

Study on Outpatients' Waiting Time in Hospital University Kebangsaan Malaysia (HUKM) Through the Six Sigma Approach¹

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Abstract

Purpose: To identify the various procedures at the outpatient clinic as well as to investigate the possible operational problems that may lead to excessive patients' waiting time. A patient's experience in waiting time will radically influence his/her perceptions on quality of the service.

Method: The study was carried out in one of the teaching hospitals in Kuala Lumpur, Malaysia – Hospital University Kebangsaan Malaysia (HUKM). The subjects were outpatients who came to the outpatient clinic at HUKM. Data were analysed using the six sigma approach. A questionnaire was used to gauge the outpatients' responses on waiting time in the clinic as well as to measure the level of satisfaction with the outpatient clinic services rendered.

Conclusion: Three main causes have been identified as the contributing factors towards excessive patient's waiting time, namely: the registration time, insufficient number of counter service staff and insufficient number of doctors. Attempts should therefore be made to reduce the registration time as well as to improve the doctor-patient ratio.

Introduction

HUKM is one of the leading teaching hospitals in Malaysia and a public hospital catering to the needs of the general public. It comprises of the general outpatient clinics, the specialist clinics, surgical and inpatient facilities.

¹ This article is based on research and analysis undertaken by the author for his Masters Program in Quality and Productivity Improvement Science Course at University Kebangsaan Malaysia (UKM), 2004. Presently he is working in the Research and Development Division, Department of Statistics, Malaysia.

Patients' waiting time has been defined as "the length of time from when the patient entered the outpatient clinic to the time the patient actually received his or her prescription".

Aims of research

The two main objectives of the study were: (i) to study the patient's waiting time in the outpatient clinic, with a view to identify the factors that affect waiting time and recommend ways of minimizing the delay; and (ii) to use the six sigma technique to identify the delay and improve management capabilities.

Research scope

Six sigma researches were done at the outpatient clinic in HUKM. The research methods chosen were to interview the patients directly and the people involved in managing the work process.

Literature research

a. Waiting time

Defined as the total time from registration until consultation with a doctor. There were two waiting times, the first is time taken to see a doctor and the second is time to obtain medicine. (Jamaiah Hj Mohd Sharif and Suriani Sukeri 2003)

b. Registration time

Defined as waiting time from the moment patients submit a clinic appointment card or referral letters at the counter until getting a call from the counter (WL Lim, MD, Manaes, 2001). During this time the payment process and record classification are made. Registration time is part of patient's waiting time.

c. Six Sigma

First introduced by Motorola in 1986, Six Sigma is a method to measure the quality of a process to fulfill customer's needs which approaches perfection up to 3.4 defects per million opportunities. Data and statistical analysis were used to identify defects in processes and reduce variation. With Six Sigma, defects in a process can be measured by identifying the best method to eliminate defects and approach 'zero defect'.

Customers' satisfaction is the main factor. A new and more effective method has to be adopted to ensure customers' satisfaction.

Six Sigma specifies a very high standard of quality achievement. This is identified through levels of failure and involves very low costs. In the following table, the different of sigma value according to level of failure and costs could be seen:

Table 1: DPMD level and CDPG sigma value

Sigma Level	DPMD	CDPQ
1- Sigma	691,462 (Low competitive)	Incalculable
2- Sigma	309,538	Incalculable
3- Sigma	66,807	25.40% of sales
4- Sigma	6,210 (USA industries)	15.25% of sales
5- Sigma	233	5.15% of sales
6- Sigma	3.4 (World industries)	< 1% of sales

Source: Pande and Holpp, 2002, 'What is Six Sigma?'

