# Evaluation of Waiting Time and Satisfaction in Outpatients in Imam Hossein Polyclinic of Zanjan Using Patient-Pathway Analysis

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## Abstract

*Background:* Waiting time is an important factor affecting the satisfaction of outpatients and also one of the indicators for assessing the level of access to health care services as well as service quality.

*Objectives:* The aim of this study was to evaluate the waiting time and satisfaction in outpatients referring to Imam Hossein polyclinic, Zanjan in 2017 using patient flow analysis (PFA).

*Methods:* The present research is a descriptive-analytical study. A total of 392 outpatients were selected using a convenience sampling method. Data were collected using a timing checklist and Patient Satisfaction Questionnaire (PSQ) and analyzed using structural equation analysis and analysis of variance through LISREL 8.5, MINITAB 17.2, SPSS 24, and STATISTICA 12 software.

*Results*: According to the obtained data, the longest average waiting time was in the radiology clinic ($27\pm11$ minutes), and the shortest was in the pharmacy ($5\pm3$ minutes). Also, the average duration of the examination was $9\pm9$ minutes. The mean patient satisfaction was 3.38 out of 5 (average degree of satisfaction). The results showed that waiting time was inversely related to patient satisfaction and examination time was directly related to satisfaction, and waiting time in the laboratory and admission had the greatest effect on reducing patient satisfaction. Also, the patient's waiting time to receive services and the duration of the doctor's visit were at an acceptable level and patients' satisfaction with the waiting time was at a moderate level.

*Conclusion:* Since the radiology clinic was one of the bottlenecks of outpatient facilities in this polyclinic, measures to reduce waiting time and increase patient satisfaction are recommended.

*Keywords: waiting time, patient-pathway analysis, satisfaction, outpatients, clinic*

## Introduction

Today, health care providers tend to reduce the number of admissions, reduce costs, and increase income, and seek to provide opportunities for people to see a doctor, prevent the progression of the disease and reduce the need for hospitalization [1]. Accordingly, referring to outpatient clinics of the hospital has become the most common method of patients' access to health care [2-4], and most of the diagnostic and even treatment process are performed on an outpatient basis.

Outpatient services have become an integral part of health care systems, and because of the rapid growth of outpatient health services, the planning for this sector and its function is extremely sensitive [5]. On the other hand, patient satisfaction is an important factor in maintaining the position of health care providers in the current competitive environment, and satisfaction is considered as an important consequence at the international level. One of the most important aspects of patient satisfaction is the waiting time

to receive services, the number of visits and patient examination, and the duration of each examination. Satisfied patients more participate in their care program and achieve more therapeutic goals, and as a result, timely prevention and treatment reduce costs [6].

Patient waiting time is not only one of the important factors affecting patient satisfaction, but also one of the indicators for evaluating the quality of outpatient services. In other words, the waiting time to receive health services is one of the indicators of the level of patients' access to health care services. Therefore, waiting time can be used as a tool to measure the level of access to services and consequently the quality of the health system [7-9]. In a study by McCarthy, 64% of cases reported dissatisfaction with a long waiting time [10]. A long waiting time has been reported in all parts of the health care system. Health care providers are under pressure to provide better services despite limited resources. Optimizing patient flow and removing bottlenecks in key wards is an existing solution to reduce costs and increase the quality of health care [11]. Therefore, for proper management of outpatient treatment systems and patients' waiting time, we need an appropriate management tool and decision logic. Various approaches have been proposed for the management of waiting time, of which patient flow analysis (PFA) is one of the techniques that examine the methods of reducing patient waiting time and improving the efficiency of services provided. This technique reveals gaps in staff performance and service delivery system and is a good tool for examining the way patients move in the clinic and examining the efficiency of patient flow. This technique can also represent the workload of a clinic at specific times or intervals, patient flow bottlenecks, and critical pathways [12]. In the present study, we studied the waiting time of patients using PFA and also the satisfaction of waiting time in Zanjan specialized Social Security Organization clinics.

