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Analysis of Improving the Quality of Outpatinent Service At Hospital X Through Triz Method (Theory of Inventive Problem Solving)

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ABSTRACT

The research in this introduction aims to analyze and improve the quality of outpatient services at Hospital X using the TRIZ (Theory of Inventive Problem Solving) method. This research seeks to find innovative solutions to improve the quality of hospital services using creative principles from TRIZ, which is expected to increase patient satisfaction and strengthen the hospital's credibility in the eyes of the public. This research also seeks to utilize the SERVQUAL model to identify gaps between customer expectations and perceptions of service quality, so that it can produce systematic and sustainable improvements in health services. The methods of collecting data are primary data and secondary data. The gaps identified from the expectation and perception questionnaire in the hospital outpatient service include doctors not arriving as scheduled and waiting times in the outpatient pharmacy exceeding 60 minutes. Utilizing TRIZ inventive principles, such as 35 (Parameter Changes), 30 (Flexibility), 34 (Discarding and Recovering), and 2 (Taking Out), can enhance the timeliness of hospital outpatient services. By applying TRIZ inventive principles 10 (Preliminary Action), 19 (Periodic Action), 23 (Feedback), and 28 (Mechanics Substitution), the hospital can expedite outpatient pharmacy services. Implementing preliminary preparation, periodic action, feedback mechanisms, and technology will help reduce patient waiting times, improve efficiency, and ensure better service. These recommendations will be adjusted according to the actual conditions in the hospital. Future research can further investigate Lean management in outpatient pharmacy to identify and eliminate waste.

Introduction

Service quality and customer satisfaction are essential aspects of the service industry due to their interconnectedness. (Indrasari, 2019). Customer satisfaction is achieved when the quality of service meets or exceeds customer expectations. Hospitals, as agencies operating in the health services sector, are crucial in enhancing the health status of the Indonesian population. (Dekrita & Samosir, 2022). Therefore, hospitals must provide professional health services by maintaining high-quality standards. Patients, as the primary customers of hospitals, experience satisfaction when the service quality is consistently upheld (Kurniati & Mustikawati, 2023; Mayasari et al., 2021).

Good service quality has an impact on improving hospital quality. (Permana, 2016). Efforts to improve the quality of health services are the most important step in providing better services to patients. (Adam, 2018; Alfarizi, 2019). The research results show that quality hospital services can increase patient satisfaction and encourage patients to want to come back to the hospital, thereby increasing the hospital's credibility in the community. (Patattan, 2021). Other research studies also reveal that this is very important for hospitals to do as hospital business competition is also increasingly competitive.

Outpatient services serve as the gateway to a hospital, shaping its image in the eyes of the public. These services represent the largest unit within a hospital, involving various types of healthcare professionals and facilities, and are capable of serving a large number of community members. The success of this unit in fulfilling community needs can be a barometer for the quality of healthcare services provided. Research indicates that high-quality operational management and services positively impact the overall quality of hospital services.

To enhance service quality, an effective approach is the TRIZ method. TRIZ, an acronym for the Russian "Teoriya Resheniya Izobretatelskikh Zadach" or "Theory of Inventive Problem Solving" (TIPS), was developed by Soviet inventor Geinrich Alshuller (Lin & Su, 2007). Research demonstrates that utilizing TRIZ allows for a more open, organizational conceptual view to address hospital problems and respond more swiftly to patient needs (LariSemnani et al., 2015).

A study indicated that TRIZ helps identify contradictions in outpatient services and find innovative solutions. (Lee, Zhao, & Lee, 2019). This approach aims to promote creative and systematic thinking in problem-solving by using inventive principles. TRIZ seeks to generate new ideas by resolving contradictions, leading to creative solutions (Sheu, Chiu, & Cayard, 2020).

A literature review study across various hospitals utilizing TRIZ applications revealed systematic innovation solutions. This study recommends TRIZ improvements for various types of healthcare services (Guner & Kose, 2020). Other research suggests that TRIZ serves as a problem-solving guideline applicable to any institution or context, including hospitals and healthcare services (Ranabhat et al., 2016). TRIZ offers various systematic innovation solutions to hospital problems, with several studies integrating TRIZ with other methods. The positive impact of TRIZ in hospitals confirms it is a flexible and innovative method for finding solutions to hospital facility issues (Chang, Liu, & Chen, 2017).

