient Related Factors	Yes	No
Comorbidity	32(21.9%)	114(78.1%)
Significant Laboratory Report	18(12.3%)	128(87.7%)
Patient knowledge of the scheduled procedure	142(97.3%)	4(2.7%)
Cigarette smoking	40(27.4%)	106(72.6%)
Alcohol Consumption	68(46.6%)	78(53.4%)
Other substance (Miraa)	12(0.08%)	134(99.92%)
Other substance (Muguka)	4(0.03%)	142(99.97%)

Table 4 indicates that 78.1% of the patients had no co-morbidities while 21.9 % (32 patients) had co-morbidities such as hypertension (20), diabetes (8), both hypertension and diabetes (2) and asthma (2). Patients with diabetes are evaluated before surgery to determine the best course of therapy which may involve use of insulin or other hypoglycemic drugs to optimize their overall perioperative outcomes (Rollins *et al.*, 2016). Patients with prior medical history of hypertension should be assessed in preoperative clinic at least one week prior to surgery in order to afford enough time for management and optimization of the BP. Elective surgery should be cancelled if the BP is elevated due to the higher relative risks of perioperative complications related to hemodynamic abnormalities, (Aronson,2014). For patients with asthma, adequate preoperative assessment and optimization that include detailed history, pulmonary function test and medications are recommended in order to reduce the risk of perioperative

respiratory adverse events such as bronchospasm, laryngospasm, desaturation, coughing, excessive secretions and pneumonia, (Fernandez-Bustamante *et al.*, 2017). The study also found that 27.4% of the research participants were cigarette smokers. This suggests that such patients are at risk of perioperative morbidity such as cardiovascular and pulmonary complications. Lauridsen *et al.* (2017) found that a number of postoperative outcomes such as slow wound healing, wound infections and cardiac problems have been associated with cigarette smoking. Therefore, all patients who undergo elective surgery should be asked about their use of cigarettes and appropriate interventions for surgical environment should be considered. Similarly, 46.6% of the patients undergoing elective surgery reported that they consumed alcohol. Harmful use of alcohol is considered to be a risk for surgical outcomes hence all patients who arrive for elective surgery should be asked about their alcohol consumption thereby generating a

learnable moment and provide opportunity for interventions aimed at reducing alcohol consumption and mitigating postoperative risks, (Shabanzadeh *et al.*, 2015). Finally, the study found that very few (0.08%) and (0.03%) of the respondents chew miraa and muguka respectively.

4.4 Surgical Outcomes

4.4.1 Surgical Outcomes Indicators

Many studies have cited a number of surgical outcomes associated with perioperative risks in patients undergoing elective surgery (Cox *et al.* 2016; Alsaigh *et al.*, 2020). These include; morbidity (For instance pain, hemorrhage, postoperative nausea and vomiting and infections), readmission rates, prolonged hospital stays and mortality.

Table 1: Surgical Outcomes Indicators

Surgical Outcomes	Yes	No
Post-operative nausea and Vomiting	16(11%)	130(89%)
Cancellation of surgical procedure	42(28.8%)	104(71.2%)
Re-admission for elective surgery	22(15.1%)	124(84.9%)
Prolonged stay in the hospital	80(54.7%)	66(45.2%)

The results in Table 5 highlight some of the surgical outcomes that were reported by patients undergoing elective surgery. These included postoperative nausea and vomiting (11%), readmission for elective surgery

(15.1%), and prolonged stay in hospital (54.7%). The study sought to establish the reasons for prolonged stay in hospital and the following reasons were established; financial constraints (45%), wound infection (18.8%), and slow wound healing (11.3%). This suggests that there should be interventions to financially support patients undergoing elective surgery through waivers or insurance mode of payments. These findings are in line with a study by (Cox *et al.* 2016) that associated the length of hospital stay with patient's condition, hospital policy and operative factors. In order to mitigate wound infection after surgical procedure, it is critical that sterility is maintained at all levels of wound care. Patient factors such as comorbidities, cigarette smoking and nutritional status also play a part in healing process of the wound. A study by (Merkow *et al.*, 2015) noted that surgical site infections are the leading postoperative complications that increase readmission rates. Another study by (Alsaigh *et al.*, 2020) found a readmission rate of 23% after 30 days postoperative and concluded that focus on understanding and preventing preoperative risks is very essential.

