



Addis Ababa University
Addis Ababa Institute of Technology
School of Mechanical & Industrial Engineering

**Service Quality Design Through Customer-Oriented Failure
Reduction (Case Company: Saint Paulos Hospital)**

A Thesis Submitted to the School of Graduate Studies of Addis Ababa
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Degree of Master of Science in Industrial Engineering

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Declaration

I hereby declare that the work which is being presented in this thesis entitled “Service quality improvement through customer oriented failure reduction (case company Saint Paulos Hospital)” is original work of my own, has not been presented for a degree of any other university and all the resource of materials used for this thesis have been duly acknowledged.

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This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

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ABSTRACT

Service quality has been considered as one of the vital areas for improving performance of any business process. Service quality is one of the most effective means of building a competitive position. Especially in health care service sector, service quality have significant role because, in this sector the main customers are patients who need a medical service so in this sector quality of service is linked with wellbeing of patients. This research was conducted by measuring the service quality, determining appropriate service design based on customer requirement and identifying customer oriented service failures and preparing corrective and preventive solution for the identified failures. The major problems identified in service quality of saint paulos hospital are patients take a long service time to be served in OPD department, OPD doctors have high working load which affects their effectiveness and in all ward of the hospital it is observed that there is frequent readmission rate of patients. So the objective of this study is to improve service quality in St Paul's hospital by providing mechanism of developing appropriate service design based on customer's requirement and reducing or eliminating significant failures. In order to measure the service quality SERVQUAL model is used for analyzing respondents expectation and perception and service gap is identified.using QFD analysis having regular technical training,having transparency in information flow,desining policies and procedures,having up-to-dated medical equipments,and conducting regular interpersonal training are identified as the most critical technical requirnmnts.using FMEA analysis "not accurate medial records, not having adequet equipments, no on time serice delivery,understanding problem and patients not feeling safety during diagnosis" are identified as the most critical failures respectfully.according to the identified critical technical requirements the suggested service design is proposed.And also the recommended solution for the identified critical failures is provided.

Keywords: QFD, FMEA, and SERVQUAL

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ACCRONOMY

SQI	Service Quality Improvement
COFR	Customer-Oriented Failure Reduction
SPH	Saint Paulos Hospital
QFD	Quality Function Deployment
CRM	Customer Relationship Management
KPI	Key Performance Indicator
SERVQUAL	Service Quality
VOC	Voice of the Customer
FMEA	Failure Mode and Effects Analysis
MEET	Medical error encouragement training

CHAPTER ONE

1 INTRODUCTION

A service is an intangible act or use for which a consumer, firm, or government is willing to pay. The term "service" represents and constitutes various issues. It covers a wide range of intangible and heterogeneous products and activities that are difficult to summarize within a simple definition (WTO, 2010). According to Kenneth (2005) the service industry contains public transportation, public utilities, restaurants, hotels, marketing finance, news media, personal services, and government (defense, health, education, welfare, and municipal services).

The term "quality" comes from the Latin word "quality," which means an attribute or property. However, a different scholar gives a different interpretation of the term "quality." According to Crosby (1992), quality is defined as conformance to specification in the test of quality reliability. Quality is "fitness for use," which means the value concept varies from one customer to another (Juran, 1999). Quality is minimizing variation, precision, and accuracy in production (Deming, 2005). And quality is meeting customer wants and providing greater worth (Moradi and Raissi, 2015).

Service quality is a measure of how an organization delivers its services compared to the expectations of its customers. Customers purchase services as a response to their wants. In order to increase service quality, identifying the ones that make customers satisfied and dissatisfied is an important issue. To keep their customers happy, several organizations need to enhance their customer service (Abdissa, 2019). An organization that wants to be competitive must achieve quality service by considering customer expectations (Mengistu, 2018).

Service quality has been identified as one of the most effective means of building a competitive position and improving organizational performance. It's also focused on evaluation that reflects the customer's perception of specific dimensions of service, reliability, responsiveness, assurance, empathy, tangibles, and satisfaction.

Belay (2014) states that in Ethiopia it is not well trending to see organizations that are committed to building loyal customers and providing excellent service due to various reasons: it may be because of a shortage of knowledge in the area, the business may be dependent on a traditional system, a lack of commitment, less attention to quality, and many

other reasons. Since competition in the service sector is increasing, organizations have to work on improving service quality by understanding and resolving customer complaints.

Service failure can be defined as service performance that does not meet the customers' expectations in a way that leads to customer dissatisfaction (Wilson, Zeithaml, Bitner, & Gremler, 2016). Customers are dissatisfied because the service quality they received falls below their expectations (Chuang et al., 2012). Service failure diminishes customer satisfaction, which may lead to a reduction in trust customers have in a company for their time and business.

According to today's customer-oriented market, most decision-making approaches developed for drawing service quality improvement strategies extremely depend on customers' perceptions. Therefore, while identifying failures around the service process, considering customer complaints plays a significant role in magnifying problems that management didn't consider.

It's an important issue. analyzing and studying customer-oriented service failure and applying proactive treatment of the system rather than finding a solution after the failure occurs (Stamatis, 2003). Prioritizing failures also helps service-provider companies reduce time, cost, and resources that are required after failure occurs. FMEA prioritizes failures according to how serious their consequences are, how frequently they occur, and how easily they can be detected.

1.1 Background

This research is applied to health sector quality improvement. Health care services share a set of common characteristics with other services. Successful management of hospital service quality is increasingly becoming a strategic perspective for hospitals because it has a strategic role in accelerating the improvement of public health (Kadir et al., 2017).

Increasing patient satisfaction depends on removing human errors within the hospital system. Because the healthcare industry is based on human-powered jobs, the effect of errors within the healthcare system on human life and the organization itself is tremendous in practice (Gupta et al., 2004).

Globally, countries are faced with health system problems that vary from one to the next. While health service delivery challenges are more often seen in countries with a very high

Human Development Index (HDI), human resources challenges attract more attention in those with a low HDI (Roncarolo F. et al. 2013).

Quality in Africa's health care systems has become a major concern due to seemingly intractable poor health indices in most countries. Maternal and infant morbidity and mortality rates are high, and life expectancies are very low compared with other regions. The World Health Organization (WHO, 2008) reported that about 536,000 women died in 2005 due to complications of pregnancy and childbirth; 400 mothers died for every 100,000 live births. The unfortunate ratio is 9 in developed countries, 450 in developing countries, and 900 in sub-Saharan Africa. This shows the quality of health care services has largely received little attention in many African countries.

Currently, even though there have been encouraging improvements in the coverage and utilization of health services, there is still an increasing trend of community dissatisfaction with the Ethiopian health care system (FMOH, 2008).

In research conducted by Wondwossen (2019) in a few public and private hospitals in Addis Ababa, it was stated that due to poor patient care and satisfaction in government hospitals, they failed to attract health care customers. Moreover, the government hospitals' health workers' poor attention, negative attitudes and behaviors towards their clients and patients, intense competition between public and private health institutions, shortage of modern equipment, and significant shift of customers from government hospitals to private hospitals are diversely affecting the government hospitals' revenue and will lead to a decline in income and poor quality service delivery for patients.

As a low-income country with a population of more than 110 million people and a high fertility rate, Ethiopia is one of the countries with the highest proportion of unmet health care needs (World Bank, 2019). Ethiopia has poor health outcomes even by sub-Saharan African standards, characterized by many decades without a national health policy, weak health care system infrastructure, and low government spending (World Bank, Ethiopia, 2004).

Service failure in health care is specifically critical; it is associated with higher mortality rates and poor treatment outcomes (Um & Lau, 2018). In addition to failures that are directly life-threatening, such as wrong treatment or surgical mistakes, the risk of service failure in health care includes a potential lack of compliance with the prescribed treatment when a dissatisfied patient is complaining or switching service providers (Um & Lau, 2018). In general, health

care failures can have serious consequences, so it is important to manage health care failures proactively.

Customer perception is an important issue in health care nowadays. Understanding the views, needs, demands, and woes of clients is an essential step in order to achieve client satisfaction. Client perceptions of quality are often influenced by their interactions with health providers; resolving client complaints can achieve a high level of satisfaction by working on related indicators and their improvements.

Customer judgment of health institution service quality and their feedback are essential in health care service monitoring and improvement since they can be used as a subjective evaluation of the service received against the individual's expectations. More over, the need for evidence-based interventions in health care areas such as medical care, nursing care, physical comfort, politeness of staff, and waiting time should be addressed.

Even if it remains controversial whether clients' ratings reflect anything about technical quality or simply the interpersonal skill of the service providers, it remains clear that equity and quality of health services depend on well-trained health professionals, quality of health facilities, and medical equipment. Therefore, achieving client satisfaction through the reduction of client-oriented failure is essential for service quality improvement.

Despite studies conducted on health care quality systems and health care quality improvement, there are very few published studies done on service quality improvement through customer-oriented failure reduction in hospitals in Ethiopia. Thus, it becomes important to study the failures based on patients' perceptions in order to improve the service quality of the hospital.

1.2 Problem statement

In St. Paulo's hospital OPD department, different problems are identified that reduce the quality of the hospital's service delivery. Through preliminary data recording, it's been identified that patients wait up to 95 minutes on average from their arrival time up to their entrance to the doctor in OPD, which is a very long time compared to the standard. The Institute of Medicine suggested that patients should be examined within 30 minutes of their scheduled appointment (O. Melley et al., 1983). Since the customers of the case company are patients who need medical service, waiting for a long time to get service may have a more severe health effect than being dissatisfied. Caregiver relatives are also negatively affected by this long waiting time, since they are there to help patients by leaving their regular work.

According to the 2010 WHO Standard, medical doctors should serve a maximum of 25 patients per day, which states that medical doctors should visit 15 patients in the morning and 10 in the afternoon. But actually, in the OPD department, medical doctors are serving more than 35 patients per day, as the data from the case company shows. This overloaded work of OPD doctors results in other related problems for the quality of the hospital's service delivery by creating medical errors and elongating the time it takes to make decisions and diagnose.

The frequent readmission rate of patients is also another problem identified in the hospital ward service. Hospital readmission is when patients who had been discharged from a hospital are admitted again for the same or related care within 30 days. Because of improper initial treatment, resources in the hospital are occupied, which leads to long waiting times for new entrants and also results in more complications for patients' diseases.

Another problem observed through direct observation and by asking patients is:

- Even if the hospital human resources department believes that the hospital employees are serving properly, patients complain that some receptionists and nurses discriminate against customers; they don't give equal service to all patients, especially rural and urban patients, and patients who have relatives who are hospital staff members are served properly without waiting for service.
- Customers complain about poor communication between patients and medical staff. Since St. Paul's Hospital is a specialized hospital, different patients speak different languages and come from different areas, so there is a communication problem. Because of this problem, medical doctors can't easily understand patients, and patients also can't get enough information about things to do and not to do, which ultimately results in patients being readmitted.
- Customers complain that the OPD department is not easily accessible, even if the hospital department places a number for each room. Customers complain that the OPD department is not easily visible and accessible.

In the study conducted by Tangute Demas et al. (2017) in the St. Paul's Hospital gynecology ward, the women's overall satisfaction with intrapartum care was low; among 394 women, only 19% were satisfied by the service given.

A study done in St. Paulos Medical College by Yeshanew et al. (2017) also states that the overall rate of satisfaction among both patients and health care workers with the laboratory

services was low. The complaints are about the location and site of the laboratory, the waiting place of the laboratory, and the cleanliness of the latrine used to collect laboratory specimens.

All the above problems indicate that there is a service quality problem that leads to customer dissatisfaction, which shows that there is a quality service delivery problem in the hospital system.

1.3 Research question

1. What are the significant customer-oriented failures and their causes in the hospital's service delivery?
2. What is the appropriate service design based on customer requirements?
3. What are the most critical failures, and how can we eliminate those failures in service delivery?

