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Research Article

Knowledge and Practice of Surgical Staff towards Preoperative Care in Sudan

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Abstract

Preoperative care is defined as the preparation and management of a patient prior to surgery. It includes both physical and psychological preparation. Inadequate preoperative preparations have an impact on the patient's physiological and mental well-being, as well as the patient's postoperative outcome and even mortality. The goal of our study was to assess the knowledge and practice of surgical staff towards preoperative care in Sudan. Descriptive cross sectional hospital based study was conducted using self-administered questionnaire. Out of 165 participants, 61.8% of the study populations were house officers, 22.4% were registrars, and 15.2% were medical officers. 81.2% of doctors had good knowledge, 15.2% had average knowledge and only 3.6% had poor knowledge. 49.1% had good practice, 41.2% had average practice, and 9.7% had poor practice. Significant associations were found between the age and the practice (p=0.054) and between the knowledge and practice about the preoperative care (p= 0.047). Sudan ministry of health should work to improve the quality of hospital services through quality improvement projects. More hospitals and units should be urged to formulate their own guidelines to decrease the post-operative complication.

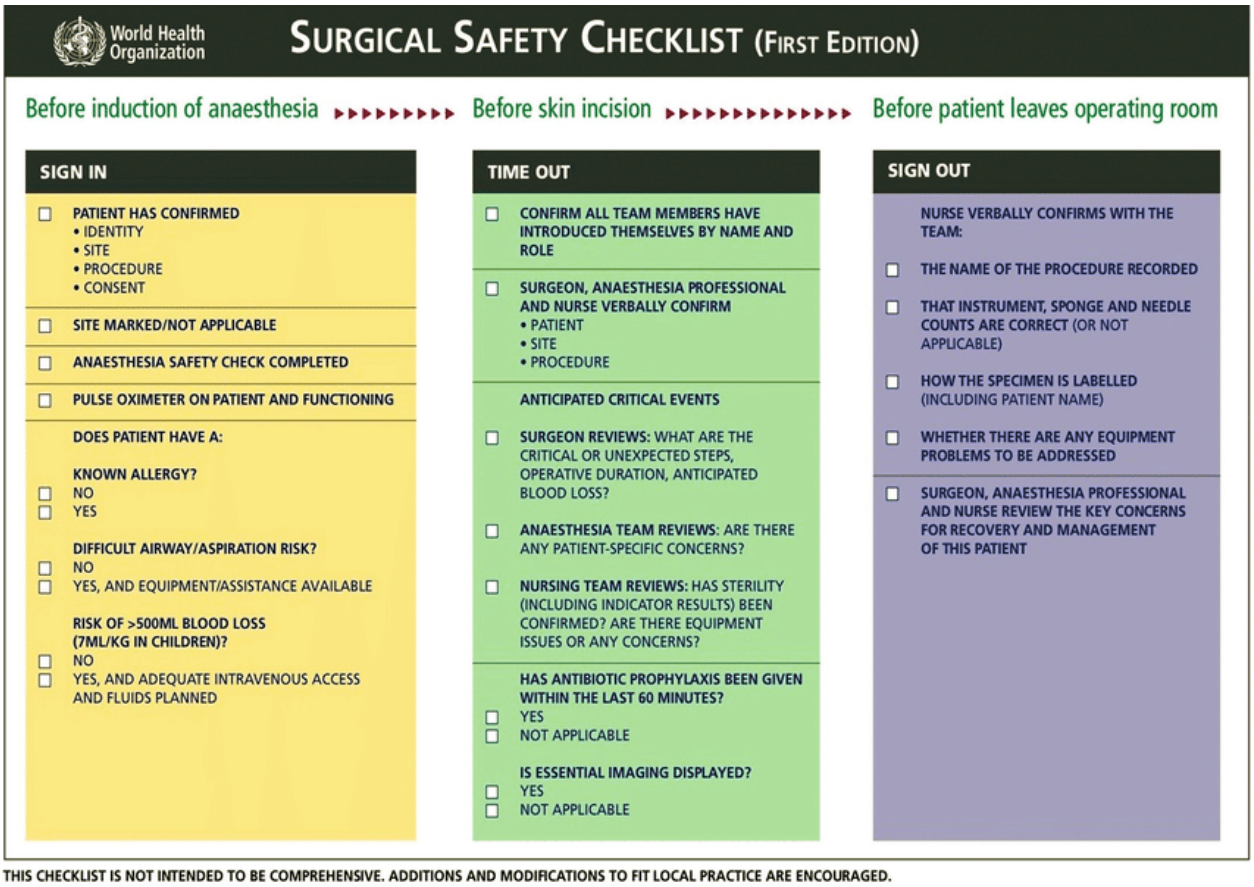
Keywords: *Preoperative Care; Knowledge; Practice; Surgery; Doctors; Sudan*

