Dissertation Report

27 February to 26 June

KIMS HOSPITALS™

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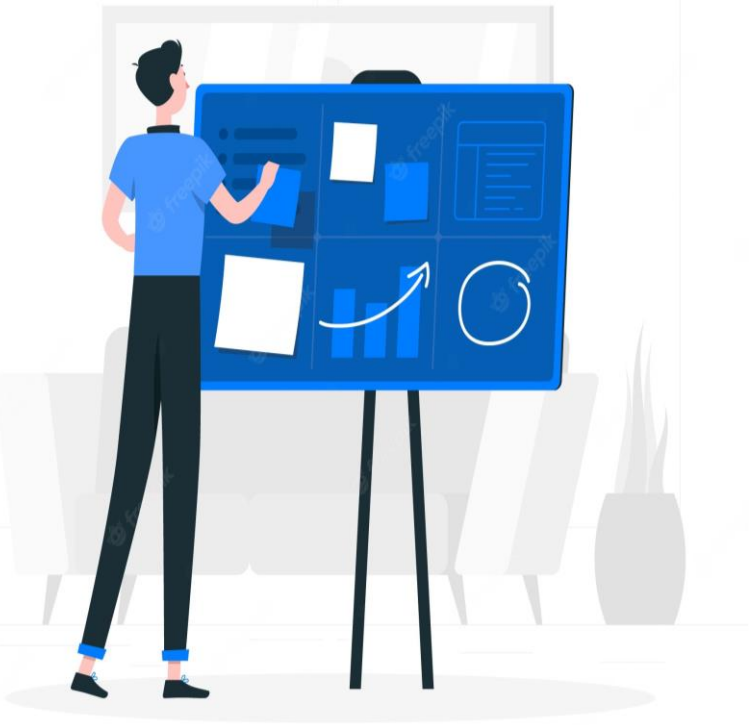
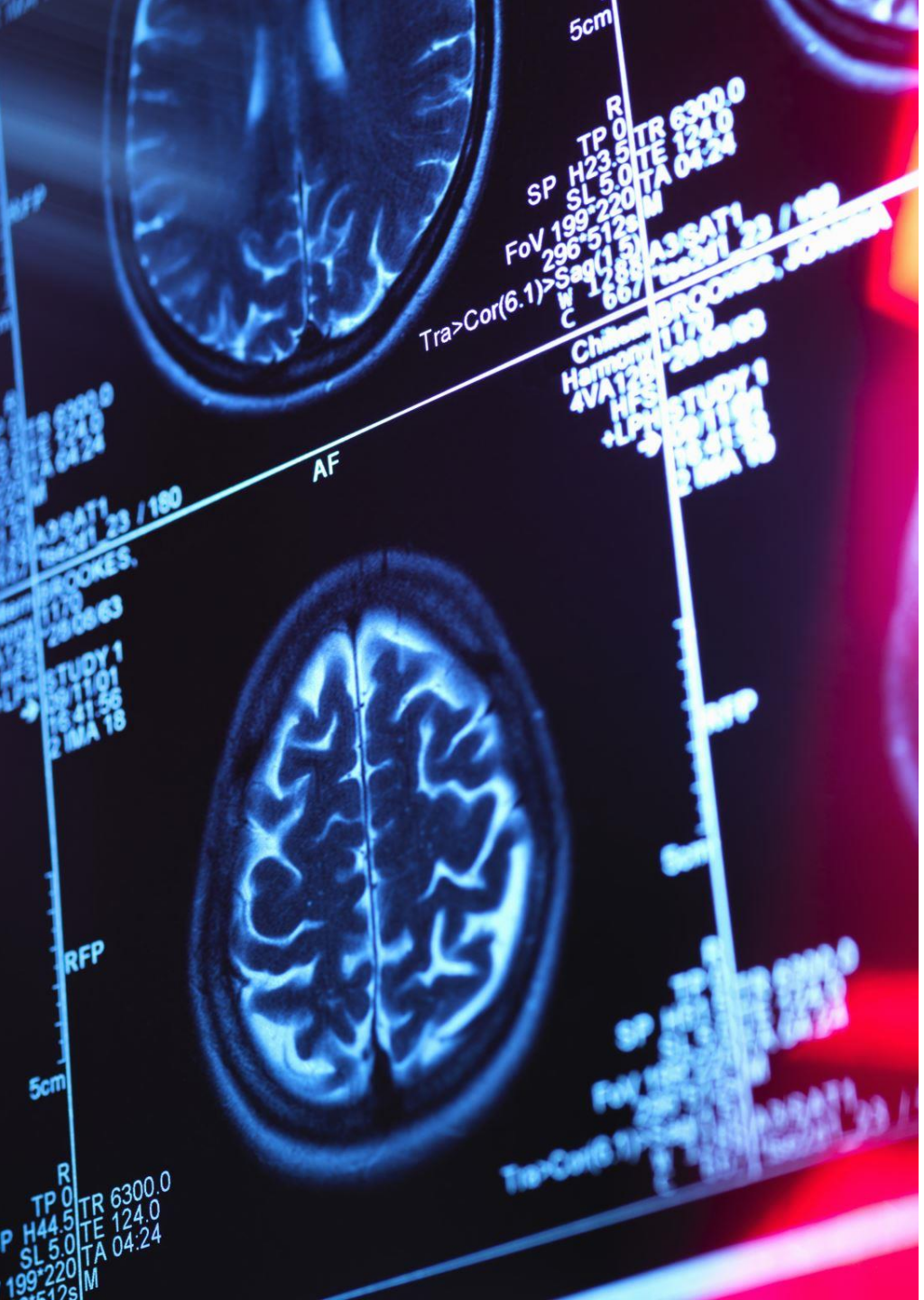


“A Study on the Utilization Rate of Operation Theatre and their Sterilization and Disinfection Processes at KIMS Hospital, Secunderabad”

Organization Profile

- Krishna Institute of Medical Sciences (KIMS) Hospitals is one of the largest corporate healthcare groups in India with its branches in Telangana, Andhra Pradesh, and Maharashtra.
- It was founded by Dr. Bhaskar Rao Bollineni, in 2000 in the city of Nellore.
- In Telangana, KIMS has its branches at Secunderabad, Kondapur, Gachibowli, and Paradise Circle, Andhra Pradesh and Maharashtra Nagpur. KIMS Secunderabad is the flagship hospital of the KIMS group, operational since 2004 and currently has 1000 beds.
- It offers a broad spectrum of specialities including Cardiology, Gastroenterology & Hepatology, Neurosciences, Organ Transplantation, Paediatrics, Dental, Fertility Treatments, Oncology, Orthopaedics, Urology, and Bariatric Surgery.



