

**EXPLORATORY STUDY ON TRENDS AND
COMMENCEMENT STATUS OF SURGERY IN OT
OF MAX HOSPITAL, GURUGRAM.**

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfilment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

By

Shivani Shakti Rao

Under the guidance of
Prof. Vinod Kumar SV

2021

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(Max Hospital, Gurugram)

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **EXPLORATORY STUDY ON TRENDS AND COMMENCEMENT STATUS OF SURGERY IN OT OF MAX HOSPITAL, GURUGRAM** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

A handwritten signature in blue ink, reading "Shivani", with a horizontal line underneath the name.

Shivani Shakti Rao

Name of Student

Date: July 02, 2021.

Completion Certification

Date:-02 July 21

TO WHOMSOEVER IT MAY CONCERN

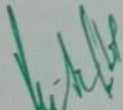
This is to certify that Dr. Shivani Shakti Rao has worked with Max Hospital, Gurgaon as Management Trainee – Operation Theater and Accident & Emergency w.e.f April 5th to July 2nd, 2021.

She is well versed in her capacity as Management Trainee in Operation Theater and Accident & Emergency.

During the period of her association with us, we found her a dedicated, loyal, sincere and hard working person.

We wish her all the best for the future.

Yours sincerely,



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Certificate from Faculty Guide and School Dean

CERTIFICATE

This is to certify that dissertation titled **EXPLORATORY STUDY ON TRENDS AND COMMENCEMENT STATUS OF SURGERY IN OT OF MAX HOSPITAL, GURUGRAM** is a record of the research work undertaken by **Shivani Shakti Rao** in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

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Abstract

Introduction

In the entire hospital, OT can be termed as most crucial and revenue affecting resources of hospital under the fact that maximum admissions in hospitals are done for surgical processes (1). Variations in normal OR processes can be delay in start time of surgery, early start time of surgery, cancellation or postponed or done on some another day. If not prevented, then these increases the overall cost incurred, increases the burden of work, unsatisfied patients leading to poor patient satisfaction score and hospital's standing is questioned. Improving OT efficiency will lead to many positive aspects which may include reducing overtime pay to staff, revenue increase, less waiting time for patient and improved patient satisfaction.

Methodology

All the patients who availed the treatment during the months of February and March 2021 are included. For February, 300 patient and for March, 399 patient was available. So, in total 699 patient's data for analysis was obtained. All the data collected; primary data via questionnaire and secondary data via HIS was analysed using Microsoft Excel.

Results

On analysis of all 699 cases only 5% of all cases happened on time whereas 50% of surgeries were delayed than the scheduled time, nearly 24% of surgeries started before to their planned time, 15% of surgeries were never happened, and 4% of the surgeries were done some other day. To know the reasons associated with delays of surgeries, survey by OT staff including anaesthetists was analysed; where 84% staff reported that delay in commencement of surgeries were commonly experienced by them in OR. According to them, major reason for delays were lack of effective communication (60%), Patients (50%) and surgeons (44%). For lack of Inter departmental communication, awaited clearance from clinical departments for the patient's fitness was the reason related to delay of surgery. 40% respondents said that patient's financial clearance delays the surgery and 28% responded that patients' late hospital admissions result in delay to the OR process.

Conclusion

Various trends of surgeries and reasons leading to the delay start of surgery in operation theatre are explored in this study. This study highlighted reasons for cancellations, unplanned surgeries-emergency surgeries, delay start of surgery and departments associated with beforementioned. It has been identified that majority of reasons causing delay can easily prevented. Having a team at every point related to OR process can be useful, which is multi-disciplinary and maintain effective communication among themselves to solve any issue arising at any point of time.

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Abbreviations

S.NO	Abbreviations	
1.	OR	Operating Room
2.	OT	Operation Theatre
3.	LOS	Length of stay
4.	HMIS	Hospital Management Information System
5.	CPRS	Computerized patient record system
6.	ID	Identity
7.	ORIF	Open reduction and internal fixation surgery
8.	TKR	Total knee replacement
9.	OPD	Out-patient department
10.	G.I.	Gastro-intestinal
11.	TPA	Third party assurance
12.	PAC	Pre- anaesthetist check-up
13.	AAGBI	Association of Anaesthetists of Great Britain and Ireland.
14.	NPO	Nothing by mouth

