

Study on The Process Flow and Utilization Effectiveness of Operation Theatre

By

Kusum Kumari

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

Academic year, 2016-2018



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TO WHOMSOEVER MAY CONCERN

This is to certify that Dr. Kusum Kumari, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at Dr. Virendra Laser Phaco Surgery Centre, Jaipur from 1st February 2018 to 4th May 2018.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



(Col.) Dr. Ashok Kaushik

Dean, Academics and Student Affairs

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TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Kusum Kumari** student of **IIHMR, Jaipur** has completed her internship and dissertation at "**Dr. Virendra Laser, Phaco Surgery Centre, Jaipur**" from **1st February 2018 to 4th May 2018**.

During this period, she has successfully completed her projects on

1. A study on process flow and utilization effectiveness of operation theatre
2. A study on Gap analysis of hospital in compliance with NABH- SHCO Standards

Along with this, She was engaged in:

- Designing and implementing various forms of hospital as per NABH norms
- Training of Hospital employees for NABH pre assessment.

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

We wish her all the best for future endeavours.

For **Dr. Virendra Laser Phaco Surgery Centre- Eye Hospital, Jaipur**

Dr. Virendra Laser & Phaco Surgery Centre Pvt. Ltd.



Director

Dr. Virendra Agrawal

Managing Director

The IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "A Study On The Process Flow And Utilization Effectiveness Of Operation Theatre " submitted by Dr. Kusum Kumari, Enrollment No. IIHMR-U/01/2016-18/0437 under the supervision of Dr. Arindam Das for the award MBA in Hospital & Health of University carried out during the period from Feb.1,2018 to Apr. 30,2018 embodies my original work & 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 institute of higher learning.

Kusum Kumari

Signature

**INSTITUTE OF HEALTH
MANAGEMENT RESEARCH**

(WHO Collaborating Centre for District Health System Based on Primary Health Care)



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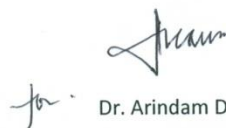
I wish her all success in all her future endeavors.

A handwritten signature in black ink, appearing to read 'Ashok Kaushik'.

(Col.) Dr. Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur

A handwritten signature in black ink, appearing to read 'Arindam Das'.

Dr. Arindam Das

Associate Professor and Associate Dean Research

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ACRONYMS

1. DRVLPSC – Dr. Virendra Laser &Phaco Surgery Center
2. OT – Operation Theatre
3. TSSU – Theatre sterile supply unit
4. STP – standard temperature and pressure
5. RACE – Rescue Alarm Confine Extinguish
6. PASS – Pull Aim At Base Squeeze Sweep Side To Side
7. MPS - Medical Practitioners Society
8. OR – Operating Room
9. OPD - Out Patient Department
10. OCT – Optical Coherence Tomography
11. IPD - In Patient Department
12. UID – Unique Identification Number
13. IOL – Intraocular Lens
14. MRD – Medical Records Department
15. USG - Ultra SonoGraphy
16. MLC – Medico Legal Case
17. MOTC- Main Operation Theatre Complex

ACKNOWLEDGEMENT

Apart from the efforts of me, the success of any project depends largely on the encouragement and guidelines of many others. I take this opportunity to express my gratitude to the people who have been instrumental in the successful completion of this dissertation project.

I am heartily thankful to Dr. VirendraAgrawal (Medical Director) whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of the subject, feel motivated and encouraged every time. Without his encouragement and guidance this project would not have materialized.

My sincere thanks to my mentor, Dr. Arindam Das for his support and to Dr. Ashok Kaushik (Dean Academics), and respected faculties for their guidance. Lastly, I offer my regards and blessings to all of those who supported me in any respect during the completion of the project.

Dr. KusumKumari

Management Trainee

Dr.Virendra Laser, Phaco Surgery Centre

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1.1 INTRODUCTION

The surgical suite typically consumes 9-10% of the hospital budget. Surgical suites once needed only 20% utilization to produce a positive bottom line. However, economics of the OR environment have changed dramatically in the past 25 years. Technological advances like minimally invasive surgery which need costly equipment, payments based on diagnosis related groups, captivated payment and discounted fee-for service have all significantly reduced margins in the surgical business. It is therefore, not surprising that this area is earmarked by many hospitals as a place to reduce expenses. All of us who work in the OR must be cost efficient and must maximize productivity for long-term success.

Achieving these goals requires reliable data to help various stakeholders, chief executive officer, chief financial officer, nurses, surgeons and anesthetists-all have to align what sometimes appear as disparate goals.

We need to examine traditional OR management practices. Traditional utilization measurements that look only at the time patients are in the OR reward surgeons for occupying OR's but do not address cost efficiency or productivity. One measure of how well an OR functions is the "utilization".

“OR utilization is defined by Donham and colleagues as the quotient of hours of OR time actually used during elective resource hours and the total number of elective resource hours available for use Optimum utilization of the OT time has always been a priority area for Hospital Administrators.”

“Baker had opined that accurate records, weekly analysis of recorded data, establishment of operating room rules and regulations and strict adherence to and enforcement of approved policies and procedures are essential ingredients for an efficient operating of an operating room. Thus it is clear that study of operating room records can provide means of assessment of the degree of utilization of operation theatres.

The hospital budget comprises of large expenditure for the operation theatre complex and thus requires maximal utilization to ensure optimum cost-benefit. There is paucity on the study of data in India on the use of available operating time and the reasons for less-than-optimal utilization.

