Study of The Turnaround Time in Orthopedic and Spine Surgeries in Operation Theatre at Indian Spinal Injuries Centre

By

Harmandeep Singh

Dissertation submitted for the partial fulfillment of the

MBA Hospital and Health Management

Academic year, 2016-2018

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INSTITUTE OF HEALTH
MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Harmandeep Singh** of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Indian Spinal Injury Centre, New Delhi** from **1st Feb 2018 to 1st May 2018.**

The Candidate has successfully carried out the study designated to his 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.

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HRD/TC/4321/2018 17th May'2018

TO WHOM IT MAY CONCERN

This is to certify that **Dr. Harmandeep Singh,** student of MBA/Health and Hospital Management, The **IIHMR University**, Jaipur is presently working in the capacity of **Trainee Hospital Administrator in the Department of Administration at Indian Spinal Injuries Centre since 1st Feb 2018 to 30th April 2018.**

He has successfully completed the dissertation project in the **Department of Operation Theatre** on **"Turnaround Time in OT" under the mentorship of Dr K Preetham, Additional Chief of Medical Administration.**

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IIHMR UNIVERSITY

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation, Study of the turnaround time in orthopedic and spine surgeries in operation theatre at Indian Spinal injury centre, New Delhi submitted by **Dr. Harmandeep Singh** with Enrollment No- **IIHMR-U/01/2016-18/0416** under the supervision of **Dr. Mohan Bairwa** for award of **MBA in Health and Hospital management** from The IIHMR University carried out during the period from **1st FEBRUARY 2018 to 1st MAY 2018** 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

17/May/2018

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that all the ethical issues have been considered while collecting data for my dissertation titled- Study of the turnaround time in orthopedic and spine surgeries in operation theatre at Indian Spinal Injury Centre,New Delhi.

SIGNATURE

17/MAY/2018

Acknowledgements

"The single greatest cause of happiness is gratitude." — Auliq-Ice

As I complete this small contribution to scientific pursuit, it gives me immense pleasure to acknowledge the guidance provided by my mentors. I take this opportunity for acknowledging Indian Spinal Injury Centre Hospital that provided me with this honor.

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Date: 15/05/2018
Place: New Delhi

Dr. Harmandeep Singh
Indian Spinal Injury Centre

Guide to abbreviations

ABBREVIATIONS	
ISIC	**Indian Spinal Injury Centre**
OT	**Operation Theatre**
OR	**Operating Room**
TAT	**Turnaround Time**
CPM	**Critical Path Modeling**
PACU	**Post Anesthetic Care Unit**
MIN	**Minute**

PROJECT TITLE

"Study of the turnaround time in Orthopedic and Spine surgeriesin operation theatre in Indian Spinal Injuries Centre

INTRODUCTION

In Hospitals, operation theatreis one of the costliest components in secondary care improving OT efficiency should be at the forefront of efforts to improve health service as operation theatre accounts for mainly 60% of a hospitals total revenue (Jackson,2002). Improvement in the OT can save approximately 60 minutes per case which can significantly improve the profit margin up to few thousand dollars (Twinpeaks group2011).

Reducing the TAT is one of the best practices to reduce the staff overtime and can lead to better customer satisfaction.(Cendan and Good,2006). TAT is one of the most important quality indicator that reflects the performance of OT of a hospital (Vitezand Macario1998).Emphasis on data analysis and making evidence based decisions to reduce the OT time is one of thebest practices in medical healthcare centers(Adam et.al,2004). Cost incurred by the OT department is 20-40 % of total cost, though it generates the max revenue which is overlooked and hospital focuses on cost cutting by minimizing the staff and supplies (Jackson, 2002). Operational efficiency in surgical theatre lays emphasis on time i.e. reduction in time related to a input level that transforms into operational efficiency. In the OR efficiency means maximum use of time,minimizing the wastage resulting in maximizing the output. Output in a surgery implies a completed surgery such as total knee replacement.(agency for clinical innovation 2015).

During a routine audit it was noticed that large of funds are being lost in giving overtime for the OT staff.The overtime was significantly more than those availed by the other administrative departments.With a view to streamline the current OT processes before bringing up more number of OTs, a study on turnaround time was carried out so as to identify the reasons for the above mentioned problem.

Definition of Turnaround Time (Surgery Management improvement group, 2008)

- **For Nurses**, TAT means the time from one patient leaving the operation theaterto the next patient entering the operation theater.
- **For Anesthesiologists'**, TAT means the time from shifting and handing over offirst patient's vitals in Post-Anesthesia Care Unit **(**PACU) to the induction of anesthesia of next patient.

  For Surgeons, TAT means the time from the closure of one patient's surgicalwound to the next patient's incision. We observed the workings of the theatre team members during the turn-around time, thereby creating a process map of the many tasks required to complete.

