

Operation Theatre Utilization with Context to Non-Productive Time

By

Nitin Kumar Nagar

*Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management*

Academic year, 2015-2017



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Nitin Kumar Nagar** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Asian Heart Institute, Mumbai** from February 2017 to May 2017.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.
The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.



Col. (Dr.) Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur



Dr. Arindam Das

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CERTIFICATE

The certificate is awarded to

Dr. Nitin Kumar Nagar

Enrollment No. IIIIMR-U/01/2015-17/0312

In recognition of having successfully completed his
Internship in the department of

Medical Administration

and has successfully completed his project on

Operation Theatre Utilization In Context To Non Productive Time

from **15 February 2017 to 15 May 2017** at

Asian Heart Institute, Mumbai.

He comes across as a committed, sincere & diligent person who has a strong drive and
zeal for learning.

We wish him all the best for future endeavors.

For Asian Heart Institute

Authorized Signatory


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*Every heart
deserves the best*

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **OPERATION THEATRE UTILIZATION WITH CONTEXT TO NON PRODUCTIVE TIME** and submitted by **Dr. Nitin Kumar Nagar** Enrollment No **IIHMR-U/01/2015-17/0312** under the supervision of **Dr. Arindam Das** for award of MBA in Hospital and Health Management of the University carried out during the period from **FEBRUARY 2017** to **MAY 2017** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.


Signature

THE IHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled **"OPERATION THEATRE UTILIZATION WITH CONTEXT TO NON PRODUCTIVE TIME"**



Signature of student

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ACRONYMS/ABBREVIATIONS

OT- Operation theatre

OR- Operating room

TPA- Third party administrator

2D Echo- 2 dimensional Echocardiogram

A&E- Accident and Emergency

DAMA- Discharge against medical Advice

HCA-Health care Assistant

ALOS- Average length of Stay

CMD-Chief Medical Director

COO-Chief Operating Officer

CGHS-Central Government Health Scheme

CSSD-Central Sterile and Supply Department

CT-Computerized Tomography

ECG-Electro Cardiogram

TMT-Trade Mill Test

EEG-Electro Encephalography

EMG-Electro Myography

HOD-Head Of Department

HRD-Human Resources Department

ICU-Intensive Care Unitt

HDU-High Dependency Unit

IPD- In-Patient Department

AHI-Asian Heart Institute

MRD-Medical Records Department

ACKNOWLEDGEMENT

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Dr. Nitin Kumar Nagar

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Study on Operation Theatre Utilization with context to Non Productive Time.

Introduction:

A working theater, additionally called as a working room (OR) or working suite, is an office inside a healing facility where surgical methodology are done in a clean situation. Generally, the expression "working theater" alluded to a clean or amphitheater in which understudies and different onlookers could watch specialists perform surgery.

Healthcare, as with some other administration operations, requires ceaseless and orderly development to remain financially savvy, productive and give excellent administrations. Operation theaters (OTs) are the key territory which includes colossal capital venture; it is exceedingly labor serious too alongside being a high cost focus. It is a high need benefit region from the administration perspective, which requires sufficient consideration and ability to enhance productivity for better rates of return. From the review contemplate on OT use, it was clear that there is useless time (NPT), which requires complete redress. The goal of the review incorporates expanding the proficiency of the OT use with a specific end goal to evade the NPT in OT, enhance effectiveness and lessen related monetary misfortune.

- Utilization efficiency of the OR refers to time lag between the two consecutive surgical procedures and the efficiency with which the OT runs according to the scheduled plan.
- Turnover time might be characterized as the period of time that begins when one patient leaves the OR and closes when the following patient on the timetable enters the same OR.
- Non Productive Time refers to the time takes place apart from the actual surgical procedures. E.g. Delay, cleaning, OT preparation etc.

HOSPITAL INTRODUCTION

Asian Heart Institute , is the No.1 Cardiac healing center in India that was built up in 2002. It is situated in the western suburb of Bandra, at the Bandra Kurla Complex (BKC), in Mumbai, Maharashtra. In only 15 years, the doctor's facility has treated more than 300,000 patients and finished more than 39000 angiographies and angioplasties and more than 22000 heart surgeries. Asian Heart Institute has a mind-boggling achievement rate of 99.83% in sidestep surgeries and a general 99.6% in cardiovascular surgeries. These achievement rates are among the most astounding in the world. It has spearheaded the treatment of complex heart surgeries, blood vessel join and pulsating heart surgery in India.

