

**Summer Training at
Fortis Hospital,
New Delhi**

**Study of Waiting Time in a Multiple Server Queuing Model at Front Desk of
FHSB and Ways to Reduce the Wait Time**

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**Under the guidance of
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**MBA Hospital and Health Management
2015-2017**



**The IIHMR University, Jaipur
2016**

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Dr. Garima Kalra** student of **MBA Hospital and Health Management** from the IIHMR University, Jaipur has undergone summer training at **Fortis Hospital, Shalimar Bagh (New Delhi)** from 1st April to 31st May, 2016.

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

The Internship is in fulfilment of the course requirements.

I wish her all success in all her future endeavours.



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TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Garima Kalra** has successfully completed her training from **1st April 2016 to 31st May 2016** in **Medical Administration** of this hospital. She has duly completed her case project on **"Analysis of Queuing Time at Front Desk"**.

Any information used to complete the project is the intellectual property of Fortis Hospital Shalimar Bagh and hence should not be used for any other purpose.

During the training her performance was good.

We wish her all the best for all her future endeavors.

For **Fortis Healthcare Ltd**
Fortis Hospital, Shalimar Bagh



Rohit Anand
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 **Fortis SPECIALITY** Hospital

ACKNOWLEDGEMENT

I take this opportunity to express my profound sense of gratitude and indebtedness to all those who helped me throughout the duration of the project.

The study has been a novel learning experience as being a first exposure to hospital industry. This study helped in understanding and learning the hospital setup, its various departments, their functioning and their interrelations. However, none of this would have been ever possible without the priceless support of several people. I express my deepest gratitude to all of them who have made this endeavor a success.

I own my profound gratitude to Dr Rajeev Nayyar (Medical Director) for his keen interest, constant guidance, encouraging appreciation and solemn advice throughout the project.

I am highly obliged to Dr S.D. Gupta (Director, IIHMR Jaipur) Col. (Dr) Ashok Kaushik (Dean Academics and Student Affair, IIHMR Jaipur) for providing such a great opportunity. I am also thankful to my mentor Dr Monika Chaudhary for being a constant source of guidance and support.

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ACRONYMS/ABBREVIATIONS

ANM- Auxiliary Nurse Midwife

EUS- Endoscopic Ultrasound

ECBC- Energy Conservation Building Code

ERCP's- Endoscopic Retrograde Cholangio Pancreatography

FHL-Fortis Healthcare Limited

FHSB-Fortis Hospital Shalimar Bagh

FICCI- Federation of Indian Chambers of Commerce and Industry

GNM- General Nurse Midwife

GRIHA- Green Rating Integrated Habitat Assessment

IPD- In-Patient Department

MLC- Medico-Legal Cases

MRD- Medical Record Department

OPD- Out-Patient Department

PCS- Patient Care Services

REL-Religare Enterprise Limited

GDA- General Duty Assistant

HDU- High Dependiant Unit

INTRODUCTION TO FHL



Fortis Healthcare Limited is a leading integrated healthcare delivery service provider in India. The healthcare verticals of the company primarily comprise hospitals, diagnostics and day care specialty facilities. The company operates its healthcare delivery services in India, Dubai, Mauritius and Sri Lanka with 54 healthcare facilities (including projects under development), approximately 10,000 potential beds and 260 diagnostic centers.

Vision

“Saving and Enriching Lives”

Mission

"To be globally respected healthcare organization known for Clinical Excellence and Distinctive Patient Care”

Values

- Patient Centricity
- Integrity
- Teamwork
- Ownership
- Innovation

Board of Directors

- Mr. Malvinder Mohan Singh (Executive Chairman, FHL)
- Mr. Shivinder Mohan Singh (Non Executive Vice Chairman, FHL)
- Mr. Sunil Godhwani (Chairman and M.D. REL)
- Mr. Harpal Singh (Mentor and Chairman Emeritus, Fortis Healthcare)
- Dr. Brian W Tempest (Chairman, Religare Capital Market)
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- Ms. Lynette Joy Hepburn Brown
- Pradeep Ratilal Raniga
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- Shradha Suri Marwah

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- Mr. Daljit Singh (President, FHL)
- Mr. Bhavdeep Singh (CEO, FHL)
- Mr. Gagandeep Singh Bedi (Group Chief Financial Officer, FHL)
- Mr. Rahul Ranjan (Company Secretary, FHL)
- Mr. Rajiv Kapoor (Executive Vice President, Chief People Officer, FHL)
- Dr Bishnu Panigrahi (Senior Vice-President, Medical Operations, FHL)

INTRODUCTION TO FORTIS HOSPITAL SHALIMAR BAGH



Fortis Hospital, Shalimar Bagh, New Delhi, is a multi-super specialty Hospital offering super specializations within departments, with the mission of providing quality medical care. It commenced its operations in 2010 and serves the residents of North, West and North-West Delhi, and the neighboring states.

The hospital is equipped with 262 beds and is spread over an area of 7.34 acre with built up area of 3.87 lakh sq. ft, brings a wealth of medical expertise with the finest talents amongst doctors, nurses, technicians and management professionals in an environment that enables them to deliver the highest quality of healthcare through state-of-the-art facilities that aims at leaving no stone unturned in enhancing patient centric care.

Fortis Hospital, Shalimar Bagh, strives to be the champion for quality and patient centricity and is an NABH accredited hospital. It is the first hospital building in India to have registered for the green building rating system. It has been designed as an energy efficient building that compiles with the ECBC and is undergoing TERI GRIHA green rating certification. The hospital has received 3 Star rating for its building by the Bureau of Energy Efficiency, Government of India, under the Ministry of Power, making it only hospital from Delhi to receive such recognition. Federation of Indian Chambers of Commerce and Industry (FICCI) has recognized the hospital's excellence in branding, marketing and building with the FICCI Heal 2015.



National Accreditation Board for Hospitals & Healthcare providers

- NABH is a constituent board of Quality council of India, structured to cater to much desired needs of the consumers and to set Benchmarks for Progress of health industry.
- The standards provide framework for quality assurance and performance improvement of hospitals.
- The Standard focus is on Patient safety and quality of care.
- There 10 Chapters in the NABH book, which comprise of two Major aspects of Healthcare delivery

Patient Centered	Organization centered
1. Access, Assessment and Continuity of care.	6. Continuous Quality Improvement
2. Care of Patients	7. Responsibility of Management
3. Management of Medication	8. Facility Management and Safety
4. Patient Rights and Education	9. Human Resource management
5. Hospital infection control	10. Information Management system

Hospital Overview:

- **FHSB** – is divided into 2 Blocks, A - block & B – block, and now recent development is the Fortis Cancer Institute, which maybe named C – block.
- Further, again the Departments are divided Floor wise, which is as follows:

FLOOR	WING A	WING B
LOWER BASEMENT	Parking for hospital staff	Parking for hospital staff
UPPER BASEMENT	Materials, Stores, Time office, BMW Dept, Mortuary,	H.R, Administration, Marketing, IT, House-keeping , MRD, Biomedical engineering dept, CSSD, Laundry, Dietitcs, In Patient Pharmacy, Blood Bank, Laboratory, Café Jamjaajee
GROUND FLOOR	Radiology, ATM, Waiting Area, Investigations and Diagnostic Area , Emergency Dept, IVF Dept	Reception, Registration, OPD's, Patient waiting areas, cafeteria for patients and attendants, CCD, Prayer Room, International lounge, Doctor's Lounge, PWD-Patient welfare dept., Out Patient Pharmacy.
FIRST FLOOR	Opds, mammamia, LDRs, NICU Wards (1B2)	
SECOND FLOOR	Wards (2B1 & 2B2)	Opd Dialysis Unit, Endoscopy Rooms , OT
THIRD FLOOR	Wards (3B1 & 3B2)	Cath lab, CCU, Cardiac opd
FOURTH FLOOR	Wards (4B1 & 4B2)	MICU, SICU, PICU
FIFTH FLOOR	Deluxe Rooms, Suites, Presidential suite.	OT Complex, CTVS ICU

