

# Improving Timeliness of Diagnostic Healthcare Services: Effective Strategies and Recommendations

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**Abstract.** Timeliness and accessibility of healthcare services reflect system's capacity to provide care quickly after a need is recognized. King Faisal Specialist Hospital and Research Center in Jeddah, Saudi Arabia worked on improving timeliness of diagnostic electromyography and nerve conduction study for carpal tunnel syndrome and peripheral neuropathy patients to avoid significant treatment delay and potential complications. We identified causes of delayed appointments and implemented strategies to reduce it from 12 to 2 weeks. FOCUS PDCA approach as well as Pareto analysis were used to identify and target core issues then suggest effective strategies including improving staff productivity, enhancing teamwork coordination and motivating healthcare team stakeholders. The results show that 93% of appointments were made available in less than 2 weeks, compared to only 8% pre-improvement, no show rate reduced to 2% compared to 13% and total procedure volume was increased to 99 compared to 52 per month.

**Keywords.** Healthcare, Timeliness, Accessibility, Performance Improvement.

## Introduction

There is an urgent need for healthcare organizations to develop and improve their services quality as well as their quality improvement methods. Serious and widespread quality problems exist in healthcare systems. These problems are causing harm in direct or indirect way [1]. Many measurable parameters can be used to evaluate the quality of provided healthcare services, including safety, effectiveness, efficiency, availability, timeliness, accessibility, appropriateness and equity, especially in developing countries, where there is a growing interest in evaluating the performance and outcomes of healthcare systems [2]. From the perspective of patients as well as healthcare professionals, timeliness and accessibility to healthcare services are essentially important when it comes to diagnostic procedures and become even more important when this is related to avoiding severe morbidities and permanent complications, such as in cancer and neurological diseases [3]. It is commonly reported by patients that they had to wait for long time before they could get their diagnostic procedures performed. This reflects poor timeliness and accessibility to different diagnostic services, which have serious and big influence on treatment outcomes, disease prognosis and expected complications in addition to the influence on patient

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satisfaction [4, 5]. The proper management of appointment scheduling can have a major role in optimizing timeliness and accessibility to the healthcare system. It is common that we face a larger no show rate when the scheduling system is defective, where these unattended appointments represent a significant under-utilization of valuable healthcare resources [6]. Many factors affect the performance of appointment scheduling, including arrival and service time variability, patient and provider preferences, available information technology and the experience level of the scheduling staff. It is essential for healthcare to learn how to manage critical bottlenecks from industrial and business domains [7]. Hospitals need to develop dynamic policies and procedures for scheduling patient appointments taking into account the fact that patients may cancel, reschedule or not show up for their appointments, such as using Open Access Policy [8, 9]. Electromyography (EMG) and nerve conduction study (NCS) are medical diagnostic procedures commonly used to evaluate the function and integrity of the skeletal muscles and electrical conduction of the motor and sensory nerves of the human body. Over the last couple of years, the average appointment time for those procedures has been increasing. Appointment time was around 24 weeks in the first quarter of 2015. This may result in patients' dissatisfaction and significant delay in patient care. A performance improvement project was launched to identify the root causes of the delay and implement effective strategies and recommendations to reduce the appointment time as much as possible. The main objective was to ensure that more than 90% of Carpel Tunnel Syndrome (CTS) and Peripheral Neuropathy (PN) patients seen in Neurology or Family Medicine clinics get their appointments for EMG/NCS procedures within two weeks.

