Analysis of Quality Level of Outpatients in Puskesmas Baktiya Using Fuzzy-Servqual Method (Service Quality)

Bakhtiar¹, Muhammad Zakaria², Khairul Anshar³ and Fitri Wahyuni⁴

¹,²,³,⁴Industrial Engineering Department, Faculty of Engineering, Universitas Malikussaleh, Aceh, Indonesia

E-mail: irmuhammad@unimal.ac.id, fitriwahyuni045@gmail.com

Abstract. Puskesmas Baktiya is a company engaged in central of public health service services related to the patient. Thus it is necessary to improve the quality of services provided so that customers feel comfortable and satisfied, and need a method to measure the quality of Puskesmas Baktiya. The data collection steps were conducted by observing and distributing questionnaires from several criteria. The criteria are obtained through interviews and literature study. The method used to measure the quality of service using Fuzzy-Servqual. The research instrument used questionnaires with a total sample of 40 respondents, ie outpatients Puskesmas Baktiya. The results of data processing, obtained that the value of fuzzy-servqual per criteria as a whole has a low value so that Puskesmas Baktiya needs to make improvements. It also shows that customer expectations are not yet in line with the perceptions of the services they receive. With these results the management of Puskesmas Baktiya need to immediately improve the quality of service to attract patients. Patient waiting time for service to doctor's office (after registration) and patient waiting time for drug taking (after service in check room).

1. Introduction

Puskesmas Baktiya is one of the health centers in the Baktiya sub-district. It is hoped that Puskesmas Baktiya has an advantage in service quality so that it can become one of the supporting sectors in efforts to improve the image of Alue le Puteh village.

Puskesmas Baktiya has a strategic location, located along the Medan-Banda Aceh road so that it is easily accessible by the community both in the Baktiya sub-district and the communities of several villages outside the Baktiya sub-district, where public transportation lines run more smoothly to the Public Health Center in the sub-district [1]. One of the factors influencing the demand for health services in developing countries is the difficulty or ease of achieving physical health service facilities, in addition to income, price, and quality of health services [2].

In order to improve the quality of services to patients, the staffs are expected to be able to know or identify what patients expect when they receive services. Patient satisfaction will be achieved if you get services that meet your expectations. To measure service quality, measurement methods are needed that can describe the level of service quality of service providers [3]. The most popular service quality model and up to now has been used as a reference in assessing service quality is the servqual model (short for service quality) [4]. The measurement of service quality in this model is based on the service expected by the customer (expected service) and the perception of service (perceived service) in the five dimensions of service quality, namely the dimensions of reliability, responsiveness, assurance, empathy, and physical evidence.
The Departemen Kesehatan Republik Indonesia developed a method of evaluating the public health center’s performance on 3 aspects, namely management aspects, scope of activities and quality of public health center services. In the aspect of service quality, one important instrument is patient satisfaction. In 2009 the results of the performance appraisal on the aspects of implementing the management of Puskesmas Baktiya were at a level of sufficient performance (category II). In the aspect of the scope of activities assessed are the scope of activities of the public health service effort. In this aspect, most of the realization of program coverage is at the level of good performance (category I). Meanwhile, an assessment of aspects of patient satisfaction has never been carried out. In general, Public Health Center in North Aceh district including Puskesmas Batiya does not yet have a mechanism for monitoring customer satisfaction on a regular basis. Inability to monitor customer satisfaction can have a negative impact on the health center in the future [5].

An assessment of the quality of public services is not enough to only be done by using indicators attached to the bureaucracy / officers such as efficiency and effectiveness, but it must also be seen from the indicators attached to service users, such as service user satisfaction, accountability and responsiveness [6,7]. A good understanding of patient satisfaction is one of the important things that can help in determining policies and decision making for efforts to improve the quality of health center services. In connection with the foregoing, the authors wish to find out and analyze the quality of outpatient services at the Puskesmas Baktiya based on patient assessment.