CHAPTER-1

INTRODUCTION

In the entire hospital, OT can be termed as most crucial and revenue affecting resources of hospital under the fact that maximum admissions in hospitals are done for surgical processes (1). It is said to be complicated area as it has to maintain the sterile environment for all surgical procedures to avoid nosocomial infection. OT is crucial as it epitomises heavy budget than any other department. Therefore, ruminated as vital organ of hospital which involves manpower and finances (2). Majorly the developed countries have alterations in OR process due to reasons which are not under control or can't be prevented as those setting are highly invested; unlike developing nations where OR variations can be solved and prevented(3) (4). Variations in normal OR processes can be delay in start time of surgery, early start time of surgery, cancellation of surgery or postponed or done on some another day. If not prevented, then these increases the overall cost incurred, increases the burden of work, unsatisfied patients leading to poor patient satisfaction score and hospital's standing is questioned. To increase the surgical turnover, decrease return to OT with infection; OT should be maintained and should be well managed (5). To measure the efficiency of OR, analysing the OT utilization is the best way. OR use increases the revenue generated by OR; thus the increase in OT utilization. OT utilization is the "proportion of hours the OT time used during elective resource hours and the total number of elective resource hours available" (6). On analysing the utilization rate, asepsis measures can be taken care with assigning planned time for emergency operations an helps in augmenting the decision making of the facility (7). It has been explained that "OR which are well utilized have accuracy in on time start of surgeries, effectiveness in case time, OR utilization, following proper quality measures & proper scheduling" (8). If the planned surgeries are cancelled, surgery not starting according to planned time, unplanned surgeries are more than planned surgeries; then these signs demarcate the inefficient OR utilization. Study have witnessed "99.3% delays which were escapable. Delay in starting scheduled cases reflects operating room inefficiency" (9). Study done in developed nations have encountered "11.9% of cancellations on day of surgery and reasons for cancellation were unpredictable running

of previous surgeries, no bed for patients postoperatively, patient cancelled themselves and change in patient clinical fitness” (3). Study explained that “there exist various causative factors which affects delay including lack of proper planning, deficiencies in teamwork, communication gap and limited availability of trained supporting staff” (10). Studies observed major cancellation in patients having elective surgery. The common causes of cancellations were beds non-availability in recovery ward, patients did not come for surgery, patient not prepared for surgery(11).

If any OR process does not happen properly or has some disturbances at any point results in increased patients’ complaint due to increased dissatisfaction. Thus, following SOPs and dodging delays/cancellations/postponing should be concentrated by administrative department for better satisfaction results. To escape from such complaints registered while patients discharge pointing towards delay in surgery should be prioritized. In general overview, these activities may be undesirable, but they are obstruction in smooth workflow impacting patient care. Thus, to devise solution to the problems encountered study on exploring the trends which are undesired and acts as barrier are needed to be observed. Different trends result from planned cases to add on cases, on time start to planned start time of cases, surgery done to surgery never happened, etc. Improving OT efficiency will lead to many positive aspects which may include reducing overtime pay to staff, revenue increase, less waiting time for patient and improved patient satisfaction (Appendix:1).

Research Questions

- Is there any change in scheduled timings for commencing of planned surgeries in Max Hospital, Gurugram, Haryana?
- What are the trend of surgery being operated in Max Hospital, Gurugram, Haryana?

Objectives

- To identify pre-operative waiting time of planned surgeries in Operation Theatre.
- To assess the status of planned surgeries in terms of rescheduling, cancellation & associated departments.

- To determine the status of unplanned surgeries & associated departments in terms of emergency cases.

CHAPTER-2

REVIEW OF LITERATURE

Studies published worldwide which explains the different reasons, trends, and causes affecting the efficiency of OR have been reviewed. Studies published after 2005 are included in the literature review.

Operation theatre is the core revenue generating areas of the hospital (12). “If managed poorly, then this impact negatively on patient outcome and satisfaction score with increased hospital LOS, increasing financial burden on patients” (13). For efficient working of Operation theatre, factors affecting the normal process flow should be observed and bottlenecks should be minimized.

Study observed that “Utilization of theatre can be increased by avoiding delayed starts, avoiding cancellation of cases, proper scheduling of surgeries, by anaesthetizing the patient in anaesthesia room instead of operating room and by laying of sterile trolleys in lay-up room instead of operating room” (14).

Another study explained “different ways to improve OT utilization which includes audit to accurate case-duration estimate, percentage of on-time initial surgery starts, Pre-admission/hospitalization, Patient-in-to-incision time, average turnover time in OR” (5). All these aspects when considered would result in increased operation theatre utilization rate.

Study have also demonstrated that a “coordinated multidisciplinary process redesign can reduce room turnover time plus anaesthesia induction and emergence time. This process is applicable to ORs and has optimal benefit for cases of 2 hours or less in duration”. This would increase the revenue generated from OR (15).

Vinukondaiah et al observed in prospective observational study that “delay in starting lists, under-scheduling, interruption due to emergency surgeries, administrative reasons,

induction of anaesthesia and recovery policies are the main factors that account for inefficient use of operating facilities”. (16).

Study demonstrated the preventable delays. “If OT stakeholders have attitudinal change, good inter-departmental communication, universal health insurance, operative check list, dedicated specialty theatres, preoperative anaesthetic clinic, and regular auditing of hospital equipment will go a long way in mitigating delays associated with OR” (9).