A study on operation theatre utilization in regard to the starting and closing time of the operation theatre, interval between surgical procedures, cancellation of surgical procedures and reasons thereof. Reasons that account inefficient use of operating facilities are delay in starting lists, under-scheduling, interruption due to emergency surgeries, administrative reasons, induction of anaesthesia and recovery policies. The available operating time could be increased by 20% by adopting the corrective measures.

Improving cost effectiveness, while maintaining a quality of care, is a universal objective. These goals imply an optimization of planning and a scheduling of the activities involved. This is highly challenging due to the inherent variable and unpredictable nature of surgery.

1.2 REVIEW OF LITERATURE

The study conducted on operating time and less utilization has concluded that delay in starting lists, under-scheduling, interruption due to emergency surgeries, administrative reasons, induction of anaesthesia and recovery policies have caused the increase in the inefficiency in the use of operating facilities. The operation time availability could be increased to 20% by adopting the corrective measures. **(1)**

This study was conducted to determine the main factors hindering maximum utilization of the theatre, with a view to improve efficiency and effectiveness of the operating theatre team. Data was collected prospectively over a period of 3 months (16th May - 22nd August 2005). A total of 28 elective operation lists consisting of 47 eye surgeries was surveyed. Theatre time utilization was studied with respect to commencement and end of cases, turnover interval, start delay interval and main reasons for delays. **(2)**

A total of 57 hrs 5 mins (46.8% of total theatre time used) was spent on doing the actual surgeries and the turnover activities between cases. The total amount of time lost before the commencement of the lists was 64 hrs 50 mins (53.2% of total theatre time surveyed). Late arrival of operating theatre team personnel was noted to be the main single contributory cause of start delays, accounting for 32 hrs 35 mins of lost time. He concluded that the ophthalmic theatre time at our centre is grossly underutilized and measures aimed at reducing start delays and the logistic problems would help ensure optimal utilization of time and other resources. **(2)**

Dissatisfaction and discontentment are found among patients and doctors in spite of optimum utilization MOTC due to long waiting lists in every surgical. Even with the existing bed strength and number of OTs, one way of solving this problem is running the OTs in two shifts or increasing the OT time. This would result in the need of extra manpower, supplies and costs. To make the adequate number of staff available, restructuring the reorganization of O.T. personnel should be performed by considering the adequate number of staff in each shift. While implementing such measure we need to be ensured that this would not in any way downgrade or harm the academic standards in the undergraduate and postgraduate teaching which is of prime importance. This system can be tried on experimental basis for a short period to test its feasibility. (3)

National Health Services Management Board has pointed out that full utilization of operation theaters would involve the increase in the recruitment of staff, the provision of substantial numbers of extra beds as well as a substantial amount of extra funding. Due to unrealistic scheduling and shortage of OT time, nearly 26% of the total cases posted in all the OTs were cancelled. The single most important cause for the cancellation was found to be "time factor" due to restriction of general anesthesia time. In our study also, the most common reason for cancellation was lack of operating time (78.1%) due to restriction of general anesthesia time, while the overall cancellation rate was 22.5% (73/325 cases). (4)

"The need to control high costs of running operating rooms while providing for timely patient care led us to assess the time wasted in the operating room (OR). OR "time-waste" is defined as the time in which the scheduled OR was not busy with the scheduled patient. As per the study was amounted to 79 hours over the 30-day study period (15% of total time). It was wasted owing to inappropriately prepared patients (12%), unavailability of surgeons (7%), insufficient nursing staff, anesthesiologists, or OR assignment to emergency surgery (59%), congestion of the postanesthesia care unit (10%), and delay in transport to

the OR (2%) Another issue delineated was the frequent occurrence of surgical cases running longer than their scheduled time (termed "spill-over"), outrunning the staffing expectations after 3:00 PM and delaying admission of add-on and emergency procedures, adding 33% to the time wasted. A quality-assurance committee review resulted in implementation of new guidelines, and within 3 months several underlying causes were rectified, and time-waste and spill over time was reduced by 35%. Surgical time predictions were also improved. Shortage of nurses and anesthesiologists, and OR emergency reassignment remained the major causes of OR waste time. It was concluded in the study that Continuous surveillance on OR suite-patients' prompt care, repeated evaluation, and wise staff deployment-could maximize OR efficiency. **(5)**

The study have shown that by improving list management, OR rescheduling, reducing patient pathway time, reinforcing Day Surgery Program and establishing Pre-anesthesia clinic, improves the overall OR efficiency. **(6)**

1.3 AIM- Measuring the time utilization effectiveness of OT at Dr. Virendra Laser Phaco Surgery Centre , Jaipur

Specific aim of the study is to map process flow in OT and then find out the time spent on actual surgery ,time spent on supportive services and time waiting while operating room was being made for the surgery. The average idle time (unproductive time) needs to be calculated. Reasons for under utilization of operating rooms, if any need to be identified to improve its efficiency.

1.4 OBJECTIVES:

- 1) To map the process flow of OT
- 2) To evaluate the time utilization of OT
- 3) To identify bottlenecks, if any , in efficient and effective utilization of OT and to suggest corrective actions for the same

PURPOSE OF THE STUDY:

This study was planned to evaluate the current status of utilization of time at the operation theatres in Dr. Virendra Laser, Phaco Surgery Centre, Jaipur which would go a long way in improving the utilization of operating room. This will also assist and facilitate the OT personnel to identify the time specific problems and overall gaps for further improvement in the operation theatre functioning.

PROBLEM IDENTIFICATION:

The surgical suite typically consumes 9-10% of the hospital budget. Over time in OT leads to less of OPD time for surgeons which leads to long waiting time in OPD. Delay in start of OPD affects the whole functioning of the peripheral hospital. Hence proper scheduling and time utilization of OT is of utmost importance for smooth functioning of the hospital. In order to improve the utilization of operating room it is essential to know how much time is spent on which activity.

