Original Article

Surgical case cancellation in a tertiary hospital in Yenagoa, Nigeria

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Abstract

Background: The efficiency of patient care in an operating theatre and by extension the hospital can be assessed by examining the rate of cancellation of surgical procedures. Case cancellation may significantly decrease the quality of healthcare delivery and reduce the income generated while increasing hospital running costs. There is also a significant impact on the patient and family.

Aim: This study was carried out in our centre to identify the case cancellation rate, factors responsible for and associated with such cancellations and suggest mitigating measures.

Methods: A hospital-based cross-sectional study of surgical case cancellations carried out over a 6-month period at a tertiary hospital in Nigeria. Case notes and theatre records of patients booked for elective and emergency procedures over the study period were utilized. A standardized data form was used, with retrieved data entered into Microsoft Excel and exported to IBM Statistical Package for Social Sciences (SPSS) version 21 for analysis.

Results: Three hundred and thirty-four cases were recorded in this 6-month period. Two hundred and fifty two (75.4%) were elective procedures while eighty two (24.6%) were emergencies. The average case cancellation rate was 26.2%. Fifty percent of case cancellation reasons were patient-related. The most common patient-related cause was unfitness for surgery (46.1%). Hospital-related factors accounted for 28.01% of cancellations.

Conclusion: Cancellation of surgical cases remains one of the most important challenges facing a hospital surgical service. Financial constraints encountered by patients can be relieved by the expansion and modification of government health insurance schemes. Hospitals are encouraged to periodically identify factors causing cancellations and solve them.

Keywords: Case cancellation, elective, emergencies, rates, factors associated

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INTRODUCTION

The efficiency of patient care in a hospital can be assessed by examining the rate of surgical procedure cancellation.[1] It is a major factor in the inefficient utilization of hospital resources. Case cancellation may significantly decrease the quality of healthcare delivery, and reduce income generated while simultaneously increasing hospital running costs. This is in addition to a significant impact on the patient and family in terms of emotional impact, increased morbidity, lost working days and disruption of daily life. [1, 2]

Different definitions of cancellation exist in the literature. Some workers define it as only those procedures that were cancelled on the day the procedure was supposed to take place while others include those that were cancelled the previous day. [2] In other definitions, cancellations involve any cases that appeared on the definitive operation list and were ultimately not carried out. [2]

The Modernisation Agency Theatre Programme (National Health Service,United Kingdom) defines cancellations as those that occur after the patient has been informed of the operation date. [3]

Classifying cancellations by aetiology is useful since it helps to pinpoint weaknesses in the system which need to be corrected. Cancellation reasons can be subdivided into patient, hospital, anaesthetist and surgeon-related factors.[4] While there is no generally agreed cancellation rate for surgery, less than 5% is usually considered acceptable. [4, 5] Cancellation rates have been found to range from 1% to 23% across hospitals in North America, the United Kingdom, New Zealand, Australia, Hong Kong and South Africa. [4, 5] Reasons for cancellation were found to include limited operation theatre facilities, lack of human resources, low awareness and bad perception. [5] This study was carried out in our centre to identify the case cancellation rate, factors responsible for and associated with such cancellations while suggesting mitigating measures.

METHODOLOGY

Design: This study was a hospital-based cross-sectional study.

Setting: The study was carried out at the Federal Medical Centre Yenagoa, a 400-bed hospital serving as the only tertiary health facility for the 1.2 million people of Bayelsa State. Yenagoa is the capital of Bayelsa state with a population of approximately 250,000 people.

The hospital has a 3-suite theatre which is shared by the surgical specialties of Paediatric Surgery, General Surgery, Burns and Plastic Surgery and Gynaecology. There is another 3-suite theatre which is used by the specialty of Orthopaedic Surgery. The theatre suites for Obstetric patients are located adjacent to the delivery suites and were not included in the study. Our study used the definition of cases cancelled on the day of the procedure as our template.

Duration: November 2021 to April 2022.

Population: This consisted of all patients scheduled for elective or emergency surgical procedures in the period under review. Inclusion criteria for this study consisted of all patients booked for elective or emergency surgery in the time period under study, patients with complete medical records, those properly documented in theatre records as well as patients whose procedures were done under general or regional anaesthesia. Exclusion criteria included patients with incomplete data in theatre records and those whose procedures were cancelled before the day of surgery. Three hundred and sixty-two patient records were retrieved but only three hundred and thirty-four were entered in the study because twenty-eight were excluded due to incomplete data.

