

Study on Utilization of Operation Theatre

By

Gaurav Loona

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

Academic year, 2015-2017



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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Dr.Gaurav Loona student of **MBA Hospital and Health Management** from The IIHMR University, Jaipur has undergone internship training at Sarvodaya hospital, Faridabad from 6 Feb, 2017 to 6 May, 2017.

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

The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.



Col.(Dr.) Ashok Kaushik

Dean, Academic and Student Affairs

The IIHMR University, Jaipur



Dr. P.R. Sodani

Dean Training

The IIHMR University, Jaipur



Dissertation Certificate

This certificate is awarded to Dr. Gaurav Loona in recognition of having successfully completed his Internship in the department of "Operation Theatre" under the Guidance of Dr. Saurabh Gahlote (Medical Administrator) on the Topic "**A study on OT Utilization**" at Sarvodaya Hospital, Faridabad

He has undergone 03 months of Dissertation from 6th February, 2017 to 6th May, 2017.

We wish him all the best for future endeavours.

For Sarvodaya Hospital & Research Centre

Rahul Khandelwal

Manager -HR

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled Study on utilization of operation theatre and submitted by Dr. Gaurav Loona Enrollment No. IIHMR-U/01/2015-17/0280 under the supervision of Dr. P.R. Sodani for award of MBA in Hospital and Health of the University carried out during the period from 6th February to 6th May embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.


Signature

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled Study on utilization of operation theatre in Sarvodaya Hospital, Faridabad.



Signature of student

ACKNOWLEDGEMENT

Sarvodaya hospital has provided me a great chance of learning and professional development. Hence would like to acknowledge Sarvodaya hospital for considering me to be a part of it and giving me this golden opportunity to meet so many wonderful people and professionals who led me through this dissertation period.

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1. ABSTRACT

OT utilization is defined as quotient of actual hours utilized on daily basis and the available OT hours per month. In today's world people are becoming more and more cautious towards health services. The managerial aspect of providing health services to patients in hospitals are becoming increasingly important. An operation theatre is one important area of the hospital where live saving and life curing procedures are carried out under immaculate conditions in a stable environment by well trained person with proper handling, comfort to patients ensuring maximum safety. In all hospitals, the OT always act as a leading source of revenue generation. Hence it is necessary to optimize the resources. This study aims to understand the utilization of the operation theater in Sarodaya hospitals. The average utilization of all 6 OT's for the month of February is nearly 36% & for the next month lies closely to 46%. Finally for the last month of the study period i.e. april'17 the utilization seem to be reaching to 50.54%. For February to april'17 utilization trend seem to be increasing for OT 1,2&3 whereas OT 4,5,6 needs more improvement. For the cancelled cases, the cancellation rate is around 2%. Further research can be done and reasons for rescheduling may be identified. Work may be done to manage and treat these reasons for OT utilization.

2. BACKGROUND

In today's world people are becoming more and more cautious towards health services. The managerial aspect of providing health services to patients in hospitals are becoming increasingly important. An operation theatre is one important area of the hospital where life saving and life curing procedures are carried out under immaculate conditions in a stable environment by well-trained person with proper handling, comfort to patients ensuring maximum safety. In all hospitals, the OT always act as a leading source of revenue generation. Hence it is necessary to optimize the resources. The productivity of operating theatres can be monitored in various ways. Essentially it tends to be defined in terms of ability to translate available time into earnings. (2, 3, 4) Utilization is a simple and adequate measure of the efficiency of a theatre, because its ability to generate revenue (its efficiency) rises as the time for which it is used increases

OT utilization is defined as quotient of actual hours utilized on daily basis and the available OT hours per month.

It can be implicated that utilization of OT in the institute is optimum, except for IDOT complex. The reason could be explained by the difference in scheduling of surgeries in theatres. In open scheduling, many times theatre tables remained under booked for surgeries by the department. It can be noted that utilization of theatre by various departments is also optimum, except for the departments of vascular surgery and cardiothoracic surgery. This was mainly due to underestimation of time consumed by each surgery resulting in cancellation of surgeries posted last in list, leading to unutilized time at the end of the day in Operation Theatres. Although utilization measured longitudinally may be characteristic, utilization would typically vary from day to day, depending on caseload and the individual nature of procedures.