Abbreviations

ASA: American Surgical Association; SSI: Surgical Site Infections; WHO: World Health Organization; RBG: Random Blood Glucose; DM: Diabetes Mellitus; SIC: Surgical Informed Consent.

Introduction

Preoperative care is defined as the preparation and management of a patient prior to surgery. It includes both physical and psychological preparation. Its primary goals are to assess the patient's overall health status, educate the patient about surgery, anesthesia, intraoperative care, and postoperative pain management in the hopes of reducing anxiety and facilitating recovery, and optimize the patient's medical condition in order to reduce surgical and anesthetic perioperative morbidity or mortality [1]. Surgical check lists are a simple and promising techniques for improving surgical patient safety around the world. Preoperative errors and complications can be avoided with the use of a surgical checklist as shown in table [1].



World Health Organization

SURGICAL SAFETY CHECKLIST (FIRST EDITION)

Before induction of anaesthesia ▸▸▸▸▸▸▸▸▸ Before skin incision ▸▸▸▸▸▸▸▸▸▸▸▸▸ Before patient leaves operating room

SIGN IN

- ☐ PATIENT HAS CONFIRMED
  - IDENTITY
  - SITE
  - PROCEDURE
  - CONSENT
- ☐ SITE MARKED/NOT APPLICABLE
- ☐ ANAESTHESIA SAFETY CHECK COMPLETED
- ☐ PULSE OXIMETER ON PATIENT AND FUNCTIONING

DOES PATIENT HAVE A:

KNOWN ALLERGY?
- ☐ NO
- ☐ YES

DIFFICULT AIRWAY/ASPIRATION RISK?
- ☐ NO
- ☐ YES, AND EQUIPMENT/ASSISTANCE AVAILABLE

RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)?
- ☐ NO
- ☐ YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED

TIME OUT

- ☐ CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM
  - PATIENT
  - SITE
  - PROCEDURE

ANTICIPATED CRITICAL EVENTS

- ☐ SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS?
- ☐ ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS?
- ☐ NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS?

HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?
- ☐ YES
- ☐ NOT APPLICABLE

IS ESSENTIAL IMAGING DISPLAYED?
- ☐ YES
- ☐ NOT APPLICABLE

SIGN OUT

NURSE VERBALLY CONFIRMS WITH THE TEAM:

- ☐ THE NAME OF THE PROCEDURE RECORDED
- ☐ THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE)
- ☐ HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME)
- ☐ WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

Table 1: *WHO surgical check list [2].*

Physical preparation may consist of a complete medical history and physical examination including the patient's surgical and anesthesia background. Allergies, recent and ongoing drug therapy, unusual pharmacological responses or reactions, and any complications or side effects from prior anesthetics should all be taken into account. Additionally, a family history of adverse events related to anesthesia should be documented. Full assessment of systems should be included in the history to search for undetected disease or chronic disease that is not well controlled. A targeted pre anesthesia physical examination should -at the very least- include an assessment of the airway, lungs, and heart, as well as documentation of vital signs. Complete blood count, electrolytes, prothrombin time, activated partial thromboplastin time, and urinalysis are examples of laboratory tests. The patient will most likely have an electrocardiogram (ECG) if he or she has a history of cardiac disease, or is over 50 years of age. A chest x ray is done if the patient has a history of respiratory disease. Part of the preparation includes assessment for risk factors that might impair healing, such as nutritional deficiencies, steroid use, radiation or chemotherapy, drug or alcohol abuse, or metabolic diseases such as diabetes. The American Surgical Association ASA grading system was introduced originally as a simple description of the physical state of a patient as shown in table [2].