Another study on time utilization observed that delays can be minimized by effective OR time and schedule utilization. Majority of delays were experienced in transferring patients to the theatre due to hospital layout because some wards were far from the theatre, and it would have taken about long time to go and come back from there. So, structural issues also lead to delays and inefficiency in process flow (17).

Study done by Weldon et al focused on interprofessional communication. It was stated that “Interprofessional communication plays an essential role in information transfer during operations. Communication among professionals including surgeons, anaesthetists, operating department practitioners and nurses, as well as surgical trainees, medical and nurse student should be appropriate for smooth functioning” (18). Prospective study done also observed communication as a common problem. It was observed that half of the issues were present due to miscommunication which leads to negative effects which jeopardized patient safety by interrupting normal process (19).

Study done in Australia by Schofield and team found the cancellation related to scheduled cases and elective cases on the day of surgery. On investigating the reasons ; it was observed that under-estimated time for surgery, procedural reasons, non availability of post-operative beds, patient unwillingness and patient unfit for surgery were associated with cancellation of surgeries (3).

Another study done in Tanzania by Chalya et al explained the method to prevent cancellations via careful planning and efficient OT utilization of resources (manpower, facilities) available. If scheduling and admission processes are improved; then this would add into better use of available resources. Overtime payments being a way to prevent cancellation but may increase the operational expenses of hospital. “Intramural practice has been found to lower the rate of cancellation of elective surgeries; however,

the amount of money paid to the theatre staff during intramural practice is not up to mark to enable them to do overtime”. (2).

Studies found the reasons for cancellation in their retrospective study. They observed that because of presence of dedicated OR for emergency; add-ons or emergency cases do not contribute to cancellation of planned surgeries. However, emergency call to surgeons for such cases and their arrival can be an issue which leads to delay of surgery. They also observed the inadequate preoperative medical optimization and compromised patient's medical fitness as the reason for cancellation of surgeries. Cancellations were mainly due to surgeon's unavailability, sterilized instruments unavailability, and technical problems with instruments (20).

Study done in tertiary hospital explained the way to minimize the delays and reduce activities which were unvaluable via Lean management. Lean management act as tool which helps in simplifying the processes and highlighting the preventable errors from the process. All the services provided to the patient are directly related to the efficiency of OT and is of major concern for patient's well-being and satisfaction. (21).

Studies have focused on cancellation of surgeries and the ways to reduce cancellation of surgeries. They analysed that using quality management strategy cancellations can be reduced and number of surgeries can be increased. Main reasons for cancelling of surgeries were “surgeon's related, anaesthetist's related factors, under- estimated time of previous running surgery, changes in patient clinical status and lack of ICU beds. Standardization of processes, proper planning and using anaesthetics clinic helped reduce the operations cancellation” (22).

CHAPTER-3

METHODOLOGY

After literature review and on basis of aims & objectives, methodology was selected.

The main aim of the study is to discover the trend of surgeries witnessed on scrutinising the data retrieved from the Max HIS, for improving the efficiency of Max OR.

Research Design

Data from HMIS of Max Hospital, Gurugram unit; retrospective record are obtained, and exploratory study is done.

Setting

To explore trends of cases, study was carried out in OR complex of 70+ bedded Max hospital, Gurugram, Haryana. Study was done to know the voids in process flow and for planning SOPs for future.

The OT complex comprise of four OT, accounting of three major OT and one sepsis O.T. for unknown patients/ suspected patients. For maximum planned cases three OR (including 1 septic OR) are used, while the fourth one is kept ready for the urgency.

Population

Study population for this study included surgical intervention patients visited hospital in month of February and March 2021 and OT staff. Patients whose data was fully present in HIS are included.

Size

All the patients who availed the treatment during the months of February and March 2021 are included. For February, 300 patient and for March, 399 patient was available. So, 699 patient's data for interpretation was obtained.

Study instrument

Data storage accounts -registers, patient's file, Max HIS & computerized patient's record system was used to collect end to end data.

OT staff and anaesthetist help was taken in filling up the survey to know the reasons behind the delay or late start of surgery.

Operational definitions

Table:1- Operational Definitions

Planned timings	Timings planned a day prior to surgery in OT list.
Planned surgery	Surgeries already in the planned OT list a day prior to surgery.
Unplanned surgery	Surgeries which are planned on the same day of the surgery.
Delay starts of surgery	starts after the planned time.
Early start of surgery	starts before the planned time of surgery.
Cancellation of surgery	Present in OT list but do not happen on day of surgery.
Postponed surgery	Surgery which do not happen on day of surgery but happen afterwards.

Analysing Methods

All the data collected; primary data via questionnaire and secondary data via HIS was analysed using Microsoft Excel.

All variables analysed are portrayed in pictorial representation (graph, tabular, pie-charts) (Appendix:5).

Ethical considerations

This study was approved, and permission was given by the Hospital administration of Max Hospital, Gurugram. Privacy and concealment of identity have been secured and information is reported anonymously so that none of the identity is disclosed. Patients' name, I.P. no. have not been recorded during any procedure of data collection.

