

**Study on Delay in Surgery of Scheduled Patient in
Operation Theatre**

**Internship Training
at
Paras HMRI Hospital, Patna
(10th February – 10th May 2014)**

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**Under the guidance of
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**Post Graduate Diploma in Hospital & Health Management
2012–14**

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TO WHOMSOEVER MAY CONCERN

This is to certify that Ms Mohita Sinha student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from Institute of Health Management Research, Jaipur has undergone internship training at Paras HMRI Hospital, Patna from 10th February to 10th May, 2014.

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

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



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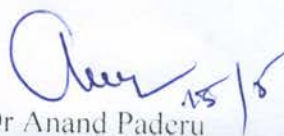
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TO WHOM SO EVER IT MAY CONCERN

This is to certify that Ms. Mohita Sinha has completed her dissertation on "**Study on Delay in Surgery of Scheduled Patients in Operation Theatre**" from February 10th, 2014 – May 10th, 2014 at **PARAS HMRI HOSPITAL, PATNA.**

We found her sincere, hardworking and devoted to her work.

We take this opportunity to wish all the best for her future endeavours.



Dr Anand Paderu

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "A Study on Delay in Surgery of Scheduled Patient in Operation Theatre" at Paras HMRI Hospital, Patna submitted by Ms Mohita Sinha Enrollment No 1338 under the supervision of Dr Shilpi Mishra Sharma for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from 10th February 2014 to 10th May 2014 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.

Mohita Sinha

Signature

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Executive Summary

Operation theatre is the department of the hospital where a high cost is incurred. The utilization of the operation theatre will not be achieved if the resources are not used effectively. Effective management is necessary for making the operation theatre efficient enough to meet the high revenue generation for the hospital and improving patient flow and reducing waiting list. Optimal use of the capacity of the operation theatre can be achieved by better work flow of the organization, such as better team of surgeons, anaesthetist etc. The study has been performed in operation theatre to identify delay in surgery of scheduled patient actual number of targeted surgery which could not be attained by examining the proper utilization of operation theatre of the hospital in relation to the turnaround time in operations and analysis of scheduled patient delay in OT shifting from ward will help in systematizing the process and in turn resulting the efficient OT utilization and surgery. The objective of this study is to study the process of OT and identify the bottleneck if there is any using the indicator Critical to quality (CTQ) that involves taking following record of each operating room and each operation and recommend the solution for reducing the bottlenecks in the utilization of

the operation theatre and improving the efficiency and reducing the delay in surgeries leading to more revenue generation for the hospital. The study involves descriptive study of all the scheduled IPD patient undergoing surgery in Paras HMRI Hospital for 3 Months from Feb' 10th to May 10th. The sampling method involves purposive sampling that includes all the scheduled patient undergoing for surgery. The data involves use of primary data by visiting individual operation theatre to observe directly, record from registers already maintained, In-depth interview with the surgeons, anaesthetists, head nurses and managerial staff. The study showed that most of the scheduled surgeries performed were of orthopaedic i.e. 54.9% followed by general surgery i.e. 35.18% followed by neuro surgery i.e. 9.39%. Most of the surgeries performed were of major surgery. The major reasons for delay in surgery were found because of non-financial clearance i.e. 48.24% followed by late shifting of the patient i.e. 21.92%. The delay in surgery could be avoided by providing adequate nursing staff, reconfirmation of PAC prior to surgery, part preparation to be done before shifting of patient from ward to pre OP, blood arrangement a day prior to surgery.

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1.0 Introduction:

Operation theatre is the department of the hospital where high cost is incurred. The utilization of the operation theatre will not be achieved if the resource are not used effectively. Operation theatre represents significant amount of expenditure in the hospital budget so it is necessary for making the operation theatre efficient enough to meet the high revenue generation for the hospital and improving patient flow and reducing delay. Optimal use of the capacity of the operation theatre can be achieved by better work flow of the organization such as better team of surgeons, anaesthetist⁷.

Operation theatre represents significant amount of expenditure in the hospital budget. Considering the magnitude of the cost incurred in the operation theatre, hospital administrator should more concern about the efficient utilization. So in order to maximize the utilization of operation theatre, it is essential to find out how much time is spent on which activity in the operation theatre and what activity and factors hamper the

utilization rate. The number of operation theatre should be enough for meeting the need of the demand on the basis of the number of beds⁸.

We can estimate the number of the operation procedure in a year can be done with the help of the following formula:

Number of operation procedure in a year = (No. of surgical beds × No. of working days in a year)/ Average length of stay of patient in surgical room.

It is obvious that optimum utilization of operation theatre is possible if there is proper scheduling of the operative procedure. Timely, relevant & accurate information during scheduling is essential for the efficient running of the operation theatre. Scheduling an operation is as keen to the scheduling like other room in hospital ward. Assuming that a surgical operation will last for an average one and a half hours from “knife” to closure, up to four operations can be carried out in a working day per operation theatre. With the time in pre anaesthesia preparation, positioning of patient, draping the patient etc., before knife is put to his body and after the operation for anaesthetist’s check-up and dressing etc.,

and before patient is wheeled out of the room, on an average each case is likely to take two hours. Up to five cases can be taken if appropriate 'mix' of cases i.e. major and minor is scheduled for each room.

