

**HIS IMPLEMENTATION PHASE 2 IN OPERATION
THEATRE OF PARAS HOSPITAL, GURGAON**

**Internship Training
at
Paras Hospital, Gurgaon**

**By
Juhi Harjai**

**Under the guidance of
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**MBA Hospital & Health Management
2013–15**


**Institute of Health Management Research
Jaipur
2015**

TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Juhi Harjai** student of MBA Hospital and Health Management from IIHMR University, Jaipur has undergone internship training at **Paras Hospital, Gurgaon** from 23rd February, 2015 to 22nd April, 2015.

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.

Dean, Academics and Student Affairs

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April 22, 2015

WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Juhi Harjai** has successfully completed her dissertation in the department of **Information Technology** from 23rd February, 2015 to 22th April, 2015.

During her dissertation period, she was found to be sincere and dedicated towards her assignment.

We wish her all the best for her future endeavors.

For Paras Hospitals, Gurgaon



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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **HIS Implementation Phase 2 in Operation Theatre of Paras Hospital, Gurgaon** and submitted by (Name) **Dr. Juhi Harjai** Enrollment No. **IIHMR/PGDHM/2013-15/1449** under the supervision of **Dr. S.D. Gupta** for award of MBA Hospital and Health Management/ MBA Pharmaceutical Management of the university carried out during the period from **23rd February , 2015 to 22nd April , 2015** 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

ACKNOWLEDGEMENT

The successful completion of the dissertation and final outcome of this project required a lot of guidance and assistance from different people and I consider myself fortunate to have so many people around to guide me.

Firstly, I would like to thank **Col. (Dr.) Ashok Kaushik** (Dean Academics and Student Affairs, IIHMR, University) to provide such a great learning opportunity. I am also thankful to our alumnus **Dr. Kapil Garg** (Corporate Zonal Director, Paras Hospitals) for his consent and help in further nurturing our understanding about the hospital and its working.

I respect and thank **Dr. Neeraj Bishnoi** (General Manager- Operations & Quality Paras Hospitals, Gurgaon) for his invaluable support. I own my profound gratitude to **Mr. Shuvankar** (Head of IT Dept, Paras Hospitals, Gurgaon) for guiding us and always adding value to our understanding of the hospitals. The entire project would not have been possible without the important inputs from **Dr. Ranvir Singh Saluja** (Dept. Medical Superintendent) and **Dr. P.S.Roy** (Head of OT).

I am also thankful to each and every staff at Paras Hospital, Gurgaon for sharing their experiences and knowledge and providing their precious time to add value to my knowledge. Without their cooperation, the dissertation and the project work would not have been possible.

Finally, I would like to extend my sincere regards to my mentor **Dr. S.D. Gupta** (President, IIHMR University) for his support.

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LIST OF ACRONYMS

- BME- Biomedical Engineering
- CAG-Coronary Angiography
- CCU- Coronary Care Unit
- CD – Compact Disk
- CGHS-Central Government Health Scheme
- CSSD- Central Sterile Service Department
- CT-Computed Tomography
- CTVS ICU- Cardio Thoracic Vascular Unit
- DNB-Diplomat of National Board
- DVD – Digital Video Disc
- DVT-Deep Vein Thrombosis
- ECG-Electrocardiography
- ECHS-Ex-servicemen Contributory Health Scheme
- ED-Emergency Department
- EMG-Electromyography
- EMR/EHR – Electronic Medical Record
- ENT-Ear Nose Throat
- ER- Emergency Room
- ETO-Ethylene Oxide
- GDA- General/Ground Duty Assistants
- HIS-Hospital Information System
- HIV-Human Immunodeficiency Virus

- HMIS-Hospital Management Information System
- HOD-Head of Department
- ICU- Intensive Care Unit
- IPD- In-Patient Department
- IT-Information Technology
- JCI-Joint Commission International
- LDR- Labor Delivery Room
- MICU-Medical Intensive Care Unit
- MRD- Medical Record Department
- NABH- National Accreditation Board for Hospitals and Healthcare Providers
- NABL- National Accreditation Board for Testing and Calibration Laboratories
- NICU- Neonatal Intensive Care Unit
- NSICU-Neurosurgical Intensive Care Unit
- OPD- Out-Patient Department
- OT- Operation Theatre
- OTC-Operation Theatre Complex
- PAC- Pre- Anesthetic Checkup
- PACU-Post Anesthetic Care Unit
- PHC-Preventive Health checks
- PICU- Pediatric Intensive Care Unit
- PTCA-Percutaneous Thrombo Coronary Angioplasty
- ROI – Return on Investment
- SICU-Surgical Intensive Care Unit
- TAT-Turnaround Time

1 INTRODUCTION

Healthcare is a very important part of our society & it is imperative for healthcare providers to do their jobs in an effective & efficient manner, HIS help them manage all their medical & administrative information.

When we joined the hospital phase II HIS implementation was going on in various department of the hospital like blood bank, O.T., CSSD etc. I was assigned the work of HIS implementation in Operation Theatres. Hospital has a tie up with an external software agency who designed the basic software for the departments, I was asked to coordinate with the staff of the Operation Theatre & software agency to implement the changes in the software according to the functional requirement of dept.

Once all the changes were being made training was given to the staff for the effective & efficient use of software. All the problems encountered while using the software were enlisted in the form of an issue tracker to keep the records.

Software makes the work lot easier for the staff & enhances their efficiency. Periodic review was done to make sure the proper functioning of the software

1.1.1 HMIS

Healthcare is a very important part of our society and it is imperative for healthcare providers to do their jobs in an efficient and effective manner. Each day hundreds of

thousands of patients enter healthcare facilities challenging the administration to run the show smoothly. The employees have to manage and integrate clinical, financial and operational information that grows with the practice.

Previously, this data was organized manually, which was time consuming and failed to deliver the desired level of efficiency. Most professionally run hospitals and clinics now rely on hospital information systems (HIS) that help them manage all their medical and administrative information.

A hospital information system (HIS) is essentially a computer system that can manage all the information to allow health care providers to do their jobs effectively. These systems have been around since they were first introduced in the 1960s and have evolved with time and the modernization of healthcare facilities. The computers were not as fast in those days and they were not able to provide information in real time as they do today. The staff used them primarily for managing billing and hospital inventory. All this has changed now, and today hospital information systems include the integration of all clinical, financial and administrative applications.

Modern HIS includes many applications addressing the needs of various departments in a hospital. A centralized information system can be customized according to the specific requirements of a hospital. A hospital can tell the solution provider its needs and the applications can then be molded to deliver exactly what was demanded. For instance, you can demand a solution that is based on RDBMS for easy retrieval of information. You can

also ask the vendor for a HIS that has user friendly features and a multilingual interface that can be used by a diverse workforce.

2 REVIEW OF LITERATURE

Healthcare aspect is vital in daily lives where most people nowadays prefer to find a hospital that offers better healthcare services. People's demands for good-quality services provided by hospitals drive these organizations to improve their services by adopting information system (IS). In the context of hospital environment, the adoption of IS is quite tremendous since many hospitals are able to increase their services to high quality level for competing with other healthcare entities . This can be proven in many developed countries like United States of America (USA), United Kingdom (UK), and other countries which have adopted IS in their organizations^[1]

2.1 Hospital and IS

Hospital and IS Hospitals around the world have widely utilized IS for over 30 years. IS for many hospitals in US and UK have been automated since the emergence of IBM systems. For example, US government has made the adoption of the electronic medical records as mandatory to all healthcare providers by 2014 (RAND Health 2005). Besides that, the emergence of the technology evident the adoption of the systems has taken place across hospitals in most countries like USA, England, Egypt and Jordan , Scotland and New Zealand .

At the beginning of IS implementation, it focused only on improving efficiencies in accounting function such as billing and financial reporting . Far East Journal of Psychology and Business Vol. 8 No. 3 Sep 2012 3 However, as the need to manage and integrate clinical, financial and operational information grows and evolves, HIS gives many benefits such as it could provide the best possible support of patient care and administration by electronic data processing . Realizing these benefits, MOH pioneered HIS project in hospitals around Malaysia, including Terengganu, Pahang and Sarawak. The adopted HIS is the systems that can help the selected hospitals to become the benchmark of modern, automated hospitals and realize the goals of becoming a model “e-hospital” in Malaysia.^[1]

2.2 Hospital Information System (HIS)

Hospital Information System (HIS) Hospitals are information-intensive organizations and pay a great attention on information management and processing, which have to be carried out using appropriate IS. HIS is a computer-based system designed to assist the management of the administrative and medical information within a hospital . It helps to improve operational efficiency, care quality and more informed decision making.

According to N.ghosh (2010), the systems give comfortable access to patient data. The increasing customers’ expectations and regulatory requirements also lead to the need for clinical information and administrative tools that can be immediately accessible. It has been further stated by Lee and Meuter (2010), that efficiency is achieved through the use of the system that allows users to obtain patient critical information as soon as it is needed.

Furthermore, by improving operation efficiency, the application of the systems could also reduce the costs . As supported by Hegji et al. (2007) serving patients with quality of care would be worth for better return in the future. Additionally, by providing accurate and reliable information, the use of the system could enhance decision making . It is also noted in the study conducted by Ashcroft (1998) found that users in healthcare services had clearly perceived the significant impact of the system on their decision making. Despite its widely accepted benefits, HIS adoption is still at a slow pace in certain countries due to lack of computer skills and training . The inability of individual user to facilitate their knowledge in the systems application has caused significant barriers to wider adoption of HIS. This is argued by Caldeira and Dhillon (2010) by listing 17 facilitating competencies in delivering IS benefits, which is among all are, ability to ensure user application knowledge and provide ongoing IS training.^[1]

2.3 Users acceptance towards the system

The role of IS has led to many changes, and it creates more opportunities for those who adopt and utilize it. Even though IS seems to provide many benefits, the increase of rate in its adoption is influenced significantly by its users. Therefore, users 'acceptance towards the systems is an important aspect. Since IS is usually adopted as a result of environmental changes, economic pressure, competition and organizational change, thus many unable to manage it appropriately in order to get the best output from it. Some rather prefer to stick to manual systems because of several factors such as strong resistance to adapt, effect on job practices, as well as training and skills.

According to Aggelidis and Chatzoglou (2008), perceived usefulness and ease of use are two fundamental factors in evaluating technology acceptance by users. Basically, users are more open to a new system when they become familiar with the function and could witness benefits from it. It is further noted that the system should provide more managerial involvement in the implementation, facilitate research needs, act as a protection against future complaints, and as the measurement of professional hierarchy.^[2]

2.4 Factors to be considered while implementing the software

From the literature accessed for this study, social factors were identified to be more critical than the technical factors when determining the success of implementation. The most common factor observed in the literature that influenced the success of HIS implementation related directly or indirectly to change management, pointing out the necessity of formal managerial skills to manage the transformation, the need for effective communication channels, and the importance of a vision for change. Extensive upfront planning, securing political support, and implementation from the top were also identified as important success factors. Associated with these factors was mention of the characteristics of leaders. These included beneficial characteristics that led to success (e.g. transformational type, physician-champion, senior), and detrimental characteristics that predisposed an implementation to failure (e.g. over committed and emotionally involved leader).^[2]

Consideration of the end user was the next most commonly identified factor. Raising users' understanding of the requirements and benefits of change, as well as ensuring user

participation in the design and development of the system were identified. Regarding user involvement it was pointed out that the difference between genuine user involvement and users being mere informants should be borne in mind.^[2]

2.5 More Restraints than Drivers

There are an estimated 14,000 hospitals in India, excluding the private clinics and nursing homes. This factor should be enough to drive the hospital information systems (HIS) market in India along with the corporatization of the healthcare provider space, growth in the health insurance market, and the development of medical tourism. On the contrary, the HIS market in India is still in the early growth stage. It is a small market dominated by in-house implementations and customized solutions developed by small local software developers. In terms of technology adoption, the Indian market is far behind its Asia Pacific counterparts such as Australia, Japan, South Korea, Singapore, and Malaysia.