- Some Departments at FHSB are Outsourced, like :
 - IVF- Dr. Gauri and team
 - Lab : SRL
 - RADIOLOGY : ATULAYA

Top Specialties

- Bariatrics
- Mental Health and Behavioral Sciences
- Plastic/Cosmetic Surgery
- Nephrology-KTP
- Obstetrics and Gynecology
- Cardio Thoracic and Vascular Surgery
- Orthopedics and Joint Replacement

Clinical Specialties

- | | |
|---|---|
| 1. Anesthesiology | 20. Mental Health and Behavioral Sciences |
| 2. Bariatric | 21. Minimal Access Surgery |
| 3. Cardio Thoracic and Vascular Surgery | 22. Neonatology |
| 4. Cardiology | 23. Neurosurgery |
| 5. Clinical Nutrition and dietetics | 24. Nephrology |
| 6. Critical Care | 25. Obstetrics and Gynecology |
| 7. Dentistry and Maxillo-Facial Surgery | 26. Oncology |
| 8. Dermatology | 27. Ophthalmology |
| 9. Diabetes and Metabolic Disorders | 28. Organ Transplantation |
| 10. Emergency Medicine | 29. Orthopedics and Joint Replacement |
| 11. ENT | 30. Pediatric Surgery |
| 12. Endocrinology | 31. Pediatrics and Neonatology |
| 13. Fetal Medicine | 32. Physiotherapy and Rehabilitation |
| 14. Gastroenterology and Hepatology | 33. Plastic/ Cosmetic Surgery |
| 15. General and Laparoscopic Surgery | 34. Pulmonology/Respiratory Medicine |
| 16. GI and Hepatobiliary Surgery | 35. Radiology |
| 17. Hematology | 36. Rheumatology |
| 18. IVF | 37. Urology |
| 19. Internal Medicine | |

Connectivity of Floors

- Lifts: There are total of eight lifts in the hospital which has different capacity.
- Stairs: There are total of nine staircases. Two staircases go on basement rest are to go up from ground floor.
- There are no ramps.

Fire Safety System

There are various are safety equipment in OPD and IPD which includes

- Fire Extinguisher and Hose reel
- Hydrant System
- Fire Detection System (Smoke Detector, Heat Detector, MCP, Hooter cum Flasher, Fault isolator)
- Fire alarms (Code Red)
- Emergency fire exits – there are nine fire exits in the hospital

Different Codes

- Code Blue – Individual Disaster. Dial 77
- Code Red – Fire. Dial 88
- Code Grey – Internal Disaster. Dial 88
- Code Pink – Baby Missing. Dial 88
- Code Purple – Fight/Physical Altercation. Dial 88
- Code Yellow- External Disaster. Dial 88
- Code Orange-Hazmat Spill. Dial 5062(Hazmat team)

DEPARTMENTAL DETAILS



EMERGENCY DEPARTMENT

The Dept. of Emergency Medicine at FHSB is a dept with the most modern life support systems and manned by highly qualified paramedics with knowledge and skills to evaluate and stabilize patients who seek emergency medical care, especially those with potentially lethal and serious conditions.

Due to the unplanned nature of patient attendance, this department provides initial treatment for a broad spectrum of illness and injuries, some of which may be life threatening and require immediate attention, except for major burns.

It is located at the ground floor with its own dedicated entrance and operates 24 hours a day.

Patients are either transferred to other departments or are discharged within 4 hours.

Infrastructure

- 16 bedded triage
- Doctor's working station
- Hospital information system
- Urgent care area
- Observation area
- Doctor's Work Station
- Resuscitation suite
- Store room
- Waiting area for patient's attendants is outside the department

Staffing

- Senior Consultant
- Team Leader
- Emergency Physicians
- Nurses
- Emergency Reception
- GDAs
- Paramedical staff for ambulance
- Security personnel

OPERATION THEATRE COMPLEX

(CERTIFIED AS GREEN OT) by ISO 9001 BUREAU VERITAS

This unique certification ensures that the Operation theatres of this hospital adhere to

- Staff training & safety awareness protocols in Anesthesia.
- Use of environment friendly anesthesia techniques.
- Patient & OT staff health friendly anesthesia filling systems.
- Efficient scavenging systems & good waste disposal capabilities.

It is located at the topmost and the fifth floor of the hospital in A wing of FHSB for being independent of general traffic flow.

It has 8 Operation theatres where surgical operations are carried out in a sterile environment in which 7 are used for routine surgeries and the 1 is kept free for emergency surgeries if arrive.

On an average basis, approx 18-20 surgeries are performed in a day from 8am to 8pm, however Emergency services are available round the clock

Several operating rooms are part of the operating suite that forms a distinct section within a health-care facility. Besides the operating rooms and their wash rooms, it contains rooms for personnel to change, wash, and rest, preparation room and recovery rooms, storage and cleaning facilities, scrub stations, dedicated corridors, offices, administrator room.

It is connected to CSSD through Dumb waters; one is used to carry sterile goods and another for carrying used instruments.

Personnel Engaged are-

Anesthetists- 8

Surgeons

Staff Nurses-26(circulating and scrub nurses)

