Dissertation Title

"STUDY ON TURN AROUND TIME IN NUCLEAR MEDICINE DEPARTMENT" OF NATIONAL HEART INSTITUTE"

A Dissertation Proposal for

Post Graduate Diploma in Health and Hospital Management

By

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Certificate of Internship Completion Date:.....

TO WHOM IT MAY CONCERN

This is to certify that Ms. ADITI GOTTLIEB has successfully completed her 3 months internship in our organization from January 11, 2013 to April 30, 2013. During this internship she has worked on TURN AROUND TIME OF NUCLEAR MEDICINE under the guidance of me and my team at IINMAS. During the time of internship she was found hardworking, sincere and dedicated. We wish her good luck for her future assignments

(Signature)

Dr. A PANDEY **(Name)**

Sr CONSULTANT **Designation**

Certificate of Approval

The following dissertation titled "**TO STUDY TURN AROUND TIME IN NUCLEAR MEDICI NE DEPARTMENT OF NATIONAL HEART INSTITUTE**" is hereby approved as a certified study in management carried out and presented in a manner satisfactory to warrant its acceptance as a prerequisite for the award of **Post- Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation

Name	Signature
DR. BRIJENDER SINGH DHILLON	1/5/13
PAWAN TANEJA	
MEENAKSHI GAUTAM	

Certificate from Dissertation Advisory Committee

This is to certify that **Ms. ADITI GOTTLIEB** , a graduate student of the **Post- Graduate Diploma in Health and Hospital Management**, has worked under our guidance and supervision. He/She is submitting this dissertation titled " TURN AROUND TIME IN NICLEAR MEDICINE DEPARTMENT" in partial fulfillment of the requirements for the award of the **Post- Graduate Diploma in Health and Hospital Management**.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Faculty Mentor		Organizational Advisor	
Designation		Designation	Centre head
IIHMR		Organization	INMAS
New Delhi		Address	NHI
Date		Date	7.6.13

FEEDBACK FORM

Name of the Student: ADITI GOTTLIEB

Dissertation Organisation: IINMAS, NHI.

Area of Dissertation: Nuclear Medicine Department.

Attendance: Full Attendance.

Objectives achieved: The induction of Aditi into nuclear medicine department has been a wonderful experience and she has managed the department well. All tasks

Deliverables: given were promptly and properly addressed.

Strengths: Responsible, hard working, sincere & can manage well.

Suggestions for Improvement:

Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)

Date: 30/4/13
Place: NEW DELHI

Acknowledgement

I would like to extend my heartfelt gratitude towards all the personnel at "National Heart Institute" who helped me get through this project.

This project would never have been possible without those who went out of their way to help me.

I start expressing my sincere gratitude to**, Dr. Awadhesh Pandey** who gave me the opportunity to work in this renowned organization.

Sincere thanks to all staff at all levels, for helping me at each and every step of my work. Heartiest gratitude to them for making my stay and work at this place a memorable one.

Last but not the least I would like to thank my institution, my faculty members and my mentor **Mrs. Kirti Udayi** without whose guidance this project would have been a distant reality.

Aditi Gottlieb

Signature

Hospital Profile

NATIONAL HEART INSTITUTE

National Heart Institute, brain child of doyen of Cardiology in India, Dr. S. Padmavati, was inaugurated in 1981 by the then Prime Minister of India, Mrs.Indira Gandhi, as the Clinical Research and Medical Care Delivery wing of All India Heart Foundation, with the aim of providing State-of-art Modern Cardiac Care Technology to the financially impoverished section of the society. It was intended to be a self sufficient, stand alone facility and therefore it was decided that people with paying capacity should also be taken up and the surplus generated from them be channelized for the treatment of the poor.

The National Heart Institute is the Research & Referral tertiary care Heart Hospital of the All India Heart Foundation, which acts as a nucleus for diagnosis and treatment of heart ailments and allied diseases and is equipped with state of the art equipments. Surgical services include all kinds of closed and open Heart Surgeries like Coronary Artery Bypass Surgery, off pump bypass surgery (beating heart surgery), valve repair & replacement surgeries, aortic / carotid surgeries, congenital heart surgeries including blue babies and minimally invasive (Key hole) surgeries. It has modern Cath lab facilities where procedures like Angiographies, Angioplasties, Stenting of the Coronary arteries, valvotomies correction of birth heart defects and closure of holes of the heart, Electrophysiological studies, Radio Frequency ablation, Rotablation, Intra-vascular ultrasound, pacemaker and internal defibrillator implantation are carried out. Highly qualified staff trained in India & abroad, with extensive experience in Cardiology & Cardiac Surgery service these areas.

Apart from indoor treatment, the Institute also provides comprehensive medical check-up, i.e. Executive health check-ups, at nominal rates with a view to ensuring good physical conditioning and health of all individuals. Cardiac patients with other ailments are also admitted to this hospital, as specialists for diseases other than heart are available round the clock for consultation and treatment.

The Institute has been recognized for open heart surgeries, coronary artery bypass surgery, angiography and angioplasties and other specialized cardiac treatment by the Central Govt. Health Scheme (CGHS), Employees State Insurance (ESI), and Employee Contributory Health Scheme (ECHS), besides the Governments of Himachal Pradesh, Haryana, Madhya Pradesh, Mizoram and Govt of NCT of Delhi. Ministry of Defense, Office of the Director General of Armed Forces Medical Services and Directorate General of Medical Services Naval Headquarters has recognized NHI for treatment of their employees and their families. 122 Public sector bodies, almost all the TPAs and International Organizations like World Health Organization & UNICEF are also empanelled with the National Heart Institute.