Undoubtedly, Indian hospitals have been very late in realizing the advantages of information technology (IT). Lack of awareness, the low priority given to financing of IT-related investments, lack of suitable solutions, as well as the absence of professional decision making has led to low penetration of HIS in this high-potential market.^[3]

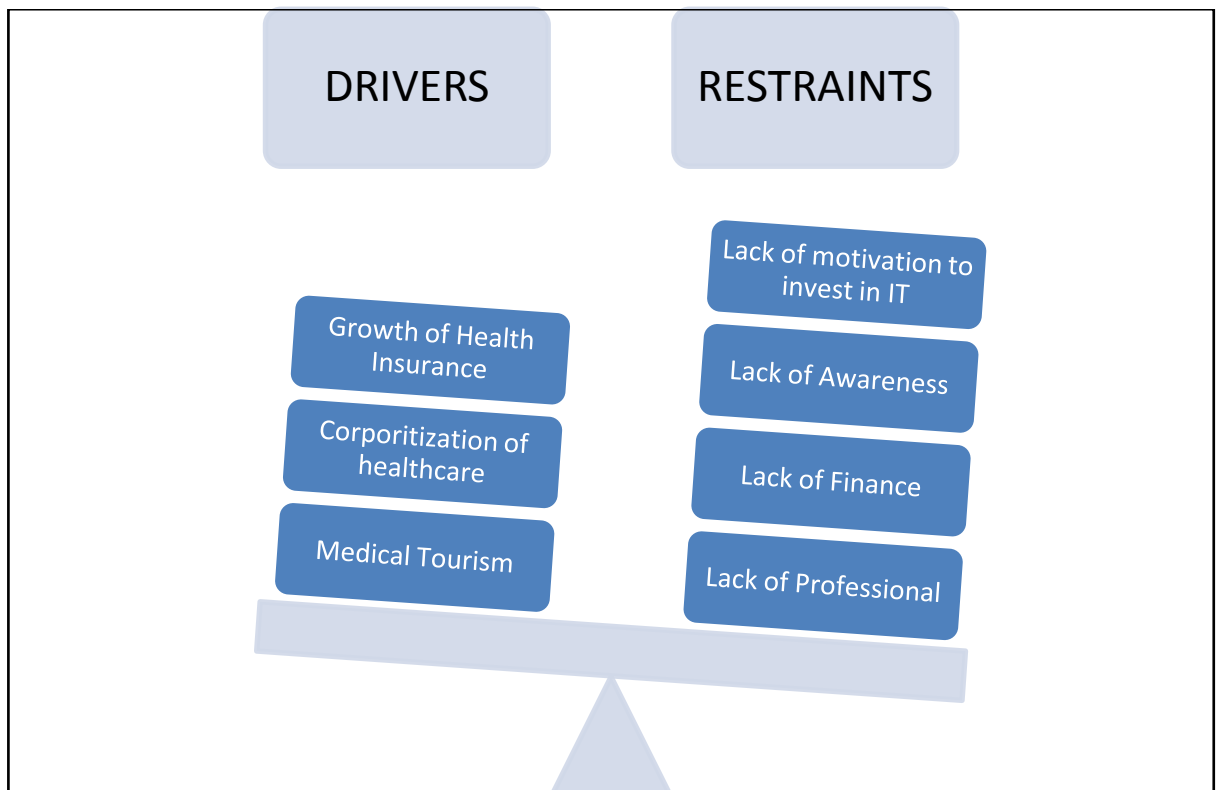


Figure 1-Factors to be considered while implementing the software

2.6 Low priority to spending on IT

Hospitals in India give IT budgeting a low priority as compared to equipment budgeting. They do not mind spending a large sum of money on a Computed Tomography scanners or Magnetic Resonance Imaging systems, but allocate small budgets for the implementation of HIS solutions. A high-cost solution such as Picture Archiving and Communications System (PACS) is being implemented only in corporate hospitals or high-end private and charitable ones in India, while other hospitals are averse to accepting such high-cost solutions. ^[3]

2.7 Information System Failures

The causes of Information System Failure during Implementation

Poor communications:

Good communication is essential and often, it needs to be done via different media in order to ensure that it reaches all levels of the organisation.

It serves to communicate the vision of the project, as well as allowing feedback from staff on the progress and any unintended consequences that may have arisen as a result of the changes. In addition, one must always remember that “action speaks louder than words”. This means that the actions of the leadership and management must be consistent with the messages that they are espousing.

Lack of a powerful guiding coalition:

For successful change to occur, the leadership must include strong line-leadership who is committed to the success of the project. They must work together with other stakeholders in order to achieve lasting change. Full support and commitment of the top-leaders have been found to be an essential factor for success.

Lack of change management:

Project management is important to ensure that the project is adequately staffed, funded and coordinated. However, even more important is the management of change within the organisation. Human nature prefers the status quo; so often, the response to change is either

fight or flight. Neither would benefit the change process. Individuals who can motivate and inspire their peers and fellow workers are essential in this aspect.

Lack of short-term wins:

As most Information Systems implementation takes many months if not years, there needs to be planned achievable short-term goals built into the process every 6 to 18 months.

These small "celebrations" allows the renewals of motivation among all staff and also serve to remind them that the final goal is achievable and is one step closer to fruition. This would also allow them to re-focus their efforts and attention on the project.

Designing short-term goals into the process naturally leads to an incremental implementation process overall, which is much more likely of success than prolonged "big-bang" approaches^[4]

3 RATIONALE

- I. To manage the data related to the clinic, finance department, laboratory, nursing, pharmacy and also the radiology and pathology departments.
- II. To have access to quick and reliable information including patients' records illustrating details about their demographics, gender, age etc.
- III. An effective HIS also delivers benefits such as:
 - enhances information integrity
 - reduces transcription errors
 - reduces duplication of information entries
 - optimizes report turnaround times

- IV. Modern hospital information systems typically use fast computers connected to one another through an optimized network. These computers are programmed to collect, process, and retrieve patient care and administrative information ensuring better ROI and delivery of service. If the hospital authorities have more relevant information they can make better decisions.

4 OBJECTIVES

- I. To computerize all details regarding patient details and hospital details
- II. To automate process of ward entries
- III. To maintain records effectively

5 METHODOLOGY

- I. **Study Design:** Descriptive Study
- II. **Study Area:** Paras Hospital , Gurgaon
- III. **Study Duration:** 2 Months
- IV. **Data Tool:** Hospital Information Software employed in OT, having input of the data related to patients coming from OPD, IPD, and Emergency & Accident.

INCLUSION CRITERIA: Implementation of Phase 2 HIS in a particular department i.e. Operation Theatre in Paras Hospital, Gurgaon.

EXCLUSION CRITERIA: Implementation of HIS in other departments of Paras Hospital like Blood Bank, CSSD, Linen and Laundry, EMR, Complaint ManagementPROJECT

In Paras Hospitals Gurgaon , HIS implementation Phase 1 was already completed in certain departments like Registration Front Desk, IPD, billing, pharmacy, Laboratory, Radiology, ward management, etc. , as the work load and data entries were excess in these departments.

Now, HIS Implementation Phase 2 for following departments started- Blood bank, OT, CSSD, Linen and Laundry, MRD, EHR, Equipment maintenance, Housekeeping departments.

Paras Hospitals had tied up with external agency for the software. The software provided basic functionalities and our task to track the process in departments and refine the system according to the needs of the department and to train their staff to use the system efficiently.

In Operation Theatre HIS implementation the software extended a helping hand while recording following things:

- OT Scheduling
- Reports
- Tracking registered patients
- Patient Details
- OT Checklist

- Doctors and staff appointed

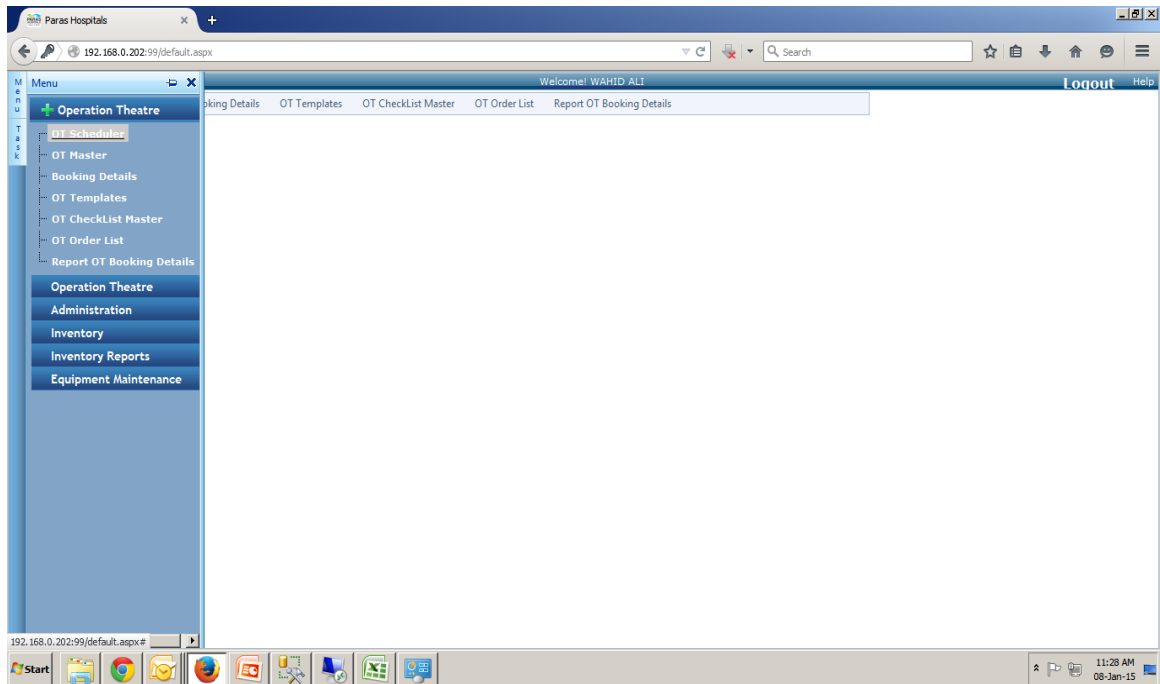
Earlier they used to note every detail manually and maintain records, but after HIS, most of the records and entries were done on system. The software can be utilized in many ways to generate reports and to maintain easily retrievable data for discussions and check department efficiency.

The following shows the HIS in system screens and the steps involved in HIS in OT Department:

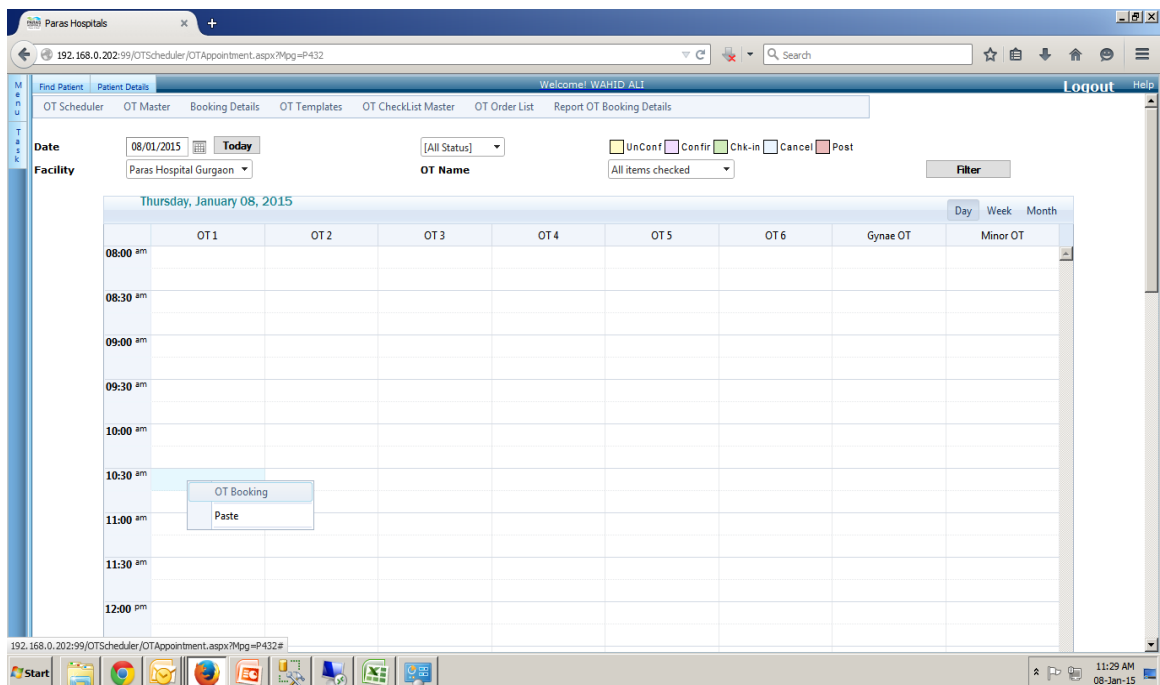
1) For **LOGIN** in HIS-Enter Username and Password.



2) Open **OT MODULE** and select **OT SCHEDULING** option for book schedule



3) Click on **TIME SLOT**



4) OT schedule booking page will be open

OT Booking Details

IP No [] New Close

Patient Details

Reg No [] First Name* [] Middle Name [] Last Name []

DOB [] Age(Y-M-D) [] Gender* [Select]

Theater Details

Theater* OT 1

Date* 08/01/2015

Time* 10:30 AM To 10:45 AM

Surgeon Details

Surgeon* [Select]

Anesthetist* [Select]

Asst. Surgeon [Select]

Anaesthesia* [Select]

Remarks [Add]

Surgery Package

Department All

Sub Department [Select]

Service* [Select] Main

Other Resources

Perfusionist [Select]

Scrub Nurse(s) [Select]

Floor Nurse(s) [Select]

OT Technician(s) [Select]

OT Equipment(s) [Select]

Surgery Added

5) If patient is already admitted then click on **IP SEARCH BOX** and select **ADMITTED PATIENT**

OT Booking Details

IP No 151 New Close

Patient Details

Reg No 1234 First Name* G Middle Name K Last Name JHA

DOB 10/09/1964 Age(Y-M-D) 50 0 0 Gender* Male

Theater Details

Theater* OT 5

Date* 08/01/2015

Time* 9:30 AM To 9:45 AM

Surgeon Details

Surgeon* [Select]

Anesthetist* [Select]

Asst. Surgeon [Select]

Anaesthesia* [Select]

Remarks [Add]

Surgery Package

Department All

Sub Department [Select]

Service* [Select] Main

Other Resources

Perfusionist [Select]

Scrub Nurse(s) [Select]

Floor Nurse(s) [Select]

OT Technician(s) [Select]

OT Equipment(s) [Select]

Surgery Added

6) Fill ALL FIELD

The screenshot shows the 'OT Booking Details' form for a patient named HIMANSHU BARAI. The form is divided into several sections: Patient Details, Theater Details, Surgeon Details, Surgery Package, and Other Resources. The Patient Details section includes fields for Reg No (300211), First Name (HIMANSHU), Middle Name, Last Name (BARAI), DOB (18/10/1984), Age (30), and Gender (Male). The Theater Details section includes Theater (OT 3), Date (08/01/2015), and Time (9:30 AM to 10:45 AM). The Surgeon Details section includes Surgeon (ANIL K. AGARWAL (FT)), Anesthetist (UNITI (ANAEHSTHESIA)), Asst. Surgeon (AMIT SRIVASTAVA), and Anaesthesia (349 OT GASES). The Surgery Package section includes Department (CTVS), Sub Department (CARDIAC SURGERY), and Service (CT4001 ARTERIO-VEINUS FISTULA HIGH). The Other Resources section includes Perfusionist (ASHOK GOLA), Scrub Nurse(s) (BALWANT YADAV), Floor Nurse(s) (SUBHASH KUMAR), OT Technician(s) (WAHID ALI), and OT Equipment(s) (CYSTOSCOPE). The form is titled 'OT Booking Details' and has a 'New' button and a 'Close' button. The browser address bar shows 'http://192.168.0.202:99/OTScheduler/OTAppointment.aspx?Mpg=P432'.

