

Patient flow analysis in a children's clinic

Saeed Assefzadeh¹

تحليل تدفق المرضى في عيادة للأطفال سعيد آصف زاده

خلاصة : استعمل تحليل تدفق المرضى لتقدير مدة انتظار المرضى المحالين إلى عيادة خارجية كبيرة لأمراض الأطفال ، وكذلك المدد التي تستغرقها استشارات أخصائيي الأطفال والأطباء المقيمين (المعاودين) . ولقد وُجد أن متوسط زمن الانتظار لمقابلة أطباء الأطفال والأطباء المقيمين كان 77 دقيقة و7.8 دقيقة على التوالي . أما الاستشارات فكانت تستغرق في المتوسط 3.4 دقيقة لدى طبيب الأطفال و7.7 دقيقة لدى الطبيب المقيم (المعاون) .

ABSTRACT Patient flow analysis was used to assess the waiting time of patients referred to a large paediatric outpatient department, and also the lengths of the consultations of the paediatricians and interns. The average waiting times to see the paediatricians and interns were 77 minutes and 7.8 minutes, respectively. The average lengths of consultation for the paediatricians and interns were 3.4 minutes, and 7.7 minutes, respectively.

Analyse du flux des patients dans un service de consultations externes pédiatriques

RESUME L'analyse du flux des patients a été utilisée pour évaluer le délai d'attente des malades envoyés en orientation-recours dans les principaux services de consultations externes pédiatriques ainsi que la durée des consultations effectuées par les pédiatres et par les Internes. L'attente moyenne pour consulter les pédiatres et les internes était respectivement de 77 et de 7,8 minutes. La durée moyenne de la consultation s'élevait à 3,4 et 7,7 minutes respectivement.

¹Qazvin University of Medical Sciences and Health Services, Qazvin, Islamic Republic of Iran.

Introduction

Patient flow analysis (PFA)¹ is a managerial technique to find alternatives for minimizing the waiting time for services and increasing their efficiency. The technique can help to identify gaps in the distribution and utilization of personnel, time and skills [1-3]. It allows clinic managers and workers to look at the way the clients and patients move through the clinic [4].

Patients may have to wait for long periods before obtaining individual services in health centres and outpatient departments, partly because of poor organization. Improved management could lead to better coverage and acceptance of services by communities. Clinic schedules should suit the needs of the communities served rather than those of the health staff.

Some researchers have applied PFA to evaluate the efficiency of the ambulatory services in outpatient clinics as well as the health centres. As a result, they have succeeded in reducing patients' waiting times and in increasing the efficiency of health care providers [1-6].

In this study, PFA was used to assess the waiting time of patients referred to a large paediatric outpatient department, which is attached to Qods teaching hospital. The main objectives of the survey were: to record the waiting time spent by patients in each station to receive the services; and to measure the duration of the consultations of the interns and paediatricians.

Materials and methods

Oods children's teaching hospital is the only paediatric centre in the region, which

covers a total population of 1 000 000. It has a 24-hour outpatient department and a half-day special clinic. The study was conducted from 1 to 31 October 1994. All patients referred to the paediatric clinic during 24 hours were followed. Interns saw patients 24-hourly, but the paediatricians saw them only 3 hours a day (from 10:00 to 13:00). A pilot study was also conducted. PFA requires staff to record entry and exit times for every patient at their service station, so synchronization was used to measure the waiting times of the patients and record them in the check-list. Good monitoring and control by the research team supported the plan. The flow of the patients in the clinic is shown in Figure 1. It shows the possible services that might be received by the patient. The waiting times of the patients were measured and recorded in the check-list according to their flow from arrival to exit.

Results

During the study period, 1896 patients arrived at the clinic. Of these, 8.8% were neonates (< 28 days), 29.3% were 1-11 months and the rest were between 1 and 12 years old (Table 1). Boys comprised 60.3% of the patients. Of the total, 1564 cases consulted the interns, 234 consulted the paediatricians and 98 patients left the clinic without receiving any service. (Of this number, 66 patients refused to see interns, 23 complained of waiting too long to see the paediatricians and nine wanted to see certain doctors.)

The morning shifts (07:30-13:30) had 45.7% of the referrals, 18.3% arrived during the afternoon shifts (13:31-19:30), and 36.0% arrived during night shifts (19:31-07:29 the next day). The highest

¹The term client flow analysis (CFA) is used for the same purpose as PFA for analysing clients' flow with reference to health centres for preventive care [4].

