

## Study of Utilisation of CT Scan Machine at a Tertiary Care Teaching Hospital

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### Abstract

In today's health care environment, the equipment purchase must be cost justified. As India is a developing country with constrained resources and hi-tech hospitals, CTs are most cost effective than other image modalities on image quality. Establishment and maintenance of CAT scan unit in a hospital is expensive and every effort must be made for optimum utilization of this equipment in appropriate manner.

Utilization of imaging equipment is an important parameter for planning of services as these equipment's are costly and underutilization can lead to massive losses due to depreciation and other reasons.

In our study, utilization coefficient of CT machine was found to 60% which shows that our machine is being properly utilised as per set norms.

**Keywords:** Utilization; CT scan; Efficiency

### Introduction

Imaging equipment is very complex now than ever and the choice is extensive that the medical institutions and the administrators of the health care institutions are forced to pay close attention to the management of new kind of technology in a very efficient manner. The importance of imaging modality of investigation assumed great significance in the past two decades. 60% of diagnostic investigations require photo documentation, of which CAT scan imaging is recognized as a potentially useful mode of investigation, but also an expensive one [1].

The Cost of Imaging modality of investigations is enormous. A forecast for 1999 for this type of investigations in world health care market done by Market Intelligence Research Co., a firm based in Mountain View, USA, 1999, said this would be around USD 5 billion. In comparison to this USD 3.5 billion was spent by non-federal General hospitals alone in the US, on imaging equipment and supplies in 2000 [2].

In era of cost-intensive medical care, every equipment being installed in health care institutions need to be fully & properly utilized. An optimum utilization of equipment will result in [3]:

- Optimum patient handling and rapid turnover.
- Minimum possible costs.
- Quality patient care & satisfaction.

The current study was conducted to study the utilization of CT scan machine at a large tertiary care teaching hospital of north India.

## Objective

Study of utilisation of CT scan machine at a tertiary care teaching hospital

## Methodology

### Study Design

A prospective study was carried out.

### Study duration

A prospective study was carried for a period of one month.

### Study setting

CT scan section.

A prospective study was conducted to calculate the workload over period of one month and to determine the utilisation coefficient. The utilization coefficient of the machine was calculated by the following formula.

$$\text{Use coefficient (@)} = N/M \times 100$$

Where

N = Average number of hours the equipment is used per day.

M = Maximum number of hours the equipment can be used per day.

*Note:* If the use is less than 50%, it is considered to be under utilized

## Data analysis

The data was received from the answered questionnaires and was plotted on excel 2013. The data was analyzed statistically with the help of statistical software SPSS v19. All the continuous variables of the study were represented by the descriptive statistics and all the categorical variables in the term of frequency and percentage.

## Results

A total of 434 scans were carried out in the study month which yielded an daily average of 14.47 cases.

### Workload

| <i>Average Number of scans done over one month</i> | <i>Average number of scans done daily</i> | <i>Average duration of each Scan in minutes</i> | <i>Average duration for which machine is used daily in hours</i> |
|--|---|---|--|
| 434  | 14.47                                     | 20  | 4.82   |

**Table 1:** Workload of CT scan machine.

## Utilisation Coefficient

The duration for which machine is being used (N)=4.8 hours

Maximum duration for which machine can be used=8 hours

Hence Utilisation Coefficient= $4.8/8 \times 100=60\%$ .

## Discussion

Medical equipment used for diagnostic, monitoring and therapeutic purposes is a key component of medical treatment. Managing the equipment is one of the most important functions of hospital for continuous, uninterrupted and quality services. It is emphasized that the state of art technology is what gives the hospital the cutting edge in maintaining the treatment standards as well as the advantage in meeting the exciting cutthroat competition. Utilizing the purchased equipment to their fullest potential is the important duty of hospital managers & the management. Under-utilized equipment will lead to major losses to the stakeholders in the business.

Shakti Gupta et al [3] state that utilization coefficient of an equipment should be more than 50 percent in order to say that this equipment is properly utilised. In our study, utilization coefficient of CT Scan machine came out to be 60 percent, hence our machine is being properly utilized.

The observations of Blake et al, with a staff strength of 7.5 observed a workload of 350 scans per month [4].

Knaus and Davis, according to their study in a hospital in US over a period of 12 months came out with a figure of 255.83 scans per month, when compared to that our hospital having a caseload of 332 cases is around 1.6 times higher [5].

## Summary

Utilization of imaging equipment is an important parameter for planning of services as these equipment's are costly and underutilization can lead to massive losses due to depreciation and other reasons.

In our study, utilization coefficient of CT machine was found to 60% which shows that our machine is being properly utilised as per set norms.

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