OT Coordinator-1

Nurses at PSU-4

Technician-14

OT admin-1

MAJOR EQUIPMENTS OWNED AT OT COMPLEX

LAP SETS-3

C ARMS-3

NEURO MICROSCOPE

ENT MICROSCOPE

OPTH MICROSCOPE

PLASTIC MICROSCOPE

MAJOR COLPOSCOPE

LASER MACHINES

STEOREOTENTIC FRAME

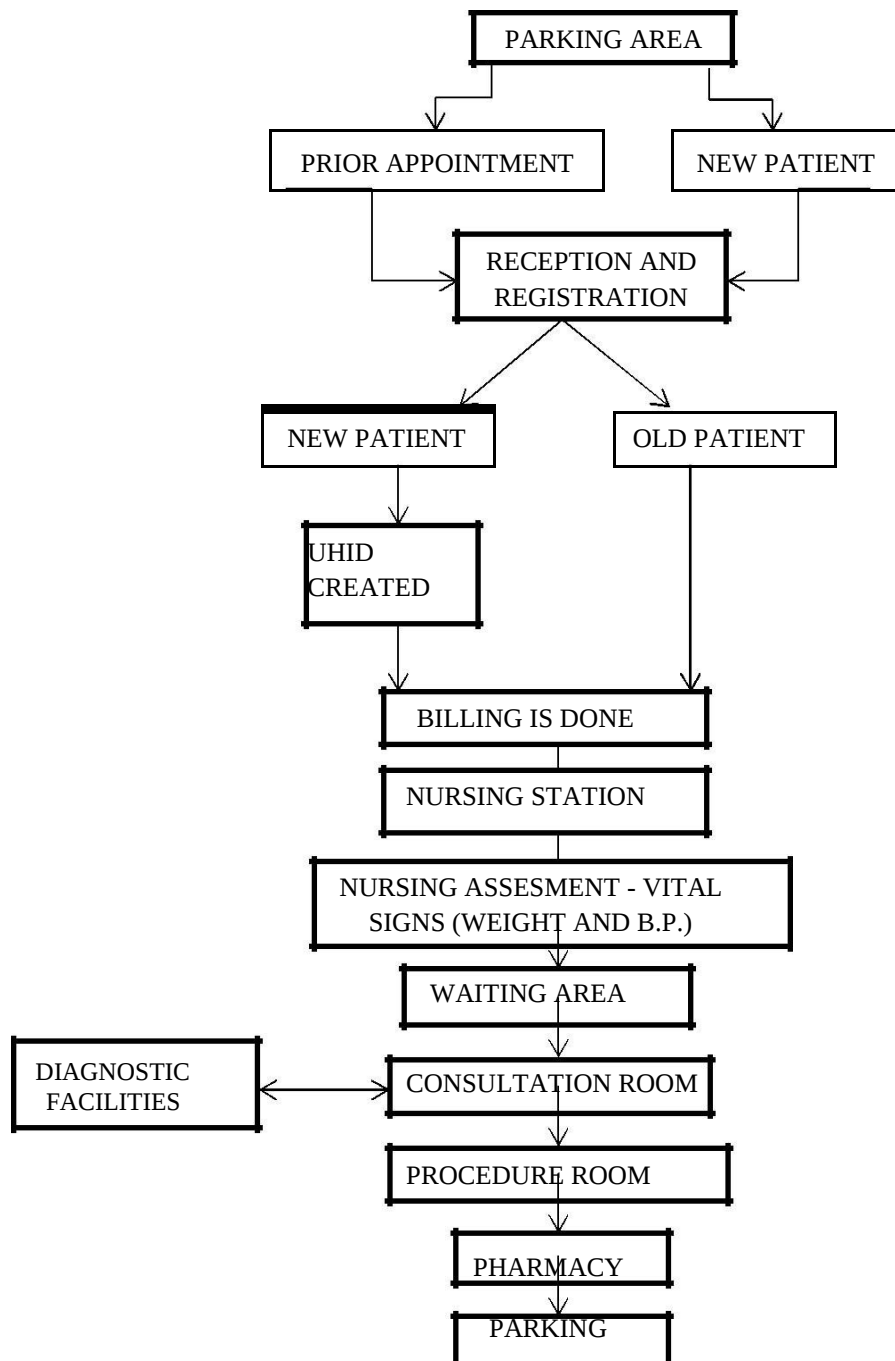
ADMINISTRATIVE ACTIVITIES

Preparation of operation schedule
Preparation of OT list
Requisition of patient
Identification of patient, part and records
Shifting patient to OT
Preparation for doctors and assisting staff

OUT-PATIENT DEPARTMENT

- OPD is distributed over four floors (ground-3rd floor) in A wing of Fortis Hospital.
- Every floor has a procedure room and a front desk.
- Appointments are centralized and are recorded on the Hospital Information Management System. As soon as appointments are fixed, a text message is sent to the patient confirming the appointment. No walk-in patient is turned away, and staffs try to accommodate these patients between the appointments already scheduled for the day.
- Each OPD has a waiting area of a capacity to handle 50-100 patients waiting.
- On an average, FHSB handles an opd of around 300 patients from 8am – 8 pm.

OPD PROCESS FLOW



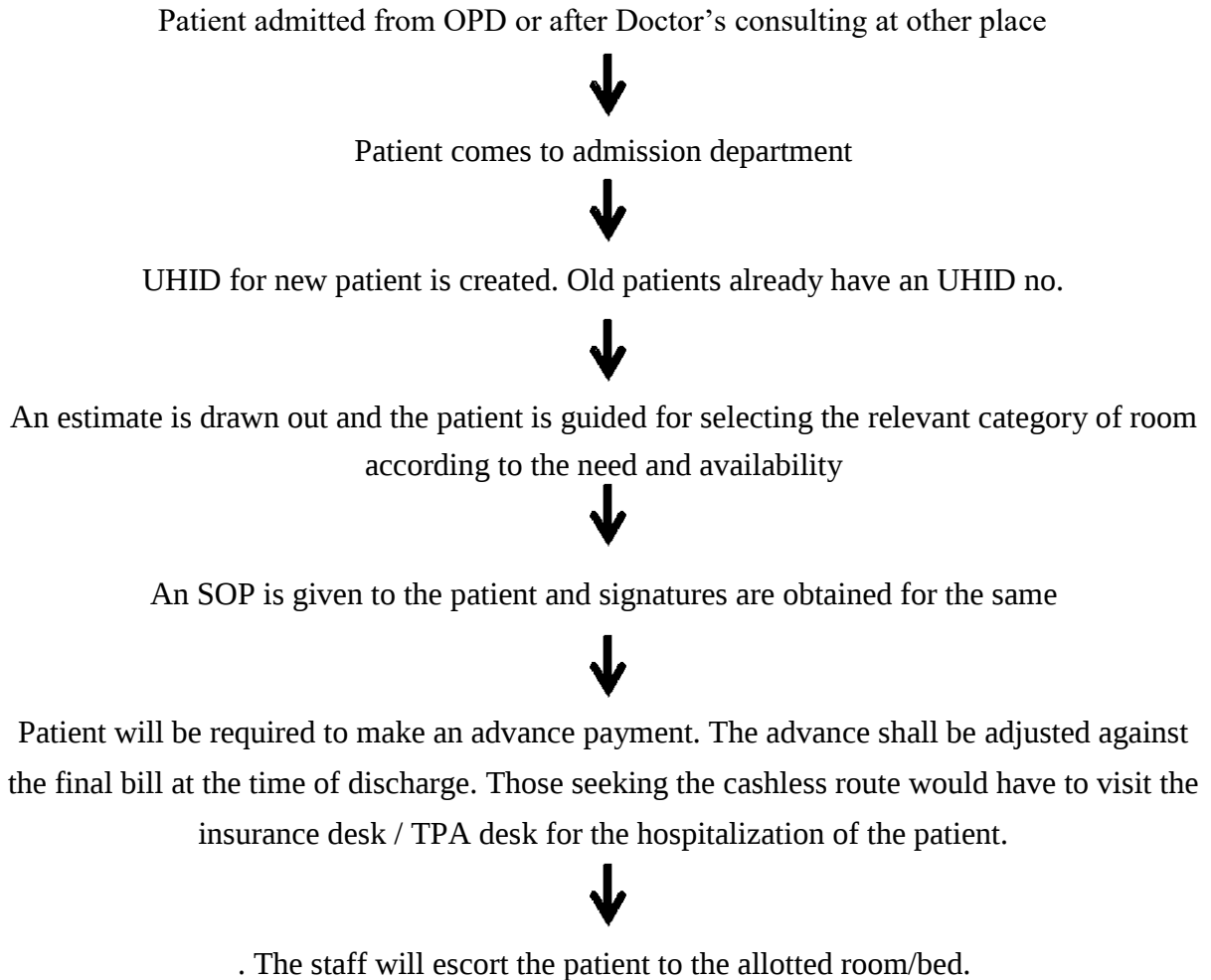
IN-PATIENT DEPARTMENT

- IPD is distributed over four floors (2nd-5th) in B wing of Fortis Hospital including a total no of 262 beds.
- Every bed side has :
 - Details of Consultant and nurse written on top of every bed.
 - Room Equipment checklist.
 - Important Instructions
- Every Floor has central nursing station with information board covering
 - Designation and contact no. of
 - Duty Doctor
 - Administration Staff
 - Support Staff
 - Nurses' names with shift timing and designation
- Nurses to bed ratio is 3:1
- TAT for cash patient is 3hrs and for a cashless patient is 5hrs. ALOS for simple Laparoscopic surgery is 2 days.
- GDAs (General Duty Assistants) – 4 on every floor in every shift.

Break-Up of Rooms

TYPE OF ROOM	NO OF ROOMS
• Presidential Suite	1
• Suite	3
• Deluxe Room	9
• Single	43
• Twin Sharing	60
• 4 Bedded Ward	40
• Economy Ward	36

Admission Process



STAFF

Admission Personnel – 5

Qualification Required – Graduation

On Admission Desk they also provide attendants pass to patients.

Discharge Process

The nurse will assist patient in the discharge process which may take few hours to complete the process.



Once the final bill is generated, patient is expected to clear the dues by paying cash or by a credit/debit card.



The nurse will hand over patient's discharge summary and other belongings (like thermometer, urinal bedpan, etc.--used during the course of stay).



The nurse will then explain the medication that patient needs to continue after discharge and any other follow-up instructions.



In case patient needs a medical ambulance to drop them at their home, then they need to inform the nurse and he/she will make the necessary arrangement.