Study background

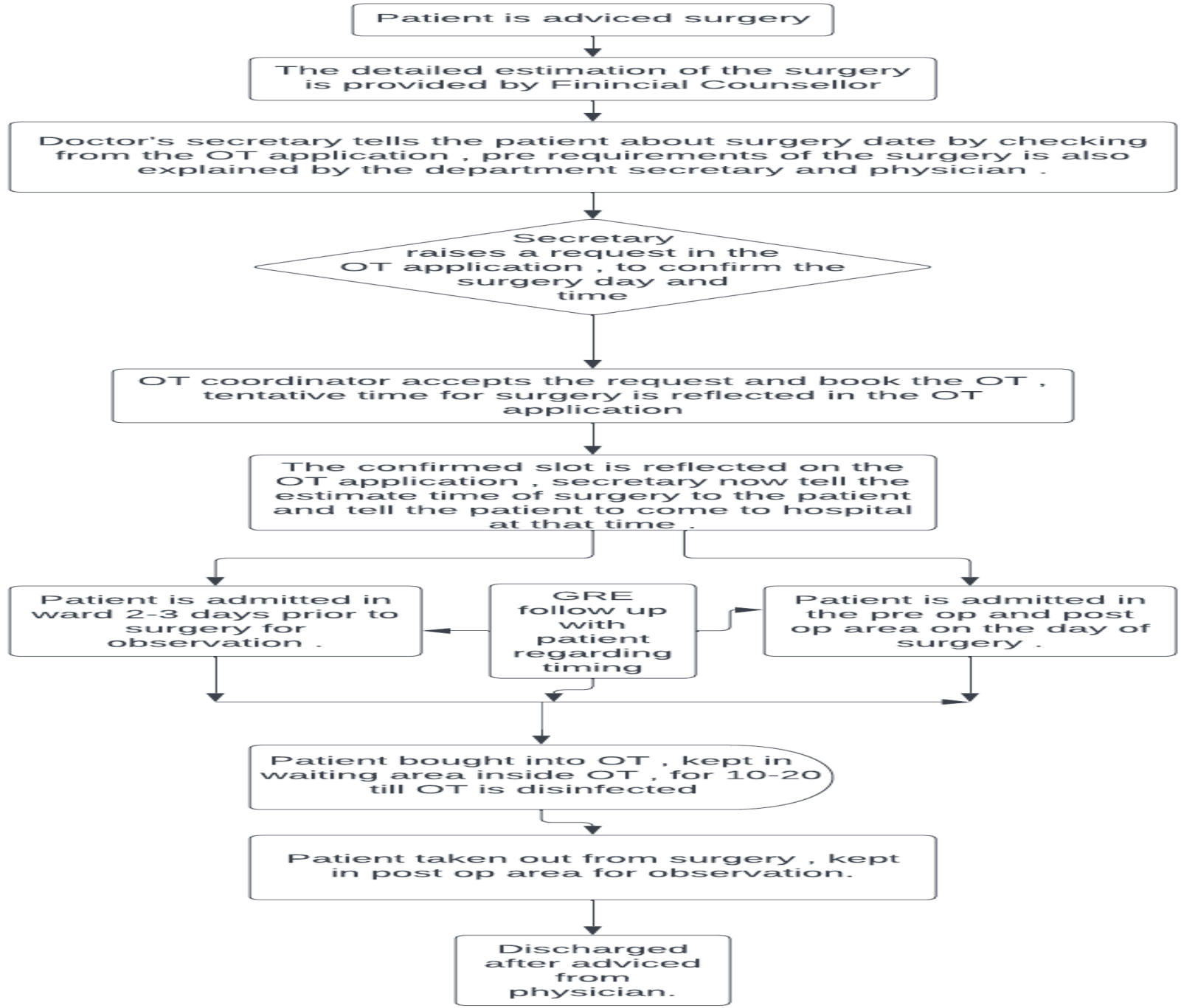
Surgical procedures and disinfection processes were observed for 8 weeks i.e. from 6th March to 29th April 2023, which includes all the surgeries being done in the operation theatre complex 3,4,11,17,18,19,20 of KIMS Hospitals Secunderabad, these OT consist of four specialities which were cardiothoracic , surgical oncology , urology and orthopaedic . Overall utilization rate of each speciality is calculated along the total number of surgeries in each operation theatre and methods of disinfection and sterilization.

Aim - To study how surgical facilities are utilized and the process of disinfection of the operation theatre complex.

Objectives

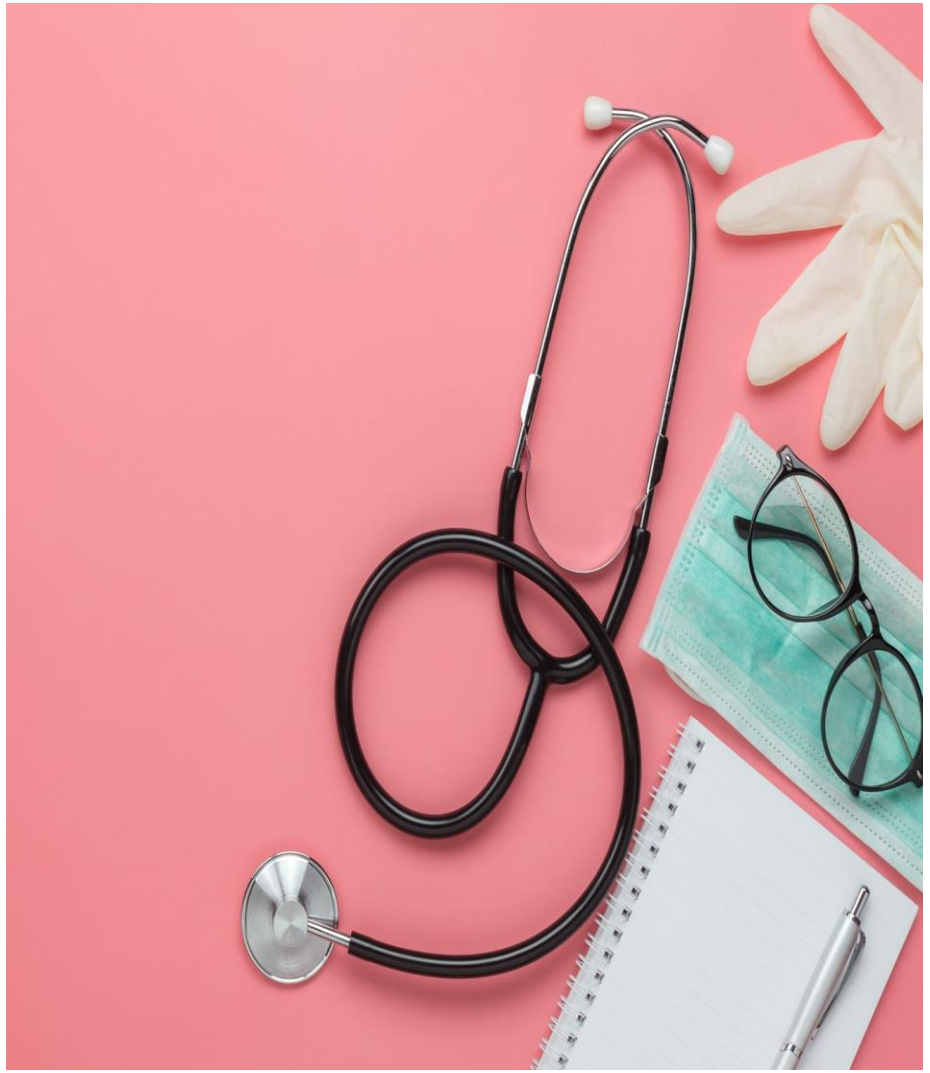
- To determine and evaluate the operation theatre utilization rate.
- To identify the process flow to find any bottlenecks in the process.
- To find out whether process of sterilization and disinfection are as per the protocol or not.

