

**Summer Training at
Fortis Escorts Hospital, Jaipur
(April 3 to June 2, 2017)**

- **Correlation Between Provisional Diagnoses and Findings in Radiology**
- **Study on Equipment Utilization in PHC Department**

**By
Vineet Dwivedi**

**Under the guidance of
Dr. Nirmal Kumar Gurabni**

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


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

CERTIFICATE

This is to certify that **Dr. Vineet Dwivedi** has undergone summer training in **Fortis Escort Hospital, Jaipur** from 3rd April to 2nd June 2017.

The candidate himself completed the project assigned to him during summer training. His 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 him success in all his future endeavors.



Col. (Dr.) Ashok Kaushik

Dean (Academic & Student Affair)

The IIHMR University, Jaipur



Dr. Nirmal K Gurbani

Professor

The IIHMR University, Jaipur

Ref./FEHJ/HR-Comm./TRN/017

26th June , 2017TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr.Vineet Dwivedi** worked as a **Trainee** with us in the **Dept. of Quality Assurance & FOS** from 3rd April, 2017 to 2nd June , 2017.

His performance during the period in the department was good. He comes across as a willing, sincere and intelligent person who has a strong drive and zeal for learning.

We wish him the best for all his future endeavors.



Authorized Signatory

FORTIS HOSPITALS LIMITED

Regd. Office: Escorts Heart Institute and Research Centre, Okhla Road, New Delhi - 110 025

Tel: +91 11 2682 5000, Fax: +91 11 4162 8435 CIN: U93000DL2009PLC222166

ACKNOWLEDGEMENT

I would like to express my sincere Thanks and gratitude to **Fortis Escort Hospital, Jaipur (Rajasthan)** for allowing me to complete my summer internship and project in the facility.

The structure and the content of this project have been deeply influenced by many people for whom I wish to express my gratitude.

I sincerely Thanks **Mr. Prateem Tamboli (Zonal Director- North Eastern Zone)** and **Ms. Nihar Bhatia (Head Quality Officer)** for giving me the opportunity to do my project at **“Fortis Escort Hospital, Jaipur”**.

Foremost, I would like to Thanks **Ms Arpita Roy (FOS Officer), Dr. Mitali Mathur (Quality Department Employee)** who were kind enough to spare their valuable time and provided several important suggestions at every stage of my study.

I also acknowledge all the help & support provided by **Ms Reema Saini (Quality Department Employee), Ms. Daljeet kaur (Training Head)** in the fulfillment of this project.

Also I am sincerely grateful to **Dr. Ashok Kaushik (academic dean), Mr. Hembhargav (placecom incharge), and Dr. N. K. Gurbani (mentor) IIHMR UNIVERSITY, JAIPUR (Rajasthan)** for his continuous encouragement in completion of this project.

Sincere especially thanks to all the staff of the department 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 thanks to my **PARENTS** because of whom I am here and who are always there whenever I require their help.

Thanks to one and all.

Dr. Vineet Dwivedi

MBA (HM) 1 YEAR.

IIHMR UNIVERSITY, JAIPUR

TABLE

ACJBOWLEDGEMENTS.....	1
TABLE OF CONTENTS.....	2
HOSPITAL PROFILE.....	4
NABH ACCREDITATION.....	10
PROJECT-I.....	12
INTRODUCTION.....	13
MODE OF DATA COLLECTION.....	14
RESEARCH QUESTION.....	14
OBJECTIVES.....	14
REVIEW OF LITERATURE.....	15
STUDY DESIGN AND METHOD.....	16
FINDINGS AND ANALYSIS.....	17
LIMITATION.....	19
CONCLUSION.....	20
RECOMMENDATIONS.....	21
REFERENCES.....	22
PROJECT II.....	23
INTRODUCTION.....	24
RESEARCH QUESTION.....	25
OBJECTIVES.....	25
NEED FOR STUDY.....	25
REVIEW OF LITERATURE.....	26
RESEARCH METHODOLOGY.....	27
DATA COLLECTION.....	27
ANALYSIS AND INTERPRETATION.....	28
OBSERVATION.....	29
RECOMMENDATION.....	29
REFERENCES.....	29

HOSPITAL PROFILE

Fortis Escort (FEHL) is founded on the vision of becoming an integrated 'Healthcare Delivery Organization' driven by quality, excellence, technology and compassionate care. FEHL, one of the largest private healthcare companies in India, has one of its hospitals in Jaipur as Fortis Escorts Hospital, Jaipur. (FEHJ) which specializes in cardiac sciences, neurosciences, renal sciences and gastrointestinal diseases. The hospital also provides superior services in mother and childcare, orthopedics and also a complete range of multi-specialty services in all disciplines.

FEHJ has dedicated facilities for comprehensive care of trauma patients and others in need of emergency care which include an emergency operation theatre and a 10-bedded medical intensive care unit (MICU). Fortis is the first amongst the proposed multi super specialty hospitals to be set up in Rajasthan. Fortis is the first hospital in the country to attain NABH Accreditation in minimum stipulated time (Six months) after commencement of operations and was re-accredited on 27th April 2011. FEHJ is a super-specialty hospital backed by multispecialty.

Super Specialties- Cardiology & Cardiac Surgery, Renal Sciences, Neuro Sciences, Gastro-Intestinal sciences.

Multi Specialties - Orthopedics & Joint Replacement, Diabetes & Endocrinology, Dermatology, Internal Medicine, Pulmonary, Medicine, Ophthalmology, Dietetics, Physiotherapy and Preventive Health Check, General Surgery, Dental Surgery, Cosmetic & Plastic Surgery, ENT, Gynecology & Obstetrics, Pediatrics & Neonatology.

VISION OF THE HOSPITAL:

"Saving and enriching lives"

MISSION OF THE HOSPITAL

"To create a world-class integrated healthcare delivery & learning system in India, entailing the finest medical skills combined with compassionate patient care".