INTENSIVE CARE UNIT (ICU)

There are total of 4 ICUs in FHSB naming MICU (Medical ICU), SICU (Surgical ICU), PICU (pediatric ICU) and NICU (Neonatal ICU)

PICU, MICU and SICU are located at the 4th Floor in the A wing of FHSB.

NICU is located at 1st floor in B wing.

There are total of 17 beds in MICU, 6 in HDU (High Dependent Unit) and 22 beds are there in SICU, with the remote controlled system and alpha beds if required for patients. The beds are separated by curtains which provide privacy and also soften the look. For patients to be kept in isolation there are isolation rooms 1 in MICU and 2 in SICU.

Every ICU has work stations, storage, equipment area and patient movement area. And every bed is provided with bedside outlets like oxygen, vacuum and compressed air outlets, vital monitoring device etc.

Various important records are to be maintained are:

- MICU communication record
- SICU communication record
- Multi disciplinary meet record
- Patient shift out parameters
- Apache record sheet

Shift out process flow-

When a patient gets recovered and his condition follows all shift out parameters which are required for the transfer of patient from ICU to Wards these steps are followed-

Treating doctor make remarks on doctor notes



Nursing staff to send room shift clearance in counseling by attendant



Counseling after clearance stamp and sign on clearance paper



Attendant submit clearance sheet to respective nurse time recorded



Room allotted by IPD desk patient shifted to room



RMO of wards informed, nursing supervisor informed, respective treating doctor informed.

Central Sterile Supply Department

- Supportive, non-medical service department
- Provides sterile devices, equipment, to the departments like operation theatre, cath lab and others
- Service utilization
 - 80% to the OT
 - 10% to the Cath Lab
 - 10% to Ophthalmology and E.N.T. department
- Divisions of the area
 - Receiving Area
 - Washing Area
 - Decontamination Area
 - Sterilizing Area
 - Sterilized Area
- Process Flow
 - Receiving
 - Checking the list and the number of equipment
 - Signed received
 - Cleaning
 - Through tap water
 - Dismantled
 - Soaked in enzymatic solution for 10mins in two different containers
 - Machine cleaning
 - Dismantled equipment put into the ultrasound machine
 - Dried after ultrasound machine for 10mins
 - Washer disinfectant
 - For heavy machinery and trays
 - Washed and dried in machine
 - Sterilization
 - Reassembled, checked by the list

- Packed in a tray
 - Doubled packed in inner sterile cloth outer normal cloth
 - Put on a name coded sticker with a temperature color bar
 - Put in to sterilizer
- Manpower
 - 15 staff
 - 6 housekeeping staff
 - Minimum of 5 people for every procedure ○ One stand by person
 - Requirement – 20-25 staff
- Staff Training
 - A month training before the person joins the department
 - Once on floor, supervised for another month ○ Continuous classes are organized

CATH LAB

- Procedures done – Angiogram, PTCA, Ballooning, Stunts, Pacemaker, EPS (diagnostics and therapeutic)
- Time taken
- Diagnostic – 30-45mins
 - Therapeutic – 1-2hrs
- Number of Procedures – 10-15 procedure done in a day including emergencies
- Consent form
 - Filled at the time of admission in case of day care procedure, on the table in case of emergency, and in wards in case of IPD patient
- 22 beds and 2 isolation room
- Human resource involved
 - 15 staff
 - 3 full time cardiologist

DIALYSIS UNIT

- Day care procedure
- Bed turnaround time for a procedure 4 hours
- 11 dialysis machines
- 900+ dialysis per day
- Manpower – 14
- Inflow of Patient
 - Mostly OPD ○ IPD

ENDOSCOPY

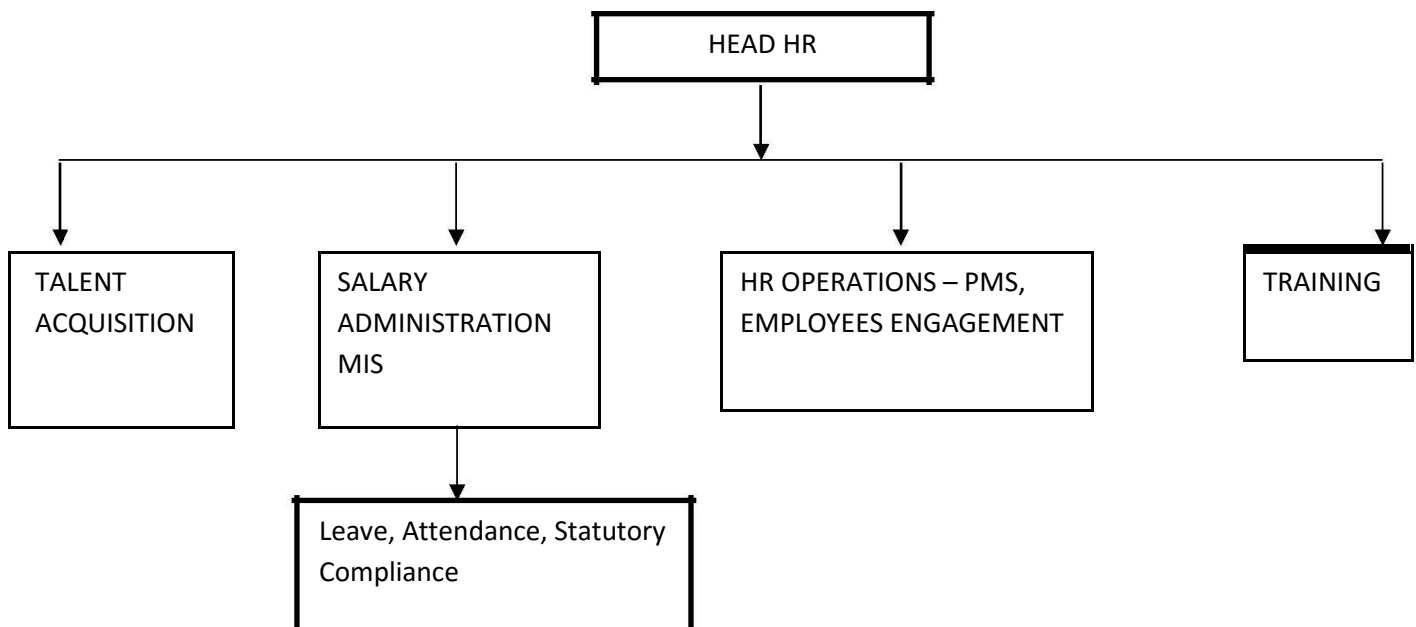
- It is located on 2nd floor
- Procedures per day
 - 20-25 Endoscopy ○ 5-8 colonoscopy ○ 2-3 EUS
 - 2-5 ERCP's
- Process Flow
 - Doctor's prescription is seen and reports are checked
 - Vitals are measured
 - Ultrasound is done
 - Medicines according to the procedure are given ○ Procedure is performed
 - Patient is kept in observation
 - Patients is discharged and reports are given

BLOOD BANK

- FHSB has its own blood bank. All blood groups are available. But it is preferred that patient arranges blood through his relatives or any friend and should give replacement.
- Blood bank consists of
- Sample collection area / reception area : In reception area a form is given to the attendant of the patient regarding their details before he/she donates blood.
- Apheresis area: blood has several components including red blood cells, platelets and plasma. Donor apheresis is a special type of blood donation in which a specific component platelet, plasma is withdrawn from donor
- Component room: in component room the whole blood is separated into packed cells FFP and platelets.
- TTI room: it is to diagnose transfusion transmitted infections. If donor is detected positive of TTI status it means donor have potential to transmit the infection to their partner and children.
- Issue room: This room is to issue the screened blood bags.

HUMAN RESOURCE DEPARTMENT

Functional Organization Structure



The goal of the department is to ensure availability and retention of quality talent to meet the organization goals and objectives and overall growth and development of employee's orientation and functional training.