3. LITERATURE REVIEW

Both in developed and developing countries health care expense comprises of a significant portion of the Gross Domestic Product. Expense on healthcare for UK as a percentage of the UK GDP was estimated to be 8.4% in 2007, in which public share was supposed to be 69%. As per the statistics released by the WHO (World Health Organization), health care expense in 2007 in Iran as one of the developing country was estimated to be about 6.4% of its GDP, and the section covered by the government existed around 46.8%. This only reality makes health systems outstanding research field in industrial engineering and operations research so that it upgrades the working efficiency.

Fundamentally, there are 3 OR scheduling strategies which are employed as: (a) blocked (2) open and (3) the modified one.

Underneath the blocked scheduling strategy, the lone surgeons or the surgical groups are allotted time for particular OR in a periodic (such as once a week or in a month) time table. The strategy within the system of a blocked strategy lies in 3 stages. For the first one, the OR efficiency is splitted among the surgeons, the surgical groups, and various departments on the planning level. Thereafter, the alternating timetable called “Master Surgical Schedule” is formed which explains the number as well as the kind of operating rooms which are obtainable , the hours that OR’s will remain unlock , and the groups or surgeon sessions for each OR . The final stage is known as “surgery process scheduling” divides into pair sub issues known as “advance scheduling” and “allocation scheduling”. The initial sub issue at a strategical level (one week to one month nearly) decode the planning phase by allocating an operating date to every patient over a time horizon. The other sub issue decode a scheduling phase which shows the chain and sharing of resources for cases in a given day.

For the open strategy, the hospital doesn’t engage operation room’s which are determined to a single surgeon whilst there are sporadically the weekly schedule for every surgeon. In particular, the purpose is to take all patients. The surgeons add cases equally on the same day of the surgery, and they all are listed cases for operation theatres.

The modified strategy is quite same when compared to the blocked one except that even for “master surgical schedule” certain cases are left open for flexibility. In matter of fact, this strategy is a mix of both open and blocked strategies.

The earlier reported rates for day-of-surgery cancellation rates vary extensively within a range of around 10-40 % in institutions. The result showed 30.3 % of all scheduled elective operations in general surgery were cancelled on the day of surgery.

In one more study unavailability of operating room time was one of the important reason. Surgeons and trainees with less expertise takes much more time than expected and cannot deliver the expected result on time. For some surgeries the total period exceeded the usual time and the reason was unexpected surgical complication's, juniors were taught and allowed to do the surgery for laparoscopic procedures, unavailability of sterilized instruments, and some kind of technical problems in instruments. Medically unfit patients are also presumed to be another reason of cancellations. There were reasons like hypertension, recent onset respiratory tract infections, uncontrolled diabetes and an acute onset cardiovascular abnormality. Some cancellations which occurred due to failure in following with the preoperative orders and the development of a medical illness can be minimized by a preoperative visit by the anaesthesiologist and the surgeon a day prior to scheduled surgery.

End-minute cancellation due to failure of a patient to be present is especially difficult to resolve. It can be one of the reasons due to the patient's last minute doubts and fears. Positive attitude should be there to improve patient communication and facilitate their compliance with scheduled procedures.

Operation theatre is one such area where life threatening cases come and are operated in immaculate conditions under stable environment. In many other hospitals, the OT is said to be the leading source of revenue generation. Hence it is necessary to optimize the resources. The effectiveness of OT can be monitored in many ways. Essentially it tends to be described in terms of ability to furnish available time into the earnings(6, 7, 8).Utilisation is easy and an equivalent measure of the capacity of the theatre, as its capability to generate revenue rises as the time for which it is used increases. OT utilization is defined as quotient of actual

hours utilized on daily basis and the available OT hours per month. The current study focuses to understand the utilization pattern of the Operation Theatres of Nizam's Institute of Medical Sciences (NIMS), Hyderabad, India. This institute of Hyderabad is well renowned tertiary care teaching hospital with around 1200 beds, rendering super-specialty services among various medical and surgical specialties. Half of the beds are allocated for various surgical departments of cardio-thoracic surgery, neurosurgery, orthopaedics, plastic surgery, gastroenterology, oncology, urology and vascular surgery. The institute has five OT complexes, four of which (OT 1, OT 2, OT 3 and IDOT) are scheduled for mostly elective surgical cases and one theatre for emergency services. These theatres have a total of 18 operation tables equipped to handle all surgical cases for the above surgical departments. These theatres are scheduled for six days a week except for public holidays from 9:00 A.M. to 4:00. Scheduling of cases for operation theatres is closed type of scheduling i.e. OT tables fixed for specific departments except for one theatre complex, i.e. IDOT which follows open scheduling with prior appointment basis for all departments. Scheduled cases are usually elective surgeries, though rarely emergencies are performed in scheduled time. Apart from scheduled cases sometimes few surgeries both electives and emergencies are performed, usually referred as unscheduled surgeries.