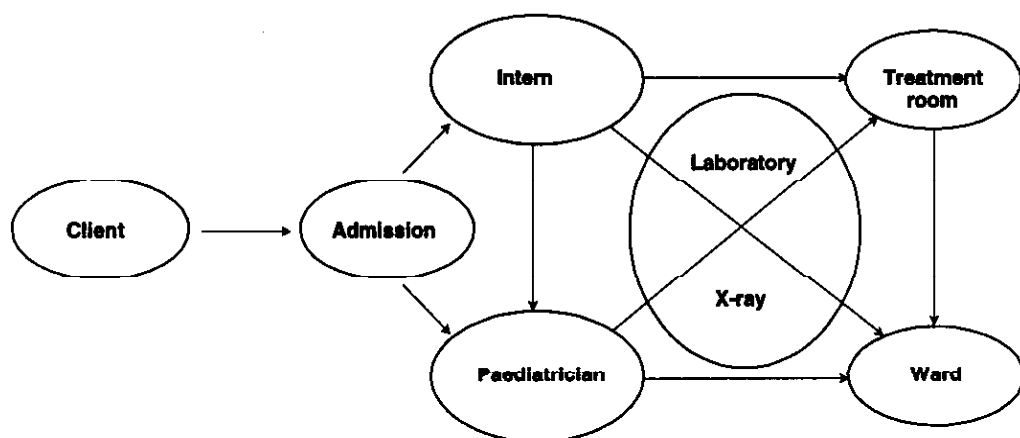


Figure 1 Patient circulation in Qods paediatric outpatient clinic

Table 1 Age distribution of patients referred to the outpatient department according to work shift

Age	Morning	Afternoon	Night	Total	Percentage
< 28 days	98	35	34	167	8.8
1-11 months	245	112	198	555	29.3
1-2 years	94	36	81	211	11.1
2-5 years	186	61	200	447	23.6
5-12 years	244	103	169	516	27.2
Total	867	347	682	1896	100
Percentage	45.7	18.3	36.0	100	

Mean age = 3.45 years; $s = 3.510$ years

patient load was between 08:00 and 09:00 (Figure 2).

The average waiting time from arrival to admission was 3 minutes; 95% of the patients waited less than 5 minutes. The waiting time to see the paediatrician ranged from 1 to 232 minutes (mean = 77 minutes; $s = 52.5$; mode = 114). The duration of consultations of the paediatricians ranged from 1 to 26 minutes (mean = 3.4; $s = 3$; mode =

2.5). It was between 1 and 3 minutes for 66.7% of the patients (Table 2). Thus on average, a patient waited 77 minutes to receive 3.4 minutes of the paediatrician's service. The waiting time to see the intern ranged from 1 to 100 minutes (mean = 7.8; $s = 11.8$; mode = 1). Of the 1564 patients who saw the interns, 90% waited between 0 and 20 minutes and 10% waited 21 to 100 minutes. The average waiting time to see

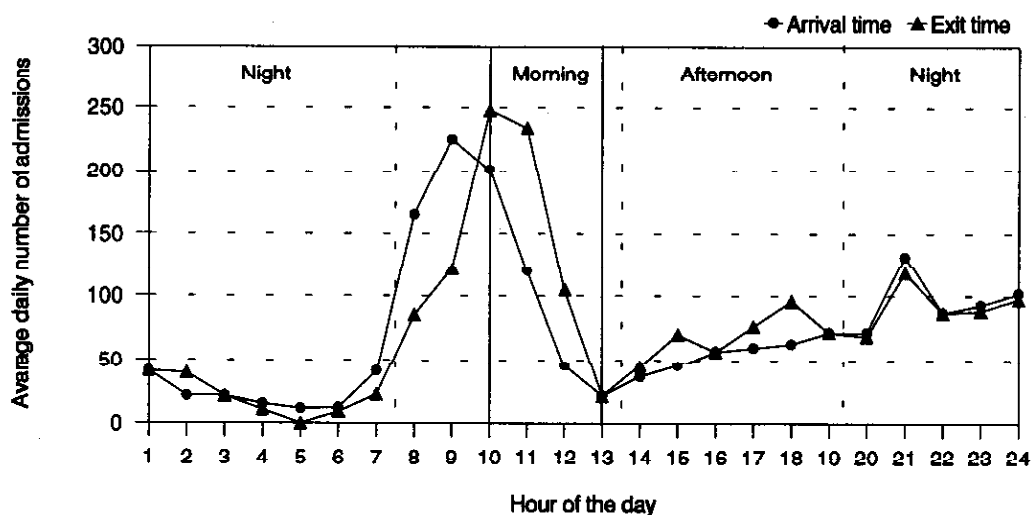


Figure 2 Distribution of the patients according to their arrival and exit time

Table 2 Distribution of the duration of consultations of paediatricians at the outpatient department