Status	*Disease State*
ASA class 1	No organic, physiologic, biochemical, or psychiatric disturbance
ASA class 2	Mild to moderate systemic disturbance that may or may not be related to the reason for surgery *Examples*: Heart disease that only slightly limits physical activity, essential hypertension, diabetes mellitus, anemia, extremes of age, morbid obesity, chronic bronchitis
ASA class 3	Severe systemic disturbance that may or may not be related to the reason for surgery, *(does limit activity)* *Examples*: Heart disease that limits activity, poorly controlled essential hypertension, diabetes mellitus with vascular complications, chronic pulmonary disease that limits activity, angina pectoris, history of prior myocardial infarction
ASA class 4	Severe systemic disturbance that is life-threatening with or without surgery *Examples*: Congestive heart failure, persistent angina pectoris, advanced pulmonary, renal, or hepatic dysfunction
ASA class 5	Moribund patient who has little chance of survival but is submitted to surgery as a last resort (resuscitative effort) *Examples*: Uncontrolled hemorrhage as from a ruptured abdominal aneurysm, cerebral trauma, pulmonary embolus.
ASA class 6	A declared brain-dead patient whose organs are being removed for donor purposes
E	An "E" is added to the status number to designate an emergency operation

Table 2: *ASA grading system [1].*

Preoperatively, diabetic patients requiring elective surgery should be thoroughly examined for symptoms and signs of peripheral vascular, cerebrovascular, and coronary disease. Blood glucose concentrations must be kept under control (less than 180 mg/dL). Patients in hospitals, both medical and surgical, are at risk for venous thromboembolism (VTE). This risk is influenced by a number of factors, including increasing age, the type of surgery performed, a history of deep vein thrombosis (DVT), and immobility. Thromboprophylaxis lowers the risk of DVT and PE, according to convincing clinical evidence [2]. In hospitalized patients, the risk of developing deep venous thrombosis (DVT) is 10–40% without any prophylaxis [2].

Informed consent is a process that facilitate the patient's understanding of the procedure, benefits, anticipated risks of the operation and post-operative follow up period. Patients who are mentally impaired, heavily sedated, or critically ill are not deemed legally capable of giving consent. The next of kin can act as a surrogate and sign the consent form in this case. A parent or guardian must sign for children under the age of 18.

Antimicrobials are frequently used in surgical patients to avoid infection (prophylaxis) or to treat an infection that has already occurred or is suspected (therapeutic) [3]. Surgical site infections (SSI) are one of the most prevalent hospital-acquired infections, and they're linked to longer stay in the hospital, more surgical intervention, higher mortality, and higher costs. Antimicrobial prophylaxis is a preventative strategy that can be used for any surgery [4]. Regarding surgical site marking, in order to reduce these errors, the WHO recommends that surgical site marking be made required for all Procedures for which it is practicable, as well as defining what constitutes proper marking and what constitutes possible exceptions [5]. Psychological preparations are so crucial; patients are often fearful or anxious about having surgery. It is frequently beneficial for individuals to convey their concerns to medical personnel, especially for critically ill individuals or those undergoing a high-risk operation. Psychological preoperative care should include the family. In most cases, pastoral care is provided in the hospital. If the patient is concerned about dying during surgery, he or she should convey their concerns to the surgeon. The procedure may be postponed in some situations until the patient feels more secure.

Problem statement

The incidence rate of major complications following inpatient surgical procedures has been reported as up to 22% with a mortality of up to 0.8% and around seven million individuals will encounter major issues as a result of surgical procedures each year, with approximately one million patients dying as a result of surgical complications (Glaysher and Cresswell 2017).

