

**Summer Training at
Shri Mata Vaishno Devi Narayana Superspeciality Hospital, Jammu and
Kashmir
(April 3 to June 2, 2017)**

**Study on Laboratory Services Through Process Mapping in
Superspeciality Hospital**

**By
Kanika Sharma**

**Under the guidance of
Dr. Goutam Sadhu**

**MBA Hospital & Health Management
2016-2018**


**Institute of Health Management Research
The IIHMR University, Jaipur
2017**

CERTIFICATE

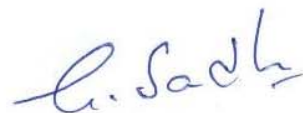
This is to certify that **Dr. Kanika Sharma** has undergone summer training in **Shri Mata Vaishno Devi Narayana Superspeciality Hospital** Kakryal (village&post), Katra tehsil, Reasi district (Jammu&Kashmir) from 3rd April to 2nd June 2017.

The candidate herself completed the project assign to her during summer training. Her approach to the project was sincere and proactive. This summer training is in partial fulfillment of the course requirement recommended for the award of MBA in Hospital and Health Management.

I wish her success in all her future endeavors.



Col. (Dr.) Ashok Kaushik
Dean (Academic & Student Affair)
The IIHMR University, Jaipur



Dr. Goutam Sadhu
Professor & Incharge
(School of Rural Management)
The IIHMR University, Jaipur



SMVDNSH/HR -2017-18/ 008

3rd June'2017

INTERNSHIP CERTIFICATE

This is to certify that **Dr.Kanika Sharma**, D/O Subash Chander Sharma bearing Enrollment No: IIHMR-U/01/2016-18/0432 from the Indian Institute of Health Management Research University Jaipur, Rajasthan has Successfully Completed her Project on "**A Study on Laboratory Services through Process Mapping in Superspeciality Hospital**" from 3rd April 2017 to 2nd June 2017 at Shri Mata Vaishno Devi Narayana Superspeciality Hospital Kakryal, Katra, District Reasi, Jammu & Kashmir – 182320.

During her Internship period, she has shown keen interest to observe and learn with good conduct.

We wish her all the best for her future endeavors.

For **Shri Mata Vaishno Devi Narayana Superspeciality Hospital**

Manu Ramachandar
Facility Director

Manu Ramachandar
Facility Director
Shri Mata Vaishno Devi
Narayana Superspeciality Hospital
Kakryal, Katra, Reasi
Jammu & Kashmir – 182 320

Narayana Vaishno Devi Specialty Hospitals Pvt. Ltd.

Shri Mata Vaishno Devi Narayana Superspeciality Hospital, Kakryal, Katra, Reasi, Jammu & Kashmir 182 320
(CIN No:U85110KA2014PLC076218). www.narayanahealth.org. Ph.:01992-279301-30, 9070888111/222/333

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ACKNOWLEDGEMENTS: -

The internship opportunity I had with **Narayana Super specialty Hospital, at kakryal,near katra in(jammu&kashmir)** was great learning experience. Therefore, I consider myself as fortunate individual to be a part of it. I am also grateful for getting an opportunity to meet so many wonderful people and professionals who led me during my entire summer training period.

I express my deepest thanks to my mentor **Mr. Gaurav Shiva, Manager Quality and Clinical services NH, katra** for providing necessary advices and guidance and arranging all facilities to make summer training effective.

I feel deeply privileged in expressing my gratitude to **Dr. Devi Shetty (CMD Narayana Group) ,Dr. Suneet Marwah (CEO NH katra unit), Mr. Manu Ramachandar(facility director) NH katra and Mr. Raman(Human Resource Manager)NH katra** for their guidance which were extremely valuable for my study both theoretically and practically.

I express my sincere thanks to all the HOD and NH staff for sharing useful information with me and providing arrangements to help in my study.

I see this opportunity as a platform in my career development. I will strive to use gained skills and knowledge in the best possible way, and I will continue to work on their improvement, in order to attain desired career objectives. Hope to continue cooperation with all of you in the future,

My sincere gratitude to my mentor **Dr. Goutam Sadhu**, for his support ,guidance and encouragement

Sincerely

Dr. Kanika Sharma

MBAHM 21

The IIHMR University Jaipur

TABLE OF CONTENTS

ACKNOWLEDGEMENT

ABBREVIATIONS

1. ORGANISATIONAL PROFILE

- Vision
- Mission
- Values
- Quality policy
- Service standard
- Observational learning
- Scope of services
- Departmental services

2. SPECIFIC PROJECT ON –A STUDY ON LABORATORY SERVICES THROUGH PROCESS MAPPING IN SUPERSPECIALITY HOSPITAL

Unit in SMVD Narayana Super specialty Hospital, kakryal near katra in
(Jammu.&Kashmir)

- Introduction
- Literature Review
- Rationale of study
- Research question
- Methodology
- Data collection
- Analysis and interpretation of data
- Conclusion and recommendations

3. REFERENCES

ACRONYMS/ABBREVIATIONS: -

- CSSD: Central sterile supply department.
- DAMA: Discharge against medical advice
- F&B: Food and Beverages
- HIC: Hospital Infection Control
- HIS: Hospital Information System
- ICD: International coding of diseases
- ICU: Intensive care unit.
- IPD: Inpatient department
- LIS: Laboratory Information System
- MLC: Medico legal cases
- MOD: Manager on duty
- MRD: Medical record department.
- MRN: Medical Record Number
- OPD: Outpatient department.
- OT: Operation Theater
- A&E: Accident and emergency department
- HK: House keeping
- SRS Samples receiving station

ORGANISATIONAL PROFILE

ABOUT NARAYANA HRUDAYALAYA HOSPITAL GROUP

Narayana Hrudayalaya has now radically changed the scenario of accessibility, pricing and s healthcare in India. Originally, Dr Devi Shetty's new concept, which emerged with the Spartan Narayana Hrudayalaya heart hospital Bangalore in the year 2001, was now a truly global healthcare provider .Today, it has 32 Hospitals, 6600 beds, 20 Cities, 15000 Employees, 1800 Doctors and their positively outlook of being able to equip and service of 30000 beds by 2018.

Dr. Devi Shetty has over the past three decades re- affirmed his commitment to 'An equitable distribution of world class healthcare for the masses at an affordable cost'. Our group's firm belief in its core values and mission statement helps reinforce our everlasting commitment to the people of Jammu & Kashmir. Narayana Hrudayalaya (Jammu&Kashmir) will bring this very same revolutionary concept to the state and its people with the promise of an affordable one-stop health-solution.

Narayana Health (formerly known as **Narayana Hrudyalaya**) is a multi-specialty hospital chain in India, headquartered in Bengaluru.

The company won the "Good Company" award for its quality, affordability and scale. The business model of Narayana Health became a Global Healthcare and Harvard Business School case study. The hospital chain is among the largest telemedicine networks in the world

The chain has 1500 full-time Doctors and 15,000 employees. On an average of 150 surgeries are performed every day and on an average of around 80,000 outpatients are seen every month. NH ranked 36th among 'World's 50 most Innovative Companies 'by Fast Companies 2012

A leader in the field of Cardiac sciences, it performs complex congenital surgeries, Coronary bypass grafting with advanced techniques like Beating heart surgeries, Minimally Invasive Cardiac surgery and other valvular surgeries on adults and children. It is equipped with

cardiac OTs, state-of-the-art Cath labs, 3D mapping of Electrophysiology, Cardiac Intensive Unit and Coronary care unit.

ABOUT NARAYANA SUPERSPECIALITY HOSPITAL, KATRA
(Jammu&Kashmir)

Narayana Superspecialty Hospital, Katra is a perfect blend of technological excellence, complete infrastructure, competent care and heartfelt hospitality - this is how the people, whom the hospital has been fortunate to serve, define the hospital.

It is a 250-bedded multispecialty tertiary care hospital, located at Kakryal, Katra within a sprawling campus of 30 acres offering high quality affordable medical care to the people within Jammu and Kashmir and bordering states as well.

Shri Mata Vaishno Devi Narayana Superspeciality Hospital is a unit of Narayana Hrudayalaya Ltd. in partnership with Shri Mata Vaishno Devi Shrine Board and is poised to cater to patients for over 20 different specialities with special focus on Cardiac Sciences and Oncology. Hospital commissioned OPD services on March 15, 2016 and IPD services on April 8, 2016. Till now hospital has provided OPD services to more than 5000 patients and IPD services to 100 plus patients.

Narayana Health is a leading Health organization which is headquartered at Bangalore, India. The group was founded in the year 2000 under the guidance and stellar leadership of Dr. Devi Shetty, along with the “Asian Heart Foundation”. Narayana Health has also setup the first Health City in the outskirts of Bengaluru, spread over 25 acres. The Health City consists of more than a 1000 bed cardiac hospital and a 1400 bed multi specialty hospital, becoming one of Asia’s most advanced Cancer Care facility. It also has India’s largest Bone Marrow Transplant unit.

“Narayana Health has an aim of achieving 100% Patient satisfaction.”

1.1 Vision: "Our vision is affordable quality healthcare to the masses worldwide."

1.2 Mission: "Our dream of making quality healthcare available to the masses worldwide"

1.3 Values: Core values are represented by the simple acronyms ‘iCARE’

- Innovation & efficiency

To continuously reduce the cost of delivery of high quality of healthcare and
Improve our reach

- C- Compassionate care

In providing accessible service that makes a difference to our patients.

- A- Accountability

To honour commitments to our patients, employees and investors with integrity
and transparency.

- R- Respect for all

Recognize the contribution of every employee and respect the rights as well as
the dignity of every patient and employees.