1.4 Objective

1.4.1 General objective

The general objective of this research is to design service quality in St. Paul's Hospital by reducing customer-oriented failures through measurement of service quality, technical characteristics that should be considered to meet customer requirements for service design, and identification and reduction of customer-oriented failures during service delivery.

1.4.2 Specific objective

- ✓ To identify customer-oriented, significant failures in the hospital's service delivery
- ✓ To determine the causes of the identified failures
- ✓ Redesign the service process to determine technical characteristics that should be considered to meet customer requirements.
- ✓ To provide a solution to reduce failures according to their criticality prioritization by including the customer's requirements.

1.5 Scope

This study encompasses only one health care center, namely St. Paul's Hospital's service process. The scope of the study includes the hospital's entire wards and OPD department only. Because many patients and other customers complain mainly in this department, and also because this department has a higher patient flow than other departments, The scope of this research using QFD is also limited to only identifying the critical technical requirements. The research objective is not to compare the hospital with other hospitals, so competitive analysis in QFD is excluded.

1.6 Limitation

The major limitation of the study was gathering relevant data. Because, as stated, the study was done in a hospital, in order to do the study effectively, data from administrative stuff, medical stuff, and most importantly, patients, is essential. But getting data may not be easy since medical staff are very busy and may not have time to provide sufficient data. And also, patients cannot give sufficient data due to their health problems or out of fear of losing quality service if they complain about the hospital.

1.7 Ethical consideration

With respect to this study, during data collection, permission is obtained from every concerned body after clearly explaining the purpose of the study to the management body, medical staff, and patients. All information that was collected from the respondents was treated with confidentiality without disclosure of the respondent's identity. The benefit of the research for patients is clearly explained to them in order to get proper data from them.

1.8 Significance

This study ultimately aims to contribute knowledge related to how service failure influences customer dissatisfaction or service quality and how SERVQUAL, FMEA, and QFD, when applied by the hospital, can achieve a high level of service quality. This study is designed to provide indispensable benefits to the following parties:

- The study provides suitable failure prevention and detection mechanisms for St. Paul's Hospital.
- This study contributes knowledge for researchers who want to undertake different studies about FMEA development.
- It provides further insight for other hospitals about service quality improvement through failure reduction.
- Furthermore, the study provides methods to reduce disease complications and the number of deaths for better patient satisfaction.

1.9 Organization of the document

The document has six chapters. The first chapter contains the problem statement, the objective of the study, the methodology followed, and the scope of the study. The second chapter covers a literature review about different service quality improvement tools related to SERVQUAL, FMEA, and QFD. The third chapter is about data collection and analysis. In this chapter, the data gathered from the case company was organized to identify the critical failures of the service and the causes of those failures. The critical failures are then

prioritized. Chapter five is about results and discussion, then the hospital service process will be redesigned, then recommendations using experimental judgment for those critical problems will be provided, and finally, chapter six is about conclusion and recommendation.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Service quality

In Anchal Gupta et al. (2018), "service" means all activities or benefits that one party can provide to another that are essentially indisputably valuable, and this has been identified as an important factor of competitiveness. High quality of service is an essential determinant of long-term profitability not only for service organizations but also for manufacturing organizations (Mirzaee Somayyeh et al. 2018). Attention to the quality of service can help an organization differentiate itself from other organizations and gain a lasting competitive advantage.

Service quality measures how well a company delivers its services compared to its consumers' expectations. Customers buy services according to their desires. They have criteria and expectations for how a company's service delivery meets their demands, whether consciously or unconsciously. A company with high service quality provides services that meet or surpass the expectations of its clients.

According to Cronin (2000), service quality is increasingly seen as the most important element in differentiating services. This has a positive impact on customer retention, word-of-mouth recommendations, staff migration rates, the cost of acquiring new customers, profitability and financial performance, customer satisfaction, and market share.

2.1.1 Customer-oriented service

According to numerous researchers, the service industry must listen to the voice of the customer to change the way services are delivered and improve the quality of those services (Coleman, 2015; Mengistu et al., 2017; Ramu and Anbalagan, 2017).

Habte Alemnew (2022) argues that to strengthen and expand on their customer relationships, businesses and organizations need an extra edge in today's fiercely competitive world. According to many clients, high-quality customer service can mean the difference between gaining and keeping consumers or losing them. Customer satisfaction and service quality research are crucial for retaining current customers and attracting new ones by identifying the characteristics customers regard as having the most value.

Customer orientation is crucial for assessing how customers view the business and how well its services are provided because of employee actions (Shams, 2015). According to Tazreen (2012), a company's commitment to customer satisfaction and service quality management

strategies are crucial for conducting market research and selecting the best course of action in the current marketplace.

Patients' opinions must start to be heard more when designing the systems for delivering healthcare services in developing nations, as patient perceptions of health services appear to have been mainly disregarded by healthcare providers in these nations (Syed Saad Andaleeb, 2001). Patient-based evaluations of medical treatment are gaining importance since there is growing interest in the quality of healthcare services and pressure to measure quality. Patients have a special viewpoint for assessing the non-technical facets of medical care.

Customers evaluate the quality of a service based on how well it satisfies their requirements and expectations (Parasuraman et al., 1985). To establish acceptable service standards, a customer-focused attitude thereby stresses understanding both expressed and latent client needs, wants, and preferences (Shostack, 1987).

According to a model of the antecedents of service quality created by Rust and Oliver in 1994, the service product, service environment, and service delivery all contribute to service quality. Their emphasis on the necessity of a client-driven service design process—one that includes user input, feedback, and engagement in creating service specifications—was crucial.

Similar to how Schneider and Bowen (1995) see customer orientation, it results in designs that are founded on a thorough grasp of the consumer rather than managerial assumptions and guesswork. They promoted using customer interviews, feedback channels, and observation of customer service interactions to obtain knowledge about customers.

- Customer involvement

There are various advantages to actively incorporating customers into service design. Customers can express their desired service characteristics, contribute to setting suitable quality standards, and pinpoint process failure points (Schembri, 2006). Customer input helps gauge changing needs and priorities over time (Belk et al., 2012). Ongoing dialogue and co-creation foster customer commitment, satisfaction, and loyalty (Lusch and Vargo, 2006).

Focus groups, consumer advisory boards, surveys, beta testing, and service prototyping are typical methods for customer-oriented design (Goldstein et al., 2002; Schneider and Bowen, 1995). Through online forums, crowdsourcing, and social media, technology enables new types of client interaction (Nambisan and Nambisan, 2008; Zhang et al., 2015).

- Service quality models

Customers' perceptions and expectations can be evaluated with the use of well-known service quality models as SERVQUAL (Parasuraman et al., 1988) and SERVPERF (Cronin and Taylor, 1992). These survey-based techniques show where there are service gaps that need to be filled. Customers are asked to rate the reliability, responsiveness, assurance, empathy, and tangibles of the services they receive. The resulting gap scores identify areas that need to be improved.

Some contend that these models lack the specificity needed to direct quality design for various service contexts (Buttle, 1996). Critical incident methodology and other qualitative methods elicit more thorough insights into the customer-defined service goals, ideal standards, failure points, and service qualities that have the biggest effects on perceptions of quality (Gremler, 2004).

2.1.2 Service quality in healthcare centers

According to the emerging literature on health care, patient satisfaction is a key issue that influences strategic choices made by health services (Gilbert, Lumpkin, & Dant, 1992). Thus, according to Donabedian (1988), patient happiness should be just as important to quality evaluations as it is to the planning and administration of healthcare systems. It is firmly held that patient happiness should be taken into consideration while designing services in underdeveloped nations. due to the connection between contentment and perceived service quality (Taylor & Cronin, 1994; McAlexander, Kaldenberg, & Koenig, 1994). The SERVQUAL Model, the Kano Model, and Quality Function Development (QFD) are just a few examples of the various customer-focused techniques that are currently available to develop the optimum service quality for the organization. In line with the most recent clinical recommendations and standards, quality healthcare is defined by Mosadeghrad (2011) as "consistently delighting the patient by providing efficacious, effective, and efficient healthcare services that meet the patient's needs and satisfy providers." clinical effectiveness using the existing resources.

Because of the recent rise in living standards, clients are paying closer attention to getting high-quality services. Patients are therefore becoming more aware of the standard of medical care in the field of medicine. Organizations can identify their competitive advantages and disadvantages and reduce resource waste by understanding the quality of their medical services (Wong A., Sohal A., 2003).

When patients receive excellent medical care, their trust in the hospital tends to grow, which helps foster the development of positive doctor-patient relationships. Therefore, it is crucial to precisely comprehend patients' requirements and expectations for medical services, as well as the discrepancy between those expectations and patients' perceptions of service quality, if we are to improve the standard of hospital care. (Ehsan Z., Abbas D., Roghayeh K., and Mohammad A., 2015).

Early in the 1980s, the idea of customer service excellence was first put forth. Christian Gronroos, a professor in Finland, developed the perceived service quality model in 1982 and established the idea of the customer's perceived service quality in 1984. According to his interpretation, service quality is a subjective concept that is based on comparing consumers' views of the service's actual quality with their expectations for it (i.e., expected service quality vs. perceived service quality). Midway through the 1980s, Parasuraman A., Valarie A. Zeithaml, and Leonard L. Berry (PZB) started looking into the variables that influence how customers judge the quality of the services they receive. The "service quality gap model" was introduced by the three of them in an article they co-wrote for the *Journal of Marketing* in 1985 titled "A conceptual model of service quality and its implication for future research." Originally, this model included ten dimensions, but it has been condensed to just five: dependability, responsiveness, certainty, and empathy.

Technical quality and functional quality are both considered by health service companies (Carman, 2000). Technical quality, or quality in healthcare services, is assessed by the accuracy of medical processes and diagnoses (JCAHO, 1987). On the other hand, functional quality relates to the way consumers receive health care (Bopp, 1990). Patients' expectations must be considered when providing healthcare services to ensure that medical procedures are effective from both the experts' (technical quality) and patients' (functional quality) points of view. As a result, it's critical to assess services both implicitly and overtly, considering consumer perspectives (Hamidi, 1998).

Due to their inherent high level of hazards, healthcare services occupy a special place among other services. Because of this, it is both more critical and challenging to conceptualize and measure customer satisfaction and service quality in a healthcare setting. Patients' opinions on the quality of the services they receive from healthcare providers have a significant impact on their decisions (Woodside et al., 1989). Quality is a key factor in patients' decisions about which hospitals to choose (Lynch and Schuler, 1990).

Hospitals have historically been a location of care where the public can receive complete medical care, both curative and preventive. Patient outcomes and patient satisfaction are the two indicators used in hospitals to gauge the quality of care. According to Kotler (2000), a person's level of satisfaction is determined by how well or poorly they feel about a product or service considering their expectations. According to Brennan (1995), patient satisfaction is the individual's assessment of how well the care they received complied with their expectations and preferences.

According to Tanner (2006), the inherent nature of the highly involved hazards gives healthcare services a special position among other services. This increases the significance and complexity of conceiving and assessing patient happiness and service quality in a healthcare context. According to Woodside et al. (1989), patients' opinions on the quality of the services they receive from healthcare providers have a significant impact on their decisions. According to Lynch and Schuler (1990), quality has become a key factor in patients' decisions about which hospitals to choose.

A patient's impressions of the quality of the medical care they receive are influenced by the functional quality that is generated. According to Gronroos (1984), this results from the patient comparing how they felt about their experience receiving medical care to their pre-experience expectations. Consequently, a medical care encounter is deemed to be of high quality in the eyes of the patient when it fulfills or surpasses their expectations (Lam, 1997). An organization's primary service, physical location, interactions with service providers, and other areas may all have an impact on how customers perceive the quality of its services.