Where there is lay-up room for unpacking of all instruments and dressings and readying them on trolley, and where the patient is anaesthetized in a separate aesthesia room, it is possible to perform a fair number of operations in close sequences to one another. Scheduling operation and operation theatres is the matter of identifying the procedures and demand from the patients for the need to be operated that are required to be performed, creating a time table of when those procedures are to be carried out and then matching that time table with all other inputs like:

- Numbers of surgeon and anaesthetist
- Theatre nurses and auxiliary staff.
- Surgical implement and equipment.
- Consumables.
- Scheduling of operations.
- Quantum of emergency cases.
- Outpatients' surgeries.
- Work methods followed in supportive areas.

The surgical suite typically consumes 9-10% of the hospital budget. The professionals who work in the operation theatre must be cost efficient and must maximize productivity for long term.

Root cause analysis and average values of total surgeries, average duration in surgery, delay in operations of scheduled patients, total number of cancellation of scheduled cases, cause of delay in patient shift from ward to OT will be calculated using SPSS 16.0. The results would be presented in the form of tables and graphs through frequency and percentages.

1.1 Research ethics

All the information collected is kept confidential and are used only for the research purpose Informed consent from the respondent will be obtained before starting interview. If any of the respondent(s) refuses to become part of the data collection process, they are not be forced by any means.

2.0 Review of literature:

A study conducted by N. Sevdalis, L Hull and D.J. Birnbach on improving patient safety in operation theatre and perioperative care: obstacles, interventions and priorities for accelerating progress on patient safety firmly on the clinical and policy agenda. To date, however, progress in improving safety and outcomes of hospitalized patients has been slower than the authors of these reports had envisaged. Here, first review and analysis of some of the reasons for the lack of evident progress in improving patient safety across healthcare specialities and then focusses on what critical part of the healthcare system can contribute to safety and also to error—healthcare teams. Finally, review team training interventions and tools available for the assessment and

improvement of team performance and offer recommendations based on the existing evidence-base that have potential to improve patient safety and outcomes in the coming decade^{1,2}

A study was conducted by H.Fei, N.Meskens,C.Chu on planning and scheduling problem for an operation theatre using open strategy. The objective of this paper is to design a weekly surgery schedule in an operating theatre where time blocks are reserved for surgeons rather than specialities. Both operating rooms and places in the recovery room are assumed to be multifunctional, and the objectives are to maximise the utilisation of the operating rooms, to minimise the overtime cost in the operating theatre, and to minimise the unexpected idle time between surgical cases. This weekly operating theatre planning and scheduling problem is solved in two phases. First, the planning problem is solved to give the date of surgery for each patient, allowing for the availability of operating rooms and surgeons. Then a daily scheduling problem is devised to determine the sequence of operations in each operating room in each day, taking into account the availability of recovery beds.

The planning problem is described as a set-partitioning integer-programming model and is solved by a column-generation-based heuristic (CGBH) procedure. The daily scheduling problem, based on the results obtained in the planning phase, is treated as a two-stage hybrid flow-shop problem and solved by a hybrid genetic algorithm (HGA). Our results are compared with several actual surgery schedules in a Belgian university hospital, where time blocks have been assigned to either specific surgeons or specialities several months in advance. According to the comparison results, surgery schedules obtained by the proposed method have less idle time between surgical cases, much higher utilisation of operating rooms and produce less overtime³.

A study conducted by Anna Sciomachen, Elena Tanfani, Angela Testi on stimulation models for optimal schedules of operating theatres. In this work discrete event simulation models developed in Witness are discussed and used to evaluate performance indices of interest related to the scheduling of operating theatre activities for surgical departments, in particular the attention is focused on the wards' productivity in terms of utilization rate, throughput and overruns. The first model reproduces the

behaviour of the operating theatre and tunes the parameters .Subsequently, alternative operative scenarios are proposed by comparing the actual time table and schedule with that obtained by using a blocked booking criterion for the weekly scheduling of the surgery rooms. The sequencings of the surgical activities are analysed according to different priority rules, derived from the classical scheduling theory. In the analysis the possibility of introducing the so-called “pre” and “post” recovery room is considered with respect to the activity level of the department.^{4,5}

A study conducted by S Ciechanowicz, N Wilson. *Delays to Operating Theatre Lists: Observations from a UK Centre*. The Internet Journal of Health. 2010 Volume 13 Number 1. The aim was to measure the incidence of delays to operating theatre lists and the reasons behind them. A cost implications analysis was also performed to discover the potential savings to be made from improvement in this aspect of theatre efficiency. Prospective surveys recording start-time delays and total daily delay during 227 multiple-specialty cases were completed over five days in March 2010 in a UK District General Hospital, split over two sites.

Information was collected onto a proforma for each case about specialty, procedure, start-time and end-time of the case, with request for an explanation for duration and reason for any delays incurred. An analysis of costs to the Trust was performed using estimated theatre hours lost with average cost of theatre use per hour. Overall 78% of cases started on time, i.e. within 15 minutes of the scheduled time, but orthopaedics and plastics achieved only 69% and 66% respectively. Orthopaedics and plastics also exceed the acceptable total daily delay time of 45 minutes (70 and 66 minutes respectively). Hospital-wide factors were the most common reason for the delays (72%). 48% were due to ward bed issues, 15% due to doctor factors and 13% inadequate pre-operative assessment. Estimated projected cost to the Trust over one year is significant at over £1 million (\$1.5 million). During the study period, theatre time was lost for usually multi-factorial reasons, with hospital organisational factors being predominant. Opportunities to improve theater efficiency were identified⁶.