2. Method
Maintenance is the conception of all activities necessary to maintain or maintain the quality of this type of research is a survey research method with cross sectional approach, where research is conducted on a population, but the data studied are from samples taken from that population. A cross sectional approach was used to observe the variables at the same time, and the subjects observed were only observed once.

Purpose of this study included in applied research, which applies a model in analyzing a problem. This study is intended to analyze the quality of outpatient services at the Puskesmas Baktiya using the Servqual model developed by Parasuraman (1988). Customer satisfaction with service quality is based on the level of one's feelings after comparing the performance he feels (perception) compared to his expectation. Service quality is seen from five service dimensions, namely tangible, reliability, responsiveness, assurance, and empathy dimensions.

The population in this study was 64 outpatients in Puskesmas Baktiya in 2017. The sampling technique in this research is the Porpoise Sampling Method. This means that the respondent (subject) was chosen deliberately with certain characteristics that are believed to be representative of the research population. Determination of the number of samples in this study using the Slovin formula. The data used in this study are data obtained from data collection directly at the research location, in primary data collection researchers used three data collection techniques, namely interviews, observations / field observations and questionnaires whose rating scale was used namely Likert scale with the level of assessment indicated with a scale of 1 to 5. Secondary data collection is done by searching archives of organizations / agencies, literature studies, previous research, literature and journals relating to the problem under study and documentation obtained through good books that use records that relate to the problem, or take data collected by other parties beforehand.

The research instrument used in the form of a questionnaire to determine the characteristics of respondents included the name, age, address, gender, education, occupation, and origin of the patient. In addition to using the questionnaire as a research instrument, in this study also supported in-depth interviews.

Data analysis is a process of simplifying data into a form that is easier to read and interpret. By using quantitative methods, it is expected that more accurate measurement results will be obtained about the responses given by respondents, so that the data in the form of numbers can be processed using statistical methods. Data analysis was performed with the initial stage of integrating servqual with fuzzy, where the use of this method in its ability to capture and subjectivity that occurs in data
collection through a questionnaire function with Triangular Fuzzy Number for measuring customer perceptions and expectations, calculating the value of service quality gaps, calculating weights, weighted servqual value calculation and assessment of the importance of a criterion. The second stage is carried out the next fuzzification process by forming Triangular Fuzzy Number customer perception and expectation values. The third stage is defuzzification to get a representative single value using Arithmetic Mean.

3. Result and Discussion
Based on its nature, it has been classified as a descriptive research, one that attempts to project a systematic and factual solution of a current problem. Research aims to evaluate the effectiveness of machines with overpowering equipment appliances (OEE) and improve engine efficiency by designing repairs for maintenance programs using reliability analysis approaches.

The variables used in this study are as follows:

- **Dependent Variables**
  - Value of engine effectiveness
  - Causes of Machine Failure
  - Engine reliability value
- **Independent variable**
  - Time Breakdown (Damage) Machine
  - Time of Setup
  - Time Available Time
  - Production Data
  - Corrective Repair Time
  - Machine Damage Intervals

The research was carried out in several stages beginning with the identification of problems to produce conclusions. The research design is detailed steps in research to produce the desired model. The steps of the research process can be seen in Figure 1.
4. Result and Discussion

4.1. Description of Respondent Characteristics
In detail, the characteristics of respondents receiving the Puskesmas Baktiya outpatient services can be seen in table 1 below:

Table 1. Characteristics of respondents receiving outpatient services in Puskesmas Baktiya

| Respondent Characteristic | Total |
|---------------------------|-------|
| Gender                    |       |
| - Men                     | 17    |
| - Women                   | 23    |
| Age                       |       |
| - 15 – 34 years old       | 14    |
| - 35 – 64 years old       | 26    |
| Education Level           |       |
| - not completed in primary school | 2 |
| - graduated in primary school | 4 |
| - graduated junior high school | 8 |
| - graduated senior high school | 15 |
| - bachelor / academy      | 10    |
| Occupation                |       |
| - Farmer                  | 15    |
| - Laborer                 | 9     |
| - Trader / entrepreneur   | 6     |
| - Private employees       | 0     |
| - PNS / TNI / Police      | 9     |
| - Retired PNS / TNI / Police | 7 |
| - Others                  |       |
4.2. Fuzzyfication Value Calculation of Patient Perception