Keeping in tune with its ethos of service to the humanity, National Heart Institute carries out regular Community outreach programmers (heart camps) and also ‘Executive Health Checks’ and ‘Recruitment Checks’ to detect cardiac problems early and take remedial action

Teaching and training programmed in the specialties of Cardiology & Cardiovascular & Thoracic Surgery. It also carries out research in all facets of Cardiology & Cardiac Surgery. National Heart Institute is recognized as a Collaborative Centre of WHO in Preventive Cardiology since 1983. It is an affiliate of the World Hypertension League and Heart Beat International. National Heart Institute lays special emphasis on "Lifestyle Disorders" and caters to outdoor consultation, education and counseling on Diabetes, obesity, cholesterol related diseases, thyroid disorders, alcohol and smoking. Indoor care for Diabetes & Lifestyle disorders are taken care of. The hospital has a department of Pulmonologist and Sleep Medicine which is equipped with sophisticated machines and is manned by dedicated Pulmonologists, Thoracic Surgeons and Physiotherapists.10% indoor beds are earmarked for poor patients having monthly income of Rs.4000/- and below and the hospital regularly provides free treatment to such patients and lots many at subsidized rates. The hospital also runs free OPDs for two hours on all working days. In collaboration with Heartbeat International; the hospital provides free Cardiac Pacemakers for needy patients.

INTRODUCTION

It has been estimated (UNSCEAR, 2000) that worldwide there are about 2000 million x-ray Studies, 32 million nuclear-medicine studies and over 6 million radiation therapy patients Treated annually, and the numbers are constantly increasing.
The use of radiation for medical diagnostic examinations contributes over 95 % of the manmade Radiation exposure and is only exceeded by natural background as a source of

Exposure (UNSCEAR, 2000). **Nuclear medicine** is a medical specialty involving the application of radioactive substances in the diagnosis and treatment of disease.

In nuclear medicine procedures, radio nuclides are combined with other elements to form chemical compounds, or else combined with existing pharmaceutical compounds, to form radiopharmaceuticals. These radiopharmaceuticals, once administered to the patient, can localize to specific organs or cellular receptors. This property of radiopharmaceuticals allows nuclear medicine the ability to image the extent of a disease process in the body, based on the cellular function and physiology, rather than relying on physical changes in the tissue anatomy.

Nuclear Medicine is a branch of medical science where radio nuclides are used for diagnosis and treatment of human diseases. Discovery of artificial radioactivity and development of nuclear reactors and particle accelerators have played a significant role in radiotracer technology. Nuclear medicine imaging and non-imaging procedures provide important information about functional status of the body organs. Radionuclides are also used for therapy of malignant and non-malignant conditions. A lot of progress has taken place over the past few years in therapeutic nuclear medicine. With the use of suitable radiopharmaceuticals targeted therapy is also possible. In nuclear medicine imaging, radiopharmaceuticals are taken internally, for example intravenously or orally. Then, external detectors (gamma cameras) capture and form images from the radiation emitted by the radiopharmaceuticals. This process is unlike a diagnostic X-ray where external radiation is passed through the body to form an image.

Giving larger radiation exposures can reduce the noise in an image, and make it more photographically appealing, but if the clinical question can be answered without this level of detail, then this is inappropriate. The radiation dose from nuclear medicine imaging varies greatly depending on the type of study. The effective radiation dose can be lower than, or comparable to, or can far exceed the general day-to-day environmental annual background radiation dose. The end result of the nuclear medicine imaging process is a "dataset" comprising one or more images. In multi-image datasets the array of images may represent a time sequence (i.e. cine or movie) often called a "dynamic" dataset, a cardiac gated time sequence, or a spatial sequence where the gamma-camera is moved relative to the patient. SPECT (single photon

emission computed tomography) is the process by which images acquired from a rotating gamma-camera are reconstructed to produce an image of a "slice" through the patient at a particular position. A collection of parallel slices form a slice-stack, a three-dimensional representation of the distribution of radionuclide in the patient.

There are several important principles of radiation protection, the main one being that radiation dose should always be kept as low as reasonably achievable (ALARA). Although these practices are essentially basic, it can be challenging to apply them as the number of diagnostic procedures and types of imaging equipment continue to expand. Even though new radiology equipment has drastically improved image quality and speed, it is now much easier to expose patients to excessive amounts of radiation, making it necessary for healthcare professions to be continually educated about radiation safety to protect their patients and themselves. The general population also is more aware of radiation risks than ever before, and as a result, they demand and deserve accurate information regarding radiation protection.

Nuclear medicine is a medical specialty involving the application of radioactive substances in the diagnosis and treatment of disease.

In nuclear medicine procedures, radionuclide are combined with other elements to form chemical compounds, or else combined with existing pharmaceutical compounds, to form radiopharmaceuticals. These radiopharmaceuticals, once administered to the patient, can localize to specific organs or cellular receptors. This property of radiopharmaceuticals allows nuclear medicine the ability to image the extent of a disease process in the body, based on the cellular function and physiology, rather than relying on physical changes in the tissue anatomy. In some diseases nuclear medicine studies can identify medical problems at an earlier stage than other diagnostic tests. Nuclear medicine, in a sense, is "radiology done inside out" or "endo-radiology" because it records radiation emitting from within the body rather than radiation that is generated by external sources like X-rays.

Treatment of diseased tissue, based on metabolism or uptake or binding of a particular ligand, may also be accomplished, similar to other areas of pharmacology. However, the treatment effects of radiopharmaceuticals rely on the tissue-destructive power of short-range ionizing radiation.

In the future nuclear medicine may provide added impetus to the field known as molecular medicine. As understanding of biological processes in the cells of living organism expands, specific probes can be developed to allow visualization, characterization, and quantification of biologic processes at the cellular and sub cellular levels. Nuclear medicine is a possible specialty for adapting to the new discipline of molecular medicine, because of its emphasis on function and its utilization of imaging agents that are specific for a particular disease process.

Types of nuclear scans

Bone scan: A bone scan is a test to help to find damage to the bones, find cancer that has spread to the bones, and watch problems such as infection and trauma to the bones. A bone scan can often find problem days to months earlier than a regular X-ray test.

For a bone scan, a radioactive substance is injected into a vein in your arm. This substance, called a tracer, travels through your bloodstream and into your bones. This could take several hours.

A special camera takes pictures of the tracer in your bones. Areas that absorb little or no amount of tracer appear as dark or "cold" spots. This could show a lack of blood supply to the bone or certain types of cancer.

Areas of fast bone growth or repair absorb more tracer and show up as bright or "hot" spots in the pictures. Hot spots may point to problems such as arthritis, a tumor, a fracture, or an infection.

