



ORIGINAL RESEARCH PAPER

Radiology

EVALUATION OF TURNAROUND TIME (TAT) AND WAITING TIME (WT) FOR GENERAL RADIOLOGICAL INVESTIGATIONS IN OUR HOSPITAL

KEY WORDS: Turnaround Time-TAT, Waiting Time-WT, Conventional X-ray-CXR, Digital X-ray-DXR, Ultrasonography-USG, Computed Tomography-CT, Magnetic Resonance Imaging-MRI

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ABSTRACT

The purpose of present study is to evaluate the Turnaround Time (TAT) and Waiting Time (WT) for general non-contrast radiological investigations. This study was evaluated in Conventional X-ray (CXR), Digital X-ray (DXR), Ultrasonography (USG), Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). The TAT for this study was measured from the time of patient registration till the time of report generation. The WT for this study was measured from the time of registration to the time of investigation. This study has identified that the TAT for non-contrast investigation in CXR, DXR and CT are within the stipulated time. The TAT for MRI investigation, has exceeded the stipulated time drastically whereas TAT for USG is exceeded mildly.

INTRODUCTION

The diagnostic radiology department is an integral part of the hospital. It is necessary to create methods that will benefit the patients and improve the efficiency of investigations in the department. Minimizing turnaround time (TAT) and waiting time (WT) is one of the ways to achieve the above goal (1). The aim of this study was to evaluate the patients TAT and WT for general radiological investigations at our hospital. This study was also used for the comparison of stipulated TAT given by our department (Table 1). The TAT for this study was calculated from the time of patient registration till the time of report generation. The WT for this study was measured from the time of patient registration to the time of the investigation. The general radiological investigations evaluated for this study were Conventional X-ray (CXR), Digital X-ray (DXR), Ultrasonography (USG), Computed Tomography (CT) and Magnetic Resonance Imaging (MRI).

MATERIALS AND METHODS

A total of 300 patients (60 per modality) were evaluated in this study, with equal distribution of male and female patients in all modalities. Two patients (1 male and 1 female) were selected at random for each day (Monday - Saturday) in all modalities of CXR, DXR, USG, CT, and MRI. Sunday, Public holidays, night and emergency patients were excluded due to prioritization of immediate scanning. Fluoroscopy procedures and contrast investigation in all modalities were excluded due to their known longer patient preparations and investigation times. Hence, only non-contrast investigations

were included in this study. Only non-contrast abdomen and pelvis investigations were included for USG. All non-contrast investigations were included in CXR, DXR, CT, and MRI. Data was collected from each patient in person from time of registration in the department till the time of finalized report generation. All the observed data were entered in Microsoft Excel and SPSS for statistical analysis.

Modality	Turnaround Time (TAT)
CXR and DXR	120 minutes
USG	180 minutes
CT	240 minutes
MRI	240 minutes

Table 1: Stipulated TAT by the department of radiology for each modality.

RESULTS

For USG investigation (Table 2 & Figure 1), WT was within 27-135 minutes (Average 65 minutes) and TAT was within 64 -185 minutes (Average 122 minutes). For CXR investigation (Table 2 & Figure 1), WT was within 2-29 minutes (Average 5 minutes) and TAT was within 33-80 minutes (Average 55 minutes). For DXR investigation (Table 2 & Figure 1), WT was within 2-15 minutes (Average 5 minutes) and TAT was within 33-84 minutes (Average 57 minutes). For CT investigation (Table 2 & Figure 1), WT was within 12-95 minutes (Average 53 minutes) and TAT was within 67-179 minutes (Average 115 minutes). For MRI investigation (Table 2 & Figure 1), WT was within 34-114 minutes (Average 67 minutes) and TAT was within 151 -317 minutes (Average 234 minutes).

Table 2: Measured WT and TAT Descriptive Statistics for USG, CXR, DXR, CT and MRI.