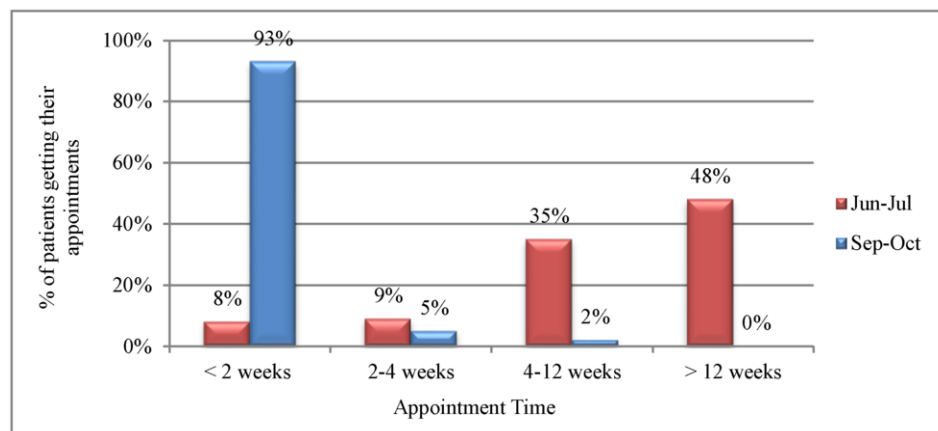
## **1. Methods**

The project team used the FOCUS PDCA approach, since this is an essential quality improvement methodology many organizations use to guide and coordinate their improvement efforts. It's a formalized process for improvement, where the letters stand for; find, organize, clarify, understand and select, to determine the root causes of a problem, then plan, do, check and act to implement the solution [10]. The improvement project was conducted during the period from June to October 2015. Root cause analysis approach was used first to determine the main factors contributing to the delay and long appointment times, since a root cause analysis is a method of problem solving used for identifying the root causes of faults or problems [11]. Pareto analysis was also used, 80/20 rule was applied to identify and target the core issues. Focusing on the vital few causes, the suggested strategies and recommendations were adopted and implemented over August 2015. Data was collected before and after implementing the suggested strategies to analyze their effects on the outcomes. The project team revised the scheduling system to increase appointment slots from 12 to 20 per week. The team launched one additional weekly clinic to accommodate 5 additional CTS and PN patients per week and a senior technologist was assigned to coordinate work with neurology and family medicine clinics for accommodating walk-in and out station patients on the same day. Consultants and assistant consultants were oriented about and engaged in these procedures to cover the clinics; assistant consultants were authorized to perform the procedures based on their credentials. Therefore, there was no need to increase the number of physicians. Patients with long appointment time were called into these new clinics to bring appointment time down. Referring physicians were also

contacted to make them aware about the newly launched clinic, especially neuroscience, orthopedic and family medicine physicians who are the major sources of referred patients. Appointments of these clinics were initially manually controlled to reduce no show rates. Cross training of staff was started to make them supportive to each other. Most importantly, involved staff were motivated and taken on board with management support to achieve this target.

## 2. Results

Root cause and Pareto analyses revealed that the unavailability of appointment slots was responsible for 31% of the delay, unavailability of physicians to conduct diagnostic procedures was responsible for 24% of the delay, no show of patients was responsible for 13%, unavailability of space within the electromyography and nerve conduction study lab was responsible for 11%, shortage of equipment 10%, increased workloads 6% and shortage of supportive staff 5%. Pre-data (Jun and Jul 2015) was collected and analyzed to determine the percentage of patients getting their appointments within 4 categories of time frames; less than 2 weeks, 2-4 weeks, 4-12 weeks and more than 12 weeks. Post-data (Sep and Oct 2015) was collected, analyzed and compared with the pre-data to determine the impact of the implemented interventions. Figure 1 shows pre-and-post data. Table 1 shows that 93% of appointments are now available in less than 2 weeks, compared to only 8% pre-improvement, no show rate was reduced to 2% compared to 13% and total procedure volume was increased to 99 compared to 52 per month before improvement.



**Figure 1.** % of patients getting appointments within 4 time frames before and after the interventions.

**Table 1.** Appointment time of EMG and NCS, no show rates and number of performed procedures before and after the performance improvement project.

Project Measurable Indicator	Pre-Data	Post-Data	Improvement
Appointments within 2 weeks	8%	93%	85%
No Show Rate	13%	2%	-11%
Procedures Volume	52/Month	99/Month	90%

### 3. Discussion and Recommendations

Timeliness and accessibility in health care reflect system's capacity to provide care quickly after a need is recognized. They are two of the six dimensions of quality the Institute of Medicine established as a priority for improvement in the healthcare system. Measures of timeliness and accessibility include time spent waiting in doctors' offices and emergency departments, and the interval between identifying a need for specific diagnostic tests or treatments and actually receiving services [12]. The evidence discussed in many studies shows that diagnostic delay can cause serious harm to patients in the form of complications and/or permanent disabilities that could have been avoided if diagnostic services were accessible and provided on time [13,14]. Achieving improvement in productivity, improvement in work processes and increase in customer satisfaction, our study is recommending that the number of clinics should be well planned according to the number of patients. Appointment schedule should be efficiently utilized by considering adding more slots whenever feasible. It is essential for credentialed and privileged assistant consultants to conduct extra clinics independently to reduce the burden on consultant physicians. It is important to ensure effective and balanced technical staff workload and to monitor staff productivity, therefore cross training of staff is recommended to make them supportive to each other.

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