In an environment that is becoming more competitive, service quality has become a key difference for healthcare organizations to draw in and keep patients. Higher perceived service quality is linked to improved patient satisfaction, compliance, and positive behavioral intentions, according to research (Andaleeb et al., 2007; Prakash, 2010). As a result, healthcare facilities are giving investments a higher priority in order to enhance their service offering. In order to gauge the quality of healthcare services, there are numerous proven models. The most prevalent one is SERVQUAL, which includes the five characteristics of tangibles, dependability, responsiveness, assurance, and empathy (Parasuraman et al., 1988). In studies, SERVQUAL has been modified to evaluate patient expectations and perceptions of service quality in a variety of healthcare settings, including hospitals (Prakash, 2010), clinics (Zarei et al., 2012), and dentistry services (Pakdil and Harwood, 2005), among others.

A version that only concentrates on performance perceptions rather than discrepancies between expectations and perceptions is the SERVPERF model (Mpiganjira, 2014).

New influences on service quality judgments in contemporary healthcare situations have been discovered by recent studies. Alghamdi (2014) emphasized the significance of office and building aesthetics. The availability of cutting-edge medical technology and equipment is also important (Duggirala et al., 2008). Numerous scholars have suggested that the important characteristics of privacy, communication, and interaction quality be included (Rao et al., 2006; Wu et al., 2017). There is a need for new measurement techniques to evaluate the quality of virtual care given the growth of telehealth services (Kruse et al., 2018). Additionally, for particular services like cancer treatment and specialist clinics, researchers are creating specialized service quality indexes (Iskandar et al., 2018). (Zamil et al., 2012).

Healthcare facilities must constantly analyze patient expectations and experiences to ensure high service quality. Service shortages can be found using techniques like mystery shopping (Trautman and Kim, 2007) and patient feedback/interviews. The implementation of focused quality improvement activities can then improve patient satisfaction.

2.1.3 A service failure in healthcare service

According to Spreng et al. (1995), the terms "service failure" and "problem that customers have in the health care service process" are interchangeable.

There has been a lot of research on enhancing the customer experience and client retention for service providers. The quantity and severity of problems consumers experience and the way the provider responds to these problems, however, have a significant impact on how well they perceive the quality of a service provider. It is to be expected that issues will arise because services are intrinsically changeable in how they are carried out (Hart et al., 1990).

The Technical Assistance Research Project (TARP) estimates that six times as many people hear about a bad customer service experience as a good one. Positive word of mouth has the potential to be a very effective technique for luring in new clients. The reputation and success of an organization's efforts to draw in new clients can be severely harmed by unfavorable word of mouth.

Customers react in one of two ways when a healthcare service fails them. They have the option to complain or not, and they offer the service provider the chance to address the issue as long as they either stay with or leave the service provider. If customers decide not to express their displeasure, they can either leave the service or stay if they choose not to

complain. In addition, they have the option of staying or leaving if they object. This is determined by the way the service provider manages the circumstances.

According to Gronroos (1990), service recovery processes are the actions taken by a corporation in response to a consumer complaint about a supposedly failed service. It includes every step taken to return an unhappy customer to a satisfied condition (Bell, 1994).

According to Holmlund and Kock (1996), firms are increasingly investing in service failure recovery efforts based on customer complaints. This is because customer service failure identification is a more crucial and effective failure identification strategy.

Dissatisfaction among patients is linked to higher mortality rates (Kennedy et al., 2014), making healthcare service failures, among other types of service failures, particularly serious because they frequently involve life-or-death circumstances.

In addition, research hasn't focused as much on patient dissatisfaction as it has on patient happiness. This could have been a result of the ongoing uncertainty surrounding the unidimensionality of both customer satisfaction and dissatisfaction. According to Oliver (1997), dissatisfaction is an overall effective reaction brought on by an inadequate return from the consumption process.

Service failure is a serious problem in healthcare that can have a detrimental effect on patient loyalty, satisfaction, and wellbeing. When a patient's requirements or expectations are not met by the healthcare delivery, there has been a failure of service (Ranjan et al., 2022). Long wait periods, incorrect diagnoses or treatments, subpar facilities, and a lack of staff empathy or communication are all common reasons for failure (McColl-Kennedy et al., 2011).

In a variety of healthcare contexts, the nature and effects of service failure have been extensively investigated. Failures in hospitals have a detrimental impact on patients' perceptions of the quality of care (Kang et al., 2014). Administrative and scheduling mistakes regularly result in unhappy patients at clinics (Guo et al., 2021). Even little mistakes like failing to make an appointment in a timely manner can make people reluctant to come back (Zhou et al., 2022).

Effects of service failure vary depending on the degree, type of fault, and who is to blame (Maguire et al., 2022; McCollough, 2009). When failures concern essential medical issues as opposed to ancillary services or processes, patients are more unsatisfied (Naidu, 2009).

Healthcare organizations can mitigate negative impacts through service recovery efforts like apologies, explanations and compensation (McColl-Kennedy et al., 2011).

Recent studies have concentrated on telemedicine service failure, which poses special difficulties for patient-provider interactions (Akter et al., 2020). During virtual care, tensions might arise fast due to technical issues and a lack of "online rapport." Studies highlight the significance of attentiveness and empathy while dealing with telehealth failures (Akter et al., 2020; Huang & Sun, 2022).

Overall, the phenomenon of service failure puts healthcare providers at risk for losing clients and losing their reputation for high-quality care. Better experiences and results can be obtained by funding projects for failure prevention and rehabilitation.

2.2 SERVQUAL, QFD and FMEA tools

2.2.1 SERVQUAL Model

The SERVQUAL scale was created by Parasuraman et al. in 1988 to assess how customers see service quality. The SERVQUAL scale is frequently used to assess discrepancies between expectations and perceptions of standards related to the quality of the service provided. Gaps are what these differences are called. According to Yussef et al. (1995) and Stevic et al. (2019), there are five main components of service quality: tangibility, reliability, responsiveness, assurance, and empathy.

Following extensive revisions, SERVQUAL eventually contained 22 items divided into five different sub-scales that matched the dimensions of the model for the perceived service quality difference. Since its creation, SERVQUAL has been utilized in a wide range of service industries, including higher education, fast food, healthcare, communications, and the financial sector. In the medical industry, SERVQUAL is also commonly utilized (Parasuraman A., Berry L., 1991).

Many academics have utilized SERVQUAL to assess the caliber of medical services. For instance, Teng et al. (1989) confirmed that SERVQUAL was valid and trustworthy in this population by using it to evaluate patients in surgical departments. Many academics in China have investigated how customers view the caliber of the services they receive. The SERVQUAL evaluation system was introduced to the Chinese medical industry by Niu Hongli in 2004. They developed an index system for a medical service quality evaluation scale based on SERVQUAL and researched the most effective way to read the scale. Numerous studies discuss the use of SERVQUAL in the assessment of the caliber of medical

services. Yang Jia et al. (2006) surveyed 216 outpatients in a Beijing hospital and discovered a significant overall service quality gap by dimension: the tangibility of services.

Five service quality dimensions are included in the SERVQUAL model developed by Parasuraman et al. in 1988.

- Tangibles are the outward manifestations of physical infrastructure, machinery, staff, and communication tools (Abdissa, 2019). According to Gupta and R. Srivastava (2012), the SERVQUAL model's tangibility dimension for the service industry is extensively used to compare client expectations and perceptions.
- Reliability: The reliability component of service quality relates to the service sector's need to process products accurately and dependably; this statistic shows the strength of the service organization (Bonar & Sacchi, 2011). The primary factor used to gauge how satisfied customers are with a company's level of service is reliability (Abdissa, 2019).
- According to DM Sheaba and Sekata Kenea (2017), "responsiveness" is the ability to provide prompt service and the willingness to assist customers. As a result, it is a dimension that considers their needs, concerns, and demands.
- Assurance: This refers to an organization's employees' capacity to foster belief and confidence in the business through their awareness and attention. It combines questions that were originally intended to assess competence, civility, credibility, and security (Abiyot and Gemechu, 2016).
- Empathy is one of the service quality dimensions because it modifies how attention is given to the customer, helps with communication, takes the consumer into account, and gives individualized attention to the secure ideas of its clients (Abiyot and Gemechu, 2016).

One of the most popular tools for evaluating and improving service quality in healthcare settings, including hospitals, is the SERVQUAL model (Butt and de Run, 2010; Zarei et al., 2012). Five essential aspects of quality are captured by SERVQUAL: dependability, assurance, tangibles, empathy, and responsiveness. By surveying patients' expectations and perceptions, hospitals can identify gaps and target areas for service improvement (Carrillat et al., 2007). SERVQUAL has been used in numerous studies to comprehend patient viewpoints and lower service failures in hospitals. Taner and Antony (2006) used SERVQUAL to identify the main areas of patient satisfaction at a Turkish hospital that were lacking:

responsiveness and reliability. Focus groups and process mapping were then conducted to redesign admission and discharge processes to enhance responsiveness. Similarly, Arasli et al. (2008) employed SERVQUAL to diagnose problems in a Cyprus hospital before implementing management changes to improve tangible aspects like facility cleanliness and layout.

According to research, poor service, particularly during admissions, meals, cleanliness, and discharge, has a detrimental impact on SERVQUAL ratings (Zarei et al., 2012). Therefore, a number of authors have advised hospitals to proactively assess patient expectations, pinpoint potential failure points, and adopt unique service quality initiatives (Padma et al., 2010; Butt and de Run, 2010). The designing and delivery of services with a failure reduction focus can be driven by this customer-focused strategy based on SERVQUAL data.

But SERVQUAL does not fully capture all service quality elements in contemporary healthcare (Duggirala et al., 2008). Some researchers have developed or modified models to take into account elements like humanity, discretion, communication, and clinical excellence (Rao et al., 2006; Zamil et al., 2012). Despite its flaws, SERVQUAL is still one of the best models for utilizing patient perspectives to identify service problems and enhance customer-focused service delivery in hospitals.

2.3 QFD

In Japan, Quality Function Deployment (QFD) was developed more than 20 years ago as a quality system centered on providing customers with satisfied goods and services. The "voice" of the customer must be heard throughout the development of the product or service if the value is to be delivered to customers effectively. In Japan, the late Dr. Shigeru Mizuno, Dr. Yoji Akao, and other quality professionals created the QFD tools and procedures and arranged them into a thorough system to guarantee quality and client satisfaction in new goods and services. Akao and Mizuno (1993)

Ohfuji, Noda, and Ogino's early applications of QFD in Japanese service organizations were for a shopping center, a sports complex, and a variety of retail stores in 1981 (Akao, 1990). In more recent times, Kaneko has integrated QFD, reliability, and quality circle activities in hotels, malls, and medical facilities.

Eliminating service issues might be compared to meeting expected requirements as a result. When nothing goes wrong, there is no reason for satisfaction or a competitive advantage. On the other hand, by identifying and delivering on exciting requirements before the competition,

substantial value can be obtained. According to Novi, Michigan, in 1993, QFD identifies possibilities to create enthusiasm and ensures that expected standards don't slip through the cracks.

Customer requirements are considered by QFD, which then converts them into specifications for engineering and service methods. By shortening the lead time for design and offering improved services, QFD seeks to satisfy client needs (Chen, 2016). For service design in hospitals, QFD has various applications.

To streamline processes and cut costs, Chaplin and Terninko (2000) developed customer-driven healthcare. Yaprakli and Güzel (2010) employed QFD to enhance two privately operated medical clinics in Erzurum, Turkey, and compared the outcomes of these two clinics with those of the clinic with the largest market share in the same area.

To meet customer requirements (CRs) and increase customer satisfaction, quality function deployment (QFD) is one of the most popular client-driven design and development methodologies. Deploying a quality function enables a business to address quality issues proactively rather than reacting to complaints from customers. Deploying quality functions also causes an organizational change, moving quality from being inspected into the service to being designed into the service; hence, QFD can be thought of as "designed-in quality" rather than "traditional inspected-in quality."

The findings of a perceived quality survey could be linked to complaints thanks to the QFD approach. Additionally, it helped identify the characteristics that had the biggest impact on patient satisfaction as well as pinpoint areas that might use development based on client demands (Lorenzo S1, Mira J, Olarte M, Guerrero J, Moyano S, 2004).