- E- Excellence as a culture

Where we individually excel to collectively ensure the highest quality of
and reliable services to our patients and sustainable values to all our
stakeholders.

1.4 Quality Policy:

- Deliver world class patient care through medical excellence.
- Create a patient-centric environment:
- Ensure high standards and safety of treatment during the patient’s stay

- Continuous Quality Improvement through implementation of robust clinical and non-clinical process and protocols
- Having world-class infrastructure and cutting-edge technology utilized by highly skilled employees.
- Complying with statutory regulations

1.5 Service Standards:

- Courteous
- Attentive
- Compassionate service
- Teamwork
- Safe



Mode of data collection:

Every department of the hospital was observed carefully for its working, staff, hierarchy, physical set up and major challenges faced by it, if any.

Source of information: a) Primary:

- Interaction with doctors, executives and other employees
- Interaction with patients and their attendants
- Direct observation

b) Secondary:

- Registered records
- Website of the hospital
- Pamphlets, magazines, brochures etc

Findings:

1.7 Scope of Services:

1.4 Scope of Services:

- Anaesthesia & Critical Care
- Department of Cardiac Science
 - Cardiac Anaesthesia
 - Cardiac Electrophysiology
 - Cardiothoracic & Vascular Surgery
Paediatric & Adult
 - Interventional Cardiology
Paediatric & Adult
 - Non-Invasive Cardiology
ECG, ECHO, HOLTER, TMT
- Department of ENT
- Department of Dentistry
- Dermatology
- Diabetology -Endocrinology
- Department of Gastro Science
 - Gastroenterology & Haematology
 - G.I & Laparoscopic Surgery
- Department of Neuro Sciences
 - Neurology
 - Neurosurgery
- Department of Paediatric

- Neonatology
- Paediatric
- Paediatric Surgery
- Department of Plastic Surgery
- Department of Renal Sciences
 - Dialysis
 - Nephrology
 - Urology
 - Transplant Services (Liver)
- General & Laparoscopic Surgery
- Institute of Bone, Joint & Spine
 - Hand & Upper Limb Surgery
 - Joint Replacement
 - Spine surgery
- Internal Medicine
- Obstetrics & Gynaecology
- Psychiatric
- Department of Nuclear Medicine
- Oncology Haematology
- Oncology Medical
- Oncology Surgical
- Radiation Oncology
- Psychiatry
- Psychology
- Pulmonology
- Pulmonology-Interventional
- Emergency / Casualty

DIAGNOSTIC SERVICES

1. Non-Invasive Cardiology Services

- Echocardiography - Adult
- Echocardiography - Paediatric
- Foetal Echocardiography
- Trans-oesophageal Echocardiography
- Treadmill Test
- ECG and Holter
- EEG/ ENMG
- PFT

2. Radiology Services

- X-ray
- MRI Scan
- CT scan (128 slice)
- Ultrasound

3. Nuclear Medicine- Gamma Imaging

4. LINAC

5. Laboratory Medicine

- Biochemistry
- Clinical Pathology
- Haematology

- Histo-Pathology
- Microbiology

6. Blood Bank

7. Endoscopy / Bronchoscopy Services

SUPPORT SERVICES

1. Cardiac Rehabilitation
2. Counselling
3. Ambulance services
4. Telemedicine
5. CSSD
6. MRD
7. Human Resource
8. Purchase and inventory
9. Pharmacy
10. Morgue
11. Strategic Initiative- Includes Marketing, Branding , corporate communication cell, claims recoveries , corporate relations and relationship with other partners
12. Library
13. OP Pharmacy & IP Pharmacy
14. Waste management.

OUT SOURCE SERVICES FOR THE HOSPITAL

1. Housekeeping
2. Security
3. F &B services

1.5 DEPARTMENTAL SERVICES:

1.Outpatient Department:

There are 5 decentralised OPD:

1. East OPD (1-16)
2. West OPD (1-5, Gynae and Paediatrics)
3. Cardiac OPD
4. Gastro OPD
5. Oncology OPD

OPD Timings: 9am to 5pm.

Average no. of OPD patients 240-250 per day (Including old and new patients)

2.In Patient Department:

- General Ward 1:
Location: Ground Floor
Bed Capacity: 6 Beds
- General Ward 2,3,4:
Location: First floor
Bed Capacity: 18 Beds
- General Ward 5,6,7
Location: third Floor
Bed Capacity: 18 beds

- CCU
Location: First floor
Bed Capacity: 14 Beds
- SICU
Location: First floor
Bed Capacity: 10 Beds including 3 beds for isolation
- ANC Ward
Location: Second Floor
Bed Capacity: 5 Beds with 2 Beds in Labour room
- Paediatric Ward
Location: 1st Floor
Bed Capacity: 6 Beds
- PICU
Location: 1st Floor
Bed Capacity: 5 Beds
- NICU
Location: 1st Floor
Bed Capacity: 5 Cribs
- Post-Operative Ward
Location: Second Floor
Bed Capacity: 14 beds
- Semi Private:
Location: (Ground Floor, First Floor, Second Floor)
Bed Capacity: 24 beds
- Private Ward
Location: (Ground Floor, First Floor, Second Floor)
Bed Capacity: 18 Beds

3.Emergency Services:

Location: Ground floor

Entrance: Separate entry from the main road

The Emergency Department is a well-equipped 10 bedded department. 4 beds for each triage category Red, Yellow, Green and 1 bed for isolation

Staff: 1 Emergency In- charge, 3 MO, 1 Nursing In- charge, 10 Staff nurses.

Ambulance service is provided with collaboration of Shrine Board, 2 A.C.L.S (Advanced Cardiac Life Support Ambulances) have been created which cater to serve patients

Priority 1(serious)-RED	PRIORITY II(Delayed)-Yellow	Priority III(Minimal)-Green)
• Chronic self-limiting disorders • Patients have life threatening injuries or conditions which are critical • Survival with immediate treatment e.g.- respiratory arrest	• Requirement of definite treatment but no immediate threat to life exists. • E.g.-acute abdominal pain, acute renal failure	• Patients having minimal injury or minor conditions and are ambulatory. • E.g.- abrasions and superficial lacerations.

4.Operation Theatre:

There are total of 7 OTs

Location: Second^{Floor}

Easy access to CCU, Blood Bank, Emergency and CSSD

Post-Operative ward is attached to the OTs

Manpower: Head of the Department, 3 Anaesthetist, 2 OT in-charge ,5 OT Technicians,10 Staff Nurse, 3 House Keeping Staff.

5. Cardiac OPD:

Location: First floor

Separate OPD for cardiology cases

Facilities available:

- TMT
- Electrocardiography
- Echocardiography
- Electromyography

6.Catheterisation Lab:

Location: First Floor

All Invasive Procedures are done in cath lab such as Angiography, Angioplasty, Cath Study, and Electro Physiological Study.

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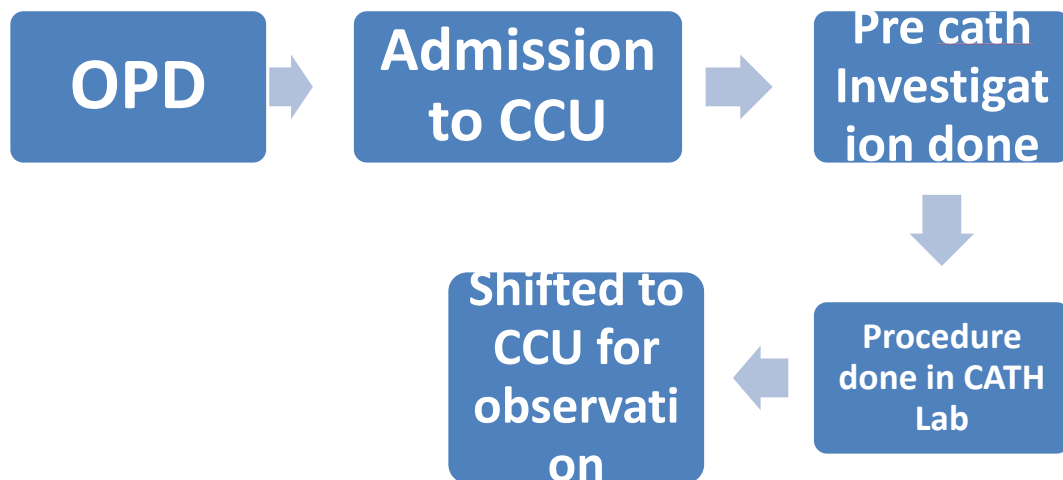
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- Department of Neuro Sciences
 - Neurology
 - Neurosurgery
- Department of Paediatric
 - Neonatology
 - Paediatric
 - Paediatric Surgery
- Department of Plastic Surgery
- Department of Renal Sciences
 - Dialysis
 - Nephrology
 - Urology
 - Transplant Services
- General & Laparoscopic Surgery
- Institute of Bone, Joint & Spine
 - Hand & Upper Limb Surgery
 - Joint Replacement
 - Spine surgery
 - Sports Medicine & Arthroscopy
- Internal Medicine
- Obstetrics & Gynaecology
- Psychiatric

- Respiratory Medicine

ALLIED SERVICES

- Dietetics
- Emergency & Trauma
- Lab Medicine

Process Flow



6. CSSD

Location: Lower Ground Floor

Total Area is divided into 4 Zones:

- Zone I. (Dirty Utility) Reception, Inspection and Documentation
- Zone II. (Clean Area) Assembly and Packing
- Zone III (Sterile Area) Sterilisation
- Zone IV (Issue Area) Storage and distribution

Check for proper sterilisation

- Bowie dick test
- Leak test

- Sterilisation test
- Batch monitoring test

Functions-

- Cleaning
- Processing
- Sterilization of all instruments, kidney trays etc.
- It helps in infection control process.
- It is responsible for optimum utilization of equipment resources of the hospital.