JUSTIFICATION

Workload at operation theatres in DRVLPSC is high and no proper scheduling of the operative cases has been noted and there was no activity wise checklist found and filled during surgery so, it is essential to know how much time is spent on which activity. To maximize/improve the utilization of operation theatre it is essential to know how much time is spent on which activity and there by identify the factors resulting in underutilization or over utilization of the facility. The priority for hospital administrators is the optimum utilization of the OT time.

Delivery of services: -

The delivery of care in the operating room is a functional team concept. The doctors and nurses use many interventions when caring for the patient having surgery, including proper identification and collecting pertinent data using appropriate assessment to develop a plan of care for the patient.

Governing principles of OT management managers are to

1. Ensure patient safety and the highest quality of care
2. Provide surgeons with appropriate access to the OT
3. Maximize the efficiency of operating room utilization, staff, and materials to reduce costs
4. Decrease patient delays

Enhance satisfaction among patients, staff and physicians. The delivery of care in the operating room is a functional team concept. The doctors and nurses use many interventions when caring for the patient having surgery, including proper identification and collecting pertinent data using appropriate assessment to develop a plan of care for the patient.

1.5 METHODOLOGY

- Type of study – DESCRIPTIVE CROSS SECTIONAL PROSPECTIVE STUDY
- Setting – Dr.Virendra Laser &Phaco Surgery Center, Jaipur
- Duration – 3 months, 1st February 2018 to 4th may 2018
- Source of data –

Primary data: -

1. By visiting individual operation theatres to observe directly
2. Records from registers already maintained
3. Discussion with the management staff, and other clinical and paraclinical staff of the OT.

Secondary data: -

1. Internet search engines
 2. Hospital management information system : netram was also used to get information regarding patients from January 2017 to January 2018
- Sample Selection: have included all the surgical patients of DRVLPSC as samples from 1 Feb 2018 to 30 April 2018.

Inclusion Criteria: All the surgical patients of cataract, injections, VR of DRVLPSC

Exclusion Criteria: All the surgical patients of Lasik, Epilasik, C3R, Smile of DRVLPSC

- Data Collection Procedure: The technique will be used for conducting the study will be non-random convenience sampling technique as sample of respondents will be chosen according to convenience

➤ **Data Analysis Procedure**

- A self-developed excel sheet for the analysis.
- Format for recording the turnaround time.
- Graphical representation of data analysis.