Patient Details			
Reg No	300211	First Name*	HIMANSHU
DOB	18/10/1984	Age(Y-M-D)	30 0 0
		Gender*	Male
		Middle Name	
		Last Name	BARAI

Theater Details	
Theater*	OT 3
Date*	08/01/2015
Time*	9:30 AM To 10:45 AM

Surgeon Details	
Surgeon*	ANIL K. AGARWAL (FT)
Anesthetist*	UNITI (ANAEHSTHESIA)
Asst. Surgeon	AMIT SRIVASTAVA
Anaesthesia*	349 OT GASES
Remarks	If any

Surgery Package	
Department	CTVS
Sub Department	CARDIAC SURGERY
Service*	CT4001 ARTERIO-VEINUS FISTULA HIGH
	☒ Main

Other Resources	
Perfusionist	ASHOK GOLA
Scrub Nurse(s)	BALWANT YADAV
Floor Nurse(s)	SUBHASH KUMAR
OT Technician(s)	WAHID ALI
OT Equipment(s)	CYSTOSCOPE

7) If not admitted then fill patient FIRST NAME, AGE and GENDER and ALL FIELD

The screenshot shows the 'OT Booking Details' form for a patient named PRAVEEN SRIVASTAV. The form is divided into several sections: Patient Details, Theater Details, Surgeon Details, Surgery Package, and Other Resources. The Patient Details section includes fields for Reg No, First Name (PRAVEEN), Middle Name, Last Name (SRIVASTAV), DOB (08/01/1990), Age (25), and Gender (Male). The Theater Details section includes Theater (OT 3), Date (08/01/2015), and Time (9:30 AM to 9:45 AM). The Surgeon Details section includes Surgeon, Anesthetist, Asst. Surgeon, and Anaesthesia, all with '[Select]' dropdown menus. The Surgery Package section includes Department (All), Sub Department, and Service ([Select]). The Other Resources section includes Perfusionist, Scrub Nurse(s), Floor Nurse(s), OT Technician(s), and OT Equipment(s), all with '[Select]' dropdown menus. The form is titled 'OT Booking Details' and has a 'New' button and a 'Close' button. The browser address bar shows 'http://192.168.0.202:99/OTScheduler/OTAppointment.aspx?Mpg=P432'.

Patient Details			
Reg No		First Name*	PRAVEEN
DOB	08/01/1990	Age(Y-M-D)	25
		Gender*	Male
		Middle Name	
		Last Name	SRIVASTAV

Theater Details	
Theater*	OT 3
Date*	08/01/2015
Time*	9:30 AM To 9:45 AM

Surgeon Details	
Surgeon*	[Select]
Anesthetist*	[Select]
Asst. Surgeon	[Select]
Anaesthesia*	[Select]
Remarks	

Surgery Package	
Department	All
Sub Department	
Service*	[Select]
	☒ Main

Other Resources	
Perfusionist	[Select]
Scrub Nurse(s)	[Select]
Floor Nurse(s)	[Select]
OT Technician(s)	[Select]
OT Equipment(s)	[Select]

8) After fill **ALL FIELDS** page will be as below

OT Booking Details

IP No: 14/11856

Patient Details

Reg No: 300211, First Name: HIMANSHU, Middle Name: , Last Name: BARAI
 DOB: 18/10/1984, Age(Y-M-D): 30 0 0, Gender: Male

Theater Details

Theater: OT 1, Date: 09/01/2015, Time: 10:45 AM To 12:00 PM

Surgeon Details

Surgeon: ADHISWAR SHARMA, Anesthetist: UNITI (ANAESTHESIA), Asst. Surgeon: ANUJ DOGRA CC, Anaesthesia: 349 OT GASES, Remarks: If any

Surgery Package

Department: CTVS, Sub Department: CARDIAC SURGERY, Service: CT3001 ANTERIOR CHEST WALL REPAIR (Main)

Other Resources

Perfusionist: ASHOK GOLA, Scrub Nurse(s): BALWANT YADAV, Floor Nurse(s): SUBHASH KUMAR, OT Technician(s): TEJPAL, OT Equipment(s): OXYGEN

Surgery Added

9) Click on **ADD & SAVE** option

OT Booking Details

IP No: 14/11856

Patient Details

Reg No: 300211, First Name: HIMANSHU, Middle Name: , Last Name: BARAI
 DOB: 18/10/1984, Age(Y-M-D): 30 0 0, Gender: Male

Theater Details

Theater: OT 1, Date: 09/01/2015, Time: 10:45 AM To 12:00 PM

Surgeon Details

Surgeon: [Select], Anesthetist: [Select], Asst. Surgeon: [Select], Anaesthesia: [Select], Remarks: , Add

Surgery Package

Department: All, Sub Department: All, Service: [Select] (Main)

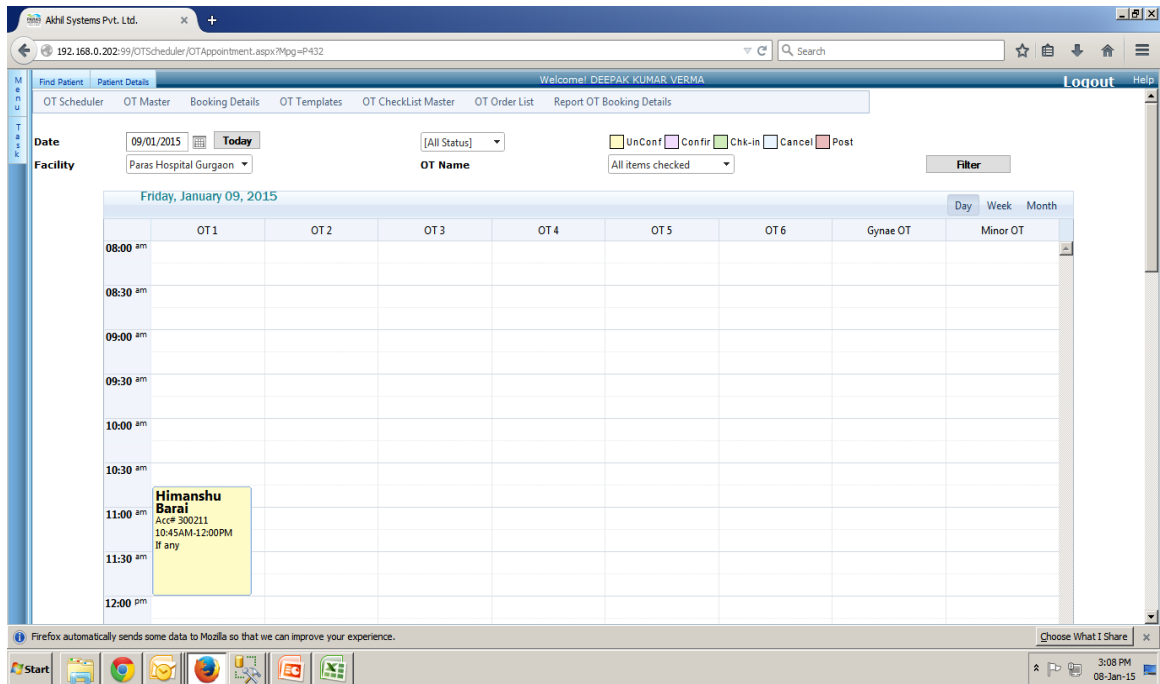
Other Resources

Perfusionist: [Select], Scrub Nurse(s): [Select], Floor Nurse(s): [Select], OT Technician(s): [Select], OT Equipment(s): [Select]

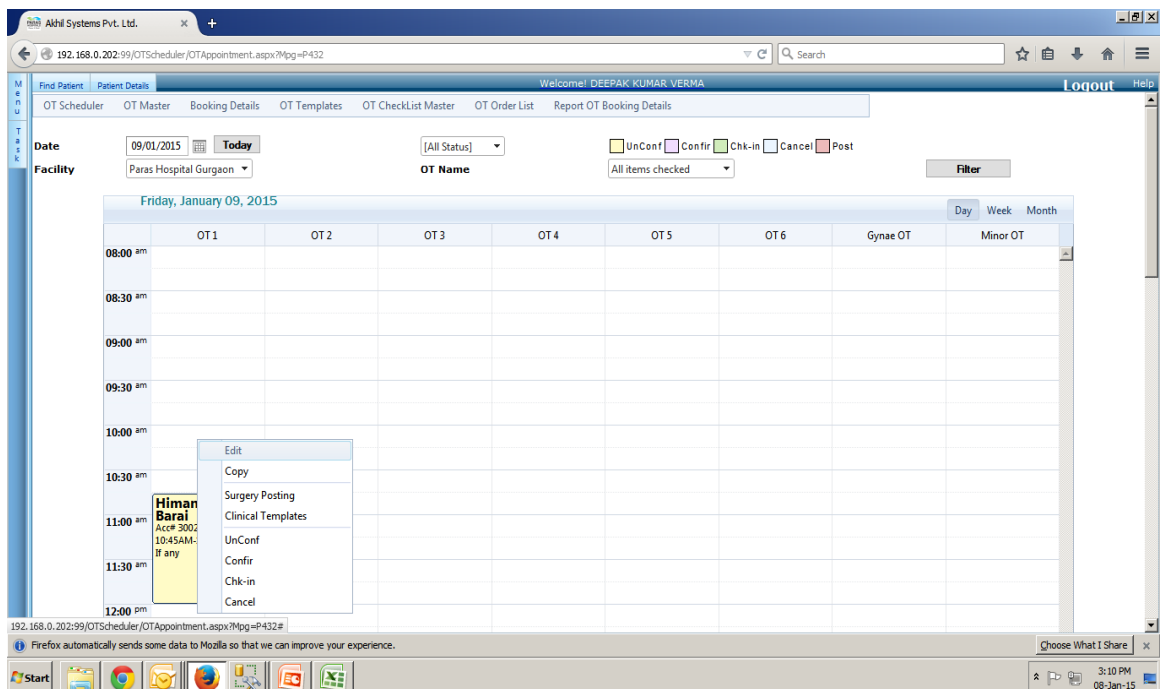
Surgery Added

Sl. No	Surgery Name	Date	Start Time	End Time		
1	CT3001 ANTERIOR CHEST WALL REPAIR	09/01/2015	10:45:00	12:00:00	Edit	View Details

10) After save, booking detail show on OT schedule in **YELLOW COLOR** with Pt. Detail



11) For edit in booked schedule right click on booked schedule and select **EDIT** option



12) Edit page will be open click on **EDIT** option, then click on **UPDATE** option

OT Booking Details

Reg No: 300211

Patient Details

First Name: HIMANSHU, Middle Name: , Last Name: BARAI, DOB: 18/10/1984, Age: 30, Gender: Male

Theater Details

Theater: OT 1, Date: 09/01/2015, Time: 10:45 AM To 12:00 PM

Surgeon Details

Surgeon: ADHISWAR SHARMA, Anesthetist: UNITI (ANAEHTHESIA), Asst. Surgeon: ANUJ DOGRA CC, Anaesthesia: 349 OT GASES

Other Resources

Perfusionist: ASHOK GOLA, Scrub Nurse(s): BALWANT YADAV, Floor Nurse(s): SUBHASH KUMAR, OT Technician(s): TEJPAL, OT Equipment(s): OXYGEN

Surgery Added

Sl. No	Surgery Name	Date	Start Time	End Time	Edit	View Details
1	ANTERIOR CHEST WALL REPAIR	09/01/2015	10:45	12:00	Edit	View Details

13) In case of booked schedule postpone or change in another OT then right click on booked scheduled and select **COPY** option

