

Summer Internship Report



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ABBREVIATIONS



ABHR- Alcohol Based Hand Rub

AC- Air Conditioner

ACH -Air Change per hour

AI-Artificial Intelligence

BN- British Standards Institute

Covid-19 – Corona Virus Disease of 2019

EDD – Expected Date of Delivery

EN- European Standardisation

Organisations

ETO- Ethylene Oxide

FFP-Filtering Face Piece

FRSM- Fluid Resistant Surgical Mask

HFNO- High Frequency Nasal Oxygen

HCQ- Hydroxychloroquine HRCT- High Resolution Computed Tomography

ICMR- Indian Council of Medical Research

IPD- Indoor Patient Department

KPI-Key Performance Indicator

NIOSH- National Institute for Occupational Safety and Health

OPD- Outdoor Patient Department

OT- Operation Theatre

PPE -Personal Protective Equipment

RTT- Referral-To-Treatment

SARS-Cov-2 – Severe Acute Respiratory Syndrome Coronavirus 2

SICP- Standard Infection Control Precaution

SOP – Standard Operating Procedure

Vit-C – Vitamin C

Vit-D – Vitamin D

ACKNOWLEDGEMENT



I AM OBLIGED TO DR S D GUPTA
SIR FOR HIS MENTORSHIP AND
GUIDANCE

I AM THANKFUL TO DR SODANI SIR
AND DR KAUSHIK SIR FOR THEIR
INDEPTH TEACHING.

MY SINCERE THANKS TO
RESHAMBAI HOSPITAL FOR
ALLOWING MY INTERNSHIP .

PRESENTATION INCLUDES



- **OBSERVATIONAL LEARNING**
- .CHALLENGES AND PRINCIPLES OF MANAGING HOSPITAL DURING CORONA PANDEMIC
- INFECTION CONTROL MEASURES ADOPTED BY THE HOSPITAL
- **PROJECT REPORT**
- HOW TO IMPROVE EFFICIENCY OF OPERATION THEATRE

INTRODUCTION OF RESHAMBAI HOSPITAL



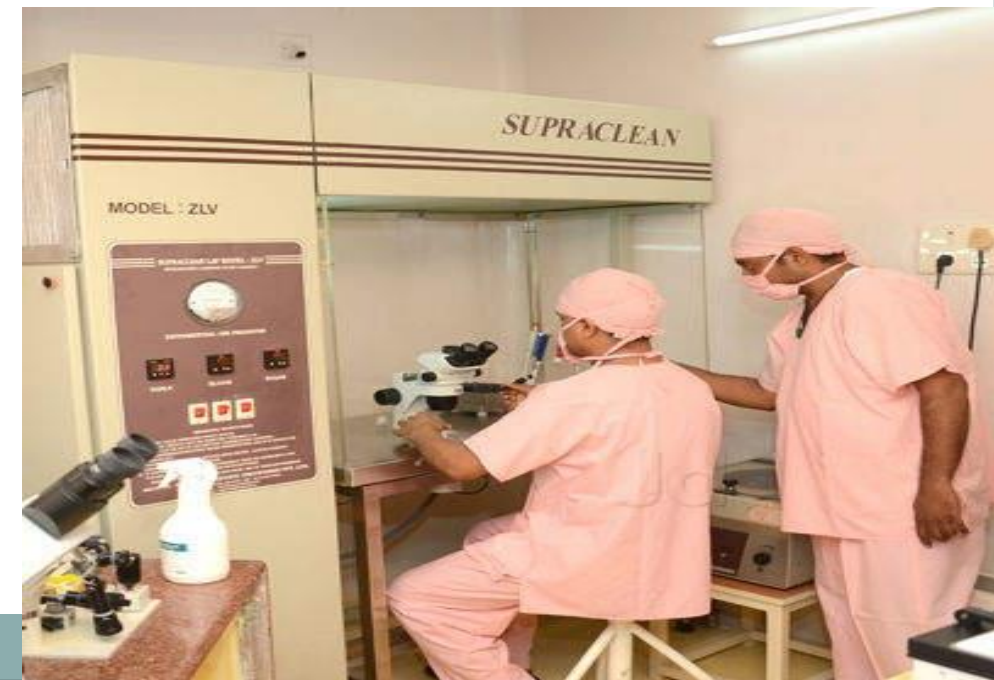
- Reshambai Hospital is a comprehensive and state of the art ISO 9001 facility with maternity care , infertility-IVF laboratory, minimally invasive (laparoscopic)surgery , Onco-Gynaecology , Uro-Gynaecology, Radiology ,Pathology and fetal medicine department, General Surgery , Anaesthesia , NICU for sick newborn for personalized services to a woman.
- Hospital offers 24 x 7 services to the patients .
- Everyday around 100 patients visit the hospital on OPD basis , 3 to 4 normal deliveries ,around 4 major surgeries and 2 to 3 minor surgeries per day are done every day . IVF laboratory of the hospital caters 10 to 12 infertile couples per month.

Reshambai Hospital –

1. 50 bedded Hospital
2. Bed Occupancy Rate of around 85 % ,
3. Patient turn over of 7.2
4. Average Length of Stay is 4.5 days .
5. Average OT utilization rate of around 65% .