Scope of Services

- Manpower planning
- Recruitment process
- Internal job posting process
- Pre-employment health check up
- Training
- Attendance and leave management
- Appraisal and promotion process
- Statutory compliance
- Employee welfare programs
- Disciplinary Actions
- Grievance Control
- Payroll management
- Budgeting

MEDICAL RECORDS DEPARTMENT

The goal of this department is the collection of all the discharged/expired health record charts. The Medical Record Department staff ensures the confidentiality, preservation, storage and retention of the patients. Medical records are given only to authorized person with their due signature on the medical record requisition slip. It is mandatory to inform (register) birth and death cases within 21 days of occurrence to Government Bodies. All records are destructed by shredding the documents.

Medical record of discharge patient should reach the Medical Record Department in time frame of 48 hours.

Retention period of Medico-Legal Case File is 10 years. MLC, legal and death cases files are kept under lock and key in MRD.

Retention period of normal file is 5 years.

Documents maintained by the department

- IPD/OPD files receive register
- IPD file dispatch register
- OPD file dispatch register
- Death Register
- Birth Register
- Discharge Summaries

Scope of Services

- Record Collection
- Analytical Evaluation
- Storage
- Data generation
- Retrieval

MEDICAL GASES

This department is situated on the upper basement of FHSB. This department's chief responsibility is to ensure the timely provision of all the medical gases where ever they may be required. This department is responsible for all the inventory control of the following gases:

- Oxygen
- Carbon Dioxide
- Nitrous Oxide
- Compressed Air
- Nitrogen

This department is also responsible for maintaining inventories of the cylinder that may be used during patient transport. The color coding of these cylinders are

- Oxygen – Black with white neck band
- Nitrous Oxide – French Blue
- Compressed Air – Grey
- Nitrogen – Grey with black neck band
- Carbon Dioxide – Black with silver neck band

WASTE MANAGEMENT SYSTEM

Color	Waste Description	Disposal Method
Red	Infected plastics	Autoclaving
Yellow	Human Tissue ,all gauze soaked in body fluid	Incineration
Blue	Unbroken glass bottles	Direct disposal
Black	General office waste	Direct Disposal
Green	Kitchen waste	Direct Disposal
Pink	Infected linen	Laundry

PWD : PATIENT WELFARE DEPARMENT-

Since its inception Fortis Healthcare has been aspiring to track patient satisfaction and feedback through our Patient Welfare Program. Fortis healthcare has an established PWD and the welfare officers, termed as the pink ladies – due to their uniforms act as liaisons between the patients/customers and the hospital. They are patients advocates or representatives striving to provide solutions to any problem they may encounter here at Fortis

MATERIALS/ STORES/PURCHASE

This dept is responsible for purchase storage of Medical Consumables, Stationary, Medical equipments, Pharmacy stores, its aim is to provide right item at the right time at the right price and quantity. Here at Fortis we have a CBU-Central Buying Unit that procures all the orders. Functions of this dept. are Procurement, Storage, Distribution.

BIOMEDICAL ENGINEERING

This dept. is again a very important part of the hospital as it helps FHSB to maintain its world class services by using world class equipments, flawlessly. It looks after all the medical devices and equipments.

CAFÉ JAMJAAJEE

Situated at Upper Basement, the canteen of the Hospital, the unique name lies in the history and Values of Fortis and Fortis culture. A well arranged cafeteria where the staff members have their meals daily.

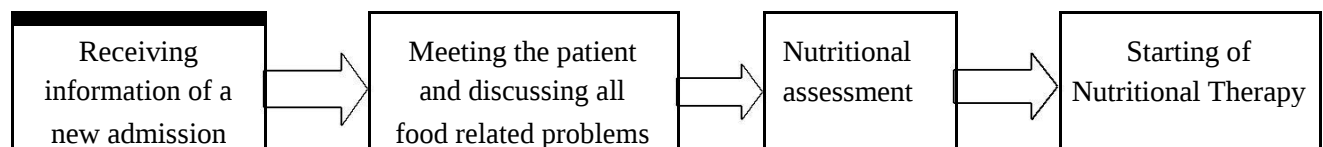
DIETETICS, FOOD AND BEVERAGES

These offices are situated on upper basement of FHSB. These departments are tasked with managing the dietary needs of the patients and the staff. The Food and Beverage department of this hospital has to be able to serve close to 2000 meals per day.

In order to be able to cater to delicate yet crucial needs of all the patients coming to the hospital, most of the functions of are outsourced. With respect to ensuring quality of services hospital maintains a service level agreement with the partnering company, and both strive jointly towards maintaining the quality of standards. There are representatives that keep a check on any issue that may crop up.

The dietetics department is tasked with the specialized function of ensuring that a patient is not presented with a meal that may not be in compliance with the treatment that the patient has come to FHSB for. To be able to deliver on this front, dietician's role includes checking the diet of all the patients periodically, going on rounds of the patients and coordinating with the kitchen in order to ensure the provision of the right quality food to the patients.

Flowchart



PROJECT

A STUDY OF WAITING TIME IN A MULTIPLE SERVER QUEUING MODEL AT FRONT DESK OF FHSB AND WAYS TO REDUCE THE WAIT TIME

INTRODUCTION

A hospital is an integral part of a social and medical organization, the function of which is to provide for the population complete healthcare, both curative and preventive and whose outpatient services reach out to the family and its home environment the hospital is also a center for the training of health workers and bio-social research.

Out Patient Department (OPD) is considered as the window of hospital services and a patients impression of the hospital begins at the OPD. The impression often influences the patient's sensitivity to the hospital and therefore it is essential to ensure services provide an excellent experience for customers.

The front desk at a clinic or hospital creates the first and the last impressions in their minds. An efficient and friendly customer care service or staff can make all the difference in creating a comfort level for the clients. Training of this team lacks in most of the hospitals, which is where they tend to lose patients or get a negative feedback. ²

A common situation that occurs in everyday life is that of queuing or waiting in line. Queues (waiting lines) are usually seen at bus stops, hospitals, bank counters and so on. In general, queues form when the demand for service exceeds its supply.

The study throws light into finding out the various problems hindering the functions of the front desk, factors responsible for increase in waiting time for the patients and ways to meet the expectations and needs of patients who walk into the OPD and helps the hospital management to gain insight into how the services should be designed and delivered to satisfy and retain them.

Having an efficient hospital queue management system at a health care institution is of utmost importance, especially when the patients visiting the facility are either in pain or frail health, making it difficult for them to queue for long periods of time until a medical practitioner is available to treat them.

The rising population and health-need due to adverse environmental conditions have led to escalating waiting times and congestion in hospitals

- Patients waiting time occur long at the front desk of the hospital.
- Patient appointments will overlap.
- Patients could prefer another health clinic due to improper management

Hospital may face the problematic outcomes including:

- Time wasted due to missed appointments;
- Loss of patients and income to other professionals because patients do not feel welcome at the front desk;
- Loss of referrals and reputation when patients report to others their negative experiences with the front desk; or
- Possible filing by patients of a grievance or report of discrimination based on treatment by the front desk.

LITERATURE REVIEW

A study of nearly 35,000 online reviews of physicians nationwide has found that customer service is patients' chief frustration, not physicians' medical expertise and clinical skill.

The study, published in the current issue of the JOURNAL OF MEDICAL PRACTICE MANAGEMENT, Reveals that 96 percent of patient complaints are related to customer service, while only 4 percent are about the quality of clinical care or misdiagnoses.¹

The Front office or reception is an area where visitors arrive and first encounter a staff at a place of business. Front office staff will deal with whatever question the visitor has, and put them in contact with a relevant person at the company. Broadly speaking, the front office includes roles that affect the right side (revenues) of trading statement of the business.

A common situation that occurs in everyday life is that of queuing or waiting in line .Queues (waiting lines) are usually seen at bus stops, hospitals, bank counters and so on [7]. In general, queues form when the demand for service exceeds its supply [5].

