

Provision of A New Management Plan for Reducing Cancellation of Elective Surgery at Ghamra Military Hospital

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Original Article

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ABSTRACT

Background:

The cancellation of elective surgical procedures poses a significant challenge within healthcare facilities, leading to increased burdens on hospitals and distress for patient their families. Aim: To improve services, enhance quality of care, and improve of operating room management by assessing and implementing a new policy to reduce cancellation rates

Patients and methods:

This intervention study employed a pretest-posttest design and was conducted on all canceled cases in four departments: General Surgery, Gynecology, ENT, and Pediatric Surgery. Additionally, a questionnaire was distributed to physicians and nurses to identify the causes of cancellations, while satisfaction questionnaire was administered to 84 patients. The study placed at Ghamra Hospital for 12 months.

Results:

The causes of cancellation related to operation were frequented "often or sometimes" by 50% due to patients did not show up, 65% due to refusal to sign the consent, 57.5% due to the patients uncompliant to preoperative preparations, 50% due to uncontrolled hypertension or blood glucose level, 65% due to no available blood group, 60% due to lack of resources and drugs, 77.5% due to lengthy of different operation, 70% due to emergency operations, 67.5% due to operation theatre unavailability, 72.5% due to missing of members of team work, 62.5% due to failure of electricity or equipment's or gas station.

Conclusion:

The overall cancellation rate was found to be 9.74%, exceeding the standard benchmark of less than 5%. Among the various departments, pediatric surgery and ENT departments exhibited the highest cancellation rates, primarily due to upper respiratory tract infections and overloaded schedules..

Key Words: Cancellation, elective surgery, quality of care.

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INTRODUCTION

The cancellation of elective surgical procedures poses a significant challenge within healthcare facilities, leading to increased burdens on hospitals and distress for patients and their families. Such cancellations can result in prolonged hospital stays, heightened expenses, and wasted resources,

while also serving as a critical indicator of operating room management quality^[1]

Defined as cases that were scheduled but not performed on the designated day, elective surgical cancellations occur at varying rates globally, estimated between 9% and 44%. This wide disparity highlights the complexity of the issue,

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which is not merely administrative but also impacts the emotional and financial well-being of patients, who may experience increased anxiety (42.1%) and depressive symptoms (26.3%) due to delays in their care [2].

Elective surgery cancellations disrupt the delicate balance of hospital operations, leading to inefficiencies, financial losses, and diminished quality of care. A benchmark cancellation rate of less than 5% exists; however, many hospitals fall short of this standard [3]. In a northern Norwegian university hospital, for instance, ineffective pre-operative planning emerged as a primary contributor to these cancellations, suggesting that improved communication and coordination could mitigate this issue[4].

In addressing the causes of surgical cancellations, both avoidable and unavoidable factors must be considered. Scheduling errors, equipment shortages, and inadequate preoperative evaluations often contribute to preventable cancellations, while emergencies and unexpected changes in a patient's condition can lead to unavoidable ones [5].

The critical role of operating rooms in hospitals is highlighted by their dual significance as essential resources and substantial revenue generators, accounting for over 40% of hospital revenue [6].

The overall cancellation rates vary significantly across different studies and institutions. Research shows cancellation rates can range from less than 1% in some countries to upwards of 17% in others [7].

In developed countries, cancellation rates typically hover between 2% to 12%, whereas developing countries can see rates as high as 44%. For example: A study in Egypt reported a cancellation rate of 21.7%, primarily due to standby operations [8].

The aim of this study was to improve services, enhance the quality of care, and improve of operating room management by assessing and implementing a new policy to reduce cancellation rates at Ghamra Military Hospital.

PATIENTS AND METHODS

This intervention study was pretest – posttest design was conducted on all cancelled cases in four departments: General surgery, gynecology (Gyna), ear nose and throat (ENT) surgery and pediatric surgery. Additionally, a questionnaire was distributed to physicians and nurses to identify the causes of cancellations, while another questionnaire was administered to a convenience sample of 84 patients.

Sample size:

The sample size was calculated using the following formula:

$$n = \left[\frac{Z_{\alpha/2}}{E} \right]^2 * P(1 - P)$$

Where: n = sample size

$Z_{\alpha/2} = 1.96$ (The critical value that divides the central 95% of the Z distribution from the 5% in the tail), $E =$ Margin of error/Width of confidence interval = 10%, $P =$ Prevalence/proportion in the study group = 31.6% (9)

So, by calculation, the sample size is equal to 84 patients.