4. RATIONALE OF THE STUDY: This study is done to understand the areas of improvement during the complete process which is one of the very important activity required in Sarvodaya hospital. The rationale for this study is based on the fact that Operation Theatre is one of the most critical areas for any hospital. It generates high revenue but is also one of the costliest facility to maintain. Therefore, it is natural to expect it to be running at maximum capacity. Hence, in order to achieve the objective this study is being conducted.

5. RESEARCH QUESTION:-

1. What is the utilization of Operation theatre in Sarvodaya Hospital Faridabad?

6. AIM OF THE STUDY:

This study aims to understand the utilization of the operation theater in Sarodaya hospitals.

7. OBJECTIVE

To study utilization of OT in Sarvodaya hospitals.

8. METHODOLOGY:

The study is based on secondary data.

A.) Research Design & duration

The research design will be Descriptive. The study is conducted over a period of three months i.e. (6th Feb-2017 to 6th April)

B.) Study Setting

Sarvodaya Hospital, Faridabad

C.) Study subjects

Surgical cases handled in all 6 ot's :

D.) Sampling Size & technique

Details of all the surgeries occurring in all 6 ot's in the above mentioned time frame is included in Research.

Total sample size taken is 1216.

8.1 Data Collection

Data was collected every day from the ot register with the help of a preformed template which is attached in the annexure.

All surgeries performed in 6 ot's over the period of 3 months have been taken. As per hospital protocol the working hours for the OT's are from 7am to 8pm i.e. 13hours. Ot preparation time has been taken as 30 mins as per the availability of nursing staff and anesthetist. Standard days for February, march, April are 24,25 ,26 respectively.

The details of the Ot record register-name, Ip no , age, anaesthetist, type of anaesthesia, surgeon in and out time and staff and surgery code, procedure done, OT planned, OT done.

8.2 Tools

Template was constructed keeping in mind the study objectives as well as the available variables in the OT register , reporting month, OT number , duration of the surgery (OT in time and out time), OT wise surgeries , total no of surgeries.

9) Data analysis plan

Data was collected and cross checked through Registers maintained on a daily basis by the OT staffs for any incomplete or partial filling. Using Microsoft Excel 2013, the collected data was then edited, coded, and calculated into various frequency distribution and graphs.

Part:-1

Names of registers:-

- OT register
- Pre-Op Register
- Post-op Register

Part:-2

Utilization of OT is calculated by:-

OT hours devoted by the team * no of days

Total Hours devoted by the team while performing surgeries

OT preparation time

Sum of Actual and Preparation time

Overall Utilization

a.) Available working hours are calculated for OT per month by –:

Working hours of the OT in the hospital/no of days in that particular month.

b.) Later on total hours devoted by the team has been calculated by taking the sum of duration of each surgeries performed in the respective OT's.

c.) Actual utilization is calculated as -: no of OT hours + no. of cases*0.3/max utilization
(available working hours for OT per month)

Where,

d.) No. of OT hours is the time devoted by surgical team in the operation theatre.

e.) No. of cases here is the total cases which are carried out individually in each OT.