7. Radiology Department:

Location: Lower Ground Floor

Area:

- Reception Area
- Console Room
- Imaging service room
- Changing room-2

Different rooms for X-Ray, Mammography, MRI-1.5 Tesla, CT Scan 64 Slice, portable x-ray machine

Sonography:

Location: Ground floor

Area:

- Reception Area
- Procedure room: 2
- Reporting room

8. Laboratory:

Location: first floor

All laboratory services related to Biochemistry, Microbiology, Histopathology and Haematology.

Blood Bank is attached with the laboratory.

9. Physiotherapy and Rehabilitation Centre:

Location: first floor

Well trained team of 6 physiotherapists managing the department and providing rehabilitation therapy for joint disease, strokes, trauma etc.

Other facilities:

- Wax Therapy
- Hydro collar- hot pack
- Interferential Therapy
- IFT- Pain Relief
- Ultrasound therapy- piezoelectric effect
- TENZ
- Muscle Stimulator
- SWD etc

10. Medical Record Department:

Scope of Services:

- Maintenance of all medical record
- Storage of records: 1) OPD: 3 years
2) IPD: 5 years
3) Death/MLCs: lifetime
- Maintaining the integrity and confidentiality of all medical record
- Maintenance of MLC cases
- Numbering and filing of patient record.
- Completion of all incomplete records.

11. Food and Beverages:

Location: Lower ground floor

The F&B department is outsourced, and the quality of food is regularly monitored by the F&B executives and the dietician.

Scope of services:

- To provide well balance nutritious food to all in patients as well as patients for dialysis as per their needs.
- To serve staff and patients attendants
- To helps in improving the patient's condition by providing hygienic, proper and nutritious food as prescribed by the dieticians.

Provide 5 servings for the general ward patients and 8 servings to the semi private and private ward patients.

Types of diet:

- Normal full diet
- Liquid diet
- Soft diet
- Diet for diabetic patients
- Diet for renal patients
- Diet post cardiac surgery patients.

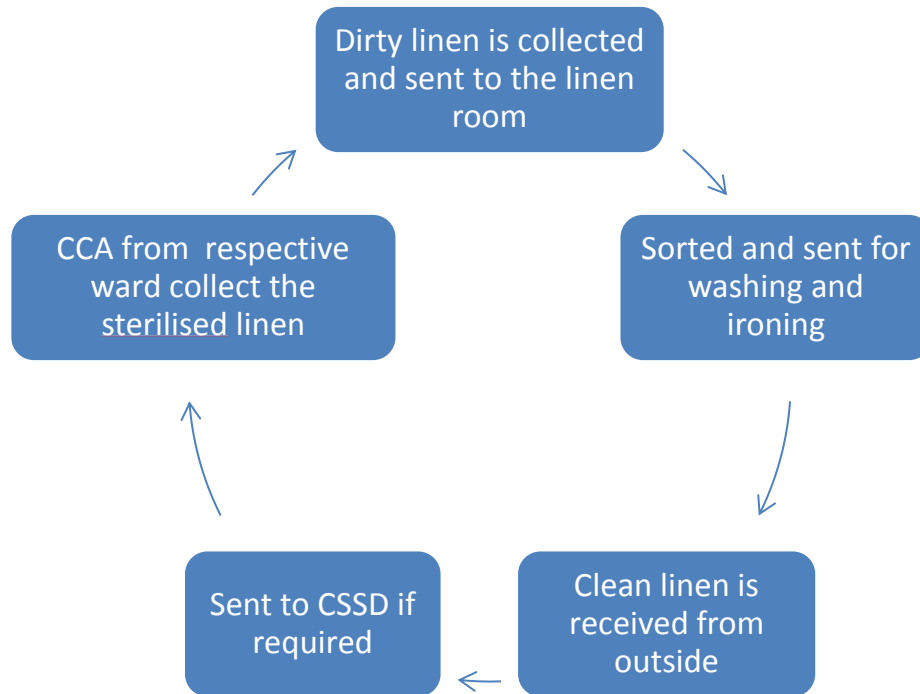
12. Housekeeping:

Housekeeping department is outsourced

Services provide:

- Maintain hygiene of the patients and the hospital
- Helping in patient's preparation
- Infection control
- Waste disposal

13. Line and Laundry:



Availability of coloured coded bags in each department. Orange colour is for serology positive patients and green bags for serology negative patients.

14. Pharmacy:

The hospital 3 different types of pharmacy:

- OPD Pharmacy
- IPD Pharmacy
- OT Pharmacy

Functions:

Dispense of drugs to all the admitted patients.

Dispense of drugs for the OPD patients.

Demand estimation according to the formulary, in the absence of formulary, establishment of specification for drug procurement

Furnishing of new drug information to consultants and other professional staff

Quality control of drugs purchased

Main Store-

- Location- lower ground floor
- Store receives all medicines, medical equipment's, instruments, consumables and other essential goods, printing and stationary material of hospital as ordered, and issues' as per the requirements to the departments.

15. Diagnostic Services:

Location: Ground Floor

Scope of services:

- Ultrasonography
- TMT
- Electrocardiography
- Echocardiography
- Electroencephalography
- Uroflowmetry
- Electromyography
- Pulmonary function test

Operational timings: 9 am to 6 pm.

16. Dialysis Department:

Location: Lower ground floor

Bed Capacity: 30 beds including 4 beds for serology positive patients

No of procedures done per day: 45-50 dialyses per day

Shift of dialysis: 7 am to 12 noon, 12 noon to 5 pm and 5pm to 8 pm.

Every patient is provided with a meal, included in tariff and the meal is prescribed by the dietician.

17. Mortuary:

Location: Lower ground floor

Temperature: 5-6 degree Celsius

Capacity: At a time four dead bodies can be kept together

Function:

- To keep the dead bodies in the hospital until the relatives claim them.
- To keep the dead bodies for post mortem (MLC Cases).

18. Security Services:

Security service department of the hospital is outsourced.

Functions:

- To provide security services to all the staff, patients, relatives and visitors
- To protect the hospital property within the premises
- To analyse threats and vulnerability in conjugation with the managements, police and others
- To control the movement of vehicular traffic inside the premises.

19. Billing and Finance Department:

Location: Ground floor

Operational timings: 9am to 5 pm for the finance department

24 hr IP bill service.

Functions:

- To provide salary to all the staff in a timely manner
- To provide payment to all the vendors and contractors
- Tracking the expenses of in patients on daily basis
- Timely discharge of patients related to financial clearance
- To provide accurate and timely financial information for decision making.

20. Maintenance Department:

Location: Lower ground floor

Functions:

- To maintain continuous electric supply to the hospital.
- To maintain the chilling plant room of the hospital
- To maintain the supply of medical gases
- To maintain the proper functioning of STP

Operational timings: 24hr.

Infrastructure:

Low tension room

Generator panel: 2 generators of 750 ampere each

Diesel tank- 24 kilolitres capacity

Sewerage treatment plan

Desk panel- control air handling unit

Chilling plant room

Gas manifold room

21. Human Resource Department:

Location: Mezzanine floor

Functions:

- Recruitment based on requisition form from respective department duly signed by In charge of the department, HR and facility director
- Induction and training programs- 3 days induction program for all new employees
- Performance appraisal ones in a year in the month of March
- Employee engagement activities such as birthday celebration, open house, and also on the job trainings such as fire safety. BLS training
- Grievance Handling
- Conduct employee exist interview

22. Fire safety Department:

Location: Lower ground floor

The hospital has 7 fire exist door in each floor. A total 26 functional fire exist doors
Sprinklers are located in the entire hospital with a distance of 6 mts between two sprinklers and
burst at 68 degree Celsius

Smokes detectors are also located in the entire hospital.

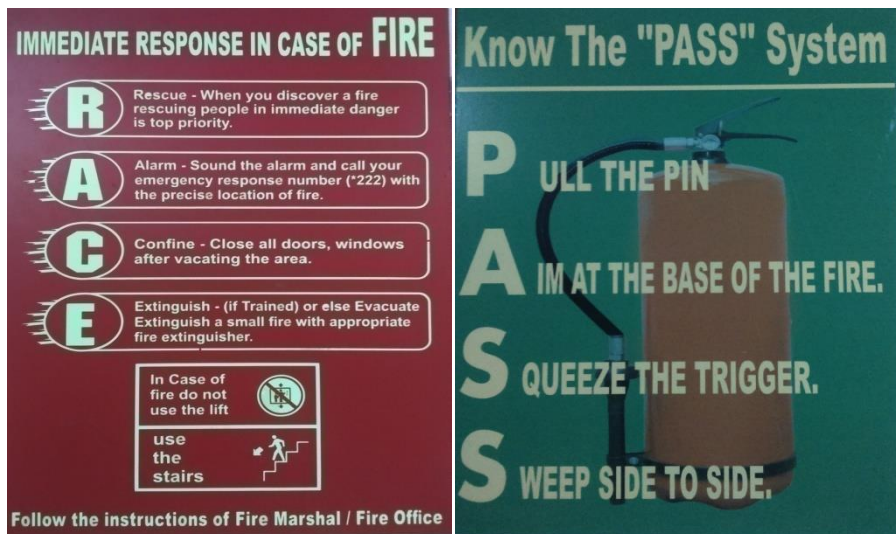
Fire Safety Equipment's:

- Horse Reel Drums 21
- Jockey Pump 01
- Alarm Valve 05
- Double Hydrant Valve 28

Hospital follows "PASS" and "RACE" protocols.