HISTORY:

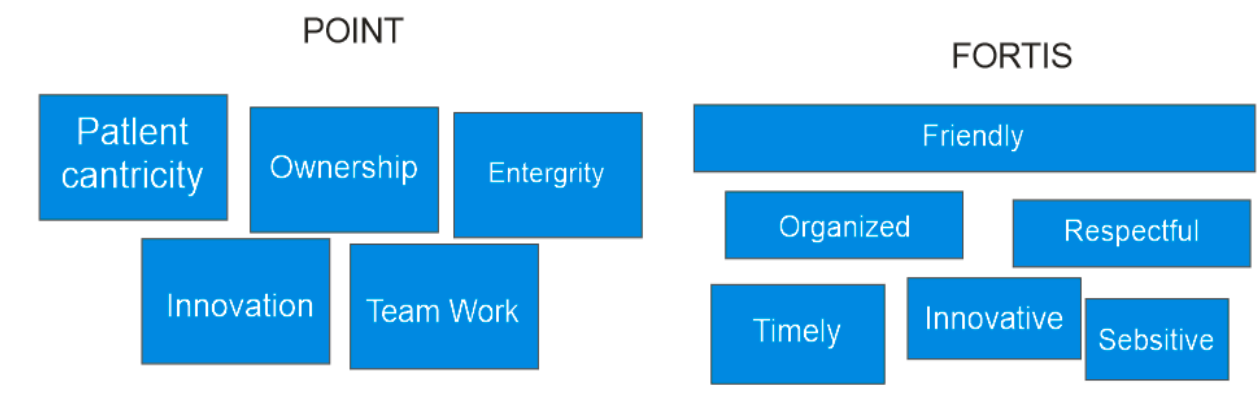
Jaipur, Aug 2, 2007 - Fortis Healthcare Ltd, one of the largest private healthcare companies in India, Thursday announced a multi-specialty hospital at Jaipur as part of its initiative to expand its operations in Rajasthan. The then Chief Minister, Mrs. Vasundhara Raje inaugurated the Fortis Escorts Hospital Jaipur (FEHJ) in the presence of Mr. Malvinder Mohan Singh, Chairman, Fortis Healthcare, Mr. Shivinder Mohan Singh, CEO and MD, Fortis Healthcare, besides other dignitaries and company officials.

FORTIS LOGO



“The two hands that fuse seamlessly with a human form express their re-assuring approach to health care. A constant reminder to all that patients centric are is fundamental to our ethos”. ‘GREEN’ is the color of healing and is symbolic of Fortis’s steadfast focus to ensure the health and wellbeing of those they minister to. ‘RED’ is expressive of the dynamic zeal with which ‘Fortis’ strive to make it a reality The Fortis logo, is the indelible assurance that there expertise always will be tempered with humanity.

FORTIS VALUES



FORTIS GROUP

Founder Chairman: Late Dr. Parvinder Singh

Executive Chairman: Mr. Malvinder Mohan Singh

India CEO: Mr. Bhavdeep Singh

Fortis Jaipur inaugurated on 2nd August 2007

No. of beds – Currently: 245, Capacity: 350

NABH accreditation received in June 2008 (within 10 months of operations, NABL & Blood Bank.

INFRASTRUCTURE:

The infrastructure facilities of Fortis Escorts Hospital, Jaipur, are par excellence, such as:

C arm with digital subtraction angiography

Flat panel cath lab

Advanced pathological lab

Mobile X-Ray

64 Slice CT scan

TMT, ECHO, HOLTER recorder and monitor and ECG to help non-invasive cardiac investigations.

500mA image intensifier TV

Digital CR reader

X-Ray.

LOCATION: The access to the hospital is very easy. The hospital is located on JLN Marg road, Jaipur. The address of the hospital is:

“Fortis Escorts Hospital”

Jawahar Lal Nehru Marg

Malviya Nagar,

Jaipur- 302107

Rajasthan, (India)

AREA: Spread over 6.68 acres with an investment of Rs. 1.10 billion, it has an operational bed facility of 210 beds with an installed bed capacity of 300 beds.

NUMBER OF DEPARTMENTS: There are presently 34 functional departments in the hospital comprising of Clinical and Non clinical departments. The detailed information about each department visited is given later. The list of functional departments is as follows:

CLINICAL DEPARTMENTS:

1. Infection control
2. CSSD (Central Sterile Service Department)
3. Physiotherapy
4. CTVS
5. SICU
6. NICU
7. LDR
8. Operation theatres
9. Triage/Emergency
10. HDU (High Dependency Unit)
11. Radiology
12. General ward
13. Laboratory's
14. Dietetics
15. MICU
16. CCU
17. Dialysis
18. Cath Lab

NON CLINICAL DEPARTMENTS:

1. Engineering
2. Biomedical Engineering
3. Finance
4. Marketing

5. Human Resource
6. House keeping
7. Laundry
8. Pharmacy
9. Medical Records
10. Food & beverages
11. Security
12. Central stores
13. Quality Assurance
14. Research
15. Patient Welfare Department
16. Information Technology

SERVICES PROVIDED: There is a long exhaustive list of services provided by the hospital comprising of clinical and non-clinical services. Both the services go hand in hand for maintaining the efficacy and efficiency of the organization for the patient and staff welfare.

CLINICAL SERVICES:

1. Cardiac Surgery
2. CTVS
3. Cardiology
4. Renal Science
5. Nephrology
6. Urology
7. Neurology
8. Neuro Surgery
9. Gastro Intestinal Diseases
10. Internal Medicine
11. Pulmonology
12. Endocrinology

13. Dermatology
14. Psychiatry
15. General Surgery
16. Plastic Surgery
17. Pediatric Surgery
18. Obstetrics
19. Gynecology
20. Pediatric
21. Neonatology

NON CLINICAL SERVICES:

1. Housekeeping & Laundry
2. Pharmacy
3. Medical Records
4. Food & beverages
5. Security
6. Central stores
7. Training and development

NABH

For the initial 26 days of my summer training, I was fortunate to be able to give my contribution in the Reaccreditation process of Fortis Escort Hospital Jaipur, as the NABH team assessed the hospital from 5th May 2017 to 7th May 2017. During these days I performed and observed following tasks.