Inclusion Criteria:

All military patients attending as inpatients for elective surgery of any age admitted in surgery departments (Gyna & obstetric, Surgery, Pediatric surgery and ENT), scheduled for elective surgeries including laparoscopic surgeries, who arrive or are brought to operation theatre for surgeries as elective cases, Leader of the hospital and all HCW (physicians, nurses) dealing with the process of surgical operations and Patients who cancelled their elective operations.

Exclusion Criteria: All males above 14 years because the hospital provides the services to the females and children, Day case surgeries as cases of ophthalmology departments, minor operations with local anesthesia and emergency surgeries.

Intervention:

The core of the intervention was to design a suitable quality management plan for the intervention procedures, started by situation analysis and implemented the designed plan correctly for both the customer and the system.

Structuring a suitable quality plan phase

For the inpatient attending to elective surgery after discussion with the hospital commander and leaderships and having opinion of HCW and some patients.

Administrative process

Started by choosing patients from an elective surgery list for admission, admissions/booking office staff must treat all patients in accordance with the clinical urgency categories and in the order as they are added to the elective surgery list. The administrative employee check all papers of the patient, and assist the nurse staff and the doctors to facilitate the all process from the patient was notified he had elective operation till the last step and admitted to make the operation. If any problem with the patient, he can send the problem in what's app phone number of complaint of the hospital.

Admission assessment of the patient

All recommendation for admission (RFA) forms must be reviewed for the need for a pre-admission clinic appointment to confirm the patient's suitability and safety to undergo the intended surgery.

To facilitate pre-operative assessments and reduce

obstacles to cancellation, we introduced a new pre-operative record that accompanies each patient. This record is designed to streamline the assessment process before admission. This optimizes and supports management of the patient's perioperative risks associated with their planned surgery.

Intraoperative follow up

The majority of the surgeons related cancellations in this study were because of overbooking/ 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. A communication tool (WhatsApp) was created for teamwork within each department. Theatre lists should be made manageable and realistic. So we design more detailed operation list the type of operation (major-moderate-mild) for every operation must be written item for estimated time and so all list time must be not exceeding 6 hours (the work hour daily from 9 am to 3pm).

Therefore, a well-defined Operation Room (OR) actual usage hours of each day. By definition of OR utilization, we only considered a theatre list matching the OR hours within these regular hours. Over-utilized OR time was excluded.

The reason that we use data collection sheet is to identify outliers in turnovers. Delays such as equipment unavailability, pre-op not ready would add extra-long time between cases; thus, for case turnovers that are longer than the average plus 15 minutes, we referred to the turnover data collection sheet and excluded the delays from turnovers.

However, OR teams acted differently in the data collection efforts. Some teams were relatively more prone to providing good-quality data. Thus, it was not possible to accurately estimate the exact turnover delay times for each case. We decided to use the average of turnover times for each specialty to roughly get the turnover times for each day. Using the average turnover time to conduct the analysis. 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 anaesthesia, preparation and cleaning operation theatres, and delayed transportation of patients to the operation theatre. Similar findings were also reported by other studies. 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. A good administrator can improve scheduling, reduce time spent preparing and cleaning and better handle resources. The most common causes of cancellations of elective surgery. Lack of theatre space and facilities have had also been reported by others. 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. We increase the number of nurses to 3 nurse for every theatre to be help in prepare the instruments in the next operation to decrease the time between the 2 successive operations especially in laparoscopic operations. We solve the problem of lack of equipment as example on General surgery the hospital provided a set of new laparoscopic instruments to be can make 3or 4 cholecystectomy in the same day

Satisfaction questionnaire

Patient satisfaction questionnaire was adopted from Internal Wound Journal. May, 2023 ^[10] This satisfaction questionnaire developed by the researcher from many sources as WHO and other questionnaires previously tested for reliability.

RESULTS

Table (1): Patient experience with cancellation

Variable	Frequency
Who informed you about operation cancellation	
• Specialist doctor	36(42.9)
• Nurse	1(1.2)
• A team of doctors	47(56.0)
Patient perception of explanation of cancellation	
• Clear and convincing	65(77.3)
• Not sufficient	15(17.9)
• Not informed about delay cause	4(4.8)
Informed about new time	
• Short time	18(21.4)
• Reasonable time	31(36.9)
• Long time	11(13.1)
• Call you back (nonspecific time)	24(28.6)
Patient response to cancellation	
• Confused	16(19.0)
• Disappointed	36(42.9)
• Understood	32(38.1)

All the patients (100%) said that the hospitalization's instructions and Operation procedures were explained

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clearly, 94% of patients were informed by the doctors about these instructions compared to only 6% by the nurses, 86.9% said that the procedures of admission to the hospital were easy but 13.1% found some difficulties in the procedures. As regards the explanation given for the cancellation, the majority of the patients 77.3% perceived it clear and convincing. On the other hand, 17.9% reported that the explanation was insufficient. The remaining minority of 4.8% were not given explanation. Otherwise

36.9% received new appointment within reasonable time and 21.4% received in short time, 13.1% they received the new appointment in long time and 28.6% they did not receive appointment because the doctors need to repeat assessment after the cause of cancellation treated, lastly 42.9% of the patients were disappointed and 19% were confused but 38.1% accepted and understood the events of cancellation. (Table 1).