Data management: Information was obtained from theatre records where cancelled cases were identified. Medical records of identified patients with cancelled cases were retrieved. Using a structured proforma, information obtained included age, sex, diagnosis, surgical specialty involved, type of procedure and American Society of Anesthesiologists (ASA) grade. Reasons for cancellation of the procedure were stratified into hospital, patient, anaesthetist and surgeon-related reasons. Other variables recorded were previous cancellation, subsequent rebooking of

surgery, timing of rescheduled surgery and ultimate patient outcome. One of the cases was cancelled after review by a consultant resulting in a diagnosis that did not require surgery.

Retrieved data was entered into Microsoft Excel and exported to IBM Statistical Packagefor Social Sciences (SPSS) version 21(IBM, New York, United States of America) for statistical analysis including percentages, mean, median, mode and tests of significance.

Ethical approval was obtained from the hospital's Research Ethics Committee.

RESULTS

Cancelled elective cases accounted for 23% of the total number of cases done in the time period while cancelled emergency cases accounted for 29.3% (Table 1). The average case cancellation rate was 26.2%.

The highest number of cancelled cases was in the specialty of Paediatric Surgery with 43 cases (52.4%), followed by General Surgery with 21cases (25.6%) (Table 2).

Majority of the patients were under the age of 16 years (52.4%) while 24.4% were aged between 26 and 35 years. Male patients had a slight preponderance at 50.8% of cases. Mean age of the population ± SD was 21.58 years ± 20.31 while the median age was 10.0 years. The minimum age was 0.01 year while the maximum age was 63.0 years.

ASA I cases made up 60.7% of cancelled cases while ASA II accounted for 23.0%. There was a significant association between ASA classification and outcome ($p<0.05$), with outcome worsening as ASA grade worsened. Elective surgical procedures accounted for 70.7% of cases cancelled while emergency procedures made up 29.3% of cases. There was a significant association between the class of surgery (elective or emergency) and outcomes with emergency cases faring worse ($p<0.05$). It was also observed that 75% of cancelled cases had prolonged stay in hospital.

Patient related factors such as unfitness for surgery and financial constraints accounted for 50% of cancelled cases while hospital related factors such as power outage, oxygen shortage and lack of hospital consumables made up 28% of cancelled cases. Anaesthetist related factors such as failed intubation were responsible for 18.3% of cancelled cases.

Table 1: Analysis of monthly case cancellation rates

Month	Number of Elective cases	Number of emergency cases	Number of cancelled elective cases (%) n=58	Number of cancelled emergency cases (%) n=24	Total number of cancelled cases (%) n=82	Total number of cases
November 2021	48	11	09 (15.5)	07 (29.2)	16 (19.5)	59
December 2021	38	15	13 (22.4)	03 (12.5)	16 (19.5)	53
January 2022	35	08	16 (27.6)	02 (8.30)	18 (22.0)	43
February 2022	34	13	08 (13.8)	03 (12.5)	11 (13.4)	47
March 2022	49	14	07 (12.1)	05 (20.8)	12 (14.6)	63
April 2022	48	21	05 (8.20)	04 (16.7)	09 (11.0)	69
Total	**252**	**82**	**58**	**24**	**82**	**334**

Table 2: Distribution of cancelled cases by Specialty

Specialty	Frequency	Percentage
Paediatric Surgery	43	52.4
General surgery	21	25.6
Orthopaedics	09	11.0
Gynaecology	08	9.80
Burns and Plastic	01	1.22

Table 3: Demographic characteristics of patients

Variables (N = 82)	Frequency	Percentage
Age (years)		
<16	43	52.4
16-25	05	6.10
26-35	20	24.4
36-45	04	4.90
46-55	08	9.75
56-65	02	2.43
66-75	0	0.00
Sex		
Female	40	49.2
Male	42	50.8

