ORIGINAL ARTICLE

PATIENT WAITING TIME AS A KEY PERFORMANCE INDICATOR AT ORTHODONTIC SPECIALIST CLINICS IN SELANGOR

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ABSTRACT

Patient waiting time was introduced to orthodontic clinics in 2009 as a Key Performance Indicator (KPI) in the Ministry of Health Malaysia (MOH) as a measure of client satisfaction. A cross-sectional pilot study was carried out in 2009 in all four main government orthodontic clinics in Selangor. The objectives were to measure patient actual waiting time and evaluate conformance to this KPI. The sample comprised of 5,286 patients; 9.2% from Tanjung Karang, 37.1% Kajang, 29.3% Klang and 24.4% Shah Alam. There were 33.8% punctual, 44.2% early and 21.9% late patients. The mean actual waiting time (AWT) in Selangor was 30 min (SD 24.7); shortest in Tanjung Karang (16.5min, SD 15.3) and longest in Shah Alam (47.9min, SD29.6). AWT was 21.9 min (SD 17.4) for patients punctual for appointments, 40.3 min (SD 40.3) for early patients and 21.9min (SD19.8) for late patients respectively. Although the mean AWT was long for early patients, 20% of them were seen earlier than their appointment time. All four clinics complied with the MOH KPI performance target (>50%) with a mean compliance of 87.5% for Selangor. There is statistically significant difference in punctuality of patients in different clinics (p<0.0001) and in KPI conformance between clinics (p<0.0001).

Key words: Orthodontic clinic, Key Performance Indicator (KPI), waiting time

INTRODUCTION

Long waiting time in government specialist dental clinics is a common complaint by patients seeking specialist care. Although almost all patients are seen on an appointment basis, patients often have to wait long beyond their appointment time before being seen. Previously, the waiting period stated in individual clinics' Clients' Charter is not standardized and is subjected to local conditions[1]. Most Clients' Charter in government facilities arbitrarily states the waiting time as between 30-45 minutes for appointments, provided patients are punctual.

The proposal for implementing Key Performance Indicators (KPI) was mooted in 2008 by the Ministry of Health Malaysia (MOH) as one of the primary goals to enhance healthcare delivery system and client satisfaction[2]. One of the oral health KPI proposed and adopted was the monitoring indicator "percentage of patients seen within 30 minutes of appointment time by the dental specialist in specialist clinics should not be <50%, provided the patient was not late" as a Client Charter Compliance Index[3]. This was an initiative to discourage operator tardiness and encourage patient punctuality for a more efficient service.

All government orthodontists have an annual performance output target to achieve which is agreed upon between individual orthodontic clinics and the Deputy Director of Oral Health services[4]. The number of appointments, type of cases seen and staggering of appointment lists daily is aimed at achieving this target, and at the same time striving to comply with the waiting-time KPI for patient satisfaction.

Factors that can affect patient waiting time include high patient orthodontist ratio, inadequate staff, poor scheduling of appointments, healthcare provider tardiness and scant attention to punctuality and poor adherence to appointment time by patients[5,6]. A good appointment system is one that allows the patient to be seen on the day that he wishes and keeps the waiting time for both patient and doctor to a minimum, while allowing adequate time for every consultation[7,8]. Heaney et al. defined their 'patient waiting time' as the time the patient was kept waiting from the appointment

time as they were only concerned with that part of the waiting time which is the responsibility of the doctor[9]. This is similar to monitoring of the MOH KPI in the current study.

Many studies have shown that a flexible appointment system which tailors to the doctor's individual style and patient requirements instead of a fixed appointment interval was better at addressing patient waiting times. Planned breaks to accommodate additional emergency / unscheduled patients / doctor running late in the appointment design would help reduce unnecessary waiting by patients[5-9,12-14]. Known individual speed of doctors performing different procedures by clinic staff aided in scheduling mean consultation times, appointment intervals and workload capacity[5-7,9,11].

Loke and Husniyati found that poor scheduling of appointments and management of patients were contributory factors to long waiting time for routine non-specialist dental treatment in a local dental clinic[15]. In their study, almost half of the patients were late for appointments and this contributed to the disruption in the appointment time schedule for other patients who were punctual. Jamaiah et al. reported that all their patients in a specialist paediatric clinic were seen within an hour from registration and only 21% waited for more than 30 minutes compared with 67% in the study by Loke and Husniyati[15,16]. Some of the reasons given for their long wait were late patients, doctor treating unscheduled cases, patients were not around when called, uncooperative patients and unavoidable emergency circumstances.