1. Documentation

- Documentation and compilation of respective Quality Manual/ Safety Manual/ Infection Control Manual/ SOP containing the related standards of quality assurance
- NABH guidelines of various departments were compiled.
- Documentation and updation of committee files as per the meeting conducted in last year.
- New format updation of Health Policies.
- Documentation of Unit Binders for 37 department. Unit Binders were updated with Contents, Vision and Mission, Quality Policy, Pastoral List, Interpreter List, Standard Operating Procedure, Scope of Services, Unit Staff, Other Documentation including Hospital Policy, Employee Policy, Patient Rights and Rules, Amendment sheet.
- Job Cards (pocket sized card customized for each command nucleus team member. It contains the roles and responsibilities of the member in various disaster situation) were dispatched to members of nucleus team.
- Correlation study in Radiology department.
- Review of all the forms in all the departments and checking of old and new forms.

2. Mock Drills

- A Code RED mock drill was conducted to ensure disaster management and awareness amongst the staff. Safety plan in case of fire was demonstrated along with action of fire brigade extinguishing the fire and emergency ambulance set up.
- A Code GREY mock drill was conducted to ensure internal disaster and awareness amongst the staff. Safety plan in case of terrorist attack was demonstrated with the help of ATS and police force.
- I observed Staff process in Epbex (call center) during Mock drill. I made report of these and previous mock drills too.
- In both the mock drill the procedure of emergency call to action and clearing of code was observed. Proper functioning and response of the staff was observed. Display corners on respective floors were checked and updated which reflect important NABH information and policies.

3. Assessment Procedure

- NABH audit was conducted by a team of three assessors; one was principal assessor and other two as assessors along with an observer.
- A schedule was prepared by assessors for three days audit and report preparation in accordance of which the audit was conducted. It was divided into pre-lunch and post-lunch session.
- Assessor assessed each department on their compliance with NABH standards and any non-compliance or minor observations.
- Assessors conducted CODE RED and CODE PINK mock drills for ensuring safety norms.
- On final day a closure meeting was conducted.

PROJECT 1

CORRELATION BETWEEN PROVISIONAL DIAGNOSES

AND FINDINGS IN RADIOLOGY

INTRODUCTION

“The correlation study is one of the quality indicator laid down in the guideline of NABH, which aims to improve the quality services provided by the hospital and at the same time reduce the unnecessary financial burden of investigation on the patient”.

DEFINITION: Correlation study determines “whether and to what degree a relationship exists between two or more quantifiable variables”.

TYPE: There are three types of correlation that are identified-

- 1. Positive correlation:** when an increase in one variable, lead to an increase in the other and vice versa.
- 2. Negative correlation:** when an increase in one variables, leads to a decreases in another and vice versa.
- 3. No correlation:** Two variables are uncorrelated when a change in one doesn't, leads to a change in the other and vice versa.

A correlation coefficient is usually used during a co-relational study. It varies between (+1 and -1) value close to (+1) indicates a strong positive correlation while a value close to (-1) indicates strong negative correlation.

CLINICAL CORRELATION

“Correlation, is usually mentioned after the patient had CT/MRI. It refers to taking a scan and matching it up the medical history, Symptoms etc. This is to aid the diagnosis process. Usually a doctor will say that, a clinical co-relation is requested when they see something abnormal on the scan and they want to see, if what is on the scan will correlate with certain symptoms that the patient is experiencing, which can tell the doctor what type of problem the patient is experiencing”.

Clinical diagnosis is the first and foremost step in the treatment schedule of a patient.

CT SCAN (Computed Tomography Scan). It is medical imaging method that employs tomography. Tomography is the process of generating a two dimensional image of a slice or section through a 3-D tomogram. A CT of scan uses XRAY tomographic image a wide variety of body structures.

Magnetic Resonance Imaging (MRI) (Medical Imaging Technique) used in radiology to visualize internal structures of the body in detail. MRI makes uses of the property of ‘nuclear magnetic resonance’ to image nuclei of atoms inside the body. MRI provides good contrast between, the different soft tissue of the body, which makes it especially useful in imaging the brain, heart and concern.

RESEARCH QUESTIONS

- What are the kinds of losses incurred in prescribing unnecessary tests?
- To what extent the previous recommendation help in overcoming these unnecessary losses on tests?
- What is the most important part of training schedule which should be provided to the employees for increasing the correlation?

OBJECTIVES

- To study correlation between differential diagnosis and radiological findings.
- To come up with recommendation with further improvement.
- To interpret the collected data from radiology.

STUDY DESIGN AND METHODS

Study design:

- **Cross sectional**-Analyzes data collected from a representative subset at specific point of time.
- **Analytical**- Samples of subjects are identified and information about status and outcome is collected.

Location: Fortis Escorts Hospital, Jaipur.

Study subjects: All patient undergoing CT/MRI (From Oct 2016 to April 2017)

Sampling method: Random Sampling-We select a group of subject for study from a larger group, each sample chosen entirely by chance.

Sample Size: Cases taken from 1Oct 2016 to 30 April 2017

Total no. Of samples = 7209

No. Of samples/month = 25 (3%)

MODE OF DATA COLLECTION

Information regarding the organization, location, area, planning, manpower, organizational hierarchy, status and other details were collected from hospitals manual, authorities and from other sources.

DATA COLLECTION: Data was collected by reviewing records (computerized as well as manual) and from quality department.