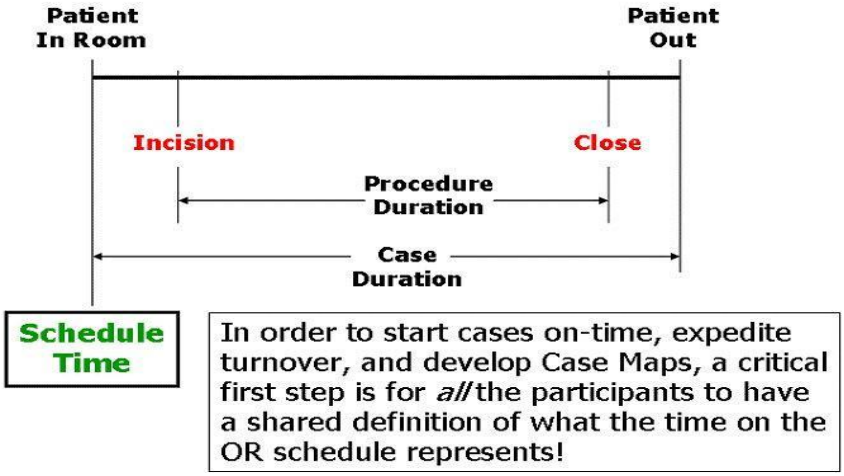

Figure 1: Shared Definition of TAT

RATIONALE

Rationale behind this project is that the hospital leadership recognized the potential for improvement, particularly the opportunity to increase the existing OT capacity, thus enabling surgeons to schedule more surgical cases. In order to realize this longer-term goal, turnaround time will be targeted for improvement to improve the operational cost of running more number of operation theatres as presently lot of financial resources are diverted for funding the overtime of OT staff.

RESEARCH QUESTION

What is the turnaround time in the operation theatre at Indian Spinal Injury Centre and factors responsible for delay in turnaround timeand ways to improve it.

OBJECTIVES

1. To study the turnaround time of Indian Spinal Injury Centre
2. To identify the factors responsible for delay in OT turnaround time
3. To give suggestions to improve OT turnaround time in operation theatre.

LITERATURE REVIEW

Author	Title	Methodology	Result
Andrew Greaves(2017)	Victorian public hospital operating theatre efficiency	Descriptive study from 1st July to 31st December 2016 on 23 health sources	It was observed that OT was underutilized and recommendation to review the IT management was given
Christmas(2014)	Operation Theatre turnaround time-where does it goes	Observational study on 271 patients was done to compare OT time for elective and trauma cases	Orthopedic surgeon underestimated operating time
Bryan A Norman (2014)	Operating room turnaround time	Observational study on 50 surgeries was done.	OR TAT were averaging 50 min rather than target value of 30 min
Oluwadiya et. al (2012)	OT utilization survey in a university teaching hospital	Observational study on sample size of 279 surgeries was done for a period of 6 months.	Recommendation to provide extra staff equipment was made
Twin peaks group(2011,july7)	The cost of an OR minute	Descriptive study was performed for a period of one month	By routinely adding a one hour case every day, a hospital can increase its margin by $500,000.
Drew stapleton(2008)	Maximizing OR turnover efficiency via CPM	Retrospective study was conducted for 50 cases	Supervision in OT increased the efficiency of surgeon
Mitchell (1996)	Study on review of national benchmark and quality team to reduce TAT	Applied quality improvement tools	Reduced the TAT from 19.9 min to 16.3 min
S.Talati (2014)	Analysis of time utilization and cancelation of scheduled cases in the main OT	Descriptive study was carried on a sample size of 325 cases	It was found that 22 percent cases were cancelled.
S.Singh(2014)	Lean six sigma application in reducing non productive time in OT	Retrospective study was done for 6 months from July to December 2010	There was a benefit of 80,000$ by making the system more efficient

R.Rohini(2011)	Improving the OT quality	Descriptive study was conducted on a baseline data of 6 months	There was a huge benefit in the saving of the hospital from the OT.

-

METHODOLOGY

STUDY SETTING

- Indian Spinal Injury Centre is the most advanced spine, orthopedic and neuromuscular surgery center situated in New Delhi , India**.**It is equipped with latest state of the art diagnostics, surgical equipmentand highly qualified team of specialist recognized internationally who have been trained in India and Abroad. Indian Spinal Injury Centre is a 178 bedded tertiary care hospital and the operation theatre handles around 5500surgical cases per year across 5 operation theatres.
- A descriptive study was carried out at operation theatre at Indian Spinal Injury Centre New Delhi from 11th April to 21st April 2018.
- Inclusion criteria- spine and orthopedic surgeries
- Exclusion criteria – General and Plastic surgeries.
- Sample Size: 61 patients undergoing spine and orthopedicsurgeries were considered

Data Collection method

Primary data was collected through observation inside the operation theatre and by recording data tabulated in the OT register.