Huang observed that patients in a surgical clinic generally appear satisfied if they waited no more than 37 minutes when punctual, and no more than 63 minutes when late for appointments[17]. Patients coming up to 15 minutes early did not mind the extra wait, but patients coming even earlier intended to be seen earlier and were only prepared to wait 15 minutes longer than otherwise. In contrast, Howart et al. reported that orthodontic patients considered a reasonable mean waiting time to be only 16.1 minute (SD 7.9)[18]. Hence, patient waiting time as a quality assurance policy in healthcare need to be constantly monitored, improved and sustained to improve patients' perceptions and satisfaction levels. Incorporating positive customer-driven features into the design of the 'wait experience' may lead to better patient and healthcare provider satisfaction[12,19-25].

A flexible appointment system is practiced in Selangor with priority given to punctual and early patients. Since the waiting-time KPI has been implemented recently, the objectives of this pilot study were to evaluate patient actual waiting time, compliance to waiting-time KPI and factors which may affect patient punctuality and compliance to this KPI by orthodontists in Selangor.

METHODOLOGY

This is a cross-sectional study with universal sampling of all patients seen from February to June 2009 in all the four main government orthodontic clinics in the state of Selangor, namely Kajang, Klang, Shah Alam and Tanjong (Tg) Karang. All patients registered daily in the clinics were included. There were no exclusion criteria.

Definition of terms[3]:

Term	Definition
Appointment time (AT)	Time that has been allocated to the patient for his / her treatment by the clinic
Registration time (RT)	Time patient registered at the counter
Time called (TC)	Time the patient is called in for treatment
Actual waiting time (AWT) = (TC-RT)	Total time the patient has waited from the time of registration to the time called in for treatment

Key Performance Indicator (KPI)
In this study we have redefined 'punctual patient' as a patient who had registered ± 10 minutes of appointment time, contrary to the rigid definition by MOH which does not allow for any leeway. Patients are always encouraged to register a little earlier than their appointment time and generally discouraged from coming very early to the clinic. Likewise, patients who are just slightly late should not be penalized. We have given this leeway because it is unrealistic for most patients to register at exactly the appointment time given, as defined in the MOH KPI criteria[3]. If there was no leeway given, we felt that many patients may be excluded from KPI monitoring since they will be recorded as 'late'. This may give a false impression of good performance by the clinic.

The operator was recorded as 'compliant to KPI" monitoring if the punctual/early patient waited less than 30 min. from the stated appointment time and 'non-compliant to KPI' if these patients waited for more than 30 min. from their appointment time. The definitions of the following terms below are modified from those specified by MOH.

Definition of terms:

Terms	Definition	Calculation of waiting time for compliance to KPI	Compliance to KPI by clinic
Punctual patient	Patient registered within 10 min ± from appointment	Waiting time calculated from TC-AT if <10 min earlier than AT Waiting time calculated from TC-RT if within 10 min later than AT	Record compliant if patient waited <30 min before TC
Early patient	Patient registered >10 min earlier than appointment	Waiting time calculated from TC-AT	Record compliant if patient waited <30 min from AT
Late patient	Patient registered >10 min later than appointment	Patients are excluded from KPI monitoring (MOH standard)	

Reasons for operator / patient being late
Dental Surgery Assistants (DSA) at the reception were instructed to ask patients verbally and record their main reason for being late for appointments. Orthodontists were instructed to record their reasons for seeing punctual / early patients later than 30 minutes from their appointment time. No questionnaire was used. The appointment time, registration time and time patient were treated were recorded by respective DSAs. All completed forms were sent to the principal researcher where two Dental Officers did data checking, cleansing and entry.

Statistical analysis
Analysis was done using SPSS version 11.0.

Descriptive analysis and cross-tabulations were carried out between the variables. Chi-square tests were used to test differences in punctuality of patients in the different centres. The data was not normally distributed, thus non-parametric tests were carried out to test for differences in actual waiting time between early, punctual and late patients. The Kruskal Wallis test was used here. Statistical significance was set at $p < 0.05$.

Reasons for being late were categorized under patient and healthcare provider perspectives before statistical analysis.

Patient reasons included:
• Public transport problems (delays, traffic congestion, road accidents).
• Private transport problems.
• School-associated (extra classes, tuition, examinations, extracurricular)
• Personal (woke up late, forgot appointment, late from workplace etc)

Healthcare provider reasons included:
• Procedural (preceding patient's treatment took longer than expected, rebonding of loose/broken brackets and bands, broken appliances, unscheduled patients needing urgent attention, preceding patients were late, technical problems including repair of Dental unit, disruption in water/electrical supply.
• Reception (delay in registration / retrieval of patient records).