Operation Theatre Complex can conduct two major surgeries at the same time with full support functions.

Types of Surgeries: Cesarean section delivery , ectopic pregnancy , hysterectomy surgery , Gynaec cancer surgeries , laparoscopic surgeries , endometriosis and tubal recanalisation surgery for infertility , urogynaecology surgeries like stress incontinence surgery. General surgeries also conducted in the theatre complex .







CHALLENGES FOR HOSPITAL BUSINESS DUE TO CORONA PANDEMIC

- Coronaviruses are a family of viruses that can cause illnesses such as the common cold, severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS).
- In 2019, a new corona virus was identified as the cause of a disease outbreak that originated in China.
- The virus is now known as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease it causes is called coronavirus disease 2019 (COVID-19).
- In March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic.

- Corona virus infects patients of all age group and gender .
- Morbidity and mortality in aged and with comorbid conditions .
- Pregnancy itself doesn't change susceptibility to infection but due to change in body's immune system response to viral infections in general ,can occasionally be related to severe symptoms.
- Increased incidence of preterm birth due to corona infection.
- Increased perinatal anxiety , support for mental health is strengthened as far as possible .
- No evidence currently that the virus is teratogenic . Long term data is awaited.

- As per WHO report , corona pandemic will persist for next 2 to 3 years until drug or vaccine arrives .

- Preventing spread of corona infection and taking care of hospital operations will be the key to manage healthcare set up.**

Challenges a hospital faces are :

1. To keep abreast with rapidly changing SOPs/guidelines from the Govt/WHO/ICMR and rapid response to it.
2. To process humongous data coming in through media , peer reviewed papers about positive cases , patients with co-morbidities , clinical manifestations ,deaths , recovery etc including countless anecdotal reviews.
3. To convince Doctors and Healthcare worker about rational use of PPE which is a precious commodity.
4. To retain our old patients . Though some hospitals might be communicating with patients over telemedicine ,messages etc .
5. To face revenue loss is the biggest challenge and maintain finances for day to day operations is a tough challenge.

PRINCIPLES OF MANAGING HOSPITALS DURING CORONA PANDEMIC



After lockdown , patients' flow to the hospital is bound to increase again gradually and overwhelm the hospitals as demand for hospital care will pile up with time.

Non covid Hospitals are facing a difficult task of segregating infected patients and sending them to covid designated hospitals with maintaining human resource and revenue level to run hospital operations

It must oversee:

(a)Continuity of Essential Services:

- Hospital services comes under essential services.
- Hospital should identify and maintain the hospital services that facility must provide at all times and under any circumstances. - Identify the resources needed to continue services.

(b)Communication:

- Designate a person to manage the flow of information from the Hospital to the Government/local authority and to the staff regarding quarantine rules, facilities made by the hospital ,decisions taken safeguarding the patients and employees .

(c)Surge Capacity:

- It is the ability of a health service to expand beyond its normal capacity to meet increased demand for clinical care .
- Increased capacity should not overlook infection control measures

(d) Human Resource:

- Human Resource Department has to work hard to address liability, Insurance, salary, leaves to the best of their capacity with maintaining trust of the employees. It is challenge to devise duty rotations without overcrowding ,arranging transport ,managing food and beverages without putting anyone at risk.
- Group medi-claim policy for hospital employees.

(e) Logistics:

- Supplies including pharmacy to be continuous.
- Your relationships with the vendors

(f) Essential Support Services:

- Food & Beverages , Medical Gases, Laundry ,Transport , IT etc should be kept functional.

(g) Infection Prevention and Control:

- Infection prevention, surveillance, training and rational use of PPE and biomedical waste management.
- Minimize the risk of transmission of infection to patients, staff and visitors.
- Hand hygiene and respiratory practices to contain infection.
- Restrictive visitors policy.

(h) Case Management:

- Standard Operating Procedures/Protocols to deal with Covid-19 patients.
- National and International Guidelines' awareness by all the staff

(i) Surveillance:

Reporting of unusual health events like clusters of cases, atypical clinical presentations occurring in and out of the facility. That data should be made available to the public health authority to monitor the progression of Covid-19 and then plan accordingly.

j)Laboratory Services:

- Maintenance of laboratory services is necessary for the appropriate clinical management .
- Establishing a laboratory referral pathway for the identification,confirmation and monitoring of Covid-19 is very important if hospital doesn't have an in-house RT-PCR testing facility.

SPECIFIC INFECTION CONTROL PRACTICES



- Data gathered by observation ,face to face survey ,telephonic interview and from registers .
- Prevention is one and only sure shot to stay safe
- As you are dealing with mother and fetus , extra care needed in maternity care
- Probable vertical transmission from mother to fetus through placenta , amniotic fluid has proved to be infective , newborns have turned positive after delivery.

Administrative controls at an organizational level (e.g the design and use of appropriate processes , systems and engineering controls, provision and use of suitable work equipment and materials) against introduction of infection and control transmission of infection in healthcare.