3.0 Rationale:

- why there is delay in surgery of scheduled patient
- Actual number of targeted surgery could not be attained.

Thus by examining the proper utilization of operation theatre of the hospital in relation to the turnaround time in operations and analysis of scheduled patient delay in OT shifting from ward will help in systematizing the process and in turn resulting the efficient OT utilization and surgery.

3.1 Objective:

- To study the process of OT and identify the bottleneck if there is any using the indicator Critical to quality (CTQ) that involves taking following record of each operating room and each operation
- To recommend the solution for reducing the bottlenecks in the utilization of the operation theatre and improving the efficiency and reducing the delay in surgeries leading to more revenue generation for the hospital.

3.2 Justification

Operation theatre is the department of the hospital where a high cost is incurred. The utilization of the operation theatre will not be achieved if the resources are not used effectively. Effective management is necessary for making the operation theatre efficient enough to meet the high revenue generation for the hospital and improving patient flow and reducing waiting list. Optimal use of the capacity of the operation theatre can be achieved by better work flow of the organization, such as better team of surgeons, anaesthetist etc.

4.0 Methodology

4.1 Study area

The delay in scheduled patient who is undergoing surgery is being studied at Paras HMRI Hospital, Patna.

4.2 Period of study

3 month (From 10th February to 10th May, 2014)

4.3 Study type

Descriptive study of all the scheduled patient undergoing surgery has been done with respect to working hours of the operation theatre, turnaround time, delay and cancellation of the procedures.

4.4 Target population

The target population includes the IPD patient undergoing surgery.

4.5 Sampling method

The sampling technique involves Purposive sampling method that includes the scheduled patient undergoing surgery.

4.6 Research question

Is there any kind of delay in shifting patient from ward to OT, if any, where and what kind of delay?

5.0 Data collection

5.1 Data source

5.1.1 The data collection involves use of only primary data

- By visiting individual operation theatre to observe directly.
- Record from registers already maintained.
- In-depth interview with the surgeons, anaesthetists, head nurses and managerial staff.

5.2.2 Data collection method

- $\text{O.T utilization} = \frac{\text{no. of hours when O.T is being utilized}}{\text{no. of operational hours the O.T is under used (6 OT * 12 hours = 72 hours)}}$
- The average total time of survey = average time spent on the actual surgery + average time spent on supportive activities + average time spent in the making operating room ready for surgery.

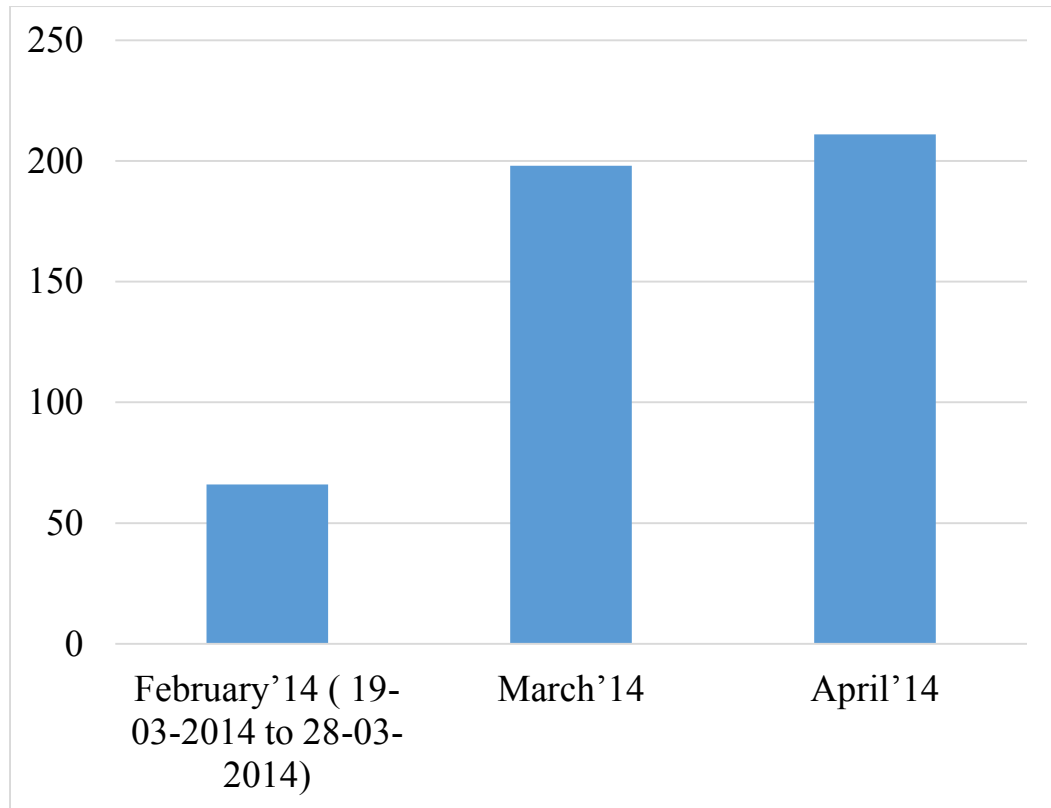
6.0 Analysis of Data

6.1 Month wise

Tab.6.1.1 Total number of scheduled surgeries to undergo month wise

S.NO.	Duration	No. of cases
1	February'14 (19-03-2014 to 28-03-2014)	66
2	March'14	198
3	April'14	211