Table (2): Teamwork experience with cancellation

Variable				Frequency
Administrative /admission procedures	➤	Cause of cancellation no administrative paper fulfillment	• sometimes	24 (60%)
			• rarely	16 (40%)
	➤	Fail in reservation operation due to unclear steps	• sometimes	22 (55%)
			• rarely	18 (45%)
Patient related	➤	Overcrowded operation schedule	• sometimes	24 (60%)
			• rarely	16(40%)
	➤	Patient didn't show up	• Sometimes	20(50%)
			• rarely	20(50%)
	➤	Refuse to sign consent	• sometimes	26 (65%)
			• rarely	14(35.0%)
	➤	Failure to comply to preoperative preparations	• Sometimes	23 (57.5%)
			• rarely	17(42.5%)
	➤	Patient broke fasting	• Sometimes	21(52.5%)
			• rarely	19 47.5%)
	➤	Uncontrolled hypertension/uncontrolled blood glucose	• sometimes	17(50.0)
			• rarely	20(50.0%)
	➤	No available bed	• sometimes	27 67.5
			• rarely	13 (32.5)
	➤	Blood group not available	• Sometimes	26(65%)
			• rarely	14 (35%)
	➤	Lack of drugs	• Sometimes	24 (60%)
			• rarely	16 (40%)
	➤	Prolonged time of a different operation	• sometimes	31 (77.5%)
			• rarely	9 (22.5%)
➤	Emergency operation	• Sometimes	28 (70%)	
		• rarely	12(30%)	
➤	Non availability of operation theatre	• Sometimes	27 (67.5%)	
		• rarely	13 (32.5%)	
➤	Missing surgery team member	• sometimes	29 (72.5%)	
		• rarely	11 (27.5%)	
➤	Electricity problems/equipment failure/gas station failure	• Sometimes	25 (62.5%)	
		• rarely	15 (37%)	
Medical decisions	➤	Change treatment plan	• Sometimes	23 (57.5)
			• rarely	17 (42.5%)
	➤	Deterioration in patient condition	• Sometimes	18 (45.0%)
			• rarely	22 (55.0%)
	➤	Acute medical event	• sometimes	22 (55.0%)
			• rarely	18 (45.0%)

The study shows the expectation from their experience of doctors and nurses and quality department that 60 % of them said “sometimes” there was a defect in administrative paper fulfilment which was the cause of cancellation but 40 % said that this was rarely the reason. 55 % said that “sometimes” the steps for reservation of the operation were unclear, on the contrary 45% mentioned it as “rarely” happening. On the other side, the overcrowded operation schedule was defined to be the cause of cancellation in the opinion of 60%. The causes related to operation were frequented “often or sometimes” by 50% due to patients did not show up, 65% due to refusal to sign the consent, 57.5% due to the patients did not comply to preoperative preparations, 50% due to uncontrolled hypertension or blood glucose level, 67.5% due to no available bed, 65% due to no available blood group especially negative blood group, 60% due to lack of resources and drugs, 77.5% due to lengthy of different operation, 70% due to emergency operations, 67.5% due to operation theatre unavailability, 72.5% due to missing of members of team work (surgeon, anaesthetist or operating nurse), 62.5% due to failure of electricity or equipment's or gas station. The causes related to medical condition “often or sometimes” by ratio 57.5%, 45%, 55%, due to medical decisions, deterioration in patient condition, acute medical event respectively (Table 2).

