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Evolution of Nationwide Central Hospital Appointment System (CHAS) Implementation: A Country Study

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Abstract. Health Transformation Program (HTP) is searching for a solution to overall concerns and structural insufficiencies such as public health insurance, accession to health care services and the service quality of the Turkish Health System. One of the works and studies carried out in this context is the implementation of Central Hospital Appointment System (CHAS) enacted in February, 2010.
Purpose. This study aimed to assess one-year pilot studies in CHAS implemented in the scope of HTP and to reveal its development in the first year. Within the scope of CHAS implementation, 11 provinces and 104 hospitals have been included to the system in one-year pilot implementation period.
Method. This study is a descriptive research. Study date was gathered from the Turkish Ministry of Health. Descriptive analysis was used to data analysis.
Results. In a total 1,025,323 appointments were given at the end of this period. Eskisehir is a lead province which is using the system in the most effective way with a rate of 17.41 % and 178,491 appointments. 10.29 % of total appointments were given in Canakkale Public Hospital and 81.55 % of total numbers of appointments were given in 16 hospitals. In the range of branches, internal medicine can be distinguished from other specialties with a rate of 12.09 %. 80.82 % of appointments intensified on 12 medical specialties. The average of call handling time is 129.17 sec and 1,403,663 calls are received by call center in the pilot application period.
Conclusion. CHAS implementation has the potential to play and important role in improving the accessibility to health care service in Turkey and other countries.

Keywords. Central hospital appointment system; call center, medical health records; hospital communication systems; medical informatics/communication.

Introduction

Appointment systems in healthcare setting have two objectives: (i) provide a better service to patients by assigning them a very short time window during which they are guaranteed to get a service, and (ii) protect the hospital from daily fluctuations in demand which can lead to an inefficient care delivery with low service utilization

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levels in some days and overloads in others. Hence, a capable and efficient appointment system is critical to patient satisfaction, physician productivity and staff morale, all of which can have an impact on performance scores of the hospital. Considering the recent technological advancements in the information and communication field (e.g. Internet, smart phones, Wi-Fi, mobile applications, etc.) it is reasonable to expect the adoption of such capabilities by the healthcare providers.

In healthcare, with greater emphasis on preventive medical practices, productivity improvement in outpatient department is becoming a central concern worldwide. For example, long wait times by patients seeking consultation has been a long term complaint in Turkey and other countries. Today's customers seek quality service for the price they pay while fierce competition has intensified the industry further. Enhancing productivity while maintaining a high level of quality has become a challenge for healthcare managers. The major factor for patients in terms of quality concerns waiting time which has become a significant portion of determining the service quality. Researchers have identified that the root of the problem in long waiting time for outpatients as being the result of an improper appointment system in place at a hospital. Over a half century numerous researchers, from the works of Bailey (1952) to Cayirli et al. (2008) [1,2] have investigated this issue extensively [3].

Appointment scheduling systems lie at the intersection of efficiency and timely access to health services. Timely access is important for realizing good medical outcomes. It is also an important determinant of patient satisfaction. The ability to provide timely access is determined by a variety of factors that include fundamental questions about how many and which types of physical assets and equipment a health system should invest in, how should it allocate resources among multiple sites, how should it staff each clinic or hospital site, what rules best determine which providers and patients receive higher priority access to resources, and how appointments are scheduled [4,5].

Research has demonstrated that missed appointments had a negative impact on patient wellbeing while at the same time decreasing the physician's efficiency and effective use of patient scheduling system could have positive outcomes for both patients and physicians in health care organizations [6]. Scheduled patient encounters include primary and specialty care visits, as well as elective surgeries. In each of these environments, the process of scheduling appointments (assigning a specific time when the patient is scheduled to start receiving care) is different, which we will describe shortly. In addition, there are unscheduled encounters that include walk-ins and urgent or emergency cases. The former, occurring mostly in primary care clinics, can be directed to an alternate facility if the clinic in question is heavily booked. However, urgent specialty care and surgical patients often need to be treated as soon as possible. The goal of a well-designed appointment system is to deliver timely and convenient access to health services for all patients. Appointment systems also smooth work flow, reduce crowding in waiting rooms and allow health systems to honor patient and provider preferences while matching supply and demand.