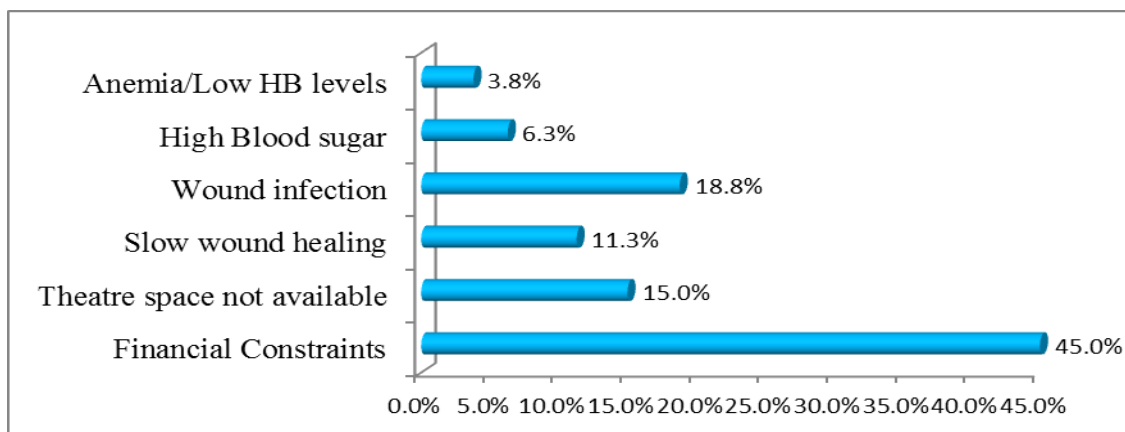


Figure 1: Reasons for Patients Prolonged stay in the Hospital

4.4.2 Pain Levels

Table 6: Pain Levels by Patients

Pain levels	Frequency	Percent
Mild (1-3)	78	53.4
Moderate (4-6)	54	37.0
Severe (7-9)	14	9.6
Total	146	100.0

The results indicate that 53.4% of the patients reported mild pain while 9.6% reported severe pain. This indicates that patients could have received adequate pain management both pharmacological and non-

pharmacological following surgery. Further, the patients who reported severe pain could be attributed to the complexity of surgery and procedures with long durations of operation. A study by Argawalla *et al.* (2019) noted that longer operations are frequently accompanied by surgical staff that is more fatigued which could lead to more technical blunders hence severe pain.

4.4.3 Estimated Blood Loss

Many studies have shown that a certain amount of blood is lost during surgery. Table 7 shows that 95.9% of the patients who underwent elective surgery at CCRH lost less than 750mls of blood. This could be attributed to the fact that most procedures performed were minor surgeries which are not very invasive. Methods of controlling blood loss could have been employed intraoperatively coupled with proper monitoring postoperatively. However, 4 patients (2.7%) of the patients lost between 1500mls and 2000mls of blood. This implies severe hemorrhage which could be associated with complex surgeries and lengthy operations. Massive blood loss could have contributed to prolonged stay in hospital in some cases.

Table 7: Estimated Blood Loss

Blood Loss	Frequency	Percent
Class I (Less than 750ml)	140	95.9
Class II (750-1500 ml)	2	1.4
Class III (1501-2000ml)	4	2.7
Total	146	100.0

4.4.4 Patient Experience Rating

First, the study sought to determine the patients' experience towards the whole surgical journey. Patient reported outcomes represent the views and perceptions of the patients and are very important measures of quality surgical care. This study found that 71.2% of the patients rated the surgical outcome as good while 24.7% rated the surgical outcome as fair. They gave various reasons for the ratings which included, "fasting made me hungry", reduced pain levels and "my wound is now clean after debridement". Those that rated the outcome as excellent and good reported encountering

friendly theatre team and good nursing care during the perioperative period.