➤ **Staffing :**

- 1) Regular aneashtetist
- 2) OT technician
- 3) OT nurse

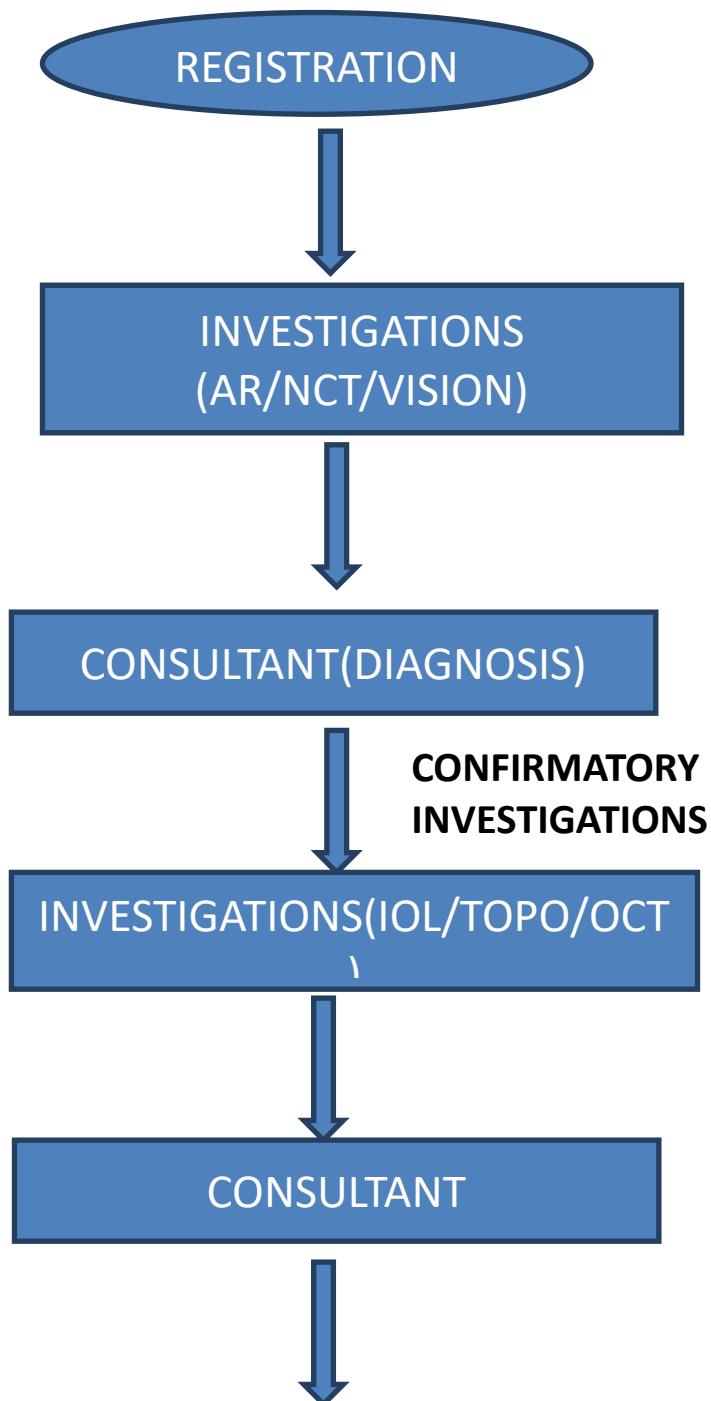
➤ **Infrastructure**

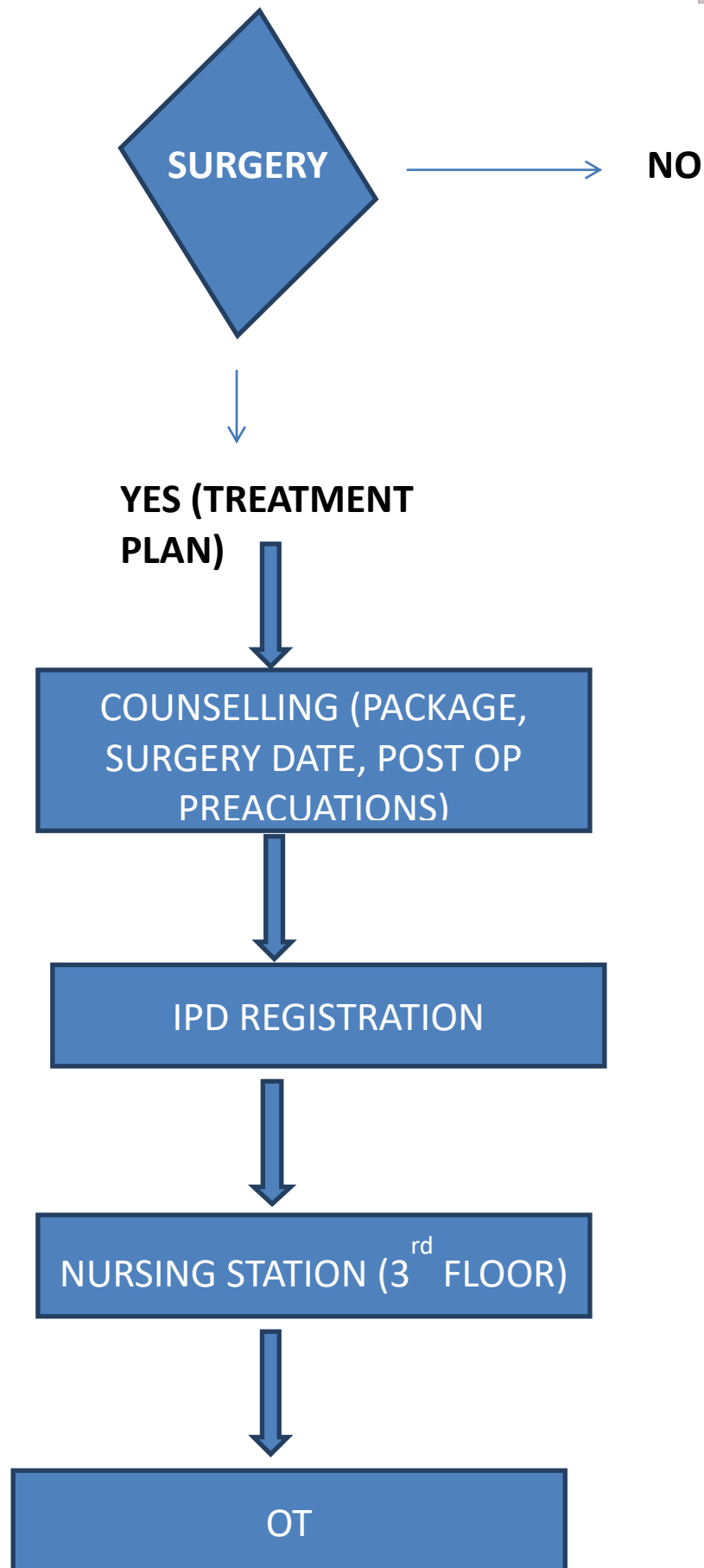
OT complex comprises of

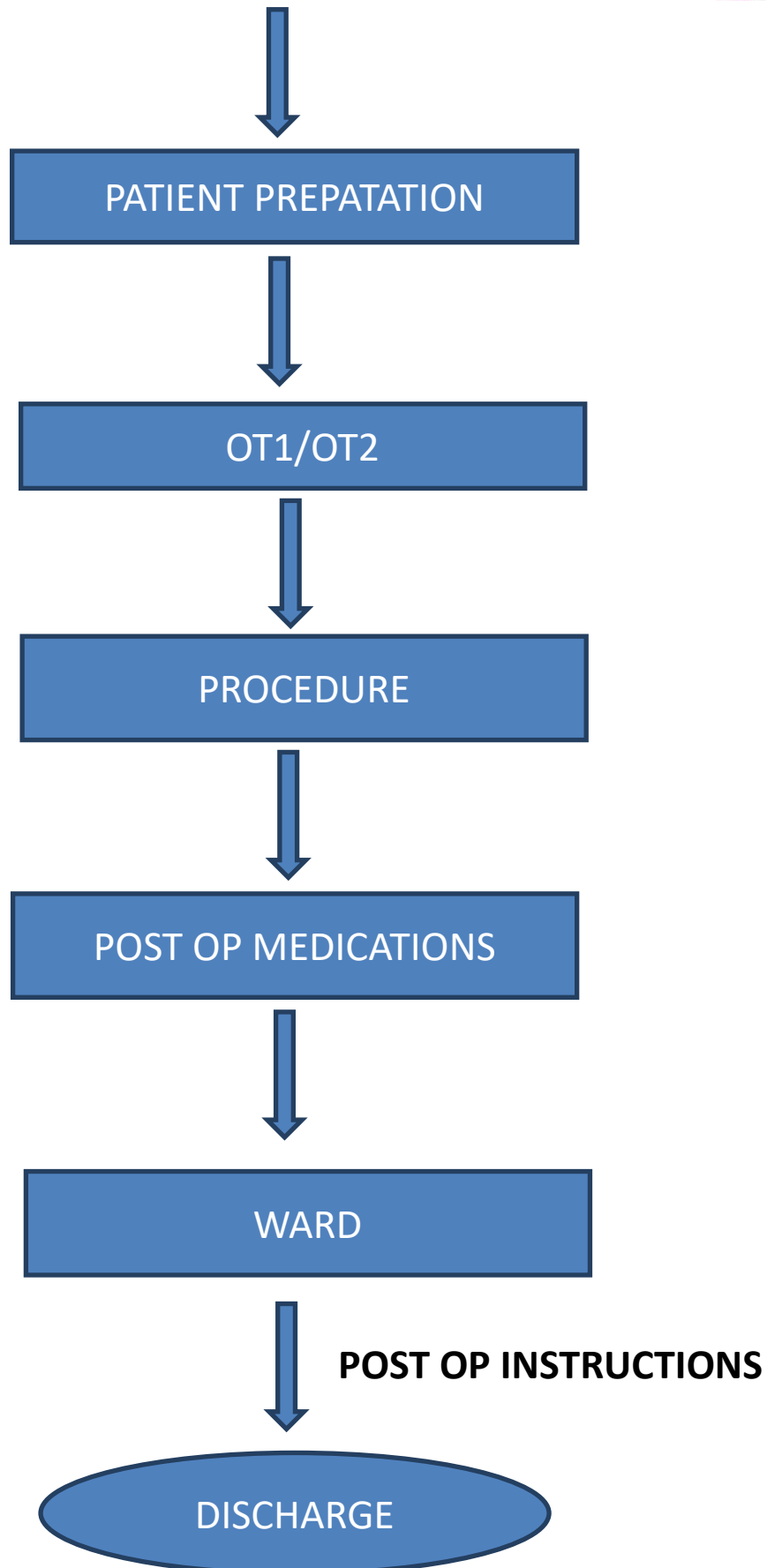
- 1) 2 OT
- 2) Autoclave room
- 3) Changing Room
- 4) Doctors Lounge
- 5) Recovery Bed : 2
- 6) OT Pharmacy

OBJECTIVE 1:

To map the process flow in OT:







1. SURGEONS RESPONSIBILITIES

PREOPERATIVE ASSESSMENT

- ✓ Assess the treatment plan of the patient. Advise the patient and his family about the procedure, risks and benefits involved as well as alternative treatments available. Refer the patient for necessary evaluations and other arrangements as required

INTRA OPERATIVE ASSESSMENT

- ✓ As per surgery plan

POST OPERATIVE ASSESSMENT

- ✓ Immediate follow up of the progress of patient in hospital and also to advise medication if required.
- ✓ Discharge planning including advice for care

1 ANAESTHESIOLOGIST'S RESPONSIBILITIES

- ✓ Pre anesthetic evaluation and treatment. If required Medical management of patients and their anesthetic procedure. And lastly to provide post anesthetic evaluation and treatment

2 OPERATION THEATRE TECHNICIAN

A trained ancillary person who is responsible and accountable for the quality of care makes sure that all the facilities provided to the patient in the operating room are delivered in proper manner. Major functions includes, but are not limited to,