Note:

DPMD = Defects per Million Opportunities

CODPQ = Costs of Poor Quality

Six Sigma utilizes a variety of existing project management, statistical and analytical tools. Several

toolkits of the Six Sigma were applied during this study:

- Descriptive statistics
Statistical image shows characteristics of collected data. At this level, data will be presented using the best presentation tools such as histogram, pie chart or others.
- Control Chart
Chart shows limits of control in the current data structure.
- Flow Chart
Chart shows description and sequence of the process done.
- Pareto Chart
Chart shows level of influence from a variable to the research problem.
- Cause and Effect Diagram
Diagram shows the relationship of a cause that gives rise to a certain problem.
- Quality Function Deployment (QFD) Chart
Chart shows relationship between customer priorities through the aspect of techniques and processes by organization.

Methodology

a. Sample size

This study, conducted at the Outpatient Clinic, HUKM, was an exploratory and evaluation study. Respondents of this study were selected patients, staffs and doctors at the Outpatient Clinic. Table 2 shows the total number of respondents in this study.

Table 2: Type of respondents

Respondents	Total
Patients	112
Doctors	4
Nurses	5
Administrative Staff	7

b. Type of data and collection methods

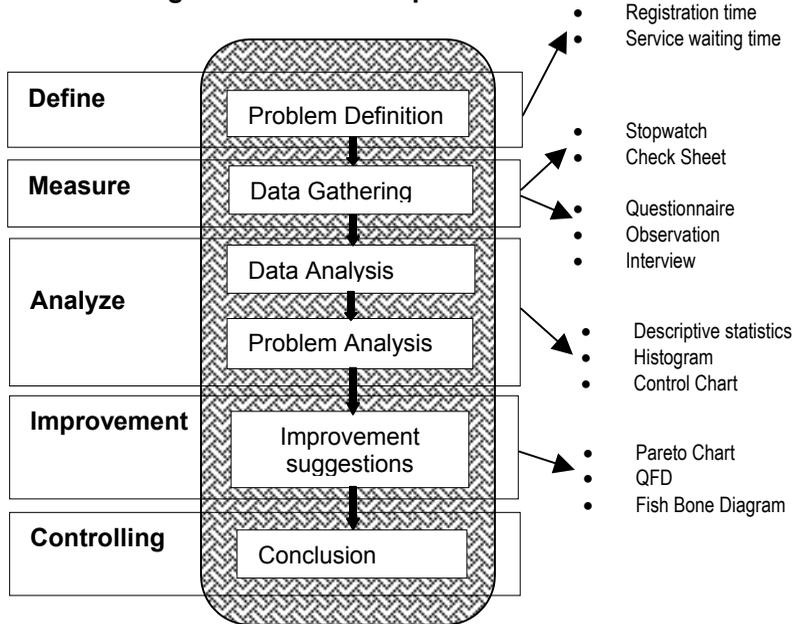
Several variables monitored in this study were data on patient's waiting time, work process, number of doctors available and number of staffs at the registration counter.

Three major collection methods were used in this study. The first method was observation. Data were collected through direct observation on the subjects involved in the various working processes in HUKM. Measurements of time spent from registration until consultation by a doctor were made using a stopwatch. The second method is through interview. In carrying out this research, some of the management staff and doctors were interviewed to obtain information on the working process in the hospital. Patients were also interviewed to find out their problems and needs. The third method involves collecting data from patients through questionnaires.

c. DMAIC Method (Define-Measure-Analysis-Improve-Control)

The Six Sigma method which consists of the five steps of "Define – Measure – Analysis - Improve - Control (DMAIC)" is the roadmap to achieve the objectives of this study. Each of the steps of this study is shown in Diagram 1.

Diagram 1 : DMAIC steps



Source: Thomas Pyzdek, 2001, 'The Six Sigma Handbook'.

Results and discussion

a. Descriptive statistics

Out of the 112 patients who were selected for the study, only 2 patients managed to receive treatment within 3 hours. On average, waiting time for a patient to obtain treatment from a doctor is 4 to 5 hours. This long waiting time gives a negative perception on the quality of services in the outpatient clinic in HUKM (see Table 3).

