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An audit of the Day-of-Surgery cancellation of scheduled surgical procedures in Sagamu, Nigeria

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Abstract

Background: Timely performance of scheduled surgical procedures may be an indirect method of assessing the quality of surgical services in a hospital.
Objective: This study aimed to determine the rate and the reasons for day-of-surgery cancellation of elective surgical procedures.
Methods: A prospective study was conducted at the Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria to audit the type of surgery and the reasons for the cancellation of procedure among patients scheduled for elective surgical procedures.
Results: A total of 1,324 patients were scheduled for elective surgeries during the period of audit and 268 (20.2%) were cancelled on the day of surgery. One hundred and seventy-four of the 268 (65.0%) cancellations were avoidable while 94 (35.0%) cancellations were unavoidable. The reasons for the cancellation of surgeries included patient-related factors (35.0%), unfavourable pre-operative clinical evaluation (31.0%), facility-based factors (28.0%) and surgeon-related factors (6.7%).
Conclusion: The day-of-surgery cancellation rate was 20.2%, and the three leading causes of cancellation of elective surgeries in Sagamu included patient-related factors, unfavourable pre-operative clinical evaluation and inadequacies of hospital resources.

Keywords: Anaesthesia, Clinical audit, Elective Surgery, Hospital Administration, Procedure termination, Nigeria

Introduction

Elective surgery is traditionally used for non-emergency surgical conditions and it usually requires general or other forms of anaesthesia. Pre-operative evaluations include an adequate clinical review of medical charts and laboratory investigations required by both the managing surgeons and the anaesthetists to ascertain the clinical fitness of the patient for the surgical procedure. Therefore, elective surgeries have the advantage of advance knowledge, planning and preparation, with the possibility for prevention and preparation for complications, to achieve reduced morbidities and for improved outcome. [1, 2]

Unfortunately, experience has shown that some elective surgical procedures get cancelled or revoked on the day of scheduled surgery despite all preparations. Cancellation of planned surgeries on the day of intended surgery refers to a situation where surgical operations that were either scheduled on the final theatre list for that day (generated at 15:00 hours on the previous day) or subsequently added to the list, were not

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performed on the scheduled day of surgery. [1] Unanticipated cancellation of planned operations results in distortion and alteration of surgical lists and schedules, insufficient and under-utilization of manpower and wastage of hospital resources. These challenges further lead to increased cost of patient care, duplication of workload and wastage of operating room time. [2-4]

Day-of-surgery cancellations, therefore, have implications on patient satisfaction, staff morale and hospital-patient relationships. [3][4] It is, thus, an indirect way of assessing the quality of surgical services and care, and by extension, the quality of services available in a hospital setting. [5] The reasons proffered for cancellation of elective procedures on the scheduled days may be patient–related, Personnel (surgeon)-related or facility-related. The incidence of cancellation of elective surgical operations in the medical literature ranges from 10% to 40%. [6 - 8] While it may not be practically possible to have a zero percent cancellation rate in health facilities, especially due to unforeseen, unavoidable circumstances, an incidence rate of less than 10 % may be permissible.

It is important to conduct an internal audit of services in every health facility to appraise the quality of care and make adjustments and amendments as appropriate, for improvement in the quality of services provided by the service. The present study is essentially an audit of cancellation of scheduled surgical procedures in a tertiary institution conducted over a 24-month period. The primary goal is to document the rate and the reasons for the cancellation of elective surgical procedures. This audit would serve quality assurance and planning purposes.

Methods

This prospective study was carried out on patients scheduled for elective surgical procedures at the operating theatres of the Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria, between January 2012 and December 2013. The hospital is a 202-bed health facility with a central modular operating theatre. The theatre has three functional operating suites, one of which is dedicated to emergency procedures. The surgical specialities utilising the remaining two operating suites at different times in the week include general surgery, urology, otolaryngology, plastic/reconstructive surgery, paediatric surgery, obstetrics and gynaecology, ophthalmology and orthopaedics and traumatology. Dental surgical, neurosurgical and cardiothoracic surgical procedures were not available in the hospital during the period covered by the audit. It is essential to indicate that the data collected during the audit excluded obstetric surgeries because they were never cancelled nor delayed. The surgical team generates the elective operating lists and circulates same to the anaesthetists, the operating theatre staff and the hospital administration, 24 to 48 hours before the scheduled day of surgery. Elective surgical procedures are performed over a period of eight hours between 0800 hours and 1600 hours routinely.