preparation of the instrumentation, equipment and environment for the surgical procedures performed. The trained person works directly under the supervision of the

consultant anesthesiologist in assigned area and is ultimately answerable to the consultant.

3 RESPONSIBILITIES OF OT NURSE

- ✓ Check the list of surgeries for the day and OT for the readiness for surgery. They also have to take a look on the availability of sterile linen and instruments. By Maintaining operation records. Nurses are responsible for making daily roster and arrange all call duties
- ✓ Get the replacement of used items from OT store
- ✓ Organize educational and training programs
- ✓ Maintain cleanliness of OT
- ✓ Ensure proper waste disposal

OBJECTIVE 2:

To evaluate the time utilization of OT

Workload at operation theatres in DVLPS hospital is high and no proper scheduling of the operative cases has been noted and there were no activity wise checklist found and filed during surgery so it is essential to know how much time is spent on which activity. In order to maximize/improve the utilization of operation theatre it is essential to know how much time is spent on which activity and there by identify the factors resulting in under-utilization or over utilization of the facility.

OPERATING ROOM UTILIZATION

OT Utilization is a measure of the use of an operating room that is properly staffed with people needed to successfully deliver a surgical procedure to a patient

Raw utilization is the total hours of elective cases performed within OT time divided by the hours of allocated block time.