Process flow in OT -



STUDY DESIGN –

Descriptive Observational Study – To get an overview of how an operation theatre is being utilised descriptive observational study is done as it helps in collecting data over a period of time. This type of study attempts to identify the features and patterns of how and operation theatre is used that too without drawing any conclusions about cause and effect or by following any particular patient over time.



SETTING – KIMS Hospital, Secunderabad

STUDY POPULATION-

1. **Inclusion criteria**: All the daily cases scheduled from 8:00 am to 6:00 pm during all occupational days. Operation theatre complexes used for the study are 3,4,11,17,18,19 and 20 , of the specialties Orthopaedics , cardiothoracic , surgical oncology and urology .
2. **Exclusion criteria**: Sundays, public holidays, and unscheduled or cancelled cases. Emergency cases and cases beyond 6:00 pm are also excluded.
3. **Study tools**: OT module application , manual data entries in register, MS excel.

DURATION OF STUDY: 6th March to 29th April (46 Days)

SAMPLE SIZE: 487 cases which were cash as well as insurance patients who have undergone surgical procedures at KIMS Hospitals Secunderabad . The samples are taken from 4 different specialities which were cardiothoracic , urology , orthopaedic and surgical oncology.

SAMPLING TECHNIQUE:

Collection of data by observation and by OT module application, examination of relevant up-to-date records, and OT staff interview.

DATA ANALYSIS PLAN:

The following parameters were observed for 8 weeks:

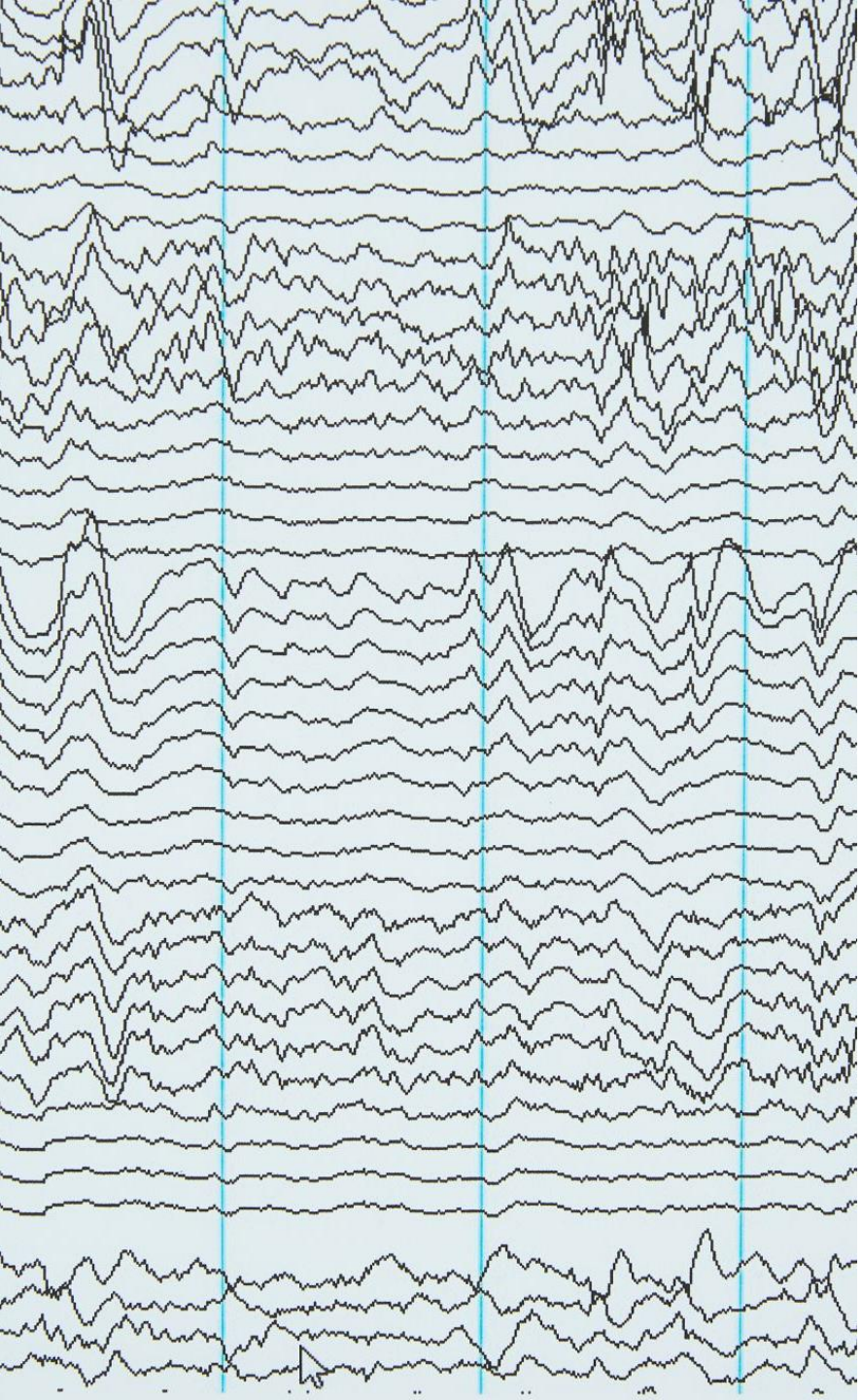
- Total no. of surgeries in OT 3 & 4 , OT 11 , OT 17 & 18 , OT 19 & 20
- Department wise no. of surgeries i.e. Cardiothoracic , surgical oncology , urology and orthopaedic department respectively.
- Time taken for surgical procedures to be finished and time allotted for the procedure.
- Overall utilization percentage for each departments.
- The time at which operation theatre starts i.e. the time when the patient was shifted inside the operation theatre for surgery. Wheel in time is noted .
- Time of shifting patient outside the OT i.e. the wheel out time was noted .
- Overall operation theatre turnover time is the time when the patient is getting shifted out of the operation theatre and the next patient being wheeled inside the OT.
- If any surgical case gets cancelled or timing is changed, the reason was written down.

- **Limitations**
- This study does have some limitations. First, information was gathered and examined during a brief period (two months), also I did not thoroughly assess the potential reasons for cancellations.

- **ETHICAL CONSIDERATIONS**
- Data security, privacy and confidentiality of all the cases was maintained all the time for collection, capturing and analysis of the information, patient name, mobile number and other identifiers were not compromised .