Each of primary care, specialty care and hospital services and organizations have certain unique features that give rise to different challenges for managing and planning appointments. In the primary care setting and institution, the vast majority of patients require services that can be performed within a fixed time length. So, primary care clinics tend to divide available provider time into equal-length time slots such that, by and large, patients' needs can be accommodated in a standard appointment slot. For certain types of visits that require more time, clinics may assign multiple appointment

slots. The appointment scheduling problem then reduces to that of finding a suitable match among the available time slots of providers in the clinic, provider prescribed restrictions on how available slots may be filled and patients' preferences for day/time of week as well as for a particular service provider. (An example of provider restrictions on the use of available slots is the limit that many providers place on the number of physical exams or new patients that can be scheduled in any given session.) Still, the problem of matching supply and demand is not easy because different patients have different perceptions of the urgency of their need and different day-of-week and time-of-day preference patterns [3,7-9].

Keeping a health service appointment can be defined as attending a prescheduled appointment at a health care facility for a health service that is administered directly at the visit. Failure to attend appointments is a common occurrence in outpatient medical health settings [10,11].

Appointment systems can be a source of dissatisfaction, both for the patients and for the providers. Patients are impacted by the lack of availability of timely and convenient appointment slots, especially when their need is urgent. Clinicians are impacted by the uncertainty in the number of patient appointments from day to day, and the mix of appointments on any given day. These factors can affect clinicians' earnings as well as their job satisfaction levels. In many instances, clinicians can handle high-priority demand, and variations in case mix, only by stretching their schedules to absorb demand variation--i.e., by shrinking lunch time, pushing back dinner and double booking (working faster). Even with such strategies in place, it is sometimes necessary to reschedule certain booked appointments for non-urgent services in order to take care of urgent demand. Moreover, significant direct waiting time is not uncommon in environments that deal with life-threatening urgent cases. Frequent involuntary changes in appointments and long direct waits can cause dissatisfaction among patients who book in advance [3,7,8,9].

Studies have documented that up to 30% of patients do not keep an initial outpatient appointment and 20% to 40% of follow-up appointments are missed in medical health clinics [12-14]. The patient failing to keep an appointment disrupts the health system at various points. By missing appointments, individuals deprive themselves of receiving necessary care, impairing clinician-patient relationship, reduce the opportunity for other patients to receive timely care, have adverse effect on learning and research in ambulatory care settings and indirectly contribute to rising health care costs [11, 15-17].

Stemming from the many issues discussed above the Turkish government had made adoption of a robust appointment/scheduling system throughout its national network of hospitals. The purpose of this study to assess one-year pilot studies in Central Hospital Appointment System CHAS implemented in the scope of Health Transformation Program (HTP), which is discussed in detail in the coming section, and to explore its development in the first year in terms of descriptive analysis. Within the scope of CHAS implementation, ministry of health selected 11 provinces and 104 hospitals where the ‘182’ call center would coordinate appointment as part of the one-year pilot implementation. There is no prior study on evaluation and assessing of CHAS implementation in Turkey. This study is first study on CHAS in Turkish health system.

1. Literature Review and Background

As the basic level of fundamental rights and freedoms, ensuring right of life and maintaining physical and mental healthy life by Government to an individual is under our Constitution. In order to fulfill this duty by Government properly, it is required that necessary arrangements shall be done to provide health care services more effectively and to allow citizens to benefit from health services in the maximum way by improving access to health care services. The Ministry of Health providing a service in accordance with the scope of this constitutional right, has carried out Health Transformation Program (HTP) so as to provide (human) patient-centered health care services since 2003 [18].

Health Transformation Program (HTP) is searching for a solution to address overall health concerns and more specifically deficient core components such as public health insurance, access to health care services, increasing the quality of service provided, improving information management capabilities, and hospital information systems infrastructure of Turkish Health System [18,19]. As part of the information management capability improvement and infrastructure development efforts, priority was given for the creation of core components of the Ministry of Health Information System, namely, the Saglik-Net (Turkish for "Health-Net"), the National Health Information System (NHIS), the Family Medicine Information System (FMIS), ***the Centralized Hospital Appointment System (CHAS)*** and the Core Resources Management System (CRMS) [20].

