

# Hourly-block and standard patient scheduling systems at two private hospitals in Alexandria

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**Introduction:** Patient appointment systems are of great importance for efficiently managing outpatient clinics as well as patient satisfaction as an indirect indicator for quality care rendered.

**Purpose:** To describe the hourly block and standard sequential scheduling appointment systems at two different hospitals, as well as to assess the patients' opinions regarding their waiting time in both systems.

**Study settings:** The study was conducted at ENT (Ear, Nose, and Throat) clinics in two of the biggest and reputable private hospitals in Alexandria. Hospital A follows the standard appointment system and Hospital B follows the hourly block appointment system.

**Study design:** A cross-sectional descriptive study was designed to compare the two settings.

**Results:** For new cases, the mean time was longer for the standard system with regards to access time ( $12.2 \pm 5.9$ ) days, while the mean time was longer in the hourly block system with regards to punctuality, waiting time, and consultation time ( $28.5 \pm 12.3$ ,  $27.5 \pm 17.1$ , and  $14.5 \pm 9.0$  minutes, respectively). For return cases, the mean time was longer for the standard system with regards to access and punctuality times ( $14.5 \pm 6.1$  days and  $48.9 \pm 27.0$  minutes, respectively), while the highest mean times in the hourly block system were for waiting and consultation ( $19.4 \pm 6.9$  and  $12.3 \pm 3.9$  minutes, respectively). Most of the patients in both systems preferred the standard appointment system to the hourly block system (73.3% for Hospital A and 55.0% for Hospital B).

**Conclusion:** Every health care organization should know how to choose the most appropriate method of appointment system and how best to organize it to meet the needs of its patients. Patient scheduling is an important tool for efficient outpatient department management as well as rationally operating outpatient resources and critical areas like physician productivity, patient satisfaction, and practice profits.

**Keywords:** appointment, schedule, waiting time

## Introduction

Nowadays, it is almost impossible to avoid waiting. We wait for appointments, news, decisions, and for good weather. We wait in the office, in the lecture hall, in front of elevators, and on the phone. We are used to waiting at the cinema entrance, at the cash desk in the supermarket, at traffic lights, and at bus stops, and finally we wait for the doctor. Experienced patients bring their books, and businessmen their notebooks, to the clinic in order to use the waiting time efficiently. However, the atmosphere in many waiting rooms is not conducive to doing something useful or even pleasant, and most people just wait patiently until their name is called.<sup>1</sup>

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Health systems are no exception as they are confronted with constantly rising costs, and diagnostic as well as treatment services become more and more specialized. On the other hand, resources (staff and finances) are becoming tighter, yet more and more patients seek treatment in the clinic. Consequently, purposeful planning, demand-oriented scheduling of patient appointments in outpatient departments, and specialty consulting hours gain more and more importance.<sup>2</sup> The managerial aspect of providing health services to patients in hospitals is becoming increasingly important. On the one hand, hospitals want to reduce costs and improve their financial assets, and on the other, they want to maximize the level of patient satisfaction.<sup>3</sup>

An appointment scheduling system is a system used to manage appointment calendars and scheduling of appointments for physicians, dentists, and other health care providers. It allocates appointments to a time slot during consultation hours. This allocation is done according to appointment scheduling rules.<sup>4</sup> In general, a good appointment system has been defined as "... one that allows the patient to be seen on the day that he/she wishes and keeps the waiting time for both patient and doctor to a minimum, while allowing adequate time for every consultation".<sup>5</sup>

There are many types of appointment systems, ranging from single-block appointments on one end of the spectrum to individual appointments on the other, as well as a mix of these such as multiple-block and block/individual systems.<sup>6</sup> A review of the literature reveals that the majority of the studies assume patients were homogeneous for scheduling purposes. This means patients were scheduled on a first-call, first-appointment basis. The main focus of these studies was to find the best appointment scheduling rule, ie, the basic template of the appointment system which determines the number of patients scheduled to each appointment slot (ie, block size) and the length of appointment intervals. Various combinations are possible: block sizes can be individual, multiple, or of varying sizes, and appointment intervals can be fixed or variable.<sup>1-5</sup> Needless to say, for block scheduling to work, the office must be adequately staffed; it should take the patient a short while after entering the office after which he/she be tended to by staff.<sup>7</sup>