Questionnaire opened only after receiving the consent from respondents regarding their privacy. None of the IP addresses and email ID are neither tracked nor stored for future references.

CHAPTER-4

RESULTS

Data is obtained which included number of OT where procedure needs to be done, patient's identity with name, surgery name, surgeon's details, scheduled timings and actual in-time of patient in OT.

699 cases were collected; 299 cases were in February and 400 cases were in March. Ortho (25% cases) had maximum cases in February and Gen. surgery (24.9% of cases) had maximum number surgeries in March. Highest number of add-ons surgeries were of Gen./Lap. surgeries in month of February and March.

ORIF and cholecystectomy were planned cases maximumly a day prior to surgery. Cholecystectomy was highly unplanned and is added on the same day of surgery. Of 699 cases, 37% of surgeries were added on the same day of surgeries (Graph:1) (Appendix:2,3,4).

Graph:1- Number of planned and unplanned cases in month of Feb and March 2021.w.r.t Departments

On analysing the planned cases, it was observed that “49% of planned surgeries started late than the planned time, 25% of surgeries started early to their planned time, 14% of surgeries were never done on the planned day, 4% of the surgeries were postponed from there planned day of surgery and only 5% of all surgeries happened on time” (Table :3 and Figure:2).

Table 3: Status of Planned surgeries for month of February and March 2021

Figure:1- Pie chart showing the status of planned surgeries for month of February and March 2021 in terms of delay start, early start, on time surgeries, not recorded, did not happen and postponed surgery.

On analysing the planned surgeries, 4% of surgeries were postponed. Orthopaedic (33%) followed by general surgery department (27%) had max. number of postponed surgeries. Least postponing of surgeries were done in Gynaecology (6% of all planned surgeries). Total Knee Replacement is the common orthopaedic cases which were postponed and were done after the planned day of surgery (Figure: 2).

Figure:2- Pie chart showing the surgeries which are postponed w.r.t departments.

Of 440 planned cases, 63 cases were never done, and in this Gen. surgery (25 % of scheduled cases) had high count and minimum were of Urology and Neurology (3% of all planned cases). Lap Cholecystectomy was the surgery which was not done in general surgery (Table:4).

Table 4: Number of surgeries not done w.r.t departments for month of February and March 2021.

DEPTT.	Not done surgeries
ENT	10
EYE	7
GEN	16
GYN	13
ONCO	3
ORTHO	10
URO	2
NEURO	2

Out of all planned surgeries, General surgery (23% of all planned surgeries) was the one department with maximum number of delays when compared with the planned time, followed by Ophthalmology and orthopaedics (19% of all planned surgeries respectively). Least number of delays were observed in vascular, oncology, and paediatric. Again, the Lap cholecystectomy was the one which was delayed than their usual planned time (Graph:2).

Graph:2- Number of planned cases done after planned time w.r.t Departments in month of February and March 2021.

On analysing the scheduled cases, 105 cases were started early to plan time and Ortho had the maximum proportion (41% of all planned surgeries) (Graph:3). Of all 440 scheduled cases, only 4% of surgeries started on time of what was planned for their commencement.

Graph:3- Number of planned cases done before planned time w.r.t Departments in month of February and March 2021

On analysing the planned surgeries, 64 cases started late than the planned time and majority were 1hr to 2 hr after their scheduled time, and this resulted 30 % of all scheduled cases. Ortho and Ophthalm have highest proportion of delays. Maximum delay went to late start of 4-5 hours of range, and this was observed in Orthopaedic (2 cases) (Graph:4).

Graph:4- Number of planned cases done after planned time and delayed time range in month of February and March 2021.

On further visualizing the planned cases, 106 cases started early to the scheduled time and majority of cases were 1hr to 2 hr ahead of their scheduled time and maximum were less than 30 min (34% of all planned surgery) of their planned time. Ortho. and eye were the department whose surgeries started before time of planned time (Graph:5).

Graph:5- Number of planned cases done before planned time and early time range in month of February and March 2021.

REASONS FOR DELAYS IN OR

In total, OT has 30 staff members and response was collected only from 25 staff members. Data collected was used to understand their aspects and reasons for delay start of cases in operating room.

Respondents had an average 5-10 years of experience in OR.

95% respondents experienced changes in commencement timings of cases. 84% respondents answered that delays were commonly experienced in OR. 16% experienced early start of cases.

In General surgery, half of the respondents (60%) experienced late start of cases, followed by Ophthalmology (44%). Minimum respondents experienced late start in G.I. cases and Orthopaedic and none experienced in Paediatric cases. (Graph:6).

Graph:6- Response of OT staff regarding departments w.r.t delay start in surgery.

In Orthopaedic (64%) majority of respondents had experienced before start of cases than planned time, followed by ENT (44%) as patients usually gets hospitalized a day prior to surgery. Very few respondents marked before start than planned time in Gynaecology (4%) (Graph:7).