Literature Review:

According to Sonal Shukla(2008)^[6] , “ In any hospital, the Operation Theatre is said to be the primary source of revenue generation with around 50-60 percent of revenue earned just by this area.” As hospital budget is majorly spent on OTs, they have to be utilized maximally to ensure optimum resource utilization (Vinukondaiah, Ananthakrishnan,&Ravishankar,2000)^[7] Tyler, Pasquariello, and Chen (2003)^[8] noted the economic importance of keeping operating rooms full as operating rooms are a major revenue producing service line, for both inpatient facilities and outpatient facilities, and may generate nearly half of a hospital's revenues. It becomes clear why an efficient and well utilized operating suite is economically desirable. Tyler et al. (2003)^[8] also claims that one hour of over-time costs approximately 1.5 times an hour of idle time.

Dr. Mohammad Faisal (2005) ^[9] suggests that for optimum utilization of the operating units, the operation theatres should not be reserved rigidly for use by a particular department. The operation theatres should further be similar in design and character to make it easy for all surgeons and nurses to use them without the necessity of familiarizing themselves every time with a new set of conditions According to Donham RT, Mazzei WJ,&Jones RL (1996) OR utilization is a commonly used criterion for deciding whether to allocate more or less block time to a surgeon.

Tyler et al. (2003)^[8] conducted research to determine the optimum utilization rate of an operating room and concluded that economic considerations are the reason it is desirable to keep operating rooms fully used when staffed. Their study indicated that efficiency increases as variation decreases, and the OR is most efficient with utilization between 85% and 95%. However, when utilization begins to reach 90-95% and greater, delays and overtime costs may be incurred, and repeatedly running late is hard on staff morale and may make recruiting and retaining scarce staff more difficult. Trade off analysis must be considered when attempting to increase utilization rates above 90%. In most hospitals the goal is to have each OR in use 75-80% of the time ([Tom williams & Heather williams](#), 2016)^[10]. Studies have (Tyler et al., 2003)^[8] used the concept of over-utilization and under-utilization to quantitate the quality of OR scheduling. Ultimately, optimized utilization results from a balance between efficiency from an economic standpoint, and patient satisfaction. Clearly, efficiency improves by increasing patient wait time and becomes most efficient when patients are waiting when the OR becomes available, so idle time is reduced. Changes, for example, instances of various term, changes in changeability of case length, crises, cancelations, et cetera will diminish ideal use. To amplify use, variables, for example, the cost to the association of requesting that patients hold up, cost of additional time, and the capacity of specialists to take cases to another suite must be viewed as (Tyler et al., 2003).

B.M. Sakharkar (1998)[11] made a review on time use of working rooms in an extensive showing clinic and had perceptions that the greatest usage was observed to be between 10:00 am and 1:00 pm. Deferral was brought about by specialists bringing about the working rooms staying inert to the degree of 105 minutes on a normal. Out of the eight hours operation time accessible, just 5 to 6 hours were really used. Sick – arranged planning of operations and late landing of specialists were the fundamental driver. Out of the accessible time, 54 for every penny of the time was spent on genuine surgery, 31 for each penny for steady exercises for the operation, and 15 for each penny holding up while the working room was being made prepared for operation.

In another review that was directed at Sher-I-Kashmir Institute of Medical Sciences by Farooq Ahmed, Syed, Tabish, Qazi, & Atif (2003)[12] out of the used time 66% was spent on genuine surgery; 21% on strong administrations and 13% on making room prepared for

operation. The aftereffects of the review proposes that use of theater can be expanded by keeping away from deferred begins, dodging cancelation of cases, legitimate booking of surgeries by anesthetizing the patients in an anesthesia room as opposed to working room and by laying of clean trolleys in layup room as opposed to working room.