STRESS THALLIUM: Thallium stress test is a nuclear imaging method that shows how well blood flows into the heart muscle, both at rest and during activity.

The test is done to see whether your heart muscle is getting enough blood flow, and therefore enough oxygen, when it is working hard (under stress).

Your doctor may order this test to determine:

- How well a treatment (medications, angioplasty, heart surgery) is working
- Before you start an exercise program or have surgery, if you are at high risk for heart disease or complications
- The cause of new chest pain or worsening angina
- What you can expect after you have had a heart attack

The results of a nuclear stress test can help your doctor:

- Determine how well your heart is pumping
- Determine the proper treatment for coronary heart disease
- Diagnose coronary artery disease
- See whether your heart is too large

Normal results

A normal result means blood flow through the coronary arteries is probably normal.

The meaning of your test results depends on the reason for the test, your age, and your history of heart and other medical problems.

DTPA SCAN: A DTPA renal scan provides functional information about your kidneys.

The kidneys filter the blood to remove waste substances such as urea (a nitrogen compound) and salt. The body discharges these wastes mixed in water as urine. The fluid is collected in the kidneys and discharged through the ureters which join the kidneys to the bladder. The top of the ureter is called the renal pelvis and this joins the kidney to the ureters.

In a Nuclear Medicine (NM) Renal Scan, images are made of the delivery of fluid into the kidneys via the bloodstream, concentration of wastes in the kidney and excretion or flow from the kidneys through the ureters and filling of the bladder.

DTPA is the radiopharmaceutical used in a DTPA Renal Scan, but sometimes the nuclear medicine specialist will decide that another radiopharmaceutical called MAG3 should be used. Renal Scan is performed to look at the blood supply, function and excretion of urine from the kidneys. The test can find out what percentage each kidney contributes to the total kidney function. A DTPA Scan may also be undertaken to evaluate:

- Renal tubular function and perfusion (how the body fluids circulate through the kidneys)
- Reno vascular hypertension (high blood pressure in the arteries of the kidneys)
- Renal artery stenosis (narrowing of the arteries that take blood to the kidneys)
- Renal tubular obstruction and trauma or damage (blockage or interruption of the ureters)
- Renal transplant perfusion and function

THYROID SCAN

A thyroid nuclear medicine scan is a diagnostic procedure to evaluate the thyroid gland, which is located in the front of the neck and controls the body's metabolism. A radioactive substance that concentrates in the thyroid is taken orally or injected into a vein (intravenously), or both. A special camera is used to take an image of the distribution of the radioactive substance in and around the thyroid gland. This is interpreted to evaluate thyroid function and to diagnose abnormalities.

Purpose

A thyroid scan may be ordered by a physician when the gland becomes abnormally large, especially if the enlargement is greater on one side, or when hard lumps (nodules) are felt. The scan can be helpful in determining whether the enlargement is caused by a diffuse increase in the total amount of thyroid tissue or by a nodule or nodules.
When other laboratory studies show an overactive thyroid hyperthyroidism or an underactive thyroid hypothyroidism, a radioactive iodine uptake scan is often used to confirm the diagnosis. It is frequently done along with a thyroid scan.

Rationale of study

According to Science of Nuclear Energy and Radiation Introduction to Nuclear Medicine
By Dr. Colin Webber Radiology, McMaster University
"Nuclear Medicine is the application of radioactive isotopes to the diagnosis and treatment of disease". The subject depends entirely upon the fact that a radioisotope of an element and a stable isotope of the same element have identical chemical properties but different physical properties.

Turnaround time of nuclear scan is defined as the "time taken for a patient walking in for a scan and walking out with the report". TAT helps us

1. To improve the quality & standard of nuclear medicine department.
2. To improve customer satisfaction
3. To provide more expedient, efficient and efficacious treatment
4. To increase patient flow.

Major steps had been taken to decrease TAT. . It is in fact one of the key performance indicator of the organization which is assessed quarterly and major steps are taken to keep it to as minimum as possible. Hence the study is undertaken to estimate the TAT in NHI hospital, Delhi and also find out the impact of this on the patients.

OBJECTIVE OF THE INTERNSHIP

It is imperative in the field of management to do internship at the end of the classroom teaching. It allows hands on experience that is sometimes missing in theoretical knowledge. Fundamental objective to internship are:

- To get involved in day to day operations.
- To comprehend the interdepartmental coordination.
- To find an area in the organization where improvement is required and where management knowledge and skills can be imparted.

MANAGERIAL TASKS:

To prepare the department for final assessment of NABH:

- Documentation **:**
  1. Radiopharmaceutical log book from Jan'12-Jan'13
  2. Bio-Medical Waste disposal log book
  3. Inventory log book from Jan'12-Jan'13
  4. Employee safety manual
  5. Collimation & Gamma camera register
- Crash cart audit
- Signage Displays
- HIS entries
- TAT preparation
- Area monitoring along with RSO with Geiger Muller meter of Nuclear medicine department, X-ray lab, Cath lab
- Infection control and Biomedical Waste Disposal and Coding. Also, training of the staff regarding BMW and Spillage management.
- An internal assessment was done and report was made for working on every non compliance and awareness based on questionnaire and checklist.

Other tasks

Patient registration
Patient history taking
Camera handling
Console machine operation
Scanning (16scans) and Processing of scans
Reporting of scans
Elusion (preparation of radioactivity)
Labeling (preparation of radiopharmaceuticals)
Injecting radiopharmaceuticals to patients (IV injections)
Visits to ECHO lab for Stress Thallium patients

General objective:

To study turnaround time in nuclear medicine department and the root causes to highlight areas of potential process improvements

Specific objective:

- To study process flow of various types of scans in nuclear medicine department.
- To find out most revenue generating scan among scans
- To find out standard time for individual scans
- To observe actual time for completion of scans
- To analyze gap between the standard and actual time for scans

METHODOLOGY

Study design:

- A descriptive study was done by collecting the data from the scans done in nuclear medicine department of the hospital.

Study Setting:

- The study is done during time period from January to March at National Heart Institute, East of Kailash, New Delhi.