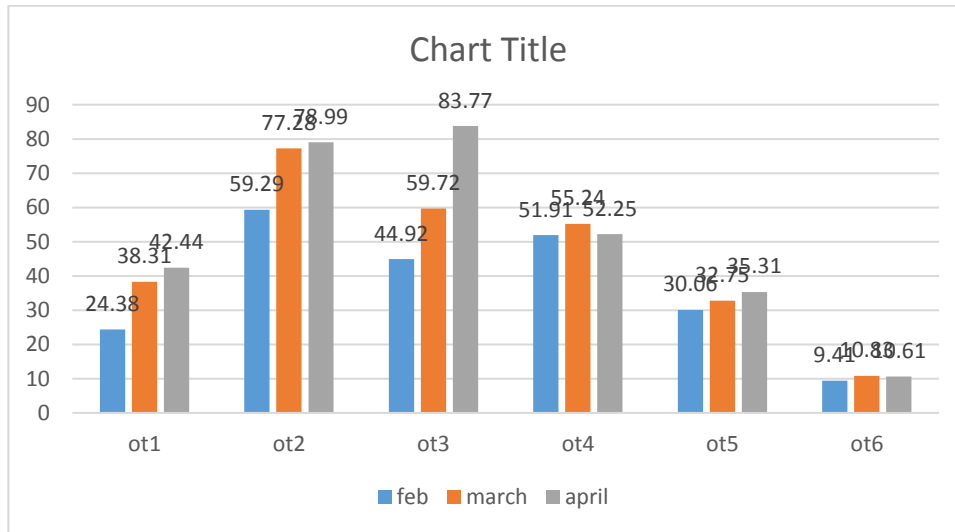
Last part remains is of utilization which is taken out as the formula:-

Actual utilization/Maximum utilization*100

10) RESULTS AND DISCUSSIONS

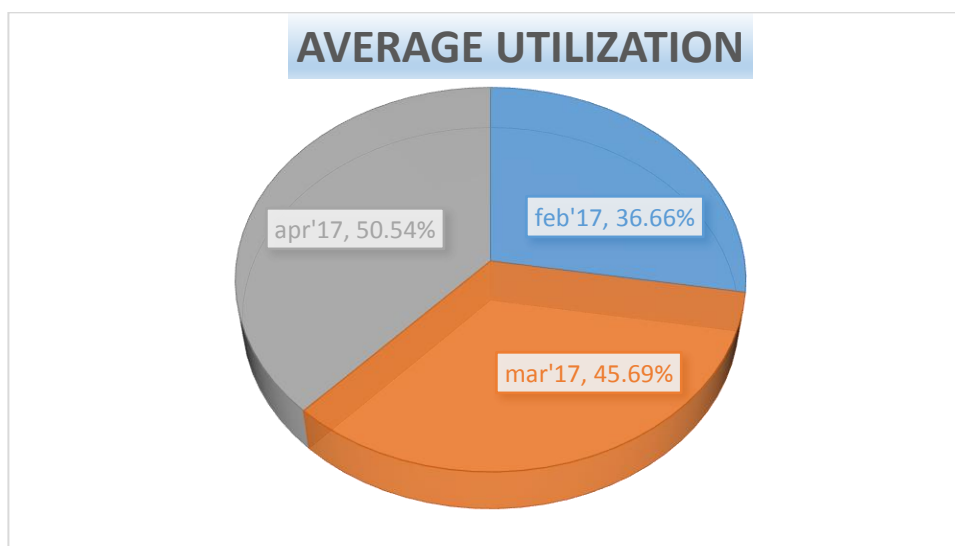
Data Analysis:-

Fig 1 : Comparative utilization of OT during study period :-



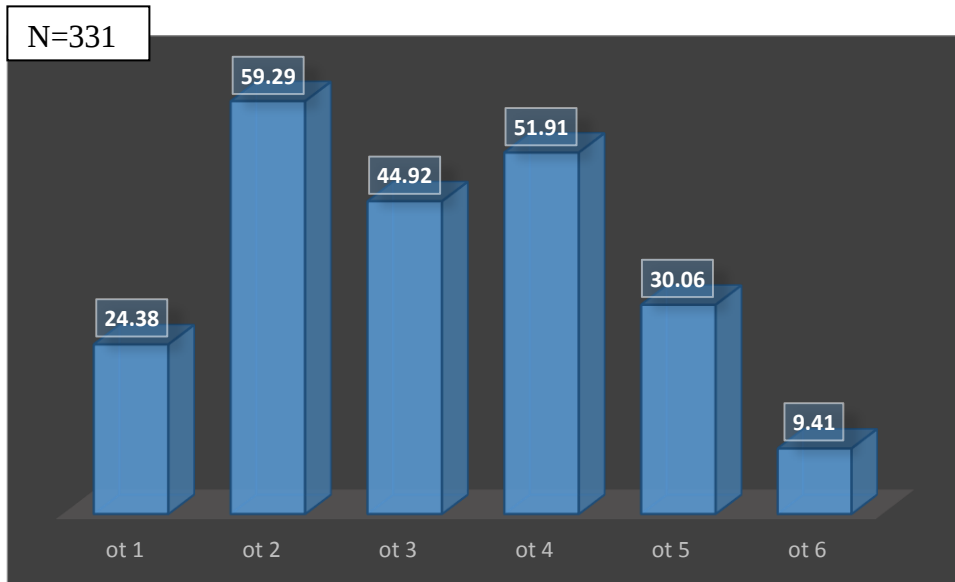
As observed the trend of OT 1 has been found to increase from February to April month by 18%. Similarly utilization in OT 3 & 4 has seen an abrupt change from 59% to 80% and nearly to 84% from 45% respectively. OT 4, OT 5, OT 6 shows a plateau stage over a period of 3 months.

