A Study on Utilization Rate in Operation Theatres

At

HCG Cancer Hospital, Jaipur

April-May, 2021

For the partial fulfillment for the award of the degree of Master MBA

Hospital and Health Management

Academic year, 2019-2021

By

Dr Ayushi Swarnkar

Under the Supervision and Guidance of

Dr. Arindam Das

(Associate Professor, IIHMR University)

Indian Institute of Health Management Research

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Global Health
Private Ltd.

Date: 03.07.2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Ayushi Swarnkar** is employed in **Global Health Private Ltd (GHPL), Medanta - The Medicity** as Trainee - Medical Administration & Clinical Operations since 07.06.2021 to till date. She is working at Medanta – The Medicity and the address is given below:

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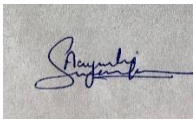
I hereby declare that this dissertation titled Monitoring Discharge Process Turn Around Time for Smooth Functioning of In-patient department at HCG Hospital, Jaipur is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



(Signature)

Name of Student: Dr Ayushi Swarnkar

Date: 03/07/2021

CERTIFICATE

This is to certify that dissertation titled Monitoring Discharge Process Turn Around Time for Smooth Functioning of In-patient department at HCG Hospital, Jaipur is a record of the research work undertaken by (Name of Student) in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management)/MBA (Pharmaceutical Management)/MBA (Rural Management) from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.

Faculty Guide
IIHMR University, Jaipur
Date: 03/07/2021

School Dean
IIHMR University, Jaipur
Date: 03/07/2021

Acknowledgement

"Results come to fruition when people collaborate. To accomplish something the direction, guidance, support and involvement were essential to conclude this report."

Indian Institute of Health Management Research (IIHMR), Jaipur and its education deserves the greatest appreciation for providing me the opportunity to understand my skills and abilities. Of course, the efforts were facilitated by all the IIHMR faculties, I acknowledge the contribution of my organization mentor Dr Monika Saxena and my college mentor Dr Arindam Das (Associate Professor, IIHMR University) in completion of the project right from the word go.

I sincerely thank Mr Jeet Singh Chavan, Head of Human Resources and Dr Monika Saxena, Clinical Superintendent at HCG Cancer Hospital, Jaipur for giving me the permission to do my project at this esteemed hospital. I consider it is a matter of pleasure and privilege to work under their guidance. I am grateful for his encouragement, support, guidance and help which has resulted in completion of my project.

And I would also like to thank each and person who helped me make this report a meaningful one.

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Abbreviations:

DOSC-	Day of Surgery Cancellation
HIS-	Hospital Information System
IOM-	Institute of Medicine
NABH-	National Accreditation Board for Hospitals & Healthcare Providers
OT-	Operation Theatre
OR-	Operating Room
PAMS-	The patient activation measure

Abstract-

Title: A study Utilization rate in operation theaters at HCG Cancer hospital, Jaipur.

Key Words: OT, NABH, HIS

Background: The study was conducted at HCG Cancer Hospital, Jaipur to assess the utilization rate in operation theatres.

Objective:

1. To analyse OT Utilisation rate in HCG Hospital, Jaipur
2. To identify the scope for improvement of OT utilization rate in HCG Hospital, Jaipur

Methodology: Descriptive study was undertaken at HCG Hospital, Jaipur from April to May 2021 to assess the utilization rate of Operation Theaters of the hospital. Non-Probability Convenience sampling method was used. Primary and secondary data was collected using Performa operation theatre NABH manuals and Internet search engines and HIS System of the Hospital

Result: It was observed that both the OTs in the month of April 2021, were utilized for around one fourth (28 percent) of their capacity whereas both the OTs in the month of May 2021, were utilized for around one fifth (20 percent) of their capacity.