Wait time depends on the number of customers (human being or objects) on queue, the number of servers serving line, and the amount of service time for each individual customers.

In healthcare institutions the effect of queuing in relation to the time spent for patients to access treatment is increasingly becoming a major source of concern to a modern society that is currently exposes to great strides in technological advancement and speed.

The danger of keeping customers waiting could become a cost to them [6]. The time wasted on the queue would have been judiciously utilized elsewhere (opportunity cost of time spent in queuing).

In a waiting line system, managers must decide what level of service to offer. A low level of service may be inexpensive, at least in the short run, but may incur high costs of customer dissatisfaction, such as lost of future business.

A high level of service will cost more to provide and will result in lower dissatisfaction costs. When considering improvements in services, the health care manager weighs the cost of

providing a given level of service against the potential costs from having patients waiting .The goal of queuing is therefore to minimize the total cost to the system.

$$S = P - E$$

In this formulation, ‘S’ stands for satisfaction, ‘P’ for perception and ‘E’ for expectation. If you expect a certain level of service, and perceive the service reviewed to be higher, you are a satisfied client. If you perceive the same level as before, but expected higher, you are disappointed and, consequently, a dissatisfied client.

QUEUING THEORY

Queuing theory is the mathematical approach to the analysis of waiting lines in any setting where arrival rate of subjects is faster than the system can handle. It is applicable to healthcare settings where the systems have excess capacity to accommodate random variations.

This is an operational research technique to quantify the waiting time of patients in each specialty and suggest alternate solution to reduce the queue and waiting time. The queuing theory has been developed in the attempt to answer the behavior of queue, average waiting time and average time spent in the system. To study the queue one has to collect data of pattern of arrival of clientele, interval between the clients or we should know the arrival pattern and service time. The objective of knowing queuing theory is to determine:

- How many channels are required to provide that average given length will not be unreasonable?
- How to schedule arrival so that queue length does not fluctuate too much.
- The cost of queue and cost of service should be beneficial.⁴

It is possible to regulate the length of queue by using the following formula. This formula helps in deciding accurate number of staff requirement also. A balanced approach to queue management is to reconcile to-

- (a) A predetermined mean queue length
- (b) Mean waiting time per patient (to be minimal) and
- (c) Minimal mean idle time for doctors.

The formula is as follows: Formula for mean queue length:

A - Mean arrival rate of patients per unit time

S - Mean service rate per unit of time

1/S - Mean service time per patient

Then mean queue length = $A^2 / S(S - A)$

Mean waiting time per patient in queue = $A / S(S - A)$

Doctor's utilization = A / S .

Queuing theory deals with the study of queues which abound in practical situations and arise so long as arrival rate of any system is faster than the system can handle.^{1,2} Queuing theory is applicable to any situation in general life ranging from cars arriving at filling stations for fuel, customers arriving at a bank for various services, customers at a supermarket waiting to be attended to by a cashier and in healthcare settings.^{3,4} Queuing theory can be applied to the analysis of waiting lines in healthcare settings. Most of healthcare systems have excess capacity to accommodate random variations, so queuing analysis can be used as short term measures, or for facilities and resource planning. Other use of queuing analysis and simulation in healthcare includes the following:

Walk-in patient clinic, emergency room arrivals, phone calls from physician office to health management organization, outpatient clinics and outpatient surgeries, physician offices, pharmacy, inventory control.

The need for application of queuing theory in healthcare settings is very important because the well being and life of someone is concerned. The time spent by a patient while waiting to be attended to by a doctor is critical to the patient and to the image of the hospital before the public.

Various attempts by the Federal Government of Nigeria to improve on health care services will not yield good results except the issue of time spent by patients at various hospital points is addressed

The aim of this report is to study the queuing system at the general outpatient clinic in relation to time spent by patients on the queue and patient satisfaction. The finding should be helpful in improving services at the clinic.

Definition of terms

1. Queue: Is an aggregation of items waiting for a service function
2. Arrival Rate: Is the mean rate of arrivals per unit of time and it is often denoted by the Greek letter lambda (λ)
3. Service Rate: Is the average number of service rendered per unit of time. It is always represented by the Greek letter Mu (μ)
4. Service Discipline: Gives the value by which customers to be served are selected.

Example:

- a. First come first served (FIFO)
- b. Last come first served (LIFO)
- c. Priority selection rule e.g., male or female customers first

Analysis of queuing situations and questions of interest, are those typically concerned with measures of system performance and include how long a customer expects to wait in the queue before being served or how long it will take to wait before service is complete .these are the factors that need to be defined and controlled by health practitioners so that management can evaluate alternatives in an attempt to control/improve queue situations.

It can be done by conducting specialized workshops and orientation trainings for the staff. They are the face of the hospital and the Gods of First Impression (first level to interact). It is their behavior, respect and hospitality which develop a sense of trust and reliability in the mind of strangers.

The quality of its staff, clinical and non-clinical is being continuously judged by them. A well-designed healthcare building, run by well-trained staff, can reduce stress levels in patients, visitors and staff and will enhance their experiences and perceptions of the healthcare setting.²

The availability of professional staff to meet, greet and assist patients and visitors is very important.

RATIONALE

Front desk of a hospital is the first point of contact of the hospital with the patients when the patient is coming to consult a doctor or avail any service. Apart from the quality of staff, equipment the main feelings and image carried by patients about hospital mainly depends on human aspect and the concern, sympathy and understanding shown by hospital staff.

Welcoming entrances and reception areas provides best practice guidance on how to enhance the experience of those visiting hospitals

This study is mainly based on reducing the waiting time of patients in the queues at front desk at Fortis Hospital.

Research question-

1. What are the factors affecting the waiting timings at front desk of OPD of Fortis Hospital?
2. What should be done to decrease the waiting time?

OBJECTIVES

1. To determine the average waiting time spent by the patient in the queue at front desk of OPD.
2. To analyze the factors those are responsible for queuing time at front desk in the OPD.
3. To recommend appropriate suggestions to reduce the queuing time at front desk in OPD.

RESEARCH METHODOLOGY

Research Design

Type of study-

Phase I - Descriptive (observational) research

Phase II - Analytical

Study Setting

The study setting was the front desk of the Fortis Hospital, situated in the Shalimar Bagh, North Delhi.

Study Scope

The study involved primary data collection prospectively from the front desk of the Fortis Hospital, Shalimar Bagh.

Type of Sampling

Non Probability Sampling

Study Sample

Patients visiting in month of May

Total Patients: 250

Inclusion criteria: Patients coming for billing and registrations

Exclusion Criteria: Patients came in queue for inquiry

Patients with more than 1 billing/invoice

FINDINGS

Study Population

The study population consisted of 250 patients from the front desk queues during a three week period.