Graph:7- Response of OT staff regarding departments w.r.t early start in surgery.

Analysing the common reasons for late start of cases, majority responded towards inter departmental communication gap (60%), followed by patients (50%) being themselves the reason and then surgeon's related issue (30%). (Graph:8).

Graph:8- Response of OT staff regarding reasons for delay in surgery.

On quantifying the reason denoting to surgeon's delays, long OPDs (44%) followed by lab reports (28%) demarcating patient unfit for surgery were the reasons (Figure:3).

Figure:3- Pie chart showing the reasons related to delay in surgery associated with surgeons.

On analysing the responses for reason related to patient's side delays, delayed financial clearance (39%) from their part was major reason followed by late hospitalization (27%) which led to late start of OR process (Figure:4).

Figure:4- Pie chart showing the reasons related to delay in surgery associated with patients.

On analysing administrative related delay reasons, delayed intimation from Financial/ admission desk (60%) was major reason followed by delayed TPA approval. (Figure:5).

Figure:5- Pie chart showing the reasons related to delay in surgery associated with administrative department

On observing the response in relation to floor nursing majority was responded that improper documentation (34%) lead to late shifting of patient from room to OR followed by unprepared patient (32%) for OR. (Figure:6).

Figure:6- Pie chart showing the reasons related to delay in surgery associated with floor nursing.

On analysing the responses, lack of porters/ unavailability of staff for transportation of patient (42%) followed by OT not available for surgery (31%) were reason for late start of surgery (Figure:7).

Figure:7- Pie chart showing the reasons related to delay in surgery associated with OT staff.

On observing the responses, maximum respondents marked that late lab results (46%) was the major reason for late start of cases followed by other department clearances (44%) regarding patient fitness for surgery (Figure:8).

Figure:8- Pie chart showing the reasons related to delay in surgery associated with another department.

On analysing the reason for postponement of surgeries, lab results awaited (90%) was the major reason associated followed by patient being unfit for surgery (75%) (Graph:9).

Graph:9- Response of OT staff regarding reasons for postponing of surgery.

CHAPTER-5

DISCUSSION

Analysis was done on data extracted from Max HIS for Feb- Mar 2021 related to cases done in OR. Analysis was done to find out the variations in cases observed in OR and further the reasons are discussed for all changes.

Planned cases and unplanned cases:

On analysis, it was observed that OR encountered both planned and unplanned cases. Out of these, planned cases had weightage over add-on cases. While observing the respondents experience, the same was visualized that planned cases are more than unplanned which denotes that staff usually gets an idea of cases and the requirements needed during surgery a day prior. It was observed that majority of planned cases which actually happened were of Orthopaedic and general surgery and general surgery had highest add-on cases. It was observed from the questionnaire that unplanned surgeries are majorly the emergency surgeries. It has observed that “general surgery cases which are urgent/emergency usually are cost burdening to the patient and also lopsided the mortality & morbidity. To avoid such instances, multidisciplinary emergency team and effective communication can play an important role in avoiding unwanted situation or life threatening condition” (23)(24). If a special emergency OR is set for unplanned then this increased number of surgeries being performed in a day with a smaller number of cancellation of cases and would avoid burden on normal planned list of surgeries and series of cases. Queuing theory model is another way which could predict the outcome of OR on specific volumes of emergency cases seen in hospital. (25).

Early start of surgeries

On observing the trend of cases in OR, very less proportion of cases were done before their planned time. As the orthopaedic patients usually gets admitted a day prior to surgeries and such surgeries are non-emergency thus can wait for a day to be operated. Thus, making Orthopaedic the only department where cases are started beforehand the planned list; mostly 1hr to 2 hr before the scheduled time.

Postponing of surgeries/ Cancellations of surgeries

On observing the findings, postponing of the cases majorly happened in Ortho and G. Surg. Whereas ENT & G.Surg. whose maximum cases got cancelled and never happened. Non availability of post-operative beds, patient not showing up in hospital on day of surgery, improper patient preparation and unavailability of nurses are some

reasons being explained for cancellation (11). During this study, there was less clarity regarding cancellation and time of cancellation. But the cancellation rate was high, so this has definitely resulted in inefficient use of OR and wastage of resources(4). On observation, majority of cancellation were only due to patient being unfit and patient not showing up for the surgery.

It has been observed in past that G.Surg. cases cancellation were undefined operating time in OR, addition of emergency case and lack of patient's fitness (16). Few other reasons for cancellation were surgeon's related that surgeon was busy in some another case that less urgent case was postponed or cancelled (26). Although on observation and analysis of questionnaire, surgeons not showing up and surgeon cancelling the surgery have never been a reason for cancellation.