Sudan is an impoverished African country with a shattered health-care system, particularly in the field of surgery. Inadequate preoperative preparations have an impact on the patient's physiological and mental well-being, as well as the patient's postoperative outcome and even mortality. Several studies have attempted to identify preoperative factors which predispose patients to complications and poorer outcomes. Within the limits of these studies, patients who are at increased risk of postoperative complications have been found to have overall poorer health and functional status preoperatively.

Justification

To the best of our knowledge, there is no published data on this topic in Sudan, emphasizing the need of conducting this research to fill the information gap. The majority of postoperative complications are caused by poor preoperative care. The overall goal of this research is to shed light on this overlooked issue.

Objectives of the Study

The goal of this study was to assess the knowledge and practice of surgical staff towards preoperative care in Sudan from December 2018 to October 2019. Our specific objectives were: to assess the knowledge of doctors about preoperative care regarding antibiotic prophylaxis, thromboprophylaxis, assessment of bleeding and coagulation profile, to determine the doctors' practices about the preoperative care regarding history taking(previous operation , taking other drugs) , laboratory investigation(random blood glucose, urine analysis) and physical examination for all systems and to assess the doctors' practices regarding the preparation specific to procedure itself (informed consent, surgical site marking, preanesthetic visit, check patient result and preparation for critical events).

Materials and Methods

This descriptive cross sectional hospital based study conducted to assess the knowledge and practice of doctors towards the preoperative care in Khartoum state- capital of Sudan during 2018-2019. There are 23 public hospitals in Khartoum state. Four hospitals were selected using multistage sampling; Ibrahim Malik hospital from Khartoum locality, Bahri hospital from Bahri locality and Omdurman and Alnaw from Omdurman locality. Doctors who were available during data collection period in surgical departments in selected hospitals and willing to participate in the study were selected including house officers, medical officers, registrars and consultants. The sample size was found to be 165. The data was collected using a self-administered questionnaire containing the following variables: Socio-demographic variables, questions concerning the knowledge of individuals and questions concerning the individual practice toward preoperative care. Data was entered and encoded manually, and was analyzed using SPSS SOFTWARE version 20. Tables and charts were used to represent the data. Ethical Approval was obtained from Ministry of health and hospitals general managers. We respected the respondent's autonomy and confidentiality and verbal consent was obtained from the respondents after informing them about the objective and benefit of this research.

Results

Socio demographic characteristics of study participants

The study population was 165, 92.1% of doctors were at the age of (23-30) years, 6.1% were (31-35) years, 0.6% were (36-40) years and 1.2% > 40 years. 73 (44.2%) of the respondents were males and 92(55.8%) were females. 61.8% of the study populations were house officers, 22.4% were registrars, and 15.2% were medical officers. Doctors who have (1-3) years of experience were 86.1 %,(4-6) years were 8.5%, (7-9) years were 3.6% and >10 years were 1.8%. The overall knowledge result showed that 81.2% of doctors had good knowledge, 15.2%of doctors had average knowledge and only 3.6% had poor knowledge.96.4%of the doctors knew about the antibiotic prophylaxis, 94.5%of the doctors knew the ways to assess the bleeding and coagulation profile (good knowledge) and 86.1%knew about thromboprophylaxis as shown in Table 3.

	Yes	No
Antibiotic prophylaxis	96.4%	3.6%
Bleeding and coagulation profile	94.5%	5.5%
Thromboprophylaxis	86.1%	13.9%

Table 3: *Doctors knowledge in surgical units about preoperative care in Khartoum state 2019 (n = 165).*

The overall preoperative practice of the doctors

49.1%had good practice, 41.2% had average practice, and 9.7% had poor practice. 50.9%of doctors had good preoperative history taking, 43.6% had average history taking, and 5.5% had poor history taking. 55.2%of doctors had good examination practice, 38.2%had average, and 6.7%had poor examination practice. 71.5% of doctors had good investigation practice, 23% had average and 5.5% had poor investigation practice. 66.7% of doctors had good preparation skills for the procedure, 30.9% had average skills, and 2.4% had poor skills.

The details regarding history taking practices of the doctors shown in table 4 below.

