Incidence, causes and pattern of cancellation of Elective surgical operations in a University Teaching Hospital in the Lake Zone, Tanzania

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Abstract

Background: Cancellation of elective surgical operations is recognized as a major cause of emotional trauma to patients as well as their families. This study was carried out to assess the incidence, causes and pattern of cancellation of elective surgical operations in our setting and to find the appropriate solutions for better patient management.

Methods: This was a prospective hospital-based study which was conducted in a teaching hospital at Bugando medical Centre from March 2009 to February 2010.

Results: A total of 3,064 patients were scheduled for elective surgical operations. Of these, 644 (21.0%) patients' operations were cancelled. General surgery had the highest rate of cancellations (31.5%) followed by orthopaedic surgery in 25.5%. Lack of theatre space and theatre facilities were the most common causes of cancellations in 53.0% and 28.4% of cases respectively. The majority of these cancellations were attributable to hospital administration in 82.0 % and most of them were preventable in 93.8% of cases. The mean hospital stay was 28.46 days and it was significantly related to the number of cancellations ($p < 0.001$).

Conclusion: Cancellation of elective surgical operations is a significant problem in our hospital. To prevent unnecessary cancellations, efforts should be made to enhance cost effectiveness through careful planning and efficient utilization of the few available hospital resources

Key words: Elective surgical operations; cancellation; causes; incidence; Tanzania

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Introduction

The operation theatre has been reported to be the heart of a hospital requiring considerable human resources and expenditure from the hospital budget[1]. Most hospitals in developed countries invest considerable resources in maintaining operating suites and having surgeons and theatre staff available on an agreed schedule [2]. However, in developing countries where resources are limited, cancellation of elective surgical operations due to various preventable reasons is a common phenomenon in most hospitals[2, 3]. It is well recognized that cancellation of patients from elective theatre operating lists increases cost, decreases efficiency, duplicates workload and wastes operating room time[1, 4]. Cancellation of elective surgical procedures also causes significantly emotional trauma to the patients as well as their families and the community in general, and its impact on hospital resources is great due to prolonged hospitalization and high cost of heath care[1, 5, 6].

Elective surgery cancellations always lead to insufficient utilization of manpower and hospital resources and can also lead to an increase in patients' treatment expenses due to prolonged hospital stay and in many cases, repetitions of pre-operative preparations and management [6, 7].

Repeat cancellations have implications for patient satisfaction, staff morale, hospital-patient relationship and training [4, 6, 7].

The incidence of cancellation of elective surgical operations has been reported in literature to range from 20% to 40%[4, 7, 8, 9, 12, 13]. The causes of cancellation of elective surgical procedures are multi-factorial and they tend to vary from one hospital to another [10]. Therefore, in order to minimize the rate of cancellations in our setting, it is important to have knowledge on the magnitude and causes of the problem.

Cancellation of elective surgical procedures is a major problem at Bugando Medical Centre (BMC). However, despite the magnitude of the problem, little work has been done to evaluate, in our setting, the extent and causes of this problem.

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The purpose of this study was to assess the incidence, causes and pattern of cancellation of elective surgical operations in our teaching hospital. This will assist us in making appropriate recommendations to enhance efficiency and minimize wastage of already limited hospital resources and manpower.

Methods

Study design and setting

This was a one-year prospective hospital-based study which was conducted in a teaching hospital at Bugando Medical Centre (BMC) from March 2009 to February 2010. BMC is consultant, tertiary and teaching hospital for the Weill-Bugando University College of Health Sciences (WBHCHS) and has a bed capacity of 1,000. The hospital has one main theatre which has five rooms. These rooms are used for general surgery, orthopedic surgery, otorhinolaryngology, obstetrics and gynecology, urology, cardiothoracic and neurosurgery operations. One theatre for obstetrics is located in the labour ward and this operates only during the day. Each of these specialities is allocated only two days in a week to use for elective surgery. The main theatre operates only from Monday to Friday, and every day all the rooms are occupied with elective surgeries. Usually no room is reserved for emergency cases. All patients scheduled to undergo elective surgical procedures are usually seen by the surgeon a day before surgery either in the ward or at the SOPD clinic. Before being scheduled for operation, all patients are usually fully investigated and prepared according to the diagnosis. The operating list is prepared by the surgeons, verified by the head of the firm, and sent to the theatre. The head of firm who in most cases a senior consultant surgeon, confirms bookings and supervises these (scheduling) activities. A pre-surgical anesthetic assessment to assess patient's fitness for surgery is usually performed a day before the operation. Feedback or apologies are usually given to patients who get cancelled by the operating/ booking surgeon.