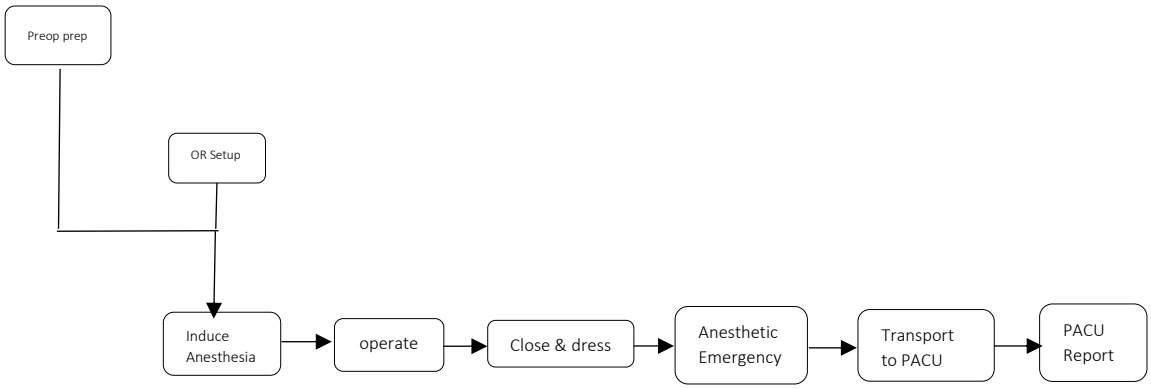
Conclusion: from this study, it can be concluded that Operation Theatre utilization rate in HCG Hospital, Jaipur during the month of April and May was 28 percent and 20 percent respectively, which is very less and needs the improvement to meet quality standards

Introduction:

An operating theatre (OT) is a room in the hospital site with one or two operating tables or other similar devices. An operating theatre accommodates one or two patients at a time, during and only during the period in which, under the direct supervision of a medical practitioner, the patients can undergo operative treatment in pregnancy or childbirth or for the prevention, cure, relief or diagnosis of disease.

The OT complex is a high-cost component in a hospital's budget. To achieve the best cost-benefit ratio, this sector of hospital activity must be utilised to the fullest extent possible. OT is reported to be the key source of revenue generating in any hospital, accounting for 50 percent to 60 percent of total revenue. To achieve a high level of utilisation in the OT, a variety of activities and individuals must be coordinated effectively. As a result, optimising the efficiency of these assets is desirable.

Process Flow in OT (Standard Operating Room):



What is OT Utilisation?

"OT utilization is defined by Donham et al. *as the quotient of hours of OT time actually used during elective resource hours and the total number of elective resource hours available."*

Quality and Utilization of OT has become the most important parameter for determining resource efficiency and operating room service quality. Each year, India performs millions of surgeries at a huge cost. As a result, it is economically significant to make efficient use of this costly resources. Aside from financial considerations, the current political demands on waiting lists and unanticipated events contribute to emphasise the

importance of maximising theatre utilisation. Enhanced theatre capacity is essential to accomplish the government's goal of gradually reducing total waiting times.

What is Quality of Care?

Institute of Medicine (IOM) in the US defined quality of care as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge"

All private, public, and corporate healthcare organisations primarily focus on quality. Healthcare organisations are being forced to figure out new ways and means to improve their operations as a result of corporatization and competitiveness in the industry. This aims to improve the hospital's product and service quality while also lowering patient dissatisfaction. As the healthcare industry becomes more complex, there are higher chances for errors to occur.

To eliminate the chances of mistake and increase efficiency, utilisation and perfection of OT, many organizations are using tools like Lean, Six-Sigma, Three or Four Sigma quality Levels.

According to NABH, to assess the quality in OT measures like patient safety, efficiency, effectiveness, timeliness, patient-centred and equitable to ensure hospital's services and performance.

Aim and Objective of the Study:

Aim:

The study aims at access time Utilization rate of Operation Theatres in HCG Hospital, Jaipur.

Objectives:

3. To analyse OT Utilisation rate in HCG Hospital, Jaipur

4. To identify the scope for improvement of OT utilization rate in HCG Hospital, Jaipur

Literature Review:

Moutasem Almashour and Hazem Al-Aal (2018) conducted an observational study to determine the cause of surgical cancellations, with data collected from the main operating theatre. The cancellation rate was found to be low, but improvements in preoperative care and assessment would significantly reduce the cancellation rate.

Deepti Sahran and Vijaydeep Siddharth (2019) examined the utilization of operating rooms in a tertiary care teaching hospital. An observational research was conducted with time tracking of numerous processes. The results showed that operation theatres are being used to their full potential; nevertheless, greater effort should be made to improve the efficiency of the auxiliary operations.

In another utilization study by steffen heider, Schoenfelder, Jan (2020), they took patients from both emergency and scheduled patients. Because the majority of the planned patients arrive from the operating room, the method stresses centralised reorganisation of scheduled surgeries while keeping the master surgery schedule in place.