Fig 6.1.2: Total number of scheduled surgeries to undergo month wise



6.2 Speciality wise:

Tab. No. 6.2.1: Total number of Scheduled Surgery census speciality wise (Month wise)

<u>S.No.</u>	Name of department	February	March	April
1.	Orthopaedic	42	85	101
2.	General surgery	8	68	70
3.	Neurosurgery	9	15	15
4.	Urosurgery	2	4	2
5.	Plastic surgery	3	12	12
6.	Cardiosurgery	0	4	10
7.	Eye/ ENT	1	1	1

Fig.6.2.2. Showing total number of scheduled surgery speciality wise (Month wise)

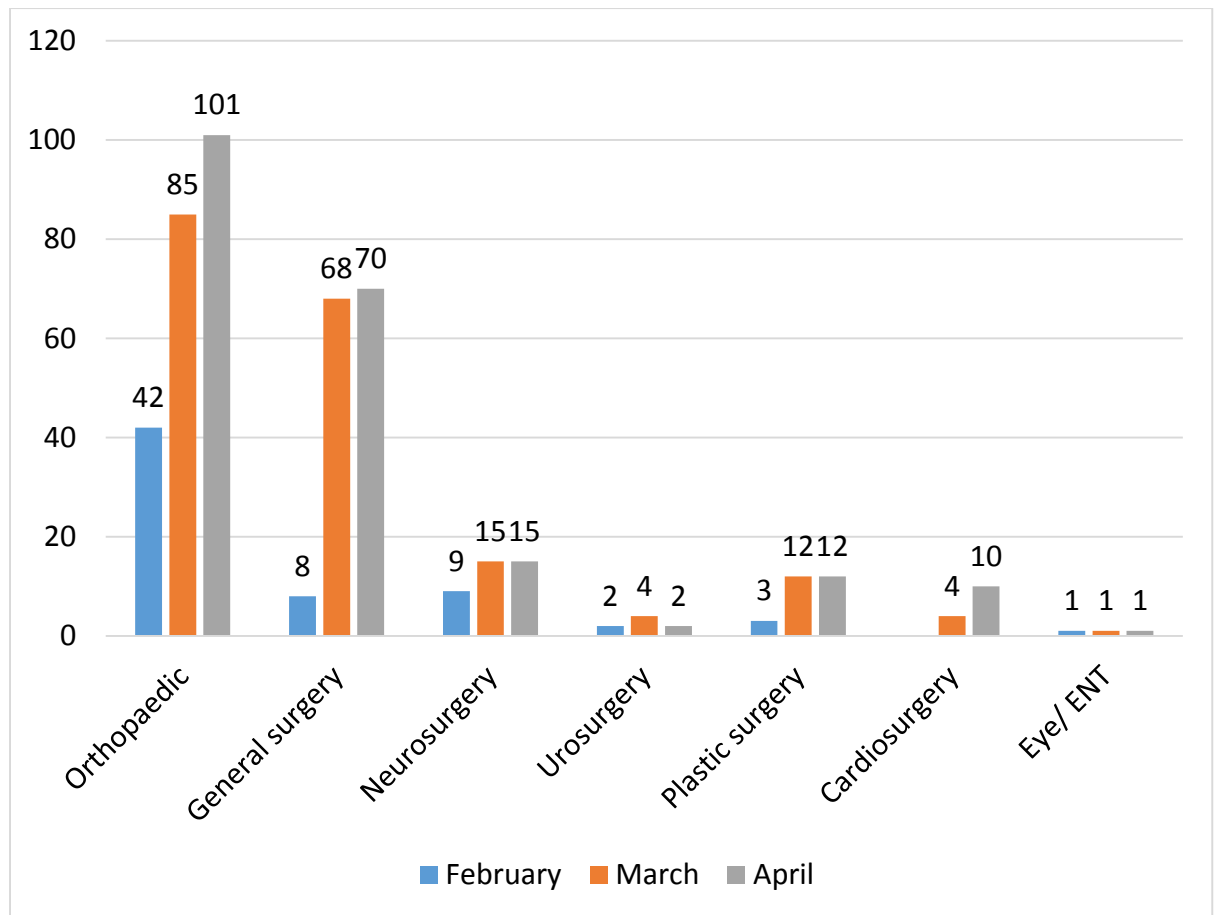
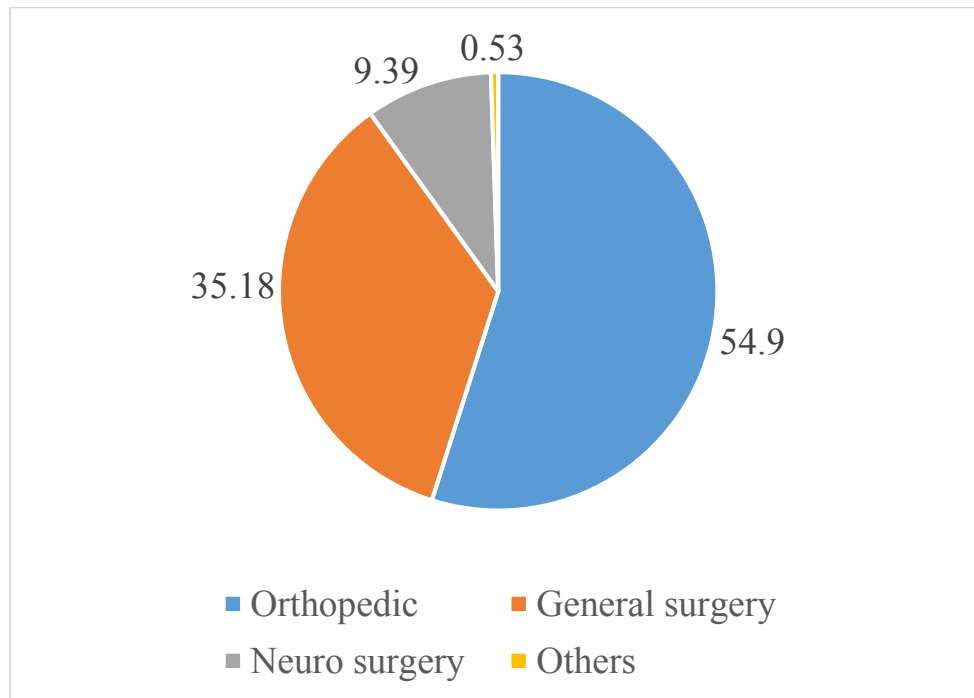