Preparing Healthcare Worker

- Videoconference meetings for to disseminate knowledge about Covid-19 amongst staff .
- Public health guidelines circulated amongst the staff
- Adoption of sustainable staffing model and likely absence.
- Online transfer of infection control practice material , mock drills on zoom for PPE use.
- Staff above 60 years of age and with comorbidity , instructed to stay at home.
- Staff advised not to attend duty if develop any symptoms of corona infection and before entering in to hospital , their temperature measurement done by thermal scanner.

- Duty roster prepared in the way which enables social distancing norms.
- Cohorting of staff , means staff will attend only one group of patients , for example staff posted in ward will not attend OPD duties.
- All the staff given multi-vitamin supplements.

Payment

- Through online transfer mode , cash payment discouraged.

Selection of patients for OPD Services

- Appointments given online. Patients advised to minimise social contacts
- If appointment missed ,co-ordinator had made required arrangements online .
- For emergency or urgency , appointments were given after reviewing the case .
 - Routine OPD based growth scans/ investigations minimised .
- Any change in future visit done after consulting treating physician

Screening of Patients & Visitors

- They were asked proper history and their temperature measured by digital infrared thermometer by hospital staff wearing FRSM to assess for infection on arrival .
- If temperature normal and no history of cough, breathlessness , loss of taste-smell then allowed for OPD services with compulsory wearing of mask.
- Those with sign and symptoms of Corona infection, EDD near term or not near term were referred to the designated covid hospitals of Ahmedabad after informing to the concerned authority .
- All visitors were instructed to scrub hands with ABHR for disinfection of hands .

Precautions taken by staff

- Staff used surgical mask , full face shield and polycarbonate safety spectacles for protection against Corona exposure.

N-95 mask (FFP-2) and tightly fitting spectacles used .

(mask has loose fit , while respirator has tight seal – N-95 mask have 95% efficiency in filtration of particles up to 0.3 micron size while FFP-3 respiratory has filtration capacity up to 99

-Mask certified by NIOSH.

OPD arrangements

- OPD segregated from other areas by closed doors.

- OPD consultation done after patient submits a form with chief complaints and associated problems to the doctor .

-Interaction between patient and doctor was kept as short as possible .

-Minimum distance of 4 feet between patient and doctor was maintained in.

In OPD and other areas , it was made compulsory to use disposable gloves and maintain hand hygiene after each patient contact .

-PPE kit including face shield used in OPD .

-Transparent screen used in between patient and doctor ,in some cases.

OPD based abdominal sonography was replaced with trans-vaginal sonography whenever feasible , to maintain distance between patient and doctor .

Policy for visitors

-For admitted patients , visitors were not allowed to stay in the hospital premises .

Guidelines for staff

-No purse ,wallet , bag ,laptop ,watch ,mobile phone , hand or wrist jewellery allowed inside hospital , a separate room allotted to the staff for keeping such stuff .

-Wearing hospital uniform after hand scrub made compulsory .

- Nursing station shifted to relatively open ,well ventilated area.

-Separate room for donning and doffing of PPE kits , isolation room had a separate PPE changing room .

-Strict precautions were put in practice after removal of PPE ,equipment decontamination and waste handling.

-All the staff using disposable gloves and masks ,minimum.

Management of Admitted patients

- Parturients for planned surgery tested for nasal and pharyngeal swab test for Corona infection ,negative patient scheduled for the surgery . -
- Those for emergency surgery were kept in isolation room and their corona testing was done and sample sent to the laboratory.
- Management of patients to be admitted for delivery- All the parturients were instructed to come to the hospital five days before their EDD and then their Covid -19 test done , if test is negative then their labor process augmented by giving medicines to decrease chances of infection to the patient or to the staff .
- For gynaecological surgeries for example hysterectomy ,Covid-19 testing and chest HRCT screening done . HRCT screening is with high sensitivity and specificity for lung involvement..
- Infertile couples who sought advice/treatment for to conceive were given counseling of delaying treatment because of Corona pandemic.

- IPD patients monitored for Corona symptoms , temperature monitoring and oxygen saturation in addition to routine monitoring.
- All the admitted patients were instructed for probability of getting infected even with due precautions and its consequences .
- Necessary permission obtained in the form of Informed Consent for chances of getting infected with Corona virus and its consequences

Management of patients who develop Corona Symptoms after admission

- Those who developed Corona symptoms after admission (estimated incubation period 0-14 days) transferred to designated Covid Hospital.
- Infection Control Personnel of Ahmedabad Municipal Corporation was informed for the same.
- In such scenario ,all the staff caring that patient would be sent for 14 days quarantine with salary .
- Beds in the ward kept at distance and minimum of 6 ACH exercised -
- Movement of staff and patients restricted .

Preparations/Precautions in Operation Theatre and Labor Room

- PPE must for all the staff.
- Labor room for the non infected women kept separated from emergency labor room for conducting emergency delivery .
- Number of staff in OT kept at minimum.
- One OT was kept ready for emergency surgery.A large sign board was hanged outside emergency OT .
- Separate Donning and Doffing area of PPE kit near the scrub area.
- Centralized AC was not utilized instead , window AC system was utilized in OT.
- Aerosol generating procedures like intubation , manual ventilation minimised in OT .
- General Anaesthesia avoided , regional-spinal anaesthesia preferred for surgeries. Whenever general anaesthesia,Video Laryngoscope was used to intubate the patient which increased distance between the patient and anaesthesiologist .