Asmal, I.I. Cronjé, L. K. Keerath (2019) analyzed operating room use and the rate of day-of-surgery cancellations (DOSCs) in a state hospital theatre complex and conducted a prospective audit. As a result of delayed first-case starts, protracted changeovers, and early list terminations, a considerable amount of time was wasted, contributing to a high DOSC rate. it also demonstrated the impact of staff shortages in state operating rooms

Meeta Tyagi and P K Tyagi (2021) did research to propose scheduling as a solution to the problem of time overrun cancellations. This is a descriptive and observational study that took place in a tertiary care hospital with ophthalmology services. The findings of this study revealed that planning cases based on procedure time and scheduling on a daily basis utilising allocation models with basic algorithms can enable optimal usage of OTs while also addressing time overruns and subsequent cancellations.

A study was undertaken by Dr. Shivoham Singh, Prof. (Dr.) Dipin Mathur, and Surbhi Jain (2020). Parameters such as patient in time, waiting area time, recovery waiting area time, and OT time were used to assess the efficiency of the operation theatre in the hospital. Out time was recorded, and the data was analysed with MSExcel and SPSS. Ninety of the 100 scheduled cases were carried out, while the remaining 10 were cancelled. The results suggest that OT

utilisation is significantly lower than its capability, and that case cancellations accounted for 10% of the total cases studied.

S Talati, AK Gupta, A Kumar, and SK Malhotra (2015) conducted a study in the OT complex of a tertiary care teaching institute to monitor time utilisation and assess the claimed causes of scheduled case cancellations. This prospective research was conducted. Each of the 16 OT tables was monitored for a period of six days. Time spent on supportive services, time spent on actual operation, room turn over time, time spent on entire process, and time between patient admission and exit were all noted. The outcome was as follows: The most prevalent reason for cancellations was a shortage of operational time, which accounted for 57 occurrences (78.1%).

Charles C.H.Liu, Chia-Huang Chang (2011) carried out an a research initiated workflow and utilisation efficiency in operation theatre. The web-based PAMS is intended to track the entire surgical patient handling workflow. And the result showed that the PAMS may oversee the progress of procedures, patient location, identification verification, and boost efficiency, according to the results.

F. A. Jan and Syed. A. Tabish (2003) conducted studies to enhance the use of operation theatre. A conservation study was conducted. The time spent on actual surgery was determined to be 66.02 percent of the total time used. And it was found that by avoiding delayed starts, preventing case cancellations, correct scheduling of surgeries, and anaesthetizing the patient in the anaesthetic room rather than the operating room, theatre utilisation can be increased.

Afef Bouguerra, Christophe Sauvey, and Nathalie Saure (2015)offer a mathematical model for designing a surgery plan in an operating room using a "open scheduling" method. The assumption is that operating rooms will be multifunctional. The proposed model's principal goal is to maximise operating room usage while reducing idle time between scheduled surgeries. They concluded that they will continue to test the proposed method using real data. They also want to improve the model by incorporating more resource restrictions, such as recovery beds. They plan to employ stochastic data to deal with real-world scenarios.

A study was conducted by Grote R1, Sydow K, Walleneit A, Leuchtmann D, and M Menzel (2010) to describe the quality of OR scheduling in the examined OR. There are some recommendations for avoiding underutilization. The results showed that operations with longer planned durations (>150 minutes) had a

considerably higher chance of having a real length that was greater than expected. When projected durations were more than 150 minutes, the disparities between planned and true durations were even greater. In the OR area studied, the prognosis of procedures with a longer anticipated length (>150 minutes) should be improved. These operations should be scheduled at the top of the OR list.

Vithal Krishna Dhulkhed and Shraddha Vidyadhar Naik (2018) studied to obtain a high degree of usage in the OT. The most prevalent reasons for the delay in commencing the operation table were the patient arriving late from the ward and administrative issues. The most common reasons for surgery cancellation were a lack of operating room time, followed by the patient's medical reasons. The researchers concluded that most of the causes of surgery delays and cancellations could be avoided with proper preoperative planning and optimization of patients and resources, as well as good communication between surgeon anesthesiologists and nursing staff.

Dr. Nighat Bakhtiar and Dr. Masood Jawaid (2013) conducted research on the rate of OT utilisation. Age, gender, medical record (MR) number, name of operations with their indications, speciality and kind of anaesthetic utilised during the procedure, and type of surgery were the main outcome measures. The monthly pattern of procedures was also looked at. The maintained record was adequate in general, although it could be better computerization of records, together with employee training on correct maintenance, can raise the quality of records to worldwide standards.

Methodology:

Study area: The study was conducted at HCG Hospital, Jaipur. HCG Cancer Center, Jaipur provides comprehensive cancer care to patients. It offers Medical, Surgical and Radiation Oncology Services from which 10 beds are dedicated to Bone Marrow Transplant Unit with stringent & infection control practices.