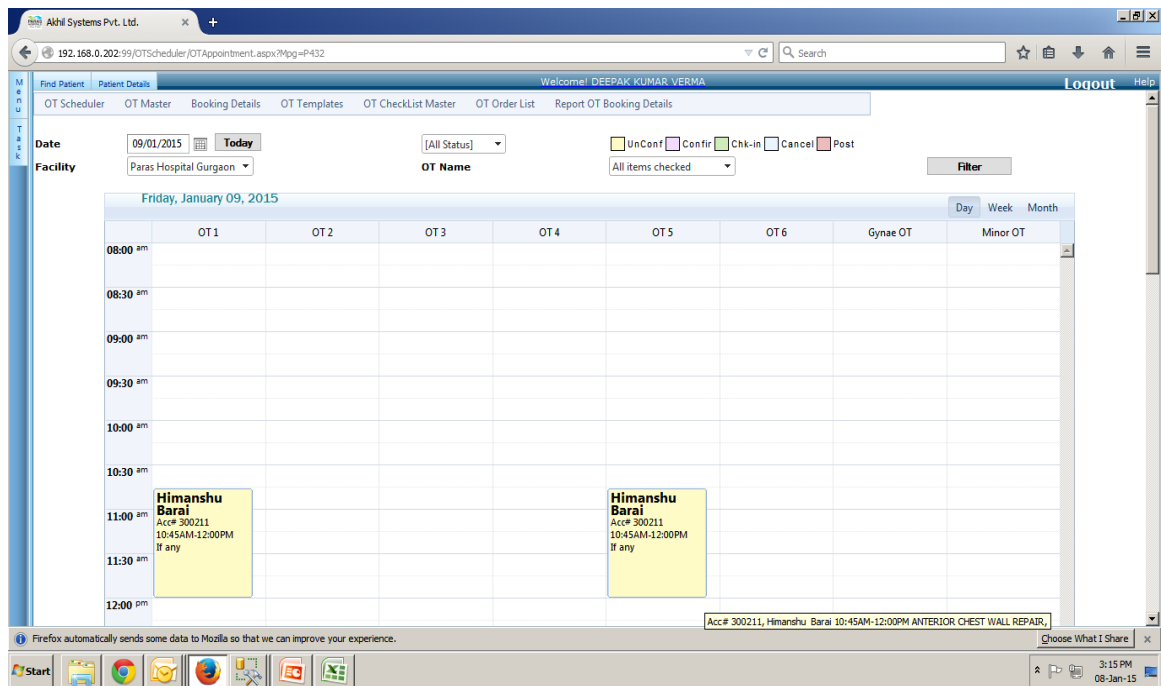
OT Scheduler

Date: 09/01/2015, Facility: Paras Hospital Gurgaon, OT Name: All items checked

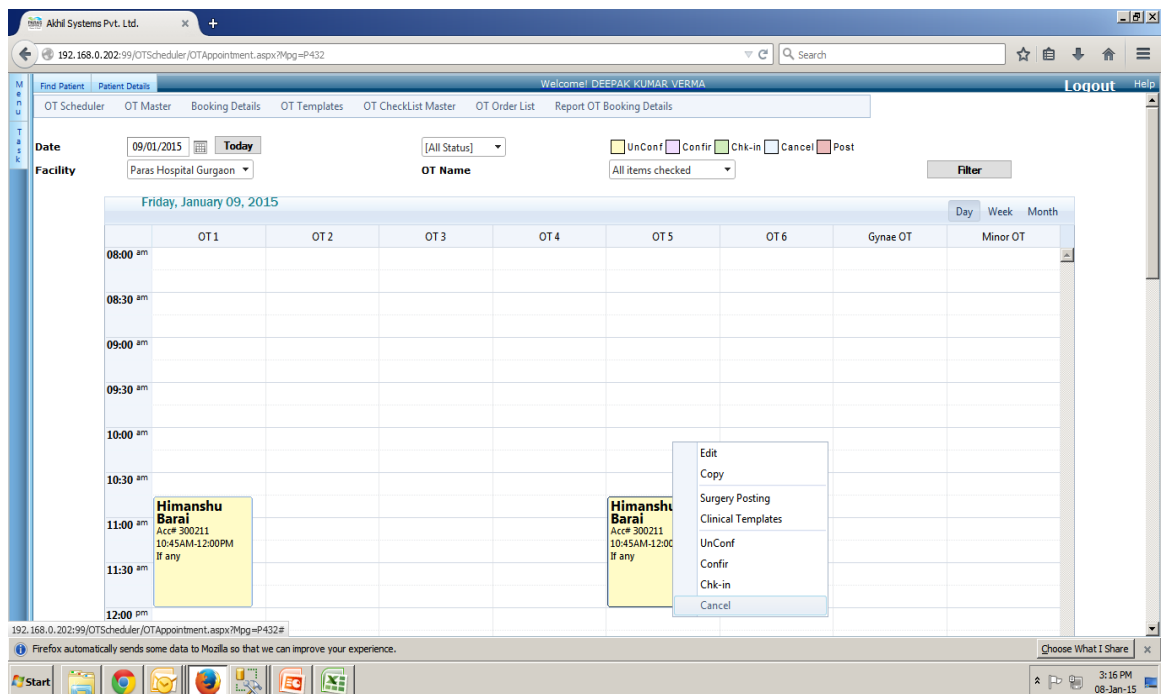
Friday, January 09, 2015

	OT 1	OT 2	OT 3	OT 4	OT 5	OT 6	Gynae OT	Minor OT
08:00 am								
08:30 am								
09:00 am								
09:30 am								
10:00 am								
10:30 am								
11:00 am	Himanshu Barai Acc# 300211 10:45AM-12:00 If any							
11:30 am								
12:00 pm								

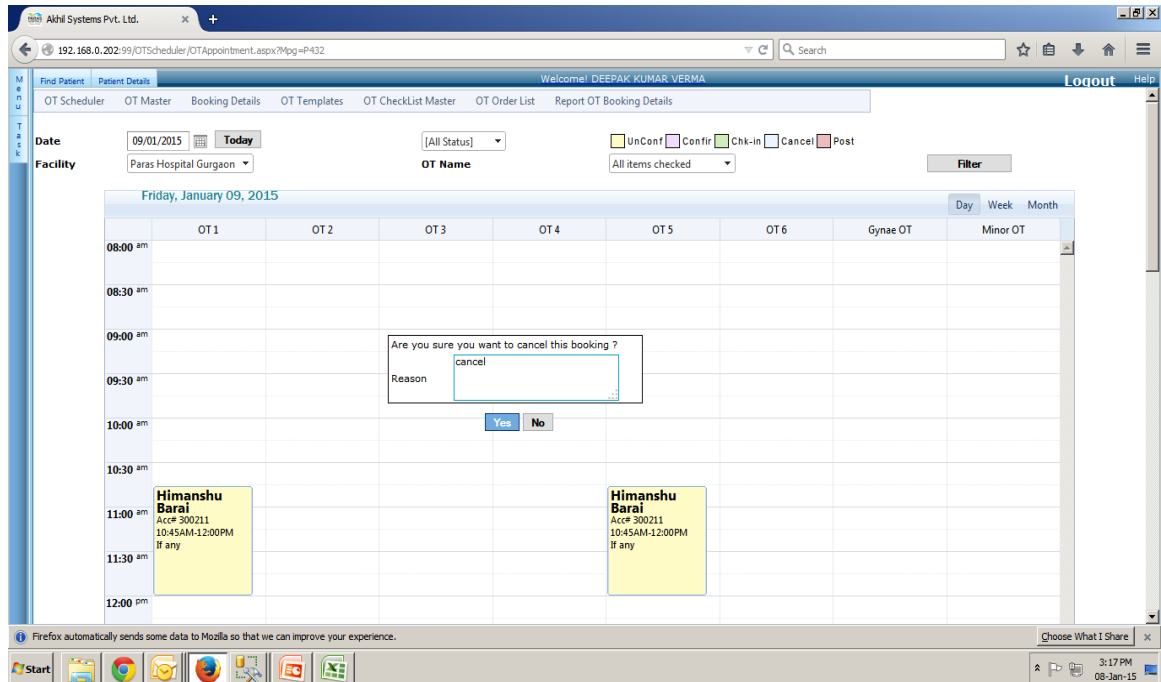
14) Now right click on new time and select **PASTE** option



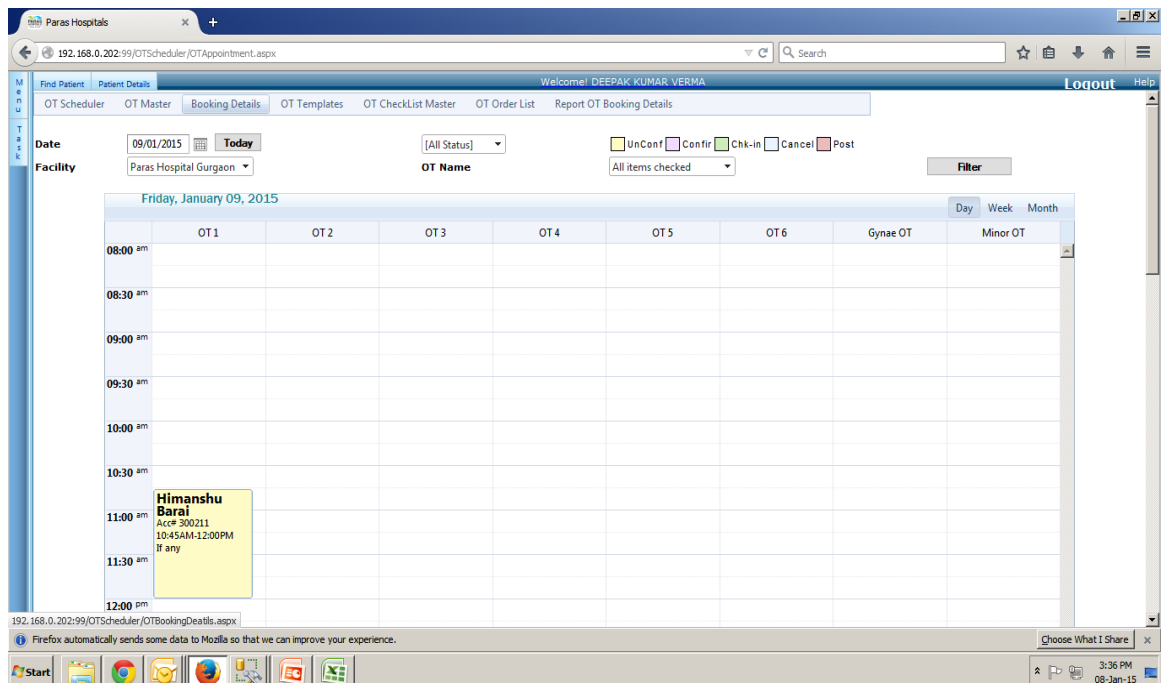
15) For cancel booking schedule, right click on booked schedule which want to delete and select **CANCEL**



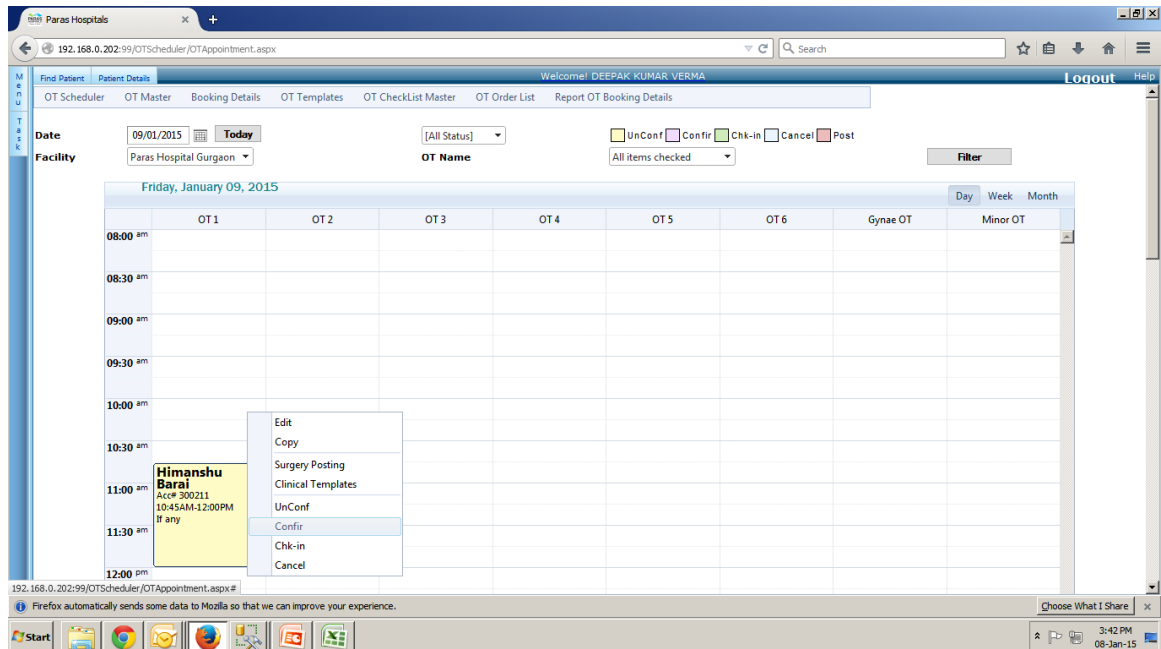
16) Give **REASON** for cancel booked schedule



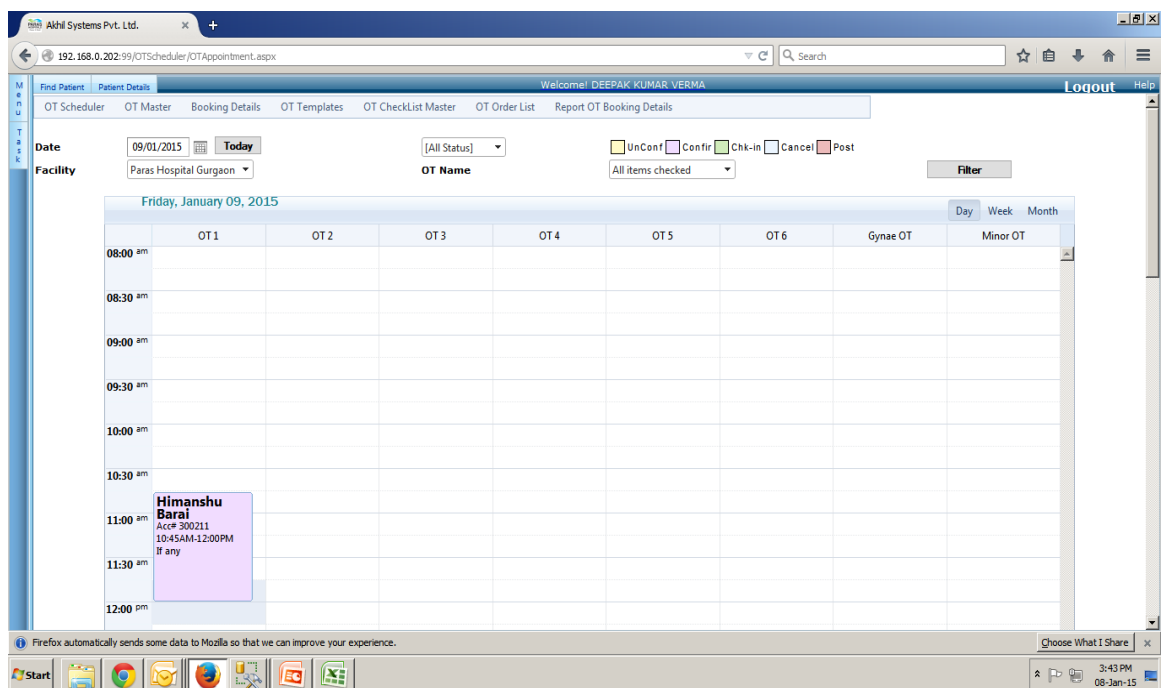
17) After cancel booked schedule, page will be open as below