In calculating the value of customer perception fuzzyfication using Ms. Excel, where the fuzzyfication value is the average value of the values c, a, b. While the results of the calculation of the fuzzyfication value can be seen in the table 2. While the results of the calculation of the ranking fuzzyfication value carried out from the highest value to the lowest value can be seen in table 3 below:

**Table 2.** The results of recapitulation of patient perception data according to the degree of importance

| No | Question                                                      | Very Good | Good Passable | Not Good | Bad |
|----|----------------------------------------------------------------|-----------|---------------|----------|-----|
| 1  | Cleanliness and comfort of the reception area                 | 0         | 22            | 6        | 2   |
| 2  | Cleanliness and comfort of the reception area                 | 2         | 28            | 8        | 2   |
| 3  | Condition and cleanliness of medical equipment used           | 1         | 3             | 28       | 8   |
| 4  | The neatness and cleanliness of the officers’ clothes         | 4         | 6             | 23       | 6   |
| 5  | Completeness of information media such as cost information boards, service procedures and suggestion boxes | 0         | 3             | 30       | 7   |
| 6  | Certainty of service schedule                                 | 4         | 9             | 25       | 2   |
| 7  | Certainty of service cost                                    | 6         | 4             | 28       | 2   |
| 8  | Medicinal quality                                            | 6         | 28            | 4        | 2   |
| 9  | Simple service procedures                                    | 6         | 8             | 21       | 5   |
| 10 | Administrative requirements are clear and easy                | 3         | 36            | 9        | 0   |
| 11 | Patient waiting time for registration                         | 2         | 29            | 9        | 0   |
| 12 | Waiting time for patients to get service by doctors           | 0         | 36            | 3        | 1   |
| 13 | Waiting time for the patient to take the medicine             | 3         | 29            | 8        | 0   |
| 14 | Doctors serve politely and friendly                            | 4         | 30            | 5        | 1   |
| 15 | Nurses serve politely, friendly and skilled in carrying out tasks | 1         | 37            | 1        | 1   |
| 16 | The medicine service serves politely, kindly and clearly explains how to use the medicine | 1         | 31            | 5        | 3   |
| 17 | Administrative officers serve politely, friendly and provide clear information | 0         | 34            | 5        | 1   |
| 18 | Patients / families are given the opportunity to submit complaints | 5         | 16            | 9        | 6   |
| 19 | The doctor listens to the patient’s complaints patiently       | 2         | 24            | 8        | 6   |
| 20 | Nurses serve patiently and have seriousness towards patient Complaints | 2         | 21            | 11       | 6   |
| 21 | Justice in getting service                                   | 2         | 24            | 11       | 3   |
| 22 | Fairness of service fees                                     | 3         | 30            | 5        | 2   |
Table 3. Calculation of the ranking fuzzyfication value