RESULTS

The sample comprised of a total of 5286 patients; 488 (9.2%) Tg. Karang, 1963 (37.1%) Kajang, 1547 (29.3%) Klang and 1288 (24.4%) Shah Alam. There were a total of 6 orthodontists working in the four clinics; one in Tg. Karang, two in Klang, two in Kajang and one in Shah Alam.

There were a total of 21.9% 'late' patients and a mean actual waiting time of 30 (S.D. 24.7) minutes. Tg. Karang had the lowest number of patients seen (488) compared with the other clinics and lowest mean actual waiting-time (16.5 min; S.D. 15.3) although the percentage of late patients was highest (30.3%). Conversely, Shah Alam saw the most patients (1288) and had the longest mean actual waiting-time (47.9 min; S.D. 29.6) although the percentage of late patients was lowest (Table 1). Kajang and Klang were similar in their percentage of late patients, mean actual waiting-time and number of patients seen. There is statistically significant difference in the punctuality of patients in the different centres (p<.0001).

Table 1. Patient punctuality, mean actual waiting time (AWT) and mean workload at different centres

Centre	Punctuality of patients			Mean AWT(S.D.) minutes	Mean no. of patients per orthodontist
	Punctual	Early	Late		
Tg Karang	24.4%	45.3%	30.3%	16.5 (15.3)	488
Kajang	34.9%	42.5%	22.5%	25.3 (20.2)	981.5
Klang	41.8%	36.6%	21.7%	25.3 (20.1)	773.5
Shah Alam	26.2%	55.6%	18.2%	47.9 (29.6)	1288
Total	33.8%	44.2%	21.9%	30.0 (24.7)	5286

Chi-square test between punctuality and centres, p<.0001

The mean actual waiting-time for punctual and late patients was 21.9 min (S.D.17.4) and 21.9 min (S.D.19.8) respectively. This was almost twice as long in early patients (Table 2). The Kruskal Wallis test showed that there was statistically significant difference in actual waiting time between at least one of the groups in Table 2.

Table 2. Mean actual waiting time in punctual, early and late patients in all centres

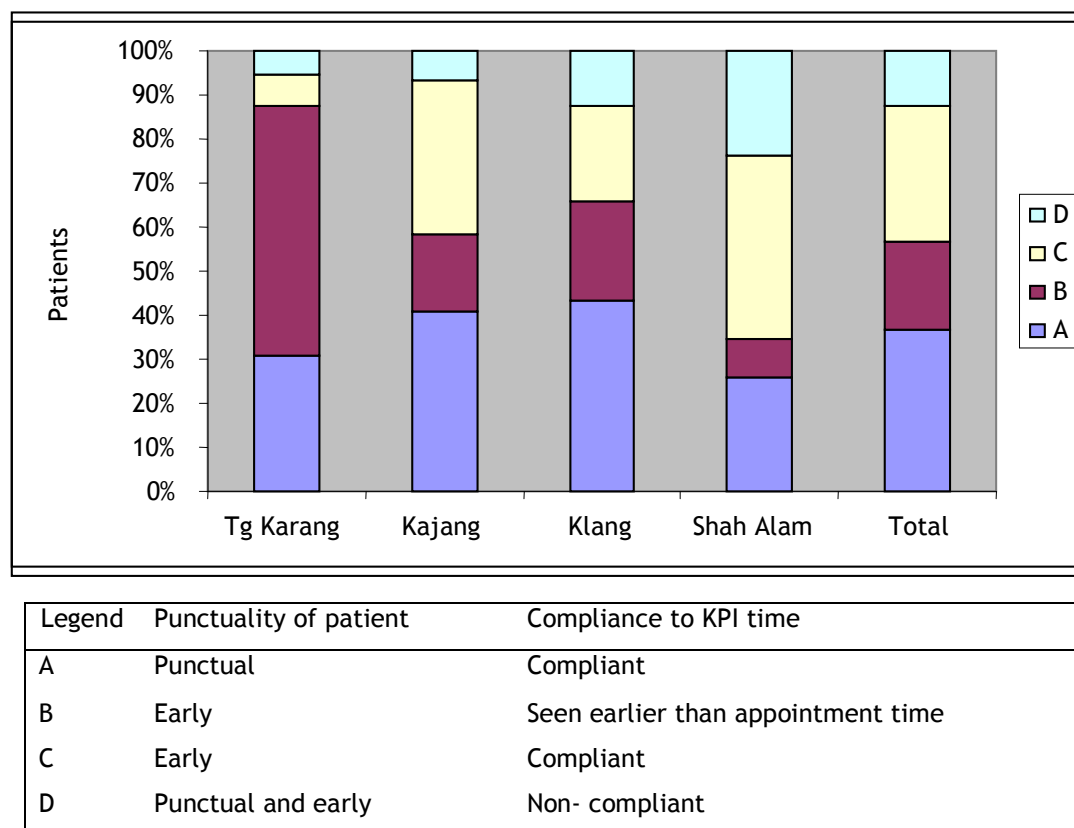| Punctuality of patient	Actual waiting time (minutes)			Kruskal Wallis Test	P value
	Mean	S.D.	No. of patients	Mean Rank	
Punctual	21.9	17.4	1788	2142.68	
Early	40.3	27.7	2338	3313.14	0.0001
Late	21.9	19.8	1160	2065.77	
Total	30.0	24.7	5286		