If the theatre time is not properly decided or estimated, then this can lead to further delay of cases. Majority of times surgeons underestimate their case duration and then the repercussions are dealt by the upcoming cases. Many a times more cases of same surgeon are added in order to reduce waiting time, and this may also lead to cancellation due to increased surgeon's fatigue. Parallely, skills of operating surgeon are also important in estimating length of surgery. Not always, but experienced surgeon may also encounter some unexpected surgical complication which needs to address by calculating the associated complication with surgery and patient's fitness score for surgery. If not from the surgeon's side, then lack of sterilized instruments and technical glitches may result in unexpected cancellation of surgery (4).

In this setting, it has been observed that majority of postponing of surgery are due to awaited lab reports and variation in Patient's vital/ undesired symptoms.

Delay of surgeries

On observing the findings, Gynae. and ophthalm were the departments with majority of delayed surgeries of approximately 1-2 hr of scheduled time. if first surgery starts late then upcoming surgeries will definitely be late than their scheduled time and then this series continue for the day. Such delays not only effect the timings of cases but also leads to wastage of resources. In few of the cases such wastage or cancelling of forthcoming surgeries can acceptable as this can be an action of save patient's life.

AAGBI says, "surgery is said to be delayed if it is late by 10 min of its scheduled time. Thus, majority of cases in this study falls under the category of being late. If the first

case starts within 15 min of scheduled time, then it is on time and expected that there would be a smaller number of delays if other surgeries are done according to their scheduled time” (27).

Late shifting of patients are majorly the cause of delay which can be prevented (16). Delay in trolley preparedness and OR readiness is one of the important steps which can affect the cases delay. Clean up procedure takes time which if not done immediately after case can further delay the cases. Such a point becomes significant in HIV/HBsAG positive patients, septic burns) (28). Although, none of the findings have attributed towards cleaning and housekeeping to be specific or cause effective in this study.

Another important factor is effective communication, which is helpful in managing and coordinating the tasks associated with surgeries (18). Findings have clearly demarcated that inter departmental communication in terms of clearance from their side denoting an action for patient’s fitness for the surgery is missing, which is highly observed in the delay of cases.

Availability of porter or staff for transportation is another reason which is preventable. Transportation/shifting of patient is a reason which contributes to the delay process. “During the transportation of the patients (either the first or second one) whenever the patient's arrival to the OT had got delayed beyond the expected time (approximately 35 min), consequences have been observed. Transportation delays excessively extended the turnover times of patient and overshooting beyond routine OT hours. In both the scenarios, the OTs remained vacant wasting precious time and resources. Also, miscommunication between the OT nurses and ward nurses in the form of wrong ward, confusion in names, and patient with similar history became the source of confusion and thus unintended delays. ICU patients also got delayed as shifting patients with infusion lines (often on ventilator) was difficult than ambulatory patients and required supervision of trained staff.” (29).

Another reason for delay in surgery are late approval from financial desk for TPA. Such approvals need to be on-time for surgery to start according to the scheduled time. Studies have highlighted “significant number of cancellations, most of which occurred within 1 day of planned surgery. Minimizing preventable causes of cancellations could decrease the likelihood of surgical delays as well as lost reimbursement” (30).

Delay in transportation also occur due to improper documentation and unsigned consent forms. Studies have reviewed the reasons for “cancellation and found that majority were administrative reasons, with unsigned consent form for surgery either from surgeon’s side or from patient’s side” (31).

For surgery to start on-time, above mentioned reasons and associated factors needs to be managed and to be audited time to time in order to avoid repercussions caused due to late start of surgeries.

CHAPTER-6

CONCLUSION:

Various trends of surgeries and reasons leading to the late start of surgery in operation theatre are explored in this study. This study emphasized reasons for cancellations, unplanned surgeries-emergency surgeries, delay start of surgery and departments associated with beforementioned. It has been identified that majority of reasons causing delay can easily prevented. It has been observed that placing the add-ons between the

planned surgery results in further delay in coming surgery. Thus, having a dedicated emergency operating room can be the solution for increasing the OT utilization without disturbing the flow of normal planned surgeries. Several factors resulting in delay is observed especially patient's late hospitalization, lack of clearances from administration, and lack of inter department communication. Departments like Gen. surg. have been identified who have large number of unplanned surgeries. Such departments should segregate the surgeries on the basis of urgency so that planned surgeries are not affected with their addition to list. Having a team at every point related to OR process can be useful, which is multi-disciplinary and maintain effective communication among themselves to solve any issue arising at any point of time.

STRENGTHS AND LIMITATIONS

Strengths:

- Result and analysis are the exact replica of what data has shown without any alterations according to convenience.
- Questionnaire findings are the actual representation of OT staff. None of the questionnaire is fake.

Limitations:

- Data for few surgeries are missing as they under documented.
- Booking of cases may not contain the actual data related to patient. So, some of the not done cases may be wrong representation.
- Data for cancellation and reasons can be inappropriate concerning feb and march due to parallel disaster (“COVID”).
- To know the reasons for delay, questionnaire was asked to be filled by staff, which can be near to the real reasons but not exact.