**Methods**

This research was an applied study in terms of its objective and descriptive-analytical in terms of type and had a cross-sectional methodology. The study population included all outpatients regardless of the general condition of the patient of the specialized polyclinic of Imam Hossein Hospital, Zanjan, in June 2017. In this study, convenience sampling was done, and according to the average monthly statistics of patients referred to the polyclinic (3200 people), using the Morgan table, 392 cases were selected (10% was added due to the probability of attrition). Initially, in order to ensure equal distribution of patients in different months of the year, the rate of patient flows into and out of all the studied clinics in 2016 was studied. The number of samples was logically divided on different days of the week so that there was no bias in data collection. These samples were collected considering 15 working days without Thursdays and Fridays. A timeline checklist was used to collect information regarding patients' path, including demographic information, clinic name, level of education, type of admission (telephone, in-person), number of referrals to the clinic, arrival and departure times from the admission stations, examination room, radiology, laboratory, and pharmacy, and considered information, including waiting times to receive services were recorded. Data were collected by the researcher in collaboration with five people and by recording the arrival and departure times from each station for each patient. Synchronized digital clocks were used to record time. A checklist was designed with the help of a professor, and its validity and reliability were confirmed by 3 experienced professors.

The questionnaire to assess satisfaction with waiting time was the standard patient satisfaction questionnaire (PSQ) with the dimensions of access to a physician and clinic services (6 questions), patient communication and patient care (4 questions), and waiting time management (4 questions) and was scored on a Likert scale (totally disagree 1, disagree 2, not sure 3, agree 4 and totally agree 5).

To avoid bias in response, the options were adjusted erratically, some with the strength and some with the weakness of the system. Therefore, in order to facilitate the analysis, first, all the options of answers were changed, and the satisfaction score was considered as the sum of the scores of each question. The results of the reliability and validity of the questionnaire are provided in Tables 1 and 2.

*Table 1: The alpha value of different dimensions of the patient satisfaction questionnaire*

| Dimensions | Cronbach's alpha |
|---|---|
| Access to physicians and services | 0.796 |
| Communication with the patient and patient care | 0.760 |
| Waiting time management | 0.860 |
| Alpha | 0.816 |

*Table 2: Questionnaire validity test results*

| | Kaiser-Mayer-Olkin | Bartlett test | | |
|---|---|---|---|---|
| | | Chi-square | Degree of freedom | P value |
| Access to physicians and services | 0.786 | 186.037 | 50 | 0.000 |
| Communication with the patient and patient care | 0.743 | 175.272 | 15 | 0.000 |
| Waiting time management | 0.813 | 181.398 | 21 | 0.000 |

In a study conducted by Yousefi Golafshani et al., the reliability and validity of the scale were assessed, and also "patients' satisfaction with the trainees" scale was used in Firoozgar hospital after translating the scale, it was sent to a specialist for translation into English. Formal and content validity was confirmed by the opinions of ten experts in medical education in the Department of Medical Education of Iran University of Medical Sciences, and a reliability coefficient of 0.98 was obtained, and finally, the final version of the questionnaire was developed [13].

Preliminary studies and control of patients' movement in outpatient service units showed that patients enter a certain route after entering the clinic and refer to different service units on their way. Accordingly, data were collected at five stations along the patients' path. In the first station, the waiting time and duration of service to patients in the admission, in the second station, the waiting time of patients for examination and the duration of the examination, and in the next step, in case of referring to radiology, pharmacy or laboratory, waiting time and service in each of these units was assessed.

In this study, descriptive and inferential analyses were performed. In the descriptive part, first, the demographic characteristics of the samples were described by drawing frequency tables and statistical charts. Then, the measures of central tendency and dispersion and the main variables of the research were calculated and examined. Regarding inferential analysis, the relationships between the variables were examined using the structural equation modeling method, and finally, the difference between the groups concerning the difference in the level of patient satisfaction was examined through the analysis of variance (ANOVA). Therefore, all stages of preparation, processing, and testing of hypotheses were performed using LISREL 8.5 and SPSS 24 software

## Results

In the specialized polyclinic studied, there were 8 clinics (gynecology, pediatrics, cardiology, surgery, internal medicine, urology, dentistry, and orthopedics). Of 392 cases who answered the questions of this study, those with below diploma education (52%), those referring to internal medicine clinic (25%), patients who referred for the first time (37.5%), and admission through telephone (51.8) showed the higher frequency.