Fig 2: Average utilization of all 6 OT's over period of 3 months



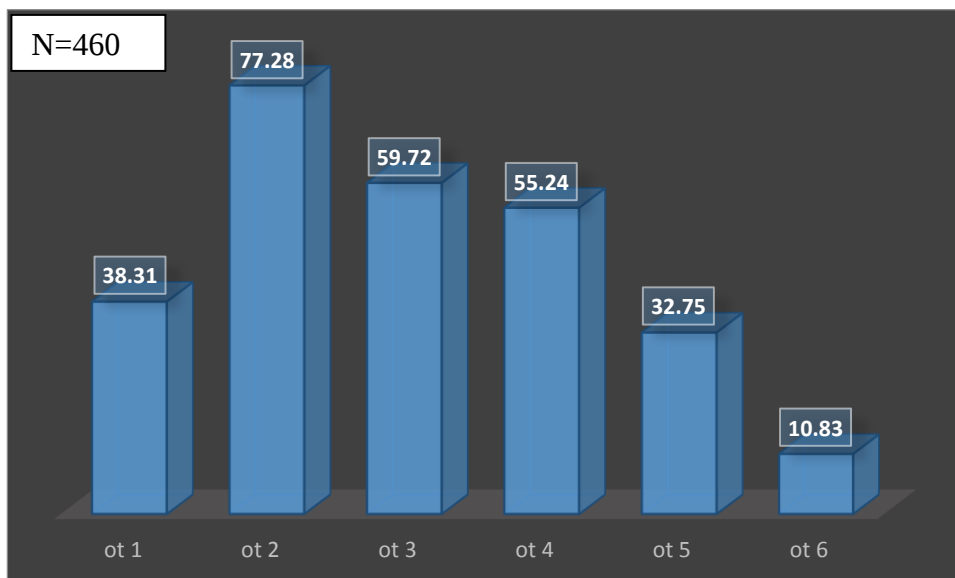
It shows an increasing trend during the study period.

Fig 3: Utilization of operation theatre in February '17.



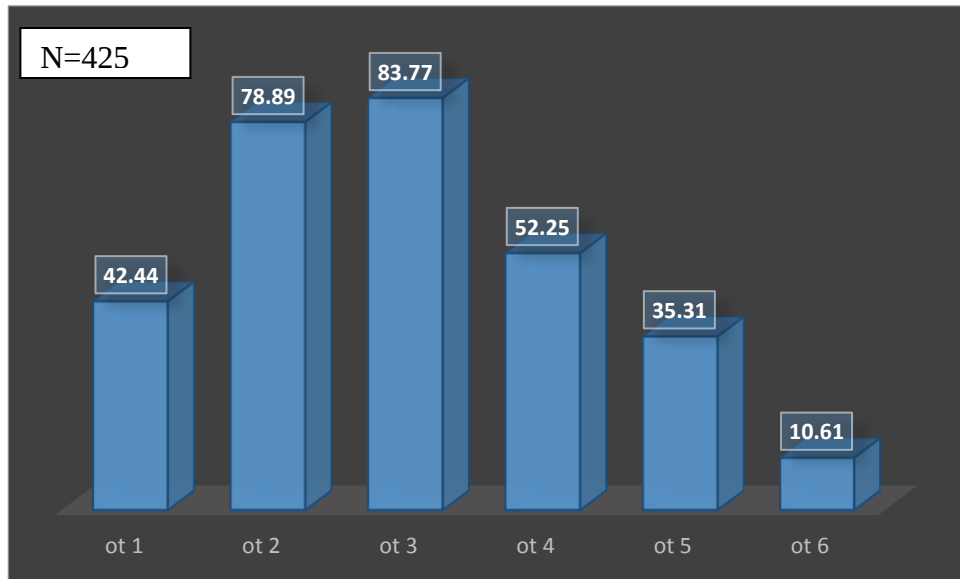
Data depicts that OT 2 has the maximum utilization rate of 59.29% followed by OT 4 with 51.91%.