Appointment rules for hourly block appointments system rule calls for patients many-at-a-time with appointment intervals sets equal to (seven for new patients and eight for return patients) the mean consultation time, whereas the standard sequencing rule schedule new patients in the beginning, then return patients and back again new patients and returns (NRNRNR).<sup>1</sup>

Su and Shih<sup>8</sup> state that the use of patient classification for scheduling purposes had been considered by a number of

studies. Some of the classification schemes addressed in these studies include new/return, variability of service times, and type of procedure.<sup>8</sup> Empirical data collected in a variety of specialties reveal that the mean service time of new patients is usually higher than that of return patients.<sup>1,8</sup> The underlying assumption was that the patient population can be distinctly classified into three groups based on consultation time characteristics, new/return patients, or type of procedure. In practical application, this implies that the scheduler channels patients to appropriate slots reserved for each patient type.<sup>1</sup> A study in the USA concluded that there were no significant differences in patient waiting times between the hourly block system and the standard appointment system.<sup>3</sup>

According to literature, the hourly block scheduling leads to a wavelike pattern of activity. The physician tends to work continuously while seeing a block of patients and then has a continuous block of free time between waves of patients.<sup>6</sup> Such scheduling leads to more efficient use of physician time, producing increased patient-free time during and at the end of the clinic. Block scheduling also results in more free time available at the end of the clinic session, whereas sequential scheduling depends upon the volume of the patients present at the clinic.<sup>9</sup>

The choice of appointment scheduling system has been known to affect the performance measures of patient waiting times and physician idle time. It is often the major reason for patients' complaints about their experiences while visiting outpatient clinics.

Customer satisfaction is an important aspect that is addressed when discussing patient scheduling, and whether or not it correlates with waiting time. Campbell<sup>10</sup> and DiTomasso and Willard<sup>11</sup> identified patient satisfaction as determinants of waiting time at outpatient clinics. Therefore, patient satisfaction with waiting time plays a crucial role in the process of health quality assurance or quality management and seems to be the first, most reliable indicator in an evaluation of quality. A patient's satisfaction was related mainly to his/her perception of waiting time in the clinic, as well as to the length of time offered to him by the service provider. So decreasing or shortening waiting times in the clinics was very valuable, not only to satisfy patients and service providers but also because "time is money".<sup>9,12-14</sup>

The ENT (Ear, Nose, and Throat) clinic is one of the most busy and crowded clinics with high patient volumes in the outpatient department (OPD) in Alexandria, especially in winter. The aim of the study was to observe the difference between the standard sequential and hourly block scheduling systems and identify patient satisfaction in both systems at two different private hospitals in Alexandria.

## Methodology

### Aim of the work

The aim of this study was to describe the consultation time characteristics of hourly block and standard sequential scheduling appointment systems at two different hospitals as well as to assess the patients' opinions regarding their waiting time in both systems.

### Study settings

The study was conducted at the ENT clinics of two of the biggest and reputable private hospitals in Alexandria. One hospital uses the block scheduling appointment system, while the other uses the standard sequential appointment system. The study took place between the second week of January 2010 and the end of March 2010.

Hospital A uses the standard appointment system. Patients were scheduled continuously during the clinic at approximately the same hourly rate, and every patient was given a specific amount of time. Patients were classified as new and return (follow-up); "new" patients were totally new to the clinic, "return" patients were former patients arriving with new problems or for follow-up of an old problem. Patients requesting appointments were given the first available appointment in the clinic schedule. The clinic works on two shifts per day: the first from 9 AM to 12 PM and the other from 1 PM to 3 PM.