Recommendations:

1. Preparation of OT list after communicating with department coordinator and confirming about the patient to avoid cancellations.
2. Communicate with N.S. and surgeon once OT list is prepared and confirm regarding priority related to case and instruments.
3. Booking, patient’s admission, and patient’s status to hospital should be intimated to surgeon via smart messaging technique linked with HMIS.
4. Dedicated theatre for add-on surgeries/ emergency cases/ OPD cases.

5. Developing SOPs related to patient preparedness including consent form, documents, lab reports enclosed and to be attached with face sheet.
6. TPA tracking should start at the time of PAC.
7. Rule to admit patient a day prior to their OT procedure and same should be conveyed to coordinators for easy communication.
8. Team leaders should be actively keeping a special check of OT patients.
9. Regular audits regarding delay and cancellation for knowing the common reasons for future changes and SOP's formulation.
10. Providing help to porters for easy shifting and transportation of patient to OR.
11. Increasing pre-operative beds.

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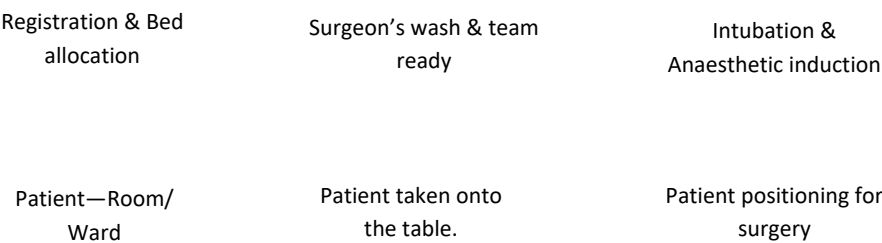
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APPENDIX-1

Conceptual framework Process flow OT:

Patients enter Hospital.



APPENDIX-2

Statistics Compilation for month of Feb & March:

Category	Feb	March
Total Cases (planned & unplanned)	299 (258 cases done & 2 not recorded)	401 {363 cases done & 18 not recorded (March 30)}
Department with Maximum Number of Surgeries	Ortho	Gen Surgery
Department with Minimum Number of Surgeries	Oncology	Dental, Vascular, Cardiac

APPENDIX-3

Statistics for month of Feb (in numbers)- Department wise

Department	Surgeries	Planned Surgeries	Unplanned Surgeries	Emergency of unplanned	Postponed Surgeries (planned)	Canceled (not done of planned)	Late Start of Surgeries	Early Start of Surgeries
CARDIO	1	1	0	0	0	0	1	0
ENT	29	21	8	5	0	8	8	4
EYE	20	19	1	0	1	2	10	6
GEN	58	33	25	20	2	6	19	3
ORTHO	77	57	21	19	3	7	20	19
URO	23	16	7	3	1	1	10	3
GYN	58	36	22	21	1	6	22	5

NEURO	20	6	14	13	0	2	0	0
PAED	2	0	2	2	0	0	0	0
PLAST	4	0	4	3	0	0	0	0
ONCO	3	2	1	1	0	1	1	0
GASTRO	1	0	1	1	0	0	0	0
VAS	2	1	1	0	0	0	1	0
TOTAL	299	192	107	89	8	33	95	40

APPENDIX-4

Statistics for month of March (in numbers)- Department wise

Department	Surgeries	Planned Surgeries	Unplanned Surgeries	Emergency of unplanned	Postponed Surgeries (planned)	Canceled (not done of planned)	Late Start of Surgeries	Early Start of Surgeries
CARDIO	1	1	0	0	0	0	0	0
ENT	37	22	15	5	1	2	7	6
EYE	57	55	2	0	2	5	31	14
GEN	98	58	40	22	2	10	30	13
ORTHO	79	55	24	20	2	3	20	25
URO	16	8	8	3	0	1	6	1
GYN	62	34	28	28	0	7	17	7

NEURO	15	3	12	11	0	0	2	1
PAED	10	4	6	5	0	0	3	0
PLAST	2	0	2	2	0	0	0	0
ONCO	17	7	10	9	0	2	3	0
GASTRO	2	1	1	1	0	0	0	1
VAS	1	0	1	0	0	0	0	0
ANA	2	0	2	2	0	0	0	0
DENTAL	1	0	1	0	0	0	0	0
TOTAL	400	248	152	108	7	30	120	68

APPENDIX-5

Exploratory Study on Trends and Commencement Status of Surgery in OT of Max Hospital, Gurugram.

CONSENT FORM:

Hello,

I am Dr. Shivani Shakti Rao, Management Trainee at Max Hospital, Gurugram.

As a mandatory and partial fulfilment criterion for obtaining MBA- Healthcare Management degree; I am doing a retrospective analysis for exploring the trends & commencement status of surgery in operation theatre in terms of delay in start time, number of cancellations of planned surgeries, emergency surgeries and associated departments as my dissertation.