Research on the SERVQUAL model demonstrates its ability to analyze and measure customer expectations and perceptions, identifying gaps between the two across five main dimensions of service quality: tangibles, reliability, responsiveness, assurance, and empathy by minimizing these gaps, service quality that can be achieved, leading to customer satisfaction. (Shao et al., 2022). The TRIZ application in healthcare services, with the SERVQUAL dimensions serving as problem identification tools, further supports this (Kose & Guner, 2020). Based on this analysis, a study was conducted entitled "Analysis of Improving the Quality of Outpatinent Service at Hospital X through TRIZ Method (Theory of Inventive Problem Solving)."

Method

In this study, the researchers examine the Analysis of Improving the Quality of Outpatient Services at Hospital X through the TRIZ Method (Theory of Inventive Problem Solving). This type of research is qualitative which is supported quantitatively. The methods of collecting data are primary data and secondary data.

The data collection method in this research used questionnaires to obtain gap values, observation, and document review as supporting data. Secondary data was obtained from a document review of data from the Hospital. The minimum sample obtained from the Slovin formula calculation required 277,16 respondents, which was rounded up to 278 respondents. Procedure election sample selected several representatives from every polyclinic in Hospital X street from a total of 19 services using a proportional random sampling technique. This technique also considers the availability and willingness of individuals to respond to research. Data analysis techniques were from Gap Analysis, Initial solution problem analysis, Problem modeling, and contradiction analysis, Elimination of contradictions based on TRIZ Inventive Principles.

Results and Discussion

This study utilized GAP analysis in conjunction with the ServQual (Service Quality) calculation method. This approach is fundamentally based on the perceived values and expectations of respondents, specifically users of outpatient services at Hospital X. The concept of customer satisfaction in this study involves measuring the gap by calculating the difference between the average values of each variable for the service received by costumers and the service expected by them. The presence of gaps is indicated by results less than 0 or negative values (-).

Design of Quality Improvement Proposal through TRIZ

Step 1: Initial Problem Analysis

The initial problem was obtained from the calculation of the Servqual gap value with the result <0 or negative value (-). The problems were then collected in order of priority and an initial problem solution was made by the researcher.

Table 1
Sequence priority problem

Variable	Information	ServQual Gap Value
V9	I got my doctor's appointment on time	-1.11786
V17	Fast pharmacy service < 60 minutes	-1.05

Priority 1: Getting doctor's appointment on time

Timely adherence to the doctor's inspection schedule is the top priority due to its significant negative ServQual gap value. Customers are dissatisfied because, based on observations at Hospital X, several doctors do not adhere to the scheduled arrival times for their polyclinic sessions. This discrepancy is often due to various factors, such as surgical schedules, traffic congestion from out-of-town commutes, and other unforeseen circumstances, leading to doctors frequently arriving late. Consequently, patients experience extended waiting times, disrupting the overall flow of hospital services. This mismatch can diminish patient satisfaction, cause overcrowding in waiting areas, reduce the quality of care as doctors may rush through examinations, and increase stress and working hours for medical staff, such as nurses, who must update patients on the situation. Therefore, effective communication is essential to synchronize schedules between doctors and the hospital, ensuring timely and accurate service delivery.

Priority 2: Fast Pharmacy Service <60 minutes

Pharmaceutical services that are fast <60 minutes are priority number two with a negative ServQual gap value (-). Customers are dissatisfied with outpatient pharmacy services at Hospital X because the delivery of drugs reaches an average of >60 minutes. Delivery of non-prescription drugs is handed over to patients as early as >60 minutes with an average of no 70 minutes, while compounded drugs take longer than non-prescription drugs. This is due to several factors, including the provision of the number of drugs to patients in large quantities and types of drugs, DPJP drug input in ERM is incomplete, so the Pharmacy department completes the filling so that the etiquette can be printed, the most important factor is the number of Outpatient Pharmacy personnel is not balanced with the number of patients. So there is a need for additional pharmaceutical personnel in outpatient Hospital X.

Table 2
Criteria for Initial Repair Solutions Hospital X Outpatient Services

Criteria Service	Improvement Solution Quality Service
Doctor's examination schedule that is not on time	Synchronize the doctor's schedule with hospital management
Pharmacy Services >60 minutes	Addition of outpatient pharmacy officers in one shift.

Step 2: Modeling Problems and Contradiction Analysis

1. Modeling Problem

Problem modeling was done using a function diagram, which aims to analyze the causes and effects of the initial solution.

The priority of service improvement is the accuracy of the Doctor's service schedule, the problem modeling diagram illustrates an increase in the function value of the accuracy of the Doctor's service schedule if there is a synchronization of the doctor's schedule. This synchronization is not limited to communication with the hospital when the doctor is late due to obstacles, but can also mean adjusting the new schedule. The absence of synchronization of doctors' schedules will reduce the value of the function, namely reducing the flexibility of doctors, so that it can still make doctors rush to provide services to patients.