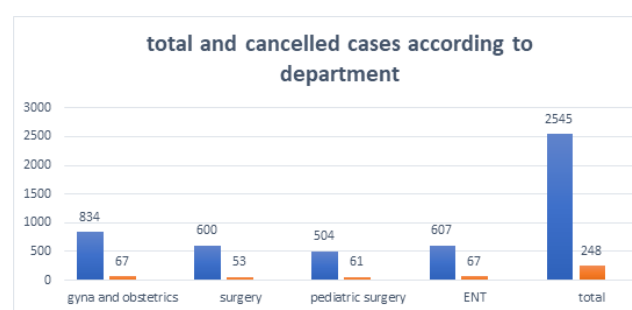
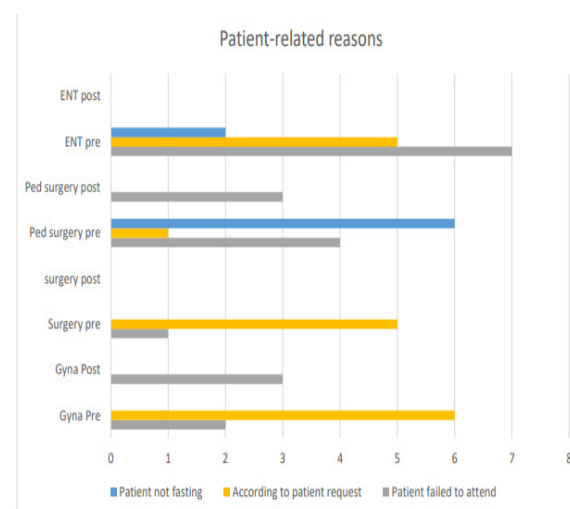


Table (3): Administrative-related reasons at Ghamra hospital pre and post intervention

	Causes	Gyna* pre	Gyna post	Surgery pre	surgery post	Ped *surgery pre	Ped surgery post	ENT* pre	ENT post	Total	Total
Administrative-related reasons	Overloaded schedule	13	-	9	6	7	3	3	-	32	9
	Emergency cases	6	2	8	6	3	3	-	2	17	13
	Lack of staff and equipment and resources	6	-	4	2	-	2	2	2	12	6
	No blood available	7	1	2	2	-	-	-	-	9	3

Graph 1: Total cases and Cancellation post intervention by month in different departments

The highest number of cancelled operations was in the Pediatric surgery, ENT departments respectively 61 cases (12.10%) 67 cases (11.04%), Gyna & obstetric and surgery were the least cancellation rate 67 cases (8.03%) 53 cases (8.83%) respectively (Graph 1).



Graph 2: patient related reasons in all departments pre and post intervention

Graph (2) show the patient-related reasons pre and post intervention Which the result shows good results especially in patient breaking fasting this is nearly avoided in all departments, for patient refused the operation also avoided in all departments, for patient failed to attend more or less results the same in Gyna & obstetric and pediatric surgery but avoided in other departments.

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Table (3) shown that Overloaded Schedule Pre-intervention (Gynaecology (Gyna), Surgery, Pediatric(ped.) Surgery, ENT) (13,9,7,3) Post-intervention (0, 6, 3,0). There was a notable decrease in delays due to overloaded schedules in Gyna (from 13 to 0). However, other departments saw mixed results, with surgery seeing a slight increase in delays post-intervention, indicating that while some scheduling issues were resolved, others might have been exacerbated or new issues emerged. Emergency Cases Pre-intervention (Gyna, Surgery, Ped Surgery, ENT) (6, 8,3,0) Post-intervention (2,6,3,2) There was a reduction in delays for Gyna and ENT post-intervention, suggesting improved emergency case management. However, surgery remained unchanged, indicating that this area may require further assessment and optimization.

Table (4) Impact of intervention on cancellation rates

Department	Pre		Post		P value
	Cancelled	Not	Cancelled	Not	
Gynecology	67(8%)	767(92%)	25(3%)	851(97%)	<0.001**
Surgery	53 (8.8%)	547(91.2%)	28 (4.6%)	572(95.4%)	<0.001**
Pediatric	61(12.1%)	443 (87.9%)	41(9.34%)	398 (90.6%)	0.002**
ENT	67 (9.05%)	540 (88.9%)	46 (7.87%)	538(92.13%)	0.000**

There were statistical significant differences between pre and post intervention according to Gyna, Surgery, Pediatric and ENT department (Table 4)

DISCUSSION

By comparing the findings of this research with studies conducted in Egypt, Ethiopia, India, South Africa and Turkey, we present a nuanced perspective on the factors contributing to surgery cancellations and the varying effectiveness of interventions across different healthcare systems. The magnitude of elective surgical case cancellation in this study was 9.74% Pre intervention which is in line with studies conducted in Egypt the prevalence of same day elective surgical cancellation was 12.59% in El Demerdash hospital by Youssef, Tarek ^[11]

We observed that the majority of patients reported clear and convincing explanations regarding their surgery cancellations. Notably, 77.3% of patients found the explanations satisfactory. However, 42.9% expressed disappointment at the cancellations, highlighting the emotional impact of these decisions. This underlines the importance of effective communication in mitigating patient dissatisfaction. A more proactive communication strategy involving both physicians and nursing staff may help further improve patient perceptions and experiences.