Hospital B uses the hourly block appointment system. Around eight patients were examined per hour and were seen in order of arrival. The clinic classified patients as new and return for scheduling purposes. At the time of requesting an appointment, patients were given the option to choose the health care provider in the first visit. The hospital had two clinics per day: the first was from 8:30 AM to 12:30 PM, and the other from 1 PM to 3 PM. For both hospitals the data collection days were Tuesday and Wednesday, 3 weeks in each setting.

### Study design

A cross-sectional descriptive study was designed to compare the two settings. Patients at each setting were divided into two categories: as new and return patients who had appointments at the ENT clinic. The ENT clinic was chosen after consulting the hospital statistician which revealed the highest percentage of patients in both hospitals.

### Target population

A convenience sample was chosen that included patients who had an appointment in the studied clinics, with a total

of 297 patients at the time of study, categorized as follows: Hospital A (N = 148) and Hospital B (N = 149).

### Data collection

Data collection tools included observation using stop-watch and interview. Patient identification data included patient ID, age, sex, residence, and visit type. Observation data included scheduled appointment time, time of arrival at the clinic, time spent in the waiting area, patient entrance time to the physician's office, and time spent by the physician with the patient. Data collected from interviews involved opinions regarding the waiting time (short, moderate, or long), the anticipated waiting time (less than 15 minutes, 15–30 minutes, 30–60 minutes, more than 60 minutes), appointment schedule preference, appointment system preference, provider choice, and ease of booking an appointment. The dimensions used in the opinionnaire were used to measure patient satisfaction with the appointment system used at each hospital.

### Statistical analysis

Data were analyzed using the SPSS statistical software program (version 13.0; SPSS Inc., Chicago, IL). Differences were considered statistically significant at  $P < 0.05$ . The Chi-square test was used for group comparison between new and return patients, while independent sample *t*-test was used for comparison of means between new and return patients regarding time parameters.

### Formula calculations

"Patient punctuality" is defined as the difference in time between when a patient arrives for an appointment and the scheduled time of the appointment.

"Access time" is the number of days after request for an appointment.

"Waiting time" refers to the time from when a scheduled time of a patient is to begin to when his/her consultation actually begins.

"Consultation time" refers to the time between when a provider starts reviewing a patient's medical record and when the provider can care for another patient.<sup>11,12</sup>

### Ethical considerations

The study was conducted in accordance with the following ethical considerations:

1. Participation was purely voluntary on the patient's behalf. No pressure or inducement of any kind was applied to encourage an individual to become included in the study.

2. Before participation, all patients were notified about the study's aim, objectives, and methods.
3. Any patient had the right to abstain from participation and to terminate participation at any time.
4. The identity of individuals from whom information is obtained in the course of the study was kept strictly confidential. No information revealing the identity of any individual was included in the final report or in any other communication prepared in the course of the study.

## Results

For Hospital A, the mean patient age was 24.5 years old. The highest age category for new patients was less than or equal to 19 years, which represented 34.8%, whereas the highest age category for return patients was less than or equal to 19 years, which represented 48.5%. The number of females represented the highest percentage of the sample under study (60.1%), whereas male patients accounted for 39.9%. Patients who lived close to the hospital represented the highest percentage (72.1%). For Hospital B, the mean age was 28 years old. The highest age category for new patients was less than or equal to 19 years, which represented 43.6%, whereas the highest age category for return patients was less than or equal to 19 years, which represented 36.2%. The number of males accounted for more than half of the sample (54.4%). Patients who lived near the hospital represented the highest percentage of the sample (63.1%). No statistical significant difference was detected between the groups for both hospitals except for gender at Hospital B ( $\chi^2 = 4.2$ ).

Table 1 shows a comparison between new cases and return cases in both hospitals with regards to time parameters. For new cases, the highest mean time in Hospital A was for access time ( $12.2 \pm 5.9$  days), while the highest mean in Hospital B was for punctuality time ( $28.5 \pm 12.3$  minutes), waiting time ( $27.5 \pm 17.1$  minutes), and consultation time ( $14.5 \pm 9.0$  minutes). There was significant difference between both hospitals regarding access time ( $t = 7.1$ ) and waiting time ( $t = -7.9$ ). For return cases, the highest mean times were at Hospital A for access time ( $14.5 \pm 6.1$  days) and punctuality time ( $48.9 \pm 27.0$  minutes); whereas, the highest mean times at Hospital B were for waiting time ( $19.4 \pm 6.9$  minutes) and consultation time ( $12.3 \pm 3.9$  minutes). A significant difference was detected between both hospitals with regards to access time ( $t = -1.9$ ) and punctuality time ( $t = 6.1$ ).