Sample size:

- All the scans (bone scan, DTPA scan & Thallium scan) done in IINMAS, NHI from January 2013 to April 2013(4months) – 246 scans
  JAN: 53, FEB: 82 MAR: 111,

Research tool:

- Quantitative method was used (primary data) , check list
- MS excel

Type of Data collected -

- Primary data collection
    - By working in nuclear medicine department
    - Direct Observation

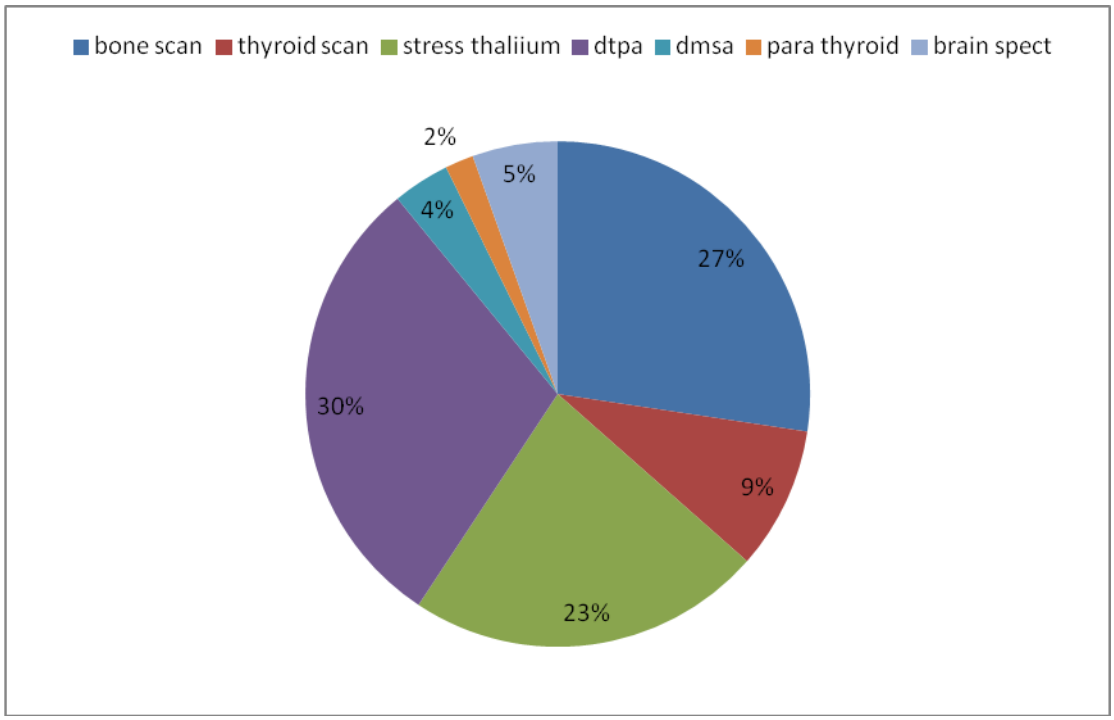
Most of the information was collected through observations. Both types of observations – participative and non participative were used in learning the function and working of various departments.

Non Participative observation was used mainly to learn the general things about the hospital like location of different departments, behavioural aspects of employee and the response time

- Secondary data collection
    - By various Hospital policies,
    - By documents in various departments.
    - Website of the hospital
    - By going through various written documents and literature available

ANALYSIS AND INTERPRETATION

Number of scans done in the month of January, February, March: 246



Bone scan: 150
Thyroid scan: 50
Stress thallium: 125
DTPA: 125
DMSA: 163
Para thyroid: 10
Brain spect: 30

COMPARISON OF STANDARD TIME & ACTUAL TIME OF SCANS

1. BONE SCAN

Standard Time	Actual Time
Total time for scan 325 mins (5.5 hrs)	Total time for scan 405 mins (6.5 hrs)
History taking 10 mins	History taking 30 mins
Med .prep. time 20 mins	Med .prep. time 45 mins
Waiting time 180 mins	Waiting time 180 mins
Scanning time 45 mins	Scanning time 60 mins
Processing time 30 mins	Processing time 45 mins
Reporting time 30 mins	Reporting time 35 mins

According to AERB guidelines, standard time for bone scan should be 325 mins i.e. 5 hours 30 mins. According to study, actual time for bone scan is 405 mins i.e. 6 hours 30 mins.

Reasons for increased TAT for bone scan

- Patient flow
- Patient coming at same time for same scan
- All medicines prepared & labeled by same technician
- Machine down time
- Lack of coordination

Recommendations

- If no. Of patients increased by 2-3 times then machine (gamma camera) should be upgraded by double headed camera, which will reduce the scanning time to almost half.
- To avoid machine down time, machine should be serviced periodically.
- Responsibility index & proper job description should be given to staff.

2. Stress Thallium scan

Standard time	Actual time
Total time for scan 230 mins (3.5 hrs)	Total time for scan 320 mins (5.5 hrs)
History taking 15 mins	History taking 30 mins
Med .prep. time 40 mins	Med .prep. time 20 mins
Waiting time 90 mins	Waiting time 120 mins
Scanning time 50 mins	Scanning time 50 mins
Processing time 15 mins	Processing time 30 mins
Reporting time 20 mins	Reporting time 60 mins

According to AERB guidelines, standard time for bone scan should be 230 mins i.e. 3 hours 30 mins. According to study, actual time for bone scan is 320 mins i.e. 5 hours 30 mins.

Reasons for increased TAT for Stress Thallium scan

- Lack of awareness of patient about procedure
- Patient rush
- Patients waiting time for TMT in eco lab
- Patient coming at same time for same scan
- Machine down time
- Lack of coordination

Recommendations

- Pamphlets can be made in which details about specific procedure can be given in a relevant format & language to be understand by patient
- All the staffs should be trained in such manner so that they can work at the time of unailability of assigned staff
- To avoid machine down time, machine should be upgraded

3. DTPA SCAN

Standard time	actual time
Total time for scan 125 mins (2.15 hrs)	Total time for scan 195 mins (3.15 hrs)
History taking 10 mins	History taking 20 mins
Med .prep. time 20 mins	Med .prep. time 30 mins
Waiting time 20 mins	Waiting time 25 mins
Scanning time 50 mins	Scanning time 50 mins
Processing time 15 mins	Processing time 30 mins
Reporting time 30 mins	Reporting time 60 mins

According to AERB guidelines, standard time for bone scan should be 125 mins i.e. 2 hours 15 mins. According to study, actual time for bone scan is 190 mins i.e. 3 hours 15 mins.