Dexter and Traub (2002) noted the cost of over-utilized time includes direct costs of overtime and indirect costs of possible employee dissatisfaction, resignation, and recruitment. However, poorly managed scheduling can lead to under-utilization as well as over-utilization, resulting in unpredictable schedules for staff. Mueller and McCloskey (1990) identified the importance that reliable scheduling has on nursing job satisfaction. Failure to have predictability has been linked to employee turnover and poor employee satisfaction leading to hidden costs. Weinbroum, Ekstein, and Ezri (2003) stated that the most significant barrier to real cost reduction in the OR is waste of surgical operating time. Wasted time was determined by evaluating the possible existence of periods of OR inactivity, idle time, and spill-over time and analyze the impact on OR performance and cost.

It is imperative to unmistakably and accurately describe turnover time since the term has been used to depict differing ranges at the same time. It is the most clear definition and data could be easily assembled from the modernized OR records. Others have described turnover time as the time anticipated that would set up and clean up for a comparable framework notwithstanding openings and deferrals (Mathias, 2000), or the sum of set-up time and room clean up time notwithstanding put off time for a comparable case (Mowbray, 2003). For Adams, general turnaround time starts when a master leaves the OR in the wake of completing a case and terminations when the authority arrives in the OR for the going with case (Adams, 2004). This nonappearance of consistency just adds to the dispute of turnover time considers. Or, on the other hand turnover time insinuates the time traverse that starts when one patient leaves the OR and closes when the accompanying patient on the logbook enters the OR (Dexter, 2003).

Based on data collected from 134 US facilities for turnover time, the median overall was 28.5 minutes, while at the 95th percentile, turnover time was 21.4 minutes. Turnover time is measured from when the prior patient exits the room until the succeeding patient enters the room (Tina

Foster,2012)^[20]. Another data collected at 31 US hospitals showed turnover time at the best-performing OR suites average less than 25 min (Dexter et al.,2005)^[30]. An American score system developed to quantify performance in surgical facilities classifies turnover time (incoming-outgoing patient) into three categories: poor, time > 40 minutes, medium, from 25 to 40 minutes, and high performance, < 25 minutes (Macario, 2006).

According to Dawlaty et al. (2008) Startling working room (OR) cancelations are customarily partitioned into avoidable cancelations (e.g., planning mistakes, gear deficiencies, and cancelation because of insufficient preoperative assessment) and unavoidable cancelations (e.g., crisis case superseding the elective calendar, surprising changes in the patient's restorative status, or patient nonappearance. The detailed occurrence of cancelation in various healing facilities ranges from 10% to 40%. There are many reasons of cancelation of elective surgical cases; and they contrast from clinic to healing facility. A working room (OR) case cancelation rate is <5% from the best performing USA doctor's facilities and delayed turnovers [proportion > 60 min] is < 10%(Macario,2006).

Cancellations of the surgery were classified as:

- Potentially avoidable (no OT time, no postoperative bed, list mistake, managerial cause, hardware or transport issue, correspondence disappointment, tolerant not prepared, and no specialist accessible); or
- Non avoidable (drop by patient, quiet clinical change, crisis need, persistent not prepared, and no specialist accessible).

According to Shakti Gupta and Sunil Kant, utilization essentially means “The use of the equipment to the full potential. Utilization index or coefficient is one of the important parameters to monitor the functional status of the equipments. It is the parameter to assess the productivity of the service or equipment.

$$\text{Use coefficient} = N/M \times 100$$

Where N=Average number of hours the equipment/service is used per day.

M= maximum number of hours the equipment or service can be used per day

RESEARCH QUESTIONS

- i. What is the Utilization of OT in Asian heart institute, Mumbai?
- ii. What are the factors causing prolonged turn over time?
- iii. What are the factors causing delay of cases in OT?

OBJECTIVES

- To determine the non productive time during the turnover and overhaul to increase overall productivity.
- To determine the delays in surgical procedure.
- To determine the reasons behind the long turnover periods and delay in surgeries

METHODOLOGY

Study area: Asian heart institute and research centre, Mumbai.

Study Type : Descriptive and Observational Research

Study Sample: Surgical procedures in all the OT's in the month from February to may 2017.