***Study Design*:**

Descriptive study was undertaken at HCG Hospital, Jaipur from April to May 2021 to assess the utilization rate of Operation Theaters of the hospital.

Sampling and Sample Size: Non-probability convenience sampling was carried out in OT. OT utilization is examined in relation to its working hours (08:00am to 06:30pm). Total available time was used as total working hours of the OT to estimate the OT utilization rate. Two OT are available in the hospital. On a daily basis, data was collected from both OT.

Tools and Techniques of Data Collection:

Primary as well as Secondary data was collected for this study.
Observation: - Data was collected using observation Proforma to observe the Quality and time utilization in OT.
Secondary data related to specifications of operation theatre, also operation theatre NABH manuals and Internet search engines and HIS System of the Hospital were used to collect secondary information.

Data Analysis: Analysis of the collected data was done using MS excel.

Inclusion Criteria: Surgeries/cases scheduled from 08:00am to 06:00pm during working days.

Exclusion Criteria: Surgeries scheduled after 06:00pm

Approach:

Records pertaining to OT schedule, surgeries during 1st April 2021 to 30th May 2021, were used for analysis. In addition, HIS data of the same period was used for the analysis.

The average time of each surgery, as well as scheduled, unplanned, and total surgeries, were used in the analysis.

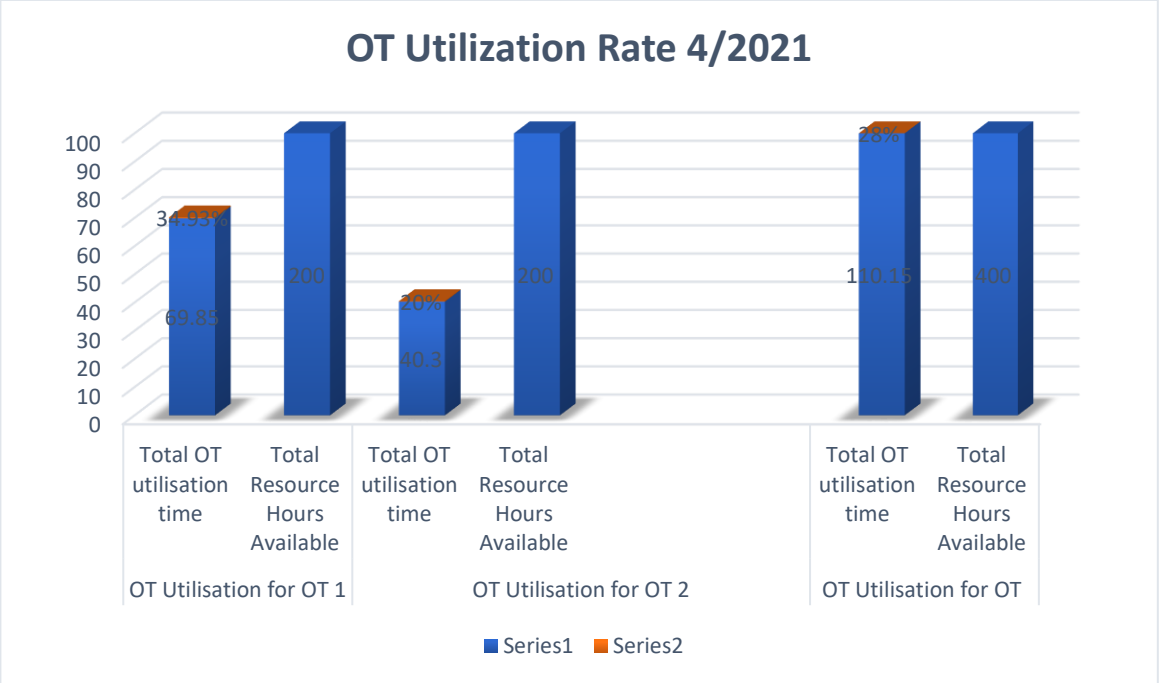
According to NABH, OT Utilisation Rate can be calculated as:

$$= \frac{\text{Number of hours when OT is being utilized}}{\text{Maximum number of hours the OT can be utilized}} \times 100$$

Results:

1. ***For the month of April, the OT utilisation rate was:***

Figure 1: OT Utilization Rate for the month of April



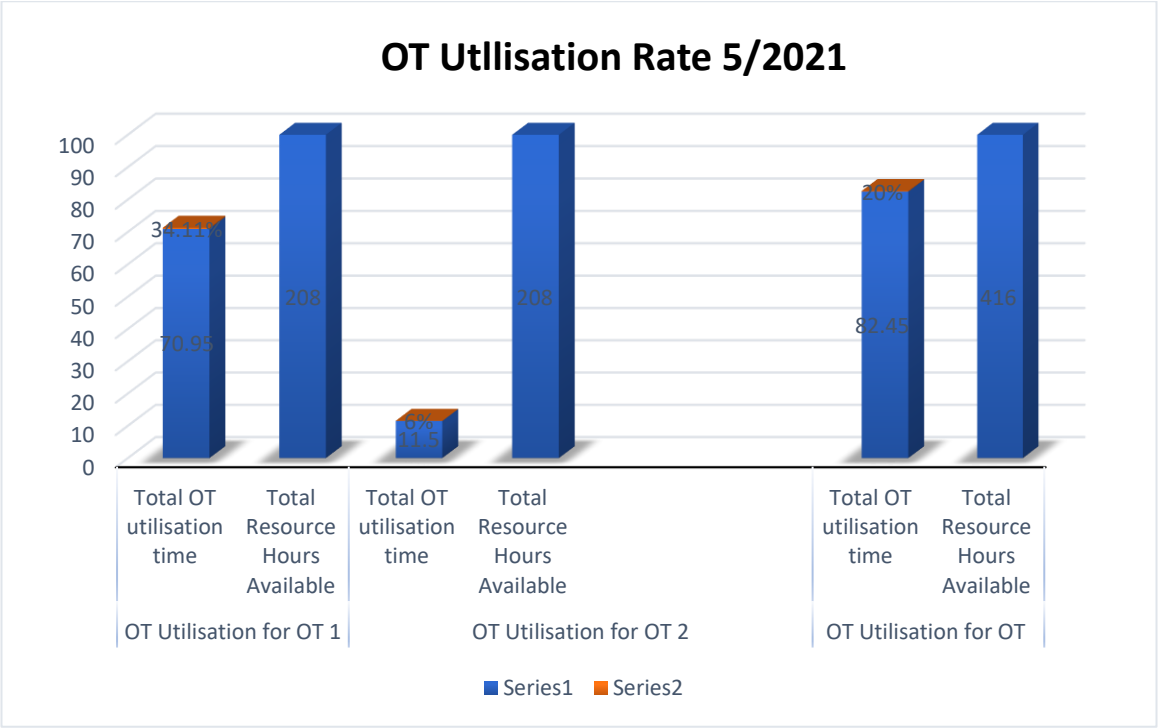
It was emerged from the analysis that in month of April, For OT-1, total 200 resource hours were available. However, only 69.85 hours were utilized implying the OT-1 was 34.93 percent efficient.

Similarly, the analysis suggests that the OT-2 was 20 percent efficient.

Overall, both the OTs in the month of April 2021, were utilized for around one fourth (28 percent) of their capacity.

2. ***For the month of May, the OT utilisation rate was:***

Figure 2: Table for OT Utilization Rate for the month of May



It was emerged from the analysis that in month of May, For OT-1, total 200 resource hours were available. However, only 70.95 hours were utilized implying the OT-1 was 34.11 percent efficient.

Similarly, the analysis suggests that the OT-2 was 6 percent efficient.

Overall, both the OTs in the month of May 2021, were utilized for around one fifth (20 percent) of their capacity

Discussion:

Utilization of OT is recognized as a significant parameter for assessing the quality of the health care services that the organization provides. When we look at time utilization in the hospital industry, we can see that time spent on actual surgical procedures varies greatly depending on case to case, as well as the doctor and complications that arise during the surgery. Time spent on Operating Room cleaning should be between 10 and 20 minutes.

Many studies found that 20% of the total time spent on the procedure was spent on support services, 30% on OR cleaning, and the remaining 50% on the actual surgery. In this study during the month of April, average Utilization efficiency for both OT-1 and OT-2 was only 28 percent whereas during the month of May average Utilization efficiency for both OT-1 and OT-2 was only 20 percent.

The results of this study will also inform us about the many areas like complete implementation of HIS and maintenance of register that have been overlooked Which will go a long way toward establishing a consistent link between the beneficiary and those who have benefited.

Conclusion:

As a capital-intensive part of a hospital, operating rooms must be used to their full potential. An OT utilisation study is a useful tool for identifying and correcting flaws. If operation theatre usage is less than 80 percent then there is space for improvement, no matter how you analyse it.