Table 2 shows the patients' opinions regarding the dimensions related to the appointment system in Hospital A. The highest percentage of new cases reported that the waiting

time was short (38.6%), while 45.2% of the return cases reported that the waiting was moderate. New and return cases shared the highest percentage with regards to anticipated waiting time being 15–30 minutes (38.6% and 45.2%, respectively), preferred appointment time in the morning (45.5% and 47.3%, respectively), appointment preference for standard appointment (75.0% and 73.1%, respectively), preferring to choose their provider (70.5% and 77.4%, respectively), and finally assuring that booking the appointment was easy (54.5% and 54.8%, respectively). There was a significant difference between new and return cases for waiting time ( $\chi^2 = 8.2$ ).

Table 3 shows the patients' opinions regarding the dimensions related to the appointment system in Hospital B. New and return cases shared the highest percentage with regards to the waiting time being long (54.5% and 63.8%, respectively), anticipated waiting time 15–30 minutes (40.0% and 44.7%, respectively), appointment time being in the morning (72.7% and 67%, respectively), being able to choose their provider (65.5% and 61.7%, respectively) and admitting that booking the appointment was easy in 87.3% of new cases and 86.2% in return cases. With regards to appointment preference, the highest percentage of new cases preferred the block appointment system (52.7%), while the highest percentage preferred the standard appointment system (59.6%). There was significant difference between new and return cases with regards to ease of booking an appointment ( $\chi^2 = 4.1$ ).

## Discussion

There was no significant difference between the two samples under study at both hospitals, giving an indication of homogeneity of the total sample. The highest percentages in both hospitals were cases younger than 19 years living near the hospital. Yet, the punctuality time was very high for both new and return cases in Hospital A ( $22.2 \pm 15.6$  and  $48.9 \pm 27.0$  minutes, respectively) and considerably high for Hospital B ( $9.8 \pm 6.8$  and  $19.5 \pm 13.2$  minutes, respectively), which is in concordance with the prevailing norms and cultures in the community, where patients prefer to be late for appointments or dates on the assumption that the opposite party will be late too (in our case, the physician will arrive late, and eventually the consultation time will start late). This observation was assured on the patients' opinions regarding the ease of booking an appointment, where the highest percentage in both hospitals stated that it was easy to fix an appointment despite the long time in both hospitals (54.7% for Hospital A and 86.6% for Hospital B). The access time

**Table 1** Comparison between new and return cases with regards to time parameters at Hospital A and Hospital B (Alexandria, 2010)

Time parameter	Hospital A New cases (n = 46)		Hospital B New cases (n = 55)		Test of significance (95% CI)
	Mean	SD	Mean	SD	
Access time (days)	12.2	5.9	9.8	6.8	(-2.37-2.3) 7.1 <sup>a</sup>
Punctuality time (minutes)	22.2	15.6	28.5	12.3	(4.67-2.5) -0.58
Waiting time (minutes)	18.9	13.7	27.5	17.1	(-2.5-2.1) -7.9 <sup>a</sup>
Consultation time (minutes)	11.3	5.8	14.5	9.0	(-3.2 to -2.4) -2.0
	Return cases (n = 93)		Return cases (n = 94)		
Access time (days)	14.5	6.1	6.1	5.3	(-2.4-0.5) -1.9 <sup>a</sup>
Punctuality time (minutes)	48.9	27.0	19.5	13.2	(-4.2-0.8) 6.1 <sup>a</sup>
Waiting time (minutes)	17.1	6.2	19.4	6.9	(-3.4-1.7) -0.8
Consultation time (minutes)	8.2	4.9	12.3	3.9	(-3.8 to -0.8) -2.2

Note: <sup>a</sup>P < 0.05.