During the study period, the names of the patients who had their surgical operations as scheduled were checked on the elective surgical lists while those whose procedures were cancelled were also noted. The reasons for the cancellation of the elective surgical procedures were documented against the respective names by the senior anaesthesia resident doctor in charge of the list. Excluded from the study were data of patients who failed to provide some of the materials required for the surgery and patients who, hitherto had been notified of possible cancellation for likely reasons.

Data were gathered from the operation lists, the theatre records of surgical procedures and individual patients' hospital records. The data obtained included the socio-demographic data, the type of surgery, proposed type of anaesthesia, surgical speciality and the reason(s) for the cancellation on the day of surgery. Surgeries were classified, based on the extent of the procedure and the type of anaesthesia, as major, intermediate or minor. The reasons for the cancellations were classified as patient-related, pre-operative preparation-related, personnel (surgeon or anaesthetist)-related or health

facility-related factors. The reasons for the cancellation of scheduled surgical procedures were also adjudged to be either avoidable or unavoidable.

The data were analysed using the SPSS version 17 (Chicago, IL) software. Descriptive statistics was used to summarise the parameters, while inferential statistics was performed for comparative analyses between patients' gender and the types of surgical procedure using the Chi-Square test.

Results

A total of 1,324 patients were booked for elective surgical procedures over the 24-month study period, and 268 (20.2%) of these procedures were cancelled on the day of surgery.

The distribution of the patients whose procedures were cancelled according to sex showed 137 (51.1%) males and 131(48.9%) females with a male-to-female ratio of 1.1:1. Out of a total of 648 male patients, 137 (21.1%) had cancellation of procedures compared with 131 of 676 (19.4%) females. There was no statistically significant difference in the rate of procedure cancellation between the sexes (p = 0.728).

The pattern of the cancellations according to surgical specialities is shown in Table I. The rate of cancellation varies among the different surgical specialities, with urology recording the highest rate (32.7%) and otorhinolaryngology recording the lowest rate (10.0%) with statistically significant difference (p = 0.042).
Out of the 765 surgical procedures classified as major, 125 (16.5%) were cancelled whereas 58 (18.6%) of the 311 procedures classified as intermediate were cancelled. Similarly, 85 (33.1%) of the minor procedures were cancelled.
The reasons for the cancellation of the procedures were regarded as avoidable (pre-operative preparation related, facility related, and personnel related problems) among 174 (64.9%) cases. On the other hand, non-avoidable reasons (such as patient related factors) were recorded among 94 (35.1%) cases (Table II). The most frequent reasons for cancellation were patient-related problems (94/268; 35%), while the least frequent reasons were surgeon-related (18/268; 6.7%) problems such as overbooked surgical lists, non-availability of surgical staff and last minute cancellation based on surgeon's discretion.
Table III shows the details of the rate of cancellation of different grades of surgical procedures according to surgical speciality. Overall, the proportions of cancelled surgical procedures were 16.5%, 18.6% and 33.1% for major, intermediate and minor procedures respectively.

Table I: Frequencies of elective surgery cancellations across surgical specialities

Surgical specialty	Total number of scheduled surgeries	Number of surgeries cancelled	Proportion of surgeries cancelled (%)
General surgery	333	76	22.8
Orthopaedic surgery	196	38	19.4
Urology	110	36	32.7
Gynaecology	175	38	22.4
Paediatric surgery	170	38	22.4
ENT	120	12	10.0
Ophthalmology	143	16	11.2
Plastic surgery	77	14	18.2
Total	1324	268	20.2

Discussion

Millions of people undergo surgical operations each year in surgical theatres around the country. Some of these surgical operations are unplanned (emergency) while others have been scheduled as part of the patients' treatment plans (elective). [9 - 11] While emergency surgical procedures are often performed quickly with little time for extensive and adequate preparations, elective or scheduled procedures allow sufficient time for pre-operative evaluation and preparation and should, ideally, not experience a cancellation on the day of scheduled surgery.
The rate of cancellation of elective surgical procedures on the scheduled day of surgery may

be an indicator of the efficiency of the operating theatre. [12, 13] Till date, there has been no consensus on acceptable cancellation rates for surgical cases worldwide, although, a rate less than 5% is recommended. [13, 14] Reports of cancellation of elective surgeries among various institutions in Nigeria, in Africa and other continents vary between 10% and 40%. [4, 7-9] The cancellation rate of 20.2% recorded in the present study confirms that one in every five of elective surgical procedures in Sagamu, Nigeria was cancelled on the day of the scheduled surgery. Such cancellations reflect some inefficiency in the processes involved in the provision of surgical services in the facility. Other studies have reported cancellation rates varying from less than 2%, [15] and rising steadily to as high as 36.6%. [4, 7, 15, 16]