	Always	Usually	Often	Sometimes	Rare	Never
Communication	35.2	40.6	12.7	9.7	1.2	0.6
Comorbidities	80	15.2	3	1.8		
Pregnancy	41.2	27.3	13.9	9.7	5.5	2.4
Previous operation	85.5	6.7	3	4.2	0.6	
Anesthetic problem	35.8	23	13.3	7.9	12.1	7.6
Drugs	48.5	20.6	13.3	6.7	6.7	4.2
Smoking and alcohol	49.1	23	12.7	5.5	6.1	3.6

Table 4: *History taking practices of doctor's in surgical units regarding preoperative care in Khartoum state, 2019, (n = 165).*

The details regarding operation care practices of the doctors shown in table 5 below.

	Always	Usually	Often	Sometimes	Rare	Never
Blood cross matching	81.2	12.1	3	1.8	1.8	
Informed consent	89.7	5.5	1.8	3		
Surgical site marking	32.7	20.6	15.8	8.5	12.7	9.7
Preparation for critical event	47.3	35.8	7.3	4.2	3	2.4
Naming the operation	84.8	9.1	1.8	1.8		2.4
Preanesthetic visit	33.3	16.4	12.7	14.5	6.1	17
Check patient investigation	84.8	10.3	2.4	1.8	0.6	

Table 5: *Doctors operation care practices in surgical units regarding preoperative care in Khartoum state, 2019, (n = 165).*

The details regarding examination practices of the doctors shown in table 6 below.

	Always	Usually	Often	Sometimes	Rare	Never
Full Examination	25.5	32.1	24.8	12.1	3.6	1.8
Respiratory examination	44.2	31.5	10.9	9.7	3	0.6

Table 6: *Doctors examination practices in surgical units regarding preoperative care in Khartoum state, 2019, (n = 165).*

The details regarding investigation practices of the doctors shown in Table 7 below.

	Always	Usually	Often	Sometimes	Rare	Never
Assess risk of thromboembolism	31.5	31.5	13.9	12.1	7.9	3
Measure BP, RR, urine analysis	80.6	12.7	3.6	1.8	0.6	0.6
Measure RBG	92.7	3	1.8	2.4		
Assess risk of blood loss	52.1	26.1	10.9	7.9	2.4	0.6

Table 7: *Investigation practices of doctors in surgical units regarding preoperative care in Khartoum state, 2019, (n = 165).*

Statistical association

There was significant association between the age and the practice (p=0.054).

Age	Poor	Average	Good
23 - 30	14	62	76
31 - 35	1	4	5
36 - 40	1	0	0
> 40	0	2	0

Table 8: *The association between the age and practice about the preoperative care, p-value = 0.057, (n = 165).*

Another significant statistical association has been found between the knowledge and practice about the preoperative care (P-value = 0.047).

Knowledge Scale	Practice scale		
	Poor	Average	Good
Poor	2	3	1
Average	1	15	9
Good	13	50	17

Table 9: *The association between the knowledge and practice about the preoperative care, p- value=0.047, (n = 165).*

There was no significant statistical association between the gender and knowledge (p value = 0.54), gender and practice (p- value = 0.23), the qualification and knowledge (p-value = 0.31) and no association between qualification and practice about the preoperative care (p- value = 0.39). Also there was no significant statistical association between age and knowledge (P-value = 0.77), no association between the years of experience and knowledge (p-value = 0.4) and no association between the years of experience and practice about the preoperative care (p-value = 0.8).

Discussion

Medical specialties are commonly solicited to help managing surgical patients during the perioperative period due to the increasing medical complexity of surgical patients [6].This is cross sectional hospital based study conducted to assess the knowledge and practice of preoperative care in Khartoum state in 2018-2019, a sample of 165 doctors were chosen. This study found that the majority of partici-

pants were between the ages of 23 and 30 and that they were mostly house officers and registrars. Due to the fact that preoperative care is the most delicate matter that determines whether the treatment is successful or unsuccessful, the majority of doctors had a high percentage of overall knowledge regarding this topic. In considering practice of doctors, particularly history taking, about half of doctors50.9% had good preoperative history taking. Only 35.2%ofdoctors did communicate well with their patients, this could be due to language barriers or time pressure. As regard physical examination revealed that 49.1% of doctors, or half of them, followed sound preoperative examination procedures, this could be due to time constraints and overcrowding in surgical wards.

