



## COMPARISON BETWEEN THE QUEUING SYSTEM AND APPOINTMENT SYSTEM IN HOSPITALS

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### ARTICLE INFO

**Key Words:** Queue and Appointment System,

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**The Problem of the Study:** Despite the globalization in health services and technological integrations, patients still face with uncalled-for waiting times in service encounter process. This waiting time cannot be limited to not only waiting physicians but also waiting for treatment, waiting for an emergency or waiting for an accident case. It is aimed in this study to understand the effects of these waiting times on psychological effects on patient satisfaction.

**The Purpose of the Study:** It is aimed in this study to evaluate the level of patient satisfaction by analyzing and evaluating waiting in queues and appointment system in polyclinic units of State Hospital.

**Method:** This study mainly consists of the patients that are provided services from State Hospital. The study was conducted based on a survey system with 150 patients in 4 polyclinics between 28.04.2014 and 09.05.2014.

**Findings and Results :** Even though waiting periods change in each polyclinics, the most intense times of queues are between 08:00-11:00 and 13:00 and 15:00. Generally waiting periods in Otorhinolaryngology is 62 minutes, 45 minutes in General Surgery , 47 minutes in Ophthalmologic clinic and 68 minutes in Internal Diseases clinic. The highest contentedness level in appointment system is in Ophthalmologic clinic. Periods in waiting in queues are much more than those in appointment system. At the end of the study, it is

### ABSTRACT

determined that appointment system is more efficient than waiting in the queues.

## INTRODUCTION

Rapid developments in information and communication technologies, technological integrations and globalization process have created significant changes in health sector as in others. Hospitals are providing service in an integrated manner with technology by raising their quality of service, increasing accessibility to health services and enhancing level of health standards.

‘Today, it is a reality that the number of health institutions cannot supply the needs of this raising population despite the positive developments in this sector. As a result of increasing level of income, a demand of more qualified service has emerged (Tekin, 2015:484). Lack of sources, ineffective use of the system, problems while providing service especially in polyclinics and long queues become inevitable (Fedai et al, 2000:49).

One of the sectors that queue problems are mostly encountered is the health sector. Within this aspect, hospitals are thought as a system comprised of queuing networks (Luck1972). According to a research done by Ministry of Health , patients wait approximately 70 minutes after arriving to the hospitals to meet the doctor and this period reaches nearly two hours in university hospitals ( Ministry of Health,1994). Patients are waiting on phones and on internet as well as in front of patient admission office. To solve waiting problems in hospitals, patients are provided health services speeded in time periods (Alagöz, 2003:2). However, ineffective planning of sources and the imbalances in supply and demand of services cause long waiting times. Determining the number of patients to be treated without an analytical model and serializing at the beginning of the clinic hours are the main reasons of long queues in hospitals. Under this circumstance, patients have to arrive hospitals early to get a sequence. Therefore there becomes

stampede in lounges especially during these moments because these patients have to wait in queues (Gürpınar and Karahan, 2009:156). In order to reach health services in more active and productive ways, one of the most important projects studied by Ministry of Health within scope of Health Transformation Project is Central Appointment System ([www.sisoft.com](http://www.sisoft.com)). Appointment system is a system used for planning the sources, effective and efficient workforce, increasing patient contentedness, shortening the long queues (mhhs.gov.tr). The two main performance indicators of an appointment system are waiting times and doctors’ leisure times (Brahimi, 1991).

The purpose of appointment is minimizing the loss of time and extending the flow of patients in periods to regularize the work load. On condition that appointment system is carried out in an efficient way, undermanned waiting periods can be decreased to minimum level. In this context, the effectiveness of queue and appointment systems will be examined and these two systems will be compared and the contributions to patient contentedness and supplying service will be discussed in this study.

## MATERIAL AND METHOD

The universe of the study is comprised of patients who are provided service by Gumushane State Hospital. The study is carried out on 150 patients in four polyclinics between 28.04.2014 and 09.05.2104 based on questionnaire system. Dates are collected with a sampling method through a survey and an enrollment form. Four polyclinics (interior diseases, Ophthalmologic, otorhinolaryngology, general surgery) are analyzed related to the efficiency of queue and appointment system in hospital.