18) If case is confirm then right click and select CONFIRM option



19) After confirm color will be **Pink**

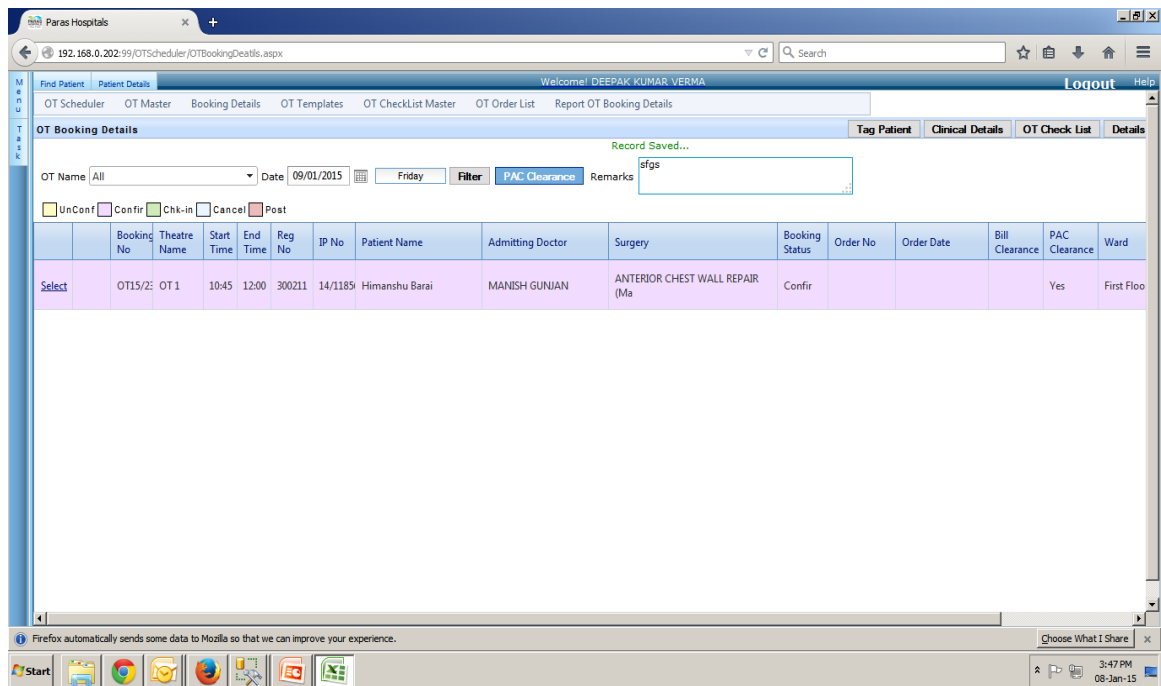


20) Now select **BOOKING DETAIL** option for **PAC** clearance

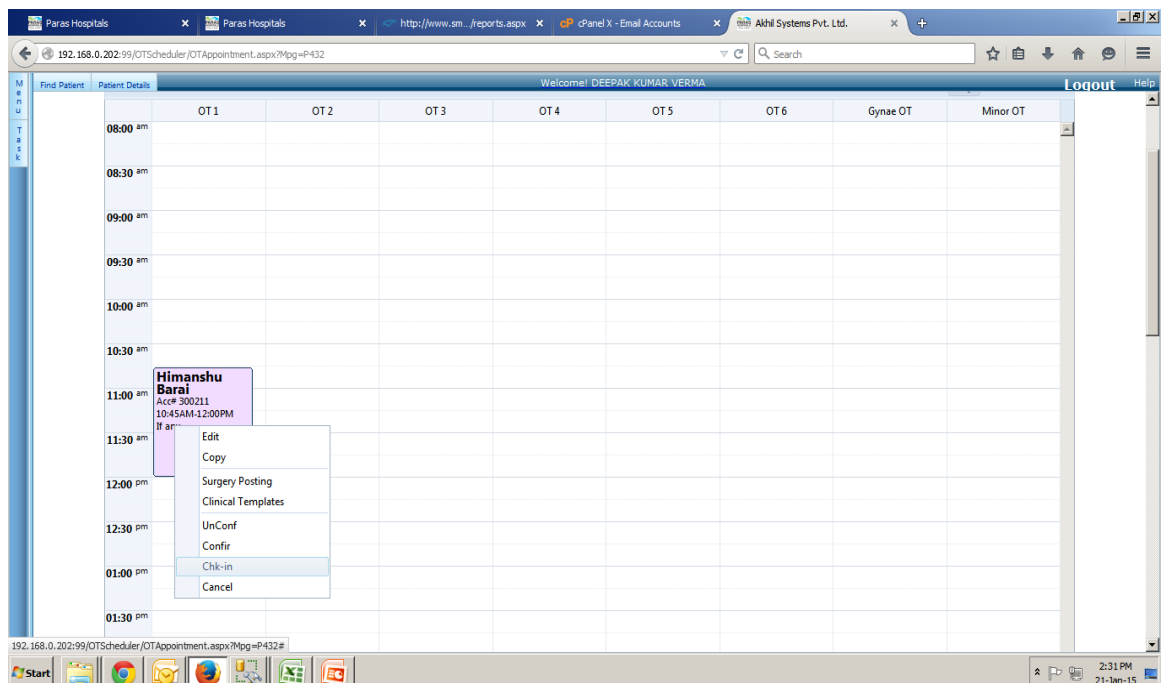
21) **SELECT PATIENT** which wants to **PAC** clearance

Booking No	Theatre Name	Start Time	End Time	Reg No	IP No	Patient Name	Admitting Doctor	Surgery	Booking Status	Order No	Order Date	Bill Clearance	PAC Clearance	Ward
OT15/2: OT 1		10:45	12:00	300211	14/1185	Himanshu Barai	MANISH GUJAN	ANTERIOR CHEST WALL REPAIR (Ma)	UnConf					First Floor

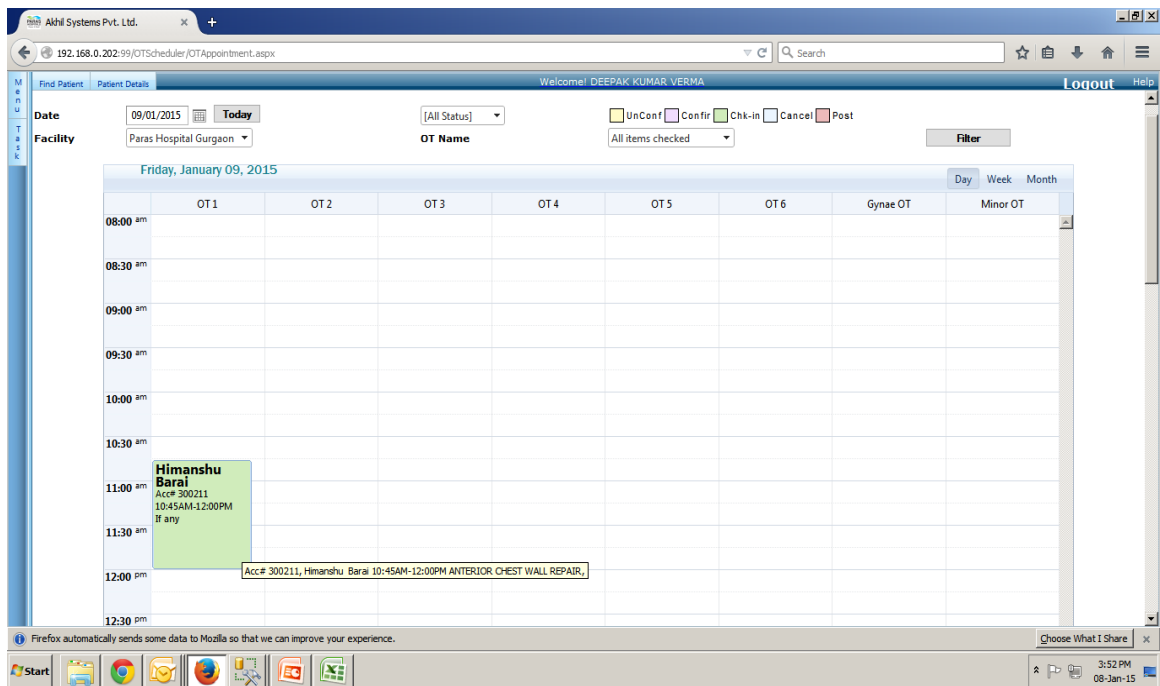
22) Select **PAC CLEARANCE** after **ENTRY REMARKS**



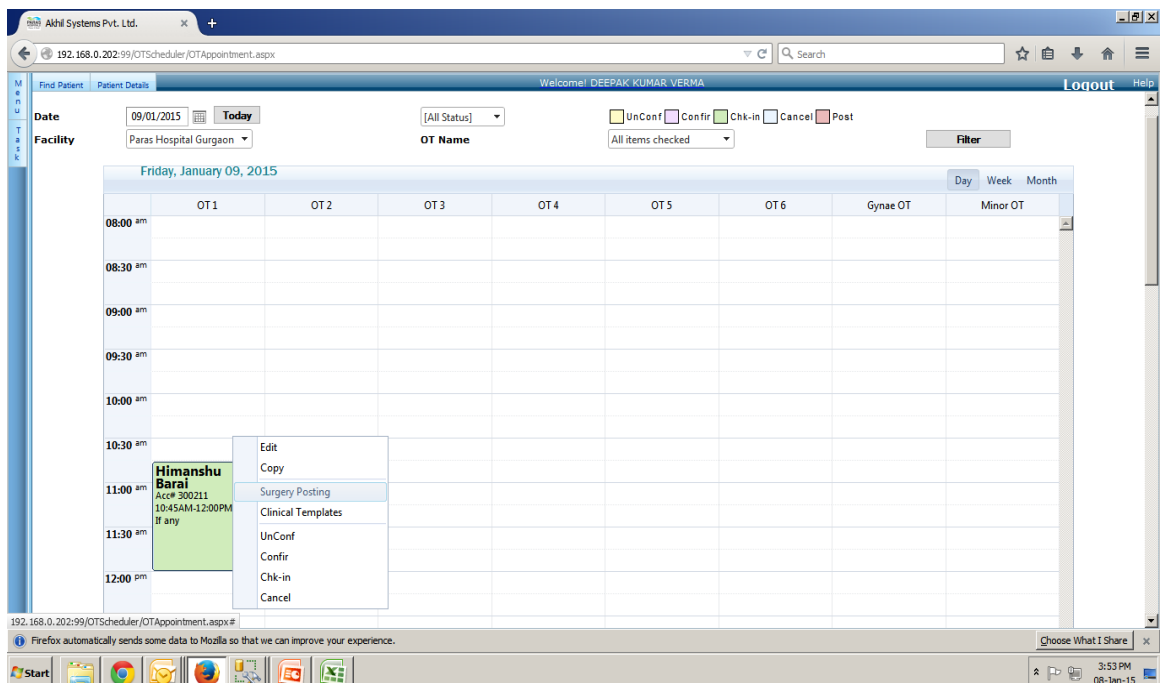
23) Right click on **Booked detail** select **CHECK IN** option for check in patient in OT



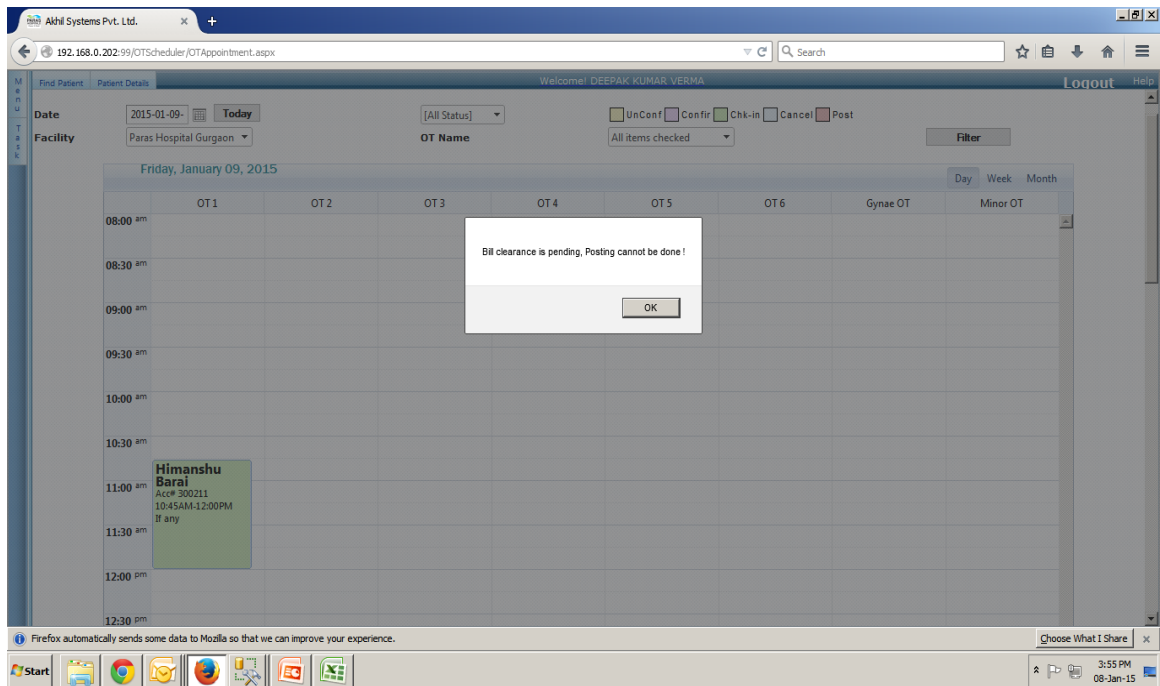
24) After check in color will be **GREEN**



25) Now **RIGHT CLICK** on booked detail and select **SURGERY POSTING** for post surgery



26) If this **ERROR** shows in that means **Bill Clearance** Is Pending



27) Now for clearance bill, billing person will select **Billing module** and select **OT CLEARANCE option**

The screenshot shows the Paros Hospitals Billing module interface. The left sidebar contains a menu with options: Billing, Patient Lists, Patient History, Master Activity List, OP Order Bill, IP Order Bill, Billing Dashboard, Refund, Pricing, Advance Collection, Pre-Authorized, Credit Note, Patient Credit Limit, Re-Admission, Bill Dispatch, **OT Clearance** (highlighted), Intimation, Credit Approval, File Request, MIS Dashboard, Registration, Appointment, and EHR. The main window displays a table of patients with the following columns: Gender/Age, Admission Date, Bed No, Bed/Billing Category, Doctor, Encounter Status, and Company. The table shows 169 records found. The bottom status bar indicates the time is 4:12 PM on 08-Jan-15.