- **Implications of the research**

The implications of this research could be significant for the KIMS hospital administration, surgeons, nursing and paramedical staff and also the patients. By identifying the most frequent reasons for delay of scheduled surgeries, the management team can take steps to address these issues , thus leading to more efficient use of the operation theatre complex and better patient outcomes. This study can also help in identifying certain areas where technology and other interventions can be implemented to optimize operation theatre utilization rate. Also the effective sterilization and disinfection methods are studied to ensure aseptic environment of the operation theatre complex .



Results:

- Section 1 of results shows the comparison of surgeries performed in the month of March and April (2023), 8 week comparison is shown among four specialities i.e. urology, cardiothoracic , surgical oncology and orthopaedic respectively .
- Section 2 of results depicts hours operation theatre complex of four specialities being functional versus actual functioning hours.
- Section 3 of results shows the average utilization rate of the operation theatre complex of four specialities being undertaken for the study.
- Section 4 of results shows the adherence to the disinfection and sterilization policies.

Section 1

Comparison of surgeries performed in the month of March and April 2023 –

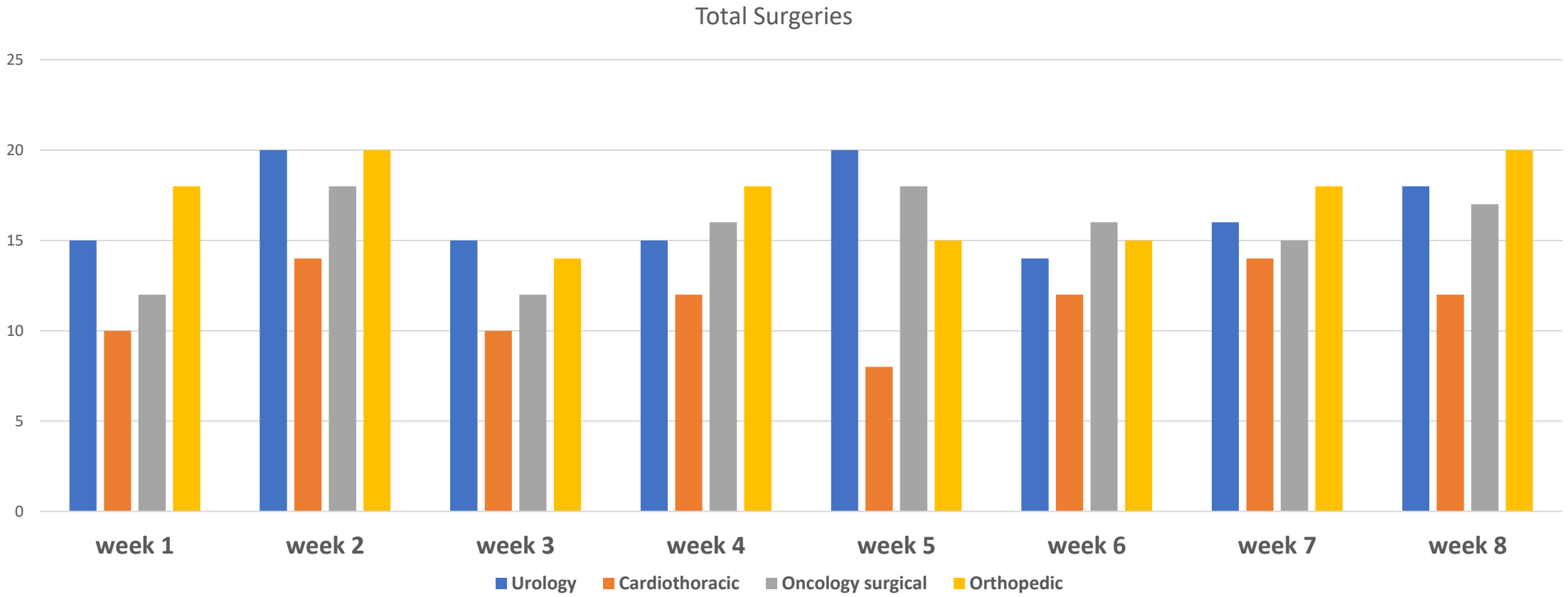


Fig.1 – Comparison of total surgeries

Interpretation - A total of 487 were performed during the duration of 8 weeks , in orthopaedic department a total of 138 surgeries were performed followed by 133 surgeries in urology department , 124 in surgical oncology and 92 in cardiothoracic department respectively .

Section 2

Hour’s operation theatre complex of four specialities being functional versus actual functioning hours.

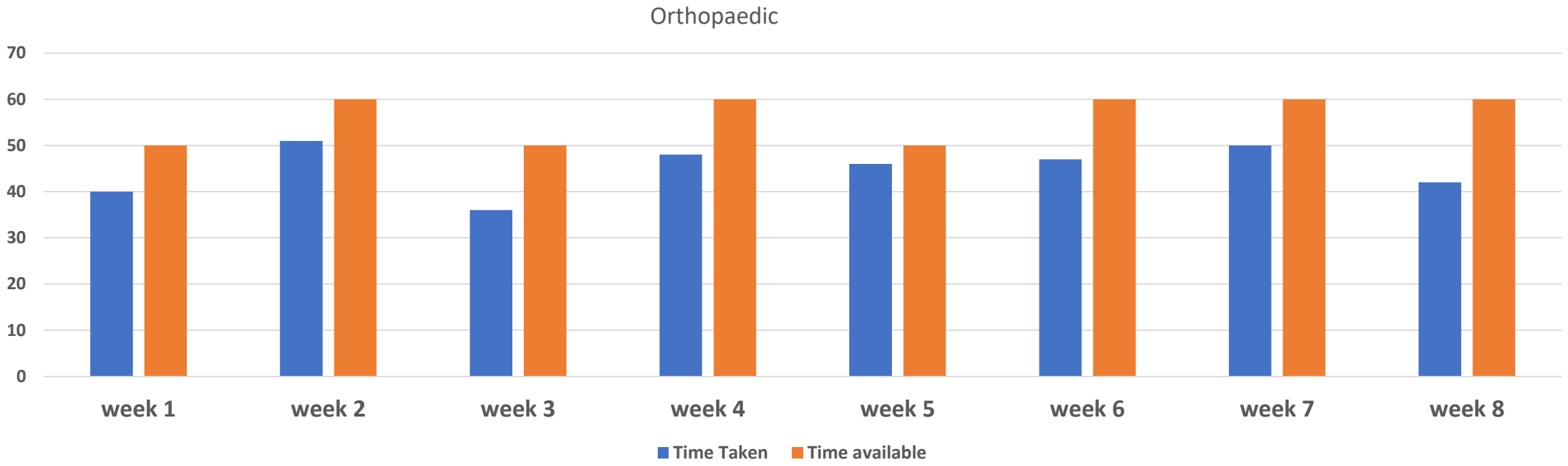


Figure 2 – Time taken in hours for total orthopaedic surgeries.

