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An Observational Study on the Loss of Economy Due to Surgery Cancellation in A Tertiary Care Hospital, Kashmir India and Suggestions for Improvement

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Abstract
The present study was conducted to identify and estimate cost borne by cancellation of elective surgeries in a tertiary care hospital in Kashmir India .The data of scheduled elective surgeries was collected. Inpatient medical records were reviewed for elective surgeries in 6 months starting from October 2023 to march 2024. During the course of study 3000 cases were scheduled to undergo impatient elective surgical procedures. Out of these 149 were cancelled. Among the cancelled cases 105 were cancelled during the preparation in the surgery wards and 44 were cancelled in operation room. The total cost of surgery cancellation was 58050 US$. Out of this 27804 US$. (48%) was related to bed expenses, 90685 US$. (17%) was related to physician visits and 203175 US$. (35%) for direct cost related resources and supplies

Keywords: Surgery cancellations, Cost of cancellation, loss of economy.

1. Introduction

The operation theatre is a high cost department within the hospitals. Considerable resources are wasted if OT is not utilized effectively. In any hospital, the OT is said to be the primary source of revenue generation with around 50-60% of revenue earned by this department. It is therefore desirable to optimize the efficiency of this asset. Cancellation of surgeries on the day of surgery (DOS) is the major cause of inefficient use of operating room time and drain on finite healthcare resources [1].An elective surgical procedure is said to be cancelled if the patients name has appeared on the list for surgery but the surgery was not done on the scheduled date [2]. DOS cancellation is a recognized quality problem reflecting in efficiency in management [3, 4]. The higher cancellation rates indicate that the health resources are not being used effectively, thereby increasing the cost [5]. It increases healthcare costs and also creates significant inconvenience among patients and families [6]. Cancellations of scheduled operations would thus reduce the income of hospital and is therefore costly to patients in terms of lost working days and disruption of daily life [7]. Waste disposable equipment opened for cases that are

never performed, expend resources in the form of salaries and benefits for workers who remained idle and wasted investigation and blood cross matching [8,9].

In Kashmir several studies were done to investigate the reasons for cancelling scheduled surgeries but no study analyzed the theme from the economic-financial aspect in terms of direct cost (human recourses, medication and material). Therefore a need is felt to go for a study that will help to identify and estimate cost borne by cancellation of elective surgeries. The present study was conducted at Noora Hospital Kashmir India, which is 150 bedded super specialty hospital having 5 operating rooms run by cooperate sector in order to provide cost information that can support management and leadership in decision making process based on quality and efficiency.

2. Methodology

An observational study was conducted by the Department of operation theatre and anesthesia technology Sunrise university Rajesthan in collaboration with Directorate of health services Kashmir province India. The study was carried out at Noora Hospital having 5 operating rooms performing different surgical procedures. The data was collected from October 2023 to march 2024 on a specially designed case Performa. Inpatient medical records were reviewed retrospectively for all patients scheduled for elective surgeries in a period of 6 months. The study population was patients who were scheduled to undergo elective surgeries. Patients undergoing outpatient surgery and emergency surgical procedures were excluded from the study.

A check list was prepared including patients demographic data (like gender, age, etc), circumstances in which surgeries were cancelled (before and after the preparation of operation room and during surgical procedures), hospitalization unit, surgery date and reason for cancelling, medication, materials, bed and recourses fees and researchers filled it up after reviewing of patient medical document of those with record of cancellation code. The cases were mixed of general surgery, orthopedic, gynecologic, urology, ENT, neurosurgical and cardiac surgical cases. The hospital uses a “fixed our system” for operation room allocation. The operation list for elective procedures is prepared and sent to the theatre by proceeding night. All patients thus listed are evaluated by the consultant anesthetists and potentially difficult cases were meant for consulting with the specialist in the relevant field. When the cancellation occurred, the nurses report the reason of cancellation in the nursing report sheet of patient document. The cost was calculated from hospital bill. The cancelation reasons were then entered into the data base and statistical analysis was performed by using SPSS-16. The study was approved by intuitional ethics committee