Reasons for increased TAT for DTPA scan

- Increased patients out flow
- Lack of staff
- Unavailability of reporting person
- Patients coming at same time for same scan
- Machine down time
- Lack of coordination among staffs

Recommendations

- All the staffs should be trained in such manner so that they can work at the time of availability of assigned staff
- Responsibility index & proper job description should be given to staff...
- To avoid machine down time, machine should be upgraded

General reasons for increased TAT

- Increased patients out flow
- Lack of staff
- Unavailability of reporting person
- For stress test, patients have to wait for tmt, which plays major role in increasing tat
- Patients coming at same time for same scan
- Machine down time
- Lack of coordination among staffs
- Lack of documentation
- Same staff for documentation & processing. (Lack of job distribution).

Recommendations

1. Pamphlets can be made in which details about specific procedure can be given in a relevant format & language to be understand by patient
2. All the staffs should be trained in such manner so that they can work at the time of availability of assigned staff
3. Responsibility index & proper job description should be given to staff...
4. To avoid machine down time, machine should be upgraded
5. If no. Of patients increased by 2-3 times then machine (gamma camera) should be upgraded by double camera, which will reduce the scanning time to almost half.
6. There should be coordination among the staffs.
7. Documentation can be done on
    I. Patients feed back
    II. Protocols for image acquisition & processing
    III. Sedation / anaesthesia given to patients
    IV. Drug administration & dosages
    V. Calibration, repair & downtime
    VI. Staff risk monitoring register
    VII. Quality control & quality improvement...

References

- www.molecularimagingcenter.org, Gambhir S. Just what is molecular medicine?
- thefreedictionary.com > scintigrahy Dorland's Medical Dictionary
- http://www.nndc.bnl.gov/wallet/wc7.html
- Edwards Cl: Tumor localizing radionuclides in retrospect and prospect. Semin Nucl Med 3:186–189, 1979.
- Nuclear Medicine manual by National Heart Institute
- AERB (ATOMIC ENERGY REGULATORY BOARD) manual.
- http://interactive.snm.org/docs/whatisnucmed.pdf from the Society of Nuclear MedicineRENCES

Annexure

JANUARY

TOTAL NO. 0F PATIENTS: 53

	PATIENT ID	PATIENT NAME	AGE	SEX	TYPE OF SCAN	PT. IN TIME	PT. OUT TIME	TOTAL TIME TAKEN	AVERAGE TIME FOR BONE SCAN	DTPA SCAN	ST. THALL
									6 HRS	3 HRS	5.5 HRS
01/1/13	38113	N.K KAPIL	43	M	DTPA	11:20	14:45	03:25			
	39113	BABU RAM	42	M	BONE	10:35	16:30	05:55			
	40113	MEENA	52	F	BONE	08:30	15:00	06:30			
01/1/13	42113	SUHKVEER SINGH	43	M	DTPA	14:00	15:20	01:20			
	44113	KULWANT KAUR	42	F	DTPA	15:00	18:40	03:40			
14/1/13	45113	SALWANT SINGH	69	M	BONE	09:00	15:45	06:45			
	43113	BAWA SIBGH	64	M	BONE	09:30	15:00	05:30			
15/01/13	46113	FIDA HUSSAIN	22	M	DTPA	09:45	13:00	03:15			
	47113	MUNNI DEVI	56	F	DTPA	12:00	15:15	03:15			
16/01/13	48113	JAMMAT RAI	68	M	BONE	09:25	15:35	06:10			
	49113	SARDARI LAL	76	M	BONE	10:30	16:15	05:45			
	50113	PUNJAB SINGH	74	M	BONE	10:00	16:00	06:00			
17/01/13	52113	MALVINDER SINGH	69	M	BONE	09:15	14:30	05:15			
	53113	GURBACHHAN SINGH	71	M	BONE	08:40	15:10	06:30			
	54113	POLO DEVI	62	F	DTPA	14:00	17:00	03:00			
	55113	AMAR SINGH	72	M	DTPA	16:15	19:30	03:15			
18/01/13	56113	GURDEV KAUR	47	F	DTPA	16:25	19:45	03:20			
	57113	DALEL MALIK	63	M	DTPA	10:00	13:30	03:30			
19/01/13	58113	RIMPAL KAUR	35	F	BONE	12:00	18:30	06:30			
	59113	DR. ASHOK	54	M	STRESS THALLIUM	11:00	16:45	05:45			
21/01/13	60113	DR. KULBIR KAUR	61	F	DTPA	14:00	17:00	03:00			
	61113	SUKHVINDER KAUR	42	F	THYROID	12:00					
	62113	JUJHAR	19	M	DTPA	09:15	12:30	03:15			
22/01/13	63113	SUKHWINDER KAUR	32	M	DTPA	14:00	17:50	03:50			
	64113	AMARJIT SINGH	58	M	DTPA	09:50	13:05	03:15			
	65113	PURAN SINGH	71	M	BONE	11:00	17:40	06:40			