PASS: Pull Aim Squeeze Sweep for operating a fire extinguisher

RACE: Rescue Alarm Contain Extinguish, Evacuate.



2. PROJECT REPORT

A STUDY ON LABORATORY SERVICES THROUGH PROCESS MAPPING IN SUPERSPECIALITY HOSPITAL

**AT SMVD NARAYANA SUPERSPECIALITY HOSPITAL AT KAKRYAL NEAR
KATRA (JAMMU&KASHMIR)**

Project Guide-

Mr. GAURAV SHIVA (MANAGER QUALITY
&CLINICAL SERVICES) &

DR. GOUTAM SADHU

(PROFESSOR&INCHARGE RM IIHMR JAIPUR)

INTRODUCTION

DEPARTMENT OF LAB MEDICINE

Department of Laboratory Medicine is a clinical testing center attached to Shri Mata Vaishno Devi Narayana hospital, providing its services directly to both hospital patients as well as referral cases. It is open 24 hour a day. It 's a high tech lab with fully automated instrument which are directly interfaced with hospital information system and laboratory information system. Facility of stat tests (emergency) and sample is also outsourced for some tests to Dr. LAL path labs Delhi. The laboratory has a documented policy and procedure to ensure the protection of the patient's confidential information and this included the electronic storage and transmission of results. All staff of the laboratory has signed a declaration to the effect that he or she shall always confirm to the policy of client / patient confidentiality established by the unit. Laboratory services shall comply with all national standards and law

PURPOSE

To offer comprehensive testing services to assist in diagnosing disease, monitoring health and evaluating therapy for outpatient and inpatient including emergency and health checkup

SCOPE AND SERVICES

- Biochemistry
- Hematology
- Immunology
- Histopathology
- Clinical pathology
- Serology
- Microbiology

LAB EQUIPMENTS

Bichemistry Equipments :- Dimension Rxl Max,Centaur CP and Biorad D-10(Hba1c).

Hematology Equipments :-Beckman coulter Actdiff,sysmax CA-104.

Serology Equipments:- Vitros Eci and Transasia Elisa lisa scan Reader

Microbiology :- Biosafety Cabinet.

Histopathology :-Cryostat,Arcadia-H,Histocore,Automated Tissue Processor,Microtome

LIMS

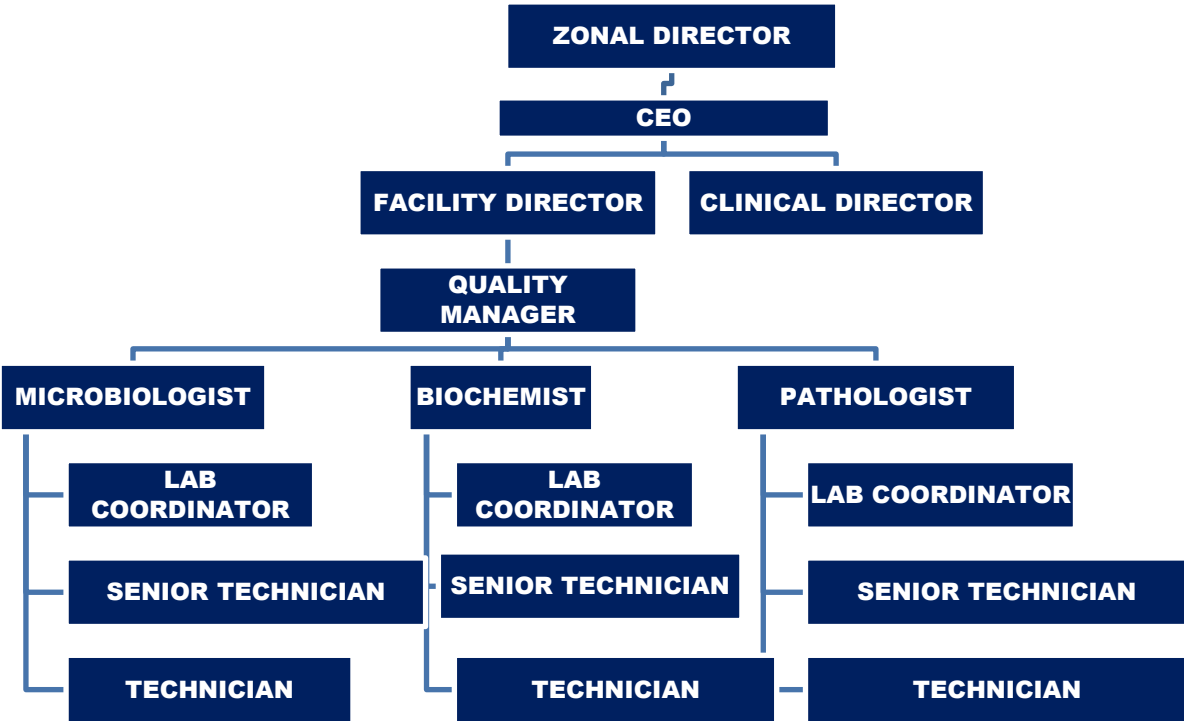
NH in partnership with ICT partner has installed a software known as HINAI lab .HINAI LAB is a cloud based system it serves for million of people that are connected on a cloud based technology.



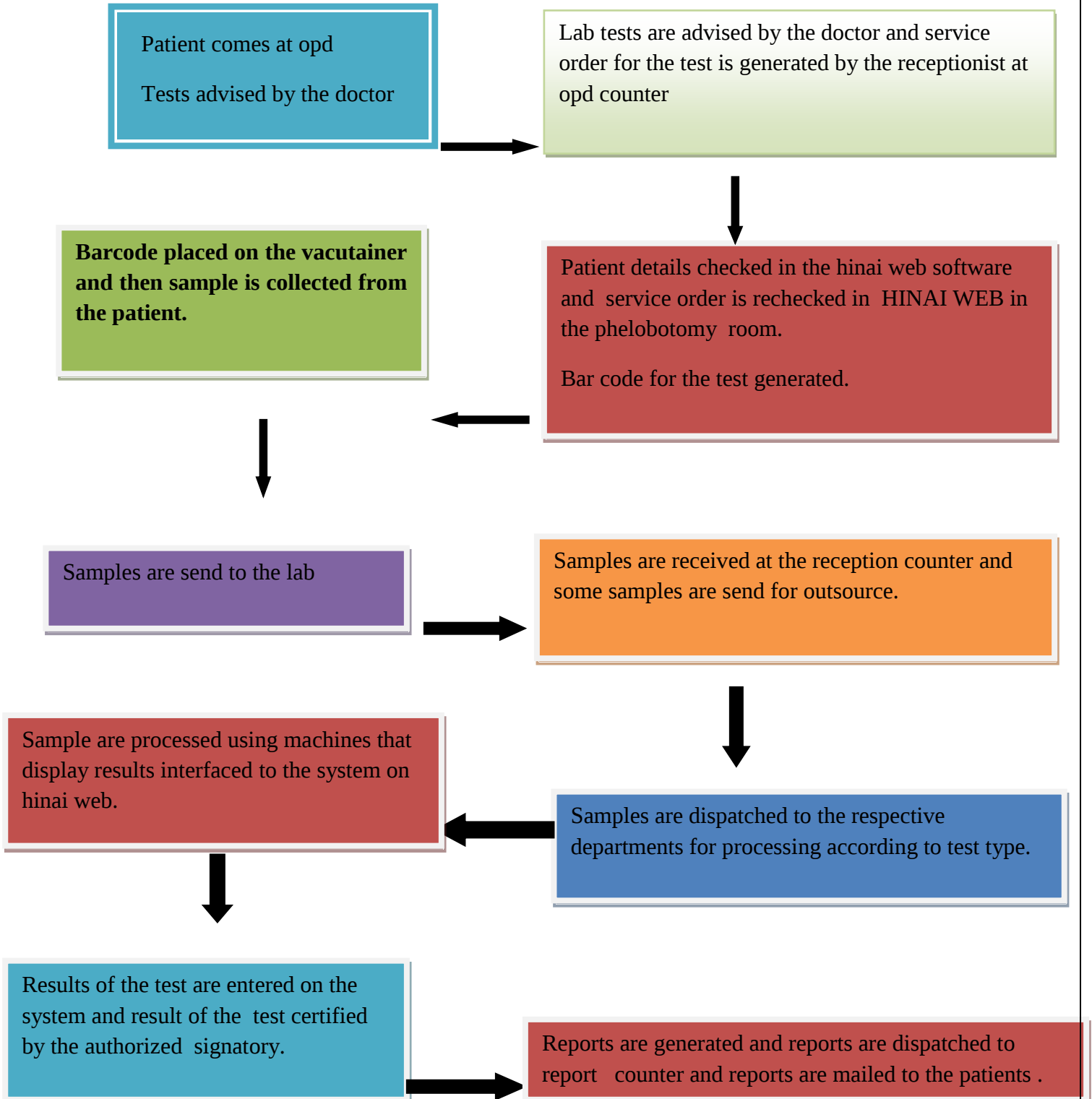
It provides with a system that starts from billing the test, ordering the test on the hinai web, identification of specimen, provides with a unique barcode for each test that is tracked by the machine during processing and prevent from any wrong investigation performed if placed properly on the sample. It has special provision for detecting previous test results and making comparision with current result test. It has helped in sharing the load of manual

enter result are directly interfaced on the system through online and online result certification.