As the relevance of health issues has become more widely recognized, the community and related government entities have given the hospital's services substantial consideration. A nation's progress and prosperity are reflected in the population's level of health. As one of the service sectors involved in health, a hospital's service quality is something that customers should seriously consider.

Patients are the consumers in this scenario, and they are critical enough to judge the caliber of hospital services (N. Cross, 1988). The Quality Function Deployment (QFD) matrix method is one strategy that can assist hospital managers and executives in creating strategies for enhancing their service characteristics in line with patient preferences. In this study, patients

are considered to be the hospital's customers, and QFD will convert what they require into what the hospital ought to create. Hospitals can use QFD to prioritize patient requirements, discover creative solutions to meet those needs, and enhance workflows for maximum efficiency (L. Cohen, 1995).

QFD has been utilized to include marketing, engineering design, production, and other pertinent organizational tasks in technical design requirements. Quality Function Deployment (QFD) was formed with the House of Quality (HOQ) Matrix to translate consumer needs into the company's technical language (Shun H. C. 2014).

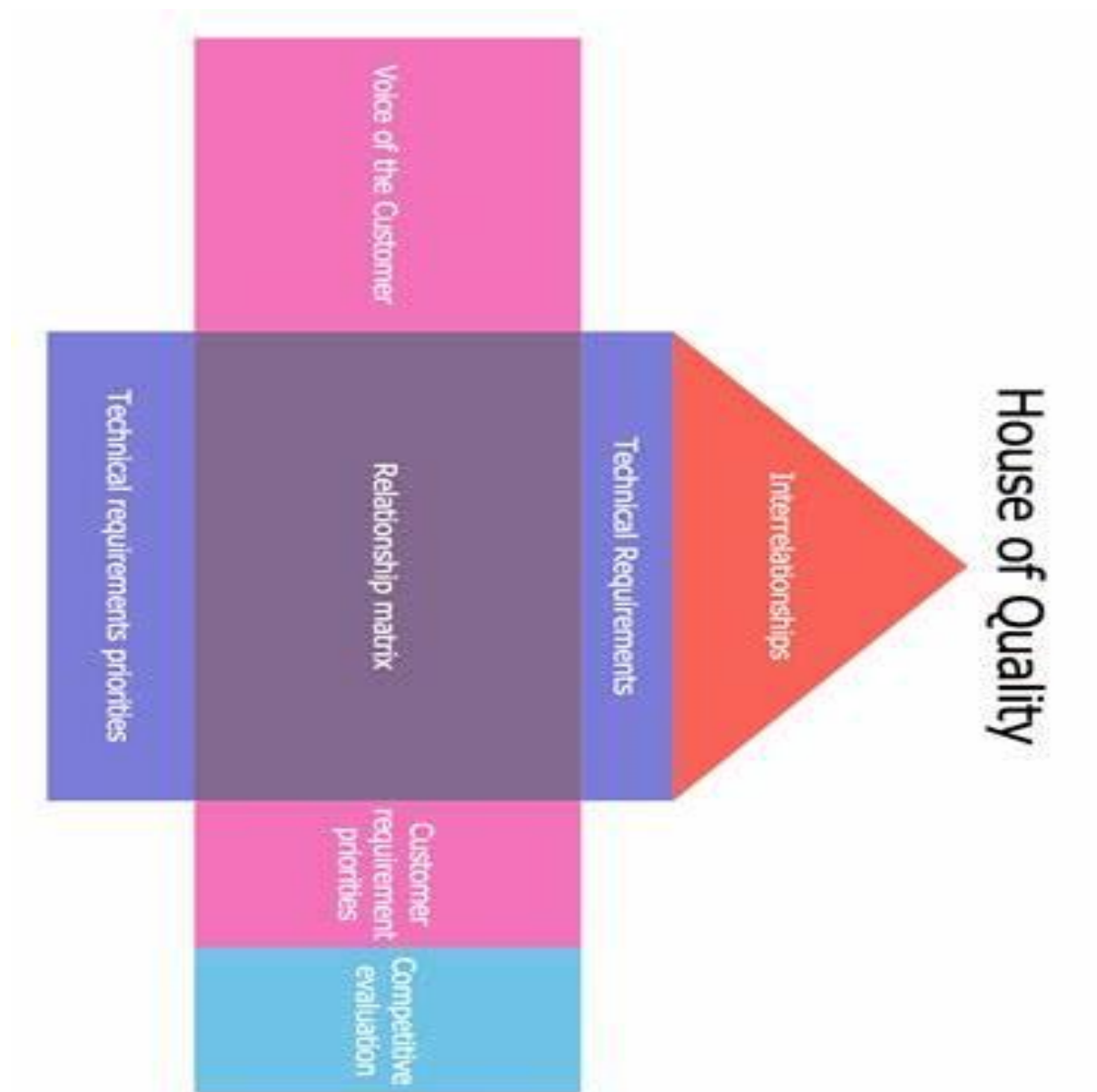


Figure 2.1 House of Quality (translating the service quality gaps into strategy formulation, Tetrakis et al., 2012)

According to Muda and Mat Roji (2015), the QFD technique initially enhances internal quality by fusing consumer feedback with specific products or services, technical specifications, the process of planning control, and manufacturing operations. A separate set of the matrix is included in the QFD implementation. The first one is referred to as the "House of Quality," which is utilized to support the adoption of QFD but is ineffective in implementing HOQ's assistance in converting client requirements into technical design specifications. According to Erdil and Arani (2018), HOQ regulates the customer's voice and indicates the proper path to construct QFD, making it the main component of QFD implementation. The gaps that serve as a factor in service quality can be identified by QFD. According to Apornak (2017), QFD is a tool that gathers data on client wants and incorporates anticipated features into the finished product.

According to Mazur (2014), QFD is the best way to achieve customer satisfaction and can be used to improve the quality of both new and existing products and services. A strong team is required for the implementation of QFD since it requires extensive and effective communication among goals. QFD is a procedure that facilitates communication between management and the team when working on a project so that a new product or service or an updated version of an existing product's workflow can be easily understood (Apornak, A2017). The QFD application has three main objectives: prioritizing client desires, whether they are explicit or implicit; translating customer demand into operational features; and providing all departments with affordable access to high-quality goods and services. its manly attention to customer satisfaction. (Baran & Yldz, 2015). In general, QFD is a common tool in service and product quality improvement that aids in the development of product and service design regarding customer needs and is applied to new and existing products and services to improve quality.

A methodical strategy for incorporating customer wants into the design of goods and services is called Quality Function Deployment (QFD) (Akao, 2004). Higher satisfaction can be achieved in the healthcare industry by using QFD to better match service offers to patient needs and preferences (AL-Bashir & Ahmad, 2019). QFD has been used in numerous research to improve services and decrease failures in the healthcare industry. At a hospital in Turkey, Taner et al. (2007) employed patient surveys and QFD analysis to pinpoint significant service failures such lengthy wait times and insufficient directional signage. This directed activities like better signage placement and appointment scheduling, decreasing

patient annoyance. In order to improve the outpatient service designs at an Indian hospital, Vats et al. (2012) applied QFD.

Additionally, QFD has been modified expressly for healthcare failure avoidance. Malhotra (2019), for instance, suggested combining failure mode and effect analysis (FMEA) with quality function decomposition (QFD) to proactively assess patient demands, identify probable failure modes, assess risks, and execute service adjustments aimed at failure reduction. By making proactive enhancements to the service design process, this integrated QFD-FMEA strategy hopes to increase patient satisfaction. However, difficulties with quantifying subjective customer demands, a lack of doctor involvement, and resistance to service changes are obstacles to QFD application in healthcare (Carman, 2000). Some writers claim that maintaining patient-focused services with few failures requires continual QFD application (Vats et al. 2012). In general, QFD continues to be an effective paradigm for enabling patient-centered service quality design and failure reduction in the healthcare industry.

2.4 FMEA

FMEA is an important technique that is employed in this study to analyze service process failures. FMEA is a technique for reliability analysis that helps find failures with significant effects on system performance (Stamatis, 2003). Ford Motor Company adopted and pushed FMEA after NASA originally put forth the idea in 1963 (Chang et al., 1999). It emphasizes defect prevention, safety improvement, and customer happiness augmentation (McDermott et al., 2008).

According to Raheja and Gullo (2012), FMEA can be used to evaluate failure modes and reduce the impact of certain failure modes by implementing corrective measures in a system. In practice, researchers frequently utilize FMEA for risk assessments. FMEA is used to reduce potential risks in the service system; as a result, it can be utilized to improve the quality of services offered. FMEA is utilized throughout the design phase to prevent failures in the future. Later, both before and during the process' continuous operation, it is used for process control. FMEA should ideally start in the very beginning phases of conceptual design and continue through the life of the good or service.

Development is the process of taking steps, beginning with the most urgent ones, to avoid, lessen, or eliminate failures. The risk priority number (RPN), which is the result of the

occurrence (O), severity (S), and detection (D) of a failure, is used by FMEA to establish the risk priorities of failure modes. (RPN = O S D).

FMEA (Failure Modes and Effects Investigation) is a tool for doing an organized, proactive investigation of a process where harm may result. To determine when, how, and to what degree the system might fail, an FMEA team composed of representatives from every aspect of the process under review meets. Following that, team members with the necessary knowledge collaborate to come up with improvements to stop failures, especially failures that are likely to happen or would seriously injure patients or staff. <https://www.bing.com/ck/a>

Process FMEA												
Item Name:		FMEA Team:		Prepared by:		FMEA Date (Orig):		Revision #:				
Process Step or Variable or Key Input	Potential Failure Mode	Potential Effect on Customer Because of Defect	Severity	Potential Causes	Occurrence	Current Process Controls	Detection	RPN	Actions Recommended	Resp. & Target Date	Actions Taken	Current RPN
What is the process step?	In what ways can the Process Step, Variable, or Key Input go wrong? (chance of not meeting requirements)	What is the impact on the Key Output Variables (customer requirements) or internal requirements?	How Severe is effect to the customer?	What causes the Key Input to go wrong? (How could the failure mode occur?)	How frequent is cause likely to occur?	What are the existing controls that either prevent the failure mode from occurring or detect it should it occur?	How likely is Detection of cause?	Risk Priority # to new cause controls	What are the actions for reducing the Occurrence of the cause, or improving Detection? Should have actions on high RPN's or Severity of 9 or 10.	Who's Responsible for the recommended action? What date?	What were the actions implemented? Include completion month/year. (Then recalculate resulting RPN.)	Future Severity Future Occurrence Future Detection
												8 2 4 64

Figure 2.2 FMEA analysis tabl.

A systematic technique called Failure Mode and Effects Analysis (FMEA) is used to assess the effects of anticipated failures in processes or services (Stamatis, 2003). FMEA can help healthcare facilities prevent service failures by identifying where and how they might happen (Arfeen et al., 2016). FMEA has been utilized in numerous studies to reduce customer-focused service failure rates in hospitals. In order to evaluate outpatient chemotherapy treatments, Taner et al. (2007) used FMEA to identify failures such medication errors and create an action plan to reduce risks. FMEA was applied to assess the discharge process by Sinha et al. (2019), exposing flaws such insufficient patient education. Readmission rates were lowered via targeted modifications.

Some academics have suggested combining FMEA with instruments like Quality Function Deployment (QFD) that systematically gather voice of the customer data in order to incorporate patient opinions into it (Malhotra, 2019). With the help of patient feedback, the FMEA-QFD methodology develops service quality standards and failure mechanisms. FMEA then evaluates and ranks failures, directing service redesign that is concentrated on high-risk, negatively affecting customers failures. However, difficulties with quantifying failure risks, time-consuming processes, and organizational opposition provide hurdles to the application of FMEA (Shebl et al., 2012). However, using data and customer requirements, FMEA offers a disciplined approach to identifying and reducing service failure modes in healthcare. For proactive quality improvement to increase customer satisfaction, ongoing FMEA analysis can be used.