Table 3 shows the mean non-compliance to KPI by orthodontists in Selangor was 12.5%, with the highest recorded in Shah Alam followed by Klang, Kajang and Tg. Karang. Non-compliance to KPI was 51.5% in punctual and 48.5% in early patients respectively. The majority of patients who were punctual and seen within KPI time were from Kajang and Klang whilst the majority of patients seen within KPI time in Shah Alam were those who were early (Figure 1). Tanjong Karang had the lowest percentage of non-compliance to KPI time (5.3%) and the highest percentage of early patients seen earlier than their appointment time (56.5%).

Table 3. Compliance to KPI in punctual and early patients in different centres

Compliance to KPI	Punctuality of patient	Centre				
		Tg Karang	Kajang	Klang	Shah Alam	Total
Yes	Punctual	6.9%	40.8%	34.4%	17.8%	1524(36.9%)
Yes	Early	2.0%	42.4%	20.8%	34.8%	1264(30.6%)
Yes, earlier than appointment	Early	23.3%	32.2%	33.3%	11.3%	824(20.0%)
Not compliant	Early or punctual	3.5%	19.1%	29.2%	48.2%	514(12.5%)
Total		340	1522	1212	1053	4126(100%)

All late patients were excluded from monitoring (n=1160)

Legend	Punctuality of patient	Compliance to KPI time
A	Punctual	Compliant
B	Early	Seen earlier than appointment time
C	Early	Compliant
D	Punctual and early	Non- compliant

Figure 1. Compliance to KPI in punctual and early patients within different centres (N=4126)

There was poor recording of reasons for patients being late or clinics seeing patients late (Table 4). Reasons recorded for patients being late were known in only 30.7% of patients. Of the known reasons the most frequent was public transport problems (14%) followed by personal problems (9.4%) and schools' associated problems (6.1%) in all centres. Response rate of recorded reasons for non-conformance to KPI by all clinics was only 7.4%. The majority of known reasons given by orthodontists were mainly due to rebonding of dislodged brackets/bands and to lengthy treatment of a preceding patient.

Table 4. Reasons for being late by patients and healthcare providers

Reasons	Centre				
	Tg Karang	Kajang	Klang	Shah Alam	Total
Patient problems					N=1160
Public Transport	9	94	49	10	162 (14%)
Private Transport	1	7	6	0	14 (1.2%)
School-associated	2	53	9	7	71 (6.1%)
Personal	6	79	24	2	109 (9.4%)
Total	18	231	88	19	356 (30.7%)
Healthcare provider					N=514
Reception counter	0	1	1	0	2 (0.4%)
Procedural problems	0	0	36	0	36 (7.0%)
Total	0	1	37	0	38(7.4%)

Number of late patients = 1160
Number of patients in 'non-compliance to KPI' by healthcare providers=514

DISCUSSION

The current study showed surprisingly good results with all the clinics achieving much higher than the required MOH standard of more than 50% compliance to KPI waiting time despite including patients who were 10 minutes late for their appointment categorized as punctual. With a flexible appointment-based system, waiting times should be minimal if patients were punctual and efficient time management practiced[6,10,12,19,26]. In Howart et al.'s study in an orthodontic department, 50% of patients were kept waiting and the other 50 percent were seen either earlier or at their appointed time[18]. Their figure was higher than the current study but their mean waiting time past appointment was only 9.4 min (SD 10.9) for punctual and 18.9 min (SD 9.1) for late patients.