- Interpretation - Over the duration of 8 weeks an average of 45 hours were taken for orthopaedic surgeries to be performed as compare to average 56 available hours each week . Procedures like total knee replacement (TKR) , ORIF(Open reduction and internal fixation) of the Distal Radius Fracture took around 2 – 3 hours , while some procedures like bilateral core decompression took up to 4 hours

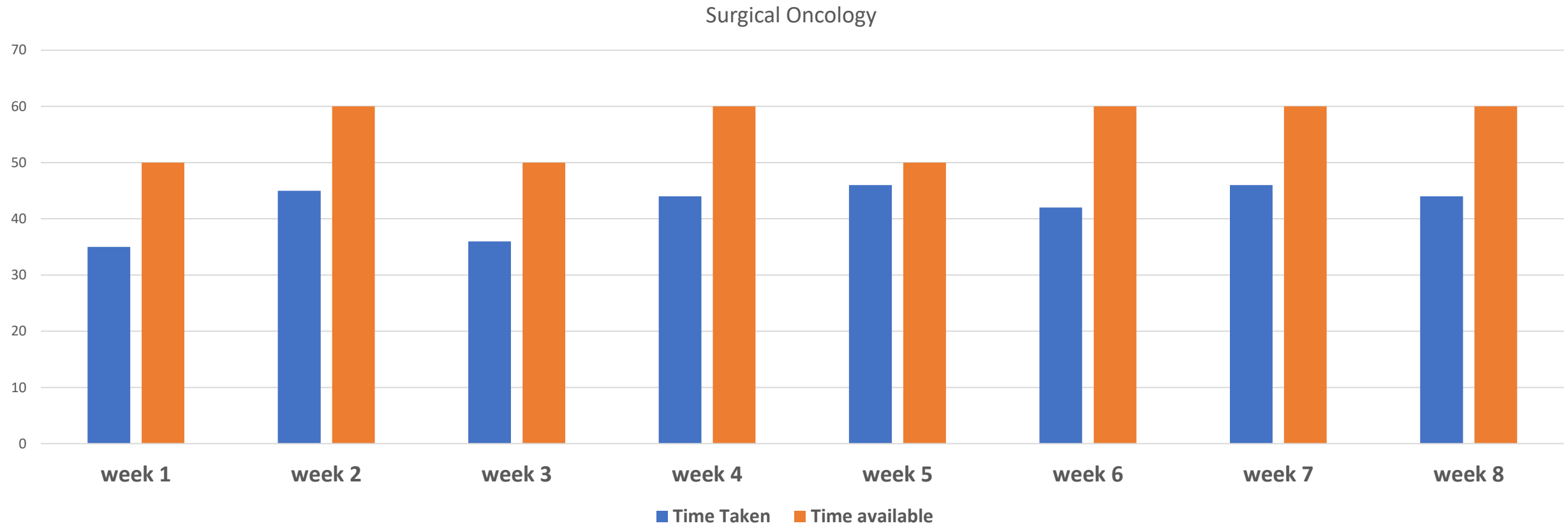


Figure 3 –Time taken in hours for total surgical oncology cases

Interpretation – An average of 42 hours per week is the time taken for surgical oncology cases to be performed as compared to 56 hours available per week . Surgical procedures like ileostomy closure , total thyroidectomy, took around 4 to 5 hours while certain other procedures like myomectomy , laparotomy , radical nephrectomy , lap tubectomy , lymph node biopsy took around 2-3 hours .

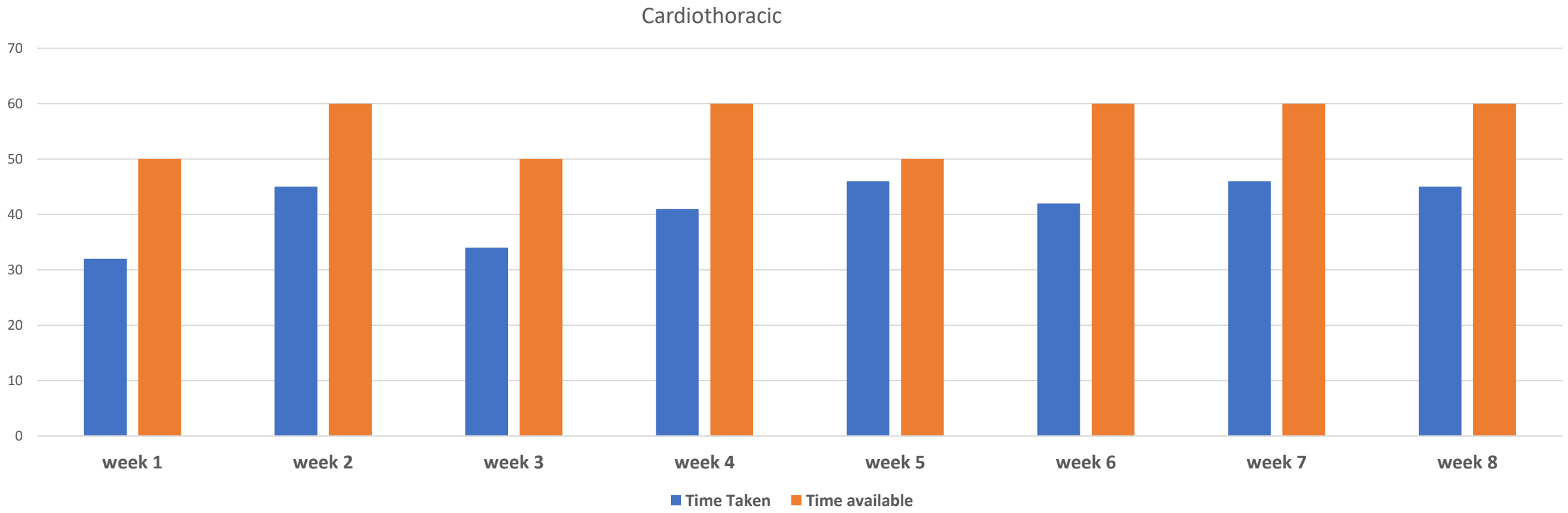


Figure 4 – Time taken in hours for total cardiothoracic surgeries

Interpretation – As seen in the above data 41 hours per week is the average time taken for the completion of cardiothoracic cases .

Procedures like Coronary artery bypass graft (CABG) , orchidectomy took around 3 to 4 hours for completion , while certain procedures like aortic valve replacement , mitral valve replacement took around 2 hours for completion .