So, from this study, it can be concluded that Operation Theatre utilization rate in HCG Hospital, Jaipur during the month of April and May was 28 percent and 20 percent respectively, which is very less and needs the improvement to meet quality standards.

Flaws of this study were that HCG has not adopted and implemented HIS system fully so most of its work is carried out manually in the OT, booking registers are not well managed and there is no information or any data available on surgeries cancellations and rescheduling so to to overcome these flaws HIS system should be implemented and proper register should be maintained to keep track of planned, unplanned, cancelled surgeries in the OT.

Scope for Improvement of OT Utilization Rate:

- Efficiency of OT -1 and OT-2 came out to be 34.11 percent and 6 percent this may be due to delay in admission process resulting in patients going to any other facility. This can be increased by improving admission and discharge process.

- Internal assessment can be done to check what's the reason for the underperform of OT.
- 3. Planning can be done one day prior to and admissions can be made in the evening a day before surgery to increase the OT performance.
- For Operation Theater, a proper register should be kept.
- The utilization rate of OT will be maximized if surgeries are scheduled properly.
- Proper roaster of the OT staff should be made.

- A training session for personnel on planned and unplanned procedures, should be held.
- Cleaning the OT should take 10-20 minutes.
- To increase patient footfall in the hospital, the hospital's branding is required.
- Quality assessment should be performed on monthly basis in OT.
- Team meeting should be performed along with Doctors, quality heads, nursing head to maximize utilization.

Limitations of the Study:

- HCG is a single speciality hospital because of which it caters to a niche group of patients resulting in less patient number.
- Due to COVID-19, patient footfall was low in the hospital.
- There is no information or data available on surgeries cancellations, rescheduling.

References:

- Almashour M, Al-Aali H, Mohamed E. Causes of Cancellations of Surgeries in the Operation Theater at Salmaniya Medical Complex.
- Asmal II, Cronjé L, Keerath K. An audit of operating theatre utilisation and day-of-surgery cancellations at a regional hospital in the Durban metropole. South African Medical Journal. 2019 Oct 1;109(10):765-70.
- Bakhtiar N, Jawaid M, Khalique A, Iqbal P. UTILIZATION OF OPERATION THEATRE. The Professional Medical Journal. 2013 Dec 15;20(06):1048-52.
- Bouguerra A, Sauvey C, Sauer N. Mathematical model for maximizing operating rooms utilization. IFAC-PapersOnLine. 2015 Jan 1;48(3):118-23.
- complex of a tertiary care teaching institute of North India. Journal of postgraduate medicine. 2015 Jan;61(1):3.
- Heider S, Schoenfelder J, McRae S, Koperna T, Brunner JO. Tactical scheduling of surgeries to level bed utilization in the intensive care unit. IISE Transactions on Healthcare Systems Engineering. 2020 Oct 1;10(4):229-42.
- Grote R, Sydow K, Walleneit A, Leuchtmann D, Menzel M. Quality of OR planning. Avoiding operating room underutilization or overutilization. Der Anästhesist. 2010 Jun 1;59(6):549-54.
- Jan F, Tabish S, Qazi S, Atif MS. Time utilization of operating rooms at a large teaching hospital. J Acad Hosp Adm. 2003;15:1-6.
- Liu CC, Chang CH, Su MC, Chu HT, Hung SH, Wong JM, Wang PC. RFID-initiated workflow control to facilitate patient safety and utilization efficiency in operation theater. Computer methods and programs in biomedicine. 2011 Dec 1;104(3):435-42.
- Naik SV, Dhulkhed VK, Shinde RH. A prospective study on operation theater utilization time and most common causes of delays and cancellations of scheduled surgeries in a 1000-bedded tertiary care rural hospital with a view to optimize the utilization of operation theater. Anesthesia, essays and researches. 2018 Oct;12(4):797.
- Sahran D, Siddharth V, Satpathy S. Are the operation theatres being optimally utilized?–A prospective observational study in a tertiary care public sector hospital. Indian Journal of Surgery. 2019 Oct 10:1-8.
- Talati S, Gupta AK, Kumar A, Malhotra SK, Jain A. An analysis of time utilization and cancellations of scheduled cases in the main operation theater

- Tyagi M, Tyagi PK, Singh S, Satpathy S, Kant S, Gupta SK, Singh R. Allocation scheduling leads to optimum utilization of operation theater time. Medical Journal Armed Forces India. 2021 Feb 20.