Study subjects

The study subjects included all patients who were scheduled to undergo routine elective surgical operation, but due to some reasons they could not have their surgery done. Patients with minor ambulatory surgery are usually operated upon outside the main theatre at the SOPD clinic and therefore were excluded from the study if their surgery was cancelled. Data on the cancelled operations were obtained from the daily operating theatre list and documented in a special form. The data documented included patients' demographic data, the type of operation cancelled, number/frequency of cancellations, reasons for cancellation and who decided to cancel the operation. A cancellation of operation was defined as any elective operation that was either scheduled on the final theatre list for that day or was subsequently added to the list, and that was not performed on that day. The reasons/causes for cancellation were categorized as hospital-related, surgeon-related, patient-related and anesthetist-related and were classified into potentially preventable and non-avoidable causes/reasons.

Data collection and analysis

Data were collected using a pre-tested, coded questionnaire and analyzed using SPSS computer software version 11.5. Data were summarized in form of proportions and frequent tables for categorical variables. Means and standard deviation were used to summarize continuous variables. Significance was defined as a p-value of less than 0.05.

Ethical consideration

Ethical approval to conduct the study was obtained from the WBUCHS/BMC joint institutional ethic review committee before the commencement of the study.

Results

During the period under study, a total of 3,064 patients were scheduled to undergo elective surgical procedures. Of these, 2,420 (79.0%) patients were operated on while the remaining 644 patients' procedures were cancelled on the day of surgery for various reasons, giving a cancellation rate of 21.0%. Of the total number of patents whose operation was cancelled, 208 (32.3%) patients experienced at least one cancellation, 260 (40.4%) two cancellations, 110 (17.1%) three cancellations, 46 (7.1%) four cancellations and 20 (3.1%) patients experienced five or more cancellations.

A total of 596 (92.5%) patients whose operation was cancelled were in-patients and the remaining 48 (7.5%) patients were outpatients. These differences were statistically significant ($p< 0.001$). The ages of patients whose operation were cancelled ranged from 1 month to 86 years (mean = 36.32 ± 16.45 years). There were 424 (65.8%) males and females were 220 (34.2%) with a male to female

ratio of 1.9:1. These gender differences were found to be statistically significant (65.8% versus 34.2%, $P < 0.001$).

General surgery had the highest number of patients booked for operation (24.7%) followed by orthopedic surgery in 21.8% of patients. Cardiothoracic surgery and Ophthalmology had the least number with 3.2% and 2.2% of patients booked for operations respectively (Table 1).

Table 1: Speciality distribution of cases (booked/cancelled)

Speciality	No of cases booked/%	No of cases cancelled/%
General surgery	756 (24.7)	238 (7.8)
Orthopaedic surgery	667 (21.8)	170 (5.5)
Otorhinolaryngology	442 (14.4)	68 (2.5)
Urology	423 (13.8)	67 (2.2)
Gynaecology	313 (10.2)	76 (2.5)
Neurosurgery	298 (9.7)	27 (0.9)
Cardiothoracic surgery	98 (3.2)	5 (0.2)
Ophthalmology	67 (2.2)	3 (0.1)
Total	3064 (100)	644 (21.0)

The highest cancellation among different surgery subspecialties was for general surgery (31.5%), followed by orthopedic surgery (25.5%) (Table 2).

Table 2: Type of operations cancelled as percentage of booked operations

Speciality	Number of cases booked	Number of cases cancelled	%
General surgery	756	238	31.5
Orthopaedic surgery	667	170	25.5
Otorhinolaryn-gology	442	78	17.6
Urology	423	67	15.8
Gynaecology	313	76	24.3
Neurosurgery	298	27	9.1
Cardiothoracic surgery	98	5	5.1
Ophthalmology	67	3	4.5

The majority of causes of cancellation of surgical operations were related to hospital administration in 82.0% of cases. Of these, lack of theatre space (280; 53.0%) and lack of theatre facilities (e.g. gown, towels, power and water supply e.t.c.) (170; 28.4%) were the most common causes of cancellation of surgical procedures. The causes of cancellation related to the surgeons, patients and anesthetists accounted for 8.4%, 6.2% and 3.4% of cases respectively. The majority of causes of cancellations (604; 93.8%) were potentially preventable, whereas the remaining causes (40; 6.2%) most of which were related to patient factors were unavoidable. The detail of reasons for cancellation of surgeries is shown in table 3.