When ventilator used for general anaesthesia , it was ascertained that there was no leak in the ventilator circuit as it increases chances of airborne infection .

- For surgery disposable , fluid repellant surgical gown ,gloves, eye protection ,PPE and a FFP-3 respirator as per BS/EN standards used.
- Anaesthesia Machine Ventilator was protected with a high efficiency filter to prevent cross infection to the patients.
- All monitors , machines , cautery system covered with transparent plastic and plastic removed and discarded after each surgery.
- During surgery , talking should be kept at minimum whenever needed and sign language used to convey information.
- Patient under spinal anaesthesia had to wear N-95 mask.If oxygen needed , oxygen was given over N-95 mask.
- Aerosols generated from cauterization of the tissue was removed by a closed suctioning system .
- If blood transfusion needed , covid-19 negative blood units given..

Government had issued an advisory that ex-Corona positive patient can donate blood 28 days after last negative report with repeat Corona test before donation.

Sterilization and handling of equipments and materials

- Breathing circuit ,mask , tracheal tube, equipments were sent for ETO sterilization after each surgery.
- OT was cleaned as per policy . Surfaces cleaned with 2 to 3% hydrogen peroxide spray disinfection ,1% sodium hypochlorite solution or wiping with 70% alcohol.
- No use of OT after emergency operation atleast for 20 minutes if patient conventionally ventilated with general anaesthesia .
- General purpose detergent used to wash instruments and then disinfected in to 1:1000 Sodium hypochlorite solution . It is also used to wipe out floors , tables , doors etc.
- Surgical instruments autoclaved as usual .
- Disposable items used more than reusable items as per policy.

- Linen/Cotton material used by any patient handled ,transported and processed in a manner that prevents exposure to the skin and mucous membrane of staff.
- Staff uniform washed separately.

Food and beverages

- Patients were served food prepared by the hospital kitchen under strict precautions .
- Cafeteria staff was examined for their health screening , time to time.

Waste Disposal

- Waste generated in the hospital including used PPE kits , spectacles etc considered as clinical waste , presumably infective for Corona infection and waste disposed by local waste disposal team.

Medical Records

- Electronic Record used for sharing the patient data and storage for the future retrieval , paper use minimized to contain infection.

Transport

Patients advised to use own four wheeler for to visit hospital instead of shared transport.

-Ambulance services provided on demand with maintaining precautions

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PROJECT REPORT ON BEST PRACTICE STANDARD FOR OPERATION THEATRE EFFICIENCY

- Hospital needs to reduce cost and improve financial assets ,at the same time supposed to deliver quality healthcare which satisfies patients.
- OT is the largest cost and revenue centre and has impact on hospital's performance.
- Conflicting priorities and the preferences of its stakeholders makes management of OT a difficult task , with scarcity of costly resources.
- As aging population increases , demand for OT service will increase which will necessitate efficient OT system with adequate planning and scheduling of the procedures.
- Constant upgradation in technology and new inventions will create burden on hospital for to upgrade its facility with time . Staff will need updating their knowledge database and managers will need to change their strategy as per the situation .
- With ever changing paradigm , OT needs smart , efficient management.

Name “operating theatres” has its origin in its history. At one time there used to be a table and all around raised chairs for students to see the operation.



For efficient use of the Operation Theatre , planning of Operation Theatre should be standard and as per standard ISO protocol.

***Objective of Planning Operation Theatre**

- Design should aim to make patients feel at ease
- Facilitate efficient functioning
- Flexibility of use of the space
- Ease of cleaning the theatre – including the floor, walls, surgeons panel and any equipment such as pendants and theatre lights
- Ease of use of surgeons panels, theatre lights and pendants
- Use of natural light in patients' areas
- Patients' and staffs' safety
- Facilitate coordination of various services
- Regulate flow of traffic
- Minimize maintenance

Location

- Should be located near accident and emergency department and ICU
- Accessibility to CSSD and investigative facilities

Zoning

- Protective Zone
- Clean Zone
- Aseptic Zone
- Disposal Zone

Various functional subareas of Operation Theatre

Reception

Holding Area

Anaesthesia Induction Room

Post Anaesthesia Care Unit

Staff Room

Sanitary Facility for staff and patients

Rest Room

Laboratory

Seminar Room

Toilet

Store Room

Offices

Theatre Sterile Supply Unit

Scrub Room

Instrument Set-up Room

Operation Theatre: Size depends on the type of surgical use and economic consideration as the larger ones are costly to maintain in terms of air-conditioning

-Size:

Minimum 400 sq ft

For special procedures 600 sq ft

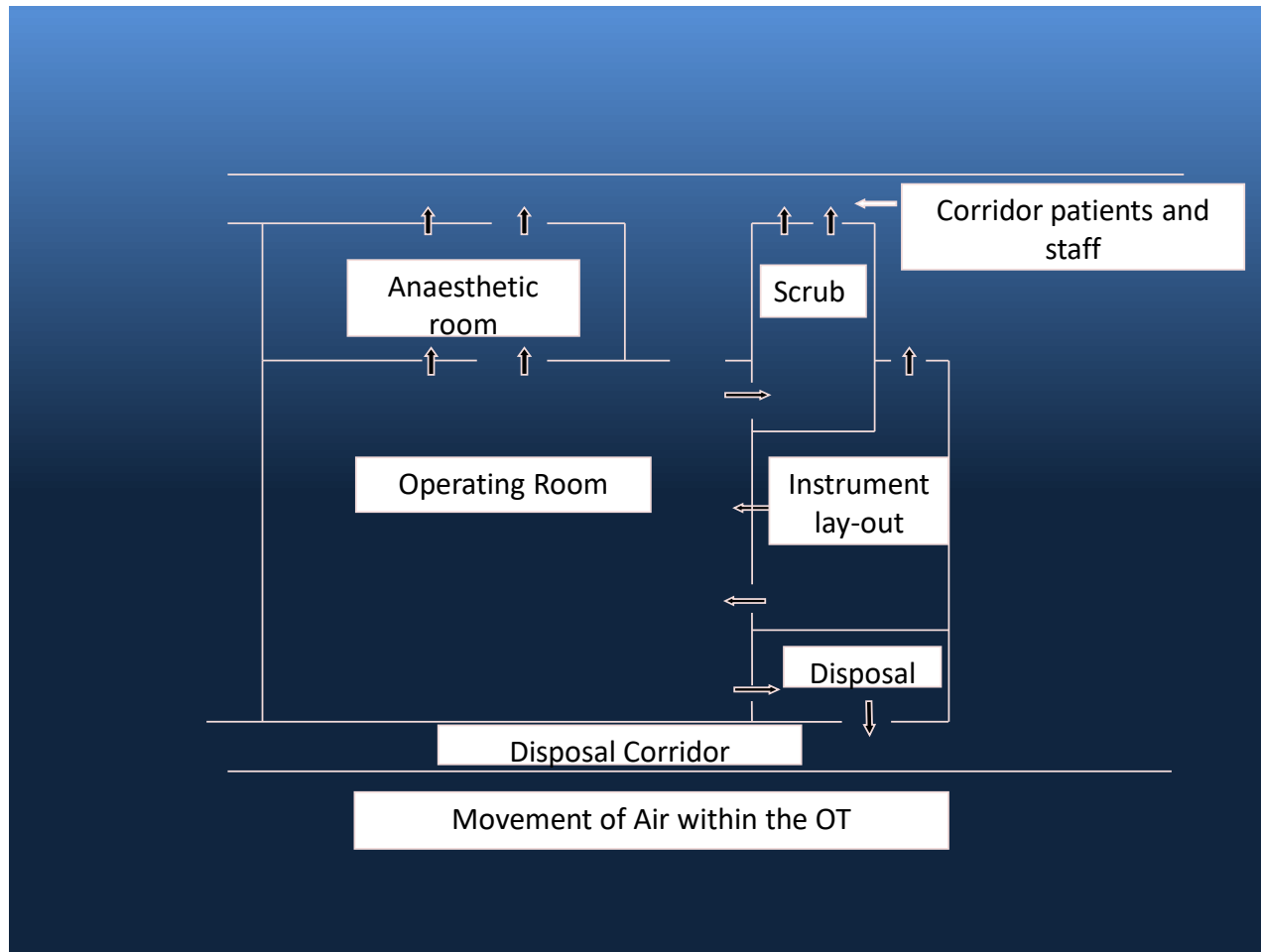
Space for Future Expansion

- Central Zone Centered Around the Table
- Parking Space : 36 Inches Wide Around the Walls for Keeping
- Equipment not of Immediate Use
- Circulation Space: Space Between Above Two
- Door of the OT should be 4-5 feet wide
- Sliding doors to prevent air disturbance
- Floor should be anti skid, impervious and easy to clean
- Wall finish should be seamless, Impervious and washable
- Ceilings should be smooth and impervious
- Joints between walls, ceiling and floor are to be watertight junctions.
- Laminar flow ventilation is used in modern operating theatres to reduce the number of infective organisms.
- Equipment-Ceiling Mounted Equipment, Wall Mounted Equipment, Floor Mounted Equipment
- Electrical equipment in the OT need proper grounding

MODERN OPERATION THEATRE



OPERATION THEATRE LAYOUT



FACTORS AFFECTING OPERATION THEATRE EFFICIENCY

“Hospital utilization” denotes the manner in which hospital resources are used.

Various indices are commonly used in the assessment of hospital utilization, but no one of them alone can give a full picture. A gross index is an index expressing the overall average utilization for all types of hospital in the area. The specific index, on the other hand, expresses the utilization of a certain type of hospital or of a certain service within the hospital.