Fig 4: Utilization of operation theatre in March '17.



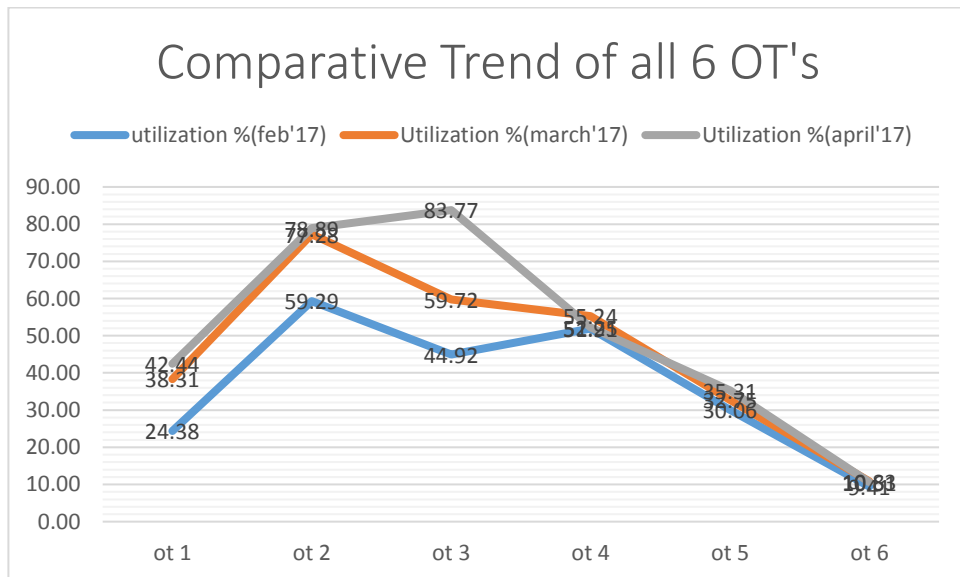
Data depicts steady utilization growth of OT 4 and sharp increase of OT 2 & OT 3 when compared with February '17.

Fig 5: Utilization of operation theatre in April '17



Data shows increasing trend in utilization in the month of April '17 as compared to February & March in all the 6 OT's

Graph 4: Comparative trend of all OT's over a period of 3months (Feb. Mar, apr'17).



FINDINGS:-

- 1.) The average utilization of all 6 OT's for the month of February is nearly 36%.
- 2.) The average utilization for the next month lies closely to 46%.
- 3.) Finally for the last month of the study period the utilization seem to be reaching to 50.54%.
- 4.) For February to april'17 utilization trend seem to be increasing for OT 1,2&3 whereas OT 4,5,6 needs more improvement.
- 5.) For the cancelled cases, the cancellation rate is around 2%.

LIMITATIONS:-

- 1.) Data of the some Postponed and cancelled cases were not found in OT Registers.

RECOMMENDATIONS:-

- 1.) A check should be maintained on Rescheduling cases.
- 2.) Proper scheduling of OT cases must be done on priority irrespective of planned and OT cases.
- 3.) Ensure that the cases are done only in the department wise dedicated OT.

CONCLUSIONS:-

- 1.) Inventory management and Inventory Audit required in The OT
- 2.) Staff motivation is an issue. Monthly meetings required between management and staff to explain role and responsibilities, set goals. Performance review and performance related pay can be one of the methods.
- 3.) Cancellation rate is nearly 2% which showed data is inadequate to come to a conclusion.
- 4.) Further research can be done and reasons for rescheduling may be identified.
- 5.) Work may be done to manage and treat these reasons for OT utilization.