REVIEW OF LITERATURE

“Correlation studies, between ‘admission diagnosis’ and ‘discharge diagnosis’ are rare. Some studies, regarding methods of diagnosis have been done, in relation to ‘specific disease’ or related situations, but general comparison, between final and initial diagnosis irrespective of specific disease situations, in a hospital is a very rare attempt”.

Attempt to use ‘clinical examination’ and proper history taking for ‘accurate diagnosis’ has been highlighted, in some studies, but ideal situation of achieving maximum accuracy is still wanted.

“Few salient features of this study, were that in 43.3% of the case there was an agreement in diagnosis between the ‘final diagnosis and provisional diagnosis’. One such study, in relation to matching of diagnosis, was carried out in Hong Kong, to find out the accuracy of emergency department admission and effect of investigations on diagnosis accuracy, of all admission diagnosis 71.4% matched the final diagnosis in this study”. (B.D.E Igbinedion and A Akhigbe)

“A study was also done in Lahore, where 80% of the cases had correct provisional diagnosis. No significant association, was found between the ‘match and unmatched’ of final and provisional diagnosis with age and gender but period of hospitalization, showed significant association reason of which may have been that complicated cases where diagnosis did not match, may have required longer period of stay. Again there was significant association, in respect to referrals as difficult cases may have required referral’s by which the diagnosis, may have been proved to be different from initial one similar reason may have been responsible for ‘significant association in case of ≥ 2 types of investigations”.

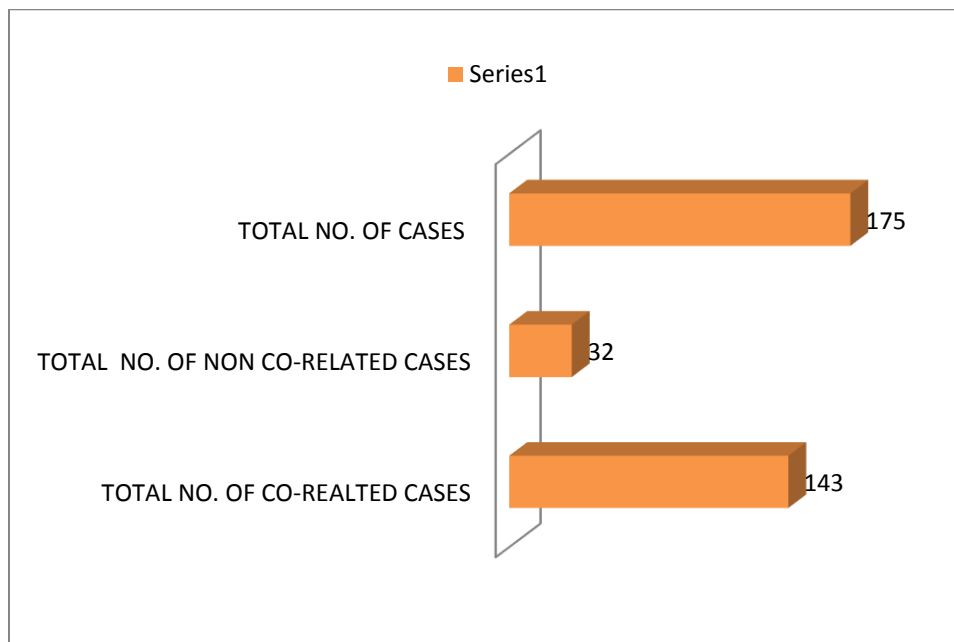
“Clinical examination had 55.4% sensitivity and likelihood ratio of 1.5 for matching of final diagnosis with provisional diagnosis, while diagnosis investigations had ‘sensitivity’ of 44.51% and likelihood ratio of 0.71%”.

“An Australian study, compared the sensitivity of clinical examination, to radiographs for detection of dental caries ‘in molars’ and found clinical exam a higher sensitive test (96% vs 58%)”.

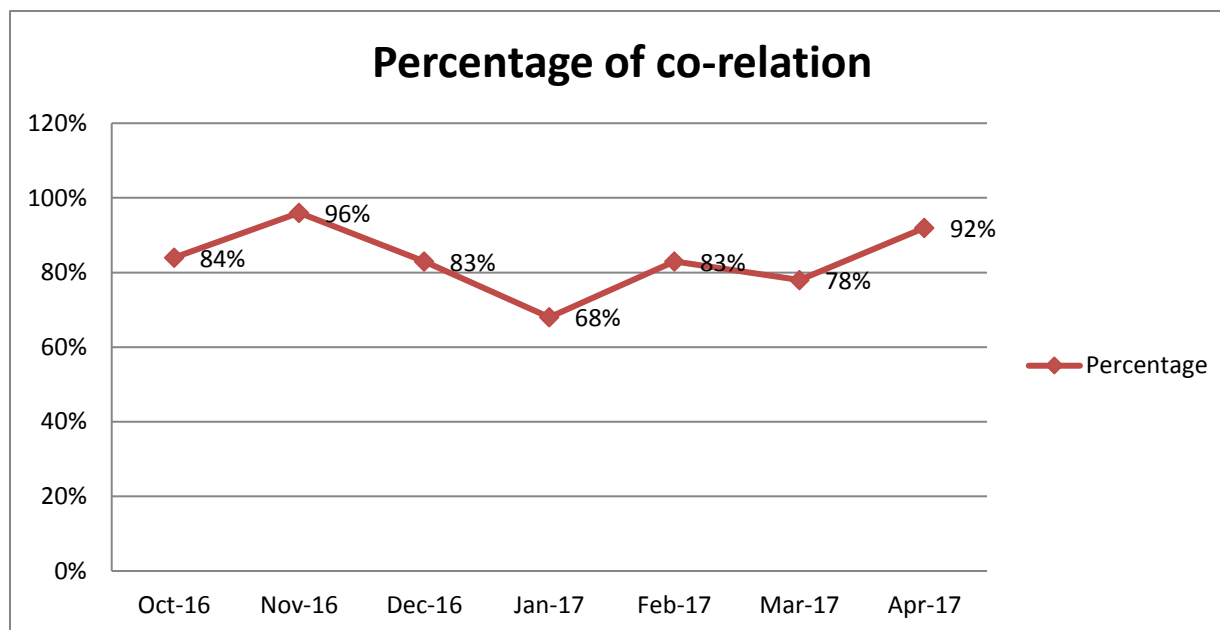
“An American study, in relation to ‘lumbar spinal stenosis’ showed that history taking and physical examination, had a string likelihood ratio of ≥ 2 for detection of the problem”. (Reid MC, Lachs MS, Feinstein AR)