Utilization analysis

--Operating room utilization is noted by using formula --

$$\text{URJ} = \frac{(\text{room clean} - \text{open sterile supply})}{(\text{RA stop} - \text{RA start})}$$

(adapted from American Hospital Association) Where,

URJ = room utilization, J = room number, Room clean = time room is ready for next usage. Open sterile supply = time first supply package is opened for that patient's care. 1 = number of patients served. n = total number of patients in room J/day. RA stop = expected conclusion of surgery and end of day clean-up. RA start = expected time at which first case set-up may begin.

-Utilization analysis involves surgical scheduling methods, instrument sterilization techniques, storage space utilization, equipment utilization and anesthetic procedures.

- Operating room utilization is calculated for the normal day starting and stopping hours.

-One hundred percent utilization/ day for particular operating room would be 8 hours/day. Few hospitals regularly achieve 100 percent operating room utilization. For hospitals performing a representative diversity of cases 80 percent utilization is considered acceptable.

-The longer the average case length the higher the expected utilization.

-In a large teaching hospital, the maximum utilization was found to be between 9 A.M. and 1 P.M.

--Delay was caused by surgeons and anaesthetists resulting in the operating rooms remaining idle.

-Unplanned scheduling of operations and late arrival of surgeons were the main causes.

- Classic utilization is defined as the ratio of the total OT time used to the total OT time allocated or budgeted.

-This definition of utilization is inadequate because it fails to differentiate the quality of utilization. Consider a simple example: a single OT is budgeted for 8 hours with two surgeries scheduled each of 4 hours duration. If the surgeries are performed consecutively within the budgeted work day, classic utilization is measured as 100 percent with no wasted resources. By contrast, consider the same OT when one 4 hour surgery is performed during regular hours and the other is performed entirely after regular hours. In the latter scenario there are 4 hours in which an expensive OT remains unused and 4 additional hours for which personnel must be recalled and overtime costs apply. Each scenario is an example of 100 percent classic utilization, but in the latter there is both under and over utilization, with penalties to the staff and institution inherent in each.

-Under utilization and over utilization used to evaluate the quality of OT schedules and the efficiency of OT utilization..

-For each operation following times were recorded: OT ready, patient enters OT, anesthesia induction complete, surgery start, surgery end, patient leaves OT.

Room turnover time (time from patient in to patient out) and Patient turnover time (time from end of surgery in one patient to end of induction of next patient) measured.

General Anaesthesia was associated with prolonged patient turn over time as sometimes patients wake up late from anaesthesia .

-For to reduce turnover time , excellent coordination between teams is necessary. accomplished.

Scheduling strategy

Schedule efficiency is important to achieve a high level of utilization in the OT.

The surgeon must give attention to schedule efficiency to contain costs. Surgeons should be aware that 100 percent utilization of OT time is unrealistic except when there are repetitive, uniform - length procedures.

A regular utilization rate below 50 percent should suggest overstaffing, overbuilding or poor schedule management.

- Norms of utilization should be above 60 percent and peaks should exceed 75 percent.

- For efficiency of scheduling, all OTs should be completely modular and should be large enough to accommodate any type of surgery.

Block or scheduling

Sequencing procedures for operations within an operating room is important .

Initially operating rooms were essentially staffed eight hours a day and procedures were booked on a first come, first served basis with goal to provide as much care and surgical convenience as possible.

- Blocks of OT time is given to busy surgeons or surgical services. Block time greatly increases surgeon satisfaction. OT utilization is maximized by filling block time .

The key to maximizing OT utilization then is to determine:

- (i) the appropriate amount of block time to allocate to each surgeon
- (ii) how to choose which day to schedule a patient for surgery.

Estimating case duration

- Accurate predictions of OT times for surgical procedures necessary for matching OT suite workload to capacity.
- Estimation can increase the accuracy of the commercial scheduling software to predict duration of surgery.
- It makes easy able to contain cost swings. Efficient scheduling can reduce costs by reducing underutilization (operating rooms empty earlier than expected) and /or by reducing unplanned extension of the work day (operating rooms occupied later then predicted).
- The benefits of better scheduling would also extend to patients (i.e. reduce unnecessary waiting time).

-Mean of the duration of cases of the same scheduled procedure performed by other surgeons is as accurate a method to predict case duration as sophisticated analysis.

The goal of estimating case duration is to determine whether a case can fit into a "hole" (gap) in the OT schedule or whether an add on case will be completed within available time, then the maximum amount of time that a case is likely to require needs to be determined. The "upper predictive bound" specifies with a certain probability (e.g. 90%) that the duration of new case will be less than or equal to the bound. Upper predictive bounds measure the risk of an unusual and undesired event occurring (e.g. case runs over).

Sequencing cases

The OT manager can use statistical decision theory to sequence cases to decrease the impact of limitations in equipment or personnel on case scheduling. Surgical suite manager should consider a probability of 80 to 90 percent of no overlap being an acceptable risk in scheduling of cases.