Developments are currently occurring in terms of accessibility of healthcare for citizens. An important national project in Turkey is the Centralized Hospital Appointment System that is currently being piloted in some provinces (Erzurum and Kayseri). In provinces where CHAS is implemented citizens can dial direct '182' CHAS Call Centre to reach 'Oral and Dental Health Centers' as well as secondary and tertiary hospitals affiliated with the Ministry of Health and can get an appointment from the hospital and physician of their choice with the help of the 182 operator. CHAS was initially implemented in Erzurum and Kayseri provinces as a pilot program. Throughout the pilot implementation, observations were made and then the process was initiated to roll-out in phases throughout Turkey. Within this scope, as of July 2010, CHAS implementation was initiated in Yalova, Eskişehir, Bilecik, Çanakkale, Edirne, Kırklareli, Sakarya, and Tekirdağ provinces. The phased implementation of CHAS is scheduled to complete by the end of 2011 [19].

One of the works and studies carried out in this context is the implementation of Central Hospital Appointment System (CHAS) enacted in February, 2010. CHAS enables the citizens to make appointments in any public secondary and tertiary healthcare provider together with Oral and Teeth Health Centers by calling the CHAS Call Centre phone number "182". The citizens are assisted by online operators during phone calls. All the healthcare professionals from public secondary and tertiary healthcare providers share their calendars of at least 15 days with the Ministry of Health (MoH) through CHAS Web Services to enable operators to make appointments according to these shared calendars. As such MoH not only expects the '182' access be operational but also calendar sharing among participating providers be enabled as an integral part of the piloting of CHAS in all 81 provinces by the end of 2011 [20].

Central Hospital Appointment System (CHAS) will be a system that all the MoH public hospitals are dependent on. The hospitals will inform the working timetables of the doctors regularly to a central system (resources), and the citizens (users using those

resources), who phone call center, will take appointments according to that timetable for the empty hours. With that system, 75% of the working periods of the hospitals will be open to appointments. The remaining 25% of period will be spared for the control examinations and study results evaluations. That rates will be able to be changed when necessary observing the process of the system.

Working timetables will not be same for every hospital, but will not completely be left to hospitals decision. It is aimed at protecting the density of polyclinic procedures not to scatter homogeneously during the day.

The access to the appointment system of the citizens will be processed over call centers, that is, operators at first. Call Centers was reached with a three-digit fixed line of the Ministry. Operators were chosen from especially medical vocational high school and given a special training. It is believed that even if it is not possible that they cannot offer medical instructions service, they will contribute in reducing the rates of citizens' visiting wrong polyclinics. Access channels such as SMS, Internet and kiosk will be opened to use due to the anxiety of exploitation of the system within 2 years. Still, with the electronically ID card whose pilot scheme will begin in 2012, the citizens will be able to get online appointments via Internet by themselves.

Call centers established as a result of great developments in the information and communication technologies can be defined as a “system” allowing all the connected groups (costumers, suppliers, distributor etc.) to use communication channels such as telephone, internet, fax and mail, referring received calls to one center and coordinating several highly skilled personnel [21-23]. Each call center has following features [21, 22]:

- A call center is a dedicated operation with employees focused entirely on the customer service function.
- Those employees are using telephones and computers simultaneously.
- The calls are processed and controlled by an automatic distribution system.

Financial sector is the first sector using call centers due to high cost of face to face interaction with a customer [24]. These call centers are used in many sectors operating in different fields nowadays, enabling bank customers to make banking transactions from their homes after hours in the first years they established. Some of these are travel agencies, airports, hospitals, marketing of cosmetic products, after-sales customer services, computer support services [25].

As a first implementation, call centers were used to reduce personnel costs and ensure work efficiency in the companies. However, these centers have changed into the centers in which all kinds of communication shall be provided with a customer [26]. Hence, the most important advantage of call centers is providing communication between customers and companies. The other advantages of call centers are additional sales, higher service quality, increasing the quality of customer relationship management and customer satisfaction.