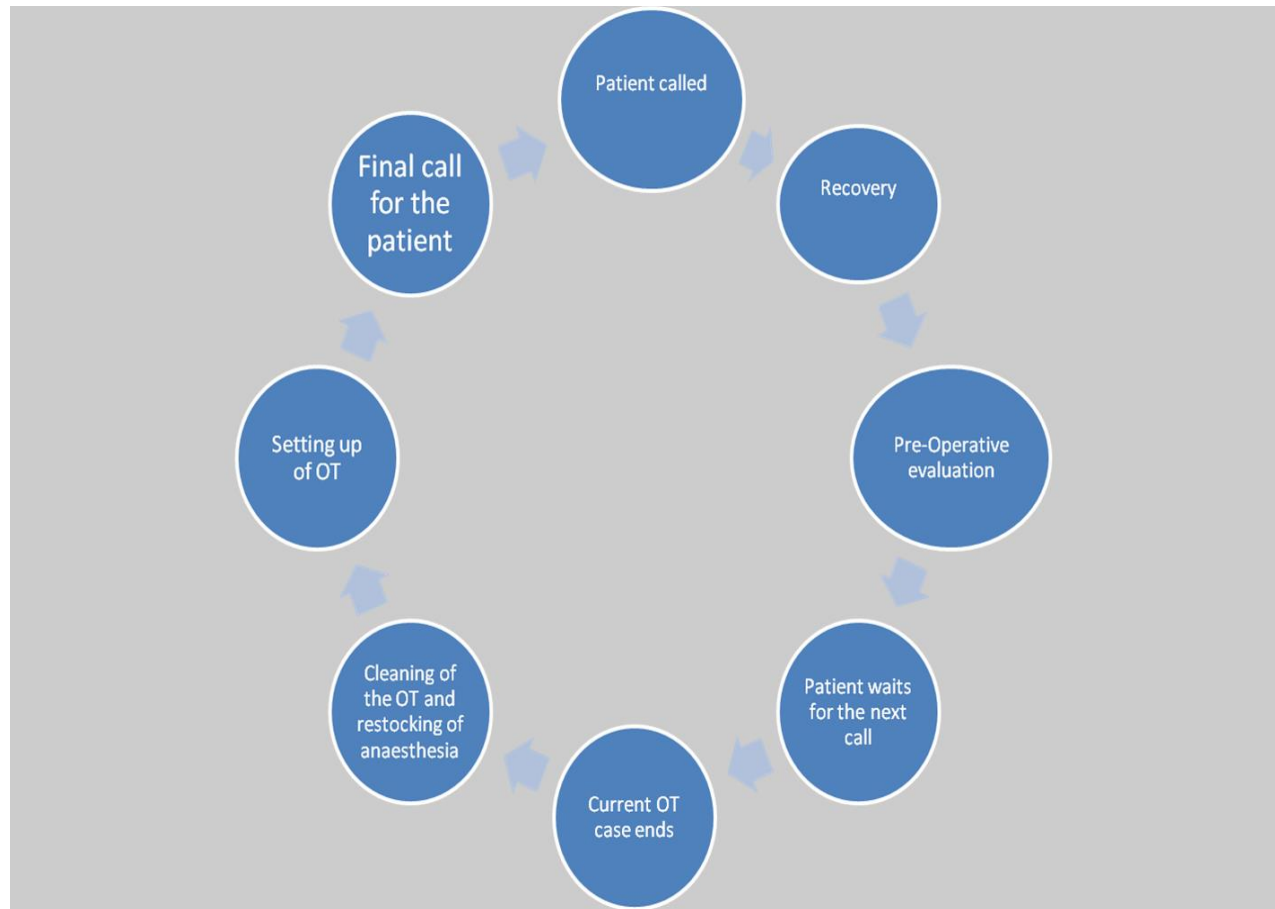
Study Period : 3 Months

Sampling Technique: Non probability convenient sampling

Data Collection : 120 surgeries

Statistical Tools: MS-EXCEL, MS-WORD, Pie charts and graphs, fishbone

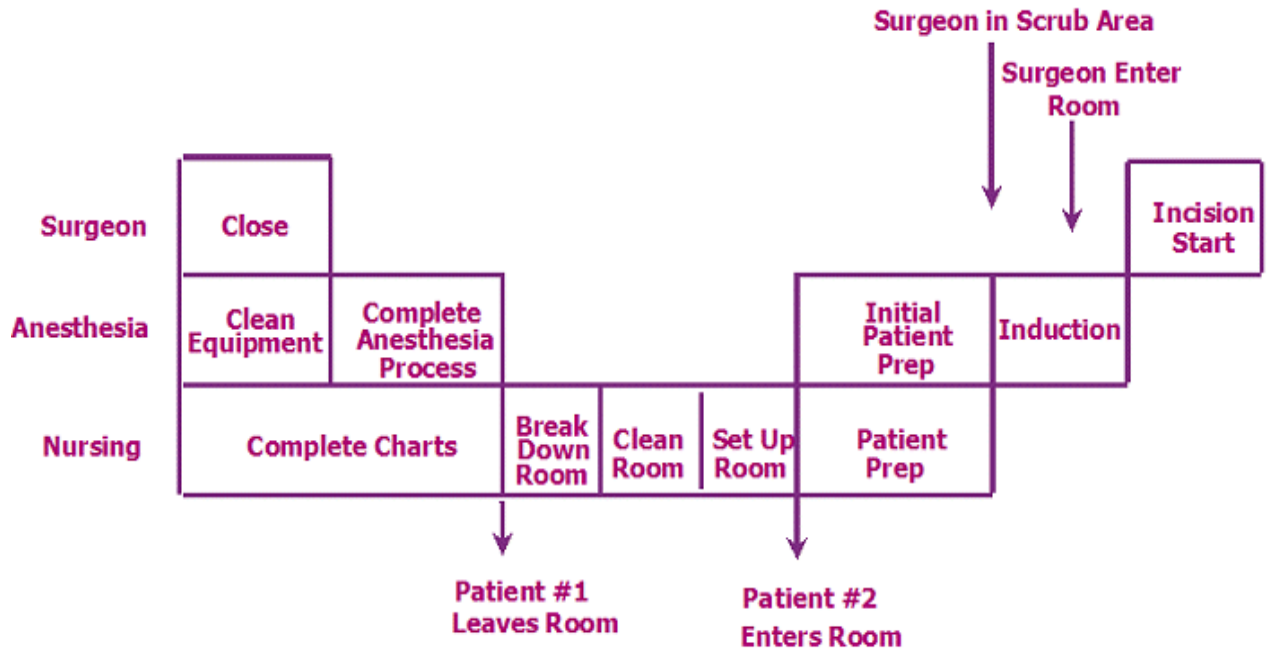
OPERATION THEATRE PROCESS FLOW :-



Patient calling time: Time at which the patient is called to the OT by the team leader nurse at the nursing station of OT complex. The TL nurse calls at the respective ward where the patient is admitted and ask the nurse of the ward about patients present clearance status. If the clearance such as consent, 2DEco report, HHH report, TPA etc is clear, the nurses of the ward asked to bring the patient to the OT complex with the help of a porter.

Pre Operative Recovery area: after the patient is brought to the OT complex, the patient is first shifted to the recovery area where he waits for the next call by the TL nurse. At the recovery, the ward nurse handover all the documents of that patient to the preoperative nurse at the recovery area. The preoperative nurse does the required assessment and rechecking of all the documents. Patient's vitals get checked, patient is made understand about the anesthesia and the surgery by the anesthetist and the surgeon. The average time in recovery is usually 30 min prior to the surgery.

Turn over time: Turnover time may be defined as the length of time that starts when one patient leaves the OR and ends when the next patient on the schedule enters the same OR. Ideal turn over time is 20 min.



Exercises are performed consecutively

- Nurses conveys already finished case instruments to the cleaning range, then
- Picks instruments/supplies for next case, then
- Scrub, circulatory Nursing, housekeeping and anesthetist finishes room set up, then
- Anesthetist visits quiet in Pre-agent Holding, then
- Patient is transported into Operation theater, and so on., and so on.