Table 3: Causes of cancellation

Causes of cancellation	Frequency	Percentage
Hospital-related causes	**528**	**82.0**
Lack of theatre space	280	53.0
Lack of essential theatre facilities e.g. gown, towels, power, beds, water supply, etc	150	28.4
Time constraints	54	10.2
Emergency priority	14	5.7
Inadequate theatre staff	14	2.7
Surgeon-related causes	**54**	**8.4**
Over booking /long operation lists	42	77.8
Surgeon not available	8	14.8
Others	4	7.4
Patient-related causes	**40**	**6.2**
Financial constraints	12	30.0
Not seen in the ward	10	25.0
Patient not prepared (e.g. patients not consented, unavailability of blood etc.)	8	20.0

Continuation of table 3

Causes of cancellation	Frequency	Percentage
Uncontrolled medical illnesses e.g. hypertension, diabetes mellitus e.t.c	7	17.5
0thers	3	7.5
Anesthetics-related causes	**22**	**3.4**
Inadequate number of anesth-esiologists/anesthetists	8	36.4
Lack of anesthetic facilities e.g. oxygen cylinder, drugs etc	7	31.8
Failure to administer anesthesia	5	22.7
Others	2	9.1

The overall duration of hospital stay ranged from 5 to 48 days (mean = 28.46 ± 14.12 days) and it was significantly related to the number of cancellations ($P < 0.001$). At the end of the study period, 497 (77.2%) patients were operated, 82 (12.7%) patients were discharged before operation, 25 (3.9%) were still in the ward awaiting elective operations, 22 (3.8%) were discharged against medical advice and 18 (2.8%) died before operation.

Discussion

Elective surgical operations require a major organizational effort between surgical team, theatre staff and hospital administration. It also requires major expenditure of time and cost by patients and their families[1, 5, 6, 11]. Cancellation of an elective procedure carries a major cost implication to the hospitals because of wasted hospital resources and major impact on patients because of loss of time from work as well as the impact of the wasted effort on the patient's family [11].

The acceptable cancellation rate for elective surgical procedures is controversial[7]. The reported incidences for elective surgery cancellation vary widely among institutions from 10-40%[4, 7, 8, 9, 12, 13]. In our study, the rate of cancellation of elective surgical procedures is comparable to what was reported by others [1, 8]. The high rate of cancellation in our study reflects a high degree of inefficient utilization of hospital resources and increased cost of patient care.

In agreement with other studies[6, 7, 12], our study found a significantly higher rate of cancellations among males than females. This is contrary to Garg et al [2] and Al-Bushra et al[13] who reported higher cancellation rates among females than in males. Gonzalez-Arevalo et al[14] reported no gender differences. We could not establish the reasons for the gender differences.

We also noted a significant higher rate of cancellations among in-patients than out-patients. This is contrary to Gonzalez-Arevalo et al [14] who reported a higher rate of cancellations among out-patients than in-patients. The reason for higher rate of cancellations among in-patients can be explained by the large number of the in-patients in our study and also most of in-patients operations were long and therefore they were likely to suffer cancellation. We could not establish the reasons for the low day case surgery in this study.

In our study we found that most cancellations were in the general surgery section followed by orthopedic surgery and otorhinolaryngology, and the least cancellation was in the ophthalmology and cardiothoracic sections. In contrary to our results three reports have indicated higher cancellation rate among the urology, orthopedics and gynecology than in general surgery [8, 15, 16]. General surgical patients in our hospital present the main bulk of patients who will undergo surgery. Furthermore, the orthopedic section presents a major part of cancellations due to large number of patients, besides two theatres/working day reserved for orthopedic procedures. Ophthalmology and cardiothoracic sections present the least number of cancellations due to the fewer number of patients in these sections.

The most common causes of cancellation in our study were attributable to hospital administration in the majority of cases. Similar reasons for cancellation of elective surgery were reported by Ojo & Ihuzue[7]. Most of these causes are potentially preventable and are a typical example in third world countries.