Abbreviations: CI, confidence interval; SD, standard deviation.

**Table 2** Patient's opinionnaire at Hospital A (Alexandria, 2010)

Dimensions	New case (n = 44)		Return case (n = 93)		Total		$\chi^2$
	No.	%	No.	%	No.	%	
<b>Waiting time</b>							
Short period	17	38.6%	16	17.2%	33	24.1%	8.2 <sup>a</sup>
Moderate	12	27.3%	42	45.2%	54	39.4%	
Long	15	34.1%	35	37.6%	50	36.5%	
<b>Anticipated waiting time</b>							
Less than 15 minutes	16	36.4%	26	28%	42	30.7%	3.2
15-30 minutes	17	38.6%	42	45.2%	59	43.1%	
30-60 minutes	9	20.5%	24	25.8%	33	24.1%	
More than 60 minutes	2	4.5%	1	1.1%	3	2.2%	
<b>Appointment time</b>							
Morning	20	45.5%	44	47.3%	64	46.7%	0.2
Afternoon	18	40.9%	39	41.9%	57	41.6%	
Evening	6	13.6%	10	10.8%	16	11.7%	
<b>Appointment preference</b>							
Standard appointment	33	75.0%	68	73.1%	101	73.7%	0.06
Block appointment	11	25.0%	25	26.9%	36	26.3%	
<b>Provider choice</b>							
Yes	31	70.5%	72	77.4%	103	75.2%	0.8
No	13	29.5%	21	22.6%	34	24.8%	
<b>Ease of booking an appointment</b>							
Easy	24	54.5%	51	54.8%	75	54.7%	0.6
Slightly difficult	15	34.1%	35	37.6%	50	36.5%	
Difficult	5	11.4%	7	7.5%	12	8.8%	
<b>Total</b>	44	100%	93	100%	137	100%	

Note: <sup>a</sup>P < 0.05.

**Table 3** Patients' opinionnaire at Hospital B (Alexandria, 2010)

Dimensions	New case (n = 44)		Return case (n = 93)		Total		$\chi^2$
	No.	%	No.	%	No.	%	
<b>Waiting time</b>							
Short period	10	18.2%	10	10.6%	20	13.4%	2.1
Moderate	15	27.3%	24	25.5%	39	26.2%	
Long	30	54.5%	60	63.8%	90	60.4%	
<b>Anticipated waiting time</b>							
Less than 15 minutes	5	9.1%	8	8.5%	13	8.7%	2.6
15–30 minutes	22	40.0%	42	44.7%	64	43.0%	
30–60 minutes	21	38.2%	39	41.5%	60	40.3%	
More than 60 minutes	7	12.7%	5	5.3%	12	8.1%	
<b>Appointment time</b>							
Morning	40	72.7%	63	67%	103	69.1%	1.3
Afternoon	14	25.5%	26	27.7%	40	26.8%	
Evening	1	1.8%	5	5.3%	6	4.0%	
<b>Appointment preference</b>							
Standard appointment	26	47.3%	56	59.6%	82	55.0%	0.8
Block appointment	29	52.7%	38	40.4%	67	45.0%	
<b>Provider choice</b>							
Yes	36	65.5%	58	61.7%	94	63.1%	0.2
No	19	34.5%	36	38.3%	55	36.9%	
<b>Ease of booking an appointment</b>							
Easy	48	87.3%	81	86.2%	129	86.6%	4.1 <sup>a</sup>
Slightly difficult	5	9.1%	13	13.8%	18	12.1%	
Difficult	2	3.6%	0	0.0%	2	1.3%	
<b>Total</b>	<b>55</b>	<b>100%</b>	<b>94</b>	<b>100%</b>	<b>149</b>	<b>100%</b>	

Note: <sup>a</sup> $P < 0.05$ .

was significantly different in this study, and was longer in the standard appointment system than the hourly block system, which raises a question beyond the objective of this study related to the human and nonhuman resources available at Hospital A and their eligibility to offer high quality care under the standard sequential system.