Predicting surgical groups needs of block time

- A common approach to forecasting OT needs is to use the average of a surgical groups recent total hours of elective cases.
- Forecasting surgical groups need for OT time is necessary to ensure there is adequate staff available either to complete the work in a manner that minimizes labor costs or during regularly scheduled OT hours.
- OT manager can use equations based on normal distributions to calculate the upper prediction bounds (upper limit) for total hours of elective cases.
- The average of the most recent two to four weeks period can be used to predict surgical groups future use of block time.

Effect of waiting time on utilization

How patients are scheduled into OT block time varies among surgical suites. Patient requests to be scheduled varies among surgical suites. Usually a patient needing surgery is given the first available surgical date for which the surgeon has open block time. Patient then wait to have surgery from the time they are given a surgical date until their day of surgery. If patients is ready to wait then there will have more flexibility in finding the best date to schedule a case to match the expected case duration with the open block time that day.

Optimizing utilization

- Add on cases should be considered simultaneously at a cut-off time (e.g. 4 p.m. the day before surgery) and then scheduled based on scheduled duration from longest to shortest.
- Lowest staffing costs when the operating room manager doesn't incorporate surgeon and patient preferences and schedule the cases as per time availability.
- Overflow block time is operating room time for a surgical groups cases that cannot be completed in the regular block time allocated to each surgeon in the surgical group.
- Capacity -of OT complex is the long-run average patients per day that it can process. If ample patients waiting for surgeries, it can serve maximum patients /day . This capacity is determined by many different resources, including people-surgeons-anaesthetists, equipment, rooms, and supplies.

-Utilization- of a resource is the long-term fraction of time it is busy, which is given by the average arrival rate of work (for example, patients per hour) at the station divided by the resource capacity over the long term.

-Bottleneck- of a system is the resource with the highest utilization.

-The **capacity** of a system is defined by its bottleneck, which is the resource in the system with the highest utilization. So, if operating rooms are the bottleneck in the OT complex, throughput (patients per day) cannot exceed the capacity of the rooms. We can improve the performance of the entire system only by improving performance at the bottleneck resource.

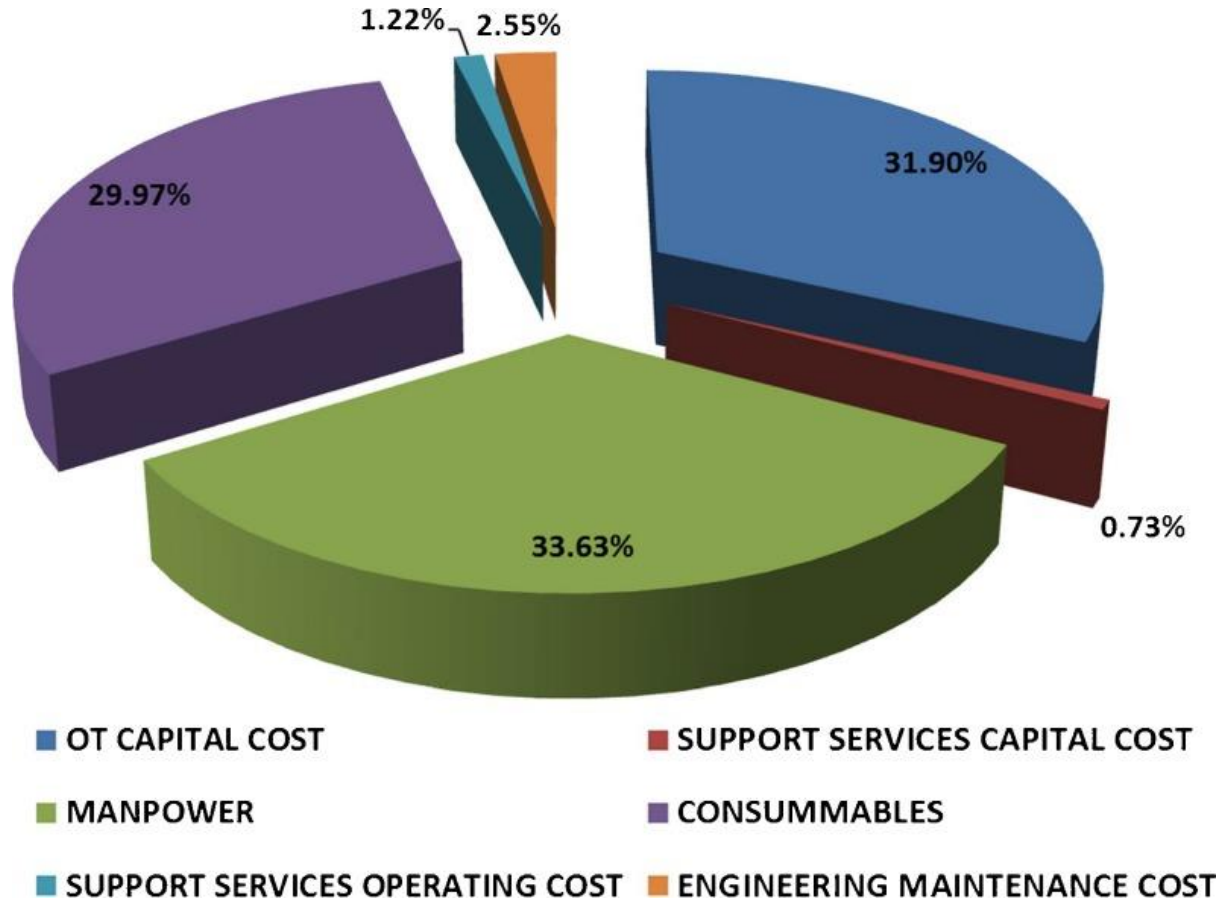
Cost of cancelling a case

Under utilization and cancelling of the surgery increases cost for the hospital with inconveniency to the patient.