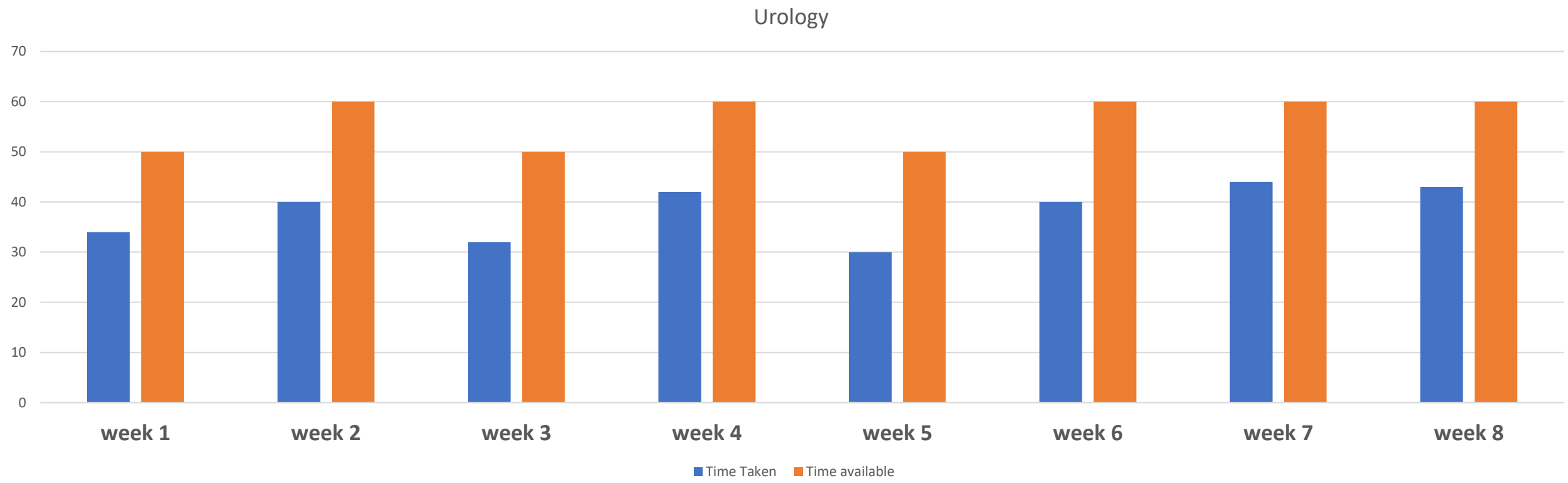


Figure 5 – Total surgical hours for urology department

Interpretation – As per the above data it is seen that 38 hours per week are utilized by urology cases . Certain surgical interventions like kidney transplantation took around 4 hours for completion while procedures like ureteroscopy and laser stone fragmentation took around 2 to 3 hours for completion .

Section 3

Average utilization rate of the operation theatre complex of four specialities being undertaken for the study .

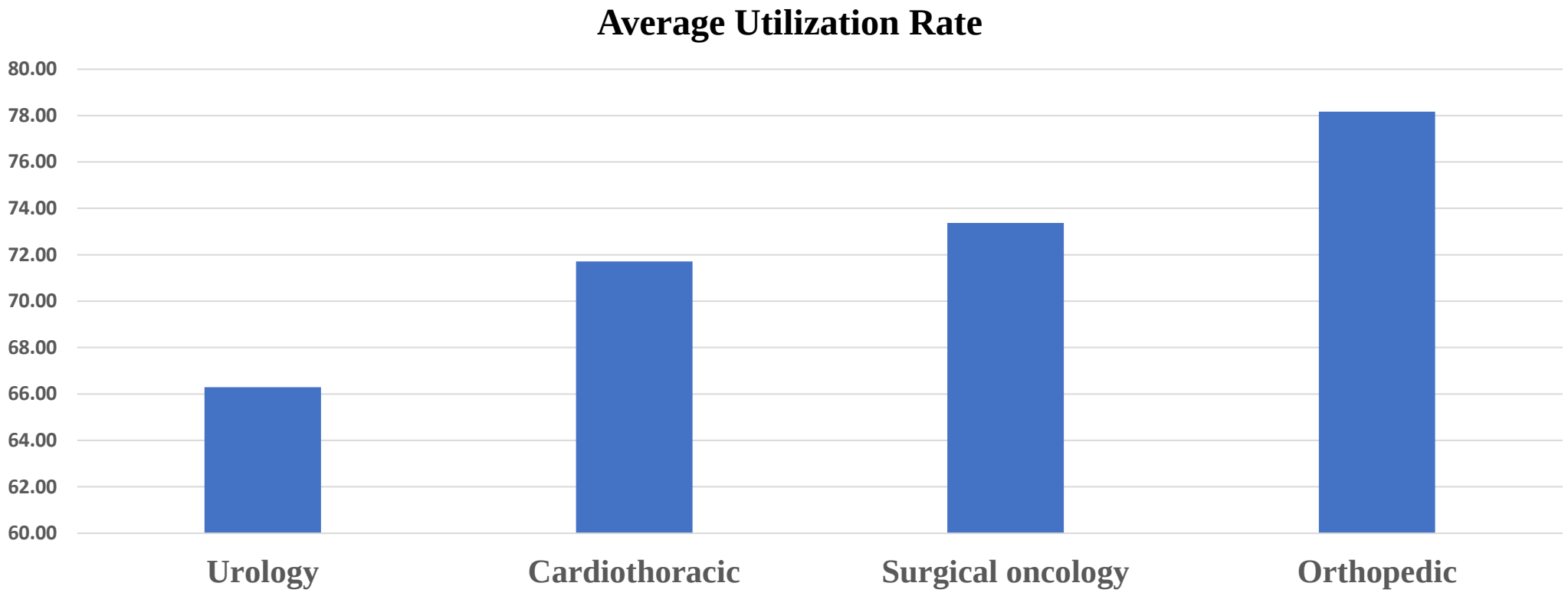


Figure 6 – Average utilization rate

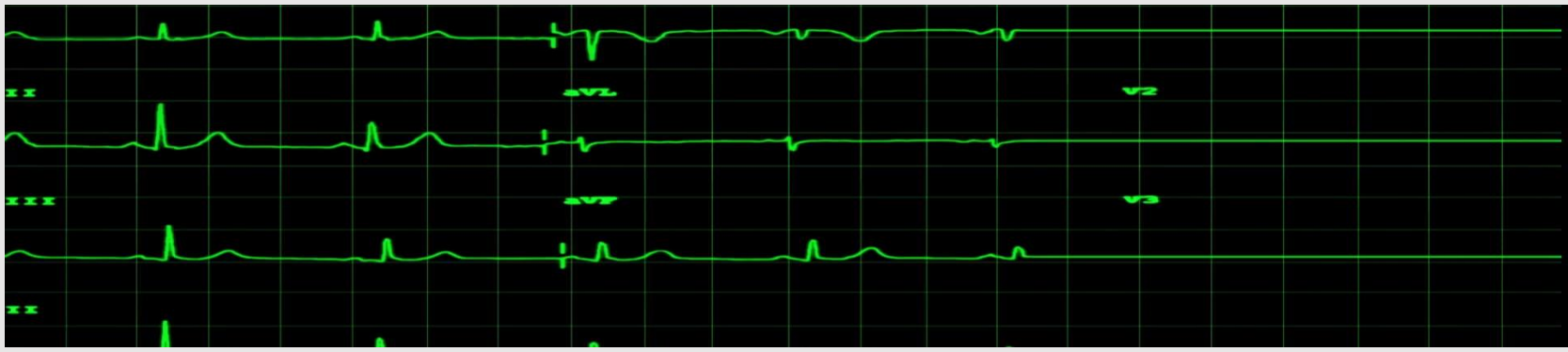
Interpretation – Orthopaedics speciality has a recorded utilization rate of 78.17%. After orthopaedics surgical oncology speciality has the second-highest utilisation rate (73.38%). At a rate of 71.7%, the cardiothoracic specialty has had the third-highest usage.. The urology speciality, with a usage rate of 66.29%, has the lowest utilisation rate among the examined specialties