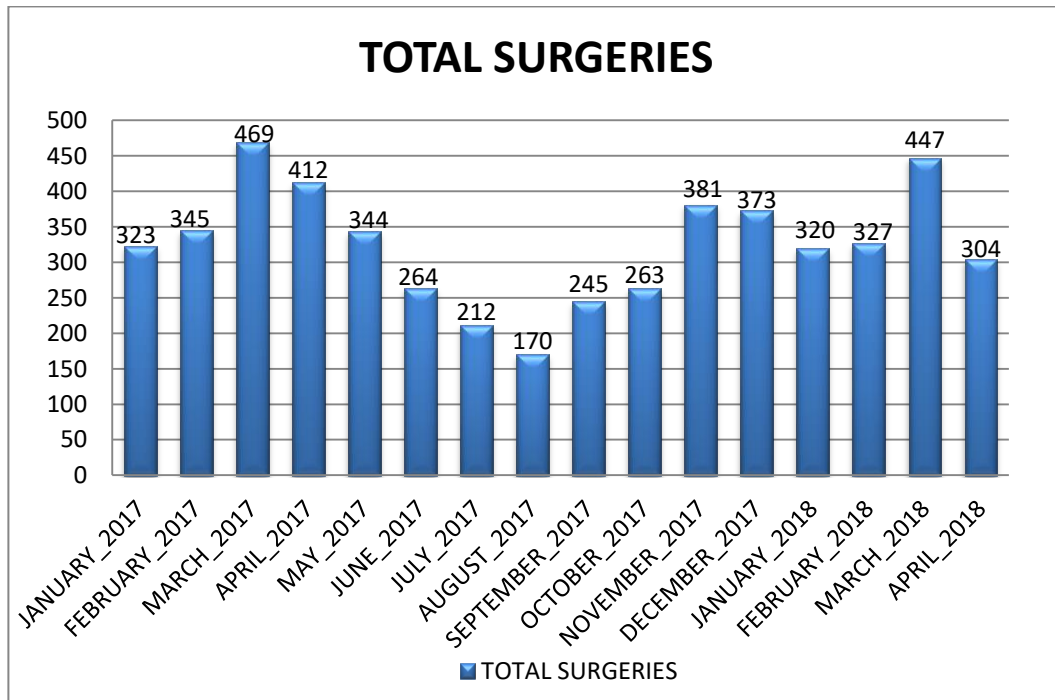
Raw utilization = (total hours of cases performed / total hours of OT time allocated)*100

**TOTAL NO OF SURGERIES DONE IN DRVLPSJ JAIPUR FROM
JAN 2017 TO APRIL 2018**

TABLE NO 1 :

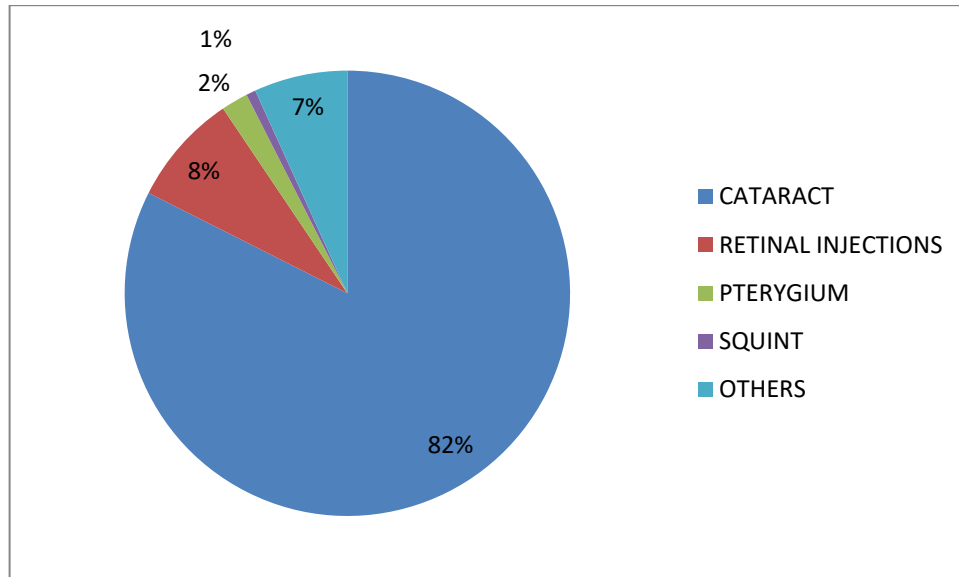
MONTH	CATARACT	RETINAL INJECTIONS	PTERYGIUM	SQUINT	OTHERS	TOTAL
JANUARY_2017	243	43	6	2	29	323
FEBRUARY_2017	280	34	9	3	19	345
MARCH_2017	386	49	5	1	28	469
APRIL_2017	359	18	4	5	26	412
MAY_2017	284	30	7	6	17	344
JUNE_2017	180	27	10	2	45	264
JULY_2017	150	36	4	0	22	212
AUGUST_2017	131	19	2	1	17	170
SEPTEMBER_2017	196	29	4	1	15	245
OCTOBER_2017	219	21	5	1	17	263
NOVEMBER_2017	330	17	10	3	21	381
DECEMBER_2017	327	18	7	3	18	373
JANUARY_2018	266	24	7	3	20	320
FEBRUARY_2018	281	17	8	1	20	327
MARCH_2018	397	18	7	3	22	447
APRIL_2018	257	23	6	1	17	304

GRAPH NO: 1



INFERENCE: From above data it is clear that maximum surgeries took place in the months of February, March, October and November