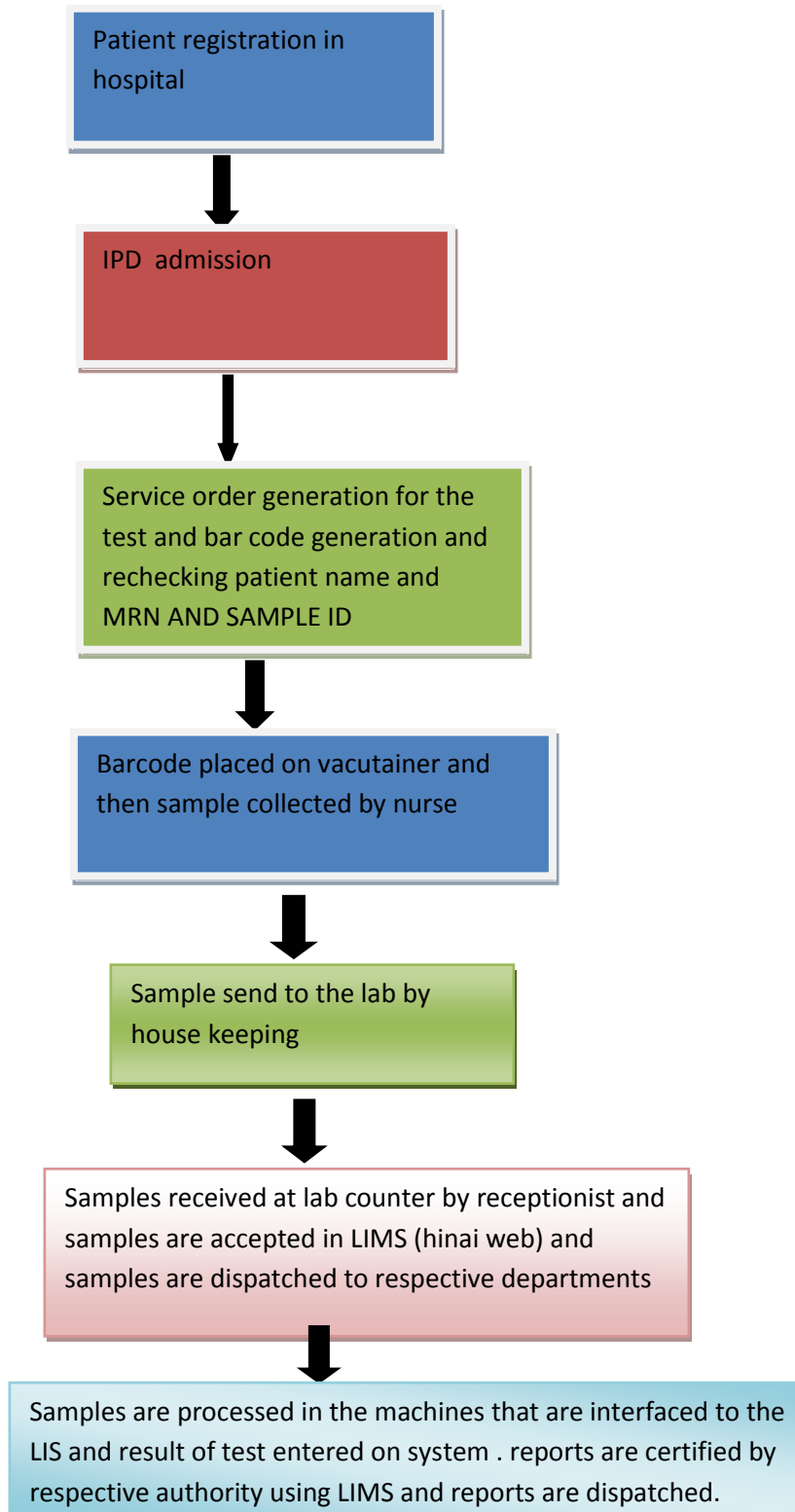
ORGANIZATION STRUCTURE AND STAFFING



IDEAL LABORATORY PROCESS FLOW AT OPD



IDEAL LABORATORY PROCESS FLOW AT IPD



LITERATURE REVIEW

Clinical Pathologists today are more bothered about the technical and analytical part of the test instead of assisting in diagnostic testing. Clinicians have to decide for test selection and test interpretation. It is therefore necessary for clinical pathologist to engage in clinical value innovation. The role of clinical laboratory service is to improve patient care by improving the test results and providing timely diagnostic assistance. For better future prospects it is important to have strategic positioning of the clinical lab with more focus on improving efficiency and effectiveness. There is more need for focusing knowledge of clinical laboratory pathologist to provide major contribution for in vitro diagnostic services. (1)

The appropriate ordering and interpretation of lab results is important for accurate diagnosis of patient illnesses. Sometimes wrong test is ordered and performed due to lack of poor communication between lab technician and physicians and CPOE. Besides these issues sometimes the lab failed to notice that the test was ordered stat today lab has evolved a lot and most of the things that are learned by doctors and nursing and lab technician are no more applicable leading to inappropriate ordering of the test results. (2)

RATIONALE OF STUDY

Laboratory is a basic source of getting information about health care data. The hospital laboratory services must be consistent to correctly assess the various illnesses of patients.

The hospital laboratory is probably one of the most underutilized resources in the healthcare delivery system, not only from the point of view of the efficiency of the services but also from the potential impact it can have on health outcomes. Modern laboratories face significant challenges in terms of appropriate timing and collection of samples, identification of samples and fast delivery to the laboratory while ensuring accurate reporting of results, with interpretation and easy access from the patient medical record. This study involves process mapping using flow charts to observe the steps involved in lab investigations starting at the time when the tests are advised by the doctor, then sample collection, sample receiving at the lab, sample processing and report certification and report dispatch by tracking every step. By this study one can identify the common problems at each step, what are the reasons for report delay and various errors seen at all process levels. By observing the processes involved in whole lab investigation in order to identify the gaps from ideal process to eliminate the wrong steps and provide recommendations for the improvement as laboratory services are the major sources of the revenue generation on a regular basis in hospitals. Most of the major diagnosis are dependent on lab investigations results; therefore it is important that tests are done accurately without any delay and reports are provided on time. This study is a platform to observe the challenges at each and every step of the entire process. It is important to know how to collect specimens and perform tests correctly in order to obtain correct results. To do all this, it would be made sure that all steps are followed sequentially and correctly in proper time. Without good quality lab services test results may be wrong and if they are not currently accurate, consistent and dependable every effort should be made to raise them to an acceptable standard.

RESEARCH QUESTION

- What is the current process flow in department of lab medicine at SMVDNH katra?
- Are there any gaps leading to delays in the current process?
- What can be possible solutions to improve the process flow?

OBJECTIVE OF STUDY

- To study the current process flow of laboratory department
- To identify the errors of laboratory services.
- To provide suggestions for improvement
- To identify the existing lacunae and problems of laboratory services

RESEARCH METHODOLOGY

Study type: The study is descriptive in nature.

Study method: A prospective study has been done tracking the process flow by observing the processes involved in sample collection, sample receiving , sample processing and report certification.

Sample size: 290 samples are taken for study.

Study Area: The location of study was laboratory of Shri Mata Vaishno Devi Narayana Super speciality hospital (first floor)

Study population; Patients advised for lab investigations from OPD, IPD first floor and IPD third floor and A&E department.

Study period was from 10 april,2017 to 20 may,2017.

Sampling technique: Purposive sampling technique.

MODE OF DATA COLLECTION

- Observation
- Indepth interviews
- Secondary data from LIMS

DATA COMPILATION, ANALYSIS AND INTERPRETATION

The data is gathered using direct observation of the process involved at each step of the whole investigation

Data is entered manually and checked for consistency and completeness then analysis is carried out using MS Excel 2007 software

Step Number	Current Step in Process	Starts with or Is Handled By	Ends With (as needed)
1	Requests test	Doctor	ICU nurse
2	Input samples and lab investigations in LIMS	ICU nurse	
3	Inputs samples into computer, which generates barcode tracker	ICU nurse	
4	Creates hard copy of service order of test	ICU nurse	
5	Put barcode on the sample	ICU nurse	

6	Takes samples to sample receiving station, which receives samples from all locations in the hospital and redirects them to lab	HK	SRS
7	Enters MRN in computer system to match patient to barcode	SRS	
8	Checks tests, tubes, etc.	SRS	
9	Sorts trays by department and puts into separate trays	SRS	
10	Prepares batches of tests	SRS	
11	Takes tests to laboratory for processing	SRS	Lab tech
12	Put the sample in centrifuge machine	Lab tech	
13	Collect sample from centrifuge	Lab tech	
14	Puts samples into test machine trays	Lab tech	
15	Loads trays into test machines	Lab tech	
16	Administers tests	Lab tech	

17	Informs ICU nurse of test reports verbally	Lab tech	ICU nurse
18	Enters test results into computer system	Lab tech	
19	Prints reports of test results	Lab tech	
20	Provides reports to head of department for approval	Lab tech	Head of department (HOD)
21	Signs results in batches	HOD	GHK
22	Delivers reports	ICU NURSE	ICU nurse
23	Informs ICU doctors of test results	ICU nurse	

Table no. 1 The above table shows the process flow for making lab tests in ICU department