3. Result

A total of 3000 cases were scheduled to undergo inpatient elective surgical procedures in 6 months from October 2023 to march 2024. Out of these 149 cases were cancelled, 84 (56%) of them were male patients and 65 (44%) were female patients. Average age of patients was 52.46 $\pm$ 25.3 years (ranging from 1 to 95 years old). The average length of stay was 36 hours for cancelled cases. Among the cancelled cases 115 were cancelled during the preparation in the surgery ward and 34 cases were cancelled in operation room. The cancellation rate was found to be 4.9%. From these, 40(29.9%) were general surgery cases, 35 (27.7%) were orthopedic cases, 20(9.3%) were gynecological cases, 10(3.7 %) were ENT cases and other as shown in Table 1

Table 1: Number of surgeries cancelled

Specialty	No of Scheduled surgeries	No of surgeries cancelled %ge
General surgery	800	40 (29.9%)
Orthopedic	600	35(24.7%)
Gynecology	550	20(9.3%)
ENT	300	10(3.7%)
Urology	300	20(13.4%)
Ophthalmology	250	15 (10.0%)
Nero surgery	100	5(3.3%)
Cardiac surgery	100	4(2.7%)
Total	3000	149(100%)

The cause of cancellation was divided into avoidable and unavoidable reasons as shown in table 2. Unrecorded factors were defined as those factors whose reason for cancellation was not recorded in the medical department

Table 2: Reason for surgery cancelation

Avoidable	Unavoidable
Patient medical condition	Equipment broken or not available
Lab test result not available	No intensive care unit beds
Medical evaluation incomplete pre – operation	Operation room condition
Patient refused or gave no consent	Surgeon condition
Pre operative instructions not followed or patient not instructed adequately	Change in treatment plan

The total cost for all surgery cancellation was 58050 US$. Out of this 27864 US$. (48%) was related to bed expenses which were about 187.0 US$. Per patient, 9068.5 US$. (17%) was related to physician visit which was about 66.2 per patient. The cost related to recourses and supplies (Medication, consumption and reprocessed material) was about 203175 US$.(35%) which was about136.3 US$ per patient. Average cost for surgery cancelation was thus 389 US$ per patient. The cancellation cost by specialty in US$. is shown in table 3

Table 3: Cancellation cost by specialty in US$.

Specialty	No of surgeries canceled	Cost of cancellation per case	Total cost	Percentage of total cancellation cost
General surgery	40	435	17400	29.9
Orthopedic	35	410	14350	24.7
Gynecology	20	270	5400	9.3
ENT	10	220	2200	3.7
Urology	20	430	8600	14.8
Ophthalmology	15	300	4500	7.7
Nero surgery	5	600	3000	5.1

Cardiac surgery	4	650	2600	4.4
Total	149		58050	100

Out of 149 cancelled cases 95 cases (63.7%) were judged avoidable and cost for them was 36955.0 US$. In 20 cases the cancelation reason was not recorded. 34 cases (22.8 %) were judged unavoidable and cost for them was 13226 US$. Of the avoidable cause of surgery cancellations, patient medical condition was the highest percentage (41%) while as among unavoidable cases the highest percentage of cancellation cost was change in treatment as shown in table 4

Table 4: Cost of DOS cancellation according to the reason of cancellation

Avoidable	**Proportion of total cost (%age)**	**Unavoidable**	**Proportion of total cost(%age)**
Patient medical condition	41.0	Equipment broken or not available	3.6
Lab test result not available	0.6	No intensive care unit beds	0.7
Medical evaluation incomplete pre – operation	1.5	Operation room condition	0.8
Patient refused or gave no consent	19.7	Surgeon condition	4.5
Pre operative instructions not followed or patient not instructed adequately	0.5	Change in treatment plan	13.7
Total Avoidable	63.3	Total unavoidable	23.3
Not recorded reason	13.4		

The study found that some surgeries cost more to cancel than the others. It is found that most cancellation cost is related to cardiac surgical procedures 650 US$ for a cancelled case and lowest cancellation cost is related to ENT procedures 220 US$ for a cancelled case.

