

**Summer Training at  
Columbia Asia Hospital,  
Pune**

**Study to Identify the Reasons of Delay in Turn Around Time of Ultrasound  
Examination in Radiology Department**

**By  
Apoorva Garg**

**Under the guidance of  
Dr. J.P. Singh**

**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.Apoorva Garg**, student of MBA Hospital and Health Management from the IIHMR University, Jaipur has undergone summer training at Columbia Asia Hospital, Pune from 1<sup>st</sup> April to 31<sup>st</sup> May, 2016.

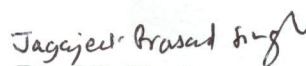
The Candidate has successfully carried out the study designated to her during summer training and her approach to the study has been sincere, scientific & analytical.

The Internship is in fulfilment of the course requirements.

I wish her all success in all her future endeavours.



**Col. (Dr.) Ashok Kaushik**  
Dean (Academics & Student Affairs)  
The IIHMR University, Jaipur



**Dr. J.P. Singh**  
Associate Professor  
The IIHMR University, Jaipur

1<sup>st</sup> June, 2016

## **INTERNSHIP COMPLETION LETTER**

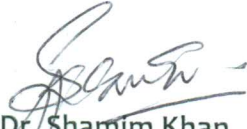
This is to certify that **Ms. Apoorva Garg** has successfully completed her Internship Programme in Operations Department in our hospital for the period of 2 months from 1<sup>st</sup> April 2016 to 31<sup>st</sup> May 2016.

During her Internship period she has completed her project on “**A Study to identify the reasons for delay in turnaround time of Ultrasound Examination in Radiology Department**”.

Her behaviour was found satisfactory during her internship period.

We wish her success in her future.

Yours Sincerely,  
For Columbia Asia Hospital - Pune

  
Dr. Shamim Khan  
GM (Pune Unit)



### **Columbia Asia Hospital - Pune**

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Phone : 020 - 7129 0222, [www.columbiaasia.com](http://www.columbiaasia.com)

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CIN: U85110KA2003PTC033055

## ACKNOWLEDGMENT

I am immensely grateful to all those who have been involved in my project. My project would not have been possible without the kind support and help of many Individuals and organization.

I would like to extend my sincere thanks to my institute, **Indian Institute of Health Management and Research, Jaipur**, from where I got this opportunity.

The project training at **Columbia Asia Hospital, Pune** provided me both learning experience as well as glimpse into the daily management functions of a renowned hospital. I was fortunate enough to interact with the people, who in their own capacities have encouraged and guided me in each and every step.

I owe a great debt to **Dr. Shamim khan** (General Manager), my guide and mentor at Columbia Asia Pune, **Mr. Jayesh Nair** (Operations manager) and **Mr. Parag Satralkar** (Executive Radiology) for showing their interest and sharing their valuable views in spite of their busy schedule. It has been our privilege to work under their dynamic supervision in the hospital

I'm grateful to my guide, **Mr. J.P Singh** Professor, IIHMR Jaipur and, other departmental heads for their cooperation, help and wholehearted encouragement. Their assistance enabled me, to overcome many obstacles during the work of my project study.

Dr Apoorva Garg

Pune

31<sup>th</sup> may 2016

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**Abbreviations –**

OPD – Out Patient Department

IPD – Inpatient Department

CSSD – Central sterile supply department

TAT – Turnaround time

ICU- Intensive Care Unit

NICU- Neonatal Intensive Care Unit

ER- Emergency Room

LDR- Labour Delivery Room

USAPS-Ultra Sonography Abdomen Pelvis Scan

USG-Ultra Sonography

USG ANC-Ultra Sonography Antenatal Scan

UPS- Uninterrupted Power Supply

LASA- Look Alike Sound Alike

CMS- Chief Medical Services

CNS- Chief Nursing Superintendent

ICN- Infection Control Nurse

MOR- Management Operational Review

HVAC- Heating Ventilating and Air Conditioning

AHU- Air Handling Unit

HEPA Filter- High Efficiency Particulate Air Filter

MGPS- Medical Gas Plant System

STP- Sewage Treatment Plant

ETP- Effluent Treatment Plant

WTP- Water Treatment Plant

AMC- Annual Maintenance Contract

CMC- Continuous Maintenance Contract

CAMC- Comprehensive Annual Maintenance Contract

RO plant- Reverse Osmosis Plant

GSR - Goods Service Receipt

ADR- Adverse Drug Reaction

RL- Responsibility Level

NDPS - Narcotic drug and psychotropic substances

**In order to undertake this crucial project it was important for me to understand set protocols and find the gaps, if any, while implementing these protocols. It was the utmost importance for me to understand processes, however small, to come to any conclusion.**

**Aims:-**

- To understand working of whole of the hospital and to seek opportunities that will provide wholesome experience
- To study hospital operations/medical services departments in detail
- To study process flow of drug distribution to IPD patients as well as the process flow of other departments

Primary objective of my summer internship program is to have experience and knowledge on the management and operational aspect of the hospital.

## **1. Observational Learning's**

### **1.1 Introduction**



## **HOSPITAL PROFILE**

### **COLUMBIA ASIA COMPANY**

The company is based in Kuala Lumpur, Malaysia and was founded in 1994. The company offer full-service hospital built in neighbourhoods, rather than the central city. Columbia Asia is the chain of hospitals in Asia, with 23 medical facilities across India, Malaysia, Vietnam and Indonesia. Columbia Asia's target market is fast-growing middle-income group. Columbia Asia hospitals are clean, efficient, affordable and accessible. The innovative design of Columbia Asia hospitals, from their manageable size to their advanced technology, is focused on creating the most positive experience for patients. Patient service, efficiency and medical excellence are all part of Columbia Asia's model to deliver the best medicine. Columbia Asia's highly skilled doctors and nurses deliver care in modern hospitals located close to where people live and work. Columbia Asia hospital specifically designed for the needs of patients and built for maximum comfort and efficiency. Patients benefit from advanced medical diagnostics, treatment and personal care that only comes in facilities where the focus is on each patient. Their transparent rate structure for medical procedures allows patients to know in advance how much their care will cost.

### ***Columbia Asia, India***

#### **East**

Columbia Asia Hospital- Salt Lake, Kolkata

#### **West**

Columbia Asia Hospital- Pune

#### **South**

Columbia Asia Hospital- Hebbal, Bengaluru

Columbia Asia Hospital- Mysore

Columbia Asia Referral Centre- Yeshwanthpur, Bengaluru

Columbia Clinic- Doddaballapur

### **North**

Columbia Asia Hospital- Patiala

Columbia Asia Hospital- Ghaziabad

## **COLUMBIA ASIA HOSPITAL, PUNE**

Columbia Asia today serves more than one million patients every year. Hospital offer comprehensive clinical programmes that are supported by a list of ancillary services (ICU, NICU, referral lab, physiotherapy, teleradiology/telemedicine, pharmacy and imaging facilities). A comprehensive medical records system forms the core of the hospital information system (HIS) that supports clinical decision making.

***Columbia Asia Hospital, Pune*** is a 100 bedded multi specialty facility situated close to IT parks at Kharadi. The hospital has highly qualified medical personnel and technicians to ensure healthcare delivery of the highest quality. The hospital's infrastructure along with internationally benchmarked standards of medical, nursing and operating protocols is the key component that will make it a preferred hospital in pune. A proprietary hospital information system and electronic medical record management assures error free and convenient patient records management, thereby greatly minimizing patient waiting time.