2.4 Integrated service quality improvement tools

In addition to this research, the SERVQUAL scale and QFD have been integrated using fuzzy logic to improve service quality. Aneesh et al. (2014) incorporated fuzzy-weighted SERVQUAL and QFD in one of these experiments to raise the service quality at an auto repair shop. Cho et al. (2016) employed SERVQUAL and fuzzy QFD to raise the quality of service provided by two electronics businesses' service centers.

A thorough customer complaint management system built on QFD and FMEA was proposed by Bosch and Enriquez (2005). In a different study, Almannai et al. (2008) suggested a decision support tool based on QFD and FMEA for the selection of manufacturing automation technologies. studies that combine QFD with FMEA.

In 2019, Mahdad Pourmadadkar and Mohammad Ali Beheshtinia conducted research on risk assessment to improve service quality and risk assessment in coronary artery bypass grafting. The methodology was created in a fuzzy environment to reflect the ambiguity and uncertainty of human resource availability. According to the study, failure modes were discovered and given priority, and corrective measures were developed, with their effects on the failure modes being ranked. 2019 (Beheshtin) Cardiovascular disease (CVD) can be treated using CABG. First, using two MCDM methodologies termed analytic hierarchy process (AHP) and TOPSIS, the disturbance in the CABG process is recognized and prioritized by FMEA guidelines. As a result, the number of corrective activities is determined and weighted according to QFD. Finally, a mathematical model is developed to determine the most cost-effective implementation tasks.

For service design in hospitals, Priyono and Yulita (2017) merged the servqual, QFD, and Kano models. Kaya (2014) used an integrated service-quality scale and a QFD to assess service quality at a hospital in Turkey. Lim et al. (1999) implemented servqual and QFD performance measurement in Singapore and used the empirical findings as input for QFD in the process of creating services for hospitals based on consumer expectations. Servqual was used by Sahney et al. (2004) to determine the gap between customer expectations and their impression of the actual service received. The QFD technique is then used to discover the minimum set of design characteristics and quality components that meet the students' requirements. This study does not take into account potential failures during service delivery.

In a study done in Pakistan to enhance the resilience of the health care sector to combat COVID-19 pandemic, a new fuzzy and QFD approach was used for evaluating the strategies, and finally it was concluded that leadership and governance capacity were the most important RAs, whereas building the operational capacity of the management resilience was the most basic, and education and strengthening laboratories and diagnostic systems were considered to be the top three RSs, respectively (Feroz Khan et al., 2021).

As Hadi Akberzade Khorshidi et al. (2015) stated in the study of the application of statistical process control on service quality using SERVQUAL and QFD with a case study in trains, reliability is the most important dimension in the internal service of trains for the passenger, and without it, the service process is not capable of performing at an acceptable level.

In a study conducted by Mohammed Pourmadadkar and Mohammed Ali Beheskitinia in 2019 around Iran, intending to link the two concepts of risk assessment and quality enhancement to health care services based on FMEA, MCDM, QFD, and a mathematical model considering a limited amount of budget, a sensitivity analysis on the mathematical model's objectives function indicated that using 30% of the total budget is enough to cover more than 70% of the effects of corrective activities on the failure models.

In a study in Turkey on a real-life case study for evaluation of service quality using the SERVQUAL scale and machine learning algorithm in health care, the details were collected and the mean score for items was calculated, which finally made explicit that the proposed model insinuates a remarkably high service gap in public hospitals regarding the general physical condition and food service by prioritizing the lower mean score and higher impacts (Serkan Altuntas et al., 2021).

In Brazil (Fabriane L. Lizarelli et al., 2021) has done a study on the integration of SERVQUAL, A-kano, and QFD using a fuzzy approach to support the improvement of decisions in an entrepreneurial education service; there were four main phases that the framework accompanies: identification of quality attributes and service processes using A-kano and SERVQUAL; integration of these two quality tools using a fuzzy interference system; integration of the two tools' output and QFD matrix using a 2-tuple fuzzy linguistic representation; and identification of improvement projects to address the opportunity identified in the phase.

According to the study by Fatemeh Shaker et al. (2018), a two-phased QFD technique should be used. The study attempts to merge an FMEA with QFD, with the first phase of QFD prioritizing failure modes based on failure consequences and the second phase prioritizing failure causes based on failure modes. According to the study's findings, the proposed approach can affect and modify the risk priority number in FMEA by taking into account the links among failure effects, failure mode, and failure effects. The identification of failure modes, failure effects, and failure causes does not engage customers, despite the study's attempts to improve FMEA by integrating with QFD; this lessens the analysis's usefulness by ignoring customer perception.

To quantify and evaluate risk, FMEA and QFD techniques were used by Priya Harikumar and P. G. Saleeshya (2018). Critical risk agents that generate risk events in the hospital were discovered using these strategies. Mitigation plans were created using the advice of experts. This study's shortcoming is that while assessing risk indicators, only employees' perceptions—not customers' perceptions—were taken into account. To increase customer satisfaction, Payesh (2010) incorporated FMEA and QFD to raise the caliber of healthcare services and initiatives. Additionally, this study does not take into account customer failures.

To improve the quality of services provided by Turkey's public hospitals, Sekan Altuntas (2019) integrates SERVQUAL, QFD, and FMEA approaches. The integrated technique based on SERVQUAL, QFD, and FMEA is used for the first time in this study to improve service quality. For this study, the servqual scale, QFD, and FMEA are all utilized to quantify the level of service quality, plan for potential service delivery failures, and design the service. As a drawback, the research does not create a preventative and corrective strategy for the failures that are given priority.

In addition to this research, the SERVQUAL scale and QFD have also been integrated using fuzzy logic to improve service quality. Aneesh et al. (2014) used fuzzy-weighted SERVQUAL and QFD in one of these studies to enhance the service quality of an auto repair shop. To raise the quality of service provided by two electronics businesses' service centers, Cho et al. (2016) used SERVQUAL and fuzzy QFD.

A thorough system for managing customer complaints was presented by Bosch and Enriquez (2005) and was based on QFD and FMEA. For the selection of manufacturing automation technologies, Almannai et al. (2008) developed a decision support tool based on QFD and FMEA in a different study. studies that combine FMEA with QFD.

In 2019, Mahdad Pourmadadkar and Mohammad Ali Beheshtinia conducted research on risk assessment to improve service quality and risk assessment in coronary artery bypass grafting. The methodology was created in a fuzzy environment to reflect the ambiguity and uncertainty of human resource availability. According to the study, failure modes were discovered and given priority, and corrective measures were developed, with their effects on the failure modes being ranked. 2019 (Beheshtinia). Cardiovascular disease (CVD) can be treated using CABG. First, using two MCDM methodologies termed analytic hierarchy process (AHP) and TOPSIS, the disturbance in the CABG process is recognized and prioritized by FMEA guidelines. As a result, the number of corrective activities is determined and weighted according to QFD. Finally, a mathematical model is established to determine the most cost-effective activities for implementation.

For service design in hospitals, Priyono and Yulita (2017) merged the servqual, QFD, and Kano models. Kaya (2014) combined the Servequal Scale and QFD to assess the level of service quality in Turkish hospitals. To create services for hospitals based on patient expectations, Lim et al. (1999) implemented servqual and QFD performance measurements in Singapore and used the empirical findings as input for QFD. To determine the discrepancy between client expectations and perceptions of the actual service obtained, Sahney et al. (2004) used servqual. Next, the minimum design characteristics and quality components that satisfy the students' requirements are found using the QFD technique. The potential problems that could occur during service delivery are not taken into account in this study.

A two-phased QFD is suggested in the study by Fatemeh Shaker et al. (2018). In the first phase of the study's QFD, failure modes are ranked based on failure consequences, and in the second phase, failure causes are prioritized based on failure modes. The study's findings

suggest that the proposed method, which takes into account the links among failure causes, failure modes, and failure effects, can affect and modify the risk priority number in FMEA. Even though the study seeks to enhance FMEA by integrating with QFD, the identification of failure modes, failure effects, and failure causes doesn't engage customers, which lessens the analysis's usefulness by removing their perception.

To quantify and evaluate risk, FMEA and QFD techniques were used by Priya Harikumar and P. G. Saleeshya (2018). Critical risk agents that generate risk events in the hospital were discovered using these strategies. Mitigation plans were created using the advice of experts. This study's shortcoming is that while assessing risk indicators, only employees' perceptions—not customers' perceptions—were taken into account. To increase customer satisfaction, Payesh (2010) incorporated FMEA and QFD to raise the caliber of healthcare services and initiatives. Additionally, this study does not take into account customer failures.

To raise the level of service in Turkey's public hospitals, Sekan Altuntas (2019) integrates SERVQUAL, QFD, and FMEA approaches. This study is the first to apply an integrated methodology based on SERVQUAL, QFD, and FMEA to service quality improvement. In this study, service quality is measured using the servqual scale, service design is done using QFD, and potential service delivery failures are avoided by using FMEA. This research's limitation is that it doesn't create a proactive and corrective plan for the failures that are given priority.

Healthcare businesses to satisfy patients and prevent failures, constant and high-quality service delivery is essential. Integrating several quality improvement technologies can make it possible to take a methodical, customer-focused approach to improving services and lowering failure rates. In order to improve healthcare services, a number of studies have suggested integrated models that include instruments like SERVQUAL, QFD, and FMEA. While QFD converts patient demands into technological requirements, SERVQUAL analyzes the discrepancy between patient expectations and perceptions to pinpoint issue areas (Punnakitikashem et al., 2013). Then, using FMEA, probable failure modes are assessed, providing mitigation depending on impact on customers and severity.

The systematic linking of patient demands to service delivery procedures and risk analysis for failure reduction is made possible by an integrated SERVQUAL-QFD-FMEA framework (Malhotra, 2019). Through SERVQUAL surveys, this strategy initially gathers information

about the voice of the consumer. Then, using QFD, needs are transformed into potential failure modes and technical requirements.

Finally, FMEA aids in evaluating and addressing high severity failures from the viewpoint of the patient (Taner et al., 2007). Other integration strategies include integrating QFD with process flowchart analysis and SERVQUAL with process mapping and gap closure (Samaranayake & Kiridena, 2015). (Vats et al., 2012). Joint applications provide for a more reliable way to identify problems, diagnose problems, and enhance services aimed towards failings. However, obstacles exist, such as resource requirements for maintaining linked frameworks and implementation complexity (Malhotra, 2019). But an integrated paradigm that puts the interests of the patient first can enable proactive and organized service quality improvement to lower failure rates.

2.5 Literature Summary and Gap

Researchers have employed a variety of strategies to increase service quality. Some studies for improving service quality have combined SERVQUAL and QFD, QFD and FMEA, and in one publication, all three of the aforementioned methods. The deficiencies have been detected, as stated in the review section, after everything has been evaluated. To sum up, this study aims to fill a gap found in the studies previously discussed.

- The potential for failure Identification is solely from the viewpoint of the design team or employees, excluding the key stakeholders, who are the clients.
- The action plan necessary to decrease or prevent those failures is not established after design and failure identification based on the customer's perception.
- To fill in such gaps, this research assesses the service process, suggests a service design based on customer requirements, detects failures that result in customer dissatisfaction, prioritizes those failures, and creates a plan for their correction and prevention. Professional validation will be utilized to determine whether the suggested approach is effective or not.

CHAPTER THREE

3 RESEARCH METODOLOGY

3.1 Research design

This research has a specific problem that it is intended to solve. In order to solve the problem first, there should be enough background information and data about the current service quality process of the company, so to do that, exploratory research is used.

The study aims to indicate that, in order to improve the service quality of organizations, failures in the service process should be reduced. So while trying to identify the critical failures and their root causes, customers' perceptions and failure identification about the service process have to be considered. By using an explanatory research design, the study can establish the existing service process of the hospital and the existing failure identification and failure detection mechanisms of the hospital.