FINDINGS AND ANALYSIS

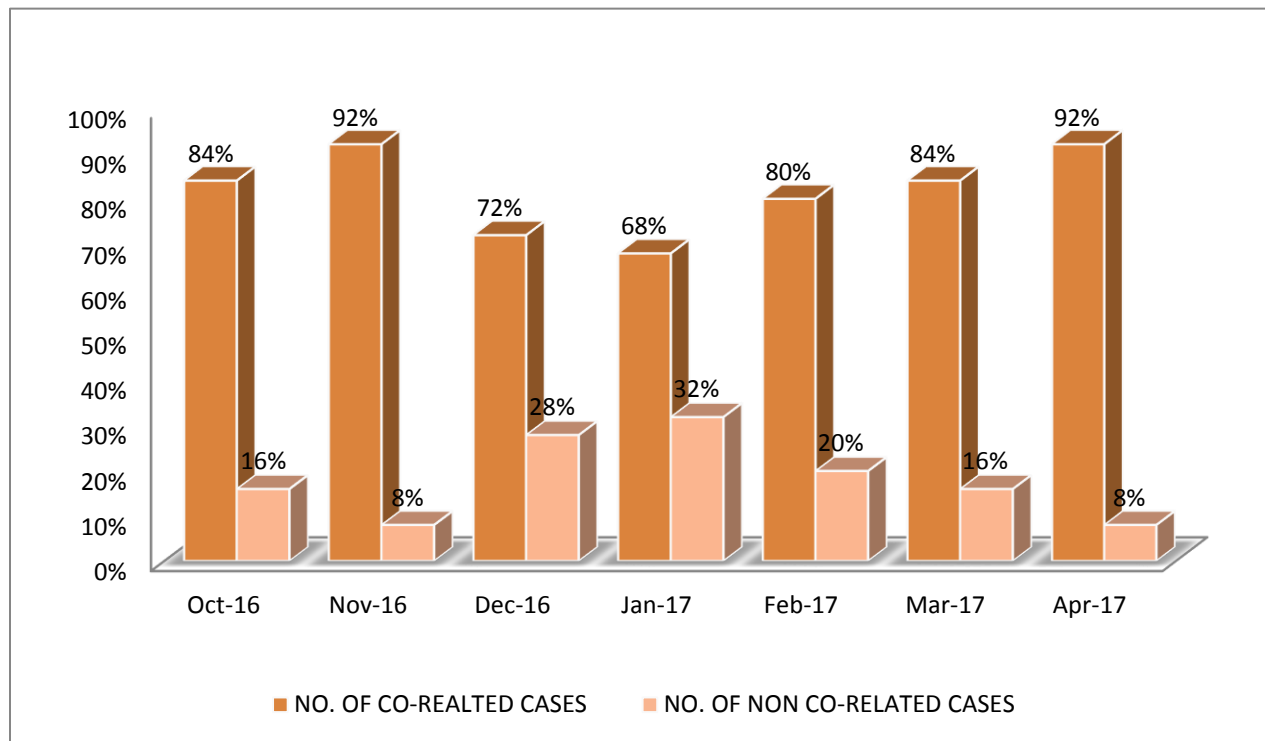
Total no. of cases taken 175, in which total no. of co-related cases is 143 and total no. of non co-related cases is 32, that is 19% of total cases.



This graph shows month wise (From 1 Oct 2016 to 30 April 2017) fluctuation of co-related cases.



This graph shows percentage of co-related and non co-related cases in each month (from 1Oct 2016 to 31 April 2017).



LIMITATIONS:

- In some of the files the history sheet is not completely filled by the junior residents .
- In some of the files there is no history sheet of patient enclosed.
- In some files at the site of the provisional diagnosis nothing is written.
- In some cases the final diagnosis is written in place of the provisional diagnosis.
- In some cases no specific diagnosis is made.
- In case of RTA no specific diagnosis is made.
- The writing of the doctor is not readable in certain cases.

RECOMMENDATIONS

1. The junior doctor should be trained well for filling the history sheets of the patients correctly.
2. Every file of the patient should be checked for the proper documentation of all the required records by nursing incharge.
3. A proper and specific provisional diagnosis of the disease should be made before sending the patient for any lab or radiological investigation.
4. The physical examination sheet like the history sheet should be typed rather than hand written to make it readable.
5. A more detailed physical examination of the patient should be done so that CT/MRI is ordered only when required.

CONCLUSION:

“The study indicates that “81%” diagnostic accuracy in ‘radiological diagnosis’ with ‘provisional diagnosis’. Matching of ‘provisional diagnosis’ with ‘discharge diagnosis’ with greater accuracy, and lesser number of investigations can lead to greater patient satisfaction, along with lesser burden on health resources of the state. Earlier, diagnostic relied more on sign and symptoms, with development of systematic methods of clinical examination more reliance was placed on signs. However major breakthrough in diagnosis, was achieved when medical technology provided a wide array of accurate and reliable radiological investigations. With the ever increasing burden of many diseases, and their resultant high mortality rates, accurate diagnosis needs to be established, This study aims to find out correlation between, “PROVISIONAL diagnosis and the lab results and correlation between physician findings and CT/MRI findings”.