Fig. 6.2.3. Showing percentage of surgery done speciality wise in the total span of study

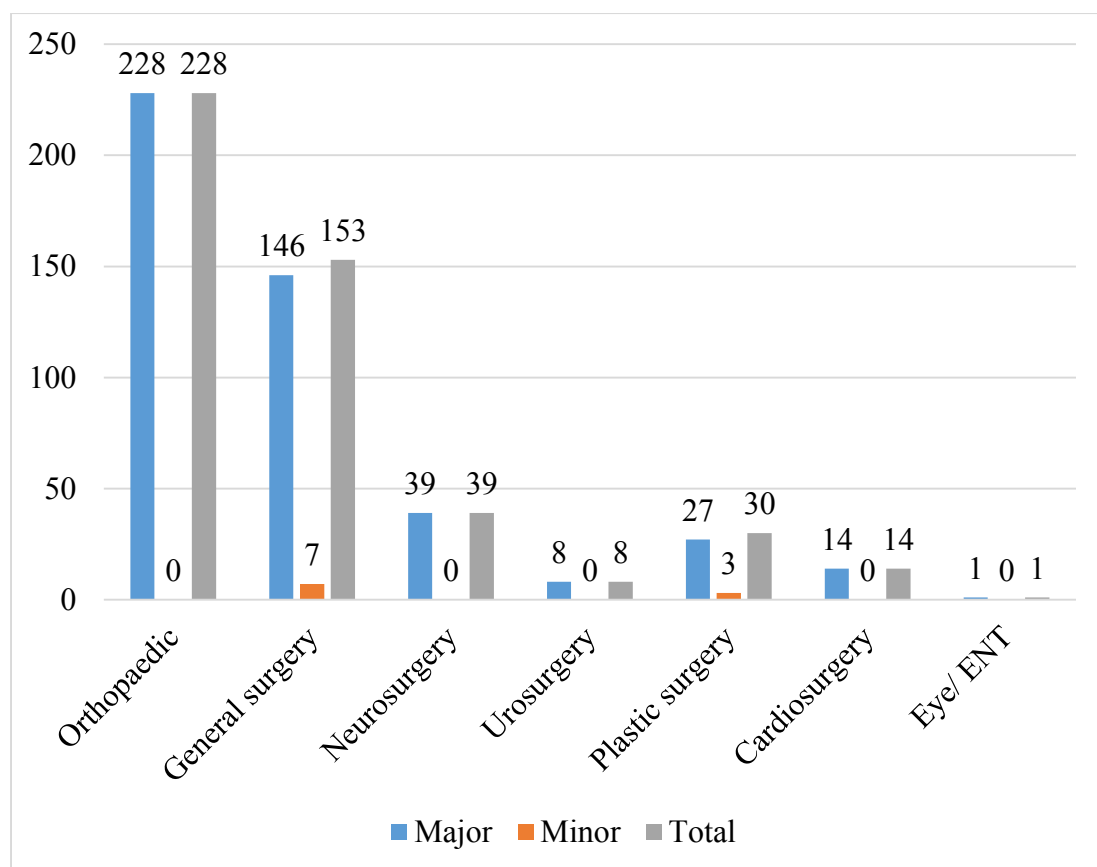


6.3. Major & Minor surgery

Tab.6.3.1: Total number of Major & Minor Surgery in each specialised department February- April'14 Surgery census:

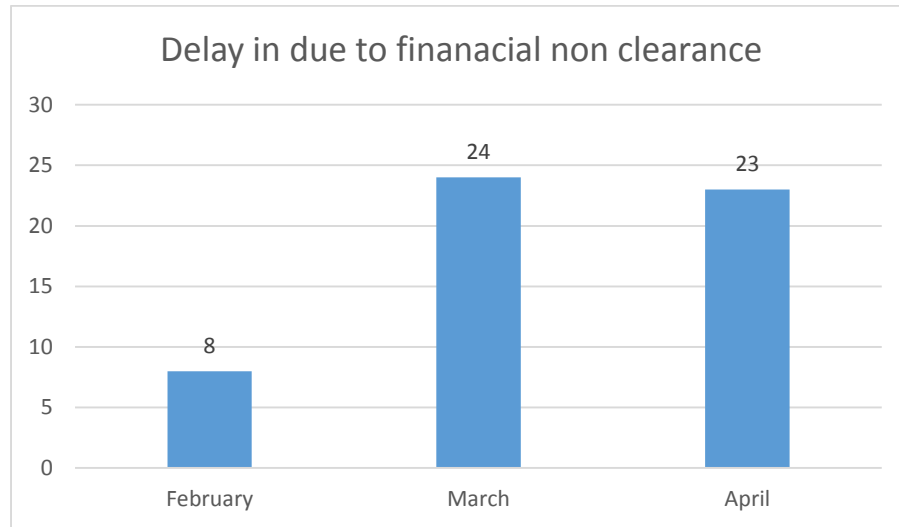
<u>S.No.</u>	Name of Department	Major	Minor	Total
1.	Orthopaedic	228	0	228
2.	General surgery	146	7	153
3.	Neurosurgery	39	0	39
4.	Uro surgery	8	0	8
5.	Plastic surgery	27	3	30
6.	Cardio surgery	14	0	14
7.	Eye/ ENT	1	0	1

Fig.6.3.2: Total number of Major & Minor Surgery in each specialised department February- April'14 Surgery census:

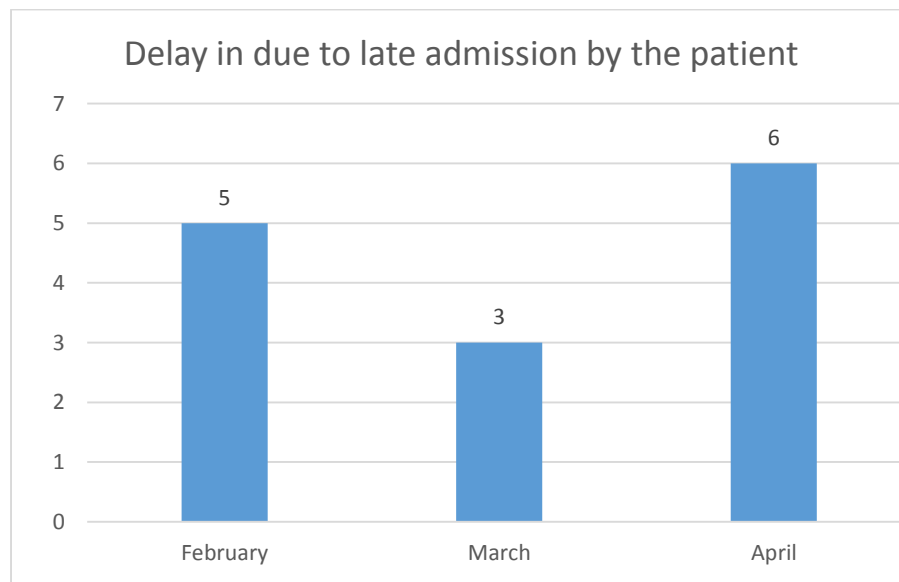


6.4.0 Delay in the surgery cases

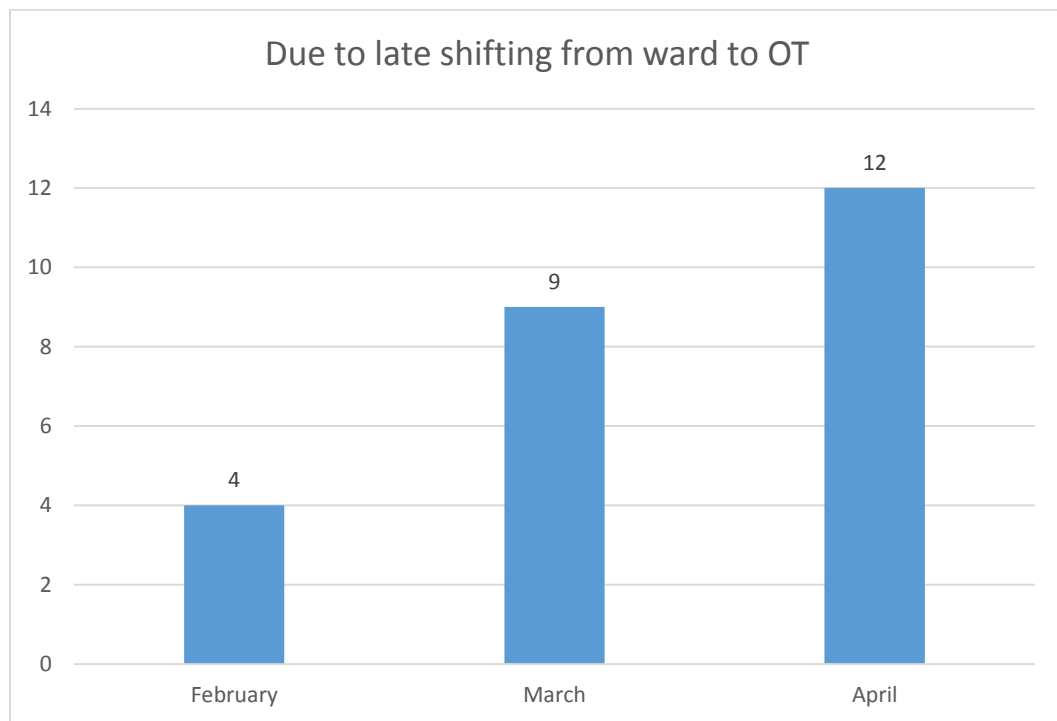
6.4.1 Due to Financial non- clearance:



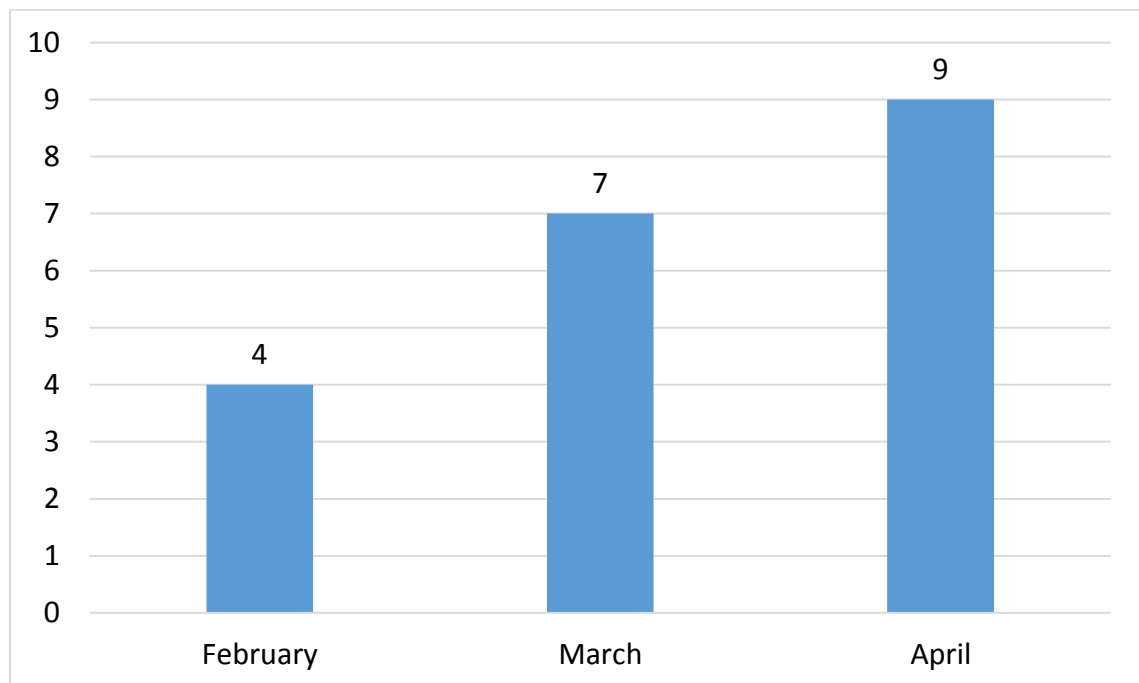
6.4.2 Due to late admission by the patient:



6.4.3 Due to late shifting of patient from ward to OT (Includes blood arrangement not there, part preparation not done, nursing staff inefficiency):



6.4.4 Due to delayed investigation report (Includes pending report, inadequate PAC, surgery charge slip not filled):

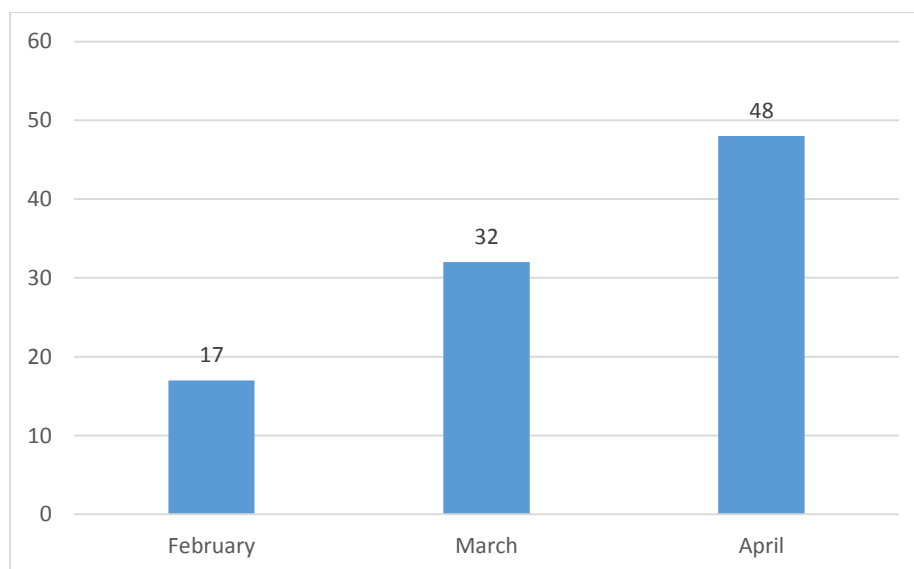


6.5.0 Cancellation of cases

Tab no. 6.5.1: Total number of Cancellation of the Scheduled surgery cases (Month wise)