For service organizations, these new technologies should facilitate greater effectiveness and efficiency. More customers can be serviced at any one point in time, and, with customers taking at least part of the responsibility for the streaming of calls (by selecting a preference from a predetermined menu using the telephone keypad), fewer staff are necessary. Fewer service centers with less space for customers should be needed leading to a concomitant reduction in management staff and further cost reduction [27].

The studies carried out for call centers can be divided into two groups. The studies in the first group have analyzed call centers through companies. Lam and Lau emphasized the advantages of restructuring call centers via technical support [28]. Brown and Maxwell (2002) searched the effects of management approach to the efficiency in call centers in England [26]. Tuten and Neidermeyer have studied the effect of employees to companies who are working under stress in call centers [23]. Malhotra and Mukherjee (2004) explored similar studies as well. They searched the effect of job satisfaction of employees working in call centers to the operational efficiency in the banks [25].

Studies in the second group have addressed call centers in the terms of customers. Bennington et al. tried to determine satisfaction levels of customers using call centers [27]. Feinberg et al. emphasized the call satisfaction and explained "first call" and "call abandonment" operations as the important parameters that affecting customer satisfaction [29]. Dean has tried to determine the level of customer satisfaction of a call center by using SERVQUAL instrument to measure desired or ideal expectations [21]. Dean has also explored consumer expectations from call centers. Dean (2004) implied that consumers' expectations can be met by call centers of the present however expectations are increasing day by day and in parallel to this, the number of unsatisfied consumer increases [22].

2. Methodology

This study is the very first evaluation of the data from pilot rollout of CHAS, which was part of actions taken to improve the effectiveness of Turkish health systems. A descriptive analysis approach was used in order to demonstrate asses the CHAS use patterns and establish a baseline for future rollout of CHAS. In this context, comparisons are made between 11 provinces using '182' call center. In addition, comparative analyses are presented among hospitals and specialties. Findings are based on the data collected from the first 12 months of pilot implementation. In conclusion, various operational indicators of a call center which are listed below are examined according to months.

Operational indicators of call centers can be defines as [6, 9];

- ***Offered Calls/Received/Incoming:*** Total of incoming calls to queue of customer representative through dialing result after entry point.
- ***Handled Calls / ACD Calls/Answered Calls:*** Total of answered calls by customer representatives which are incoming to queue of customer representative through dialing result after entry point.
- ***Abandoned Calls:*** Total of unanswered calls by customer representatives which are incoming to queue of customer representative through dialing result after entry point.
- ***Average Speed of Answer:*** Average waiting time of answered calls on the queue. It can be figured out by the ratio of total waiting time to unanswered call number.
- ***Answer Rate:*** The ratio of the number of answered calls by customer representatives to total number of incoming calls.

- ***Average Call Handling Time:*** The average value of customer representatives service period for answered calls per an answered call (in seconds)

The data that was used for this study obtained from the Turkish Statistical Institute and The Ministry of Health (CHAS Call Center Database 2011). Some descriptive analyses were made using SPSS (Version 15.0) and Excel software. This study was planned and conducted to pre-evaluation of CHAS in Turkey

3. Results

3.1. Evaluation of Implementation and Scope

Figure 1 shows the increases of the number of outpatients since 2003 in which year HTP began to carry out. Therefore, it is possible to address that HTP has an important success in the improvement of accessibility of health care services. The total number of outpatients nearly 130 million in 2003 is now approximately 295 million by the increase of 130 percent as a result of amendments in favor of patients in the payment system and efficient policies in resource allocation especially in manpower deployment (including public and private institutions).