The proposed approach has to solve the addressed problem in the case company to check its applicability, so the study will also use applied research. In order to improve the quality of service at St. Paul's Hospital, both primary and secondary data are collected. The study uses combined methods of data gathering, which are both numerical and qualitative. as the research uses an explanatory research design, which enables the collection of extensive information.

The research follows different data collection and data analysis techniques, collecting data from various sources such as patients, medical doctors and nurses, pharmacists, laboratory technicians, quality officers, etc. and then analyzing the data using the three tools SERVQUAL, QFD, and FMEA.

3.2 Data type

The research uses different data types in order to improve the service process at the hospital; it includes quantitative and qualitative data types. This data includes information about patients' expectations about the service process before they receive service from the hospital, patients' perceptions about the service process after they get treatment from the hospital, failure criticality analysis, existing quality improvement techniques, existing failure prevention mechanisms, and technical requirements.

3.3 Data source

The above-stated data types are collected from different data sources. Patients are the major data sources because the first research question, "What are the significant customer-oriented

failures and their causes in the hospitals' service delivery?" is answered by data collected from patients. Other sources of data for this research are medical staff, quality control office staff, hospital documented files, hospital administrative staff, and related research on the hospitals' service improvement process.

3.4 Primary data collection

Primary data collection from the hospital about the current patient service status will be a major primary data collection method to identify whether patients are satisfied or not with the service given in the hospital. Mainly, the research will be done by collecting data using three data collection methods: interview, direct observation, and questioning.

A questionnaire and interview will be conducted in both departments, wards, and with OPD patients in order to gather what patients expect from the hospital's OPD and ward services.

To construct the SERVQUAL model in order to determine customer-oriented failures by analyzing the gap between patients' expectations and patients' perceptions after getting service from the selected departments, the following data are collected:

- Patients' requirements and expectations in each service phase of the selected departments
- Patients' perceptions about current hospitals' service delivery status and
- service attributes that make them dissatisfied.

to construct QFD in order to determine the service characteristics necessary to meet the service requirement as well as the importance of these requirements.

A questionnaire and direct interview will be conducted again with patients in order to:

- Define patients' needs and requirements.
- Determine the weights of patients' needs.

And also again, formal and informal communication and questionnaires with medical staff to get data about the criticality of problems, their effects, the causes of those problems, and documental data about the patient's history will be collected.

Contacting managerial staff to obtain information about existing failure prevention and detection plans or actions will also be done. These types of data are essential for failure mode and effect analysis and would serve as input during planning processes for preventive action plan preparation.

While collecting data using questionnaires, both types of questionnaires are used: qualitative, quantitative, and closed-ended and open-ended questions.

3.5 Secondary data

Data collected previously by other researchers and studies done on Paulos Hospital's service delivery process will be used as a secondary data source. Other secondary data sources will be related literature reviews. Hospitals' recorded files and documents are also used as another source of secondary data. It will be assessed to gather information about service quality improvement tools.

3.6 Sampling

Participants in the research process are chosen using a purposive sampling technique in general. This study used the selected sampling technique depending on the research question's objective and scope to improve the service quality of the hospital. Full information can be collected from the selected specific participants, such as patients, especially in OPD and wards, medical doctors and nurses in OPD and wards, laboratorists, quality officers, etc. Purposive sampling is used. Population refers to a complete set of individuals having common characteristics in which the researcher is interested. In selecting the research subjects, both purposive and stratified random sampling methods will be used. A simple random sampling (every unit in the data has an equal chance of being selected in the sample) is used.

The target big data group consisted of all medical staff and patients in the hospital, but some participants were selected who had a direct relationship with the scope and objective of the research. Purposive sampling will be employed to purposefully select the case company. Stratified random sampling (the big data is divided into subgroups, and a random sample is taken from each subgroup) will be applied to determine the desired sample size. Depending on the available resources, the sample size should be adjusted accordingly. Purposive sampling will also be used to select the staff with the desired experience and representativeness that fulfill the minimum criteria (at least one year of service) for the study. Among a total of 885 employees in the hospital, 575 have a direct relationship with the research purpose. And on average per day, the hospital serves 1000–1500 patients, but specifically in OPD and wards, it's 800 on average per day. The research is going to collect data from interviews for 5 days and distribute questioners for 5 days, for a total of 10 days.

Sample size for employees

$$\text{Sample size } (n) = n = \left[z^2 * p * \frac{(1 - p)}{e^2} \right] / \left[1 + (z^2 * p * (1 - p) / (e^2 * N)) \right]$$

Where: $z = 1.645$ for a confidence level (α) of 90%

$p = \text{proportion (expressed as a decimal)}$

$N = \text{population size}$

$e = \text{margin of error.}$

$$z = 1.645$$

$$p = 0.5$$

$$N = 575$$

$$e = 0.07$$

Since, the following justifies using a 7 percent margin of error ($e=0.07$), z-score of 1.645 at a 90 percent confidence level ($=0.90$), and customer-oriented failure reduction as the method for designing service quality in St. Pualos hospital:

- According to norms and previous research, studies of the quality of healthcare services can still be conducted with a good degree of precision ($e=0.07$) (Mosadeghrad, 2014; Rana et al., 2015).
- The z-score of 1.645 indicates a two-tailed normal distribution with a 90% degree of confidence. In literature on healthcare service quality, a 90% confidence level ($=0.90$) is frequently used for surveys and questionnaires (Dhatt et al., 2011; Zamil et al., 2012).
- This means that, 90% of the time, the survey/study results should accurately reflect the genuine population mean with a $\pm 7\%$ error range (Singh et al., 2017).
- Compared to higher 95 percent or 99 percent levels, the 90 percent confidence level offers a balance between accuracy and affordability for exploratory studies on service quality (Rana et al., 2015).
- The 90 percent confidence level and 7 percent error margins were also chosen in previous hospital service quality studies, and they were determined to be enough for

accurately evaluating aspects like empathy, assurance, responsiveness, etc (Zarei et al., 2012).

Therefore, an error margin of 7% and a z-score of 1.645 corresponding to a 90% confidence level are reasonable choices for customer-oriented service failure reduction investigations in healthcare hospitals based on conventions, literature precedent, cost-effectiveness, and measurement reliability considerations for service quality research.

$$n = [1.6452 * 0.5 * (1 - 0.5) / 0.072] / [1 + (1.6452 * 0.5 * (1 - 0.5) / (0.072 * 575))]$$

$$n = 138.0625 / 1.2401$$

$$n = 111.331$$

$$n \approx 112$$

Sample size for patients

The sample size (n) is calculated according to the formula: n

$$= \frac{[z^2 * p * (1 - p)]}{e^2} \left[1 + \left(z^2 * p * \frac{(1 - p)}{e^2 * N} \right) \right]$$

Where: z = 1.645 for a confidence level (α) of 90%

p = proportion (expressed as a decimal)

N = population size

e = margin of error.

$$z = 1.645$$

$$p = 0.5$$

$$N = 800$$

$$e = 0.07$$

$$n = [1.6452 * 0.5 * (1 - 0.5) / 0.072] / [1 + (1.6452 * 0.5 * (1 - 0.5) / (0.072 * 800))]$$

$$n = 138.0625 / 1.1726$$

$$= 117.743, n \approx 118$$

Summery

Table 3.1 Data summary

No.	Data	Data type	From where its collected	How will it be collected
1	Patient requirement	Both qualitative and quantitative	Patients	Questioner and interview
2	Patients satisfaction level by the service	Quantitative	Patients	Questioner
3	Data about criticality of the failure, its cause and effect	Qualitative	Doctors and nurses	Documented file, interview
4	existing taken failure prevention and detection plans or actions	Qualitative and quantitative	Quality control management stuff	Documented file and interview
5	Major problems in the hospital service delivery	Qualitative and quantitative	Previous related researches in St, Paulos hospital	Internet exploring
6	Technical requirements	Qualitative and quantitative	Hospital's Medical and administrative stuff	Interview

3.7 Data analysis

The data collected from both primary and secondary data collection methods will be organized and analyzed as follows:

- ✓ The weights of patients' needs are determined from SERVQUAL scale scores.
- ✓ Data collected by the questioner from patients about their expectations and their perceptions about the service process is analyzed using the SERVQUAL model in order to measure the service process of the selected departments and to identify gaps (to know customer-oriented failures in the service).

- ✓ Based on the gap between customers' expectations and perceptions in the SERVQUAL model, customer-oriented failures are identified, which are used in the FMEA analysis.
- ✓ The weights of patients' needs are used in HOQ preparation.
- ✓ Hospital service will be redesigned using the QFD technique.
- ✓ In order to analyze the data using FMEA, the risk priority number will be calculated using $D = \text{detectability} * \text{occurrence} * \text{severity}$.
- ✓ The causes that led to the occurrence of the problem will be identified by using a cause-and-effect diagram.
- ✓ the number of occurrences of the problems or frequency determined by using documented files and the frequency of patient complaints or gaps
- ✓ The detectability of the problems is determined by analyzing the best preventive actions that will make the problem not occur and the preferable corrective actions for the problems that have already occurred. From the hospital's past experience and customer and staff suggestions

SERVQUAL is used to measure the service process according to five dimensions and to identify customer-oriented failures. This tool is selected because:

- If a failure or problem occurs, the major elements of the hospital system to be negatively affected are patients and customers, so this tool makes failure identification mechanisms customer-oriented. and
- Among the different tools used to measure service quality, such as post-service ratings, follow-up surveys, and mystery shoppers, SERVQUAL is more detailed and easily accessible and understandable for all customers since other tools need an internet connection to ask customers about the service provided.

The quality function deployment tool is selected because it gives a better understanding of the underlying customer priorities, improves communication, and gives clear design goals for the design area. The output of the QFD process can be explicitly stated (and rated) design requirements with associated target values to be achieved. Since the main objective of this study is to improve service quality by eliminating failures, failure analysis tools have to be used. FMEA is selected because

- It's a most comprehensive and detailed what-if analysis of problems.
- It can be easily combined with other tools.

- It was used to evaluate the impact of various possible failures.
- When combined with criticality analysis, the analysis will systematically establish relationships between failure causes and effects, as well as the probability of occurrence, and will point out individual failure modes for corrective action.

After identification of the patient- or customer-oriented failures or problems

- QFD is used to develop system designs based on customers' requirements.
- FMEA is conducted, and the prioritization of failures that will occur during service delivery will be prioritized.
- A corrective and preventive action plan will be planned.

The first part is related to the application of the SERVQUAL scale. Data collection, measurement, and evaluation of patients' perceptions and expectations related to service quality using factor analysis and the calculation of SERVQUAL scores are performed in the first part.

The application of QFD is conducted in the second part of the proposed approach. The house of quality (HOQ) for QFD is mainly constructed to determine patients' requirements and technical parameters.

FMEA is used in the last part of the proposed approach. The determination of failures related to patients' requirements, scoring failure types based on the importance level of customer needs in QFD, and determination of the probability of occurrence of causes related to failure types are performed in the last part of the proposed approach. Risk Priority Numbers (RPN) in FMEA are finally calculated.

The proposed approach provides an overall evaluation of the service system by considering patient requirements to decrease the service gap, consider service design, and decrease possible service failures.

Health-care organizations need tools for continuous improvement to fulfill their strategic role for patients. The proposed approach with integrated methodologies could be used as a continuous improvement tool for sustainable service delivery.