In our study, lack of theatre space and theatre facilities were the most common causes of cancellations of elective surgery. Lack of theatre space and facilities

have has also been reported by others [7, 9]. Cancellations of elective operations due to lack of theatre space and theatre facilities can be prevented through careful planning and efficient utilization of the already limited hospital resources including the operating room, theatre facilities and valuable manpower. Improving of the scheduling and admission procedure is of paramount for better use of hospital resources. A long-term planning should be aimed at increasing operation theatre spaces and have them all equipped with enough facilities and manpower.

Shortage of operating time was another important factor of cancellation of elective operation in this study. This can be explained by the fact that a lot of operation theatre time is wasted due to late starts, time between cases, prolonged duration of operation, prolonged time for patient to recover from anesthesia, preparation and cleaning operation theatres, and delayed transportation of patients to the operation theatre. Similar findings were also reported by other studies [1, 3, 16]. Shortage of operating time in our hospital is multi-factorial and can be reduced by co-operations of all disciplines. A team approach in presence of a good administrator can improve operation theatre management [1, 17]. A good administrator can improve scheduling, reduce time spent preparing and cleaning and better handle resources [1, 18]. The issue of 'overtime' payments may offer some incentive to prevent cancellation, but the overall costs to the hospital may be very high if overbooking is common. Intramural practice have been found to reduce the rate of cancellation of elective surgeries; however, the amount of money paid to the theatre staff during intramural practice is very little to enable them to work beyond normal working hours. This calls for the hospital to revise this practice.

Cancellation of elective surgery due to interference with emergency surgery is a major problem in our hospital because of lack of a dedicated emergency operating theatre. This can be reduced by establishment of a dedicated emergency operating theatre which is reserved only for emergency operations. Separating elective from emergency operations through the use of dedicated beds, theatres and staff can, if well planned, resourced and managed reduce cancellations and therefore improve the quality of care delivered to patients.

Cancellations attributable to surgeons in the present study were comparable to those reported in the literature [19]. The majority of the surgeons related cancellations in our study were because of over-booking/ long operation lists. We also observed that cancellations were mainly caused by some surgeons underestimating the time needed for the operation. The time taken for a particular surgery also depends on the skill of the operating surgeon .Less experienced surgeons and trainees often take more than the expected time. Cancellations attributable to surgeons are preventable by better organization of the operating room scheduling. It should be confirmed that materials in the theatre are adequate before scheduling patients for elective surgery, and alternative arrangements should be made when feasible. Theatre lists should be made manageable and realistic.

In our study, cancellations of elective operations due to patient related factors accounted for 6.2% of cases. The most common reasons for these were financial constraints and failure to return for surgery probably due to the former. We could not determine the reasons for our patient not coming but this may be related to inadequate information and counseling or may be due to financial difficulties. To minimize this, effort should be made by ensuring that all patients who are confirmed to be ready by the time the operation lists are prepared are included in the list. Patients should also be seen in the out patient clinic as close to the day of operation as possible to further ascertain their commitment and readiness, thereby reducing last minute cancellations. Patient not prepared for surgery was also a problem in our study. It is imperative to ensure that patients are adequately prepared pre-operatively so as to be able to detect any problem which is contraindicated for elective surgery. Cancellation of operations due to inappropriately prepared patients could be avoided by improving communication between patients and the doctors and nurses.

Inadequate number of anaesthetisiologists, anaesthetists and anesthetic facilities such as oxygen cylinders and drugs was a problem in this study. Similar observations were also noted in other studies don elsewhere[1, 4, 6]. Shortage of staff and lack of health resources have been reported to be a common problem in most hospitals in developing nations [1, 4]. In our resource-limited setting, where staff shortage is a challenging problem, re-distribution of the few staff available needs to be designed to address the problem. Cancellations due to shortage of Anaesthetists can be avoided by staffing of

anaesthetists and setting up appropriate arrangements for their internal cover of annual leave or study leave.

Conclusion

The incidence of cancellation of elective surgical procedures on the scheduled day of surgery is still high in our hospital. Most of the causes of the cancellations are potentially preventable and the vast majority of them are hospital related. In order to enhance cost-effectiveness and efficiency, efforts should be made to prevent unnecessary cancellations through careful planning aimed at increasing operation theatre spaces and efficient utilization of the few available hospital resources including that of the operating room, theatre facilities and valuable manpower. Improving the scheduling and admission procedure is required for better use of hospital resources. A long-term planning should be aimed at increasing operation theatre spaces and have them all equipped with enough facilities and manpower.

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