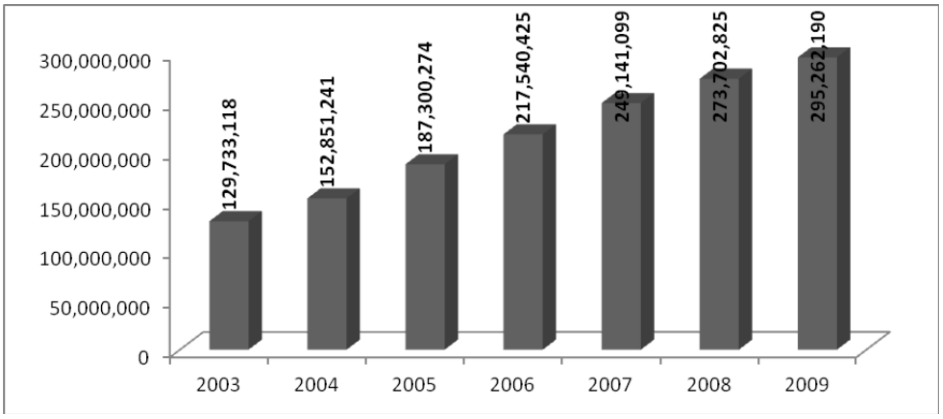

Figure 1: The number of outpatients by years (including public hospitals and all of the private hospitals). Source: The Ministry of Health, Annual of Inpatient Treatment Statistics of General Directorate of Treatment Services, 2009.

Annual frequency of admission to a physician was on the level of 1.75 in 2003 and it increases to the level of 4 by 2010. It is foreseen that this parameter will increase above this level as a result of CHAS implementation across the country.

CHAS project, which received its first call in Erzurum and Kayseri in 23rd February 2010, was rolled out in Yalova in June 2010; Eskisehir, Bilecik, Canakkale, Edirne, Kırklareli, and Tekirdağ in July 2010; Burdur and Düzce in January 2011. CHAS project's goal is to have all of the provinces in Turkey have the '182' in place and operational by June 2011.

The target population and outpatient hospital visit statistics for the provinces included in the pilot phase is shown in Table 1.

Table 1: The number of population and outpatient in the pilot provinces under CHAS implementation

Pilot Implementation Provinces	Population	Number of Outpatient Visits
ERZURUM	769,085	3,286,258
KAYSERI	1,234,651	5,754,551
YALOVA	203,741	940,285
ESKISEHİR	764,584	3,014,262
BILECIK	225,381	657,586
CANAKKALE	490,397	2,185,848
EDIRNE	390,428	2,375,859
KIRKLARELI	332,791	1,586,526
TEKIRDAG	798,109	3,088,313
BURDUR	258,868	1,315,912
DUZCE	338,188	1,036,274
CHAS Total	*5,806,223*	*25,241,674*
TURKEY Total	73,722,988	295,262,190

Source: The Ministry of Health, Annual of Inpatient Treatment Statistics of General Directorate of Treatment Services, 2009.

11 provinces have been included in one-year pilot implementation period (February 2010- January 2011). Total number of population of provinces is approximately 8 % of country population and total number of outpatient hospital visits in these provinces is approximately 9 % of the total number of outpatients in Turkey.

The number of appointments and hospitals in 11 provinces implementing CHAS is shown in Table 2. In total 1,025,323 appointments were made through '182' call centers in one-year pilot implementation period. 104 hospitals were selected as part of CHAS project for the pilot implementation where appointments were scheduled for.

Table 2: The number of appointments in CHAS pilot implementation provinces and the number of hospitals and its rates under implementation (2010)

Province	Number of Appointments	Number of Hospitals Participating	% of Hospitals in the Province
ESKISEHIR	178,491	13	12.50
BILECIK	171,815	9	8.65
TEKIRDAG	152,177	10	9.62
CANAKKALE	129,990	10	9.62
KIRKLARELI	123,936	6	5.77
EDIRNE	77,530	7	6.73
ERZURUM	73,569	23	22.12
KAYSERI	51,340	14	13.46
YALOVA	51,145	3	2.88
DUZCE	8,989	3	2.88
BURDUR	6,341	6	5.77
Total/Ratio	1,025,323	104	100

Source: The Ministry of Health (CHAS Call Center Database 2011).

When the number of hospitals are compared; Erzurum is in the first place with 23 hospitals (22.12 %) and Yalova and Düzce are the two last ones with 3 hospitals participating in each province (2.88 %). Although Eskisehir has 12.50% of the hospitals, it is in the first place with 178,491 appointments in the scope of CHAS implementation. A point of attention, the number of outpatient visits in Eskisehir and Erzurum are close where as the number of hospitals participating within the scope of CHAS in Erzurum is significantly more than others (Erzurum: 23; Eskisehir: 13), however, the difference in the number of patients using CHAS is approximately was over 100,000 in favor of Eskisehir.