REFERENCES:

1. www.fortishealthcare.com
2. explorable.com/co-relational-study
3. www.reference.com/motif/health/clinic
4. Joshib B R Manandhar K Clinical correlation of acute appendicitis with histopathological diagnosis a prospective study
5. B.D.E Igbinedion and A Akhigbe Correlations of Radiographic Finding in Patients with low back pain
6. Reid MC, Lachs MS, Feinstein AR Use of methodological standards in diagnostic test research getting better but still not good

PROJECT II
STUDY ON EQUIPMENT UTILIZATION
IN PHC DEPARTMENT

INTRODUCTION

“Utilization essentially means the use of the equipment to its full potential. Clear vision and thought regarding the use of the equipment, are necessary so that realistic performance may be set. It should be the endeavor of the management, to optimize the equipment utilization to obtain maximum return for the capital invested. Proper utilization of the hospital equipment will lead to:

- Optimal capacity of patient handling and rapid turnover
- Minimum cost
- Quality of patient care and patient satisfaction

It can be calculate by using ‘coefficient’ to assess its utility by applying the simple formula ($UC = N/M \times 100$), where N, is number of hours an equipment is likely to be used in a day and M, is maximum number of hours the equipment could possibly be used in a day if the use coefficient is less that 50%, it is considered to be underutilized and hence shows a bad investment However, Life saving equipment, cannot be subjected to this kind of assessment ⁽¹⁾

“A capacity utilization rate, for any entity, is the amount of output it has compared to the potential output, it should be producing This stated in simpler terms, simply is the difference between what a company is producing and what it is capable of producing at any given time” ⁽²⁾

“Capacity utilization depends on market demand and on scheduling production for the most efficient use of facilities. A structured approach to capacity planning lets use capacity utilization rates to determine when need to expand capacity, to satisfy increasing demand for products”.

Low Utilization

“If production capacity is idle, investment in the ‘facilities and equipment’ is not generating any income and reducing potential profit. Since additional production volume does not increase fixed costs, higher capacity utilization, may result in lower per-unit product costs and higher potential profits”.

“For example, if facilities have a capacity of one thousand units per month and cost \$10,000/month to operate, producing 500 units with a variable cost of \$20 costs $500 \times \$20$ plus \$10,000 for a total of \$20,000, or a unit cost of \$40. If it produces 800 units, costs are $\$20 \times$ price of \$35, overall profit increases”.

Peaks

“Unless planning compensates, peaks in capacity utilization, can damage both product quality and profitability, When it sees a demand peak approaching through an increase, in orders for product, it has to delay deliveries so that it can smooth, the effect on production schedule. Peaks that surpass the normal maximum capacity lead to problems in production that affect

product quality and overtime that reduces profit. Managing demand through price adjustment to reduce demand peaks and increases demand, during through balances schedule and achieves maximum profitability”.

Full utilization

“When product is successful, it can reach full capacity utilization, leading to high profitability and a streamlined manufacturing plant that turns out high quality products. If company wants to grow, and if planning has correctly forecast. the trend toward the use of all capacity, it can now expect to have new capacity, coming online to takeover new demand”.

Over-utilization

“When capacity utilization passes it`s maximum due to demand that exceeds ability to supply the products, costs rise and products quality decreases. To meet excess demands have to schedule overtime those result in, higher costs and stressed workers who make more mistakes. There is less time, for equipment maintenance, and employees cut corners to maintain high levels of production. It has to avoid over-utilization of capacity, by acting to reduce demand with longer delivery times and higher prices”.

EQUIPMENT UTILISATION Rate Formula

Radiology equipment utilization can be calculated from below mentioned formula

Equipment utilization rate =

$$\frac{\text{Total no. of hours the equipment is used} \times 100}{\text{Total no. of hours the equipment can be used}}$$

RESEARCH QUESTION:

Is the Capacity Utilization of Equipments (X-Ray Machine, USG Machine, ECG and TMT) in PHC Department of FEHJ satisfactory and to find out gaps (if underutilized)?

OBJECTIVES:

- To determine the Capacity Utilization Rate of PHC Department equipments
- TO provide recommendations to improve Capacity Utilization if required

NEED FOR THE STUDY:

“Hospital can benefit from capacity utilization rate data, because it will be able to tell that what types of services are most needed and what perhaps, is a waste of the hospital’s resources. Economic stability is often determined by the capacity utilization rate of any given entity. If a hospital determines it is running either too low or too high it can adjust the operations accordingly to allow for a profit to be made. This will allow a hospital to streamline its offerings to meet the public needs. A hospital having over utilization in one department and way under in another may adjust this to fulfill the demand of the area it serves”.

EQUIPMENT TAKEN FOR STUDY:

- **ECG**
- **TMT (2 NOS.)**
- **USG**
- **XRAY**

REVIEW LITERATURE

“Equipment plays important role in hospital and health care services, as an aid to health professionals, providing efficient diagnostic and therapeutic tools, to make the identification of the disease problem and their cures accurately and appropriately”.

“Effective management and efficient maintenance of the equipments, has deep economical impact on the hospital and is vital for smooth functioning”.

“Medical equipment is an integral part of the physical infrastructure of healthcare setup, it is an important means of providing various services to the people”.³(Lathwal OP, Banerjee A)

“Modern medical technology, has contributed immensely in improving the quality of healthcare and state of health profile of nation. The advancement, has been mainly due to improved diagnostic facilities, sophisticated equipments, and spectacular progress in the development in biomedical equipment”.¹ (International journal of research foundation of hospital & healthcare administration)

“The availability and utilization of various healthcare equipment, at all levels in the health system for effective and efficient service delivery, was also emphasized in the “Alma-Ata declaration” at the international conference on Primary Health Care in 1978, which was later included in to the strategy oh health care for all by 2000AD”.