AREA	GROUND FLOOR
NO OF SERVERS OBSERVED	4
NO OF PATIENTS	250
PARAMETERS MEASURED	QUEUING TIME AND SERVICE TIME

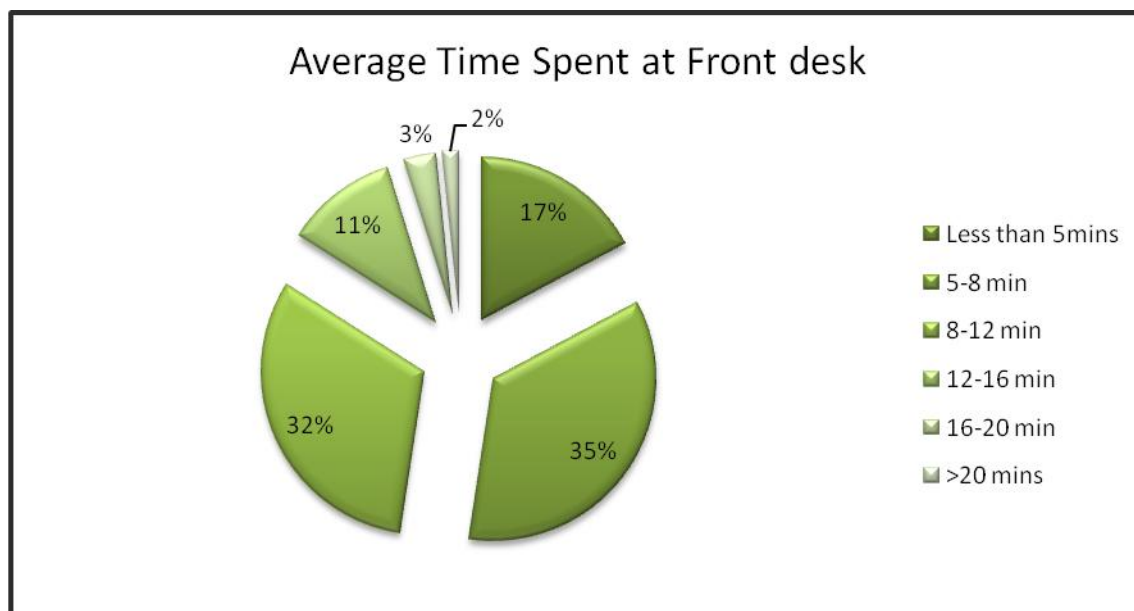
ETHICAL CONSIDERATIONS

The privacy of participants/patients will be protected by numerical coding to keep the responses and their identity confidential.

All study data will be kept confidential.

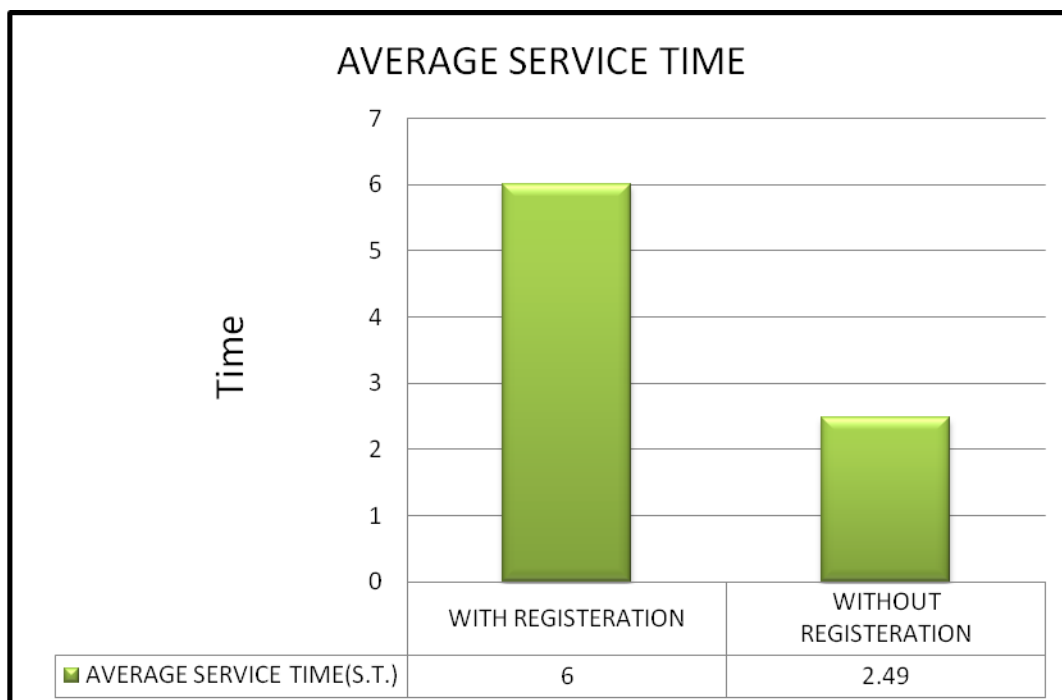
TIME SPENT AT FRONT DESK

Average Time spent at Front desk	Total	Percentage	Cumulative Percentage
Less than 5mins	43	17.2	17.2
5-8 min	88	35.2	52.4
8-12 min	79	31.6	84
12-16 min	28	11.2	95.2
16-20 min	8	3.2	98.4
More than 20mins	4	1.6	100



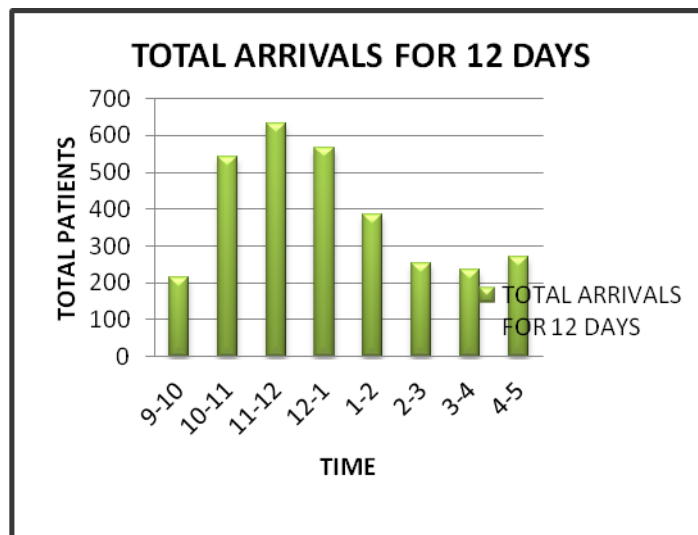
Distribution of Patients on the basis of registration and accordingly average service time calculation for the two situations-

Option	No of patients	Service Time (in min)
With Registration	57	6.00
Without Registration	193	2.49



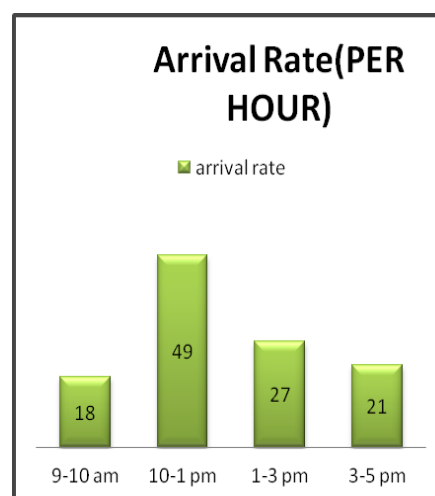
Arrival Rate counted Hourly For total of 12 days and the pattern is seen for arrival.

TIME INTERVAL	TOTAL ARRIVALS FOR 12 DAYS
9-10	214
10-11	542
11-12	633
12-1	565
1-2	384
2-3	252
3-4	235
4-5	270



According to arrival pattern Time Slot decided and Arrival Rate is calculated.

TIME SLOT	ARRIVAL RATE
9-10	18
10-1	49
1-3	27
3-5	21



COMPARISON BETWEEN EXPECTED WAITING TIME IN QUEUE TO THE ACTUAL WAITING TIME.