Length of consultation (minutes)	Number of patients	Percentage	Cumulative percentage
1	6	3.4	3.4
2	74	31.6	35.0
3	74	31.6	66.7
4	48	20.5	87.2
5	18	7.7	94.9
6	8	3.4	98.3
15	1	0.4	98.7
24	2	0.9	99.6
26	1	0.4	100

the intern on the morning shift was 8.6 minutes, on the afternoon shift was 9.5 minutes and on the night shift was 6.5 minutes. The duration of the consultation of the interns ranged from 1 to 78 minutes (mean = 7.7; $s = 8.2$; mode = 5). For 85% of patients, 1 to 10 minutes was spent on the consulta-

tion.² Only one minute was spent on consultation for 7.0% of patients in the morning

² It was observed that interns had some difficulties in interviewing patients, especially those from rural or peri-urban areas with lower education or those using dialects.

shift, 7.3% in the afternoon shift and 9.4% in the night shift. On average, a patient waited 7.8 minutes to receive 7.7 minutes of the intern's service.

Of the 1798 patients seen by interns or paediatricians, 1230 cases were discharged shortly after the consultation, 264 received bed care in the treatment room, 186 were referred to the laboratory for diagnostic tests, and 28 were referred to the X-ray department. Of the total of 1896 patients, 292 (15.4%) were hospitalized in the wards. The average length of stay in the treatment room was 14 hours.

Figure 2 shows that the discharges (exits) followed the same pattern as the arrivals. The peak time of arrival was 09:00 and the peak time of discharge was 10:00 (one hour later). So the accumulation of patients took place in that short interval.

On average:

- 1 out of every 6 patients was referred to the laboratory.
- 1 out of every 72 patients was referred to the X-ray department.
- 1 out of every 7.6 patients needed bed care in the treatment room.
- 1 out of every 6.5 patients was hospitalized in the wards.

The average waiting time in the laboratory was 23.5 minutes and in the X-ray department 9.4 minutes. Altogether, the time of circulation in the stations of the outpatient department varied between 3 minutes and 24 hours—25% (3–13 minutes), 25% (13–25 minutes), 25% (25–85 minutes), 25% (85–1440 minutes). The average flow time for all patients in the clinic was 185 minutes.

The cyclical index [7] by day of the week during the period of study was: Saturday (14.1%), Sunday (13.4%), Monday (13.5%), Tuesday (14.0%), Wednesday

(12.6%), Thursday (14.0%) and Friday (18.4%). In the Islamic Republic of Iran, the week begins on Saturday and ends on Friday.

Conclusion

Clinic managers have space, equipment and, most importantly, skilled personnel at their disposal. Optimally combined, these elements should provide a good service. Patient flow analysis offers an approach to achieve this end [6]. This technique can show the workload of the departments at certain times or intervals, the bottle-necks of patient circulation, the critical paths and so on. It is a technique which is simple, quickly performed, cost-effective, easy to learn and easily transferable [4].

This study shows that, on average, a patient waited 77 minutes to receive only 3.4 minutes service of the paediatrician. The paediatricians attend the clinic at 10:00 and their patients, who are mostly from periurban suburbs and rural areas, are referred to the clinic from 07:00 onwards. If the doctors attended at 09:00, the average waiting time would drop to 17 minutes. The duration of consultation of the paediatricians is short (only 12.8% spent more than 4 minutes per consultation)—this may indicate perfunctoriness or other reasons.

It was also revealed that the duration of interns' consultations for about 10% of patients was less than 1 minute, which is extremely short—this is a matter that teachers at the clinic should investigate. However, teaching interns good communication and interviewing skills and improving the supervision rounds by the attendants, especially on the afternoon and night shifts, will improve the quality of services given by interns, who are tomorrow's doctors.

It is recommended that in a teaching clinic claiming community orientation, better services with higher quality can be delivered to the people if continuous assessment of the current activities is done and feedback is given to the system for correction of activities. Clearly, flow analysis at the clinic level can lead to a more integrated approach to service

delivery and a more patient-oriented scheduling of services.

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