“The utilization coefficient of various diagnostic equipment, in the department of histopathology, PGIMER, Chandigarh for the year 2102 were in the order of 58.1,62.1, and 60.4% for high cost, medium cost, and low cost equipment respectively”.

“On an average, the utilization coefficient of medical equipments, under study (year 2012) of the histopathology Department, PGIMER, Chandigarh, was found to be 60.2% (above 50%).(International journal of research foundation of hospital & healthcare administration)

RESEARCH METHODOLOGY

Study Area: PHC Department, FEHJ

Study Type: Descriptive case study

Study Duration: 7 Days (From 16-5-2017 to 23-5-2017)

Study Population: Procedure performed in PHC Department for 8:00AM to 2:00PM over period of seven days (Total 140 patient)

Sampling Method: Non Probability Sampling Method (convenient)

Sample Size:

FOR X-RAY	138	98% OF TOTAL SAMPLE
FOR ECG	137	97% OF TOTAL SAMPLE
FOR TMT	63	45% OF TOTAL SAMPLE
FOR USG	77	55% OF TOTAL SAMPLE

DATA COLLECTION

DATA COLLECTION TOOL:

OBSERVATION SHEET was prepared to note down observation

DATA COLLECTION TECHNIQUE:

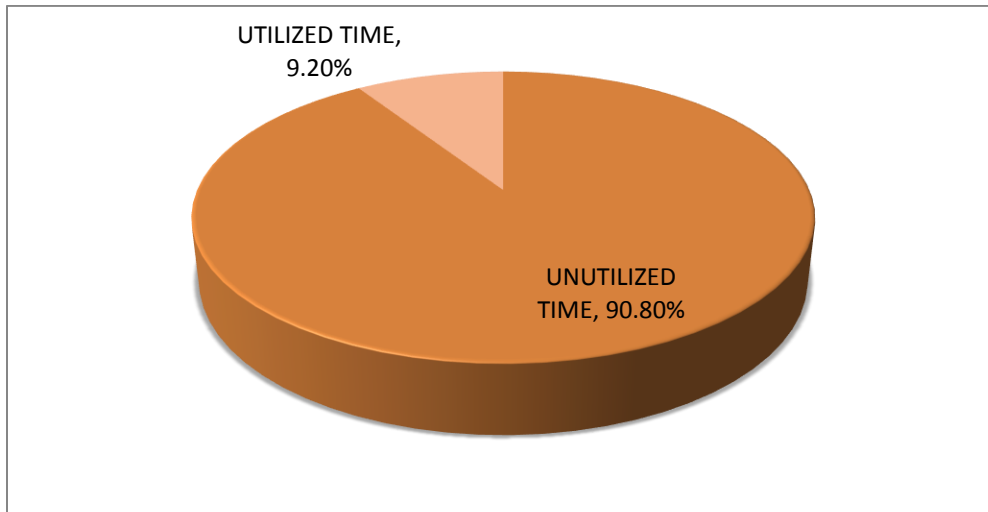
Primary Data: Observation

Interaction with staff

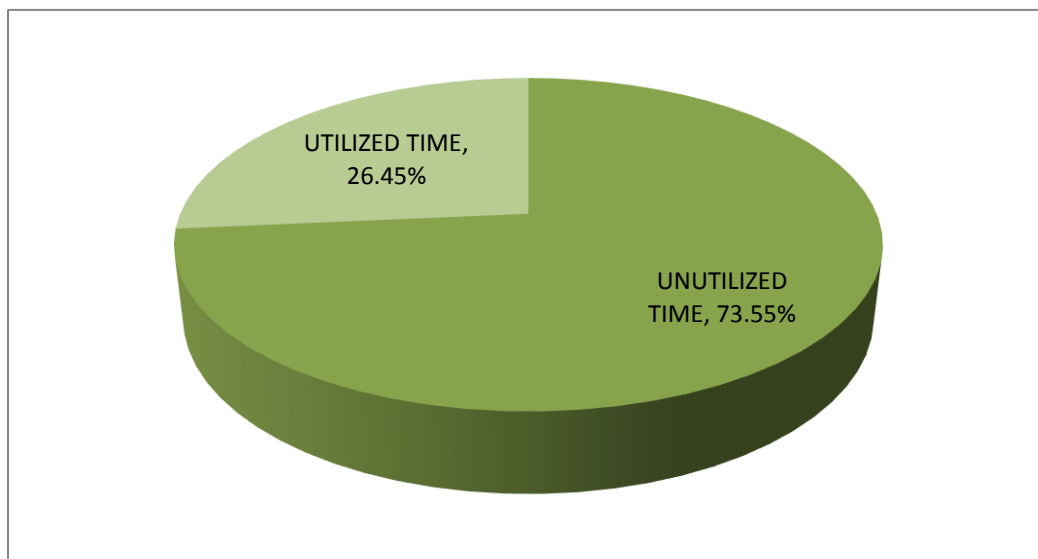
Secondary Data: PHC Department Records

ANALYSIS AND INTERPRETATION

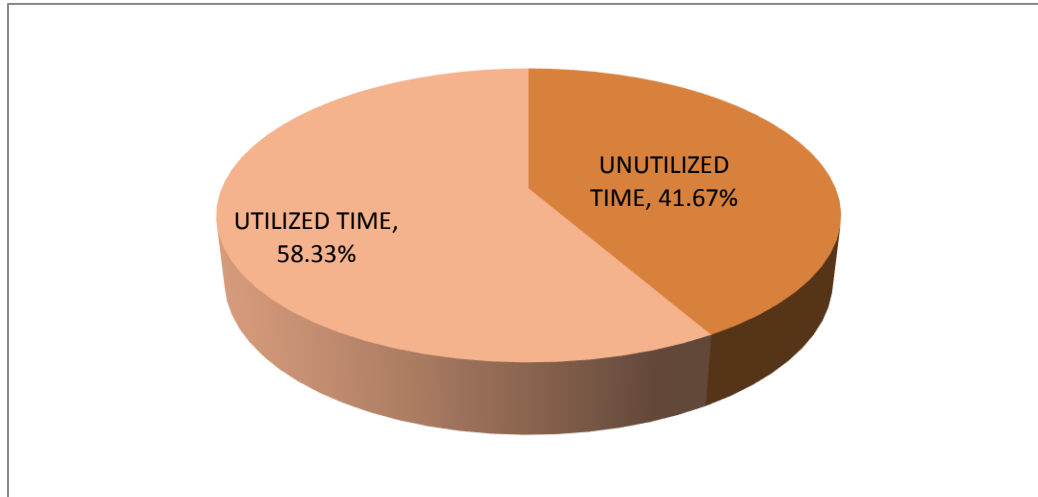
X-RAY: Out of the survey conducted 138 patients (out of 140) in operational time i.e. from 8am to 2pm had gone through this machine for investigation. It is observed that utilization rate of x-ray machines is 9.2%. Utilization rate is less because there are separate x-ray machines for Radiology Department. Average utilization time taken by x-ray is 2.12 minutes.



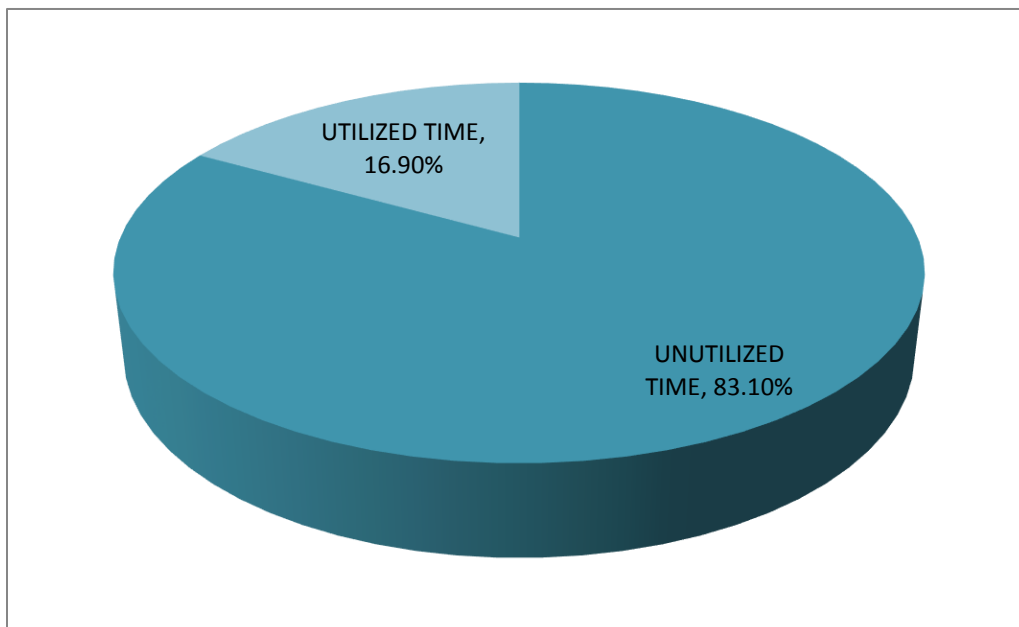
ECG: Out of study conducted 137 patients (out of 140) had used this machine for procedure in operational time. The utilization rate of ECG machine is 26.45%. Average utilization time taken by ECG machine is 5.32 minutes.



TMT: Out of study conducted total no. of patients 63(out of 140) had gone through various procedure of TMT (Two machines) in operational time. The utilization rate of TMT machines is 41.67%.Average utilization time taken by TMT machine is 23.22 minutes.



USG: Out of study conducted total no. of patients 77(out of 140) had gone through various procedure of USG in operational time. The utilization rate of USG machines is 16.90%. Average utilization time taken by USG machine is 6.33 minutes.