Gender/Age	Admission Date	Bed No	Bed/Billing Category	Doctor	Encounter Status	Company
Male/33 Yr	01/01/2015 00:53	NSCU05	NEURO ICU / NEURO ICU	AMITABH MALIK FT	Open	TARIFF VERSION 6.0
Male/50 Yr	01/01/2015 00:02	NSCU04	NEURO ICU / NEURO ICU	Dr VIVEK LOGANI / DR DEEPAK THAKUR	Open	TARIFF VERSION 6.0
Female/60 Yr	01/01/2015 00:12	CTICU5	CTVS ICU / CTVS ICU	Dr RAJNISH MONGA/DR ANUKALP	Open	TARIFF VERSION 6.0
Female/14 Yr	01/01/2015 14:40	CTICU4	CTVS ICU / CTVS ICU	DR ANURAG KHAITAN / DR SANDEEP HARKAR	Open	TARIFF VERSION 6.0
Male/22 Yr	01/01/2015 11:28	CTICU3	CTVS ICU / CTVS ICU	AMITABH MALIK FT	Open	TARIFF VERSION 6.0
Male/47 Yr	30/12/2014 02:47	CTICU2	CTVS ICU / CTVS ICU	ALOK KR GUPTA/ RAKESH	Open	TARIFF VERSION 6.0
Female/24 Yr	29/10/2014 03:52	DAY-05	DAY CARE / FOUR BEDED	SHISHIR JOHRI / DR PANKAJ GUPTA	Open	CGHS 2014 (CASH)
Male/26 Yr	29/10/2014 02:34	DAY-06	DAY CARE / FOUR BEDED	RR DUTTA	Open	TARIFF VERSION 6.0
Male/30 Yr	29/10/2014 01:18	CCU08	CCU / CCU	MANISH GUNJAN	Open	BAJAJ ALLIANZ GIC LTD.(CREDIT)
Female/1 Yr 5 Mnth 18 Days	29/10/2014 00:30	DAY-08	DAY CARE / DAY CARE	RAKESH TIWARI/ SENTHIL KUMAR	Open	STAFF(CASH)
Female/2 Mnth 1	29/10/2014 00:19	NIC-11	NURSERY/NICU LEVEL 1 / NURSERY	RAKESH TIWARI/ SENTHIL KUMAR	Open	MEDI ASSIST (CREDIT)
Male/4 Yr 7 Mnth 24 Days	29/10/2014 00:01	432 A	DOUBLE BEDED / FOUR BEDED	RAKESH TIWARI/ SENTHIL KUMAR	Open	TARIFF VERSION 6.0
Male/25 Yr	28/10/2014 23:31	413--A	FOUR BEDED / FOUR BEDED	GASTRO TEAM	Open	TARIFF VERSION 6.0
Male/30 Yr	28/10/2014 22:58	439	SINGLE BED / SINGLE BED	SHISHIR JOHRI / DR PANKAJ GUPTA	Open	ICICI LOMBARD (CREDIT)
Female/32 Yr	28/10/2014 22:34	366-B	DOUBLE BEDED / FOUR BEDED	ARUNA KALRA	Open	PARAMOUNT (CREDIT)

28) OT Clearance page will be open

The screenshot shows the Paros Hospitals OT Booking Details page. The left sidebar contains a menu with options: Find Patient, Patient Details, Patient Lists, Patient History, Master Activity List, OP Order Bill, IP Order Bill, Billing Dashboard, Refund, Pricing, Advance Collection, Pre-Authorized, **OT Clearance** (highlighted), Intimation, Credit Approval, File Request, MIS Dashboard, Registration, Appointment, and EHR. The main window displays the OT Booking Details for a patient named Himanshu Barai. The booking status is 'Chk-in'. The surgery is 'ANTERIOR CHEST WALL REPAIR (Ma)'. The booking date is 09/01/2015. The bottom status bar indicates the time is 4:19 PM on 08-Jan-15.

Booking No	Theatre Name	Start Time	End Time	Reg No	IP No	Patient Name	Admitting Doctor	Surgery	Booking Status	Order No	Order Date	Bill Clearance	PAC Clearance	Ward
OT15/2: OT 1		10:45	12:00	300211	14/1185	Himanshu Barai	MANISH GUNJAN	ANTERIOR CHEST WALL REPAIR (Ma)	Chk-in			Yes		First Floor

29) Select patient which want to clearance, **ENTER REMARKS** and select **BILL CLEARANCE** option.

Paros Hospitals

192.168.0.202:99/OTScheduler/OTBookingDetails.aspx?PT=BC&Mpg=P561

Welcome! DEEPAK KUMAR VERMA

Logout Help

Find Patient Patient Details

Patient Lists Patient History Master Activity List OP Order Bill IP Order Bill Billing Dashboard Refund Pricing Advance Collection Pre-Authorized

OT Booking Details

OT Name All Date 09/01/2015 Friday Filter Bill Clearance Remarks must enter

UnConf Confir Chk-In Cancel Post

	Booking No	Theatre Name	Start Time	End Time	Reg No	IP No	Patient Name	Admitting Doctor	Surgery	Booking Status	Order No	Order Date	Bill Clearance	PAC Clearance	Ward
Select	OT15/2:	OT 1	10:45	12:00	300211	14/1185	Himanshu Barai	MANISH GUNJAN	ANTERIOR CHEST WALL REPAIR (Ma	Chk-in			Yes	First Floo	

Firefox automatically sends some data to Mozilla so that we can improve your experience.

Choose What I Share

4:29 PM 08-Jan-15

30) After bill clearance patient name will **HIDE**

Paros Hospitals

192.168.0.202:99/OTScheduler/OTBookingDetails.aspx?PT=BC&Mpg=P561

Welcome! DEEPAK KUMAR VERMA

Logout Help

Find Patient Patient Details

Patient Lists Patient History Master Activity List OP Order Bill IP Order Bill Billing Dashboard Refund Pricing Advance Collection Pre-Authorized

OT Booking Details

Record Saved...

OT Name All Date 09/01/2015 Friday Filter Bill Clearance Remarks must enter

UnConf Confir Chk-In Cancel Post

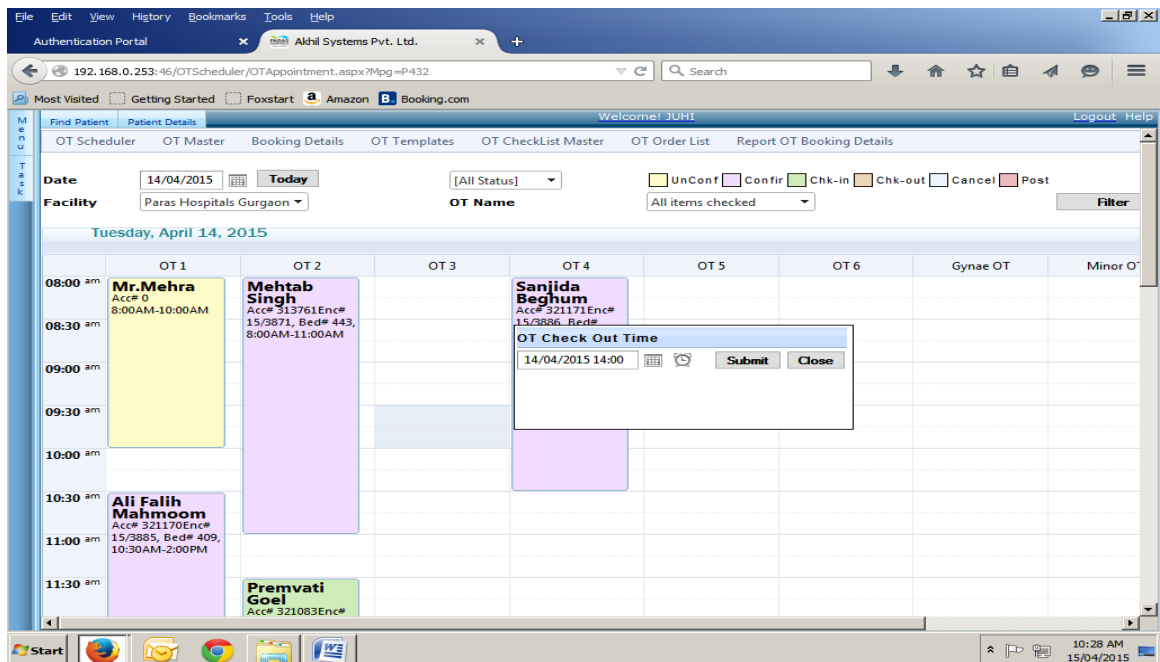
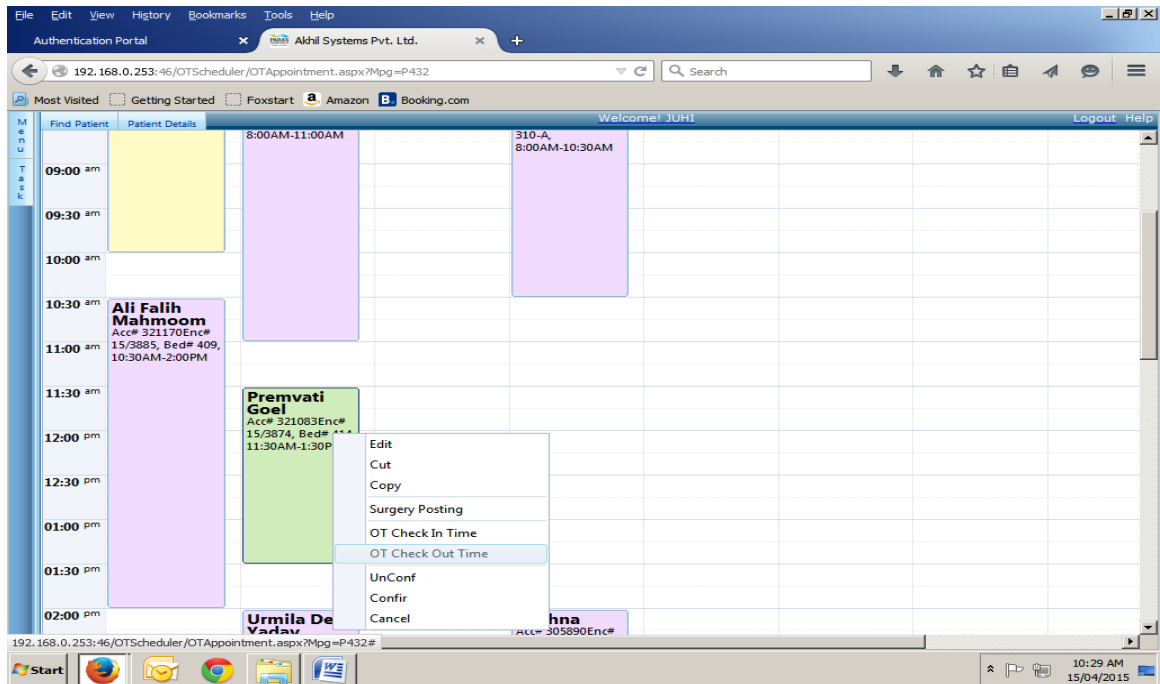
	Booking No	Theatre Name	Start Time	End Time	Reg No	IP No	Patient Name	Admitting Doctor	Surgery	Booking Status	Order No	Order Date	Bill Clearance	PAC Clearance	Ward
No records to display.															

Firefox automatically sends some data to Mozilla so that we can improve your experience.