*Table 3: Frequency of outpatients referring to Imam Hossein Polyclinic*

| Variable | Class | Frequency | Percent |
|---|---|---|---|
| **Education** | Below diploma | 204 | 52 |
| | Diploma | 110 | 28.1 |
| | Associate degree | 24 | 6.1 |
| | Bachelor's degree and above | 54 | 13.8 |
| **Clinic** | Gynecology | 79 | 20.2 |
| | Pediatrics | 92 | 23.4 |
| | Internal medicine | 98 | 25 |
| | Surgery | 23 | 5.9 |
| | Cardiology | 41 | 10.4 |
| | Orthopedics | 20 | 5.1 |
| | Urology | 10 | 2.6 |
| | Dentistry | 29 | 7.4 |
| **Referral (No.)** | Once | 147 | 37.5 |
| | Twice | 131 | 33.4 |
| | 3 times or more | 114 | 29.1 |
| **Type of admission** | Telephone | 203 | 51.8 |
| | In-person | 189 | 48.2 |

According to Table 4, the average time spent in the examination room, waiting time in the admission, laboratory, radiology clinic, and pharmacy (independent variable) ranged from 5 to 27 minutes, and patient satisfaction (dependent variable) was 3.38 out of 5 (at a moderate level). The lowest mean waiting time was reported for the pharmacy, and the highest mean was reported for the radiology clinic.

*Table 4: Descriptive analysis of six research variables in terms of measures of central tendency and dispersion (time: minutes)*

| | Waiting time on admission | Duration of the visit | Waiting time in the laboratory | Waiting time in radiology | Waiting time in the pharmacy | Patient satisfaction |
|---|---|---|---|---|---|---|
| **Mean** | 00.16 | 00.09 | 00.14 | 00.27 | 00.05 | 3.38 |
| **SD** | 00.25 | 00.09 | 00.06 | 00.11 | 00.03 | 0.35 |

The results also showed that the shortest waiting time (average) was from the time of admission to the entrance to the examination room, and also regarding the duration of the visit, orthopedic and pediatric clinics showed the shortest and the longest waiting time (Figures 1 and 2). According to the obtained data, the urology clinic had the lowest, and the orthopedics clinic showed the longest waiting time for outpatients in the admission unit.
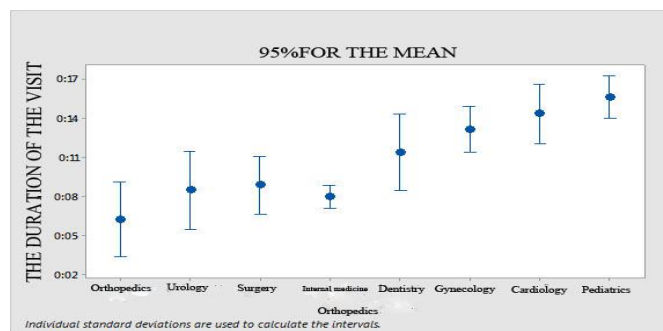