4. Discussion

The cancellation of surgical procedure increases operational and financial costs, causing huge lose to the institution. Cost containment through effective and efficient utilization of recourses has become a necessary part of healthcare delivery worldwide. Efficient utilization of operating theatre space and time is one area, which has been shown to assist in cost containment. Surgery is one of the key functions in the hospitals that generate revenue and admissions to hospitals [10]. Cancellation of surgical cases is increasingly considered as an adverse event that requires routine monitoring because of its effects on utilization of health system recourses. It is a loss for the hospital, since the internal errors do not result in the procedures that will eventually generate revenues. The elective case cancellation rate on the day of surgery is an indicator of operating theatre efficiency. Cancelling a surgical case and performing it on another day increases cost to physicians, hospital, patients and society. The cost is related to management inefficiency, since income that would contribute to the result if the surgery has been performed was not generated.

The present study investigated surgery cancellations in a tertiary care hospital in Kashmir province, found that total cancellation rate was 4.9%. The total cost of surgery cancellation was 58050 US$ and

average cost of cancellation per patient was 389 US$. The highest cancellation cost was for cardiac surgery (650 US$ per cancelled case) followed by neurosurgery (600 US$ per cancelled case). The least cancellation cost was found among ENT surgery (220 US$ per cancelled case) followed by gynecology (270 US$ per cancelled case)

The cancellation reasons were divided into avoidable and unavoidable reasons. It is estimated that around 60% of elective procedure cancellations is potentially avoidable. In the present study we found that 63.7% of elective procedure cancellations are potentially avoidable which costs about 36955 US$ and was 63.3% of total cost of cancellation (41% because of patient medical condition and 19.7 % of cost because of patient refusal or gave no consent). These findings came up with concrete possibilities of reducing the level of surgical cancellations by using quality improvement and standard improvement techniques. The cost (58050 US$.) was considerably high in terms of the size of hospital. On interpreting these data to all hospitals belonging to the corporate sector in Kashmir which cover an estimation of 7000 surgery cases every year, almost 2000 cases from scheduled surgery cases are cancelled every year with an average cost of 389 US$. per cancelled case. Thus the corporate sector in Kashmir province India is losing around 778000 US$ every year due to cancelled cases which could be avoidable. The two cost containment reasons for cancellation were patient initiated which are cancellation reason related to patient medical condition and patient refusal to give consent. The cancellation reason related to patient medical condition (41% of total cost) could be reduced by medical evaluation before admitting to the hospital. It could be done one month before surgery as it was found in the study by Pollard and Olson in their study[8] (that the DOS cancellation rate for out patients was the same for the patients evaluated within 24 hours of surgery verses those evaluated 2-30 days in advance). The establishment of pre- anesthetic clinic for pre-anesthetic evaluation of the patients by the anesthetist has been proved to reduce DOS because of patient medical condition

The second cost containment reason for DOS cancellation was cancellation related to patient decision (19.7% of total cost) which was in line with the study done by schofield[11]. It is probably possible to avoid most of cancellations related to patient decision or not following the instruction (0.5% of cases) by patient education. When patients feel that they are more involved in their care and know what will happen next, their fear and doubt contributing to cancellations are likely to be reduced [12]. Changing the view of patient and including him in the whole planning process might be a way to reduce several of the reasons for cancellations especially those which are directly related to the patient or to a poor pre-operative investigation [13]. Cancellation because of change in treatment plan was considered as an unavoidable reason in present study and it accounts 13.7% of total cost of cancellation. Although it has already being suggested by Caesar etal[12], a careful examination and reviewing of medical and surgical evaluation the day before scheduled surgery, improved patient information and education, as well as the more careful establishment of the indications for surgery " might reduce the circumstances when surgery is no longer necessary". Among total DOS 13.4% cost containment reason of cancellation did not have recorded meaningful explanation. Without knowing the reason of DOS it would be difficult to manage the problem.

5. Conclusion

The study shows that cost of surgery cancellation was very high in NOORA Hospital. More than half of the cost (63.3%)of surgery cancellation was due to avoidable reasons. To avoid cancellations we recommend performing pre-operative visits with all patients. We also suggest that hospitals shall focus

on surgeries that result in highest losses such as cardiac- surgery and neurosurgery. We recommend that a well established department of pre admission clinic shall be functional in every hospital in Kashmir with regular employ like qualified nurses and experienced anesthetists, consultant surgeons, consultant physicians and ample number of technicians. They should be rotated in the department on monthly basis. they should communicate with the patients, assess them for the co-morbidities and try to alleviate their anxiety and it will also improve patient satisfaction. The hospital management must avoid at least avoidable costs. The hospital needs to improve the management and efficiency.

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