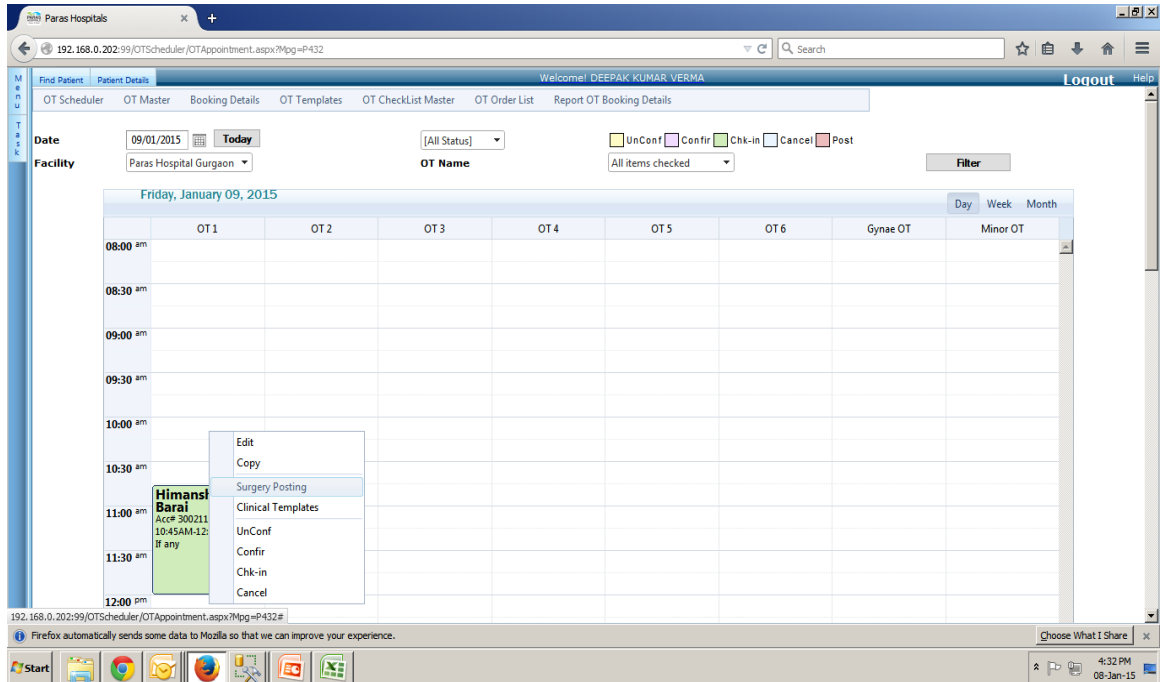
Choose What I Share

4:30 PM 08-Jan-15

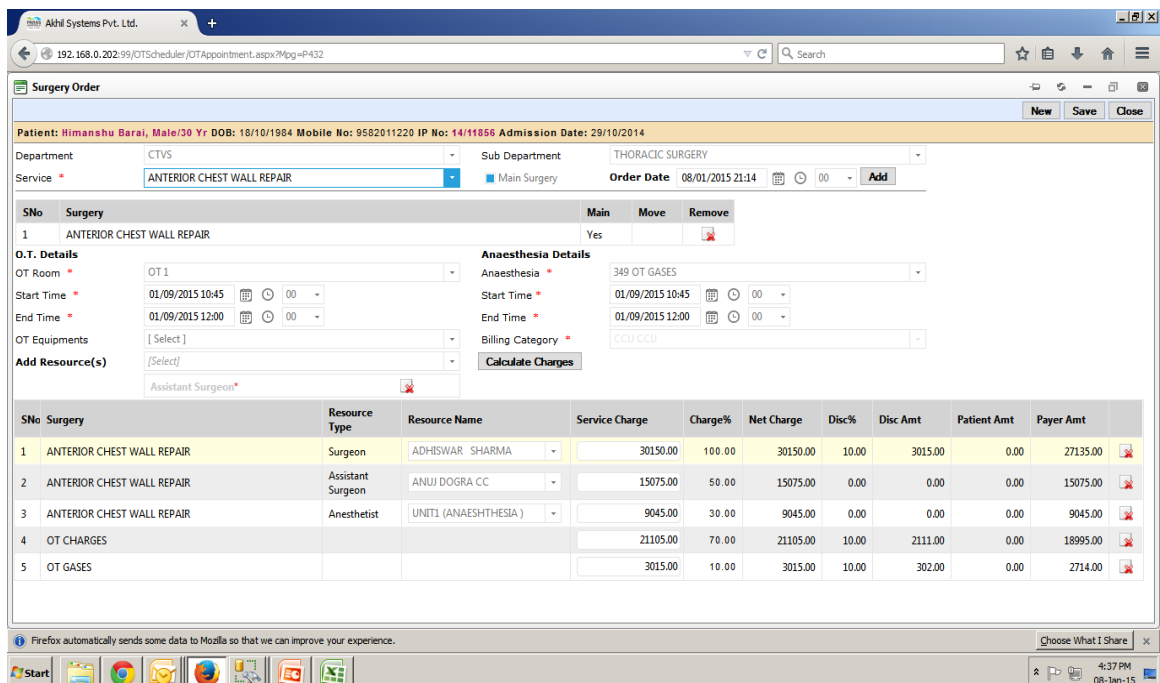
31) After OT patient will check out from OT by option **CHECK OUT**



32) Now again go to on **OT SCHEDULE** right click on **schedule book** and select **SURGERY POSTING**



33) **SURGERY POSTING** page will be open



34) Check all fields and click on **SAVE** option

Surgery Order

Patient: Himanshu Barai, Male/30 Yr DOB: 18/10/1984 Mobile No: 9582011220 IP No: 14/11856 Admission Date: 29/10/2014

Department: CTVS Sub Department: THORACIC SURGERY

Service: ANTERIOR CHEST WALL REPAIR Order Date: 08/01/2015 21:14

SNo Surgery Main Move Remove

1 ANTERIOR CHEST WALL REPAIR Yes

O.T. Details

OT Room: OT 1

Start Time: 01/09/2015 10:45

End Time: 01/09/2015 12:00

OT Equipments: [Select]

Add Resource(s): [Select]

Anaesthesia Details

Anaesthesia: 349 OT GASES

Start Time: 01/09/2015 10:45

End Time: 01/09/2015 12:00

Billing Category: CCU CCU

Calculate Charges

SNo	Surgery	Resource Type	Resource Name	Service Charge	Charge%	Net Charge	Disc%	Disc Amt	Patient Amt	Payer Amt
1	ANTERIOR CHEST WALL REPAIR	Surgeon	ADHISWAR SHARMA	30150.00	100.00	30150.00	10.00	3015.00	0.00	27135.00
2	ANTERIOR CHEST WALL REPAIR	Assistant Surgeon	ANUJ DOGRA CC	15075.00	50.00	15075.00	0.00	0.00	0.00	15075.00
3	ANTERIOR CHEST WALL REPAIR	Anesthetist	UNIT1 (ANAEHSTHESIA)	9045.00	30.00	9045.00	0.00	0.00	0.00	9045.00
4	OT CHARGES			21105.00	70.00	21105.00	10.00	2111.00	0.00	18995.00
5	OT GASES			3015.00	10.00	3015.00	10.00	302.00	0.00	2714.00

35) After save booking detail color will be **PINK**

OT Scheduler

Welcome! DEEPAK KUMAR VERMA

Find Patient Patient Details OT Scheduler OT Master Booking Details OT Templates OT Checklist Master OT Order List Report OT Booking Details Logout Help

Date: 09/01/2015 Today [All Status] UnConf Confir Chk-in Cancel Post

Facility: Paras Hospital Gurgaon OT Name: All items checked Filter

Friday, January 09, 2015

	OT 1	OT 2	OT 3	OT 4	OT 5	OT 6	Gynae OT	Minor OT
08:00 am								
08:30 am								
09:00 am								
09:30 am								
10:00 am								
10:30 am								
11:00 am	Himanshu Barai Acc# 300211 10:45AM-12:00PM If any							
11:30 am								
12:00 pm								

36) Now we can check **OT order list** in option **OT ORDER LIST**

Paros Hospitals

192.168.0.202:99/OTScheduler/OTOrderList.aspx

Welcome! DEEPAK KUMAR VERMA

Logout

OT Scheduler OT Master Booking Details OT Templates OT CheckList Master OT Order List Report OT Booking Details

OT Order List

Order dates from 08/01/2015 to 08/01/2015 Filter

Cancel Order

Cancel	Order No	Order Date	Reg No	Enc #.	Patient Name	Invoice No	Status	Entered By	Entered Date	Select
☐	IP15/175747	08/01/2015	300211	14/11856	Mr. Himanshu Barai		Active	DEEPAK KUMAR VERMA	09/01/2015 10:52:00	Select

Firefox automatically sends some data to Mozilla so that we can improve your experience.

Choose What I Share

4:44 PM 08-Jan-15

37) From here we can also **CANCEL** order

Paros Hospitals

192.168.0.202:99/OTScheduler/OTOrderList.aspx

Welcome! DEEPAK KUMAR VERMA

Logout

OT Scheduler OT Master Booking Details OT Templates OT CheckList Master OT Order List Report OT Booking Details

OT Order List

Order dates from 08/01/2015 to 08/01/2015 Filter

Cancel Order

Cancel	Order No	Order Date	Reg No	Enc #.	Patient Name	Invoice No	Status	Entered By	Entered Date	Select
☒	IP15/175747	08/01/2015	300211	14/11856	Mr. Himanshu Barai		Active	DEEPAK KUMAR VERMA	09/01/2015 10:52:00	Select

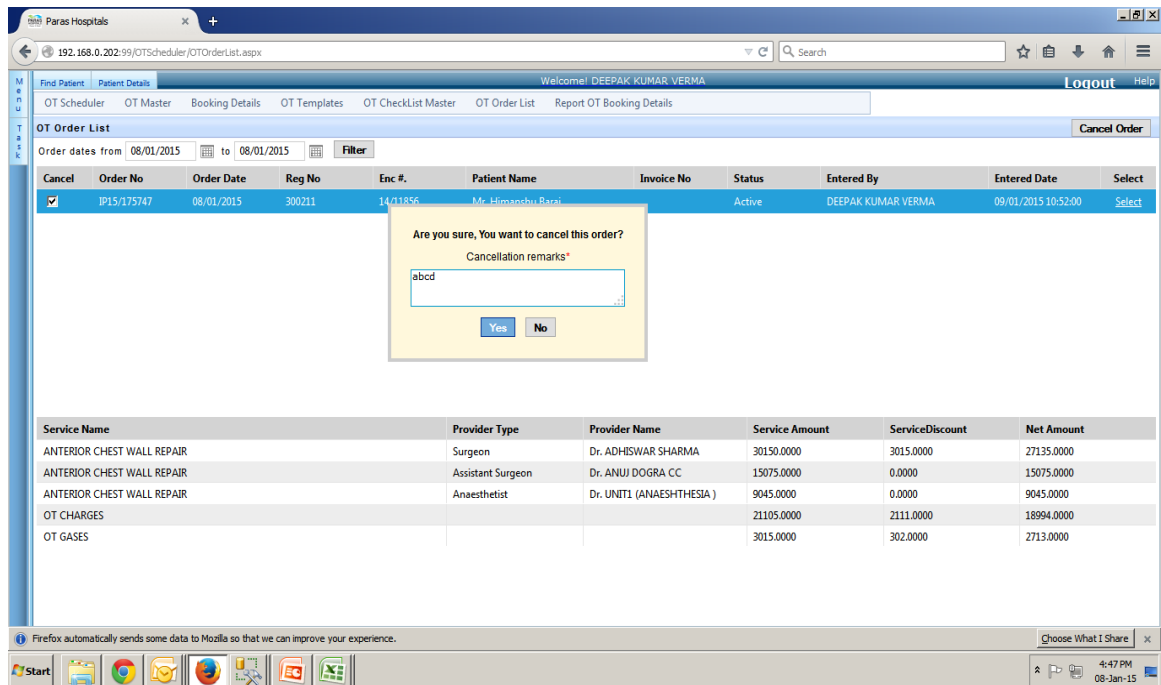
Service Name	Provider Type	Provider Name	Service Amount	ServiceDiscount	Net Amount
ANTERIOR CHEST WALL REPAIR	Surgeon	Dr. ADHISWAR SHARMA	30150.0000	3015.0000	27135.0000
ANTERIOR CHEST WALL REPAIR	Assistant Surgeon	Dr. ANUJ DOGRA CC	15075.0000	0.0000	15075.0000
ANTERIOR CHEST WALL REPAIR	Anaesthetist	Dr. UNIT1 (ANAESTHESIA)	9045.0000	0.0000	9045.0000
OT CHARGES			21105.0000	2111.0000	18994.0000
OT GASES			3015.0000	302.0000	2713.0000

Firefox automatically sends some data to Mozilla so that we can improve your experience.