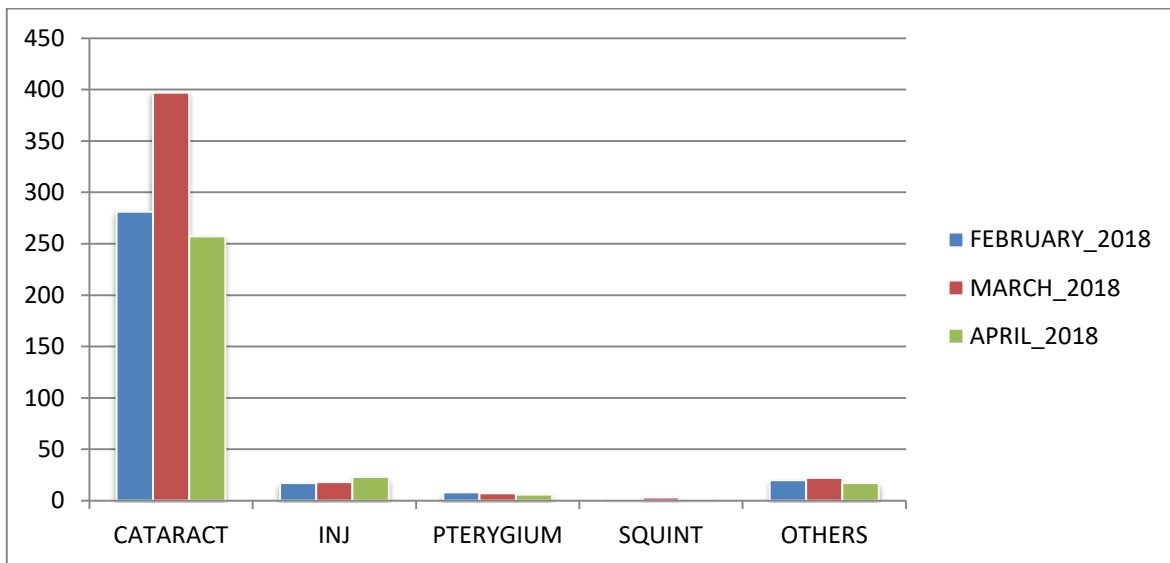
GRAPH NO 2: BREAK UP OF TOTAL SURGERIES



INFERENCE : From the above graph it is clear that cataract surgeries are higher in no i.e., 82%, retinal injections account for 8%, other surgeries like SOR, C3R, Tear repair, VR, syringing and probing, air wash, suture removal, chalazian holds for 7% ,pterygium and squint are 2% and 1% respectively.

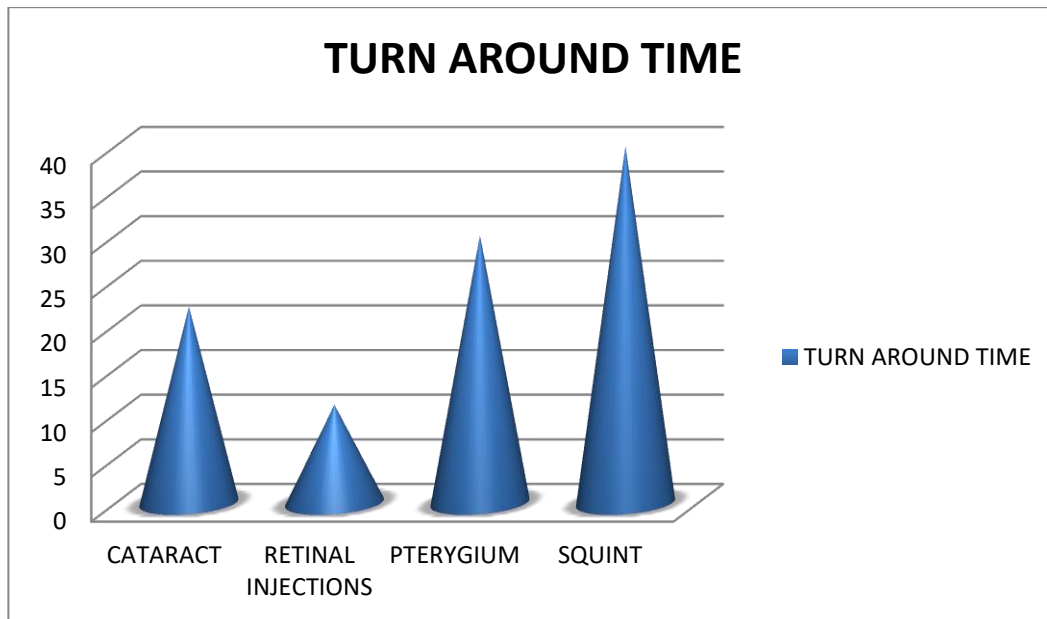
Cataract surgeries are curative surgeries which are done at higher no in this centre and no of these surgeries are increasing gradually with time.

GRAPH 3: SURGERIES IN THE MONTH OF FEBRUARY, MARCH, APRIL



INFERENCE :During the study period of three months maximum surgeries took place in the month of march and cataract account for almost 86% of total surgeries.

GRAPH 4: TURN AROUND TIME OF DIFFERENT SURGERIES



INFERENCE: Above graph depicts that average time taken for cataract, retinal injections, pterygium and squint are 22mins, 11mins, 30mins and 40mins respectively. Squint is a complex procedure so it consumes more time compared to other surgeries.

CALCULATIONS

Time Spent On Supportive Services

1. Average time for fumigation : 60 mins
2. Average time for autoclaving : 90 mins
3. Average time for making operating room ready : 20 mins
4. Average time for making patient ready : 10 mins
5. Average time for cleaning OT: 45 mins

Therefore average time spend on supportive services = 3hrs 45 mins

Total hours of time allocated for surgeries = 6 hrs 15 mins

(10hrs – 3hrs45mins = 6hrs15mins)

(Calculated as total working hours- time spent on supportive services)

No of working days (OT) = 74 days

Total working hours of OT = 10 hrs

Total available OT hours = $74 \times 6.15\text{hrs} = 462.5\text{hrs}$

OT utilized per day during study = $16132/74 = 218\text{mins} = 3.6\text{Hrs}$

Average cases per day during study = $1078 \div 74 = 14.56 = 15\text{cases/ day}$

RAW UTILIZATION:

(Total Hours of Cases Performed $\div$ Total Hours Of OT Time Allocated)*100

$= (218/375) \times 100$

= 58%

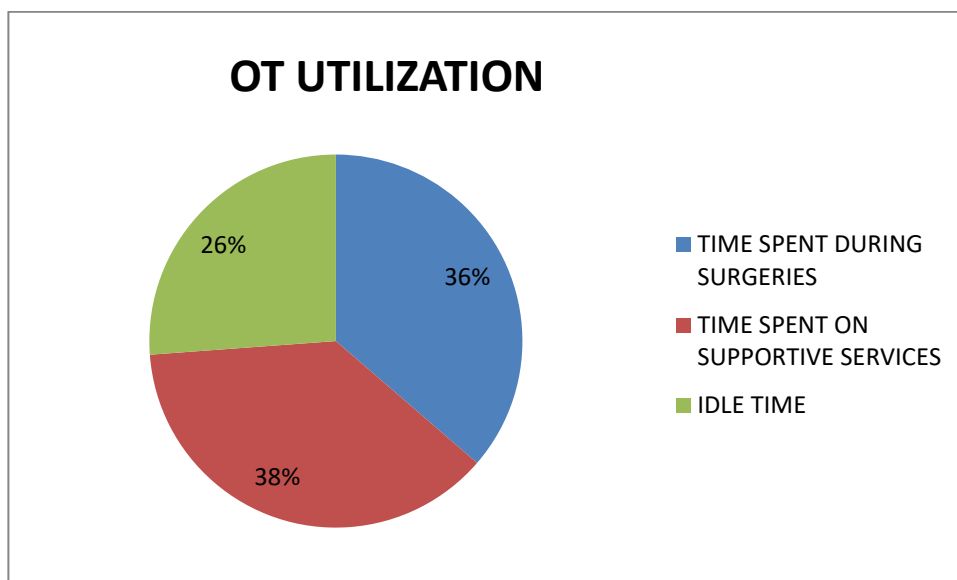
1.6 RESULTS:

Time Spent During Surgeries: 16132 Mins

Time Spent On Supportive Services: 16650 Mins

Idle Time: 11618 Mins

GRAPH 5: OT UTILIZATION



INFERENCE: The operation theatre was functional for 74 days during the study and **1078** cases were operated (15 Cases per day). Operating time utilization is 58%. Average time spent on supportive services is 3hrs45mins.

OBJECTIVE 3:

To identify bottlenecks, if any, in efficient and effective utilization of ot and suggest corrective measures for the same

1. LOW OT UTILIZATION:

Average OT time for a cataract surgery is around 25 min. this itself yields low OT time utilization. The main reason is delay in OT cases

Reason for delay or cancellation

- Patient pupil not dilated
- Patients does not arrives on time
- Doctors not intimated on time
- Doctors attending OPD patients
- Staff not reporting on time
- Patient reports not okay
- Patient not accompanied by attendant
- Sometimes delay in arrangement of lenses

2. HIGH IDLE TIME:

Under scheduling is the basic cause of high idle time

3. DELAYED CASES LEADING TO LOSS OF REVENUES

There are multiple direct and indirect costs involved in OT management such as:

Delay in starting lists, under-scheduling, interruption due to lack of materials, administrative reasons, delay in pupil dilation are the main factors that account for inefficient use of operating facilities. The correction of these factors would increase the available operating time.

1.7 CONCLUSION

Following problems emerge from the study:

- Low OT utilization
- High idle time
- Delayed cases leading to loss of revenues

The problem listed above are to be solved by strict adherence to OT protocols. The reason for low OT utilization can be grouped into patient related factors, staff related factors. Factors like late arrivals, and delay in dilation can be solved by strictly following OT protocols. Some factors like patient reports not ok (blood sugar levels high on the day of surgery) cannot be avoided.

The study shows high idle time which could easily have been avoided. Under-scheduling the number of cases is the basic cause. Main reasons are delay in authorization of insurance claims, issues of permission letters for panel patients and cancellation of surgeries due to unavoidable reasons fixing the no. of surgeries for each day for particular consultants has to be done to avoid under scheduling or over scheduling

Delayed and cancelled cases lead to loss of revenues for the hospital. Delays due to mismanagement have to be decreased by planning the surgeries and cross checking the preparation on the day prior to surgery. Cancelled cases have to be followed up by the counsellor at least twice in order to reschedule cancelled cases.

1.8 SUGGESTIONS

1) The OT and OPD days for doctors has to be segregated so that the doctor is available for OT the whole day. Handling both OT and OPD together every day either leads to long waiting in OT start or long OPD waiting hours. Long waiting hours either in OT or OPD also leads to dissatisfaction among patients.

2) The staff has to be trained on the protocols to be followed in OT strict adherence to OT protocols by the staff has to be implemented

3) Manpower required

- a) OT staff to simultaneously assist in OT supportive services. Supportive services consumes major part of the total working hours of OT. Decreasing the time taken in doing supportive services will increases the total time allocated for surgeries, which can be used for scheduling more cases. Hence an OT staff to simultaneously assist in supportive services is required.
- b) Part time anesthetist to fill in when needed. Delays due to unavailability of anesthetist are a common cause of delay in OT cases. Hiring on call anesthetist working on per case basis is a feasible solution to this problem.

More effective use of theatre time is possible if delays in starting lists are minimized, proper scheduling of surgical lists is done if more detailed preparation was undertaken by the anesthetic theatre and surgical staff, patients on long waiting lists are reassessed before admission to avoid cancellation of cases. The time spent on making room ready has be reduced but at the same time proper attention needs to be given to the aseptic precautions both at the start of day and in between cases.

Establishment of operating room rules and regulations, strict adherence to and enforcement of approved policies and procedures along with continuous monitoring has to be followed.

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