- **Mission:** “To deliver the best clinical outcomes in the most effective, efficient and caring environment”
- **Vision:** “We have a passion for making people better”
- **Moto:** “Customers First”
- **Values:** “Caring, Community Involvement, Excellence, Integrity and Team Work”

### **Scope of Services at Columbia Asia Pune:**

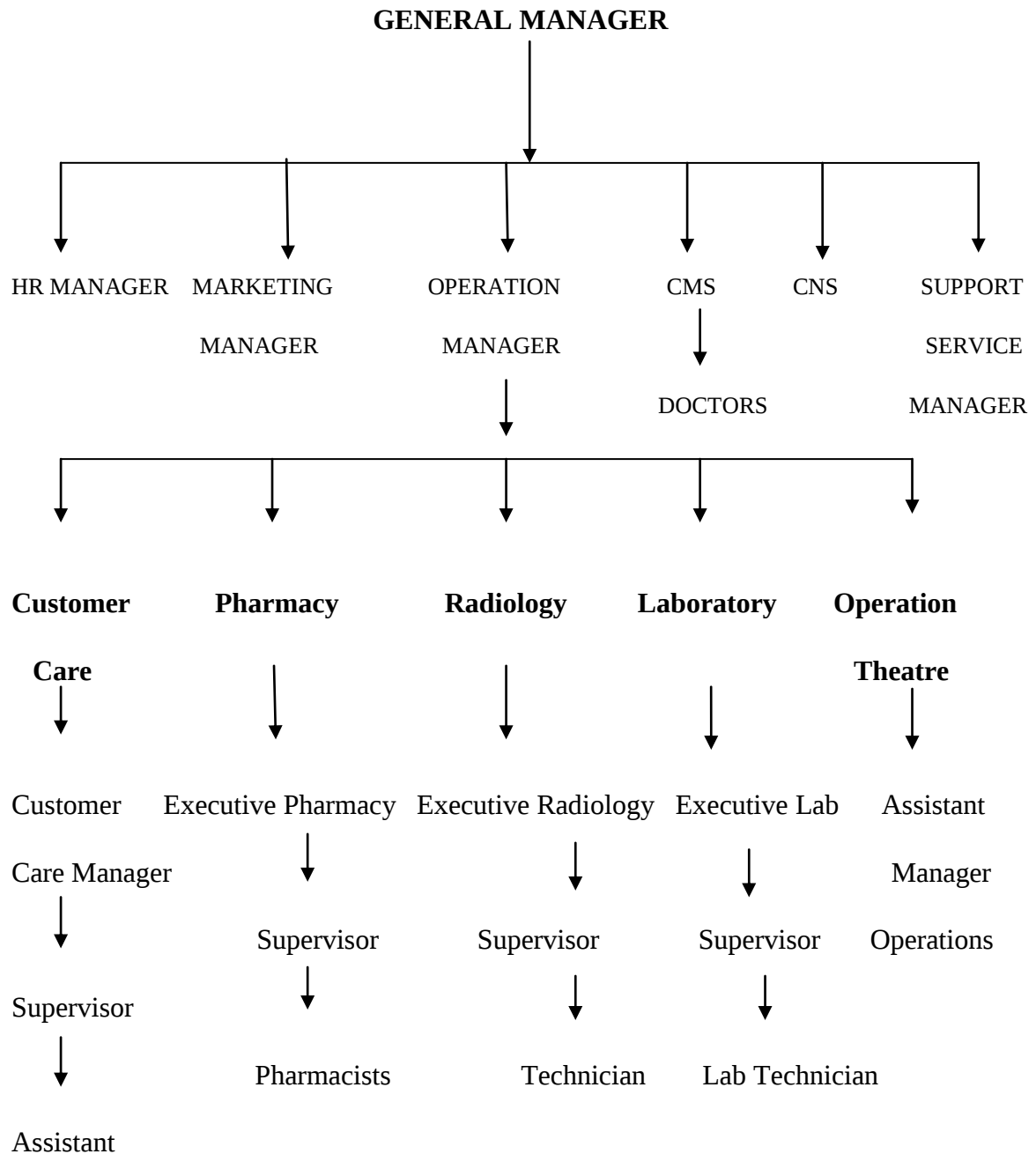
- Anesthesia
- Arthroscopic Surgery
- Bariatric Surgery
- Cardiology
- Clinical Hematology
- Clinical Psychology
- Critical Care Medicine
- Dental Services
- Dermatology
- Emergency Medicine
- Endocrinology
- ENT
- Gastroenterology
- General Surgery
- Hand Surgery
- Infectious Diseases
- Internal Medicine
- Interventional Radiology
- Interventional Neuro Radiology
- Laparoscopic Surgery
- Medical Oncology
- Minimal Invasive Surgery
- Neonatology
- Nephrology
- Neurology
- Neuro Surgery
- Obstetrics and Gynecology
- Onco Surgery

- Ophthalmology
- Oral and Maxillofacial Surgery
- Orthopedics and Joint Replacement
- Pediatrics
- Pediatric Surgery
- Psychiatry
- Plastic and Reconstructive Surgery
- Pulmonology
- Rheumatology
- Spine Surgery
- Sports Medicine
- Urology
- Vascular Surgery

**Services Not Offered:**

- Burns
- Cardio Thoracic Surgery
- Nuclear Medicine and Radiotherapy

## ORGANOGRAM OF HOSPITAL



## **1.2 Mode of data collection -**

Data was collected by method of observation and by shadowing some of the process as they occurred in the hospital it also included discussion with department head on managerial issues.

I was allotted from 8:30 am to 5:30 pm every day during the course of the internship to do the same.

## **Department:**

The floor plan of hospital is as follows:

### **Basement:-**

- HR Department
- Marketing
- Support Service Department
- Housekeeping Department
- Purchase Department
- EMRD

### **Ground Floor:-**

- Customer Care
- Finance
- Insurance Department
- OPD
- Pharmacy
- Radiology
- Laboratory
- Accident & Emergency
- Cafeteria
- Dietician

**First Floor:-**

- Nursing Station- A,B,C,D
- IPD
- Labor Ward
- Dialysis
- Physiotherapy
- NICU

**Second Floor:-**

- Nursing Station- A,B,C,D
- OT
- CSSD
- ICU
- Cath Lab

### 1.3 Department wise observations

#### **HR Department**

ORGANOGRAM:-

HR Manager/Executive



Supervisor



Assistant

The services for this department include:

- Job recruitment & analysis
- Assessment of application
- Interview processes
- Joining formalities
- Performance appraisal
- Compensation & benefit
- Training & development
- Employer engagement & relation
- Management info system