The waiting time for the hourly block appointment system at Hospital B was longer than that for the standard system. This result does not correspond with a previous study which observed that the standard appointment system had a longer mean waiting time than the hourly block appointment system. The study concluded that overbooking and crowding was created by improperly matching the time allocated for the patient visit to the patient's acuity level or time required to perform the visit, or by accommodating patients by "fitting in" walk-ins and emergency patients.<sup>15</sup> Another study also noted that if the physician overbooks the schedule even slightly, patients will experience very long waits. It was suggested that an appropriate interval to schedule patients is 1.08 (T/N), where T is the total duration of all visits, and N is the total number of all visits over a week's sampling of each physician.<sup>16</sup>

The waiting time is considered within the range when comparing it with studies which identified the norms in North America, Europe, and some Asian countries which were in the vicinity of 10–30 minutes reaching a maximum of 1–2 hours in Ecuador and 2 hours in Trieste (Italy).<sup>17–19</sup> Patients in both systems preferred the standard appointment system; this may be due to the high patient-provider bondage anticipated to that system rather than the hourly block system. Such a result is again in accordance with the oriental personality of intimacy and privacy when it comes to the physician who people confide in as a man or woman of wisdom in this part of the world.

Most of the appointment systems that exist in real-world situations are designed to improve the utilization rate of the service facility while neglecting patient waiting time. Clinic scheduling must decrease mean patient waiting time, perform well in most operating environments, and try to achieve a balance between the time the doctor waits for patients to arrive and the time patients spend waiting to be seen.<sup>12,13,17</sup> The choice of appointment scheduling system has been known to affect the performance measures of patient waiting times and physician idle time. It is often the major reason for patients'

complaints about their experiences of visiting outpatient clinics. Therefore, patient satisfaction with waiting time plays a crucial role in the process of health quality assurance or quality management and seems to be the first, most reliable indicator in an evaluation of quality.<sup>20</sup> Two studies on waiting time stated that a patient's satisfaction was related mainly to his/her perception of waiting time in the clinic, as well as to the length of time which was offered to him by the service provider.<sup>9,14</sup> So decreasing or shortening waiting times in the clinics is very valuable, not only to satisfy patients and service providers, but also because "time is money". Clinic waiting time was described by some authors as an important factor affecting satisfaction.<sup>9,14,17,18</sup>

The waiting time in this study is in concordance with studies on waiting time in outpatient settings. Patients in the study stated the anticipated waiting time to be between 15 and 30 minutes. One study attempted to characterize an appropriate waiting time using questionnaires to assess what patients considered to be a "reasonable time" to be kept waiting and found the responses to have a mean of  $16.1 \pm 7.9$  minutes. Whereas, an empirically derived standard based on a national United States survey showed that waiting time should not exceed 30 minutes.<sup>21</sup> Another study found that approximately 16 minutes was considered reasonable by their patients.<sup>3</sup>

## Limitations

The socioeconomic and occupational characteristics were not comprehensive enough to identify any statistical differences between the communities attending at both hospitals, and this could have had an effect in interpreting the results. This study did not address the issue of physician productivity nor other professional activities such as hospital rounds or staff meetings. There was also the probability that the investigator altered his/her routine or adjusted certain behaviors to achieve desirable results. These limitations are thought to be accepted in the presence of an independent observer, in addition to the possibility of a Hawthorne effect.

## Conclusion

The waiting time was longer in the hourly block system for new and return cases than the standard system, contrary to studies on patient scheduling which are in favor for longer waiting times. The access time was longer in the hourly block system than the standard system. In general, patients were dissatisfied with the long waiting time. In the standard

system they felt that their waiting time was moderate, but in the hourly block system, it was long. Eventually, every health care organization should identify how to choose the most appropriate method of appointment system and how best to organize it to meet the needs of its patients. Patient scheduling is an important tool for efficient outpatient department management as well as rationally operating outpatient resources and critical areas like physician productivity, patient satisfaction, and practice profits.

## Disclosure

The authors report no conflicts of interest in this work.

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