*Figure 1: Average (95% confidence interval) waiting time for examination by the clinic*
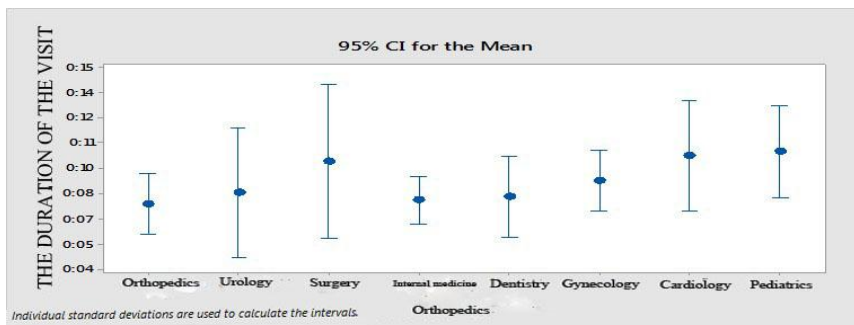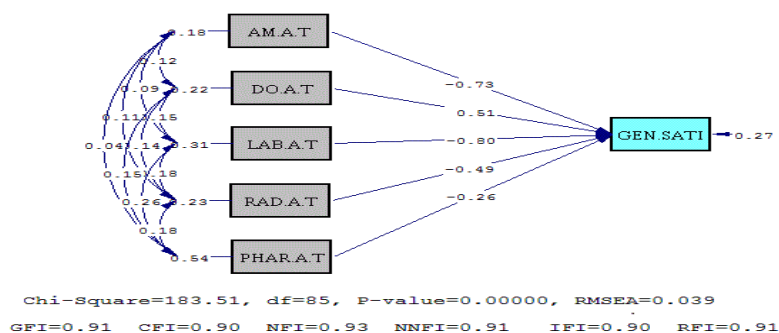
*Figure (2): Mean (95% confidence interval) time in the examination room (visit time) by the clinic*

The path analysis method is an extended method of regression models, in which independent (waiting time) and dependent (patient satisfaction) variables are analyzed together. The following model is the final model of this research. This model is developed based on the theoretical foundations and is in T-value mode, which is equivalent to the analysis of correlation coefficients and can be used to confirm or reject hypotheses. As can be seen in this model, the path of all the studied variables except the content validity variable is significant because their T-values are at the threshold of critical value (-1.96 >T>1.96). Model 1 summarizes the path coefficients of the structural equation model in T-value mode, the factor loading, and the error level of the variables in this study.



Chi-Square=183.51, df=85, P-value=0.00000, RMSEA=0.039
GFI=0.91   CFI=0.90   NFI=0.93   NNFI=0.91   IFI=0.90   RFI=0.91

*Model 1: Research path analysis model in standard solution mode*

Table 5 also summarizes the path coefficients of the structural equation model of this study. In this table, the values of both models in the t-value and standard modes are given.

*Table 5: Path coefficients of structural equation model*

| Path | Standard coefficient |
|---|---|
| **Admission** | -0. 73 |
| **Presence in the examination room** | 0. 51 |
| **Laboratory** | -0. 80 |
| **Radiology** | -0. 49 |
| **Pharmacy** | -0. 26 |

According to the path analysis pattern and values presented in the table, waiting time in the laboratory, admission, time spent in the examination room, waiting time in the radiology clinic and pharmacy, respectively, had the greatest impact on patient satisfaction. Also, the results of

this study showed that people with below diploma education had the highest satisfaction and those with bachelor's degree had the least satisfaction from referring to Imam Hossein Polyclinic, Zanjan. Also, the patients referring to the orthopedic clinic had the lowest satisfaction, and those referring to the internal medicine clinic had the highest satisfaction with the services provided in this center. Another finding of the study was that patients with 7 or more visits had the least satisfaction, and the level of satisfaction did not change significantly after up to 5 visits, and cases with In-person admission had the least satisfaction with polyclinic services.

*Table 6: Summary of the research findings*

| Independent variable | Dependent variable | Type of relationship | Highest satisfaction | Lowest satisfaction |
|---|---|---|---|---|
| **Education** | Patient satisfaction | Significant | Below diploma | Bachelor's degree |
| **Clinic** | Patient satisfaction | Significant | Internal medicine | Orthopedics |
| **Number of referrals** | Patient satisfaction | Significant | Up to 5 times | 7 times or more |
| **Type of admission** | Patient satisfaction | Significant | Telephone | In-person |