The demographic analysis indicated that children aged 0-15 years experienced the highest cancellation rates (35%), which may necessitate targeted strategies to better manage elective procedures in pediatric populations.

which nearly compatible as in the study of el Demerdash for seniors(the same ratio)as it seniors ≥ 65 years old show the highest cancellation rates (22.4%) but children ≤ 14 years (14%) which different from this study due to studies on 2 departments the almost all the patients are children (Pediatric surgery, ENT), although El Demardash has Most of cancelled cases fall within age group 55-60 followed by 65-70, 40-45, and 0-5 while cases aged between 80-85 were the least frequent among cancelled cases ^[11].

We classified the causes of cancellation to three parts, patient-related (15.7%), administrative-related (28.2%), and medical-related (56.1%) categories provide valuable insights. The predominance of medical-related reasons mirrors findings in other studies, such as those by Boudreau et al ^[12] which highlighted clinical examination inefficiencies as a significant cause for cancellations.

In this study, patient-related factors accounted for 21.4% of cancellations pre-intervention, which decreased to 13.1% post-intervention. This reduction is consistent with findings from Ethiopia, where patient-related cancellations constituted 16.5% of cases. Both studies highlight the importance of patient education and adherence to preoperative instructions.

In contrast, a study from North-East India reported a higher rate of patient-related cancellations at 27.1%. This discrepancy may be attributed to systemic challenges in scheduling and patient preparation within resource-limited healthcare systems, underscoring the need for tailored interventions in such contexts ^[13].

The reduction of patient-related cancellations in studies from Turkey, where 59.7% of cancellations were deemed avoidable, suggests that effective communication strategies can significantly improve patient compliance. This aligns with the findings from this study, emphasizing the role of patient management by Kaddoum , et al ^[14].

In your study, a total of 5044 operations were scheduled across various departments, leading to a cancellation rate of approximately (7.69 %) in elective surgeries. This aligns with previous research, such as the studies conducted at Tikur Anbessa Specialized Hospital (33.9%) and Asella Teaching and Referral Hospital (32.2%) in Ethiopia, indicating a concerning trend of cancellations in surgical departments.

The distribution of cancellations was notably higher in Pediatric Surgery and ENT departments, reflecting trends observed in other studies where these specialties consistently report higher cancellation rates. For instance, your results indicated 61 cases (12.10%) in Pediatric Surgery and 67 cases (11.04%) in ENT, reinforcing findings from Appavu et al., ^[15] who reported similar trends in cancellation rates across specialties.

Limitations and Strengths

It is a single center study and so may not be applicable to other institutions. The study was on female and children only because the hospital provides services according to military therapeutic maps. The study was for 9 months' post intervention which was relatively not enough time to judgement. We did not study the loss of OT time due to delay in transport of patients from the ward to the OT and from recovery room to the ward. This factor definitely contributed to shortage of time.

Strengths:

This was the first study of its kind in the hospital, and we compared and assessed the burden of elective surgical case cancellation using international benchmarks. The study sheds light on how patients and health providers contribute to the cancellation of elective surgical procedures in our center.

CONCLUSION

The overall cancellation rate was found to be 9.74%, exceeding the standard benchmark of less than 5%. Among the various departments, the pediatric surgery and ENT departments exhibited the highest cancellation rates, primarily due to upper respiratory tract infections and overloaded schedules. Post-intervention analysis showed a notable reduction in cancellations, particularly in the gynecology and obstetrics department, where cancellation cases decreased from 67 to 25, with a significant p-value of 0.001. The study identified key reasons for cancellations—administrative-related issues, medical-related reasons, and patient-related causes—allowing for targeted interventions.

List of Abbreviations

- ENT : Ear, Nose, Throat surgery
- Gyna : Gynecological
- HCW : Health care worker
- RFA : Recommendation for Admission

DECLARATIONS

- **Ethics approval and consent to participate:** An ethical approval was obtained from the scientific research ethical committee at Military Medical Academy, the institution review board of the military medical academy (IRB-MMA) approval number is 39-2023.

- **Consent for publication:** A consent of participation was signed by all adult candidates and by the legal guardian of children after being fully informed about the study

- **Availability of data and material :** Data and material available when requested

- **Competing interests:** There are no conflicts of interest

- **Funding:** All of the possible expenses are to be provided by the researcher himself

- **Authors' contributions:** All author's declares and reviewing knowledge

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