Table 3: Distribution of patients' waiting time

Waiting time	Total	Percentage	Cumulative (%)
< 3 hours	2	1.8	1.8
3-4 hours	25	22.3	24.1
4-5 hours	55	49.1	73.2
> 5 hours	30	26.8	100.0

In terms of human resources, there were only 4 doctors on duty who were assisted by 3 nurses. For administrative workers, there were only 5 of them at the counters while another 2 were involved in retrieving records of patients (see Table 4).

Table 4: Human resources

Personnel	Total
Doctors	4
Nurses	3
Counter staff	5
Record staff	2

Regarding the facilities provided, there were 9 examination rooms, 3 service counters and 1 pharmacy (see Table 5).

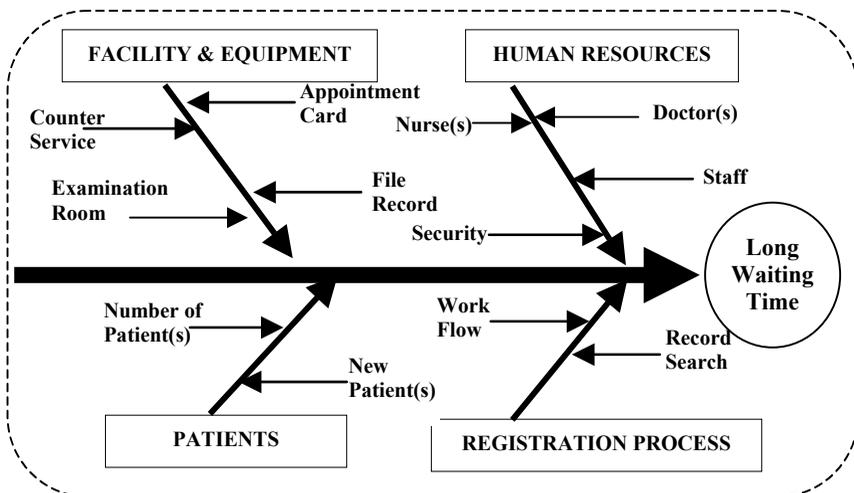
Table 5: Service facilities

Service facilities	Total
Examination rooms	9
Counters	3
Pharmacy	1

b. Causes of long waiting time

Long waiting time can be identified through 'cause and effect method'. There were four major elements that influence the waiting time such as availability of facilities and equipment, human resources, patients and registration process (see Diagram 2).

Diagram 2: Causes of long waiting time

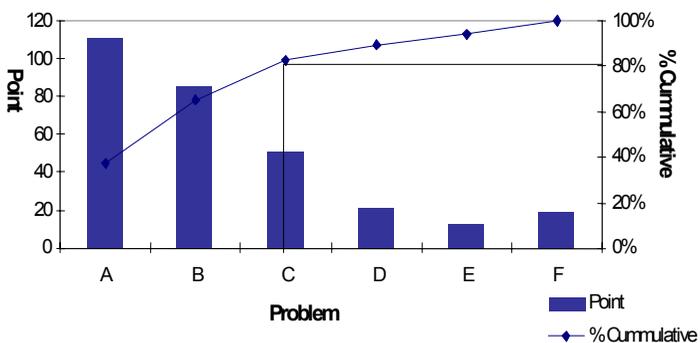


By using Pareto chart together with the cause and effect chart above, factors leading to long waiting time could be identified.

Table 6: Problems of long waiting time

No	Case	Problems	Score	Percentage	Cummulative (%)
1	A	Registration Time	111	37	37
2	B	Insufficient Doctors	85	28	65
3	C	Insufficient Counter Staff	51	17	82
4	D	Problem mixing with 'follow-up' patients	21	7	89
5	E	Too many patients at the same time	13	4	94
6	F	Others	19	6	100
Total			300	100	

Diagram 3 : Waiting time problem - Pareto chart



From the analysis above, three main problems which accounted for 80% of long waiting time were:

- a. Registration Time
- b. Insufficient Doctors
- c. Insufficient Counter Staff

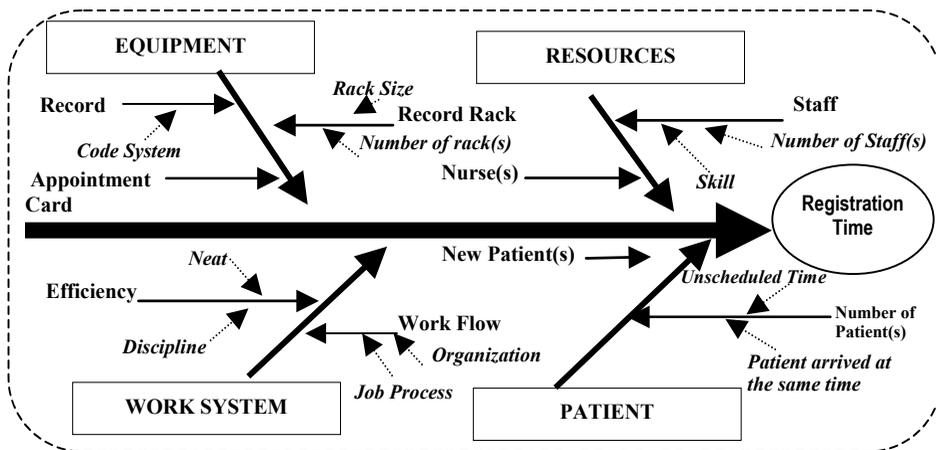
The causes of the above problem could be observed from the following cause and effect charts (Diagrams 4 to 6).

- a. Cause and effect of registration

The Pareto Chart shows that the main cause of the long waiting time is time taken for registration (see Diagram 4). A few processes have to be carried out by the counter staff during registration. The first process is to enter data into computers based on the patient's appointment card so as to obtain the reference number of the patient. Then the record staff would search for the patient's medical record in the record room. Improper record management and poor filing system affect the search time leading to a longer waiting time for patients. Work process involving record keeping would also affect registration time. Other factors include the experience and efficiency of staff.

Insufficient computer facilities at the registration counter and lack of skilled staff and nurses can also cause delays. There were new patients that came to the hospital for first appointment as well as the follow-up patients who already had appointments. However, only the date of treatment was stated in the appointment card while time was not specified for the follow-up patients. As a result, many problems arose when all of the patients come at the same time. In addition, mixing up of registration cards between patients with and without appointment causes delays because more time is needed for sorting purposes.

Diagram 4: Cause and effect of registration time

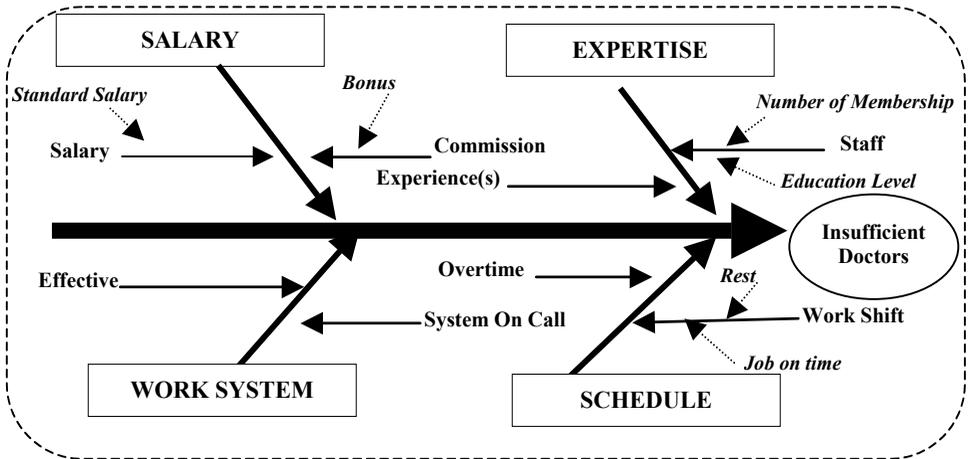


b) Cause and effect of insufficient number of doctors

Insufficient number of doctors would increase patients' waiting time. Disproportionate number of doctors and patients would cause a bottleneck in the queue for service (see Diagram 5).