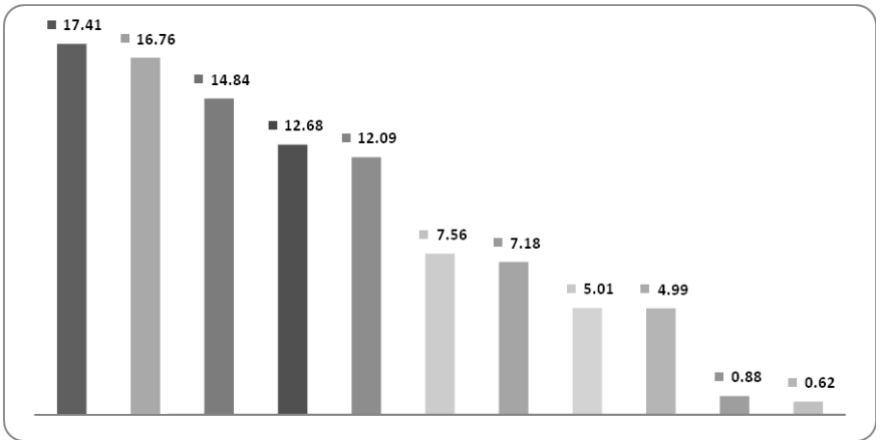

Figure 2: Distribution of appointments in CHAS pilot implementation provinces (%).

Source: The Ministry of Health (CHAS Call Center Database 2011).

The distribution of patients making appointments according to provinces is shown in Figure 2. According to Figure 2, 17.41% of total appointment number in Eskisehir is in the first place, Burdur is the last with 0.62% percent of total number of appointments scheduled.

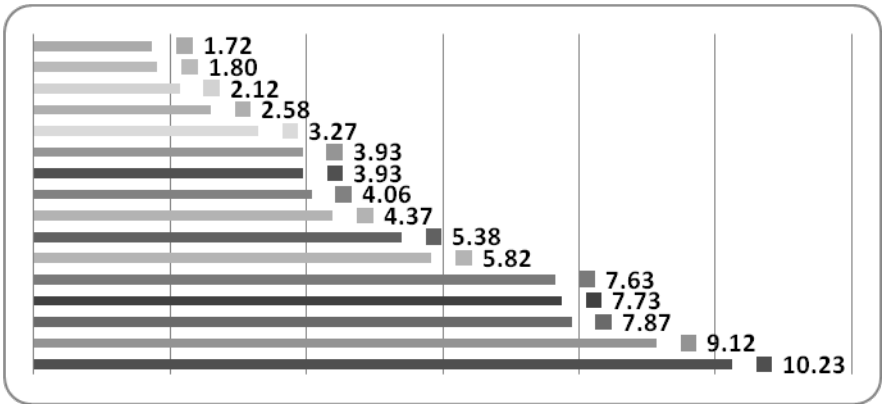

Figure 3: Hospitals intensified total number of appointments (%)

The distribution of hospitals preferred by patients made appointment is shown in Figure 3; 81.55% of total appointment is scheduled for 16 hospitals. According to this, 10.23 % of total number of appointments is made in Canakkale Public Hospital.

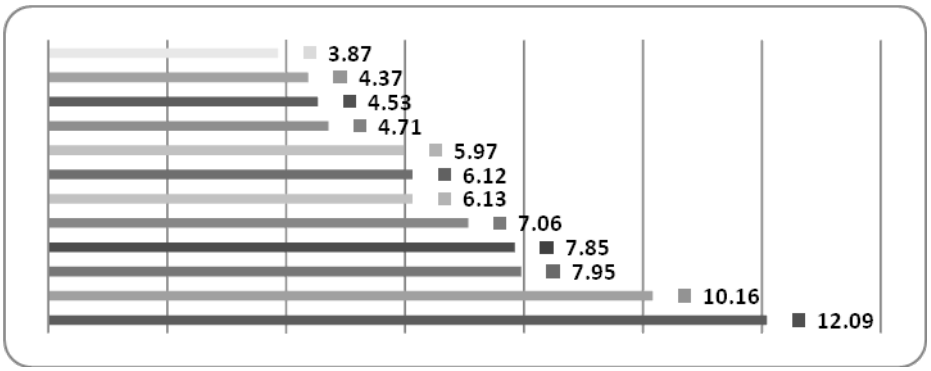

Figure 4: Specialties intensified total number of appointments (%)