Modality	N	Range	Minimum (minutes)	Maximum (minutes)	Mean (minutes)	Std. Deviation
WAITING TIME (WT)						
USG_WT	60	108	27	135	65.28	23.885
CXR_WT	60	27	2	29	5.48	5.255
DXR_WT	60	13	2	15	4.98	2.931
CT_WT	60	83	12	95	53.10	18.352
MRI_WT	60	80	34	114	66.72	19.196
TURNAROUND TIME (TAT)						
USG_TAT	60	121	64	185	121.88	29.358
CXR_TAT	60	47	33	80	55.70	11.629
DXR_TAT	60	51	33	84	57.33	10.328

CT_TAT	60	112	67	179	115.40	27.644
MRI_TAT	60	166	151	317	233.95	39.737

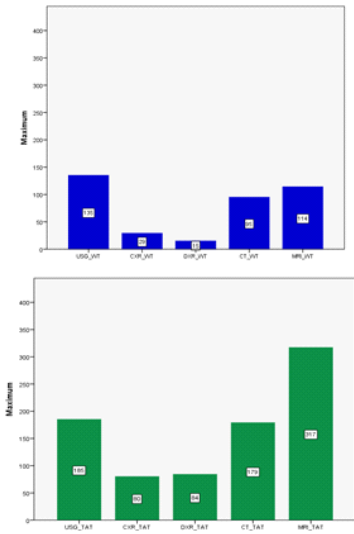


Figure 1: Measured WT (Left) and TAT (Right) for USG, CXR, DXR, CT and MRI.

DISCUSSION

Hoe defined service quality as service that meets or exceeds the expectations of a patient, thereby making the patient happy (1). A good radiology department should offer a constant and consistent service to the patient based on their need. Although crowded reception areas and long patient waiting times are a common sight in the hospital, it is also common in several other government health care institutions (1, 2). The radiology department under study, practices an open book appointment system, where a predetermined number of patients are booked per day. The date they are given depends on their arrival time, the pathology they present with, and their clinical departments (1). TAT defined as time from radiology request to the availability of the report (3, 4). Various factors affect TAT, including the total volume of work, case complexity, radiologist speed and reading style, time spent teaching trainees in an academic institution, and academic and nonacademic interruptions (5). Reduced TAT negatively affects their ability to teach, as well as the quality of resident education (6). In Private practices their main goal is to report hence they can achieve the stipulated TAT and even lesser TAT. But in case of academic medical centers, due to the time spent having residents review studies, giving feedback, and providing a second verification likely to have longer TATs than private practices. (7, 8). The major causes of longer turnaround times in Ultrasound were: power black outs, jumping of queues by other patients, and burnouts of the staffs while working alone (9).

CONCLUSION

This study is inherently skewed statistically due to the inclusion of only non-contrast patients. On the basis of non-contrast investigations, this study has found out that TAT for CXR, DXR and CT are within the stipulated time given by our department. The maximum TAT for MRI investigation has exceeded the stipulated time by 77 minutes. The maximum TAT for USG investigation has exceeded the stipulated time by 5 minutes. The mean TAT for all the modalities is within the stipulated time given by our department. The increased TAT and WT in MRI may be due to longer scan times, unpredictable delays due to additional sequences and patient movements. The mild increase in USG TAT may be due to increased patient preparation period such as waiting for full bladder. CXR and DXR have minimal TAT and WT, which may be due to the availability of multiple X-ray units/ radiographers, centralized reporting and shorter reporting/

scan times when compared with other modalities. CT has lower TAT, which may be due to shorter scan times. This study has proved that our department stipulated time is applicable for CXR, DXR and CT non-contrast patients. If contrast, special procedures and emergency cases were included, then the TAT and WT for the procedures might exceed the stipulated time. Additional steps can be implemented to further reduce TAT and WT by employing staffs for report typing with experience in medical terms. Forming a centralized reporting room for all modalities and include advanced tele-reporting system to reduce the report preparation time considerably.

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