| No | Criteria                                                                 | TFN c | TFN a | TFN b | Defuzzyfication | Rank |
|----|--------------------------------------------------------------------------|-------|-------|-------|-----------------|------|
| 1  | Cleanliness and comfort of the reception area                            | 3.5   | 5     | 6.5   | 5.75            | 13   |
| 2  | Cleanliness and comfort of the reception area                            | 3.5   | 5     | 7.1   | 6.05            | 10   |
| 3  | Condition and cleanliness of medical equipment used                      | 5.5   | 6.65  | 7.95  | 7.3             | 2    |
| 4  | Neatness and cleanliness of the clothes of the officers                  | 4.7   | 6.2   | 7.7   | 6.95            | 3    |
| 5  | Completeness of information media such as fee information boards, service procedures and suggestion boxes | 5.2   | 6.7   | 8.2   | 7.45            | 1    |
| 6  | Certainty of service schedule                                           | 4.25  | 5.75  | 7.25  | 6.26            | 6    |
| 7  | Certainty of service cost                                                | 4.3   | 5.8   | 7.3   | 6.55            | 5    |
| 8  | Medicinal quality                                                        | 3.1   | 4.6   | 6.1   | 5.35            | 16   |
| 9  | Simple service procedures                                                | 4.25  | 5.75  | 7.25  | 6.5             | 9    |
| 10 | Administrative requirements are clear and easy                           | 2.9   | 4.4   | 5.9   | 5.15            | 18   |
| 11 | Patient waiting time for registration                                    | 3.35  | 4.85  | 6.35  | 5.6             | 19   |
| 12 | Waiting time for patients to get service by doctors                       | 3.25  | 4.75  | 6.25  | 5.5             | 21   |
| 13 | Waiting time for the patient to take the medicine                        | 3.25  | 4.75  | 6.25  | 5.5             | 22   |
| 14 | Doctors serve politely and friendly                                      | 2.96  | 6.19  | 5.9   | 6.04            | 11   |
| 15 | Nurses serve politely, friendly and skilled in carrying out tasks        | 3.1   | 4.58  | 6.7   | 5.34            | 17   |
| 16 | The medicine service serves politely, kindly and clearly explains how to use the medicine | 3.5   | 5     | 6.5   | 5.75            | 14   |
| 17 | Administrative officers serve politely, friendly and provide clear information | 3.35  | 4.85  | 6.35  | 5.6             | 20   |
| 18 | Patients / families are given the opportunity to submit complaints       | 4.4   | 5.9   | 7.48  | 6.69            | 4    |
| 19 | The doctor listens to the patient's complaints patiently                  | 3.9   | 5.4   | 6.9   | 6.15            | 7    |
| 20 | Nurses serve patiently and have seriousness towards patient complaints   | 4.7   | 5.55  | 7.05  | 6.3             | 8    |
| 21 | Justice in getting service                                               | 3.75  | 5.25  | 6.75  | 6               | 12   |
| 22 | Fairness of service fees                                                 | 3.3   | 4.8   | 6.3   | 5.55            | 15   |

From the results of customer perception data processing and after defuzzyfication, it can be seen that the highest perceived value of the quality of outpatient services at Baktiya Health Center is "Completeness of information media such as cost information boards, service procedures and suggestion boxes" with a value of 7.45.

To determine service satisfaction, it can be assessed from complaints or complaints from patients. The lowest scores regarding perceptions were "Waiting time for patients to get service to the doctor's examination room" and "Waiting time for patients to take medicine" with a value of 5.5.

4.3. Calculation of the Fuzzyfication Value of Patient Expectations
To calculate the Fuzzyfication value of the customer expectation questionnaire using Ms. Excel, the calculations are the same as in the customer perception questionnaire can be seen in table 4. below:

### Table 4. Results of data recapitulation of customer expectations according to interests

| No | Criteria                                                                 | Very good | Good | Passable | Not Good | Bad  |
|----|--------------------------------------------------------------------------|-----------|------|----------|----------|------|
| 1  | Cleanliness and comfort of the reception area                           | 5         | 35   | 0        | 0        | 0    |
| 2  | Cleanliness and comfort of the reception area                           | 5         | 35   | 0        | 0        | 0    |
| 3  | Condition and cleanliness of medical equipment used                      | 6         | 34   | 0        | 0        | 6    |
| 4  | Neatness and cleanliness of the clothes of the officers                 | 2         | 35   | 3        | 0        | 0    |
| 5  | Completeness of information media such as fee information boards, service procedures and suggestion boxes | 1         | 31   | 8        | 0        | 0    |
| 6  | Certainty of service schedule                                           | 13        | 26   | 0        | 0        | 13   |
| 7  | Certainty of service cost                                               | 6         | 24   | 0        | 0        | 0    |
| 8  | Medicinal quality                                                        | 21        | 19   | 0        | 0        | 0    |
| 9  | Simple service procedures                                               | 3         | 37   | 0        | 0        | 0    |
| 10 | Administrative requirements are clear and easy                           | 3         | 37   | 0        | 0        | 0    |
| 11 | Patient waiting time for registration                                    | 6         | 32   | 2        | 0        | 0    |
| 12 | Waiting time for patients to get service by doctors                      | 5         | 33   | 2        | 0        | 0    |
| 13 | Waiting time for the patient to take the medicine                       | 5         | 33   | 2        | 0        | 0    |
| 14 | Doctors serve politely and friendly                                     | 14        | 24   | 2        | 0        | 0    |
| 15 | Nurses serve politely, friendly and skilled in carrying out tasks       | 11        | 29   | 0        | 0        | 0    |
| 16 | The medicine service serves politely, kindly and clearly explains how to use the medicine | 9         | 31   | 0        | 0        | 0    |
| 17 | Administrative officers serve politely, friendly and provide clear information | 6         | 24   | 0        | 0        | 0    |
| 18 | Patients / families are given the opportunity to submit complaints      | 28        | 12   | 0        | 0        | 0    |
| 19 | The doctor listens to the patient’s complaints patiently                 | 28        | 12   | 0        | 0        | 0    |
| 20 | Nurses serve patiently and have seriousness towards patient complaints   | 20        | 20   | 0        | 0        | 0    |
| 21 | Justice in getting service                                               | 22        | 18   | 0        | 0        | 0    |
| 22 | Fairness of service fees                                                | 18        | 22   | 0        | 0        | 0    |

The results of the calculation of the fuzzyfication value on the perception and ranking aspects are carried out from the highest value to the lowest value can be seen in table 5. below:

### Table 5. Value defuzzification customer expectations

| No | Criteria                                                                 | TFN  | Defuzzification | Rank |
|----|--------------------------------------------------------------------------|------|-----------------|------|
|    |                                                                          | c    | a    | b    |      |     |
| 1  | Cleanliness and comfort of the reception area                           | 2.75 | 3.93 | 5.25 | 4.59 | 14  |
| 2  | Cleanliness and comfort of the reception area                           | 2.75 | 6.93 | 5.25 | 4.59 | 15  |
| 3  | Condition and cleanliness of medical equipment used                      | 2.7  | 4.3  | 5.7  | 5    | 11  |
| 4  | Neatness and cleanliness of the clothes of the officers                 | 3.05 | 4.55 | 6.05 | 5.3  | 5   |
The result of calculating the value of servqual (gap) per criterion from the difference in the level of perception and expectation shows the extent to which the Puskesmas management has provided services according to the wishes of its customers (patients). The role of the gap per criterion will give a level of importance to how far the role of these criteria is in providing a level of service quality. In table 6 below.

|   | Comprehensiveness of information media such as fee information boards, service procedures and suggestion boxes | 3.35 | 4.85 | 6.35 | 5.6 | 4 |
|---|------------------------------------------------------------------------------------------------------------|------|------|------|-----|---|
| 6 | Certainty of service schedule                                                                            | 2.4  | 3.9  | 5.4  | 4.65| 13|
| 7 | Certainty of service cost                                                                                | 2.2  | 3.1  | 5.2  | 4.15| 18|
| 8 | Medicinal quality                                                                                         | 1.95 | 3.45 | 4.95 | 8.4 | 3 |
| 9 | Simple service procedures                                                                                | 2.85 | 4.35 | 5.85 | 5.1 | 6 |
| 10| Administrative requirements are clear and easy                                                          | 2.85 | 4.35 | 5.85 | 5.1 | 7 |
| 11| Patient waiting time for registration                                                                     | 2.8  | 4.3  | 5.8  | 5.05| 10|
| 12| Waiting time for patients to get service by doctors                                                       | 3.03 | 4.35 | 5.85 | 5.1 | 8 |
| 13| Waiting time for the patient to take the medicine                                                        | 3.03 | 4.35 | 5.85 | 5.1 | 9 |
| 14| Doctors serve politely and friendly                                                                       | 2.4  | 3.9  | 5.4  | 9.3 | 2 |
| 15| Nurses serve politely, friendly and skilled in carrying out tasks                                        | 2.45 | 3.95 | 5.45 | 9.4 | 1 |
| 16| The medicine service serves politely, kindly and clearly explains how to use the medicine                | 2.55 | 4.05 | 5.55 | 4.8 | 12|
| 17| Administrative officers serve politely, friendly and provide clear information                           | 1.95 | 3.08 | 4.2  | 3.64| 22|
| 18| Patients / families are given the opportunity to submit complaints                                       | 1.6  | 3.1  | 4.6  | 3.85| 20|
| 19| The doctor listens to the patient's complaints patiently                                                  | 1.6  | 3.1  | 4.6  | 3.85| 21|
| 20| Nurses serve patiently and have seriousness towards patient complaints                                    | 2    | 3.5  | 5    | 4.25| 17|
| 21| Justice in getting service                                                                               | 1.9  | 3.4  | 4.9  | 4.15| 19|
| 22| Fairness of service fees                                                                                 | 2.1  | 3.6  | 5.1  | 4.35| 16|
Table 6. The value of the biggest criteria servqual