Table 8: Patient Experience Rating

Patient experience Rating	Frequency	Percent
Excellent	6	4.1
Good	104	71.2
Fair	36	24.7
Total	146	100.0

4.5 Influence of Patient-Related Factors on Surgical Outcomes

The objective of this study sought to establish the influence of patient related perioperative risk factors on surgical outcomes in patient undergoing elective surgery at CCRH. The dependent was surgical outcome, a categorical variable in a nominal scale (1= successful, 0= otherwise) while the independent variable indicators were BMI, Waist-to- hip ratio, type of comorbidity, cigarette smoking and alcohol consumption. Chi square test was used to establish the association between independent variables indicators and surgical outcome as shown in Table 9.

The results indicate that BMI of a patient influences the surgical outcomes among patients undergoing elective surgery, (chi square value= 13.27, df= 3, p-value= 0.004 <0.05). Since the p-value is less than 0.05 this suggests that the association between BMI and surgical outcomes is statistically significant. In other words, the BMI of patient can influence a surgical outcome either successfully or otherwise. Further, 34.2% and 60.3% of the patients had a normal (18.5-24.9) and overweight (25-29.9) BMI respectively. This accounts for 81.7% of successful surgical outcomes. However, 1.4% and 4.1% of the patients who were obese (BMI >29.9) and underweight (BMI <18.5) respectively, were associated with unsuccessful surgical outcome.

Beresneva and Hall (2019) showed that, despite being younger, patients with higher BMIs who are having surgery for diverticular disease have greater rates of SSI, wound disruption, ventilator reliance for longer than 48 hours, acute renal failure, and return to the operating room. With each

higher BMI class, the chance of serious problems increased gradually. BMI 18.5 kg/m² has been demonstrated to be an independent factor influencing outcome in surgical critical care patients.

Also, the study shows a statistical significance in influence of Waist- to- Hip ratio in male patients and surgical outcomes among the respondents at 5% significant level (chi square value= 7.555, df= 1, and p-value= 0.006 <0.05). Since the p- value is less than 5% it implies that healthy patients were associated with a successful outcome. However, the study found that WHR in female had insignificant effects on surgical outcomes. This could be attributed to the fact that men are more likely to have too much fat around the waist but women are more likely to carry fat around their hips and thighs. A study by Bachmann, *et al* (2018) shows a significant positive correlation of visceral obesity, as measured by WHR and Visceral Fat Area, on the occurrence of complications and their severity after colorectal surgery.

The study revealed that the presence of comorbidities and the type of comorbidity had a statistical significance on surgical outcomes among patients undergoing elective surgery at 5% significance level. (Chi square value= 16.36, df= 4, p-value= 0.003 <0.05) since the p-value is less than 5% it implies that absence of comorbidity (85%) contributes to a successful surgical outcome among the patients. Although there were some patients with comorbidities but were associated with successful surgical outcomes which could be attributed to proper preoperative management of comorbidities (optimization).

However, the study revealed that in some cases, absence of comorbidity (15%) was associated with unsuccessful surgical outcomes. Most notably, all patients with asthma were associated with unsuccessful surgical outcomes. This could be as a result of airway responsiveness of asthma patients and anesthesia effects.

According to Fernandez-Bustamante *et al.* (2017), patients with asthma had increased

chances of postoperative pneumonia, septicemia, and urinary tract infection than non-asthmatic patients. Asthma-related preoperative emergency visits, hospital stays, or ICU stays significantly increased postoperative adverse outcomes among surgical patients. Systemic corticosteroid use before surgery has also been found as a separate risk factor for postoperative complications and mortality.

In addition, the study found that alcohol consumption influences surgical outcomes among patients undergoing elective surgery. All the cases associated with alcohol consumption were linked with unsuccessful surgical outcomes among the patients. It is for this reason that alcohol consumption was found to be statistically significant in influencing surgical outcomes at 5% significant level (chi square value= 7.47, df= 1, p-value= 0.006 <0.05). Since the p-value is less than 5% this implies that alcohol consumption contributes to unsuccessful surgical outcomes.

Regardless of the surgery, the current guidelines for preoperative alcohol use lean toward general alcohol abstinence. To reduce the risk of several postoperative complications, such as infections, wound complications, and cardiopulmonary complications, Tønnesen *et al.* (2019) recommend alcoholic abstinence beginning 3–8 weeks prior to surgery. Additionally, perioperative alcohol cessation therapies have been proposed, and two randomized clinical trials have discovered that rigorous alcohol cessation programs are beneficial in lowering surgical complication rates.