#### **Marketing Department**

ORGANOGRAM:-

Marketing Manager

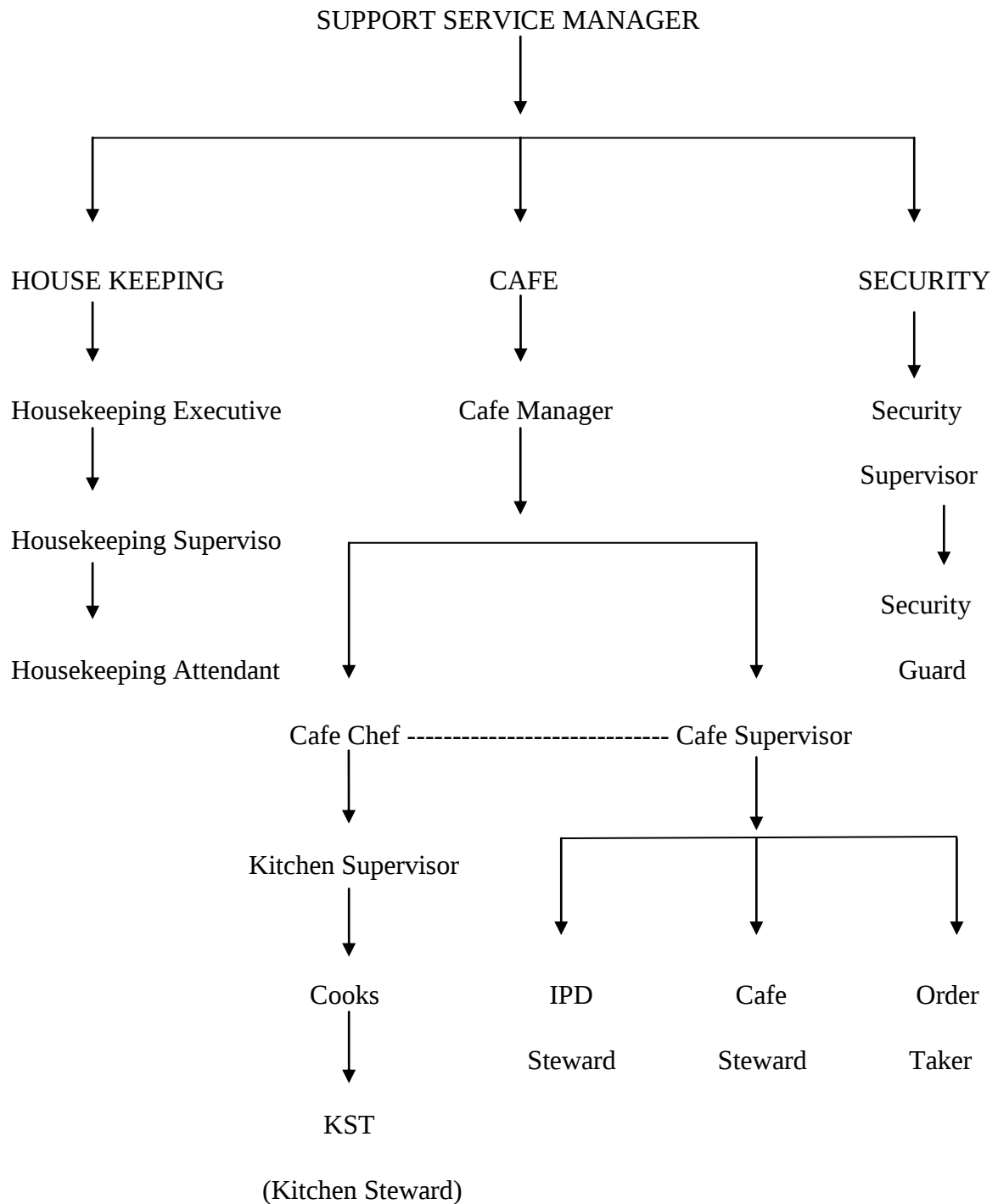


Marketing Executive

The segment in which marketing is done includes corporate, referral and international patients. The unique selling proportion of Columbia Asia is the In-house café, ethical practice and uniform price rate policy. Columbia Asia hospital is associated with 108 corporate including public sector units and school. It is also associated with nursing homes, clinics and doctors' for referrals. Columbia Asia also serves international patients from different countries.

## Support Service Department

ORGANOGRAM:



## **SERVICES:-**

- Support services shall consist of facility maintenance, bio-medical, housekeeping linen & laundry, security and food services
- Support services shall ensure that all fixed assets are tagged, that their movements are monitored and that proper records are maintained
- The hospital shall ensure that movement of items in and out of the premises is done after obtaining due authorization and with relevant supporting documentation

## **Housekeeping Department**

### **Services:-**

- The primary function of housekeeping department is to ensure overall cleanliness and maintenance of all areas of hospital
- The housekeeping department will use a combination of a efficient procedure, appropriate tools and methods with trained man power thereby ensuring a hygienic atmosphere in the hospital
- Deep cleaning ( top to bottom) in critical areas like OT, ICU, NICU twice a month and in other areas once a month
- Room deep cleaning is done on Sundays
- Checklist is provided in each room, to be filled daily
- Different chemicals for different areas of the hospital, Basilicata for OT and BHU, R1 for washroom, R2 for floor cleaning
- Maximum cleaning is done before 10:30 am (before rush hours)
- Maximum 20 minutes per room

### **Linen & Laundry**

- All the linen transferred to linen exchange sheet
- When the dirty linens are handed over to the vendor its entered into laundry exchange sheet (Three copies- Linen department, Security, Vendor)
- Five stocks are maintained-

- Laundry stock
- Patient stock
- Linen stock
- Store stock
- Linen Life Cycle- (min) 200/cycle and (max) 300/cycle

### **Cafeteria**

- The food services shall be managed in-house and will be referred as Cafe Columbia
- The food services shall ensure that the food served is presentable, palatable and safe for consumption
- The hospital serves 6 meals a day to the patients, with dietician consultation (included in room charges)
  - Breakfast with tea/coffee
  - Mid-morning soup
  - Lunch
  - Snacks with tea/coffee
  - Dinner
  - Night cap milk
- Shop act license and FDA license
- Patient feedback is taken daily

### **Security**

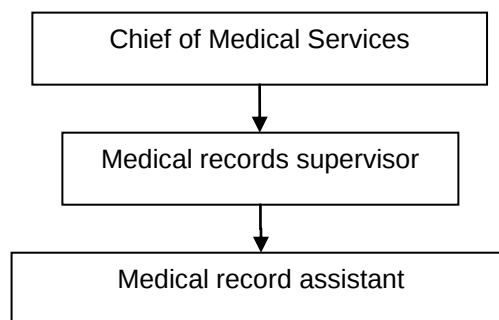
- The security department is responsible for the overall safety and security of the hospital infrastructure, the external customers and internal customers.

### **EMRD (Electronic Medical Record Department)**

The medical records department is responsible for maintaining medical records in a standardized and professional manner in order to protect patient confidentiality while allowing adequate access to providers in order to promote quality patient care.

Coding and release of information are some of the other major duties performed in medical records department.

#### **ORGANOGRAM:-**



#### **SERVICES:-**

- Compiling of daily hospital census and reporting to authorized personnel
- Updating statistics of all OP and IP census to monthly statistics
- Collecting discharge files from all the wings
- Systematic maintenance of medical records
- Coding as per ICD norms

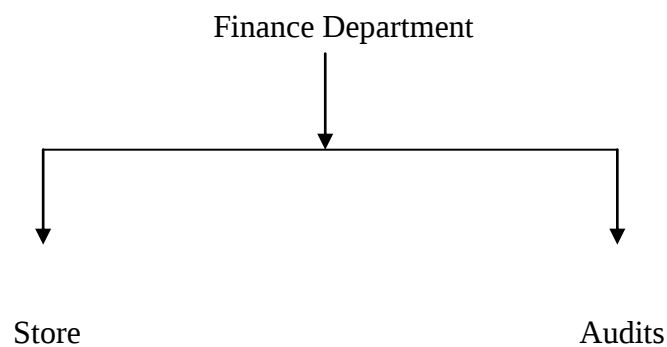
### **Customer Care**

#### **SERVICES:-**

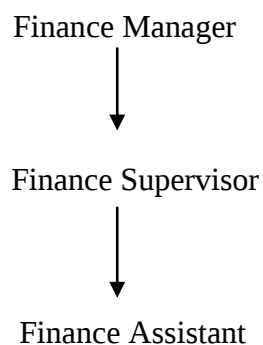
- **Enquiry Desk-** Enquiry is manned by a customer care assistant 24hrs/day, and is supervised by the customer care supervisor. Handles all doubts, enquiries and questions concerning the services Columbia Asia provides.

- **Console-** Handles internal calls (call transfers and enquiry) and external calls (call transfers, enquiry, scheduling appointments, rescheduling and dissemination of the information concerning health checks and other hospital services.
- **OPD-** Processing of appointment schedules and consultation with the respective consultants.
- **Inpatient Services-** Customer service assistant will guide and accompany the patient/patient attender through all formalities of the admission process.
- **Health Check-ups-** Offer different health check-up packages for men and women of different ages tailored to their requirements.

### Finance Department



### **ORGANOGRAM:-**



**SERVICES:-**

- Finance department provides reports and analysis on expenditure and income throughout the year, setting budgets and providing financial information and support.

**Radiology****Objective –**

The department is committed to the high profile, high quality, precise and timely diagnosis and interventional procedures in a safe and caring environment.

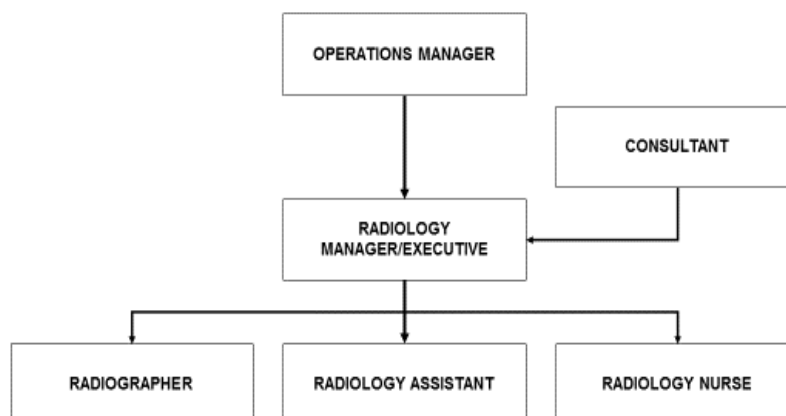
Our mission is to provide cutting edge radiology services to our valuable customers.

We will also provide tele-radiology facilities that conform to the international standards of care to our referring consultants and hospitals.