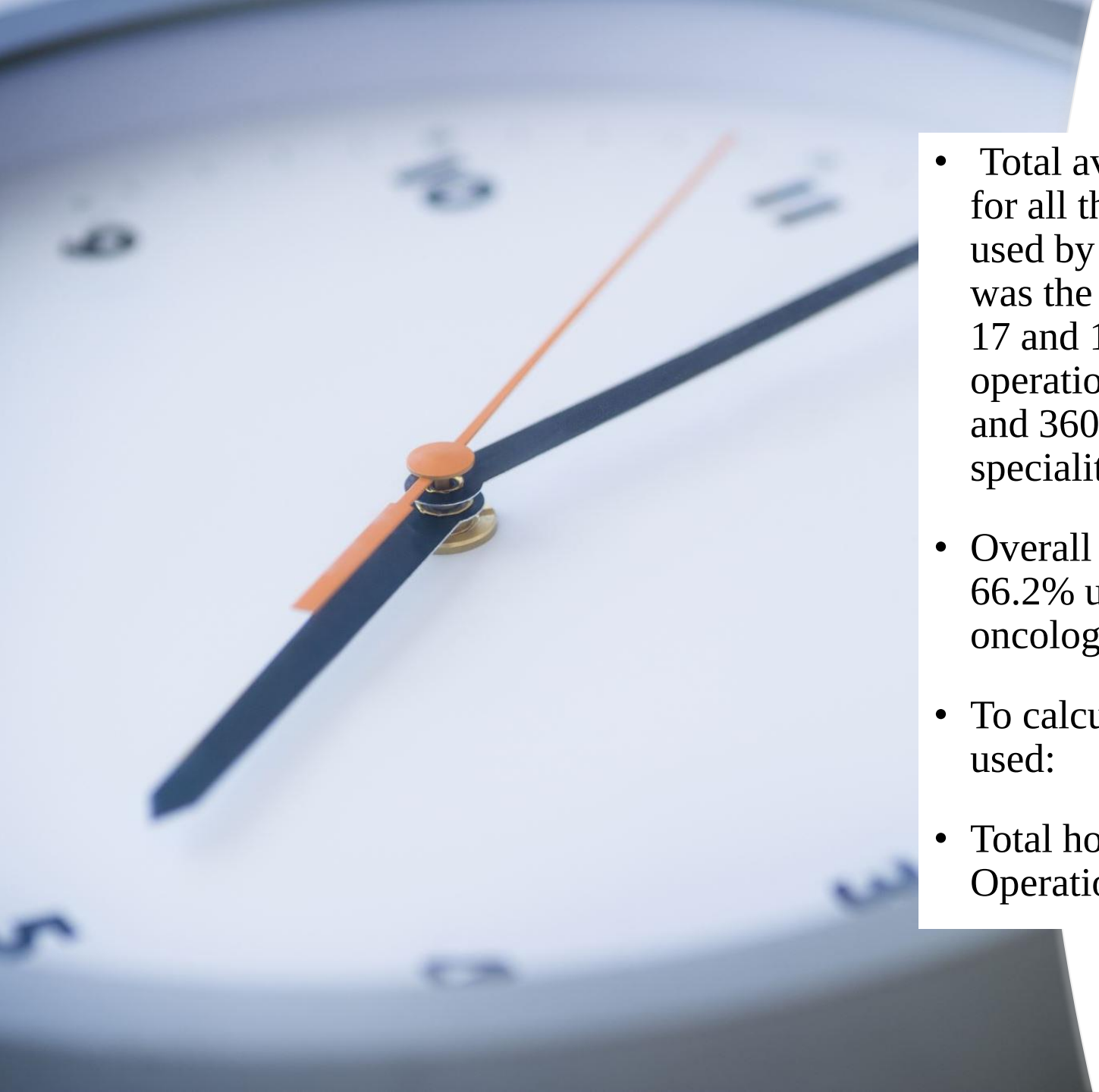
- **Discussions / Conclusion**

• The no. of surgeries performed in the month of March 2023 is 239 as compared to 248 surgeries performed in the month of April 2023.

• Number of surgeries performed have slightly increased in the month of April. In both the months maximum surgeries are being conducted in OT 3 and 4 which is of orthopaedic specialty

• As compared to the month of march, no. of cardiothoracic surgeries have slightly reduced. In March no. of cardiothoracic surgeries performed were 46 whereas in the month of April surgical cases were 44.