**Discussion**

Assessing the path and waiting time for outpatients in Imam Hossein Polyclinic in Zanjan showed that orthopedic clinic with a minimum duration of 7 minutes and pediatric clinic with a duration of 11 minutes had the longest waiting time. Also, the average waiting time for admission and examination was approximately 28 minutes, with an average time of 9 minutes. Asefzadeh, in 2017 in Qazvin assessed the waiting time for outpatients and reported that the average waiting time for admission was 3.4 minutes and 77 minutes for examination and receiving service. Also, the waiting time for examination only in 12.8% of patients was 4 minutes [12]. Compared with our results, in our study, the waiting time was shorter, and the duration of the examination was longer, and the results were more satisfactory. Mohebbifar et al. conducted a study to estimate the waiting time for outpatients in specialized clinics of teaching hospitals in Qazvin. Of the eye, urology, dermatology, and orthopedics clinics, the eye clinic with 245 minutes had the longest waiting time, and the urology clinic with 77 minutes had the lowest waiting time [1]. In our study, this time was shorter and was within the standard range specified in the Charter of Patient Rights and Responsibilities (UK), in which it is specified that all patients referring to the outpatient units of the hospital should be examined within 30 minutes of admission [14], and the minimum time a physician in a clinic should spend examining a patient is 8 minutes. Bahadori et al. examined the waiting time of patients referring to the hospital pharmacy using the path analysis method of patients who referred to the outpatient pharmacy. According to their results, the average waiting time of patients in the pharmacy in the morning shift was 39 minutes and the evening shift was 35 minutes [15], which compared with our study, the shortest waiting time was related to the pharmacy with an average of 5 minutes. Regarding these two studies, despite the relatively equal number of staff, due to the use of the electronic prescription system and the free pharmacy services, patients' waiting time was much shorter.

Aeen Parast conducted a study to determine patients' waiting time in an orthopedic clinic in Tehran using PFA. Based on the results, a long time interval between patient admission time and the presence of a specialist was introduced as the main reasons for the long waiting time [15]. While the average waiting time after admission to the start of the examination in our study was estimated at 12 minutes due to the need for timely attendance of physicians in the clinic and also the lack of training classes for faculty physicians similar to university hospitals in social security units, this case was not consistent with our study. Also, in another article entitled "Estimation of waiting time for outpatients", which was done using PFA, the patient flow and the time of entry and departure of 375 outpatients in different service stations were recorded. It was shown that about 42 to 62% of the total waiting time for

patients was spent before entering the examination room. The time interval between the start of admission and the starting activity of the examination room is one of the main reasons for this problem. The researchers stated that by reducing this time interval, a considerable patient' waiting time could be eliminated [8].

Thomas Rohlder et al. in their study at an orthopedic outpatient clinic in Calacari, Alberta using PFA showed that although the clinic is very effective in treating patients, the long waiting time and high population in the clinic cause patient dissatisfaction and low employee morale, which was consistent with the results of our study regarding increasing patient dissatisfaction with increasing waiting time [3]. In another study conducted in Labbafinejad Hospital in 2009 to assess patients' satisfaction with outpatient services, after collecting information by interview and completing the PSQ, patients' satisfaction with this hospital was estimated at the desired level. However, in terms of satisfaction with waiting time and access to the doctor, modifications were needed, which were at a moderate level in our study [6]. Keshtakaran et al. conducted a study entitled "Satisfaction Level of Outpatients Referred to Shiraz Teaching Clinics", and showed that as the level of education increases, the level of satisfaction decreases, which was consistent with the results of our study [16].

PFA has been shown as a suitable method for assessing patients' waiting time in the majority of studies conducted in Iran and worldwide, and the obtained results show bottlenecks for waiting time. In general, the results obtained from testing the research hypotheses showed that the variables of waiting time in admission, laboratory, pharmacy, and radiology clinic, as well as the waiting time from admission to the examination, had an inverse relationship with the level of patient satisfaction and the duration of examination had a direct relationship with the level of satisfaction. We found that the waiting time in laboratory and admission had the greatest effect on reducing patient satisfaction, referring to the Imam Hossein specialized Social Security Organization polyclinic, Zanjan. It has also been shown that the type of admission system, type of clinic, the level of education of patients, and the number of visits are effective in patient satisfaction.

## Conclusion

Estimating waiting time provides valuable information on identifying bottlenecks in the service delivery process as well as critical paths. This study showed that the average waiting time, as well as the duration of the examination, was within the standard range, and the radiology clinic with the longest average waiting time was one of the bottlenecks in waiting time. The officials of the radiology clinic can use PFA to check the status and identify weaknesses in the services provided in the radiology clinic to increase the efficiency and effectiveness of the clinic. The use of a telephone or online booking system in accordance with the patient admission pattern in this polyclinic can make the patient admission pattern more uniform, manage the process of providing services to patients and ultimately reduce the waiting time.