Data collection tools

Data collection tool includes the following information

- Patient id, age , sex , surgery , surgeon name , anaesthetist name
- Patient wheel in time inside the OT
- Time taken to induce the patient
- Incision time
- Wound closure time
- Patient wheel out time
- Reason for delay in shifting from ward to operation theatre (if any)

Study variables

Following variables will be studied:

- Patient shifted inside OT till induction
- From Induction time till the Incision time
- From Closure of wound time till patient shifted out of OT time
- From Patient shifted out till the time next patient shifted Inside OT.

Data collection plan

The Data regarding all the mentioned variables will be collected and arranged in a Microsoft excel sheet .the mean value of time taken for all the variables taken under study will be calculated.

RESULTS

Data regarding the time when patient is wheeled inside the operation theatre to the time when induction is completed and incision is applied was noted. From the incision to the time where the patients is sutured and taped was noted in the second. Time taken to shift the patient out of the operation theatre after reversing this patient back from anesthesia was tabulated. Finally the difference in the time between shifting out of the earlier patient and the time when OT receives a new patient was noted. This process was done for all the patients undergoing spine and orthopedic surgeries and then a mean time was calculated for each step.

Hospital	**Mean Patient In to IncisionTime**	**Mean Incision to Closure Time**	**Mean Closure to Patient out Time**	**Mean Patient out to Next Patient in tme**
ISIC	50 Min	125 Min	35 Min	35 Min
International Benchmark	19 Min	120 Min	12 Min	20 Min
Required Improvement	31 Min	5 Min	8 Min	15 Min

- Analysis of the data depicted that there is a scope of improvement in making an incision to the patient by 31 minutes
- Surgery time was more than the industry benchmark by 5 minutes.
- For taking the patient out, the OT staff takes 8 more minutes as compared to the industry standards.
- A difference of 15 minutes was seen between wheel out of a patient and wheel in of next patient.
- A net 1 hour time can be reduced for each surgery in each operation theatre.

Reasons for Delay

Based upon all the information gathered we tried to create the lists of problems that cause the delay and classifying them as follows:

- Issues which have lesser impact on functioning and may be ignored like minor equipment malfunctioning or staff reporting sick etc.
- Issues which have moderate to high dent on functioning but their severity is low. As the overall impact depends upon the severity of the problems, such problems will have low priority like change in surgical plan, miscommunication between surgeon and OT manager etc.
- Issues requiring attention but not very difficult to resolve. These problems need attention, but as they are easy to resolve, immediate action should be taken to resolve them like cases not starting in time, financial clearance of patients not done in time.
- Issues difficult to resolve requiring closed attention, can be resolved only with some difficulty of are not so easy to resolve. These require further deliberation and the step outlined should be used to draw some alternative possible solutions to resolve them like less number of OT's, shortage of staff and surgical equipment.

Table 2. Title. Reasons for Delay			
A	**B**	**C**	**D**
Low Impact on performance	**Medium to high impact but low severity**	**Requiring attention but easy to resolve**	**Problems difficult to resolve**
Overrunning of OT	Change in surgical plan	Cases not starting on time	Less number of operation theatres
Sick staff resulting in shortage of staff	Unavailability of operating surgeon	Financial clearance of patient not done	Rescheduling of list due to add on emergency cases
Minor Difference in opinion among specialist	Sometime implant is not available	Increased turnaround time	Shortage of staff and equipment like c arm
Minor malfunctioning of equipment	Miscommunication between ot manager and surgeon	Cases of local anesthesia are done in peak hours	Unexpected medical deterioration of patient
May be ignored	**Low priority problem**	**Take action to resolve**	**Prepare an alternative**
Reasons for delay in TAT			
	Avoidable		**Unavoidable**
Hospital related	Surgery Cancelled but not communicated to manager. No insurance authorization. Implant not available. OT running behind schedule Scheduling error.		Surgeon unavailable. Organ unsuitable for implant like preexisting infection on site
Patient related	Patient changed mind Financial status not cleared Blood not arranged		NPO status Medically unfit like low Hb

SUGGESTIONS

- Induction room to be utilized more to get the next case ready as the first one is nearing completion. Anesthetic department and OT manager to make sure adequate equipment available in the induction room.
- Specific anesthetist to be allotted for each theatre, and he/she should be responsible for all cases in that OT (along with help from his/her colleagues). This reduces delays in planning anesthesia in difficult cases.

DISCUSSION

- The mean TAT from wheel in of a patient inside the OT to wheel in of the next patient is approximately one hour more as compared to the international benchmark (Surgery management improvement group,2008). It can be reduced by one hour/surgery.
- The major reason of delay is in time taken to induce the patient by the anesthetist. As compared to the international benchmark it is more than double and improving it only will lead to considerable change in OT turnaround time.
- Underutilization of the induction room is the major reason for this delay.

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