FINDINGS:-

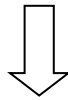
- Average non productive time = 36 min
- Standard deviation of turn over time =24.673
- 71.3% of cases are above 20 minutes of Turn over time out of 120 surgeries.
- Patient's clearance is a big issue that leads to delay and cancellation that eventually results in increased turnover time and non productive time.



Delay in clearance



Delay in calling time for the patient from ward to recovery



Patient takes more time to reach the recovery and delay in pre- operative procedure

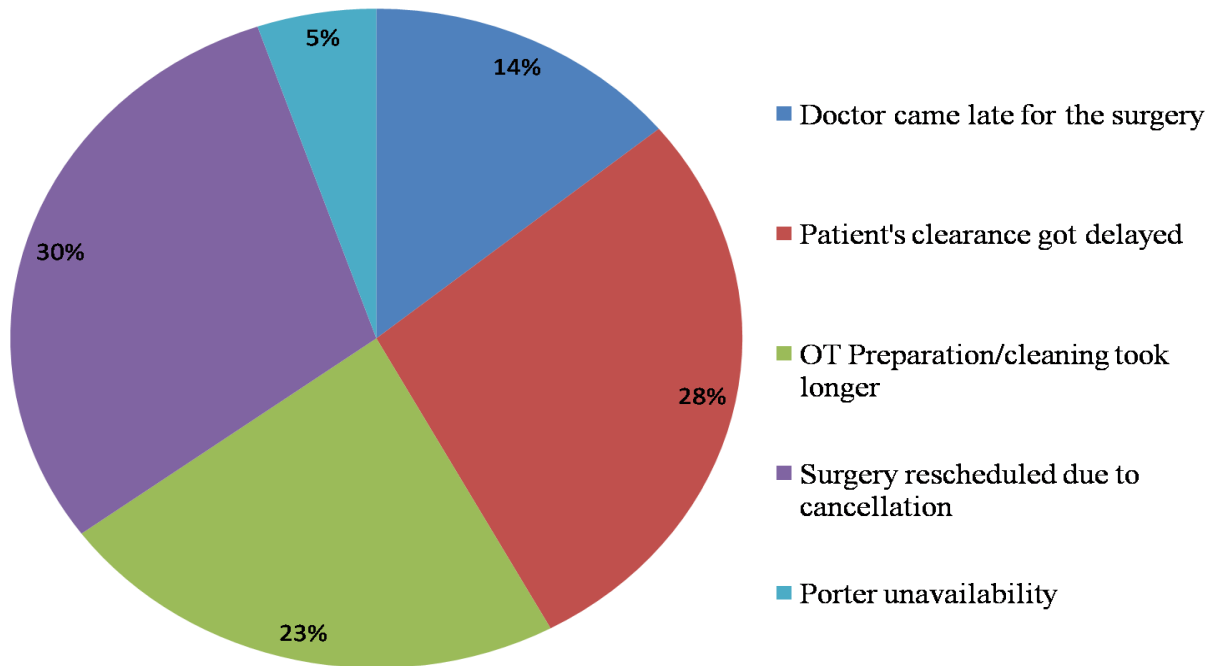


Turn over time for the OT increases

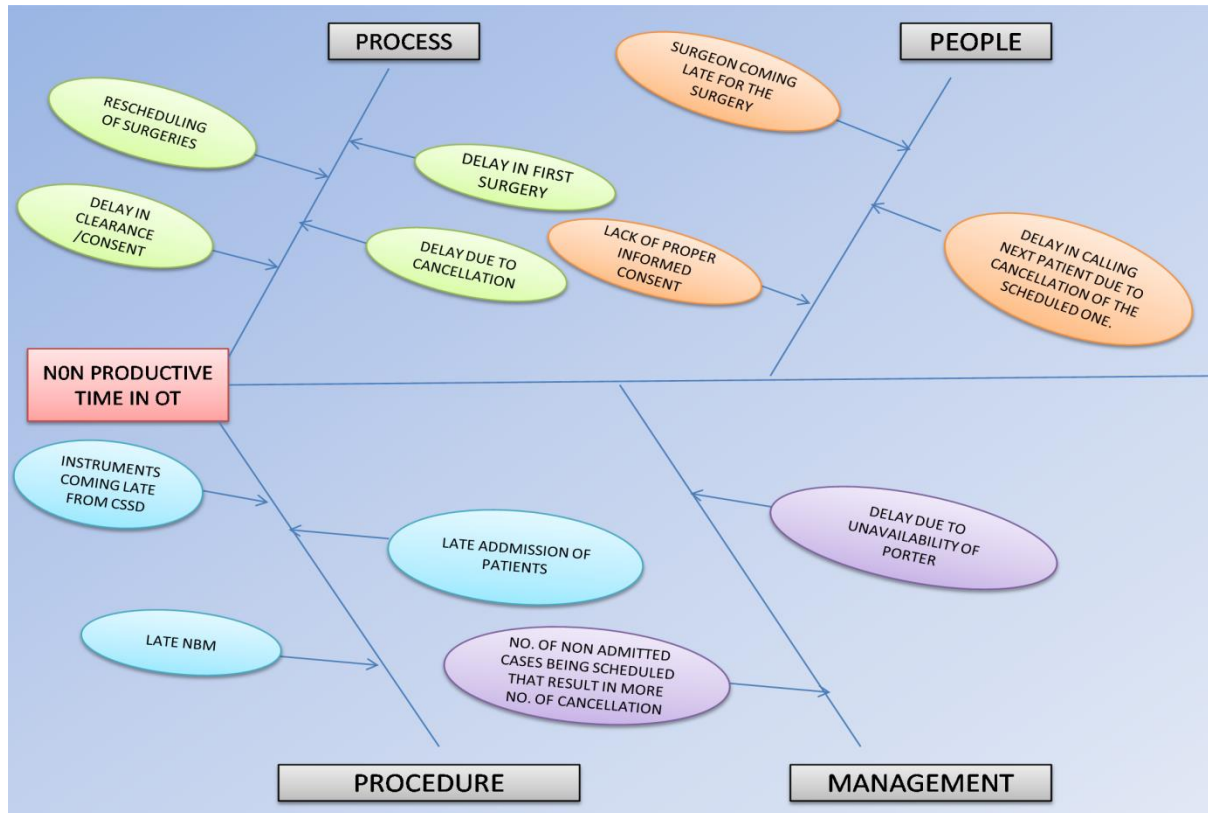
- Significant number of non admitted cases in the OT scheduled list leads to more chances for the cancellations of procedures that gradually bring more rescheduling in the scheduled list which is quite time consuming and time wasting process.
- Evident chaos at the nursing station.
- Maximum number of first surgeries doesn't start on actual scheduled time which leads to delay for the consecutive surgeries.

Data Analysis and Data interpretation:-

Reasons for increase in Non Productive Time



**FISH BONE DIAGRAM SHOWING THE EFFECT (NON PRODUCTIVE TIME) AND
THEIR CAUSES**



Conclusion

- OT attained utilization of 62% in the retrospective study. Ideally it should be near to 75% as per the literature. However in spite of higher success rate and rigid infection control policies, the utilization need to be improved to maintain the return on investment. The average turnover time of OT's was 48 minutes. This long Turn over time created the scope of improvement in obtaining more efficient Utilization.
- Turn over time was long mainly due to time taken in preparation of OT , Rescheduling and surgeon coming late for surgery.
- Rescheduling was done mainly due to cancellations of the first case and more add on/ emergency cases. Cancellations of scheduled first case made further delays in preparation of patient in ward and administration of any premedication which led to long delays .This was due to lack of communication between the patients prior to one day regarding surgery confirmation.

Recommendation:

Although AHI has the best quality practices as compared to the standard guidelines, it should focus on enhancing the efficiency and productivity in OT

.

- Patient clearance should be done prior to one day before the surgery. .(CONSENT, TPA, HHH REPORT, 2D ECHO REPORT etc....)
- Reducing the number of cancellation by reducing the delay time that takes place in handing over of patient's clearance.
- Limiting the number of non admission cases that eventually falls into cancellation and that leads to rescheduling of the surgeries.
- Including minor elective surgeries in order to increase the OT utilization.

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