The study found that cigarette smoking has significant influence on surgical outcome among patients undergoing elective surgery at 5% significance level (chi square value= 3.94, df= 1, p-value= 0.047 < 0.05). Since the p-value is less than 5% it implies that cigarette smoking is risky and smoking cessation should be recommended 3 weeks before surgery. Further, the study found that out of 40 patients who smoked cigarettes, 38 patients were associated with unsuccessful surgical outcomes.

A study by Jimenez *et al.* (2022) that found smoking to be a modifiable risk factor for greater revision rates in patients undergoing primary hip arthroscopic labral repair supports these findings. For patients undergoing arthroscopic hip surgery, this

constitutes a controllable risk factor for poor outcomes that can aid in preoperative optimization. Current smokers should be advised of the dangers of nicotine usage throughout the healing process.

Table 9: Influence of Patient-Related Factors on Surgical Outcomes

Patient Related Factors	Surgical Outcome		Total	Chi-Square	df	p-value
	Successful	Otherwise				
BMI						
Underweight (< 18.5)	0	2	2(1.4%)	13.272	3	0.004
Normal (18.5-24.9)	42	8	50(34.2%)			
Overweight (25-29.9)	77	11	88(60.3%)			
Obese (> 29.9)	0	6	6(4.1%)			
Total	119(81.5%)	27(18.5%)	146(100%)			
Waist-to-hip ratio (Male)	Successful	Otherwise	Total	Chi-Square	df	p-value
Healthy (Below 0.9)	62	2	64(78%)	7.555	1	0.006
Obese (Above 0.9)	14	4	18(22%)			
Total	76(93%)	6(7%)	82(100%)			
Waist-to-hip ratio (Female)	Successful	Otherwise	Total	Chi-Square	df	p-value
Healthy (Below 0.85)	10	2	12(18.8%)	0.377	1	0.539
Obese (Above 0.85)	39	13	52(81.3%)			
Total	49(76.6%)	15(23.4%)	64(100%)			
Types of comorbidities	Successful	Otherwise	Total	Chi-Square	df	p-value
Hypertension	20	0	20(13.7%)	16.359	4	0.003
Diabetes	6	2	8(5.5%)			
Hypertension/Diabetes	2	0	2(1.4%)			
None	97	17	114(78.1%)			
Asthma	0	2	2(1.4%)			
Total	125(85.6%)	21(14.4%)	146(100%)			
Cigarette smoking	Successful	Otherwise	Total	Chi-Square	df	p-value
Yes	2	38	40(27.4%)	3.939	1	0.047
No	106	0	106(72.6%)			
Total	108(85.6%)	38(14.4%)	146(100%)			
Alcohol consumption	Successful	Otherwise	Total	Chi-Square	df	p-value
Yes	0	21	21(14.4%)	7.47	1	0.006
No	125	0	125(85.6%)			
Total	125(85.6%)	21(14.4%)	146(100%)			

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Patient-related perioperative risks factors such as obesity, malnutrition, presence of comorbidities as well as harmful alcohol consumption and cigarette smoking have adverse effects on surgical outcomes among patients undergoing elective surgery. Prolonged hospital stay could be attributed to slow wound healing, wound infections, elevated blood sugar and financial constraints. Out-of-pocket payment can result in high medical expenditure such as surgical charges and other associated cost.

5.2 Recommendations

Patients scheduled for elective surgical procedure that are found to have medical conditions that are known to increase

perioperative risks, preoperative evaluation should include optimization or prehabilitation. All patients undergoing elective surgery should be asked about their history of cigarette smoking and alcohol consumption, and appropriate interventions for the surgical environment should be considered. This includes alcoholic abstinence starting 3–8 weeks prior to surgery in order to reduce the incidence of several postoperative complications. The high costs of surgical and anesthesia care that patients bear should be addressed through the more effective use of equitable health finance methods such as NHIF in order to reduce financial constraint among patient undergoing elective surgery. This clearly shows the need for emphasis on importance of enrollment in NHIF scheme.

Declaration by Authors

Ethical Approval: Approved

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