Patients are generally discouraged from coming unduly early before their appointment as they naturally tend to wait much longer because they cannot be seen earlier unless there was extra time in-between punctual patients to slot them in[27]. If the majority of booked patients arrived early for their appointments, they will consequently have a longer actual waiting time than punctual or late patients. Reti reported that 66% of their patients were early and 24% were late for their appointments to see a family physician and their mean waiting time was 20.7 min (S.D.15)[27]. When the waiting times were corrected for these early arrivals, there was no difference in waiting times for all patients. The current study found that 44.2% of patients were early and 21.9% late with a mean waiting time of 30 min (S.D.24 7). When corrected for arriving early, that is, seeing the early patient within 30 min of appointment; orthodontists were compliant to the KPI in 30.6% of patients (Table 3). Overall, it pays to be early as 50.6% of early arrivals were seen in conformance to the KPI compared to 36.9% in punctual patients.

Although 21.9% of late patients in the current study were excluded from KPI monitoring, in reality they do contribute to the delay in treatment to other patients due to disruption in the appointment schedule[12]. Heavy work sessions or 'slow' operators have been cited as factors contributing to patient waiting time[5,11-13]. Although the current study was not designed to evaluate operator / session workload or operator speed, it was interesting to note that Shah Alam that had the highest mean workload per operator also had the longest mean actual waiting time compared to Tg. Karang that

had the lowest mean workload per operator achieved the shortest mean actual waiting time (Table 1).

One of the problems faced daily by the clinician is 'add-on' or 'emergency' patients who demand to be seen as soon as possible without an appointment. Dexter suggested that 'add-on' patients be seen by a different operator or at the end of the regular scheduled session whilst Kapustiak and Ling recommended redistributing these patients to less busy times of the day and creating a realistic appointment schedule load[5,11,13]. Others recommended that the appointment schedule should have adequate intervals to accommodate extra patients without crowding the schedule[8,12,26]. Stoop et al. suggested that waiting-time data need clear interpretation to become meaningful[28]. Workload, output, appointment design, staffing, work ethics and patient characteristics need to be analyzed together with patient waiting time before concluding whether the orthodontist or clinic was performing and contributing to patients' satisfaction. Anderson et al. reported that waiting time per se was not predictive of patient satisfaction although longer waiting time was generally associated with lower patient satisfaction[23]. They found that the time spent with the physician was the strongest predictor of patient satisfaction and patients' dissatisfaction associated with long waiting time was reduced if there was increased time spent with the physician (5 minutes or more).

There was less patient dissatisfaction if the quantity and quality of time interacting with the clinic staff was beneficial[20,22,23]. Thompson et al. similarly found that actual waiting time was not predictive of overall patient satisfaction[22]. They reported that factors such as information delivery (explanations of procedures and delays etc.) and expressive quality (courteousness, friendliness etc.) and perceptions regarding waiting time were all positively associated with patient satisfaction. Managing the wait experience in the clinic was an important strategy and conventional or creative efforts to incorporate positive wait perceptions have been shown to reduce patient dissatisfaction[5,12,20-22,25].

On hindsight, perhaps if a survey on client satisfaction was carried out concurrently with the present study, a better perception of the impact of the waiting-time KPI on patient satisfaction can be ascertained[6,19,20,22,25]. Patients should accept that healthcare providers often fall behind schedule for a variety of reasons and patients by being punctual and responsible can help ensure that the clinic's appointment schedule is not disrupted so that both patients and clinicians will benefit[8,11,26].

Study limitation

The poor recording of reasons for lateness prevented proper interpretation of factors which may influence patients' attendance, operator's punctuality and thus patient waiting time. The reasons for failure to record have yet to be elucidated. Thus recommendations for change and new strategies cannot be made on evidence-based facts as this objective was not achieved in the study.

CONCLUSION

All the orthodontic clinics in Selangor have complied with the monitoring KPI with a mean compliance of 87.5%. The mean actual waiting time was 21.9 min (S.D.17.4) for 'punctual' patients, 40.3 min (S.D.27.7) for 'early' patients and 21.9 min (S.D.19.8) for 'late' patients. Although the mean actual waiting time was long (40.3 min; S.D.27.7) for patients who were very early, 20% of them were seen earlier than their appointment time and only 10.7% were seen late. Waiting time and compliance to KPI was associated with patient punctuality and individual clinics. Although waiting time is a complex problem and cannot be solved by one or two simple procedures but rather a mixture of office procedures, scheduling patterns, better estimates of consultation time required, better staff and patient communication; patient waiting time can be a meaningful KPI and acts as one of the performance indicators reflecting patients' satisfaction.

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