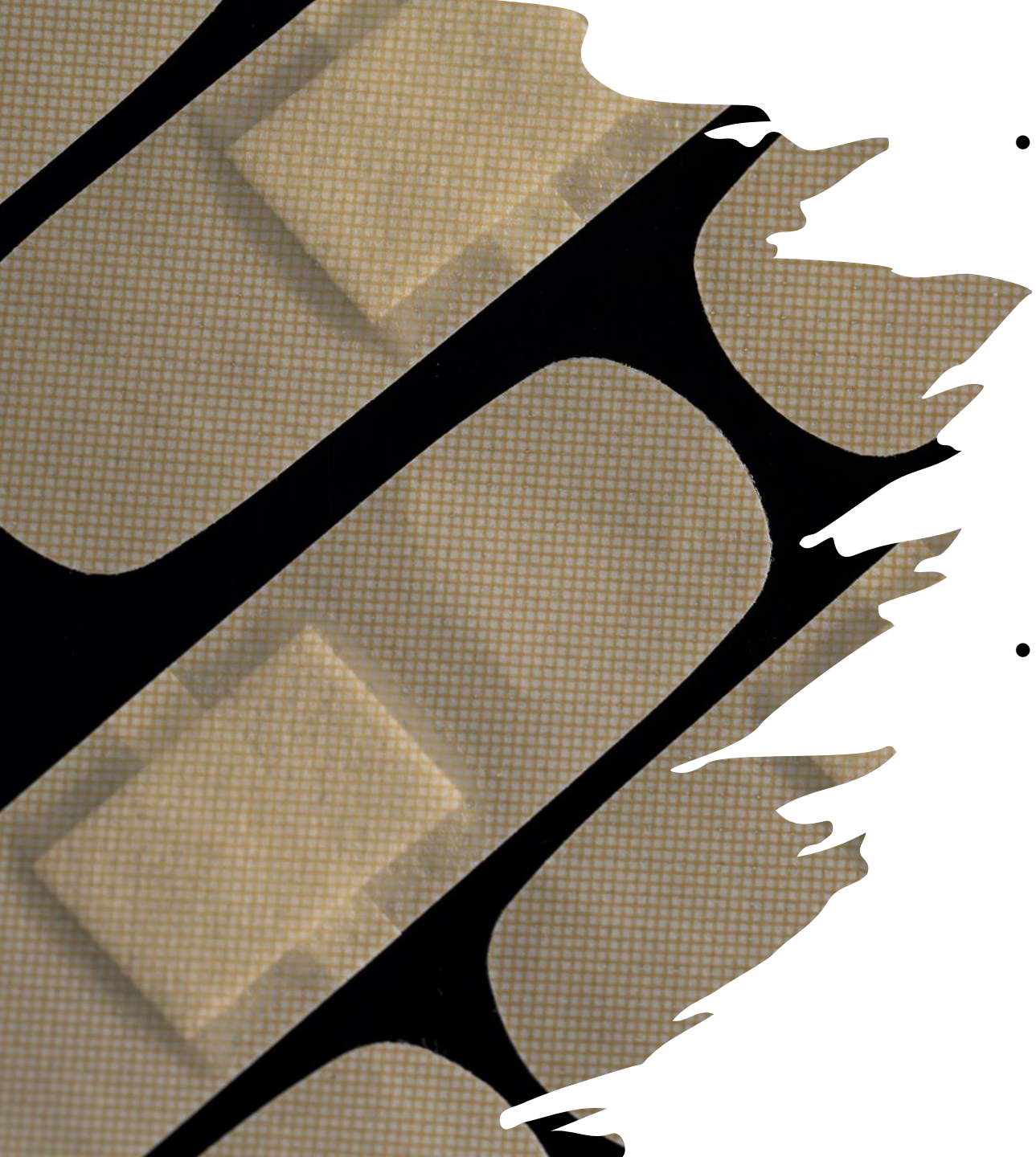


- Total available hours from 6th March to 29th April 2023 for all the OTs was 460 hours out of which 305 hours were used by operation theatre 11 of urology speciality which was the lowest followed by 331 hours of operation theatre 17 and 18 cardiothoracic speciality , 338 hours by operation theatre 19 and 29 of surgical oncology speciality and 360 hours by operation theatre 3 and 4 of orthopaedic speciality which was highest hours being utilized.
- Overall utilization percent in all the four specialities was 66.2% urology , 71.7% cardiothoracic , 73.3% surgical oncology and 78.1% of orthopaedic respectively.
- To calculate the OT utilization rate following formula is used:
- Total hours Operation Theatre Hours used / Total available Operation Theatre hours*100.

5: Recommendations

KIMS Hospital Secunderabad already has a good operation theatre utilization rate as we can see after determining the utilization rates of four specialities which were urology , cardiothoracic , surgical oncology and orthopaedics , the utilization rate of urology speciality was less around 66% as compare to the utilization rates of other specialities as they were more than 70% with 78% highest of the orthopaedic speciality, so keeping that in mind several recommendations can be considered to further optimize the operation theatre complexes and improve their efficiency.

- Standardize scheduling of all the surgeries: To reduce any waiting time in between procedures, make sure that the scheduling process is effective, well-coordinated by all the staff members. Consider using operation theatre module more efficiently and remove any bug occurring in the application so that it can aid in maximising the order of surgical interventions being performed while taking into account factors like type of procedure , length of procedure, any special requirement by patient and availability of equipment used.
- By increasing the effectiveness of pre-operative procedures such as pre anaesthetic check up , part preparation that includes preparing the patient for surgery , certain documentation and health check up if done effectively can also reduce certain delays and surgeries could start on time .
- The use of resources and equipment used for surgical procedures could be maximized by regularly reviewing and evaluating the use equipment used for surgical interventions .



- Also by improving teamwork and communication among the members of healthcare team such as effective communication between surgical teams, anaesthesiologists, nurses, and paramedical staff and ensuring regular team meetings the issues related to delay in surgeries could be discussed among all the members and those issues will not be repeated next time during any surgery.
- By adopting standardised protocols and checklists in operation theatre effective workflow could be ensured as checklists are essential for all the surgical procedures so standard protocols must be adopted as this will increase safety during any surgical procedure and also reduce unnecessary delays .

- Continuous training and development program for staff members which include nurses , anaesthesiologists , surgeons and paramedical staff could improve their work efficiency, improve their professional growth and they can work more effectively as a team.
- By analysing certain performance metrics and key performance indicators which are related to operation theatre complexes such as time operation theatre complex being used , turn around time for surgeries , cancellation rates of surgeries , waiting time of patient in pre operative area etc. helps to improve the utilization rate further and also we can monitor results by following such key performance indicators.
- By examining the patient flow from admission in the hospital to discharge we can identify certain areas which can be improved . Any bottlenecks in the process of registration , examinations in the pre operative area , and post operative area should be identified and effective solution should be provided . This will also improve the overall operation theatre utilization rate.

- If routine maintenance and downtime preparations are there it will ensure that the operation theatre complex is free of any disruptions and regular maintenance of equipment used for surgical procedures, ensure that the operation theatre can be used optimally.
- Hospital must take certain initiatives for ongoing quality improvement such as taking feedback from employees as well as from patients as this will help in maintaining good bonds and establishing a healthy culture in the hospital.

Methods of sterilization and disinfection –

- The most common type of sterilisation followed in the operation theatre complexes there was steam sterilisation, which includes exposing the tools to 121°C high-pressure steam for 15 to 20 minutes. In order to kill germs, dry heat sterilisation uses hot air at a temperature of 160–170°C for two to three hours.
- Disinfection methods include using chemicals such as chlorine, hydrogen peroxide, and alcohol. Chemical disinfection involves soaking the instruments in a solution of the disinfectant for a specific period, involve exposing the instruments to the respective agents for a specific duration.
- Regular monitoring of sterilization and disinfection processes is done to ensure that the methods are working effectively. Monitoring also helps identify any issues or problems with the equipment or processes and allows for corrective action to be taken before any harm is done to patients or staff.
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Also as a part of the process and green OT initiative the Bureau Veritas certification company carry out certain audits related to surgical site infection avoidance, anaesthesia monitoring , secure anaesthesia and secure surgical teams and tools, as a framework for measuring the quality,. The procedure is completed with a "Green Score" awarded to the hospital after meeting the necessary quality and safety standards.

Conclusion

- The no. of surgeries performed in the month of March 2023 is 239 as compared to 248 surgeries performed in the month of April 2023.
- Total available hours from 6th March to 29th April 2023 for all the OTs was 460 hours out of which 305 hours were used by operation theatre 11 of urology speciality which was the lowest followed by 331 hours of operation theatre 17 and 18 cardiothoracic speciality , 338 hours by operation theatre 19 and 29 of surgical oncology speciality and 360 hours by operation theatre 3 and 4 of orthopaedic speciality which was highest hours being utilized.
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Thank You