Table 4: Patient associated variables

Variables	Frequency	Percentage
ASA classification		
ASA I	50	**60.7**
ASA II	19	**23.0**
ASA III	5	**6.6**
ASA IV	7	**8.2**
ASA V	1	**1.6**
Class of surgery		
Elective	58	**70.7**
Emergency	24	**29.3**
Previously cancelled surgery		
Yes	16	**19.5**
No	66	**80.5**
Rebooked after cancellation	64	**78**
Timing of rebook of surgery		
<1 week	17	**25.0**
1 – 2 weeks	26	**41.7**
>2 weeks	21	**33.3**
Outcome		
Surgery rescheduled and done	56	**68.3**
Surgery cancelled again	11	**13.4**
Surgery never rescheduled	18	**22.0**
Uneventful hospital stay	11**(19.6%)**	**13.4**
Prolonged hospital stay	42**(75.0%)**	**51.2**
Death on table	03**(5.40%)**	**3.70**

Table 5: Factors associated with cancellation of cases

Reasons for Cancellation	Frequency		Percentage
Patient-Related Factors		**Percentage of the subtotal**	
Financial constraints	10	**24.4**	12.2
Patient unfit for surgery	19	**46.3**	23.2
Patient unavailable	07	**17.1**	8.53
Surgical consent withdrawn	04	**9.8**	4.87
No further need for surgery	01	**2.44**	1.21
Subtotal	**41**		**50.01 %**
Hospital Related Factors			
Power outage	06	**26.1**	7.31
Oxygen shortage	03	**13.0**	3.65
Lack of theatre consumables	11	**47.8**	13.4
Non-availability of support staff	03	**13.0**	3.65
Subtotal	**23**		**28.01 %**
Anaesthetist Related Factors			
Failed Intubation/Anaesthesia	10	**66.7**	12.2
No venous access	04	**26.7**	4.90
Anaesthetist unavailable	01	**6.67**	1.21
Subtotal	**15**		**18.3%**
Surgeon Related Factors.			
Surgeon unavailable	01	**33.3**	1.21
Diagnosis changed	02	**66.7**	2.43
Subtotal	**03**		**3.64%**
Total	**82**		**100**

DISCUSSION

The average cancellation rate in our study was 26.2% which is comparable to the figure of 23.2% reported in Ilorin by Kolawole et al [6] but not as high as the rate of 48.5% reported by Gajida et al in Kano [7] and 44.2% by Prin et al in Malawi. [8] It was however more than the figure of 16.4% reported by Shivakumar et al. [9] The cancellation rate of 7.5% reported by Gonzalez-Arevalo et al [10] was even lower. Varying cancellation rates have also been reported by other workers. [11-23] This disparity is reflected in the meta-analysis conducted by Abate et al which showed that cancellation rates were highest in the African sub-region and lowest in Europe and North America. [5] This disparity mirrors the economic divide between the nations of the northern and southern hemispheres.[24]

Paediatric Surgery had the highest case cancellation rate at 52.4% in our study. This contrasts with the studies of Chalya et al [10] which showed General Surgery to have the highest cancellation rate of 31%. Gajida et al [7] showed Obstetrics and Gynaecology to have the highest cancellation rate of 27.8%. The reasons for these differences are unclear. Seventy-five percent of cancelled cases had a prolonged stay in hospital after procedures were eventually carried out. This is not surprising given the fact that cancellation probably allowed the underlying illness to deteriorate.

Most causes of cancellation in our study were patient-related (50%) with unfitness for surgery accounting for 46%. This is in partial synchrony with the studies of Okeke et al[12] in Abakaliki where patient-related factors accounted for 47.5% of cancellations. Their study however had financial

constraints as the major patient-related reason for case cancellation. [12]

Limitations
The study was retrospective and the relatively small sample size was influenced by reduced hospital attendance in the immediate post-COVID period. Prospective studies with a larger cohort are planned in the future.

CONCLUSION

Cancellation of surgical cases remains one of the greatest challenges facing a hospital surgical service. Patient related factors have been identified as the most significant cause of surgical case cancellation in this study. Pre-operative screening programmes which identify and optimise unfit patients should be developed. Financial constraints can also be addressed through health insurance schemes such as the National Health Insurance Scheme (NHIS) and the Bayelsa Health Insurance Scheme (BHIS). Hospitals should improve inventory management to ensure availability of consumables while also investing in infrastructure to prevent power outages and oxygen shortages. Further studies with randomized controls are planned to throw more light on these findings.

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Conflicts of interest
The authors declare that they have no conflicting interests.

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