Figure 4 shows in what areas of specialties are applied intensively by patients to make appointments. There are 55 appointments in different areas in the scope of CHAS. The distribution of 12 areas of specialties, 80.82% the total number of appointments is shown in Figure 4. Appointments made in maximum number are for internal medicine clinic with the proportion of 12.09 % in the end of pilot implementation.

Table 3: Distribution of the number of appointments and cancellations in CHAS

Months	Number of Appointments (Monthly)	%	Number of Cancelled Appointments (Monthly)	%
February	154	0.01	34	0.06
March	4,104	0.40	353	0.66
April	6,273	0.61	456	0.86
May	7,939	0.77	564	1.06
June	11,431	1.11	1,204	2.26
July	38,823	3.79	1,559	2.93
August	135,306	13.20	4,266	8.02
September	123,323	12.03	4,385	8.25
October	165,188	16.11	6,178	11.62
November	138,522	13.51	7,369	13.86
December	179,955	17.55	11,344	21.33
January	214,305	20.90	15,470	29.09
Total	**1,025,323**	**100**	**53,182**	**100**

Source: The Ministry of Health (CHAS Call Center Database 2011).

Table 3 shows monthly distribution of total number of appointments in 11 provinces in CHAS pilot implementation and cancelled appointments. Accordingly, 20.90 % of total numbers of appointments were made in January 2011. 29.09% of total number of cancelled appointments was made in January 2011. It should be noted that

even though the number of appointments had increased through CHAS implementation across the provinces, the rate of cancellations had also increased concurrently.

3.2. Operational Indicators of the Call Center

In this part of study, the operational indicators for CHAS call center will be analyzed. Monthly distribution of operational indicators is shown in Table 4.

Table 4: Operational Indicators of CHAS Call Center

Month	Offered Calls	Handled Calls	Abandoned Calls	Average Speed of Answer	Answer Rate (%)	Average Call Handling Time (second)
February	3,787	3,548	239	1	92	47
March	13,699	13,202	497	1	96	106
April	16,502	15,676	826	2	95	122
May	18,386	17,767	619	2	97	124
June	26,175	25,331	844	2	97	132
July	74,765	71,597	3,168	3	96	158
August	186,242	181,542	4,700	2	97	147
September	180,387	178,865	1,522	1	99	129
October	185,029	183,207	1,822	1	99	154
November	190,068	187,298	2,770	2	98	151
December	248,053	245,425	2,628	2	99	146
January	260,570	257,585	2,985	2	99	134
Total/Average	***1,403,663***	***1,381,043***	***22,620***	***1.75***	***97***	***129.17***

Source: The Ministry of Health (CHAS Call Center Database 2011).

Table 4 shows some of the operational indicators of call center. According to Table 4, call center has received 1,403,663 calls at the end of one-year pilot implementation period. 1,381,043 of incoming calls were answered, 22,620 of them were unanswered. The average response time is 1.75 second. The year-end average of call answering rate is on the level of 97 %. Average response time is in 129.17 seconds for each call.

4. Discussion

As stated earlier, one of the works and studies carried out in this context is the implementation of Central Hospital Appointment System (CHAS) enacted in February, 2010 in Turkey. Within the scope of CHAS implementation, 11 provinces and 104 hospitals have been included to the system in one-year pilot implementation period. In a total 1,025,323 appointments were given at the end of this period. Eskisehir is a lead province which is using the system in the most effective way with a proportion of 17.41% and 178,491 appointments. 10.29 % of total appointments were given in Canakkale Public Hospital and 81.55% of total number of appointments was given in

16 hospitals. In the range of branches, internal medicine can be distinguished from other specialties with a proportion of 12.09 %. 80.82% of appointments intensified on 12 medical specialties. The average of call handling time is 129.17 seconds and 1,403,663 calls are received by call center in the pilot application period.