OBSERVATION

- As per study findings, Utilization rate of equipments taken for study are below 60% This indicates that all equipments are underutilized
- Utilization rate of equipments are mentioned below

Equipment Name	Utilization Rate
ECG	26.45%
X-RAY	9.2%
TMT	58.33%
USG	16.90%

- Utilization rate of TMT machine is higher as compared to other equipments in PHC department
- For average if time of utilization is 100% where 40% are required for actual procedure and 60% time are required to check image quality.
- Billing activities is not taking place in PHC Department so patients have to go on ground floor.
- Billing takes approximately 10 minutes for most of the patients so it affects further procedure of PHC depart.
- Sometimes process time (In report preparation) is more than required time (i.e.4 hours).

RECOMMENDATION

- Marketing of PHC facilities available at FEHJ can be done through media like television, newspaper, radio, hoardings etc
- There can be strong referral system for PHC. To develop this referral system, Memorandum of Understanding (MOU) can be signed with orthopedic, neurologist, physician and small scale hospitals or they can be assigned as authorized reference centre of FEHJ.
- There can be happy hours or a discount day. So those patients come in happy hours or discount day can get discount on the package cost.
- A committee can be formed which shall include senior employees like radiologist. Radiology technician, biomedical engineer, marketing personnel and radiology manager. There should be meeting of these committee members at regular interval to assess functioning of PHC and equipment utilization. Radiology manager should be responsible to conduct this meeting. Radiology manager should maintain data of radiology equipments utilization
- Needs to do analysis of cost of investigation or scan
- To decrease the process time there should be billing activity available.
- There should be two receptionists (Including billing staff) available on front desk in PHC department

Reference

1. www.medicalbuyer.co.in
2. www.howtodothings.com/health
3. www.imaging.com
4. www.smallbusiness.chron.com/capacity-utilization
5. medicalsupplies.net/types-of-medical-equipment
6. www.businessdictionary.co.in/defination-of-utilization
7. www.businessdictionary.co.in/defination-of-capacity-utilization