	66113	VIDHYA	78	F	BONE	09:15	16:45	07:30
	67113	JAIMAL SINGH	67	M	BONE	09:00	16:05	07:05
	68113	SUKHWINDER SINGH	47	F	BONE	15:00	20:25	05:25
	69113	NIRENDER SINGH	77	M	BONE	13:45	21:00	07:15
	70113	RADHA SINGLER	25	F	THYROID	12:00	15:30	03:30
23/01/13	72113	NASHTRA KAUR	75	F	DTPA	16:45	20:00	03:15
	73113	KARAMJIT SINGH	46	M	THYROID	09:25		
	74113	VIKAS	25	M	DTPA	10:30	13:50	03:20
	75113	YATIN	27	M	DTPA	11:05	14:00	02:55
24/01/13	76113	BAKSHISH SINGH	56	M	DTPA	17:00	20:00	03:00
	77113	KULWANT KAUR	67	F	BONE	12:15	15:30	03:15
	78113	KUNAL	4	M	DTPA	15:30	18:50	03:20
	79113	ANGOORI DEVI	55	F	BONE	15:00	21:10	06:10
25/01/13	80113	ANITA RAINA	40	F	DTPA	11:30	15:00	03:30
	81113	SUKHMINDER	47	F	BONE	08:00	14:50	06:50
	82113	SALMA DEVI	53	F	DTPA	11:35	14:05	02:30
	83113	GURMEET KAUR	45	F	DTPA	16:20	19:40	03:20
	84113	ADITYA	34	M	THYROID	11:40		
26/01/13	85113	LALITA DEVI	56	F	DTPA	09:30	13:00	03:30
	86113	S.R. BANSAL	72	M	BONE	17:00	21:20	04:20
28/05/13	87113	ROBINDER SINGH	24	M	DTPA	12:40	16:00	03:20
	88113	LAJPAT RAJ	75	M	BONE	11:25	18:00	06:35
	89113	USHA RANI	47	F	BONE	09:15	14:00	04:45
	90113	CHARAN DASS	55	M	BONE	10:00	15:00	05:00
	91113	SUMITA KUMARI	53	F	BONE	14:00	19:00	05:00
	92113	BHUPINDER SHARMA	42	M	DTPA	13:50	17:00	03:10

FEBRUARY TOTAL NO. OF PATIENTS:82

DATE	PT. ID	PT. NAME	AGE	SEX	TYPE OF SCAN	PT. IN TIME	PT. OUT TIME	total time taken	AVERAGE TIME FOR BONE SCAN	DTPA SCAN	ST. THALL
									7 HRS	3.15 HRS	6 HRS
01/02/13	1213	VIJAY KUMARI	50	F	BONE	09:25	15:55	06:30			
	2213	KARNAIL KAUR	64	F	DTPA	10:30	13:45	03:15			
	2313	MAMTA RANI	39	F	BONE	10:00	16:30	06:30			
	2414	SUSHMA DEVI	60	F	BONE	09:15	15:30	06:15			
02/02/13	5213	BALBIR KAUR	50	F	BONE	08:40	15:00	06:20			
	6213	RANJEET KAUR	32	F	DTPA	15:30	19:00	03:30			
	7213	SWARAN SINGH	42	M	DTPA	15:00	18:30	03:30			
	9213	PARAMJEET SINGH	46	M	DTPA	11:30	15:00	03:30			
	10213	KIRAN SINGH	38	M	DTPA	08:00	11:00	03:00			
03/02/13	11213	PARVEEN BHANDARI	54	M	DTPA	11:35	14:00	02:25			
	12213	GULWANT SINGH	84	M	BONE	16:20	21:00	04:40			
04-02-2013	13213	CHARANJEET KAUR	29	F	THY	11:40					
	14213	HAVANDEEP SINGH	5	M	DTPA	09:30	12:00	02:30			
	15213	KAMALJEET KAUR	37	F	BONE	17:00	21:50	04:50			
	16213	HARINDER SINGH	62	M	BONE	12:40	19:00	06:20			
	17213	SOHAN SINGH	40	M	BONE	11:25	17:30	06:05			
	18213	SURINDER KAUR	48	M	DTPA	09:15	12:30	03:15			
05-02-2013	20213	SHAWL SINGH	79	M	BONE	10:00	16:30	06:30			
	21213	SUMAN RANI	36	M	BONE	14:00	20:00	06:00			
	22213	AMARJIT KAUR	39	F	DTPA	13:50	17:00	03:10			
	23213	SWARN KANTA	62	F	DTPA	14:00	17:20	03:20			
06-02-2013	25213	MOHD. SAJID	29	M	DTPA	12:00	15:50	03:50			
	26213	KANTA DEVI	60	F	DTPA	09:15	12:40	03:25			
08-02-2013	27213	DAYA RANI	37	F	DTPA	14:00	17:45	03:45			
	28213	PAR KANCHI	42		STRESS THALLIUM	09:50	17:00	07:10			

	29213	LAL SINGH	80	DTPA	11:00	14:30	03:30
	30213	DAYA RANI	56	BONE	09:15	15:30	06:15
09-02-2013	31213	SATWINDER SINGH	67	BONE	09:00	16:00	07:00
	32213	KAMALJEET KAUR	84	BONE	15:00	21:00	06:00
	33213	SUDESH KUMARI	29	DTPA	13:45	17:00	03:15
11-02-2013	34213	KANTA DEVI	5	BONE	12:00	18:00	06:00
	35213	ASHA RANI	37	BONE	16:45	22:00	05:15
12-02-2013	36213	SONIYA	62	DTPA	09:25	12:30	03:05
	37213	SURJEET KAUR	40	DTPA	10:30	13:05	02:35
	38213	MANOJ KUMAR	48	DTPA	11:05	14:30	03:25
	39213	SHAGUN	79	DTPA	17:00	20:25	03:25
	40213	JASBIR KAUR	36	DTPA	12:15	15:30	03:15
13-02-2013	41213	TAYABBA	39	STRESS THALLIUM	10:00	16:30	06:30
14-02-2013	42213	JASWANT SINGH	62	DTPA	11:20	13:45	02:25
	43213	JASPAL SINGH	29	BONE	10:35	17:00	06:25
	44213	RAJAT	60	BONE	08:30	15:00	06:30
15-02-2013	45213	SUSHMA DEVI	37	BONE	14:00	20:30	06:30
	46213	WARYAM SINGH	42	DTPA	15:00	18:30	03:30
	47213	KASHMIR SINGH	80	BONE	09:00	16:00	07:00
	48213	SHAMSHER SINGH	56	BONE	09:30	17:00	07:30
16-02-2013	49213	SANDEEP SINGH	67	DTPA	09:45	13:00	03:15
	50213	AJMER KAUR	21	DTPA	12:00	15:00	03:00
	51213	APARNA KUMARI	29	DTPA	09:25	12:50	03:25
	52213	KANTA DEVI	5	DTPA	10:30	14:00	03:30
18-02-2013	53213	ZORA SINGH	37	DTPA	10:00	14:00	04:00
	54213	GURDIAL SINGH	62	BONE	09:15	15:00	05:45
	55213	LAXMI DEVI	40	BONE	08:40	15:00	06:20
19-02-2013	58313	HARNEET KAUR	48	STRESS THALLIUM	14:00	19:40	05:40
	60313	MANOJ KUMAR	79	BONE	16:15	22:00	05:45
	61313	BRAHMI DEVI	36	DTPA	16:25	19:30	03:05
20-02-2013	62313	HARGINDER KAUR	39	DTPA	10:00	14:00	04:00
	63313	GURMEET SINGH	62	STRESS THALLIUM	12:00	18:00	06:00