There was a strong association between age and practice; the younger the doctors (ages 23 to 30), the better the practice (76% were good), which can be explained by the fact that younger doctors are more enthusiastic and eager to learn new things when they are just starting out in medicine. Also there was a strong association between knowledge and practice, and doctors who practice well reflect their knowledge by maintaining a safe environment for surgical practice.

About one third of doctors 32.7% always mark the surgical site; however, this figure is lower than that reported in a United Kingdom in study by Sonia from 2015–2016, which revealed that 36.1% of respondents routinely marked every patient before surgery [5]. We can explain this by the absence of educational programs in Sudan that highlight the significance of preoperative surgical marking.

our study showed that most of doctors 89.7% always take the informed consent from their patient in contrast to study done in Pakistan 2014 which identified a considerable deficiency in current knowledge and attitude toward informed consent, the residents' low performance in the SIC process may have been caused by a lack of practical experience as well as inadequate training in the crucial area of doctor-patient communication on their parts [7].

Surgery-related venous thromboembolism (VTE) is a serious and possibly fatal complication. It can be prevented and is a cause of postoperative morbidity and mortality [8]. In this study, 86.1% of participants had good knowledge of thromboprophylaxis, but surprisingly, only 31.5% of them consistently evaluated the risk of thromboembolism. In contrast, a study conducted in Nigeria found that only 33.3% of surgeons had good knowledge and that only 20% of surgeons appeared to have good DVT prophylaxis practice [9]. While the similarity in practice percentages may be caused by lax adherence to guidelines, the difference in knowledge percentages may be related to variations in teaching modalities between the two countries. Almost all of respondents 96.4% knew about the antibiotic prophylaxis, it was higher compared to a study done in Ethiopia by Tefera in 2019, which stated that 75.4% Knew about the prophylaxis [3].

Nearly all of our respondents were aware of antibiotic prophylaxis. A similar finding was found in a survey conducted in Ethiopia by Tefera in 2019 which revealed that most respondents were aware of prophylaxis [3]. In contrast to our findings, a 2019 study from Sudan revealed a deficiency in doctors' knowledge regarding surgical antibiotic prophylaxis, particularly when it came to the first line of treatment in a variety of clinical settings. This may be because their study had a smaller sample size (56) than ours did (165) [10].

Undiagnosed DM carries a higher risk of perioperative morbidity and mortality than DM that has already received a diagnosis. Contrary to individuals without DM and those who had already been diagnosed with DM, patients with undiagnosed DM were more likely to need resuscitation, reintubation, prolonged postoperative mechanical ventilation, and increased perioperative mortality [11]. For diabetic patients, perioperative glycemic control has the strongest correlation with the outcomes of surgery. According to other research, diabetic patients are more likely than non-diabetic patients to experience postoperative respiratory infections, surgical site infections, urinary tract infections, acute kidney injury, admission to an intensive care unit, and longer hospital stays [12]. In our study, 92% of respondents said that they always request for random blood glucose levels as part of routine preoperative evaluation. Additionally, increased stress and metabolic demand—conditions linked to surgery—can cause plasma glucose to rise [13].

Conclusion

The majority of doctors had a high level of overall understanding about pre-operative care. In terms of overall practice, nearly half of providers had good preoperative care practices. Only half of doctors were good at obtaining history and performing physical examination, the majority of doctors were good at requesting investigations, and roughly two-thirds of doctors were good at particular surgical care preparation.

Recommendation

Sudan's ministry of health should hold educational workshops and programs to improve doctors' knowledge and urge them to follow best practice guidelines. In addition, the ministry of health should work to improve the quality of hospital services through quality improvement projects that focus on enhancing patient-centered outcomes. Moreover, hospitals and units should be urged to formulate their own guidelines executed by surgical staff and mandatory to be followed, to decrease the post-operative complication.

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