When this study was carried out, only four doctors were at work, while nine examination rooms were available. This implies an inefficient utilization of available resources. There were a number of factors that caused the insufficient number of doctors on duty. For example, there were doctors who double up as lecturers, doctors on call and doctors doing further studies. Therefore, a well-planned schedule should be in place so that patient care is not adversely affected.

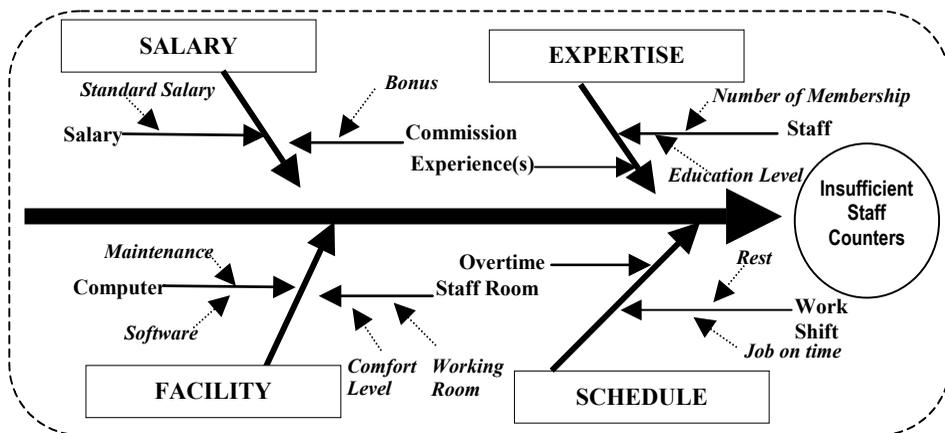
Diagram 5: Cause and effect of insufficient number of doctors



c) Cause and effect of insufficient number of counter workers

Staff at the counters also provide service to the patients. Throughout the study, only three staff were on duty at a time. Each staff had their own specific duties. One staff will be in charge of keying in patients' data. The second will be in charge of receiving payments while the third will be responsible in retrieving patients' files. The number of counter staff is not adequate compared to the number of patients, thus leading to a long waiting time for service. Proper organization of work and division of tasks among staff would greatly reduce waiting time. The majority of the staff at the counter have 10 years working experience. From the observations and feedback obtained during the interview, they were not motivated to change nor adopt the new system of work due to various reasons such as age, level of education, salaries and bonus (see Diagram 6).

Diagram 6 : Cause and effect of insufficient number of counter workers



Suggestions for improvement

Some key observations and suggestions are as follows:

a. Registration process

The registration system should be improved. For example, unifying assignments based on importance and avoiding work that could lengthen registration time will improve the registration process. Improving the record searching process, displaying information of facilities and improving working environment will also smoothen the registration process. The consultation time should also be stated in the appointment card and the usage of computers will optimize the number of patients per hour.

b. Insufficient doctors

A doctor's ability to properly handle problems would improve patient care and reduce treatment time. A more reasonable salary and a well planned schedule would improve the doctors' performance and effectiveness.

c. Number of staff at counter

A better working shift schedule should be made to balance workload among staff. There should be at least one staff assign to provide information to patients while others handle new cases. In addition, a smaller number of staff with high competence would help to lessen the problem of having insufficient staff at the counter. Staff remuneration is important because heavy workload and low salary will demotivate and decrease staff productivity and satisfaction towards work. Work related to training should be done regularly and supervision from superiors will also improve staff capability and increase morale among workers.

Conclusion

It is obvious that long waiting time affects patient's satisfaction towards the service(s) offered. Through the Six Sigma approach, the main factors leading to long waiting time are identified as registration time, number of doctor(s) and staff at the counter. Improvements should be made to fulfill customers' satisfaction.

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