	64313	SAROJ MITTAL	29	DTPA	11:00	13:30	
	65313	VIRENDER KUMAR AGGARWAL	60	BONE	11:20	17:30	06:10
	68313	AMAR SINGH	37	BONE	10:35	17:00	06:25
21-02-2013	69313	B.S CHAUDHARY	42	BONE	08:30	15:00	06:30
	70313	AYUB SINGH	80	DTPA	14:00	17:00	03:00
22-02-2013	71313	BANSI RAM	56	BONE	15:00	21:45	06:45
	73313	PRANAV	67	BONE	09:00	16:00	07:00
	74313	MOHAN SINGH	80	DTPA	09:30	13:00	03:30
	75313	USHA RANI	56	STRESS THALLIUM	09:45	15:30	05:45
	76313	ASHOK KUMAR	67	DTPA	12:00	16:00	04:00
23-02-2013	77313	SUNITA GARG	21	BONE	09:25	14:00	04:35
	78313	DARSHAN KAUR	29	BONE	10:30	17:00	06:30
	79313	HANUMAN PRASAD	5	BONE	10:00	16:00	06:00
	81313	BHUPINDER KAUR	37	DTPA	09:15	13:00	03:45
24-02-2013	82313	PRATAP	62	BONE	08:40	15:00	06:20
	83313	KRISHNA	40	BONE	14:00	21:00	07:00
	84313	GURDAS	48	DTPA	16:15	20:00	03:45
	85313	J.S NIGAM	79	STRESS THALLIUM	10:25	16:00	05:35
25-02-2013	87313	KARTAR SINGH	36	DTPA	10:00	13:00	03:00
	88313	KAMLESH KAUR	39	BONE	12:00	18:00	06:00
	89313	VARUN	62	BONE	11:00	17:15	06:15
	90313	RAJ SINGH	29	BONE	11:20	17:50	06:30
	91313	KAKA RAM	60	DTPA	10:35	13:45	03:10
26-02-2013	92313	HARPREET KAUR	37	BONE	08:30	15:00	06:30
	93313	YUDDBIR SINGH	42	BONE	14:00	20:35	06:35

MARCH

TOTAL: 111 PATIENTS

DATE	PT. ID	PT. NAME	AGE	SEX	TYPE OF SCAN	PT. IN TIME	PT. OUT TIME	TOTAL TIME TAKEN	AVERAGE TIME FOR BONE SCAN	AVERAGE TIME FOR DTPA SCAN	ST. THALL
01-03-2013	1313	JAIMAL SINGH	78	M	BONE	14:00	21:00	07:00	6.5 HRS	3.30 HRS	5 HRS
	2313	SUKHWINDER SINGH	67	M	DTPA	16:15	20:00	03:45			
	3313	NIRENDER SINGH	47	M	BONE	16:25	22:00	05:35			
02-03-2013	5313	RADHA SINGLER	77	F	DTPA	10:00	13:30	03:30			
	6313	NASHTRA KAUR	25	F	DTPA	12:00	15:30	03:30			
	7313	KARAMJIT SINGH	75	M	THYROID	11:00					
	8313	VIKAS	46	M	DTPA	11:20	13:30	02:10			
	9313	YATIN	25	M	BONE	10:35	17:00	06:25			
04-03-2013	10313	BAKSHISH SINGH	27	M	DTPA	08:30	12:00	03:30			
	12313	KULWANT KAUR	56	F	BONE	14:00	21:00	07:00			
	13313	KUNAL	67	M	BONE	14:00	20:05	06:05			
	14313	ANGOORI DEVI	4	F	BONE	12:00	19:00	07:00			
	15313	ANITA RAINA	55	F	BONE	09:15	15:30	06:15			
	17313	SUKHMINDER	40	M	DTPA	14:00	17:30	03:30			
05-03-2013	18313	SALMA DEVI	47	F	STRESS THALLIUM	09:50	16:45	06:55			
	19313	CHARANJEET KAUR	53	F	BONE	11:00	17:40	06:40			
	20313	HAVANDEEP SINGH	45	M	DTPA	09:15	12:40	03:25			
	22313	KAMALJEET KAUR	34	F	BONE	09:00	15:45	06:45			
	23313	HARINDER SINGH	56	M	BONE	15:00	21:00	06:00			
06-03-2013	24313	SOHAN SINGH	72	M	BONE	13:45	19:45	06:00			
	26313	SURINDER KAUR	24	F	DTPA	12:00	15:30	03:30			
07-03-2013	27313	SHAWL SINGH	75	M	DTPA	16:45	20:00	03:15			