To complete my dissertation, I am conducting a study to know the reasons leading to delays in commencement of surgeries in Operation Theatre. As delays in surgery have negative effects on patient satisfaction score, leads to wastage of necessary resources, affects hospital budget and reputation of hospital. Therefore, for efficient & effective management of OT, it is crucial to know the reasons behind the delays of surgery for improving patient experience and OT process.

Your participation in this survey is entirely voluntary, and all the information shared will be kept confidential. None of the identity, email ID and IP address would neither be disclosed- shared nor tracked.

Please provide your consent for this study and this will only take 15 min of your precious time.

Are you willing to participate in the study?

1. Yes
2. No

Date of interview :.....

Questionnaire

1. Name:
2. Department:
3. Designation:
4. Experience:
5. Have you ever experienced any change in commencement timings of surgeries in OT?
 - (1) Yes
 - (2) No
 - (3) Never experienced.
 - (9) Do not know

6. What is the most common observed change?
- (1) Delay starts of surgery.
 - (2) Early start of surgery
7. Considering delays, according to you which is the department having maximum delays? (Can mark multiple options).
- (A) Cardio-Thoracic surgery
 - (B) ENT
 - (C) Eye
 - (D) General Surgery
 - (E) Orthodontics
 - (F) Urology
 - (G) Gynaecology
 - (H) Neurosurgery
 - (I) Paediatric Surgery
 - (J) Gastrointestinal Surgery
8. Considering early start of surgery, according to you which is the department having maximum early start? (Can mark multiple options).
- (A) Cardio-Thoracic surgery
 - (B) ENT
 - (C) Eye
 - (D) General Surgery
 - (E) Orthodontics
 - (F) Urology
 - (G) Gynaecology
 - (H) Neurosurgery
 - (I) Paediatric Surgery
 - (J) Gastrointestinal Surgery
9. What according to you are the common reasons for delay in start of surgery? (Can mark multiple options).

- (A) Surgeons (Go to Q.10)
- (B) Patients (Go to Q.11)
- (C) Administration (Go to Q.12)
- (D) Nursing staff (floor) (Go to Q.13)
- (E) OT staff (Go to Q.14)
- (F) Inter- department communication (Lab, Cardiology, Radiology, Pulmonology, Neurology, Anaesthesiology- consent) (Go to Q.15)
- (X) Others, if yes please specify;

10. If Surgeons are the cause of delay, what is the reason: (Can mark multiple options).

- (A) Stretched OPDs.
- (B) Came late to the hospital.
- (C) Not satisfied with pre-lab test reports
- (X) Others.....

11. If Patients are the cause of delay, what is the reason: (Can mark multiple options).

- (A) Non-cooperative patient
- (B) Patient's late hospitalization
- (C) Non fasting
- (D) Patient unwillingness
- (E) Patient's financial issue
- (X) Others

12. If Administration is the cause of delay, what is the reason: (Can mark multiple options).

- (A) Lack of administrative support
- (B) Delayed financial clearance (TPA awaited)
- (X) Others.....

13. If Floor nursing is the cause of delay, what is the reason: (Can mark multiple options).

- ☐ (A) Patient not ready
- ☐ (B) Ward/ floor busy
- ☐ (C) Non-cooperative staff
- ☐ (D) Improper documentation
- ☐ (X) Others.....

14. If OT and OT staff is the cause of delay, what is the reason: (Can mark multiple options).

- ☐ (A) OT not available
- ☐ (B) Lack of trained staff
- ☐ (C) Unavailability of staff for transportation of patient.
- ☐ (X) Others.....

15. If Inter-department is the cause of delay, what is the reason: (Can mark multiple options).

- ☐ (A) Lab reports awaited/delay.
- ☐ (B) Late PAC done
- ☐ (C) Awaited clearance from other departments.
- ☐ (D) Lack of communication
- ☐ (X) Others.....

16. Out of all surgeries in a day, what do you think have major proportion of surgeries?

- ☐ (1) Planned surgeries.
- ☐ (2) Unplanned surgeries

17. Out of all unplanned surgeries, according to you are all the surgeries urgent/emergency?

- ☐ (1) Yes
- ☐ (2) No
- ☐ (9) Cannot say.

18. On retrospective analysis of past months surgeries, 3-5 % surgeries of all surgeries were postponed; according to you what are the most common reasons for postponement of surgeries: (Can mark multiple options).

- ☐ (A) Patient was unfit for surgery (NPO, increased Blood Pressure, etc)
- ☐ (B) Lab reports were not satisfactory.
- ☐ (C) Patient did not show up on day of surgery.
- ☐ (D) Surgeon did not show up on day of surgery.
- ☐ (E) TPA awaited.
- ☐ (F) Institutional reason (lack of bed, oxygen, etc)
- ☐ (X) Others.....

19. What are the changes you recommend for reducing the delay in of surgery? (2 recommendations needed)

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Thank you for your time & valuable inputs.