**Quality Indicators –**

- I. Turnaround time for radiology reports
- II. Waiting time for ultrasound scans
- III. Quality grading of films
- IV. Frequency of addendum to reports

### Organogram -



### Equipment –

- Siemens SOMOTOM EMOTION 16 slice CT scanner
- Siemens Magnum essenza MRI scanner
- Digital X RAY machine
- Mammography Machine
- High Defination USG machine
- Portable USG machine
- Fluoroscope/ C arm

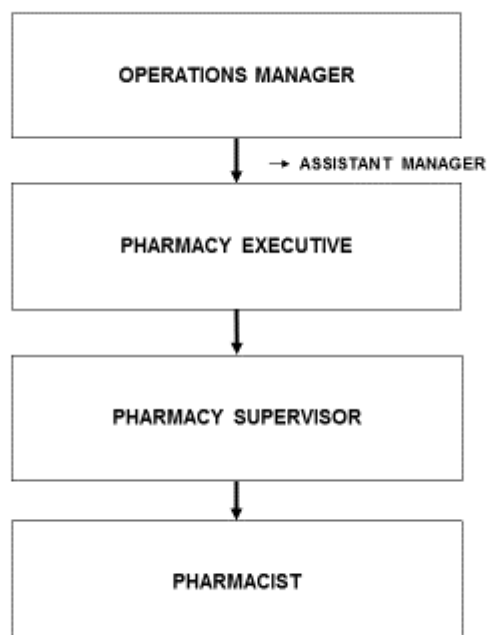
### Drug store (Pharmacy) -

The hospital has two stores, one for surgical disposables and other retail is pharmacy which also supplies all the inpatients.

### Objectives of the department –

- Ensure timely delivery of Medicines, consumables, supplies for effective patient care.
- Follow standard protocols for error free dispensing, storage and education of patients while adhering to brand service standard of pharmacy

### Organogram -



### Department Processes –

- I. OPD dispensing
- II. IPD dispensing
- III. Narcotic storage, accounting, and dispensing to wings (other departments)
- IV. Breakage, loss, theft or expiry of narcotics
- V. Medicine/consumables refund
- VI. Department stock transfer
- VII. Procurement of drugs and consumables in formulary
- VIII. Processing indent for items in formulary
- IX. Stock management – receiving stock, returning stock to vendor, stock check
- X. Purchase ‘out of formulary drugs’
- XI. Preparing GSR
- XII. Drug recall
- XIII. Management of expiry and near expiry drugs and consumables
- XIV. Storage and dispensing of cut strip medicines

### **Quality Indicators –**

- I. Percentage of stock-outs including emergency drugs
- II. Local purchase of drugs (out of formulary drugs)
- III. Usage of 'Others' code
- IV. High risk medication – ADR

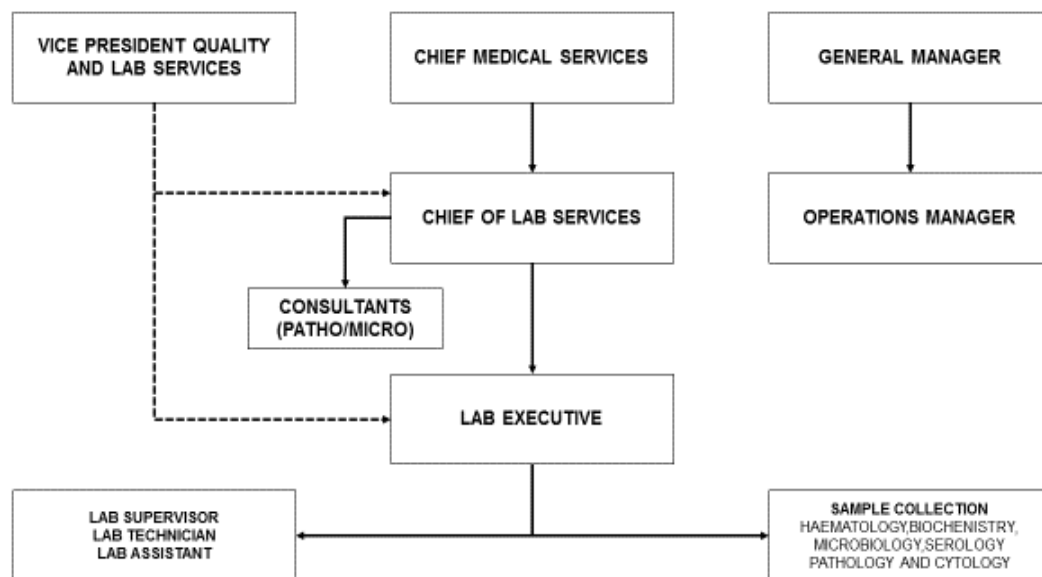
### **Observations –**

- I. Strict formulary followed – only 2 brands allowed per molecule , formulary controlled centrally
- II. Only online prescriptions are allowed , no retail prescriptions are entertained
- III. Cash collected by an employee of finance department
- IV. Possess NDPS license
- V. Department/wing wise indent schedule
- VI. Inventory level in the store – 21 days (Ideal)
- VII. Follow NABH protocols – LASA drugs,
- VIII. Expiry and near expiry drugs , High value drugs stored separately
- IX. NDPS drugs in double lock and key
- X. All drugs stored alphabetically
- XI. ROIs not followed
- XII. ABC, VED analysis implemented in the store
- XIII. Tablets, ointments, syrups etc separate\

## **Laboratory**

The laboratory is a full service facility located on the ground floor near the OPD. It was NABL accredited

### **Organogram -**



### **SERIVICES:-**

The functional components of laboratory were-

- Microbiology
- Biochemistry
- Hematology
- Cytology
- Histopathology
- Immunology
- Serology

### **Accident and Emergency**

Emergency medical services are dedicated to offering immediate, acute medical care out of the hospital or in an emergency room. The aim of emergency medical services is to provide treatment to those in need of urgent medical care.

At Columbia Asia Hospital, emergency department and emergency room is equipped with all the necessary facilities to administer the right emergency medical services.

### **WHEN TO CONTACT EMERGENCY MEDICAL SERVICES-**

- Choking
- Breathing difficulty or stopped breathing
- Severe or mild head injury with/without loss of consciousness, vomiting or abnormal behavior like aggressiveness
- Injury to spine or neck
- Seizure that lasted for 3-5 minutes
- Bleeding that is not controlled and is heavy

### **EMERGENCY CARE IN COLUMBIA ASIA HOSPITAL:-**

Once the patient reaches the emergency room, the first step is to assess and stabilize the patient. The concerned specialist is informed and investigations are started. Depending on the treatment proposed patient may be admitted to ICU or ward. In some cases, patient may be treated as an out-patient. Support of the laboratory and radiology department is available round the clock.

## **Operation theatre**

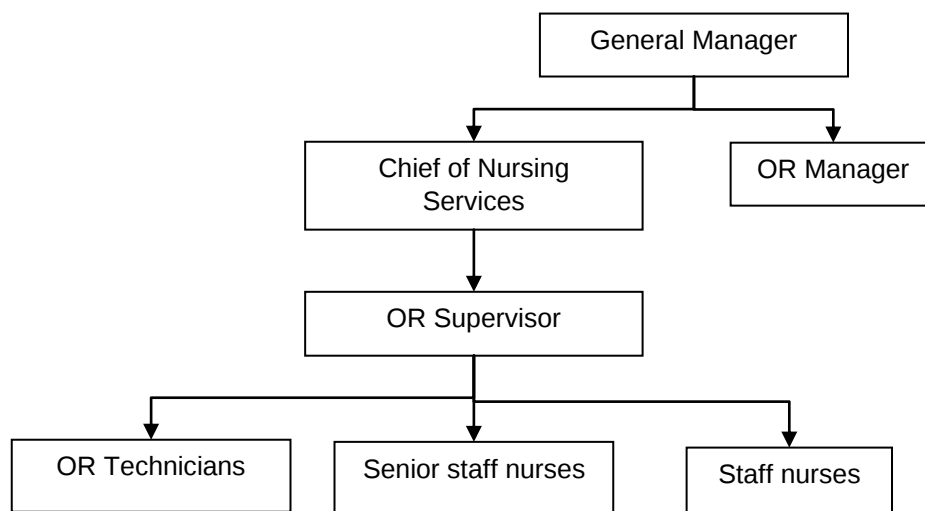
### **Objective –**

The objective of Operating Room is to provide highest level surgical care to patients undergoing surgical treatment

### **Quality Indicators –**

- I. Modification of anesthesia plan
- II. Unplanned ventilation during anesthesia
- III. Adverse anesthesia events
- IV. Anesthesia related mortality
- V. Surgical site infection
- VI. Re-exploration
- VII. Accidental removal of tubes and catheter
- VIII. Incidence of hematoma at the puncture site
- IX. % of rescheduling of procedure

### **Organogram -**



**Procedures –**

- I. Pre-operative care
- II. Pre- anesthesia check up
- III. Surgical procedures
- IV. Post- operative care

**CSSD (Central Sterile Supply Department)**

The Central Sterile Supply Department provides complex services including the preparation of sterile medical supplies for the surgery rooms. The Central Sterile Supply Department provides specialized hygienic operations (complex pre-sterilization preparation, high-temperature sterilization, low-temperature sterilization) whose outputs are sterile medical supplies.