No. of cancellation of scheduled cases	February'14	March'14	April'14
Total cancelled surgeries	14	32	48

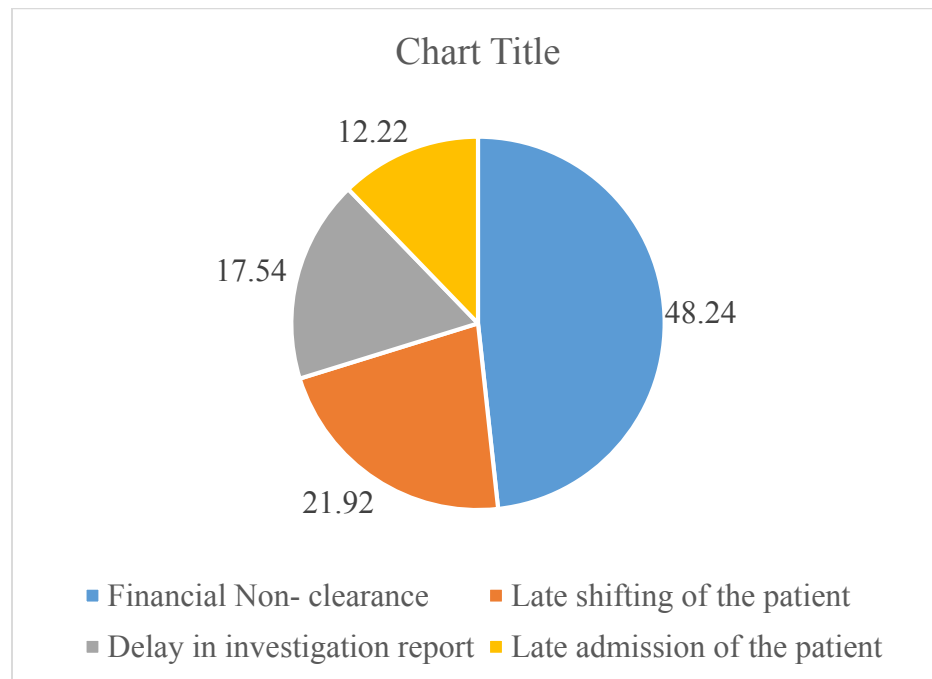
Fig 6.5.2: Total number of Cancellation of the Scheduled surgery cases (Month wise)



6.6 Reasons for delay in surgery

Fig.6.6.showing reasons for delay in scheduled surgery of patients in percentage

Reasons for delay in surgery	%
Financial Non- clearance	48.24
Late shifting of the patient	21.92
Delay in investigation report	17.54
Late admission of the patient	12.22



7.0 Observations:

- From Table no. 6.1 it has been found that total number of scheduled surgeries to undergo during month of Feb'14, March'14 and April'14 is 66, 198 and 211 respectively.
- From table no. 6.2 it has been found that most of the scheduled surgeries performed were of orthopaedic followed by general surgery followed by neuro surgery.
- From Table no. 6.3 it has been found that only 2% of scheduled surgeries performed were minor surgery.
- Most of the delay in scheduled patient undergoing surgery were found due to non-financial clearance.

8.0 Conclusion:

- Patient shifting delay should be minimised by providing adequate Staff (GDA) to improve turnaround time.
- PAC of all the patient should be reconfirmed a day prior to surgery so as to prevent delay in surgery.
- The investigation should be made sure that it is available during the shift of patient from ward to Pre OP to prevent the delay.
- Part preparation of the patient should be done before shifting of patient from ward to pre OP.
- Blood arrangement of the patient undergoing surgery should be done at least a day prior to surgery.

Other findings:

- Scheduled patient should be avoided on fast for more than 8 hours.
- Separate provision of bed for universal precaution patients in pre-post-op to minimise the chances of infection from patient's body discharge.
- Individual cardiac table and dustbin near each bed of post op should be present.
- At least one nebulizer and defibrillator should be present in post.

9.0 Bibliography

1. N.Sevdalis, L.Hull and DJ Birnbach, improving patient safety in operation theatre and perioperative care: obstacles, interventions and priorities for accelerating progress.
2. http://bj.oxfordjournals.org/content/109/suppl_1/i3.full
3. H.Fei, N.Meskens,C.Chu, (Volume58Issue,2March,2010 ,Pages 221-230)
4. Anna Sciomachen, Elena Tanfani, Angela Testi on stimulation models for optimal schedules of operating theatres.
5. (Bowers J. and Mould G., 2004, “Managing uncertainty in orthopaedic trauma theatres”.*European Journal of Operational Research* 154,599-608.)
6. S Ciechanowicz, N Wilson. *Delays to Operating Theatre Lists: Observations from a UK Centre*. The Internet Journal of Health. 2010 Volume 13 Number 1
7. Duncan Williamson, District Audit Report operating Theatre, bulletin for health bodies published by the Audit Commission (July 2002).

8. Leung MP, A study on utilization effectiveness of the operation theatre at Queen, Mary Hospital, (April 1999).