One of the limitations of the study was the lack of a uniform pattern for the admission of patients in different clinics. For example, waiting time before admission was not considered. Regarding the completion of the questionnaires, some patients did not have the necessary literacy to complete the questionnaire, which was solved by reading and explaining the questionnaire by the researcher.

Ethical issues, such as the confidentiality of patients' information, the correct and accurate report of the data collected, the accuracy of the information collected, the informed consent, and a notice by the polyclinic were fully observed by the authors (ethics code: IR.QUMS.REC.1396.225).

**Conflict of interest**

There is no conflict of interest.

**References**

1. Mohebbifar R, Hasanpoor E, Mohseni M, Sokhanvar M. Outpatient Waiting Time in Health Services and Teaching Hospitals. Glob J Health Sci. 2014; 6(1): 172-80. [In Persian]

2. Jonathan F. Bard J, Shu,Z, et al. Improving patient flow at a family health clinic. Health Care Manag Sci. 2016; 19(2): 170-91

3. Rohleder T , Lewkonia P, Bischak DP, Duffy P, Hendijani R. Using simulation modeling to improve patient flow at an outpatient orthopedic clinic. Health Care Manag Sci. 2011; 14: 135-45.

4. Noori F, Tabibi SJ, Aeenparast A, Salehi M. Outpatient flow analysis and waiting time in a radiology department. Payesh. 2013; 12(2): 195-204.

5. Lee S, Yih Y. Analysis of an Open Access Scheduling System in Outpatient Clinics: A Simulation Study. Simulation. 2010; 86(8): 503-18.

6. Ziaei H, Katibeh M, Mirzadeh M, Sedigh RM, Rabbanikhah Z, Javadi MA. Patient Satisfaction with Outpatient/Inpatient Ophtalmologic Services at Labbafinejad Medical Center. Ophtalmology. 2009; 14(3): 40-48.

7. Aeenparast A, Tabibi SJ, Shahanagi K, Aryanejhad M. Simulation in health care systems: application inoutpatient setting. Payesh. 2008; 7(2): 153-64. [In Persian]

8. Aeenparast A, Tabibi SJ, Shahanagi K, Aryanejhad M. Estimating outpatient waiting time: a simulation approach. Payesh. 2009; 8(4): 327-33. [In Persian]

9. Eldabi T, Irani Z, Paul RJ. A proposed approach for model-ling health-care systems for understanding. J Manage Med. 2002; 16(2/3): 170-87.

10. McCarthy K, McGee HM, O'Boyle CA. Outpatient clinic waiting times and non-attendance as indicators of quality. Psych Health Med. 2010; 5(3): 287-93.

11. Sepehri MA, Pedram YA. Measurement and Analysis of Strategies to Reduce Referral's Waiting Time to Public Health Centers Based on Simulation. HSR 2013; 9(5):144-8. [In Persian]

12. Asefzadeh S. Patient Flow Analysis in a Children's Clinic. Int J Qual Health Care. 1997; 9(2): 143-47.

13. Yosefi Golafshani A, Sabghobaei F, Soltan Arabshahi K, Tabatabaei M. Evaluation of Validity and Reliability of Patient Satisfaction Questionnair in Firoozgar Hospital Clinic. Razi J Med Sci. 2016; 22(139): 121-27. [In Persian]

14. Hart M. Improving the quality of outpatient services in NHS hospitals:some policy consideration. Int J Health Care Qual Assur. 1996; 9(7): 28-38.

15. Bahadori M, Mohammadnejad M, Ravangard R, Teymurzadeh E.;Using Queuing Theory and Simulation Model To Optimize Hospital Pharmacy Performance. Iran Red Cresent Med j. 2014; 16(3): e16807.

16. Keshtkaran A, Heydari AR, Keshtkaran V, Taft V, Almasi A. Level of Outpatient Satisfaction in Shiraz Educational Hospital. payesh. 2012; 11(4): 459-65.