**SERVICES:-**

- Disinfection, mechanical treatment, special treatment of all medical supplies
- Organizing and completing surgical instruments into sets
- Visual control of completeness, preparation and packing of surgery room cloths
- Moist heat sterilization
- Ethylene oxide sterilization

**ICU (Intensive Care Unit)**

It is located on second floor. There are one general ICU and one NICU. Intensive care unit cater to patients with severe and life-threatening illnesses and injuries, which required constant, close monitoring and support from specialist equipment and medication in order to ensure normal body functions. Patients may be transferred directly to an ICU from emergency department if required, or from a ward if the rapidly deteriorate, or immediately after surgery if the surgery is very invasive and the patient is at high risk of complications.

### **NICU (Neonatal Intensive Care Unit)**

This specialty unit cares for neonatal patients who have not left the hospital after birth. Common conditions cared for include prematurity and associated complications, congenital disorders resulting from the birthing process.

### **Physiotherapy –**

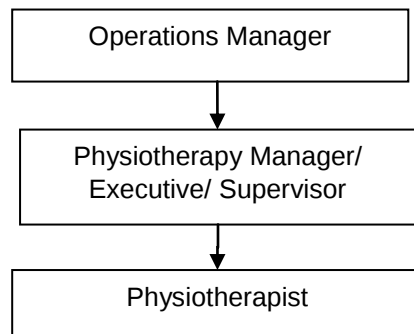
#### **Objective -**

To provide effective rehabilitation for a variety of musculoskeletal, neurological, respiratory conditions and other medical problems related to physiotherapy for patients in Columbia Asia Hospital. The Physiotherapists within Columbia Asia Hospital are committed to providing a service that is responsive to the needs of patients, innovative and based on current evidence and research.

#### **Quality Indicators –**

- I. Waiting time for procedures in physiotherapy
- II. Drop in pain score post treatment in acute cases

#### **Organogram –**



## **Services –**

- I. Interferential Therapy (IFT)
- II. Ultrasound Therapy (UST)
- III. Short wave Diathermy (SWD)
- IV. Traction (cervical and lumbar)
- V. Wax Therapy (WXT)
- VI. Moist Therapy (MOT)
- VII. Combi therapy
- VIII. Laser Therapy (LAS)
- IX. Continuous Passive Motion
- X. Shoulder Pulley and wheel
- XI. Wall ladder
- XII. Parallel bar and mirror
- XIII. Quadriceps table
- XIV. Gym ball
- XV. Multi Gym
- XVI. Exercise therapy

#### **1.4 Conclusion –**

A well organized and well maintained hospital, with all the amenities a multi-specialty hospital should possess. Located strategically, near IT parks and townships. Customer centric approach ensures patient satisfaction. Good consultant empanelment has ensured steady increase in patient flow.

#### **1.5 Limitations –**

- i. Not affordable to the middle class society.
- ii. No general ward.
- iii. No tie up with government insurance schemes like CGHS, ESIC etc.
- iv. No cardiac OT hence no cardiac surgeries performed.
- v. Low OTC pharmacy sale as they don't accept prescriptions from other hospitals or consultants.

## **2. Project Report**

### **2.1 Introduction –**

**Radiology** is a medical specialty directing medical imaging technologies to diagnose and sometimes treat diseases. Originally it was aspect of medical science dealing with the medical use of electromagnetic energy emitted by x-ray machines or other such radiation devices for the purpose of obtaining visual information as part of medical imaging. Today, following extensive training, radiologist directly an array of imaging technologies such as ultrasound, computed tomography (CT) and magnetic resonance imaging (MRI) to diagnose or treat disease.

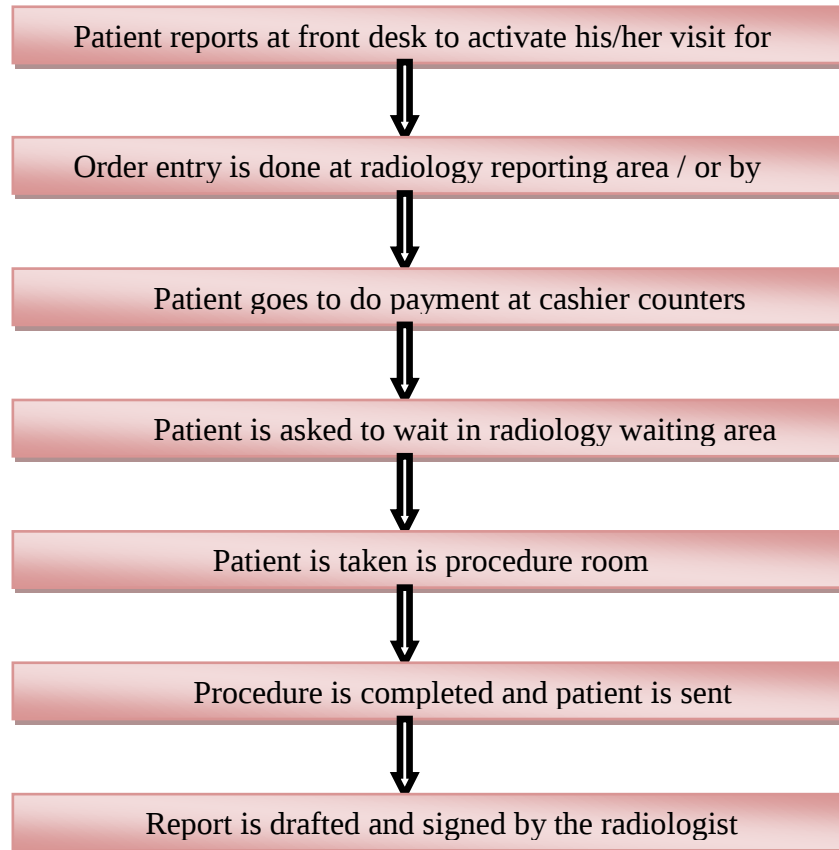
The study was conducted in the Radiology Department of Columbia Asia Hospital, Pune. The Utilisation study was conducted for Ultrasonography. Radiology department is located on ground floor and provides 24 hour services to OPD, IPD and Emergency patients.

### **Ultrasonography (USG) –**

Diagnostic Sonography (Ultrasonography) is an ultrasound-based diagnostic imaging technique used for visualizing internal body structures including tendons, muscles, joints, vessels and internal organs for possible pathology or lesions. The practice of examining pregnant women using ultrasound is called obstetric Sonography, and is widely used.

Ultrasonography may allow timely diagnosis of potentially life threatening cases and act as decision-making tool to help determine the need for transfer a patient to the operating room, CT or angiography suites. Many scholars have highlighted some of the factors influencing turnaround times for ultrasound examinations such as availability of continuous power supply to the ultrasound equipment during examinations, adequate staff performing the ultrasound examinations, giving of adequate and appropriate instructions to the patients, among many others. Shorter turnaround times for ultrasound procedures ensure the clinician's decision making in the overall patient management is faster and they also reduce overall patient stay in a hospital. Above all, short turnaround times in the imaging department also minimize complaints of delay in provision of healthcare to patients.

## 2.2 Process flow of Ultrasonography patients in radiology department:



## 2.3 Problem Statement –

A quantitative analysis to study the Turn around Time of Ultrasonography in the Radiology and Diagnostic Department of Columbia Asia Hospital, Pune.