Urology as a surgical speciality contributed the highest cancellation rate (32.7%) in the present study. Other leading contributors included general surgery (22.8%) and paediatric surgery (22.4%). These findings resonated with the reports from similar studies. [19 - 21] However, Chalya reported a disproportionately high cancellation rate in general surgical speciality in Tanzania. [5]

The end-users of hospital services usually bear the brunt when resources (including funds, health care equipment and consumables, trained hospital personnel and appropriate timing) are poorly utilised. The effects of this inefficiency are more pronounced among people in the lower income groups, who depend on more on public or government services for their health care needs. [4, 9, 10] The cancellation of surgical procedures on the scheduled day of surgery results in physical, financial and psychological hardships for patients and their relatives. The work schedules and family lives are usually re-arranged to fit into the announced schedule of surgery, and these would be disrupted when the procedures are cancelled. [11]

Patient-related factors were the leading causes of cancellation of scheduled surgeries (35.1%) in the present study. These problems ranged from patients' failure to show up for surgery, financial constraints, sudden withdraw of consent for surgery to sudden death before the scheduled day. Ebirim *et al*. [10] reported that patient-related factors were the second most frequent reason for the cancellation of surgical procedures while Kolawole and Bolaji indicated that 13.06% of cancelled surgeries were due to the absence of patients. [4] Some patient-related factors may have arisen from the low quality of patient education and counselling concerning the details of the proposed surgical procedure including indications, financial demands and realistic expectations after the surgery. [16 - 18] Appropriately rich patient education allows concerned parties, such as the patient and the relatives, take informed decisions which may reduce patients' absence on the scheduled day of surgery.

Pre-operative evaluation problems (30.6%) were also high on the list of the causes of cancellation of procedures in the present study. Some of the specific reasons included uncontrolled co-morbidities such as hypertension and diabetes, recent onset of respiratory tract infections, and acute onset of cardiovascular disorders. This was also the second leading cause for cancellation of elective surgeries in the study done by Sultan *et al*. [9]

Most patients scheduled for elective procedures are evaluated the day before planned surgery by the anesthesiologist in our hospital and the patients who require preoperative medical optimization are referred to the physician, although some high-risk patients are reviewed many days before the scheduled day of surgery.

In some other instances, patients may have been on medications or some forms of therapies for pre-existing morbidities but without adequate control before the scheduled surgery. It is to prevent or ameliorate some of these problems, that, anaesthetists were advised to begin the evaluation of patients scheduled for surgeries much earlier, rather than 24 hours to the scheduled procedures. This need for prior review led to the concept of pre-anaesthesia clinics. The pre-anaesthesia clinic is a setting where surgical patients are assessed and optimised early for surgery and anaesthesia. Therefore, the clinic provides opportunities for

Table II: Reasons for the cancellation of scheduled surgical procedures in different categories

Category of factors	Reasons for cancellation	Frequencies	Total (%)
Patient-based	Patient's absence Patient's refusal	64 4	
	Financial constraints	24	94 (35.1%)
	Patient's death	2	
Pre-operative evaluation	Poor pre-op preparation Change in clinical condition Change in treatment plan	70 6	82 (30.6%)
		6	
Inadequacies of hospital resources	Equipment breakdown	21	
	Displacement by emergency cases	12	
	Power outages	2	
	Industrial disputes	8	
	Operation time elapsed	8	
	Oxygen not available	8	
	Blood not available	5	
	Sterile drapes not available	10	74 (27.6%)
Surgeon-related factors	Overbooked surgical list Surgical staff not available	9	
	Surgeon's discretion	5	
		4	18 (6.7%)

early detection of warning signs of major illnesses as well as prompt treatment of such conditions. This closer attention to details helps with the reduction of morbidities and prevention of mortality. [19, 20]

Studies have shown that the assessment of patients in the pre-anaesthesia clinics significantly reduced operative room delays and cancellations of surgeries. [16, 20, 21] This ensures adequate workup of patients and appropriate preparations for the desired surgical procedure. [20, 22] Findings from the present study signify that there is a need for the introduction of this clinic in our centre. Effective communication between patients, doctors (anaesthetists and surgeons), the co-managing team (including physicians, paediatricians or gynaecologists) and peri-operative nurses is also expedient to the reduction of the rate of day-of-surgery cancellations.