The questions in the survey are about the treatment time, minimum waiting time, maximum waiting time, approximate waiting time (time spent), patient

contentedness and awareness of patients of appointment system. All the information about the number of appointed patient number, the number of patients in queue, the number of appointed patients that do not come, the number of queuing system patient that do not come, the number of treated appointed patient and the number of patient waiting in queue in each

polyclinics are situated in the study. Besides, average waiting times and times for changing queues' periods are observed during the day in each polyclinic.

### RESEARCH

The findings are given below obtained from the queuing system and appointment system applications of the study.

**Table 1: Outpatient patient flow**

<b>Polyclinics (minutes)</b>	The number of Patients Appointment	The number of Patients Queue	The number of patients coming by appointment	The number of patients coming queuing system	The number of patients cared for appointment	The number of patients cared for queuing
Internal Medicine	38	87	6	9	32	78
General Surgery	12	51	3	8	9	44
<u>Otorhinolaryn gology</u>	25	95	4	15	21	80
Ophthalmolog ic	11	71	3	6	8	58

When studied outpatients flow statement with the number of patients coming from the queuing system it was found to be

more than twice the number of patients the appointment system.

**Table 2: Queue system indicators**

<b>QUEUE SYSTEM INDICATORS (minutes)</b>	Internal Medicine	General Surgery	Otorhinolaryng ology	Ophthalmologic
AVERAGE DURATION OF INSPECTION.	4.5	5	4.5	8.5
AVERAGE DURATION OF QUEUE.	180	105	180	150
NUMBER OF DOCTORS	2	2	2	1
WAITING PERIOD AT LEAST	15	15	15	15

THE MAXIMUM WAIT TIME	150	75	120	120
THE AVARAGE WAITING TIME	68	45	62	47

The waiting time of the patients who want to be examined according to the queuing

system service has been found to vary between 45-68 minutes.

**Table 3: Appointment system indicators**

APPOINTMENT SYSTEM INDICATOR	Internal Medicine	General Surgery	Otorhinolaryngology	Ophthalmologic
AVERAGE DURATION OF INSPECTION.	4	4,5	3.5	8
AVERAGE DURATION OF QUEUE.	–	–	–	–
NUMBER OF DOCTORS	2	2	2	1
WAITING PERIOD AT LEAST	10	5	5	5
THE MAXIMUM WAIT TIME	20	15	15	15
THE AVARAGE WAITING TIME	13	8	11	10

According to the patients' waiting time for service appointments system it has been shown to vary between 8-13 minutes.

**Table 4: The effectiveness of queuing systems**

Polyclinics	Spent time	The number of examination	Satisfaction
Internal Medicine	68	87	40%
General Surgery	45	51	60%
Otorhinolaryngology	62	95	50%
Ophthalmologic	47	71	59%

The level of satisfaction of patients from the queue after the inspection system has been found to occur between 40-60%.

**Table 5: The effectiveness of appointment systems**

Polyclinics	Spent time	The number of examination	Satisfaction%
Internal Medicine	13	38	75%
General Surgery	8	12	80%
Otorhinolaryngology	11	25	80%
Ophthalmologic	10	11	84%

After examination of the patients examined satisfaction with the appointment

### CONCLUSIONS

The level of patient contentedness mostly based on not only to the treatment time but also to the time spent. The less time a patient spends for a treatment, the more contend s/he is. Although, waiting times change in each polyclinic, the most intense times are between 08:00-11:00 and 13:00-15:00. While the highest level of contentedness is in general surgery (%60), the least level of contentedness is in interior diseases (%40) which is the most time-consuming clinic. While the level of patient contentedness is %80 in general surgery which is in the best position of appointment system, in interior diseases

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system has been found to vary between 75-84%.

which is the most time-consuming clinic the level is %75. While the waiting time in appointment system is mostly 20 minutes, it is 120 minutes in queuing system. Evaluated in approximate waiting time, one can wait mostly 13 minutes in appointment system; this period can rise to 68 minutes. When we consider the degree of satisfaction between these systems, the level of satisfaction in appointment system is higher than in queuing system. To shorten the queue and waiting times, patients should be encouraged to use appointment system. By means of this system, personal convergence will be decreased.

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