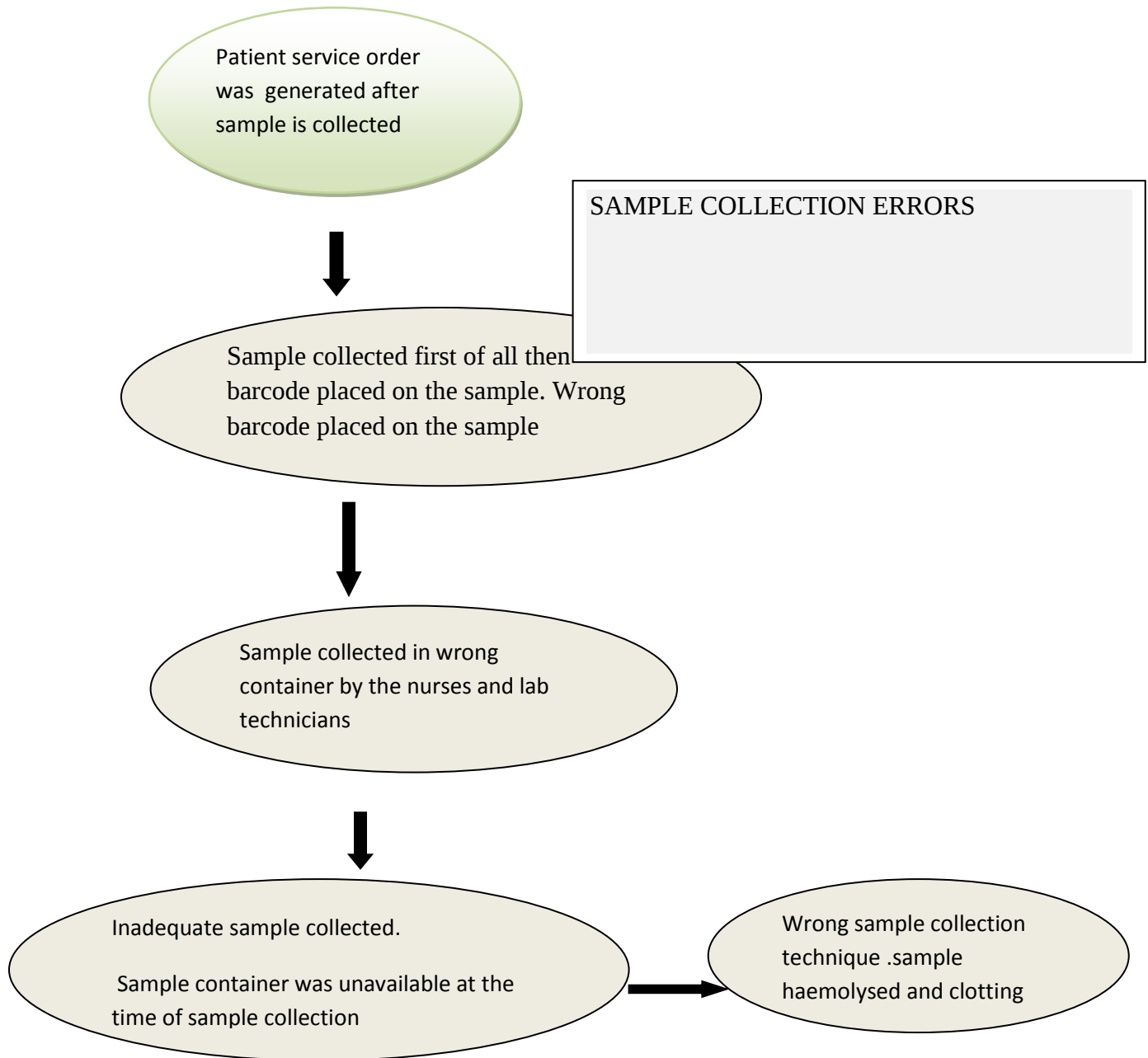
OBSERVATIONAL PROCESS FLOW

Various errors were found which indicated deviation from standard process flow leading to delay in report certification and report dispatch.

Various errors were observed at each stage of sample collection , sample sending to the lab, sample receiving in the lab , sample processing till report certification and report dispatch.

The common errors from the ideal standard process flow is listed below in the following flow chart

RESULTS AND OBSERVATIONAL FINDINGS



Huge delay in sample sending to the lab after collection



Samples send with wrong barcodes. samples send without barcodes



Wrong samples send to the lab



Delay in sample receiving by the lab receptionist



Sample with wrong service order accepted



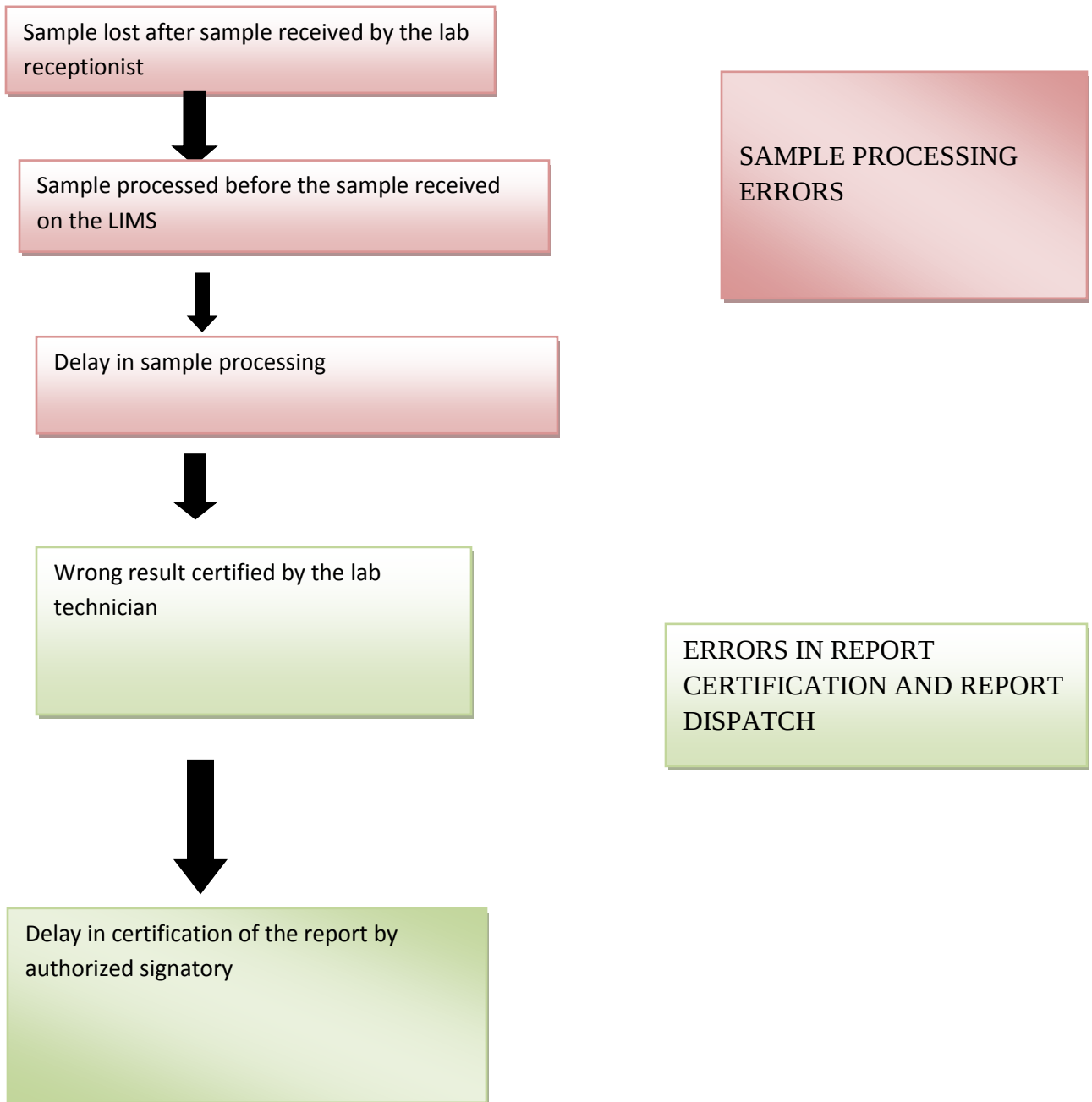
Wrong sample accepted



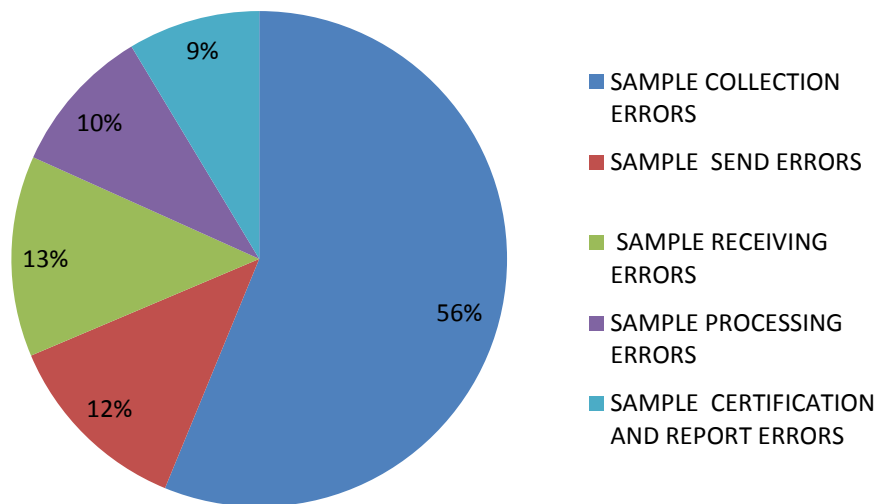
Sample skipped for outsourcing and sample lost

ERRORS DURING SAMPLE SENDING

ERRORS IN SAMPLE RECIEVING



PERCENTAGE DISTRIBUTION OF ERRORS AT 5 LEVELS OF PROCESS FLOW



SAMPLE COLLECTION ERRORS	163
SAMPLE SEND ERRORS	36
SAMPLE RECEIVING ERRORS	38
SAMPLE PROCESSING ERRORS	28
SAMPLE CERTIFICATION AND REPORT ERRORS	25
TOTAL	290

FIGURE 1INTERPRETATION

The above figure shows errors at each stage of process flow.