Health care practices and organizations are increasingly competing not only on cost, but also on quality and patient satisfaction in developed and developing countries. In this environment, timely access to care has become a more important issue for hospitals in developing countries. As a result, physician practices and hospitals are eager to embrace new approaches to patient appointment scheduling to reduce backlogs, increase productivity, and improve patient satisfaction in health systems especially developing countries [30]. In 2012 the Turkish Ministry of Health rolled out a CHAS throughout Turkey and created the capacity to make online appointments [31]. However CHAS include only public hospitals belonged to Ministry of Health. CHAS implication should cover all hospitals (public and private hospitals, family health centers) in Turkey.

The rate of people who make appointments but don't go to them is almost 30 percent in big hospitals in Turkey. This creates organizational problems at the hospitals because there are also patients who don't have appointments but wait in person to be seen by doctors who waste time awaiting the no-shows [32].

5. Conclusions and Recommendations

Health Transformation Program (HTP) is searching for a solution to overall concerns and system deficiencies such as public health insurance, accession to health care services and the service quality of Turkish Health System [18].

In addition, CHAS which is implemented in the scope of Health Transformation Program is also the first example of the systems established in this field as being extended throughout the country. The improvements provided by one-year pilot implementation in the health system are as follows;

- Congestion and disorderly patient traffic in the clinics decreased significantly,
- Patients spent less time in hospitals.

These improvements are provided through the willingness of interoperability and clarifications of the roles and responsibilities, minimizing culture clash, Building strong communication, planning far ahead and being ready for crises, searching for better but actually the most important ones are commitment, passion and teamwork.

It is foreseen that findings obtained as a result of CHAS implementation will provide an important input to high-level decision makers in strategic issues such as demand forecasting, measuring market share and competiveness of physicians and hospitals (due to system allows patient to choose their physicians and hospitals), planning and allocating work power and the other important sources. After all Ministry gets accurate feedback on planning. In addition, one of the significant result of the study is CHAS implementation has an important role in improving the accessibility to health care service. In the next studies, it is suggested to evaluate the cost effectiveness of implementation.

One of the appointment channels must be family physicians for the citizens. Family physicians must be able to take appointments for the patients they transferred to secondary health institutions from the central system which the operators reach in call center. Moreover, they will not only be able to take appointments but also send the referral information to the Electronically Health Record database (EHR) of the Ministry over Sağlık-NET (Health-NET) system. That way, the hospitals must be able to see both appointment information and referral information of the family physician for the appointments taken by family physicians. As the family practice gets more common and the rate of visits directly to the primary health institutions increases, it is expected that the majority of the appointments will be taken by the family physicians. Thus, it is targeted that the steps towards Change in Health Program will function in an integrated way and start to support each other. Thus, it will make chain of referral more attractive that health data is shared between family physician and the hospital thanks to the ease of appointment and appointment taking from family physician. On the other hand, we should not forget that that application will lead up the patients to go to the secondary health institution with no more trouble [33]. In future CHAS must be implemented in all hospitals (public and private hospitals) and family health practices. The call center personnel must be educated and improved for increasing effectiveness of CHAS.

The application was adopted with the aim of eliminating waiting times before examinations in public hospitals, therefore providing a more calm and peaceful environment for everyone by reducing queues. Such a system would be an improvement compared to past, especially by eliminating uncertainty among the patients whether they will be able to be seeing or not even though they were present at the hospital. The system also increases the quality and efficiency of health services by measuring the resource usage and distribution in hospitals and uses CHAS data to assist with the development of health policies [32]. Current findings will be useful to improve the rollout and implementation of CHAS. This study also offers an opportunity to researchers who are interested in the information technology (IT) uses in the health sector. The findings of current and additional studies should yield significant research outcomes in such areas as IT adoption and change management, impact of IT on quality of care, and process improvement [34].

Furthermore, a second study to be conducted one year after the full implementation, could offer valuable insights on challenges faced and successes realized for undertaking large scale projects at national level [35]. The results would benefit many resource constrained developing nations that are contemplating their options on projects of public concern.

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