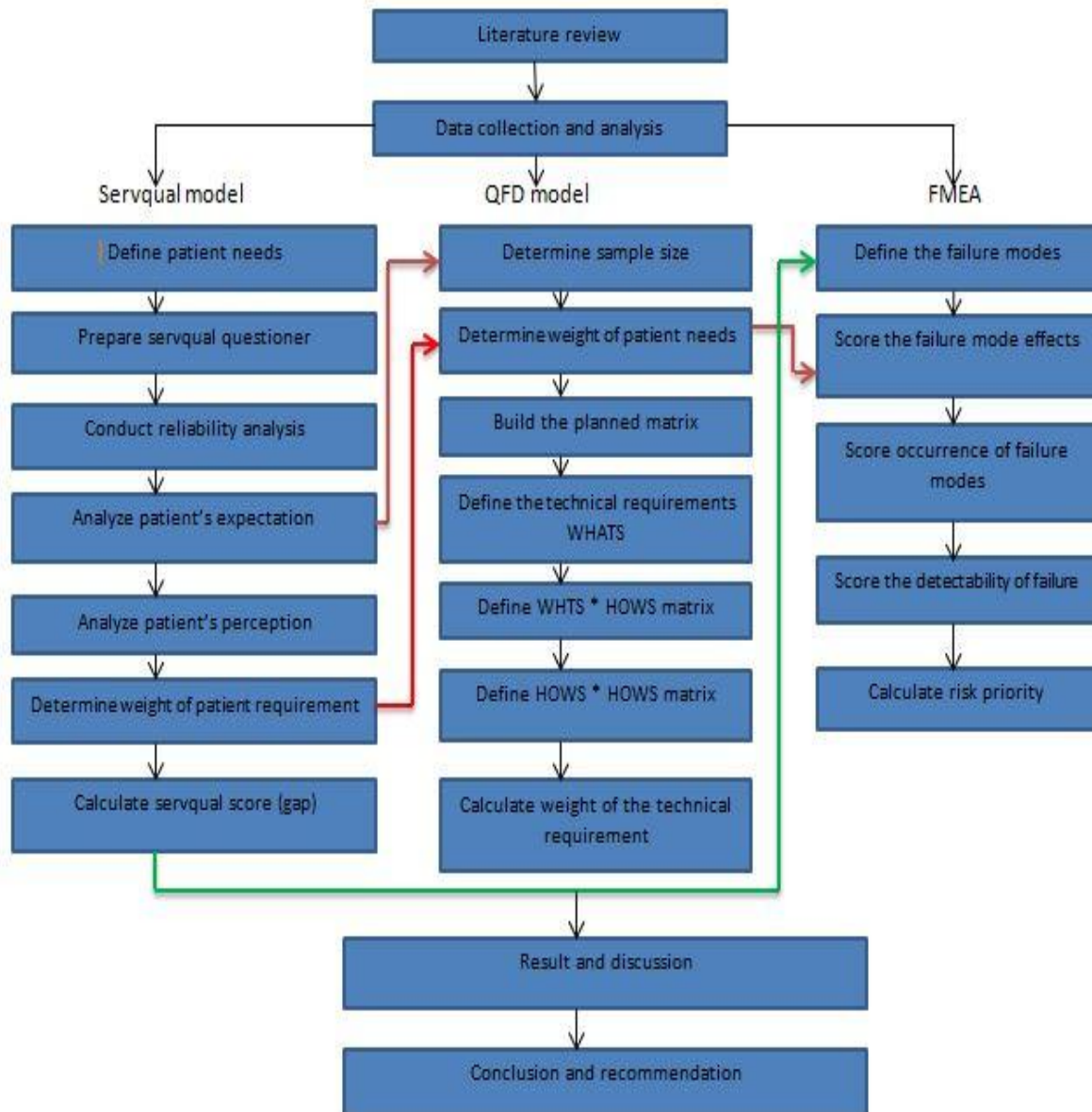


Figure 3.1 Continuous improvement tool for sustainable service delivery

3.8 Data Collection and Analysis

St. Paul's Hospital was built in 1999 (it was named St. Paul General Specialized Hospital until 2008) by Emperor Haile Selassie in collaboration with the German Evangelical Church as a source of medical care for underserved populations. It currently has 392 beds, an annual average of 500,000 patients, and a catchment population of more than five million. Approximately 75% of the patients receive medical services free of charge. There are over 1300 clinical and non-clinical staff in over 13 departments, most recently launching a new hemodialysis unit and the country's national kidney transplant center.

The medical school opened in 2007, the new millennium era of the Ethiopian calendar. It is intended to alleviate the severe shortage of medical doctors in the country.

As stated above, this research is intended to study only the OP and wards of the hospital. OPD is termed an outpatient department. Opd is the first intermediary between a patient and the hospital staff. OPD is designed for diagnosis, diagnosis tests, and minor surgical services for patients that do not have to be admitted to the hospital. A ward room is a group of hospital beds with associated treatment facilities managed as a single unit for the purpose of staffing and treatment responsibilities.

3.8.1 Data collection

In order to solve the identified problem and meet the specified objective of the research, relevant data have been collected using questionnaires, direct observation, and interviews with patients and employees of the hospital. The collected data are both qualitative and quantitative, using both primary and secondary data collection methods. The primary data was collected by a structured questionnaire and focused group discussion, and secondary data was collected from case company files, journal articles, books, hospital report websites, and thesis papers.

3.8.1.1 Servqual

The Servqual model is used to measure the difference between what customers have been expecting about the service process and what they perceive after they have been served by servers. The model uses five service quality dimensions to measure the existing level of customer satisfaction with the hospital service process. Under this model, the five dimensions considered are tangibility, reliability, responsiveness, assurance, and empathy. In order to collect data to analyze the servqual model, two types of questionnaires were prepared. One questionnaire is for customer expectations, and the other is for customer perception and the weight of service features. These questions are indicated and attached in Annex 1, Parts A and B. A five-point Likert scale was used to determine the level of expectation and perception associated with each service quality dimension of the hospital. The calculated research sample size consists of 118 respondent patients. In order to obtain an accurate response, this research gives two independent questioners for one respondent. The respondent is first required to fill out his expectations of the service process before getting service from the hospital. The same respondent was asked again about his perception after getting service and to weigh the service features of the hospital. In order to reduce inefficiency and error during the filling process, sometimes the researcher fills questions by asking patients.

The following table represents the calculation of the difference between the scores of expectation and perception.

Table 3.2 Expectation statements

No	Expectation statements	strongly disagree...St agree				
1	Did you expect SPH have up-to-date equipment's?	1	2	3	4	5

Table 3.3 Perception statements

No	Perception statements	Strongly, disagree.....St agree				
1	SPH have up-to-date equipment's	1	2	3	4	5

Difference = Perception – expectation , $3-1 = -1$, thus the gap between the perception and expectation is -1 which represents that according to the respondents the service performance could not meet the expectation.

The difference between perception and expectation for all 14 statements is calculated and summarized as below in table .

Table: Average gap between customer expectation and their perception regarding various service features of the hospital

3.8.1.2 Reliability

For the case customer service perception

Table 3.4 Customer service perception

	N	%
Case valid	30	100
Excluded ^a	0	.0
Total	30	100.0

Source own survey SPSS result

Reliability statistics customer service perception

Table 3.5 Reliability statistics customer service perception

Cronbach's Alpha	N of items
0.984	14

Table 3.6 For the case customer service expectation

	N	%
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Case valid	30	100.0
Excluded ^a	0	.0
Total	30	100.0

Table 3.7 Reliability statistics on customer service expectation

Cronbach's Alpha	N of items
0.947	14

A Cohen's alpha coefficient was also employed to measure the reliability of the data. Validity is the extent to which differences found with a measuring instrument reflect true differences among those being stated. Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure (C.R. Kothari, 2004).

In order to test the validity of the data collection instrument, researchers conducted a pilot study by distributing the first 30 questionnaires on customers' expectations and perceptions about the service process at Saint Paul's General Hospital. According to Gay (1987), "reliability" is the degree to which a test consistently measures whatever it measures. The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as "reliability," and if the result of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. The reliability of the data was found to have a Cronbach's alpha coefficient for all factors as computed below.

Table 3.8 Cronbach alphas result of reliability test

No	Factor	No of items	Cronbach Alpha
1	Patient expectation	14	0.974
2	Patient perception	14	0.984

Source own survey SPSS Result (2023)

As can be seen from the above table, both factors have satisfactory reliability coefficients in excess of the required 0.70. Therefore, the value of Cronbach's alpha in this study indicates that the scales used in the instrument are adequate and suitable.

Table 3.9 Average gap between customer expectation and perception

Statement	Average perception for each statement	Average expectation for each statement	Mean difference of statement (P-E)
Statement 1	2.83	4.02	-1.19

Statement 2	1.74	2.91	-1.17
Statement 3	3.79	2.23	1.56
Statement 4	2.78	3.44	-0.66
Statement 5	2.56	3.89	-1.33
Statement 6	1.93	3.46	-1.53
Statement 7	2.37	4.74	-2.37
Statement 8	2.89	2.85	0.04
Statement 9	4.36	2.53	1.83
Statement 10	2.19	3.86	-1.67
Statement 11	4.26	2.84	1.42
Statement 12	1.95	3.68	-1.73
Statement 13	2.46	3.63	-1.17
Statement 14	2.58	4.19	-1.61

Table 3.10 Customer requirement importance weight

Statement	Importance weight
Statement 1	8
Statement 2	6
Statement 3	6
Statement 4	7
Statement 5	7
Statement 6	7
Statement 7	8
Statement 8	8
Statement 9	7
Statement 10	8
Statement 11	9
Statement 12	7
Statement 13	6
Statement 14	6

According to the data analysis done using the SERVQUAL model by calculating the average customer perception, the average customer expectation, and then the average gap between

perception and expectation of customers, the failure modes are identified. This identification of failure modes will be very important for customer-oriented failure mode and effect analysis.

The average gap score for most of the service quality dimensions of Saint Paulos Hospital was showing a negative figure, with the highest gap score for the statement "SPH employees keep accurate and error-free records." Other service quality dimension statements show the comparatively smaller gap that represents lesser customer dissatisfaction regarding the hospital ward and OPD service processes.

in order to know how much each of these features is important to the customers. A total of one hundred points were allocated among the five features, which are called SERVQUAL importance weights according to how important they are. The first service gap on each service quality dimension statement was identified, and then SERVQUAL importance weight was allocated. The weighted score was calculated as follows:

Weighted score = mean difference for each SQ dimension statement * importance weight

Table 3.11 Weighted score of service quality dimation statements

Rater	Rater gaps (P-E)	Importance weights	Weighted scores
Statement 1	-1.19	8	9.52
Statement 2	-1.17	6	7.02
Statement 3	1.56	6	9.36
Statement 4	-0.66	7	4.62
Statemenet5	-1.33	7	9.31
Statement 6	-1.53	7	10.71
Statement 7	-2.37	8	18.96
Statement 8	0.04	8	0.32
Statement 9	1.83	7	12.81
Statement 10	-1.67	8	13.36
Statement 11	1.42	9	12.78
Statement 12	-1.73	7	12.11
Statement 13	-1.17	6	7.02
Statement 14	-1.61	6	9.66

The above weighted score of the service quality dimension statements for SPH shows that the high score was “SPH employees keep accurate (error-free) records,” followed by the service quality dimension statements. “Employees give priority to your requests,” “In SPH, there is enough knowledge and skill among staff,” “SPH gives service at inconvenient hours,” and the rest are others. This identification of a weighted score of customer requirements is very essential for quality function deployment analysis in order to redesign the hospital ward and OPD service processes.

3.8.2 Quality Function Deployment analysis

In this research paper, quality function deployment is used to identify the critical technical requirements based on patient or customer requirements. The customer requirements are identified from the service quality analysis. In servqual analysis, the rate of customers' expectations is identified, and those customers' expectations are, in other words, what customers require from the hospital service process. The identified customer requirements are used as input for quality function deployment analysis, and the importance weight of those customer requirements was also identified in the first phase of servqual analysis.