Facility-based factors contributed 27.6% to the day-of-surgery cancellation rate in the present study compared with 22.6% reported by Kolawole and Bolaji. [4] These wide -based factors included equipment malfunction or breakdown, non-availability of operating room spaces (particularly when emergency cases encroach),

Table III: Distribution of cancellation rates for different grades of surgical procedures across specialities

Surgical specialties	Total	Major surgeries	Intermediate Surgeries	Minor Surgeries
General surgery	76/333 (22.8%)	42/223 (18.8%)	15/57 (26.3%)	19/53 (35.8%)
Orthopaedics & trauma	38/196 (19.4%)	17/87 (19.5%)	8/60 (13.3%)	13/49 (26.5%)
Urology	36/110 (32.7%)	24/64 (37.5%)	6/28 (21.4%)	6/18 (33.3%)
Gynaecology	38/175 (21.7%)	15/90 (16.7%)	7/49 (14.3%)	16/36 (44.4%)
Paediatric surgery	38/170 (22.4%)	16/80 (20.0%)	7/45 (15.6%)	15/45 (33.3%)
Ophthalmology	16/143 (11.2%)	4/77 (5.2%)	7/41 (17.1%)	5/25 (20.0%)
Plastic surgery	14/77 (18.2%)	5/45 (11.1%)	4/17 (23.5%)	5/15 (33.3%)
Otorhinolaryngology	12/120 (10.0%)	2/90 (2.2%)	4/14 (28.6%)	6/16 (37.5%)
Total	268/1324 (20.2%)	125/756 (16.5%)	58/311 (18.6%)	85/257 (33.1%)

electrical power outages, non-availability of the required personnel during industrial actions, non-availability of safe blood and other theatre materials such as sterile drapes.

Inadequate and sub-standard quality medical equipment is characteristic of health services in many developing and low-income countries hence, the few available resources serve a teeming population, with the tendency for overuse and short life span. This shortage of equipment is compounded by the lack of efficient maintenance services for the few equipment. All these factors contribute to equipment malfunction or outright breakdown,

which may not be foreseen until the scheduled day of surgery. Related to this is the occasional non-availability of sterile surgical drapes and other operating room consumables as well as the challenge of power outage and lack of electricity supply to the operating room. Although the operating theatre complex in our facility has a dedicated power generating sets, the problems of malfunction may be daunting. Therefore, it is important to have good quality and serviceable medical equipment for optimal delivery of surgical care services. [6, 9, 12]

Furthermore, there is a need to consider increasing the number of operating suites, especially for emergency surgeries, since emergencies tend to out-number elective cases in the developing world. Concrete efforts should be made by health administrators to improve the consistency of services by minimising industrial disputes which may culminate in disruption of services. [4, 10]
The role of surgeons in the cancellation of elective surgical procedures in the present study is comparable to the findings in the study of Parsa *et al*. [20] We observed in the current study that some of the cancellations were due to underestimation of surgical time, overbooking or long operation list. Therefore, some of these cancellations can be avoided through better and realistic organisation of the list of cases booked or scheduled for surgery. One major limitation of our study is the inability to follow patients whose surgeries were cancelled up to assess the clinical course and determine its effect on the eventual outcome. However, this additional step can be factored into subsequent studies.

Conclusion

The prevalence rate of day-of-surgery cancellation was 20.2% and the leading causes of cancellation of elective surgeries included patient-related factors, unfavourable pre-operative evaluations and hospital resources inadequacies.

Authors Contributions: FOM conceived the research, designed the study, collected data and wrote the manuscript. SOA and NCC participated in data collection and analysis. OAA participated in data collection. All the authors participated in drafting the manuscript and made substantial contributions to its intellectual contents.

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