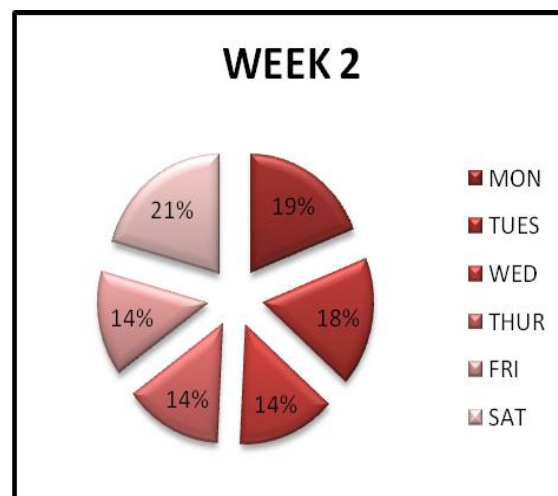
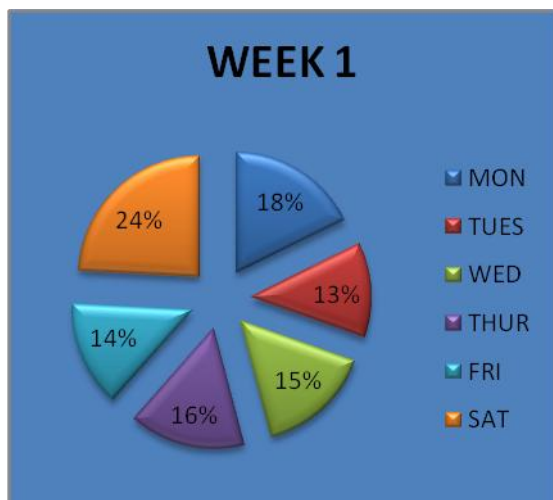
Time Interval	Arrival Rate(Per Hour)	Service Time(In Minutes)	Expected Waiting Time In Queue(In Min) No of server=4	Expected Waiting Time In Queue(in Min) No of server=3	Expected Waiting Time In Queue(in Min) No of server=2	Actual Waiting Time In Queue(In Min)
9-10 AM	18	3.3	.02	.15	1.11	1.69
10-1 PM	49	3.3	1.04	9.96	N.A	6.91
1-3 PM	27	3.3	.1	.53	4.29	4.83
3-5 PM	21	3.3	.04	.24	1.72	3.40

**COMPARISON BETWEEN EXPECTED TIME SPEND IN SYSTEM TO
THE ACTUAL TIME SPEND.**

Time Interval	Arrival Rate (Per Hour)	Service Time (In Min)	Expected Time Spend In System(In Min) No of server -4	Expected Time Spend In System(In Min) No of server=3	Expected Time Spend In System(In Min) No of server = 2	Actual Time Spend In System (In Min)
9-10 AM	18	3.3	3.36	3.48	4.44	5.02
10-1 PM	49	3.3	4.37	13.3	N.A	10.24
1-3 PM	27	3.3	3.43	3.86	7.62	8.16
3-5 PM	21	3.3	3.37	3.57	5.05	6.73

OPD PER DAY: RECORD OF 2 WEEKS

DAYS	NO OF OPDS IN WEEK 1	NO OF OPDS IN WEEK 2
MONDAY	325	319
TUESDAY	232	294
WEDNESDAY	283	239
THURSDAY	288	238
FRIDAY	261	241
SATURDAY	443	347



ARRIVAL PATTERNS ON MONDAY AND SATURDAY-

In FHSB, maximum percentage of patients visit OPD on Saturday followed by Monday. The arrival rates on front desk for registration and billing are maximum on these two days.

Time Interval	Arrival Rate Per Hour	Waiting Time In Queue(IN MIN)
9-10 AM	26	2.6
10-11 AM	61	11.2
11-12 NOON	68	12.3
12-1 PM	56	8.9
1-2 PM	44	8.4
2-3 PM	30	7.7
3-4 PM	25	4.8
4-5 PM	23	4.5

RECOMMENDATIONS-

1) Installment of proper display system/screen for floor wise OPD distribution.

OPD patients for 1st, 2nd and 3rd floor keep standing in queues at ground floor because they are not aware of the floor wise distribution (the board showing floor wise distribution gets unnoticed) **A screen display showing doctors' name and specialty for other floors' OPD should be installed right above the front desk** so that they don't spend time unnecessarily in queues of ground floor.

2) New registration takes more time. REGISTRATION FORM SHOULD BE GET FILLED BEFORE ENTERING IN QUEUE.

Service time for making invoice takes more time for new registration cases (**6.0 mins**) than already registered patients (**2.49 mins**) So patients standing in queue have to wait more if such patients are ahead of them and filling the registration form. **A table can be put at one side with the registration forms and forms should be filled there and if patients enter the queue with the filled form can save lot of time.**

3) Convert one more system into opd server counter on Mondays and Saturdays. As more arrival rate and more waiting time in queues is observed on Saturdays and Mondays, **converting 1 extra system into OPD server** just for these two days can solve the problem of queuing. If this could be **additionally supported by alteration in general evening shift from (10.30-7) to (9.30 -6.30) for 2 days only**, peak time rush starting around 10 could be handled easily with a total of 5 staffs and 5 servers.

4) Counters are different for patients coming with appointment and without appointment. If they are served accordingly then this could save more time for both kinds of patients.

5) Patients claiming for discounts take more time in service as there documents need to be photocopied every time. Some change in flow like **saving the documents in system for registered patients can save time.**

6) Gap in expected waiting time and actual waiting time. Not all the servers are working all the time and are not required when the rush/crowd of patients is less. But if arrival of patient is more, appropriate number of servers should work so that total system time of front desk does not exceed 5 minutes.

- 7) **Rails** separating the queues for different server if **arranged more appropriately** can reduce the crowd of people. A zigzag way of rails can be used so that only 1 customer (patient) reaches per server.



- 8) **Token system** could be introduced in the system which could reduce the crowd and will convert **Multiple server Multiple queue model into Multiple server Single queue** (enough waiting capacity is to be ensured first). For this token vending should be done as soon as patients arrives in hospital and should be called as per his turn and token no to be displayed at the counter.
- 9) Patients should be **encouraged to take appointments** before coming to consult a doctor in hospital. This will lessen both the service time and waiting time.
- 10) **Improving work flow and communication of staff**- providing staff with more of training sessions, not only theoretically but also practically focusing more on their attentiveness, promptness and general communication with the patients. Fix hellos and goodbyes as the first and last moments of a customer interaction are what a customer is likely to hold in memory as the permanent “snapshot” that encompasses the whole event.

CONCLUSION

Patients coming to hospital are responsible for spreading the good image of the hospital and therefore satisfaction of patients attending the hospital is equally important for management. Various studies about queuing time have elicited problems like- overcrowding, delay in consultation due to overlapping of appointments, proper behavior of the staff etc. This study throws light on the services provided by the hospital and the total time consumed at front desk.

Having an efficient hospital queue management system at a health care institution is of utmost importance, especially when the patients visiting the facility are either in pain or frail health, making it difficult for them to queue for long periods of time until a medical practitioner is available to treat them.

The waiting time spent by the patients in reception for registration is much less in case of maximum no. of patients. This represents the efficiency of the registration process.

Study calculates the average arrival rate of patients in the hospital (hourly and weekly), waiting time spent in queues at front desk, service time and the total time spend in system as soon as he joins the queue. All the results are satisfactory which states that front desk of the hospital functions satisfactorily. Study depicts that Front desk service always starts on time and the doctors mostly comes on time. Patients also come on scheduled appointment time sometimes getting delayed.

Hospital always look to overhaul their reception and waiting areas, one of their biggest concerns, best to improve the facilities to enhance patient comfort.

REFERENCES-

1. <http://www.beckershospitalreview.com/hospital-management-administration/patients-no-1-complaint-front-desk-staff.html>
2. <https://www.linkedin.com/pulse/20140408084757-231670861-does-a-welcoming-reception-or-front-desk-improve-patient-experience>
3. <http://nccc.georgetown.edu/documents/FrontDeskArticle.pdf>
4. Khan Faisal Md., Khan Humera. Out- Patient (OPD) Services in Hospitals. Principle and Guidelines. CBS PUBLISHERS & DISTRIBUTORS; 2006
5. Kandemir-Cauas, C., Cauas, L. ‘’, An Application of Queuing Theory to the Relationship between Insulin Level and Number of Insulin Receptors’’. Turkish Journal of Biochemistry, 32 (1): 32-38, 2007.
6. Elegalam “Customer Retention Versus Cost Reduction technique” A Paper Presented at the Bankers Forum held at Lago
7. Sharma, J.K. ‘’A text book on Operations Research; Theory Applications’’. 4th Edition. Macmillan publishers, India. 2009.