## 2.4 Review of Literature -

### A) The Turnaround Times for Patients Undergoing Ultrasound Examinations at the Radiology Department, Kenyatta National Hospital

Agolah Dennis Odhiambo , Auka Joash , Luke G. Kanamu

**Abstract: Background:** Ultrasound examination turnaround time is the time between ordering a test by the clinician or the referring doctor at the time of submitting and or reporting of the results. Mae (1997: 83) argues that turnaround time definitions vary from institution to institution, hence necessitating specification by date, time, and type of the procedure. Ultrasound examinations are valuable in evaluation of both emergent, life threatening patients that have injuries that are not apparent on the initial physical examination as well as for routine examinations, all of which need to be as timely as possible. According to (Jill 2011: 253) timely and accurate diagnosis for ultrasound patients and initiation of optimal care is required. It is important that several quick steps in the management (including) extensive, thorough, but short interval ultrasound examinations with emphasis aligned towards reducing patient waiting time is put in place in the radiology department. **Objectives:** Turn-around time (TAT) is one of the major determinants in the overall institutional processes growth evaluation tool. The purpose of this study was to evaluate the turnaround time for patients undergoing ultrasound examinations at the radiology department, Kenyatta National Hospital, Nairobi. The research was conducted between 2nd January and 30th May 2015 with turnaround time as the dependent variable while factors influencing turnaround time being the independent variables.

**Methods:** A three-month cross sectional descriptive survey in which 96 study subjects selected by systematic random sampling and then requested to complete a self-administered questionnaire. Data analysis was by Ms Excel and the results were tabulated and graphically presented.

**Results:** Out of the 96 patients' respondents, 51 were females while 45 were males. The major causes of longer turnaround times identified were: power black outs, jumping of queues by other patients, and burnouts of the staffs while working alone. Majority of the respondents were dissatisfied with the turnaround times for ultrasound examinations.

**Recommendations:** Investment in more diagnostic imaging resources and personnel by the Kenyatta National Hospital is advised.

## **b) Improving Ultrasound Report Turnaround Time by Using RSNA-based Reporting Template**

Conference Paper · November 2010 by **M. Kashif Mirza**

Conference: Radiological Society of North America 2010 Scientific Assembly and Annual Meeting

### **Abstract**

**LEARNING OBJECTIVES PURPOSE** improving ultrasound report turnaround time poses unique challenges due to complex workflows involving both sonographers, sonologists, and other radiology staff. This is especially true in “stat” or “priority” situations where a radiologist may be responsible for both performing and reporting an ultrasound examination. We report on a method to reduce ultrasound report turn-around-time in such situations to near-real-time by implementing RSNA-based reporting templates in a commercially available speech recognition reporting system in one academic radiology department.

**METHODS** We utilize the FADE (Focus, Analyze, Develop, Execute) process for performance improvement as outlined here. The initial phase required discovery of workflow barriers in improving report turnaround time for priority patients. A priority reporting system was based on in-patient, out-patient, and information from referrals. A team of stake-holders from radiology, information systems, our continuous quality improvements (CQI) committee, and informatics experts was formed to address the identified barriers. When a “Stat” or “priority” ultrasound examination was identified, radiologists performed the ultrasound in a room with both the ultrasound machine and reporting software within the examination room. RSNA-based reporting templates for ultrasound were integrated into the speech recognition software. Time stamps from the RIS, modality, and reporting software were recorded for analysis. Comparison was made with a period prior to implementation of this workflow to determine effect on turn-around-time. Patient and referring physician satisfaction surveys were performed.

**RESULTS** Our resulting implementation provides a faster way to generate near-real-time report for priority patients. Patients have found the priority system extremely useful in getting reports without disrupting routine patients. Although initially radiologists reported feeling burdened by the process of near-real-time reporting, the availability of

report-templates made the workflow more acceptable to them. Referring clinicians appreciated receiving timely reports in a comparable format based on RSNA reports templates.

**Limitations included** 1) a lack of availability of full set of ultrasound templates from RSNA, 2) a cultural change for radiologist to produce technology driven near-real-time reports, and 3) Ultrasound room underutilization due to reporting functions being performed in the examination room. In summary, ultrasound report turnaround time showed significant improvement, associated with greater patient and referring clinicians' satisfaction. **CONCLUSION** Reporting workflows based on integrated systems, standardized report templates and radiologist's participation can improve report turnarounds time with greater patient satisfaction.

### **c) Decreasing Radiology Report Turnaround Times: Impact of Combining Worklists**

Conference Paper • November 2007 by Mark J. Halsted, Craig M. Froehle, Hong Yang, Lane F. Donnelly

Conference: Radiological Society of North America 2007 Scientific Assembly and Annual Meeting

Abstract

**PURPOSE** Despite the proliferation of PACS, work lists in many radiology departments are not widely shared among radiologists. Queuing theory suggests that more broad sharing of radiology case wordlists for triage and case distribution purposes can reduce overall departmental report turnaround times. This study investigates whether combining radiology work lists in a large academic radiology practice reduced overall departmental report turnaround times.

**METHOD AND MATERIALS** we designed, developed, and launched RadStream, radiology work list management software that runs in parallel with a single vendor combined RIS/PACS/Voice Recognition system to redistribute the departmental caseload across a radiology practice. We then used industrial operations management methodology

to measure the degree to which increased sharing of worklists by multiple radiologists reduced overall report turnaround times. **RESULTS** Despite the fact that the total departmental caseload volume increased following implementation of the new workload distribution software while the workforce remained stable, report turnaround times decreased for all case types. Median case reading time, defined as the time between case availability on PACS and time of case dictation, decreased 18% for emergency department, 3% for inpatient, and 29% for outpatient radiology cases. Median sign off time, defined as the time between transcription and final staff signature on the report, decreased 29% for emergency department, 97% for inpatient, and remained 0 minutes for outpatient reports.

**CONCLUSION** By combining work lists and facilitating decentralized, dynamically balanced workloads across a group of radiologists, report turnaround times can be significantly shortened. We developed, launched, and measured the clinical impact of a new informatics tool that performs these functions, and present outcomes data showing that, by reorganizing a large academic radiology department's work lists using this tool, overall turnaround times were significantly decreased.

**CLINICAL RELEVANCE/APPLICATION** Widely sharing case work lists can help radiologists work more efficiently and decrease overall departmental report turnaround times.

## **2.5 Rationale of Project:-**

The written imaging report is a key method for providing diagnostic interpretation to referring clinicians from radiologists. Timely final imaging reports support informed and efficient decision making for treatment plans by referring physicians, and ultimately the delivery of care to patients. While important to timely treatment and potentially better health outcomes, short turnaround time also improves patients' experience with care, cuts input costs, and improves the throughput of imaging exams. Rapid turnaround time (TAT) of reports is especially important to patient care provided in the emergency department (ED). These measures encompass all settings, enabling quality improvement in each.

## 2.6 Research Objective:

- To determine the turnaround times for patients undergoing ultrasound examinations at the radiology department.
- To Determine factors influencing turnaround times at the radiology department
- To identify the reasons of increased turn around time
- To find out the solution

## 2.7 Research Methodology –

- **Study Design**

Observational descriptive study

- **Sample Size**

120 patients

- **Inclusion Criteria**

Data was collected from 6<sup>th</sup> April 2016 to 20<sup>th</sup> April 2016 from 8:30 am to 7:00 pm.

All the OPD patients coming for any of the 5 Ultrasonography procedures which includes USAPS, Usg anc (early) scan, Usg anc (3<sup>rd</sup> tri) scan, Usg anc anomaly scan, Usg anc (NT) scan.

- **Exclusion Criteria**

All IPD (in patient department) and emergency patients coming for USG.

- **Study Area**

Radiology department of Columbia Asia Hospital, Pune

- **Sampling Method**

Non probability sampling

- **Source of Data**

Primary and Secondary data

**Primary data includes:-**

- Direct observations
- Interaction with staff in radiology

**Secondary data includes:-**

- Required data was extracted from the HIS software.