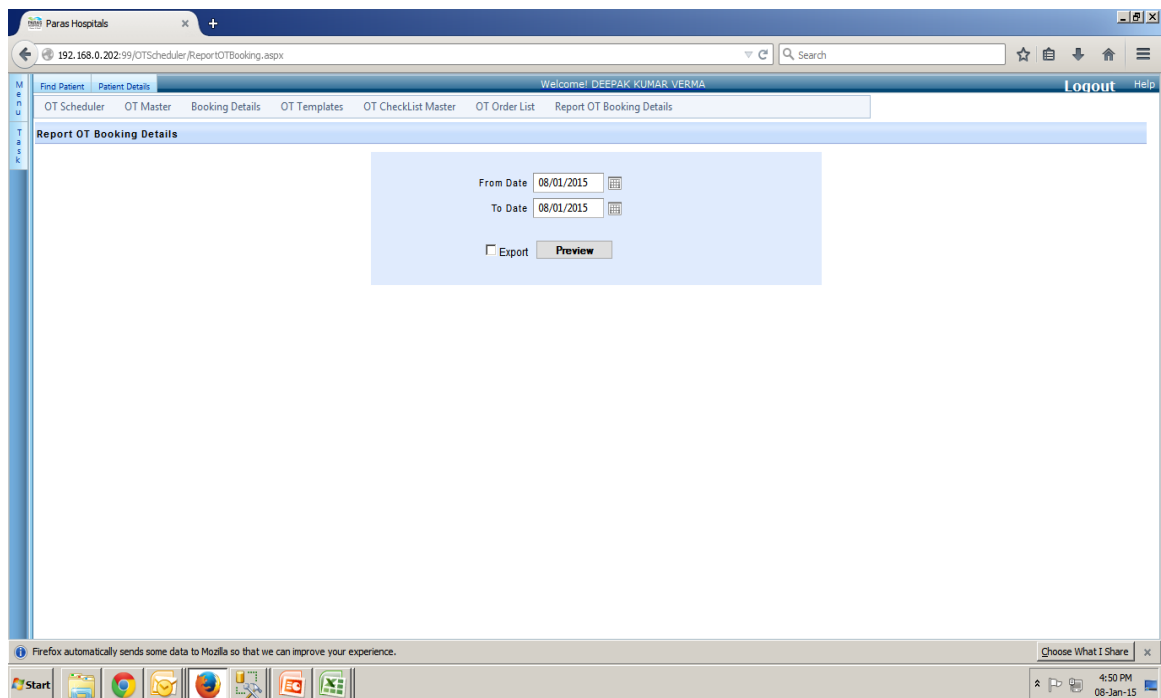
Choose What I Share

4:46 PM 08-Jan-15

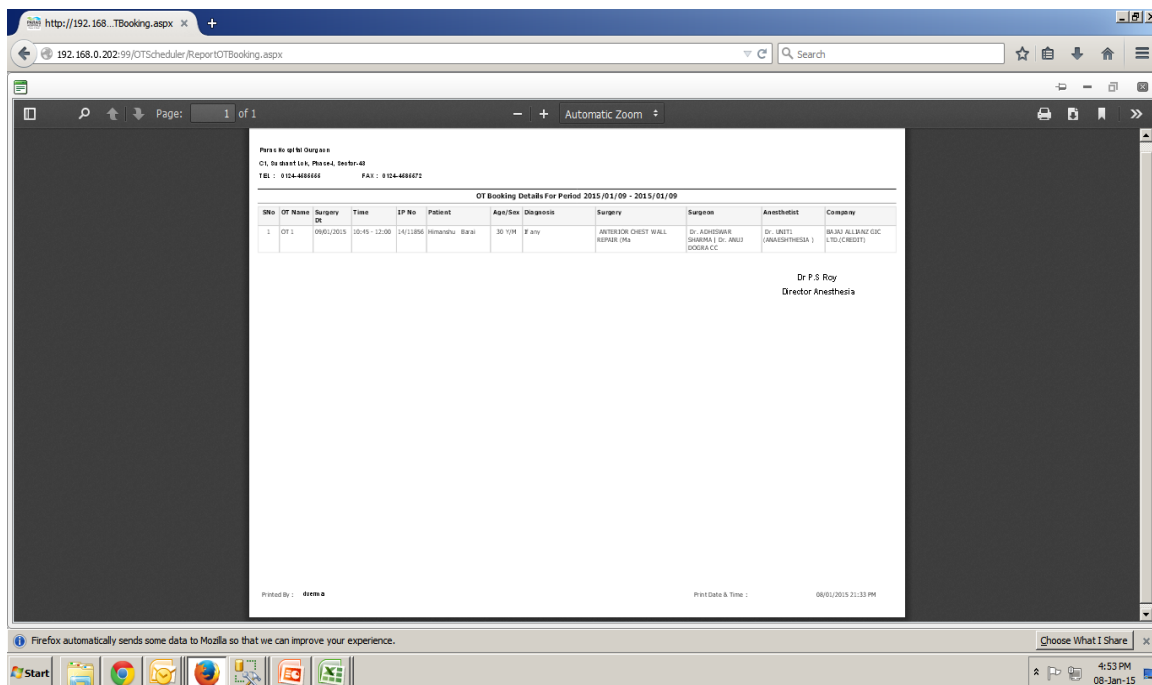
38) Enter **REMARKS** and click on **YES**



39) We can see report for OT booking by click on **REPORT OT BOOKING DETAIL**



Select **DATE RANGE** and **PREVIEW REPORT** will be open



41) We can take printout of **CASE SHEET**

After implementing the software in hospital Operation Theatre system, they were made to enter all details related to patient in this software. While entering data they encountered certain discrepancies in the software. The work flow and pattern of recording the data were not found similar to the software provided.

Hence external agency made changes step by step from the back-end to make the system efficient. The changes, points to be added or modified were recorded in **Issue Tracker**. Issue Tracker Screen shown below:

paras Issue Tracker.xls [Compatibility Mode] - Microsoft Excel

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	S.N O	Module	Page Name	Point	Bug / Enh	Observed by	Status	Priority	Date	HANDOVER & Checked by after DONE POINT	Remark	CURRENT STATUS			
1	15	Operation Theatre	OT SCHEDULAR	Should show IP No. and Bed no of Pt. in booked schedule.	ENHH	IT	Closed	Medium	10/Jun/15			CLOSED			
2	16	Operation Theatre	OT SCHEDULAR	Require checkout option for check out pt. from O.T.	ENHH	IT	PENDING	Medium	10/Jun/15		after OT checkout is needed.	OPEN			
3	17	Operation Theatre	Operation Theatre	Require O.T. summary report with all detail.	ENHH	IT	PENDING	Medium	10/Jun/15		Required format of the report.	OPEN			
4	18	Operation Theatre	Operation Theatre	OT Check list should POP UP BEFORE Check-In Option	ENHH	IT	PENDING	Medium	10/Jun/15		Required detailed requirement.	OPEN			
5	19	Operation Theatre	OT SCHEDULAR	Require Check list page at the time of Pt. Checkin in O.T.	ENHH	IT	In-Process	Medium	10/Jun/15		what is the use of checklist master?	OPEN			
6	86	operation theatre	booking details	investigations link up has to be done	ENHH	pravin sir	Closed	medium	14/02/2015			CLOSE			
7	87	operation theatre	booking details	clarify details option	ENHH	praveen	PENDING	medium	14/02/2015			OPEN			
8	88	operation theatre	OT SCHEDULAR	not able to close check list option during posting a surgery	ENHH	praveen	Closed	medium	25/02/2015			OPEN			
9	89	operation theatre	OT SCHEDULAR	cancelled patients entry should be stored in - Report OT Book Details	ENHH	praveen	PENDING	medium	25/02/2015			OPEN			
10	90	operation theatre	OT SCHEDULAR	Post surgeries entries can be edited , but it provides leverage to employee to change settings later on	ENHH	praveen	PENDING	medium	26/02/2015			OPEN			
11	91	operation theatre	OT SCHEDULAR	OT Check list should pop up before Check-In Option	ENHH	praveen	PENDING	medium	03/03/2015			OPEN			
12	92	operation theatre	OT SCHEDULAR	In OT Bookings , Other Resources fields should be mandatory	ENHH	praveen	PENDING	medium	03/03/2015			OPEN			
13	93	operation theatre	OT SCHEDULAR	PAC Clearance should pop up before Check-In Option	ENHH	praveen	PENDING	medium	03/03/2015			OPEN			
14	94	operation theatre	OT SCHEDULAR	after Surgery Posting is done , editing should not be possible . ONLY Add Option should work to add additional procedure done in OT.	ENHH	praveen	PENDING	medium	03/03/2015			OPEN			

Ready 60%

10:21 AM 02/04/2015

Figure 2-Screen shot of Issue Tracker

Issue Tracker was sent to external agency and issues were discussed telephonically and through system sharing online, changes were made by them on regular basis. The refined system was checked on regular basis and department were asked to enter details and report if they encounter new errors.

The staff was trained simultaneously to handle all data entries on time and maintain proper records on the system. User Manual for the system was made, so that system can be made user friendly.

Problems Faced during implementing software in Hospital were as follows:

- **Inter department communication** – While implementing software , there were many discrepancies in between departments as process flow followed was slightly different than basic software installed by external agency.

Like every new implementation, there were problems like , the Operation theatre staff and billing department were not communicating properly , as all staff were not fully trained initially. Their communication barriers were removed and they were trained and asked by us to communicate telephonically to I.T. Department and billing department staff for easy clearance of balance in bills and get *O.T. clearance* on time.

- **Unavailability and delayed deployment of changes** by External Agency – External agency were delaying deployment of software errors and modifications. Their staff was only communicating via telephonic conversation and online access of our systems of our hospital system from their office. Issue Tracker sent with corrections to be done was most of the times delayed and their office remain closed during weekends while hospital was still operational on Saturdays.

Time schedules were matched later on and agency staff was requested to appoint staff and make changes sent in Issue Tracker on time and weekly renewal of software were done.

- **Untrained staff** – Staff needed to be trained personally about data entry and report generation. Skilled staff is very essential to make system effective and efficient.

The staff was trained and was supplied with User Manual to make system User-friendly. Early involvement of employees/staff leads higher level of user acceptance , and makes system more effective and efficient.

6 ETHICAL CONSIDERATIONS

- The Main Values to be observed: Confidentiality – entrusted private and linked data will be kept that way. b) Integrity – technical competence, openness, ethics and scientific soundness will be observed in all operations. c) Gender sensitivity, fairness and universal coverage will be ensured.
- Staff at agencies will need to be aware of all of the security features of the HMIS that they have chosen. They will also need to be aware of their responsibilities for keeping client information safe and confidential at the agency level
- Special security training can be provided to key agency staff or to all staff to ensure that they understand and adopt appropriate security protocols, issues of confidentiality, disclosure, and grievance procedures.
- For each of the training trainers and project managers should work together to develop a standard curriculum and review and revise it periodically. They will also need to develop training materials to hand out to participants. These materials should also be updated as needed.
- The project manger should try to gauge the effectiveness of the training by creating a training evaluation form with numeric scales. ^[6]

7 RECCOMENDATIONS

- HIS successful implementation requires two way approach i.e. both financial investment and management and changing software according to process flow, making software efficient and user-friendly.
- Evolutionary approach need to be taken to train staff in HIS. They should be part of software implementation from early stage. Employees need to be regularly updated about the software that is to be implemented and regular updates need to be taken from them to change software according to the need of department in hospital.
- Inter-department coordination: Billing department and Operation theatre staff should coordinate well to get bills cleared and patient admission a smooth process.
- System errors and failures in between need to be given priority and it should be solved on emergency basis , without delay.
- Supervision – Entries of the patient data made should be reviewed on regular basis and correct training is to be provided to new staff employed in the department.
- Regular report generation – Reports should be generated monthly or weekly basis to evaluate and check efficiency of system.

8 RESULTS

- All details regarding patients and hospital were computerized
- The staff was able to record and retrieve data in less time
- Data analysis of the records made easy
- The issues raised by department were sorted and all the changes were made
- The system was made user friendly and staff was trained to use system efficiently
- Various report can now be generated easily

9 DISCUSSION

When implementing HIS in developing countries, context-specific circumstances, barriers, and needs must be taken into account. System implementation should be seen in the wider context of organizational change, of which software development is but one part.

In the expansion of HIS to other departments and wards, disinterested and skeptical medical doctors, nurses and technical staff were constant barriers and because of their lack of awareness they became indifferent to the implementation of this system and showed no encouragement, support, or commitment.

However, it is also important to work very closely, at a personal level, with the primary users to “convert”, train, and support them. So while coalitions to drive the system implementation from the top were not formed, strong networks of users were formed at the grass-root level that progressively expanded. Training of the users was carried out on a one-to-one, on-site and hands-on basis rather than in the more theory-based carried out on a one-to-one, on-site and hands-on basis rather than in the more theory-based traditional “class-room” style. This seemed to have been better accepted by the users. The key factor that led to user acceptance was the practical usage of the system. It seems to have worked well to “release” the system in its infantile stage of development thereby engaging the users early in the development process leading to their “real” involvement. Only when the technical staff experienced using the system did they realize its value. They were then able to identify how it could be improved, which was critical in the development of a system that was suited to the local requirements. Early involvement also put the users at the leading

end. Enabling them to help develop the system, rather than being at the receiving end where the end users are imposed an “externally” developed system. All this worked in favor of user acceptance. It is important to note that an “evolutionary” approach was taken throughout the implementation process where both staff and the system evolved and matured together. Software development and changing people’s attitudes were interrelated and required time but, contrary to evidence from the literature, no sense of urgency was introduced. Had it been introduced, it might have been detrimental; by not letting the change “sink in” slowly there would not have been enough time for the users to understand, appreciate, and accept the system. It is equally important to note that a “revolutionary” approach was avoided, particularly in software development. The initial design was kept as similar in layout as possible to the paper-based forms. This helped to initiate the implementation process without unnecessary conflicts.

Software makes the work lot easier for the staff & enhances their efficiency. Periodic review makes sure the proper functioning of the software

10 CONCLUSION

A good level of acceptance and awareness towards the system is required in the hospital for its successful implementation. The hospital required HIS Phase 2 implementation in departments like- Blood bank, OT, CSSD, Linen and Laundry, MRD, EHR, Equipment maintenance, Housekeeping departments. . For this external agency provided basis set-up for software. Due to the discrepancies in software and pattern of record maintenance in the department, changes were made. It is very crucial to have a consideration to the resistance that is still occurred during early phase. Department raised issues while recording the data related to patient and report generation, and the changes to be made were recorded in Issue Tracker. The changes were made and implemented and staff was trained and was supplied with User Manual to make system User-friendly. Early involvement of employees/staff leads higher level of user acceptance. The factor of system design of user interface should not be overlooked as it is one of the factors that leads to successful of the system implementation Hence the data entry system helped to make workflow easy, effective and efficient.

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