| No | Criteria                                         | Servqual Value | Rank |
|----|--------------------------------------------------|----------------|------|
| 1  | The condition and cleanliness of the medical equipment used | 4.5            | 1    |
| 2  | Patients / families are given the opportunity to submit complaints | 2.84           | 2.84 |
| 3  | Certainty of service schedule                    | 2.4            | 3    |
| 4  | Certainty of service cost                        | 2.3            | 4    |
| 5  | Medicinal quality                                | 2.05           | 5    |

From the table above it is known that the criteria that have the greatest servQUAL value are the condition and cleanliness of the medical devices used by 4.5, the second place is that patients / families are given the opportunity to submit complaints of 2.84, the third order is the certainty of service costs of 2.4, and the last is The quality of drugs available to patients was 2.05.

5. Conclusion
Based on the results of research conducted at Puskesmas Baktiya, it can be concluded as from the results of defuzzification calculations, the highest perceived value of the quality of outpatient services at Puskesmas Baktiya is "Completeness of information media such as cost information boards, service procedures and suggestion boxes" with a value of 7.45. And the lowest perception value is "waiting time for patients to get service to the doctor's examination room and patient waiting time for taking drugs" with a value of 5.5 and from the defuzzification results, it can be seen that the highest expectation value of the quality of outpatient services at Puskesmas Baktiya is "certainty of service costs" with a value of 9.4. And the lowest score is "Simple service procedure" with a value of 4.

References
[1] Azwar A 1994 *Program Menjaga Mutu Pelayanan Kesehatan Aplikasi Prinsip Lingkaran Pemecahan Masalah* (Yayasan Penerbitan Ikatan Dokter Indonesia : Jakarta)
[2] Putra, Andhika W Analisis Permintaan Penggunaan Layanan Kesehatan Rumah Sakit Umum Milik Pemerintah Di Kabupaten Semarang *http://Eprints.Undip.Ac.Id/23147/1/Full_Text.Pdf*
[3] Tjiptono Fandy and Chandra G 2011 *Service, Quality & Satisfaction, edisi 3* (Yogyakarta: Penerbit Andi)
[4] Parasuraman A, Zeithaml Valerie A and Berry Leonard L 1988 A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality *Journal of Retailing*
[5] Departemen Kesehatan RI 2007 *Penilaian Kinerja Puskesmas*
[6] Dwiyanto A 2002 *Reformasi Birokrasi Publik Di Indonesia* (Yogyakarta : PSKK UGM)
[7] Pratikno Budi 2003 *Aplikasi Fuzzy-Servqual Untuk Menganalisa Kepuasan Pelanggan Terhadap Kualitas Pelayanan jasa Pendidikan* (Teknik Industri, Universitas Muhammadiyah Surakarta)