## **2.8 Data Analysis and Interpretation –**

➤ **Analysis –**

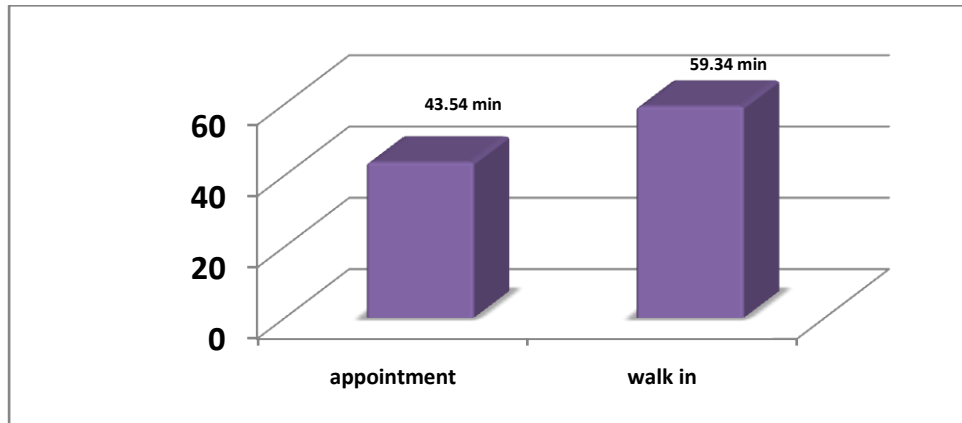
The data was entered in excel. It was cleaned and sorted to get data for the desired 5 types of USG test.

Patients waiting time in department, time taken to do the procedure and the time taken for signing off the report were calculated separately for the entire 5 USG test.

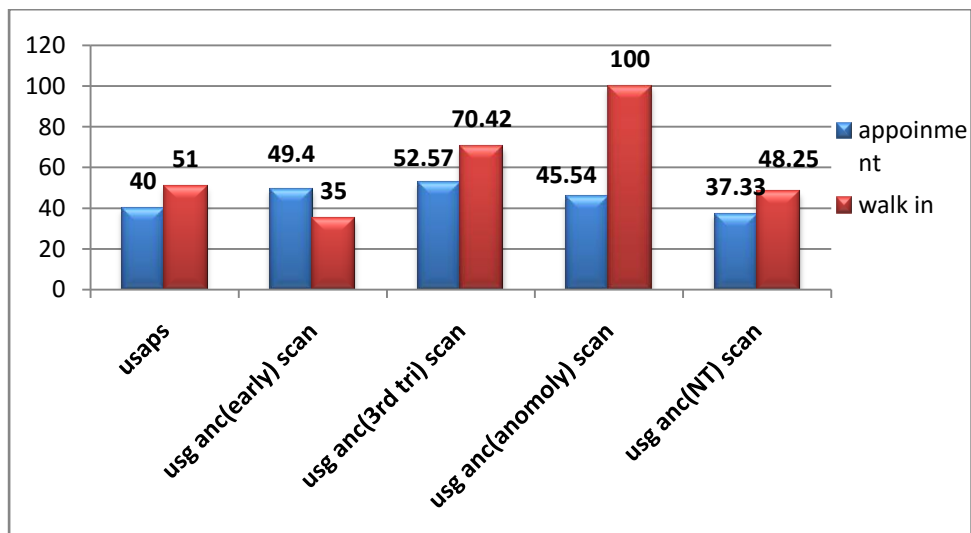
Then, total turn around time was calculated for all the patients and average turn around time is calculated of the sample size taken.

➤ **Interpretation –**

**Graph 1: (a) AVERAGE WAITING TIME OF PATIENT IN DEPARTMENT:**



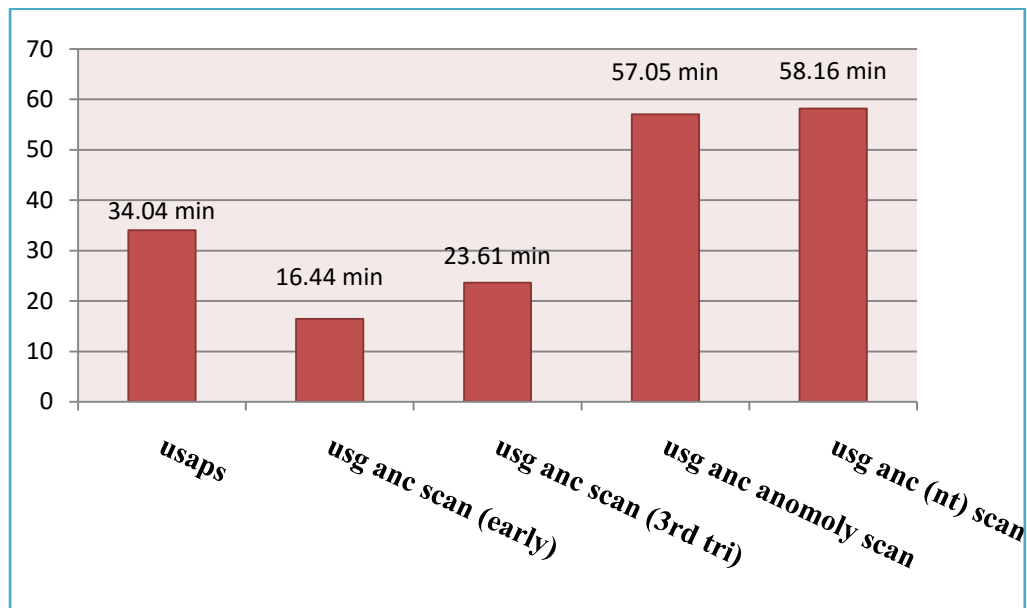
**(b) Average waiting time of app and walk-in patients according to test:**



**Interpretation of graphs:**

- The average waiting time of appointment patients is around 44 minutes which is more than the waiting time suggested by department I.e. 15 minutes for patients without preparation and for patients with preparation (till their bladder is full). The possible reasons for more waiting time can be that either patient's bladder is not full in case of patients requiring preparations and in case of patients not requiring any preparation can be any emergency patient coming for Usg.
- Whereas the average waiting time for walk-in patients is 1 hour which is appropriate according to the waiting time delivered by the department to walk-in patients.

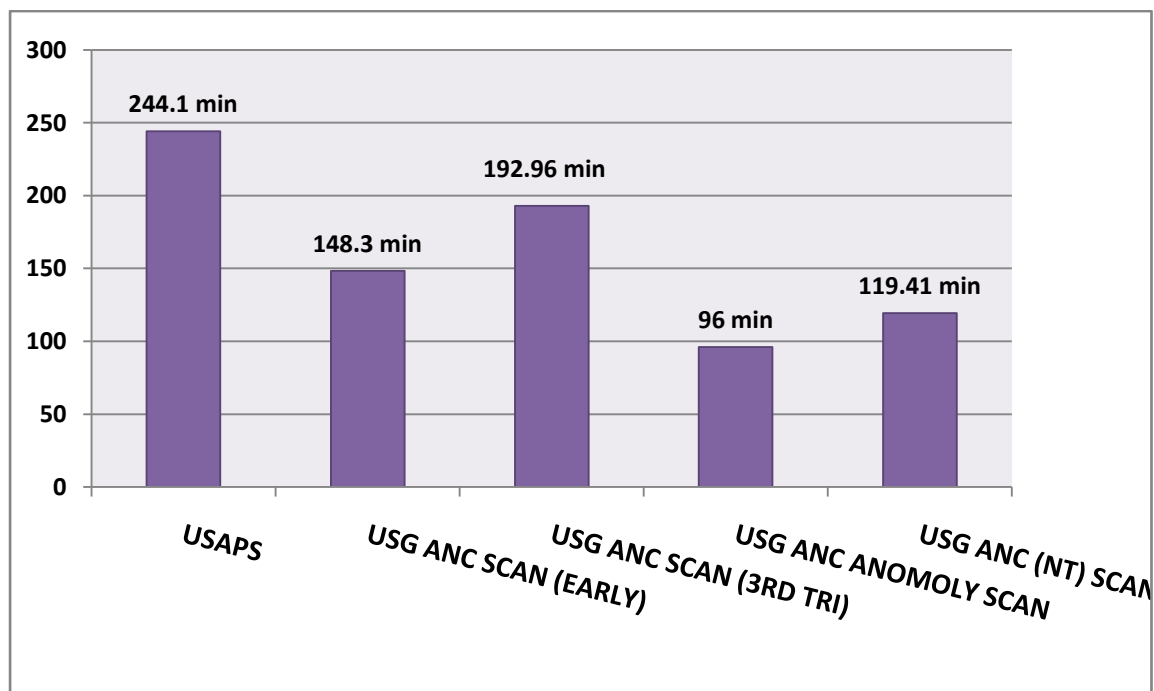
**Graph 2: AVERAGE TIME TAKEN TO PERFORM VARIOUS USG TEST:**



Interpretation of graph:

- Average time taken to perform USAPS is 34.04 min which is more than the time according to the department which is 15 min. Reasons for more time is that maximum of the times patient's bladder is not full and dr. has to wait until the bladder is full enough to perform the test.
- Average Time taken to perform other test is i.e. Usg anc early scan, 3<sup>rd</sup> trimester scan, and anomaly scan is within the time limits according to department which is 30 minutes (early and 3<sup>rd</sup> tri scan) and 60 minutes (anomaly scan).
- Average time taken to perform Usg anc (NT) scan is 58.16 min which is more as compared to the time according to the department i.e. 30 mins. Reason for more time is that most of the times the desired fetus position is not available to calculate the NT length.