The second priority for service improvement is a fast pharmacy waiting time of <60 minutes. The problem modeling illustrates an increase in the value of the service speed function. However, there will be additional costs due to additional pharmacy staff.

2. Contradiction Analysis

The existing solutions and effects were then translated into technical parameters. This technical parameter is divided into two parts, namely improving features and worsening features using 39 existing patented TRIZ Parameters. These can be explained in Table 3 and Table 4 below.

Table 3
Improving Features

Service Criteria	Technical Parameters
Enhancement accuracy service	*Stability of the subsystem # 13*
Enhancement speed service	*Speed #9*

Table 4
Worsening Feature

Criteria Service	Technical Parameters
Flexibility decreases	Adaptability #35
Additional cost	Amount of substance *#26*

Step 3. Elimination contradiction based on TRIZ Inventive Principles

Inventive principles became the feedback for better service quality for the out patients in Hospital X.

Table 5
Inventive Principles for Each Contradiction

Improving Features* VS *Worsening Feature	***Inventive Principles***
Stability of the subsystem #13 vs Adaptability #35	35, 30, 34, 2
Speed #9 vs amount of substance #26	10, 19, 29, 38

The first service improvement priority is the accuracy of the doctor's service schedule. Inventive principles obtained are:

a) 35 Parameter Change

Change the characteristics of services, such as service flexibility, service operations, and so on. That is, the time for consultation and examination of patients can be adjusted by needs. For example, old patients, if there are no other complaints, can be given a short time, while patients with high complexity or first-time patients can be given a longer time. Additional buffer time can also be added to overcome delays.

b) 30 Flexibility

Used to improve service quality and increase reliability. Having an online technology/portal to view the doctor's schedule in outpatient care in real-time, thereby reducing patient waiting and piling up, sending messages/notifications of the Hospital X application to patients for estimated time to come to the Hospital again.

c) 34 Discarding and Recovering

Eliminate things that are considered inefficient and increase flexibility. Outpatient services at Hospital X can change the doctor's service schedule, especially for some doctors who often cannot come on schedule, which can use technology in real-time. This means that the old schedule can be discarded or remain the same but can be divided, for example, half the poly then perform surgery, and continued to the polyclinic but the availability of doctors can be seen in real-time. There is a notification to patients through the portal or application regarding visiting hours to the Hospital so that patients do not wait and do not accumulate in the waiting room.

d) 2 Taking Out (Removing)

This principle identifies barriers that arise and provides alternative solutions. Not a few causes of doctor delays are due to traffic jams, especially for DPJPs whose domiciles are outside the city with daily commutes. The alternative solution is that Hospital X can provide special transport organized and managed by Hospital X to ensure doctors arrive on time.

Using TRIZ inventive principles 35 (Parameter Changes), 30 (Flexibility), 34 (Discarding and Recovering), and 2 (Taking Out) can help improve the Hospital's outpatient timeliness. By making changes to time parameters, increasing schedule flexibility, eliminating inefficiencies, and overcoming major bottlenecks, Hospital X can improve efficiency and overall patient satisfaction. These recommendations will then be adapted to the real conditions that occur in Hospital X. By implementing TRIZ inventive principles 10 (Preliminary Action), 19 (Periodic Action), 23 (Feedback), and 28 (Mechanics Substitution), the hospital can improve the speed of outpatient pharmacy services. Preliminary preparation, periodic action, feedback, and use of technology will help reduce patient waiting time, improve efficiency, and ensure better service. These recommendations can be adapted to the real conditions that occur in Hospital X in the future.

Conclusion

The gaps identified from the expectation and perception questionnaire in the hospital outpatient service include doctors not arriving as scheduled and waiting times in

the outpatient pharmacy exceeding 60 minutes. Utilizing TRIZ inventive principles, such as 35 (Parameter Changes), 30 (Flexibility), 34 (Discarding and Recovering), and 2 (Taking Out), can enhance the timeliness of hospital outpatient services. By applying TRIZ inventive principles 10 (Preliminary Action), 19 (Periodic Action), 23 (Feedback), and 28 (Mechanics Substitution), the hospital can expedite outpatient pharmacy services. Implementing preliminary preparation, periodic action, feedback mechanisms, and technology will help reduce patient waiting times, improve efficiency, and ensure better service. These recommendations will be adjusted according to the actual conditions in the hospital. Future research can further investigate Lean management in outpatient pharmacy to identify and eliminate waste.

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