	28313	SUMAN RANI	47	F	DTPA	09:25	12:45	03:20
	29313	AMARJIT KAUR	55	F	DTPA	10:30	13:50	03:20
	30313	SWARN KANTA	53	F	DTPA	11:05	14:30	03:25
	31313	MOHD. SAJID	42	M	BONE	17:00	22:30	05:30
08-03-2013	33313	ADITYA	60	M	THY	12:15		
	34313	LALITA DEVI	37	F	DTPA	15:30	19:00	03:30
09-03-2013	35313	S.R. BANSAL	42	M	BONE	15:00	21:30	06:30
	36313	ROBINDER SINGH	80	M	BONE	11:30	18:00	06:30
	37313	LAJPAT RAJ	56	M	BONE	08:00	14:50	06:50
	38313	USHA RANI	67	F	DTPA	11:35	15:00	03:25
10-03-2013	39313	CHARAN DASS	80	F	BONE	16:20	21:05	04:45
	41313	SUSHMA DEVI	56	M	STRESS THALLIUM	11:40	17:00	05:20
	42313	WARYAM SINGH	67	M	BONE	09:30	16:00	06:30
	43313	KASHMIR SINGH	21	M	BONE	11:00	17:30	06:30
11-03-2013	44313	SHAMSHER SINGH	29	M	BONE	12:40	19:00	06:20
	45313	SANDEEP SINGH	5	M	BONE	11:25	18:00	06:35
	46313	AJMER KAUR	37	F	BONE	09:15	15:05	05:50
13-03-2013	48313	APARNA KUMARI	62	F	THYROID	10:00		
	49313	KANTA DEVI	40	F	DTPA	14:00	17:45	03:45
	50313	ZORA SINGH	48	M	THYROID	13:50		
14-03-2013	51313	GURDIAL SINGH	79	F	DTPA	11:20	13:50	02:30
	52313	LAXMI DEVI	36	F	DTPA	10:35	13:45	03:10
	53313	HARNEET KAUR	39	F	DTPA	08:30	11:00	02:30
	54313	MANOJ KUMAR	62	M	BONE	14:00	21:00	07:00
	56313	BRAHMI DEVI	29	F	DTPA	15:00	18:45	03:45
15-03-2013	57313	HARGINDER KAUR	60	F	STRESS THALLIUM	09:00	15:30	06:30
	58313	GURMEET SINGH	37	M	DTPA	09:30	13:00	03:30
	59313	SAROJ MITTAL	42	F	DTPA	09:45	00:00	14:15
	60313	VIRENDER KUMAR	50	M	DTPA	12:00	15:30	03:30

					STRESS			
	61313	AMAR SINGH	64	M	THALLIUM	09:25	16:00	06:35
	62313	B.S CHAUDHARY	39	M	DTPA	10:30	14:00	03:30
16-03-2013	65313	AYUB SINGH	60	M	BONE	10:00	16:00	06:00
	66313	BANSI RAM	50	M	BONE	09:15	15:45	06:30
	67313	PRANAV	32	M	BONE	08:40	16:30	07:50
	68313	MOHAN SINGH	42	M	DTPA	14:00	17:15	03:15
	69313	USHA RANI	46	F	BONE	16:15	22:00	05:45
	70313	ASHOK KUMAR	38	M	BONE	11:25	18:00	06:35
	71313	SUNITA GARG	54	F	DTPA	10:00	13:50	03:50
	72313	DARSHAN KAUR	84	F	DTPA	12:00	15:30	03:30
17-03-2013	73313	HANUMAN PRASAD	29	M	DTPA	11:00	14:05	03:05
	77313	BHUPINDER KAUR	43	F	DTPA	10:35	14:00	03:25
	78313	PRATAP	42	M	DTPA	08:30	12:00	03:30
	79313	KRISHNA	52	M	BONE	14:00	20:30	06:30
18-03-2013	80313	GURDAS	43	M	BONE	15:00	21:00	06:00
	81313	RAJ SINGH	42	M	STRESS THALLIUM	09:00	13:30	04:30
	82313	KAKA RAM	69	M	BONE	09:30	16:30	07:00
	83313	HARPREET KAUR	64	F	DTPA	09:45	13:30	03:45
19-03-2013	84313	YUDDBIR SINGH	22	M	DTPA	12:00	15:05	03:05
	85313	SURAJ YADAV	56	M	STRESS THALLIUM	09:25	15:00	05:35
	86313	KUNAL	67	M	BONE	10:30	16:45	06:15
	87313	ANGOORI DEVI	4	F	DTPA	10:00	13:40	03:40
20-03-2013	88313	ANITA RAINA	55	F	BONE	09:15	16:00	06:45
	89313	SUKHMINDER	40	M	DTPA	08:40	12:00	03:20
21-03-2013	90313	SALMA DEVI	47	F	DTPA	14:00	17:30	03:30
	91313	GURMEET KAUR	53	F	THYROID	16:15		
	92313	ADITYA	45	M	DTPA	16:25	20:00	03:35
22-03-2013	93313	LALITA DEVI	34	F	BONE	10:00	16:30	06:30
	94313	S.R. BANSAL	56	M	DTPA	12:00	15:30	03:30

	95313	ROBINDER SINGH	72	M	BONE	11:00	17:30	06:30
23-03-2013	96313	LAJPAT RAJ	24	M	BONE	11:20	18:00	06:40
	97313	USHA RANI	75	F	BONE	10:35	17:00	06:25
	98313	CHARAN DASS	47	M	BONE	08:30	15:00	06:30
	99313	SUMITA KUMARI	55	F	DTPA	14:00	17:30	03:30
24-03-2013	100313	TAYABBA	53	F	STRESS THALLIUM	10:00	16:30	06:30
	101313	JASWANT SINGH	42	M	BONE	10:35	17:00	06:25
	102313	JASPAL SINGH	60	M	DTPA	08:30	12:15	03:45
	103313	RAJAT	37	M	BONE	14:00	20:45	06:45
28-03-2013	104313	SUSHMA DEVI	42	F	BONE	15:00	21:50	06:50
	105313	WARYAM SINGH	80	M	BONE	09:00	16:00	07:00
	106313	KASHMIR SINGH	56	M	DTPA	09:30	12:50	03:20
	107313	SHAMSHER SINGH	67	M	DTPA	09:45	13:00	03:15
29-03-2013	108313	SANDEEP SINGH	80	M	THYROID	12:00		
30-03-2013	109313	AJMER KAUR	56	F	DTPA	09:25	13:00	03:35
	111313	APARNA KUMARI	67	F	BONE	10:30	17:00	06:30
	112313	KANTA DEVI	21	F	DTPA	10:00	13:50	03:50
	113313	ZORA SINGH	29	M	BONE	09:15	15:30	06:15
	114313	GURDIAL SINGH	56	M	BONE	08:40	15:00	06:20
	115313	LAXMI DEVI	67	F	BONE	14:00	21:00	07:00
	116313	HARNEET KAUR	21	F	BONE	16:15	22:00	05:45