From the figure it is clear that the maximum percentage of error is seen at the time of sample collection followed by sample receiving and sample send errors In order to get more detailed information the errors at individual process level is seen to find out the reasons for the error at each individual process level and to see their contribution in each process level.

(1) FINDINGS DURING SAMPLE COLLECTION

SAMPLE COLLECTION ERRORS	no of samples
sample collected in wrong container	18
sample clot	4
sample haemolysed	3
wrong barcode placed on sample	41
sample collected before service order and barcode generated	32
barcode placed after sample collected	45
inadequate sample collected	14
unavailability of sample container	6
TOTAL	163

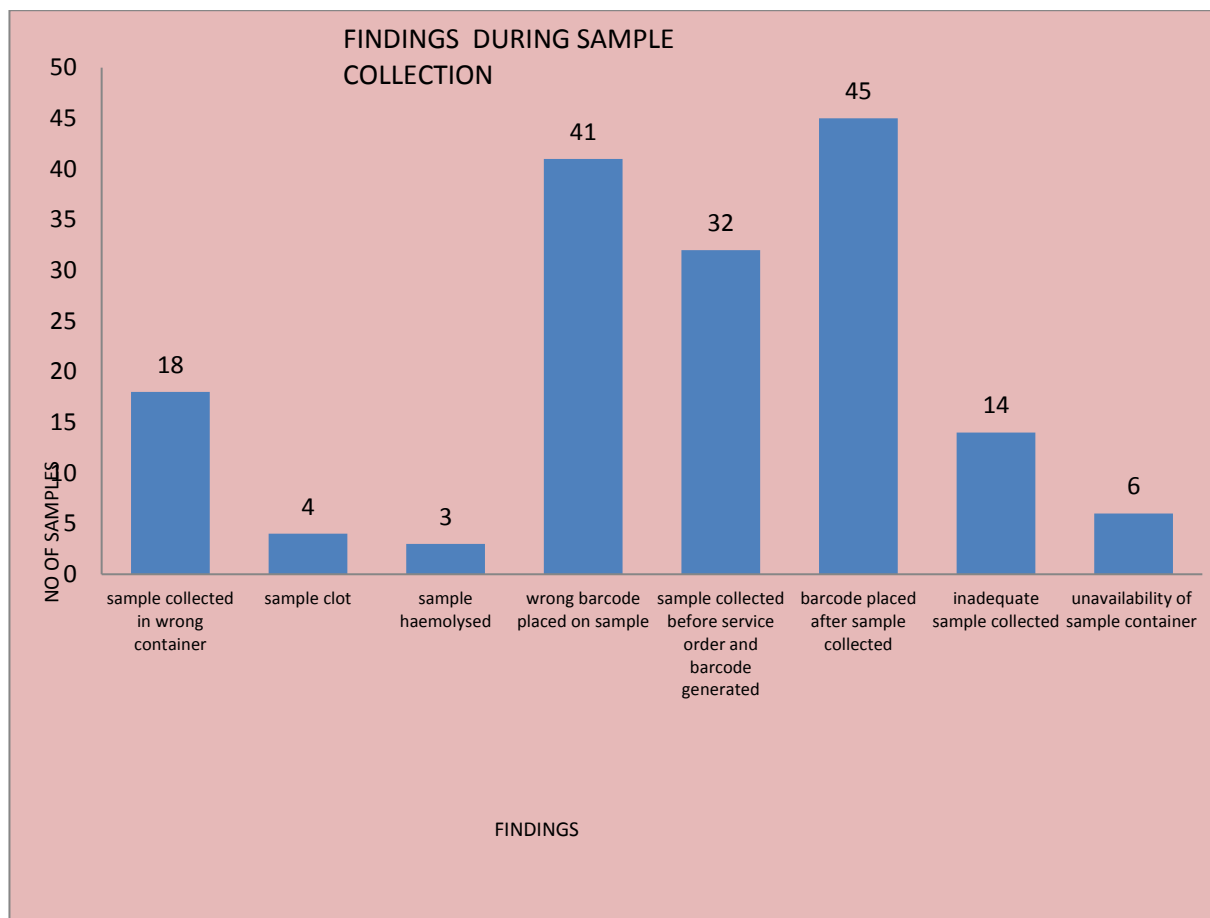


FIG 2

INTERPRETATION, RESULTS & DISCUSSION

The above diagram shows the no. of samples found with errors during sample collection out of total 290 samples taken for whole study 163 samples were detected with collection errors

Out of 163 samples with collection errors detected maximum no. of cases are seen in which wrong sequence for sample collection is followed that shows 45 samples are collected with barcode placed on it after the sample is collected. It can have serious implications as it can lead to mixing of samples and placement of barcodes on wrong vacutainer and lead to wrong results. This error is followed by 41 samples with wrong barcode placed on it and 18 samples which are collected in wrong container this can clearly be understood from lack of knowledge of fresher staff and more manpower of inexperienced staff.

(2) FINDINGS DURING SAMPLE SENDING TO LAB

SAMPLE SEND ERRORS	no. of samples
delay in sample sending after collection	5
sample send without barcodes	25
wrong sample send	6
TOTAL	36

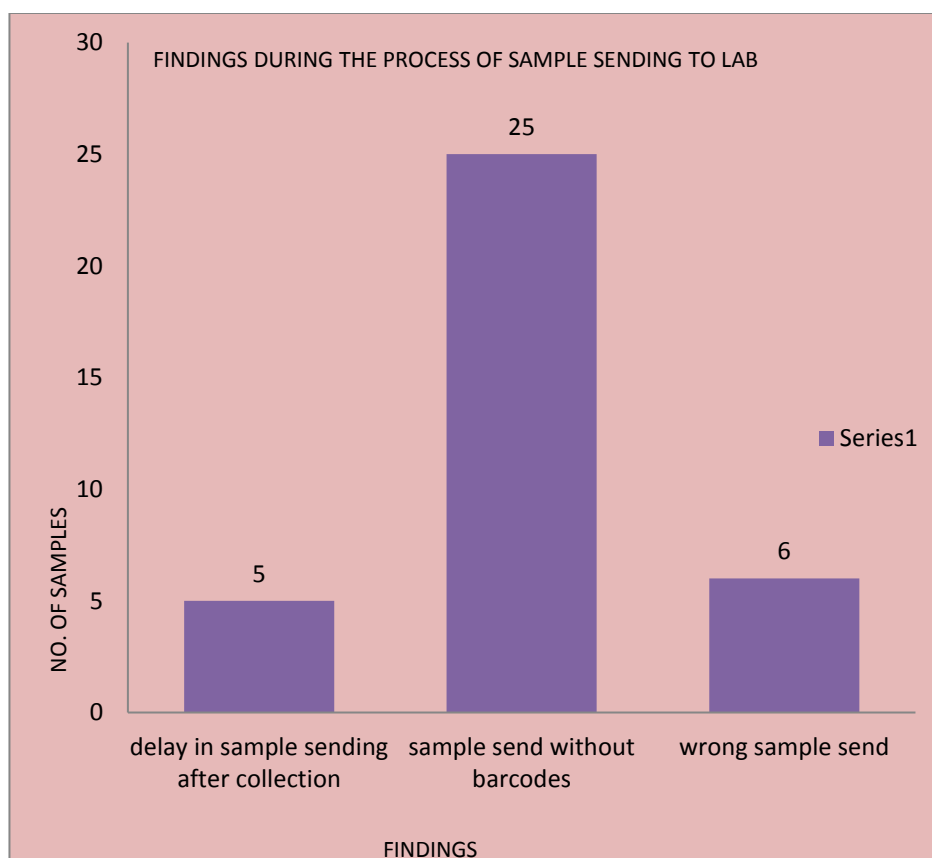


FIG 3 SAMPLE SEND ERRORS

INTERPRETATIONS, RESULTS AND DISCUSSION

The above figure shows errors during the stage of sample send to the lab from other departments. Out of the total 290 samples taken for study it is seen that 36 cases were detected with sample send errors and most contribution is by those samples without barcodes they account for 25 samples out of 36. It can have serious implications as it can lead to misplacing of samples, samples would not be detected by processing machine scanner and sample processing would not be possible. Without barcodes it will be difficult to identify the sample and identify the investigation to be undertaken.