Cost of postponing a late day case is always greater than doing it late .

-Zero tolerance for overtime- policy is not cost effective. -Publish next day's operating list by 2 PM on day before surgery.

**OT COST BREAK-UP. COST ESCALATION
CAN BE CONTAINED BY EFFICIENT USE
OF OPERATION THEATRE.**



Theatre layout

-Centralized operation theatre suite has advantages in this regard as there is efficient use of staff and facilities, better supervision, vision, flexibility in scheduling operations and problem of supplies is simplified.

Operation list scheduling

-Prevent idle time and also overruns thus, improving utilization.

Level of care

-In secondary care hospitals, the utilization may be less and the turn over of cases will be more as compared to tertiary care medical centers where the complexity of the case will affect the utilization (which will be more) whereas the turnover will be less, e.g. neurological, cardiovascular and plastic surgery cases consume more time.

Anesthetic practice

If anesthesia is given in separate room, the operating room can be used for more number of cases increasing utilization.

Timing

The starting time of theatre has direct effect on utilization. If there is any delay in starting a case utilization is going to be affected. Start time tardiness is the factor for under utilization of OT services.

Turnover times

Room turnover time, i.e. the time between one patient out and second in also affects utilization. Longer turnover time means decreased utilization.

Case duration

If case length is short utilization is less because, more time is wasted between cases than if case length is long.

Type of surgeries

In an institution where similar type of surgeries are performed utilization is expected to be more than in an institution where diversity of cases are done.

Canceling of surgeries

Canceling a case means no work for scheduled hours.

-Cancellation can be due to non-fasting patients ,medical problems , full ICU facility ,unavailability of the staff or doctor mostly.

-1 report 1 out of 10 scheduled surgeries gets cancelled . It varies for day care surgeries and indoor patient surgeries.

Supportive services

There should be no electric breaks, no faults in supply of anesthetic gases. Proper suction, equipment and sterilization facilities should be available.

Motivation of staff

There needs to be proper motivation of staff to do the job, they are expected to do.

Cooperation between different staff members is a must for utilization of any facility.

Adequate staff

The number of surgeons, anesthesiologists, nurses and nursing aides also affects the utilization. The number of different staff members should be optimal.

MANAGERIAL ASPECT OF OPERATION THEATRE HANDLING

1. Robust Accountability and Governance

- Clear support and accountability are needed to achieve a shared vision and clinical leadership.
- All stakeholders must be aligned around a core set of KPIs.
- In the simplest terms, how many more patients have been treated is far more tangible, and more likely to create understanding and buy-in than percentage rise in utilisation data.

2. Better Alignment of Workforce to Demand and Capacity

- Lack of demand and capacity plans lead to failures to meet KPIs.
- Demand and capacity planning is complex because the interdependencies across care settings (theatres, outpatients and wards)
- Performance against plans must be routinely monitored to ensure resources are optimised and supporting actions taken to realign the workforce.
- RTT adjusted enables hospitals to align capacity in a way that can be easily adjusted and monitored as priorities change.

3. Automated scheduling based on AI

- Avoid over-runs and under-runs.

- AI can provide dedicated scheduling tools to build efficient lists and support the achievement of RTT by selecting appropriate cases. -

Effective scheduling can only be achieved through direct clinician engagement.

4. On the Day Problem-Solving

- Plans change and the way teams respond to issues such as shortage of key equipment, limitations in staffing or beds, on the day - and in the moment and learn from them is key.

- Feedback between the scheduling, operational and front-line teams is vital .

- Equally, extra hands-on support (via consultancies) and a fresh pair of eyes can often deliver quick-wins and break down barriers to change.

5.Engaging Leaders with Insight

-Engaging stakeholders with easy to understand insights from data is essential. Hospital Insights platform which provides an extensive range of key operational data in one place helped one to identify that late-starts were the key issue when the accepted belief across the hospital was that late-finishes were the main challenge. The tool allow to rapidly identify repeat offenders within selected specialities, and through a selected set of interventions agreed across the theatres teams, reduce late starts by 18%.

Leadership teams need to be asking if their organisation is tackling all five levers to give them the best chance of delivering sustainable performance improvement.

The decisions made by OT management should have a clear and definitive purpose in order to maintain consistency. In order of priority, governing principles of OT 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; and (5) enhance satisfaction among patients, staff, and physicians. If OT management is properly performed ahead of time, all that doctors and nurses have to think about on the day of surgery is the patient. If management is poor, then the medical and nursing staff may waste efforts and resources to rush cases or juggle schedules, thus compromising attention to patient safety..

THANK YOU