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ANNEXURE-:

		As per Hospital Protocol	As per OT Staff & Anaethetist	Std Days	Maximum Utilization=OT Hours * No. of Days	Actual for the Month	Ot Preparation Time* No .of Cases		Actual Utilization/ Maximum Utilization X100
Month	OT	OT Working Hour (7:00 am to 8:00 pm)	OT Preparation Time	No. of Working Days	Available working Hour for OT/ month	Total Hours Devoted by Team	OT Preparation Time	Sum of Actual & Preparation Time	Utilization
Feb	OT -1	13 Hours	30 mins	24	312	70.37	5.7	76.07	24.38
	OT -2	13 Hours		24	312	168.2	16.8	185	59.29
	OT -3	13 Hours		24	312	118.24	21.9	140.14	44.92

	OT -4	13 Hour s		24	312	136.4 5	25.5	161.95	51.91
	OT -5	13 Hour s		24	312	76.1	17.7	93.8	30.06
	OT -6	13 Hour s		24	312	19.16	10.2	29.36	9.41
	To tal	13 Hour s						686.32	36.66
Ma rch	OT -1	13 Hour s	30 mins	26	338	119.2 8	10.2	129.48	38.31
	OT -2	13 Hour s		26	338	236.3 1	24.9	261.21	77.28
	OT -3	13 Hour s		26	338	171.5 6	30.3	201.86	59.72
	OT -4	13 Hour s		26	338	156.1	30.6	186.7	55.24
	OT -5	13 Hour s		26	338	85.2	25.5	110.7	32.75

	OT -6	13 Hour s		26	338	23.09	13.5	36.59	10.83
	To tal	13 Hour s						926.54	45.69
Apr il	OT -1	13 Hour s	30 mins	26	338	130.5 4	12.9	143.44	42.44
	OT -2	13 Hour s		26	338	248.3 4	18.3	266.64	78.89
	OT -3	13 Hour s		26	338	254.6 4	28.5	283.14	83.77
	OT -4	13 Hour s		26	338	150.2	26.4	176.6	52.25
	OT -5	13 Hour s		26	338	98.34	21	119.34	35.31
	OT -6	13 Hour s		26	338	28.36	7.5	35.86	10.61
	To tal	13 Hour s						1025.02	50.54

feb- apri l	OT -1	13 Hour s	30 mins	76	988	320.1 9	28.8	348.99	35.32
	OT -2	13 Hour s		76	988	652.8 5	60	712.85	72.15
	OT -3	13 Hour s		76	988	544.4 4	80.7	625.14	63.27
	OT -4	13 Hour s		76	988	442.7 5	82.5	525.25	53.16
	OT -5	13 Hour s		76	988	259.6 4	64.2	323.84	32.78
	OT -6	13 Hour s		76	988	70.61	31.2	101.81	10.30
	To tal	13 Hour s						2637.88	44.50

planned sx	unplann ed sx	emergen cy	resched ule	cancelle d	res. rate	canc rate	planned sx rate
8	9	1	1	3	12.5	37.5	50
25	21	5	5	0	20	0	80
31	34	3	5	0	16.12903 226	0	83.870967 74
29	35	11	10	0	34.48275 862	0	65.517241 38
18	34	1	6	0	33.33333 333	0	66.666666 67
28	6	0	0	0	0	0	100
8	10	6	0	0	0	0	100
29	28	18	3	5	10.34482 759	17.241 38	72.413793 1
52	28	19	2	0	3.846153 846	0	96.153846 15
42	34	24	2	0	4.761904 762	0	95.238095 24
19	43	21	2	0	10.52631 579	0	89.473684 21

35	9	1	0	0	0	0	100
20	21	0	2	0	10	0	90
26	29	0	6	0	23.07692 308	0	76.923076 92
37	52	3	3	0	8.108108 108	0	91.891891 89
28	41	12	6	1	21.42857 143	3.5714 29	75
24	42	0	4	0	16.66666 667	0	83.333333 33
17	8	0	3	0	17.64705 882	0	82.352941 18
36	40	7	3	3	8.333333 333	8.3333 33	83.333333 33
80	78	23	14	5	17.5	6.25	76.25
120	114	25	10	0	8.333333 333	0	91.666666 67
99	110	47	18	1	18.18181 818	1.0101 01	80.808080 81
61	119	22	12	0	19.67213 115	0	80.327868 85
80	23	1	3	0	3.75	0	96.25
476			12.6050 42	1.89075 63		0.3972 18	