(3) FINDINGS DURING THE PROCESS OF SAMPLE RECEIVED BY LAB

SAMPLE RECEIVING ERRORS	no. of samples
sample with wrong service order accepted	14
delay in sample receiving	20
wrong sample accepted	2
sample skipped for outsourcing	1
sample lost	1
TOTAL	38

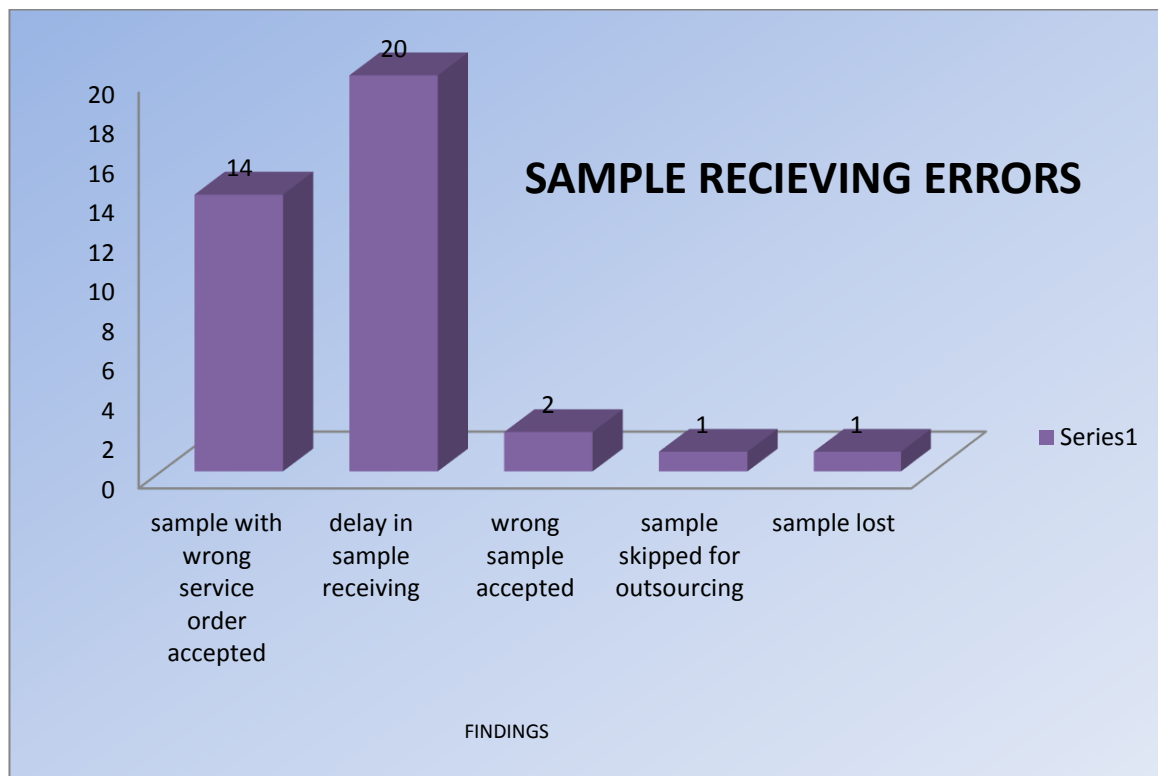


FIG 4INTERPRETATIONS, RESULTS AND DISCUSSION

The above figure shows the errors occurred from ideal process flow at the time of sample receiving. It is seen that out of 290 samples, 38 samples are detected with errors at the time of sample receiving and out of 38 total cases seen with sample received errors , 20 cases are found with delay in sample received .If the samples are received late then automatically processing will start late and storage of blood samples can lead to false hematology results.

Hence it is important to receive the sample at the time when it is sending to prevent false results and further report delay.

(4) FINDINGS DURING SAMPLE PROCESSING

SAMPLE PROCESSING ERRORS	no. of samples
sample processed before sample received on system	16
sample lost after receiving	1
delay in processing	11
TOTAL	28

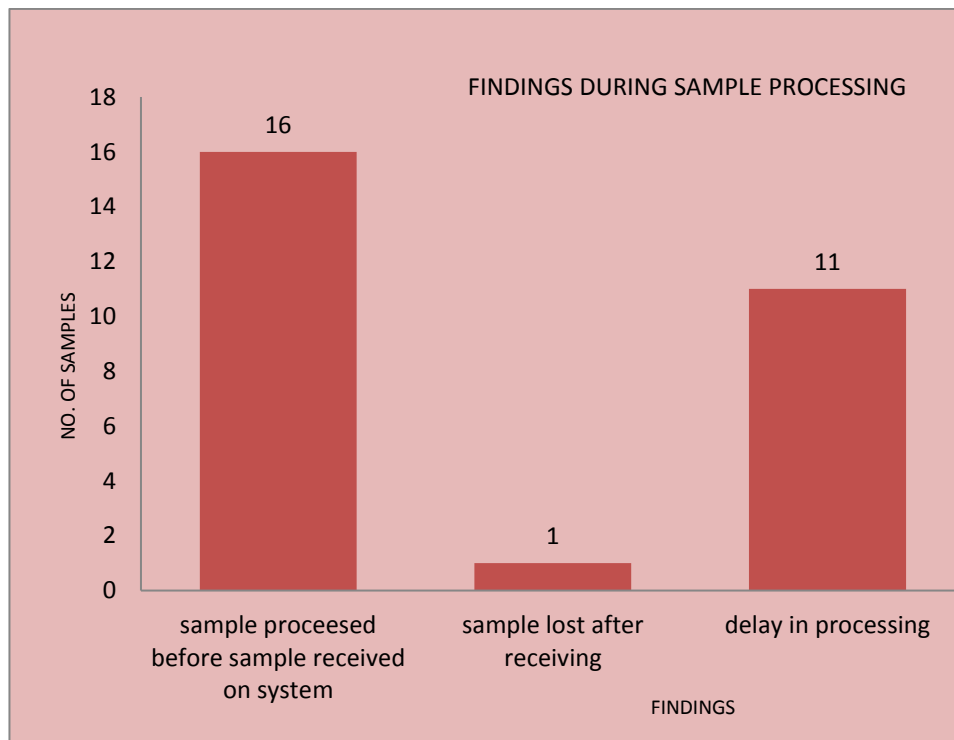


FIG5 INTERPRETATION, RESULT AND DISCUSSION

The above figure shows the errors encountered during the stage of sample processing done by the lab technicians .From the study of 290 samples it is seen that the 28 samples detected with processing errors and out of total cases of 28 samples with processing errors 16 samples are found with processing started before the sample is accepted on the LIMS system and 11 samples are found in which there occurred delayed processing of the sample if the

sample is processed late it will automatically delay the process of report certification and report dispatch so diagnosis and treatment of the patient will be delayed

(5) FINDINGS DURING REPORT CERTIFICATION AND DISPATCH

RESULT CERTIFICATION AND REPORT DISPATCH	no. of samples
wrong result certified	1
delay in certification	24
TOTAL	25

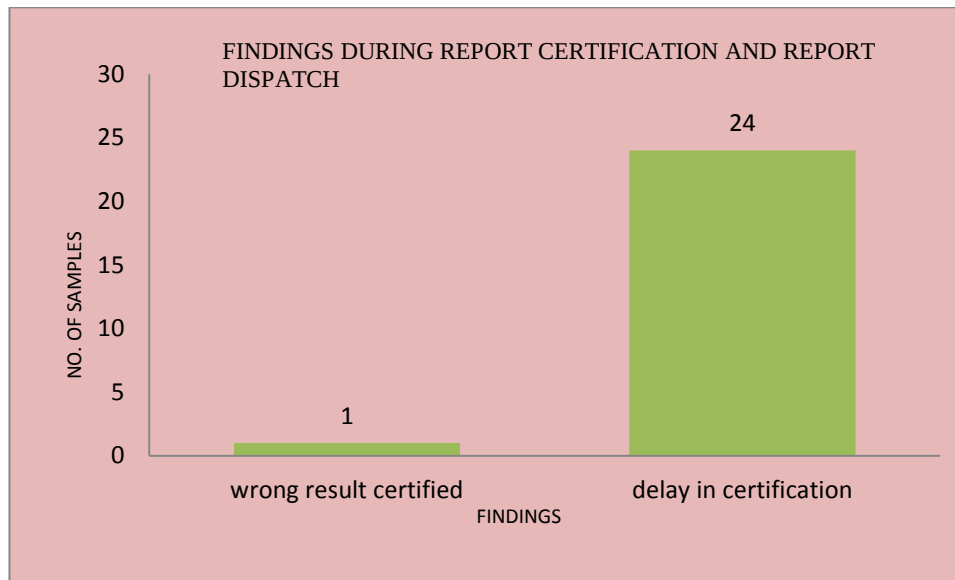


FIG INTERPRETATION, RESULT AND DISCUSSION

The above figure shows the errors detected during the report certification and report dispatch

Out of total 290 samples taken for whole process study 25 were found to be with certification errors. 24 samples out of total 25 samples with this error were found to have caused by delay in report certification

CONCLUSION

It has been observed from the study conducted on samples that most of the errors from the normal process flow in the laboratory occurred at the time of sample collection by the lab technicians and nursing staff and in most of the cases it has been seen due to the lack of knowledge by the nursing staff and lab technicians. Most of the problems encountered can be overcome by timely training of nursing staff and laboratory staff. There should be no hurry in communicating the detail and ordering the tests most of the time it has been seen that wrong service order with wrong test were ordered. In ipd problem of stock was observed it was seen that vacutainer was out of stock and was unavailable at the time of sample collection. Daily stock monitoring of department should be done at least for those tests which are ordered on regular intervals their vacutainer should be available without any delay. Sample should be send to the lab at first without any delay and for this it is necessary to send housekeeping staff at first the sample is collected. The person operating at computer windows ordering the test should be the same collecting the sample as in my study I have seen multiple people involved for ordering lab test and then generating bar code and sample is collected by another person. The process of service order generation, bar code generation and placement on vacutainer and sample collection from the patient should be done by the single person for the same patient in order to avoid chaos and prevent mixing and misplacement of sample.

SUGGESTIONS

- 1 Timely training and education of nursing and lab technicians for following ideal sequence for making and doing lab investigations, educations about proper placement of sample in right sample container and correct barcode placement for proper tracking of sample
- 2 Proper monitoring of stock of vacutainer.
- 3 Proper monitoring of LIS system by lab coordinator for checking pending and interfaced cases to prevent report delay.
- 4 Proper monitoring, calibration and maintenance of equipment's
- 5 Deploy trained staff for making and ordering tests on the LIS.
- 6 Effective communications should be there between the doctors, nurses, lab technicians and housekeeping in order to guide each other in making right tests at the right time.
- 7 A Committee of 5 members consisting of nursing superintendent, manager operations, lab coordinator, HOD of lab, housekeeping supervisor should be made for discussing the issues and making improvements. They can discuss important issues like TAT management for lab test, preventing report delay and briefing of policies and SOP on frequent basis to staff.

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