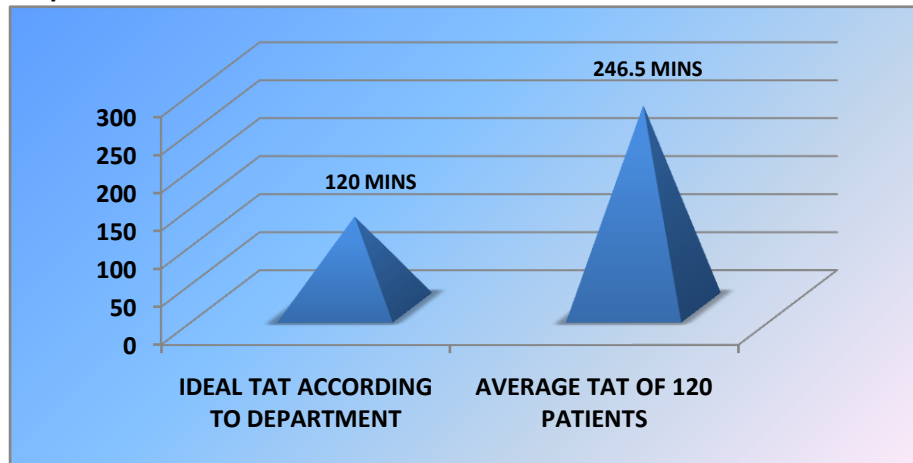
**Graph 3:** Average time taken to generate reports:



Interpretation of graph:

The above graph shows the average time taken to generate reports after the procedure is complete of various test. This time is one parameter which is a major portion of increased total turn around time of patients. Observed reasons are that radiologist don't get enough time after the procedure to immediately draft and sign the report due to tight scheduling of appointment and adjusted walk-in and emergency patients.

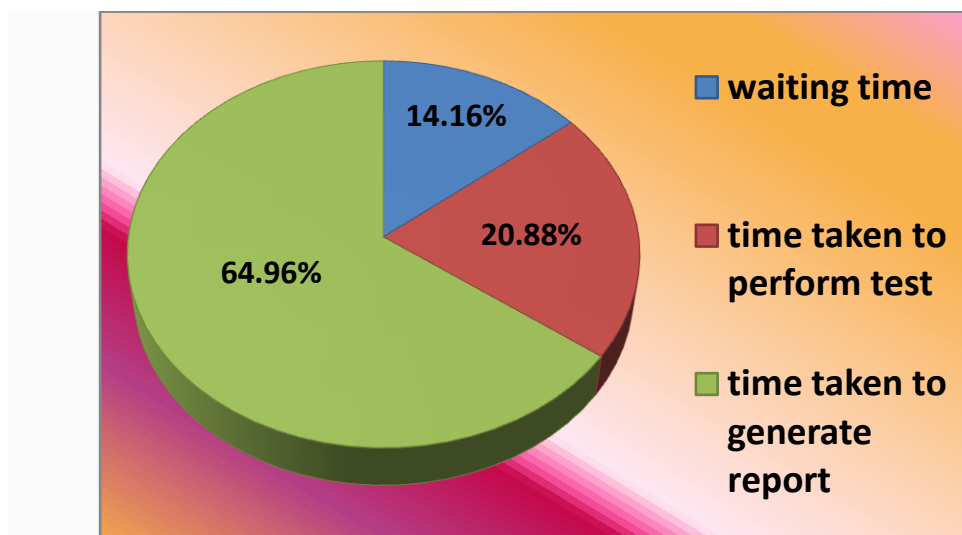
**Graph 4: SUGGESTED TURN AROUND TIME V/S AVERAGE TURN AROUND:**



Interpretation of graph:

The turnaround time as per the department is 120 mins i.e. 2 hours but the calculated average turnaround time is much more than the stipulated time and comes around 246.5 mins i.e. 4 hours 6 mins.

**Graph 5: Contribution of time taken at each step in total turn around time:**



Interpretation of graph:

Out of the total turnaround time the maximum portion of time is taken in signing off the report is 64.96% , then time taken for procedure is 20.88% of the total turnaround time and the least time is consumed as the patients waiting time i.e. 14.16% of the total turnaround time. Generation of report takes maximum time as reports are not drafted on time and due to tight schedules radiologist don't get enough time to sign off the reports.

## **2.9 Reasons of increased turnaround time:**

- Patients are not aware that their bladder should be full before most of the Ultrasonography investigations.
- Walk in patients and emergency patients are adjusted between appointments. There are no separate time slots for walk-in patients.
- Patient overload on some particular days
- Time taken for preparing the room for next patient and then calling the radiologist.
- Time taken by patients on payment counters due to queue adds on to the waiting time
- Due to tight scheduling of appointments radiologist are not able to sign the report on time
- Some procedures take more time which adds on to the delay in department like anomaly scan as proper fetus position is desired for the scan.
- Delay in drafting of reports.
- Lack of communication between staff.
- Only one radiologist is available after 4 pm.

### **2.10 Recommendations:**

- Proper token system for proper queue of patients.
- 10 minute slots kept for drafting and signing the report after every 4-5 patients.
- For both Usg machines separate appointment scheduling keeping in mind the availability of radiologist.
- Re scheduling of appointments in cases of emergency or due to unavailability of radiologist.
- At the end of the day record to be maintained of un-signed reports so that next day those reports can be completed.
- Pamphlets containing information about the desired preparations should be given to patients while giving appointments and for patients taking appointments on phone a mail should be send .
- Patient should be well informed about the 3 billing counters where they can make payments.
- Appointment confirmation system can be implemented.
- Health check up patients queued for Usg should be called one day prior regarding the preparations required.

### 2.11 References:

- 1) Medical Ultrasonography. (2015, May 27). In *Wikipedia, the Free Encyclopaedia*.
- 2) Agolah Dennis Odhiambo , Auka Joash , Luke G. Kanamu : The Turnaround Times for Patients Undergoing Ultrasound Examinations at the Radiology Department, Kenyatta National Hospital
- 3) [www.ijird.com](http://www.ijird.com)
- 4) [https://www.researchgate.net/publication/266108197\\_Improving\\_Ultrasound\\_Report\\_Turnaround\\_Time\\_by\\_Using\\_RSNA-based\\_Reporting\\_Template](https://www.researchgate.net/publication/266108197_Improving_Ultrasound_Report_Turnaround_Time_by_Using_RSNA-based_Reporting_Template)
- 5) [https://www.researchgate.net/publication/266122180\\_Decreasing\\_Radiology\\_Report\\_Turnaround\\_Times\\_Impact\\_of\\_Combining\\_Worklists](https://www.researchgate.net/publication/266122180_Decreasing_Radiology_Report_Turnaround_Times_Impact_of_Combining_Worklists)
- 6) IJHMR library
- 7) J P Crabbe, C L Frank and W W Nye :Improving report turnaround time: an integrated method using data from a radiology information system.

### 3. Annexure –

#### 3.1 Data collection table for project:

| Pt's mrn no. | Patient type | Test to be done | Time of order entry | In time procedure room | Out time procedure room | Name of radiologist | Time of report completion |
|--------------|--------------|-----------------|---------------------|------------------------|-------------------------|---------------------|---------------------------|
|              |              |                 |                     |                        |                         |                     |                           |
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|              |              |                 |                     |                        |                         |                     |                           |
|              |              |                 |                     |                        |                         |                     |                           |

#### 3.2 Time calculation table for the project:

| Pt's mrn no. | Type of pt. | Pt's waiting time in dept | Total time taken for procedure | Type of procedure | Time taken for report generation after procedure | Total turn around time |
|--------------|-------------|---------------------------|--------------------------------|-------------------|--------------------------------------------------|------------------------|
|              |             |                           |                                |                   |                                                  |                        |
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