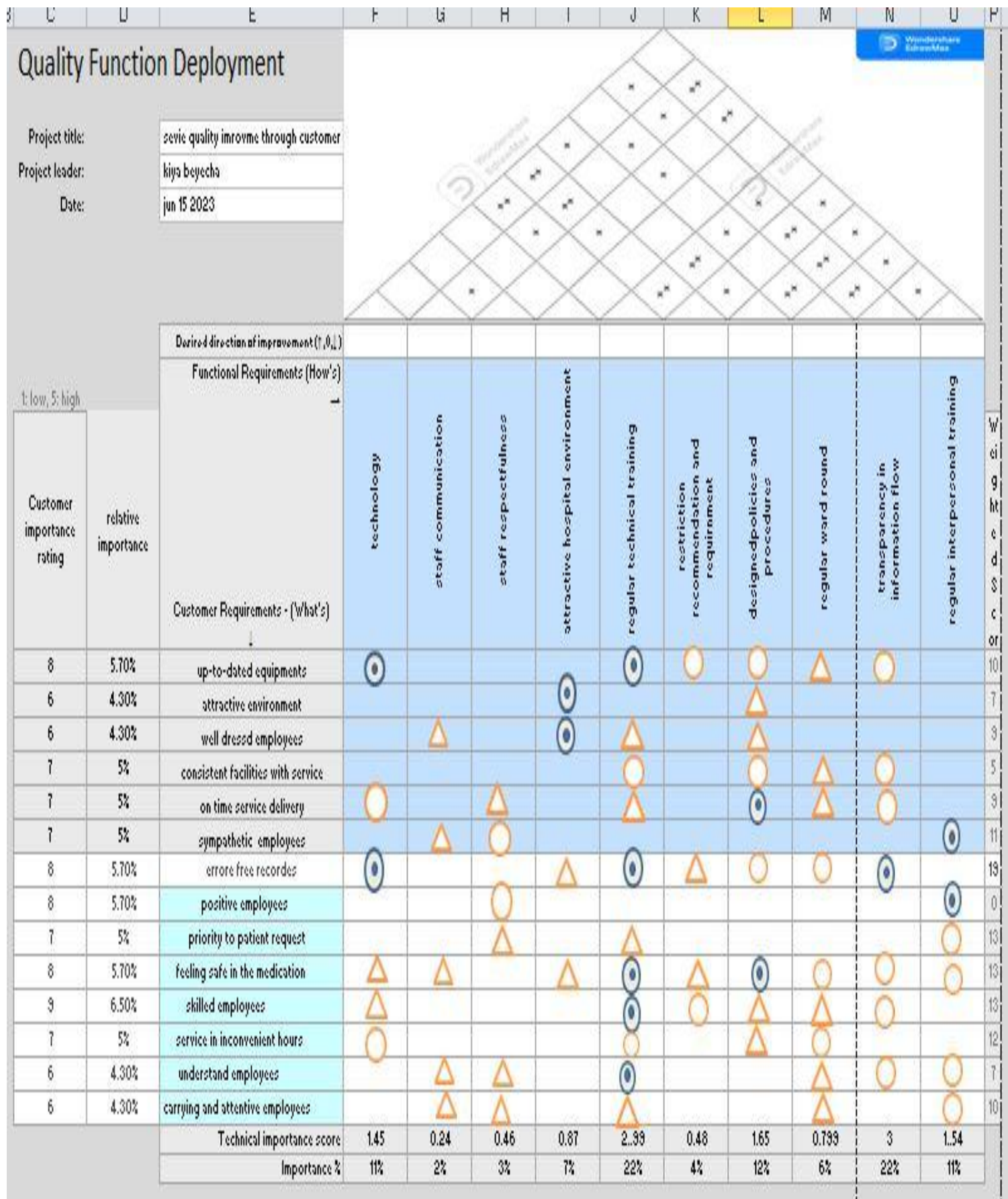


Figure 3.2 Quality Function Deployment

3.8.3 Innterrelationship between technical requirnmnts

In health care service-provider places, having adequate equipment in the outpatient department or other wards does not have any correlation with the health professionals' communication skills. In internal medicine OPD, a patient came, and in the absence of sufficient digital BP apparatus, the responsible nurse could have good communication with the patient. Although having the necessary equipment in an adequate amount is mandatory in the diagnosis process, it does not limit the health professional's ability to communicate with the patient in the right way.

Certain staff members' being respectful towards patients is crucial, and it is stated under the ethical requirements of the health professionals. Even if the hospital has a CT scan, it cannot prove that the assigned doctor is respectful towards the patient. Being respectful and treating the patients in a good manner without having adequate medical equipment such as Doppler, obstetric ultrasound, and X-rays is mostly observed in the health centers around remote areas. In the same way, an obstetric ultrasound for a pregnant mother has no impact on how the obstetrician treats the mother.

Currently, in most health service-provider areas, having an attractive physical environment is being recommended for the sake of an excellent prognosis for the patients and for the hospital's or service-provider sector's name. Whereas in most health centers with an attractive environment, there is an insufficient number of ultrasounds and x-rays, regardless of the stakeholders' capital and budget. This suggests that having the latest and most valuable equipment with adequacy, as mentioned above and others, doesn't mean that the service-provider center shouldn't be attractive. In the hierarchy of the health service providing centers, mostly primary hospitals, general hospitals are expected to have x-ray, ultrasound, laboratory machines like CBC, and chemistry machines for the general departments. Speciality clinics, teaching hospitals, and others are expected to have CT scans, MRIs, endoscopies, and such materials in addition to the machines mentioned above, depending on their field of study. Hence, a hospital with the necessary and latest medical equipment in a satisfactory amount does not mean the hospital's environment is comfortable and suitable for the patient.

In the health sector, up-to-date and knowledgeable health professionals are mandatory in order to earn the patients' and fellow citizens' trust and for meticulous work. In order to achieve and have such professionals, regular and inclusive technical and theoretical training is needed. For most health professionals, there is a knowledge gap because of either a lack of

training or practical exposure to the task or the machine. Most of the time, minor surgeries such as circumcision and simple wound suturing can be done by assigned nurses. This is due to the extent of their exposure to the procedure, their knowledge, and their confidence. According to the Ethiopian Health Bureau, there are a lot of trainings that are privately or government-funded for the above-mentioned reasons. such training as CPD, ultrasound, or circumcision. These and other trainings need practical training with the desired medical equipment, which is enough for every participant. But in most technical trainings, most participants have a chance of performing the activity once or twice for the entire training process. These scenarios do happen in most known hospitals that are found in Addis Ababa and other places, including St. Paul Hospital, where there are a lot of students and trainees.

Hypertensive patients with the silent killer case are mostly recommended to be precarious for every meal and drink they take. and they are also advised to follow the pattern attentively depending on the stage. In order to achieve the desired measure in a certain patient, the doctor should advise what should be taken with the medication, what should be the risk for aggravation of the disease, and so on. For all these recommendations, there should be a definite diagnosis of the case, which is observed through different medical equipment such as echocardiography, well-performing BP apparatus, and laboratory machines such as CBC and blood chemistry. The definitive diagnosis of the case with restrictive and supportive recommendations of the doctor takes a large percentage of the excellent prognosis of the patient, even if it is dependent on the patient's adherence.

Every higher organization in the health sector should have an organizational policy for overall continuity. In addition to this, every medical process has its own procedure, starting with the minor surgeries such as wound suturing and circumcision up to the more time-consuming surgeries like organ transplantation and brain surgeries. For the achievement of these procedures and policies, there should be a sufficient amount of medical equipment. In health sectors that are found in rural areas with the absence of adequate medical materials in number, there are a lot of well-designed policies and procedures that are driven directly from excellently performing hospitals and the health bureau itself. This implies that well-designed policies and procedures written in papers as guidelines have no use if there is no adequate material for the practice. Currently, every piece of medical equipment has a use for a certain medical procedure; this implies that without one, there is no practical use for the other.

Every day in the medical wards of inpatient treatment in different departments, there is a round where a group of health professionals, including nurses, general practitioners, specialists, and clinical pharmacists, do a case review on each individual patient and observe the prognosis and current treatments being taken by the patient. In the process, they sometimes try to examine the patient in detail again for discussion and to rule in or out the diagnosis. Most of the time, this process is very important for the patient's prognosis because, as a result of their everyday evaluation and discussion, the patient will show some sort of improvement despite the nature of the disease. In the overall round, the professionals will discuss the case without being fully dependent on medical equipment. This implies that having a regular round time in different department wards does not necessarily require adequate medical equipment.

Patients whose cases are being held by specialists and who are admitted need clear and motivating information from the health professionals, despite their condition. In most Ethiopian health systems where there are insufficiently skilled and knowledgeable health professionals, the medical information of a patient with a sophisticated case is difficult to flow from the doctors up to the nurses. In most cancer patients, the health professionals, with the help of required medical material, sometimes lack the ability to tell the exact case and the life expectancy of the patients. Transparency being the backbone for developing trust in both parties, it mostly relies on the medical materials for ruling in or out the exact diagnosis. In most cases, in the absence of or insufficiently available materials, most patients get treatment for other diseases, while at the end of the day, depending on the exact case discovered, the patient might be in the end stage or found dead.

Even if communication is personality-dependent, most professionals need to be trained to have better communication skills with each other and with patients. This can all be achieved through training and practice without the help of medical materials.

Most respectful health professionals have good communication skills with the patients and their caretakers, while some ill-mannered professionals cannot easily communicate with the patients and caretakers, and sometimes they get into conflict with caretakers. Most patients do not want to be treated by them or have contact with them. This shows that being treated with respect in first contact can have a positive effect on both parties' communication. But that does not necessarily mean that a patient who has not been treated with respect cannot always have good communication with the doctor. Even if there is a relationship between

both, for continuity and respect, the health professionals should not always be good communicators and outgoing towards the patient and care giver.

Having an attractive environment of the surrounding and also in the building with clean toilet room, colourful banners, gardens in most health service providing sectors such as hospitals and health centres does not necessarily imply the staff members are skill full in communicating with the patients. Most of the time in hospitals like St. Paul the staff members have a work load because of the number of patients that are available per day, un proportional work load and staff members. All this will have impact on how each staff member from cleaner to doctors to communicate with the patients not in a desired way. Generally attractiveness of the physical environment of the hospital has no impact on how the staff members communicate with the patients and their fellow caregivers.

Most technical or theoretical trainings that are held by responsible stakeholder groups, in addition to the knowledge and skills they provide, also increase the ability of different health professionals to know each other and communicate. While in the process, it can add value to a professional's ability to treat his or her patient with care. Caring for the patient in the way the medical ethics request can develop good communication with the patient This relationship has a long-term effect on the communication skill development of a health professional through experience.

Most patients with along contact history in the hospital and who were being admitted several times know some of staff members .This communication that came through time can make the patient safe to ask the restricted, recommended and requirements in detail with the professionals. Before discharging a hospitalized patient despite of the disease he /she has to know the required actions like recommended care, restrictions. Telling all this is a health professionals' responsibility. Although it is known in most professionals it is not always being applied in practice. Some patients or care givers that are friendly with the health professional have a chance to ask all this in detail. Generally communication skill is mandatory for both the patient and the health professional.

In most health sectors, there are well-designed policies and procedures that are passed from the higher governing body to the hospital or health center. Hence, implementing this policy is mandatory. However, health professionals' communication skills are different; acting in an ill-mannered way is questionable and punishable, which is written in medical ethics that is included in most health sector policies. Despite all this, most professionals' communication

skills vary, which implies that having a well-designed policy and procedure does not limit the health professionals' ability to treat the patient in the way they are treated.

Admitted patients in different wards are visited every day by different health professionals from nurses to specialists to know the progress of the patient. This process sometimes takes a reassessment of the patient's condition by a specialist doctor to reach a definitive diagnosis. While the process is taking place, the specialist doctor will ask different questions attentively. This act will attract the patient and build trust. Therefore, in order to have good communication with the patient, most doctors use the round-time method of asking the patient if there is any complaint about pain or discomfort in the treatment process. The patients also wait this time, mostly to raise their questions about the treatment and the general process.

Transparency is mostly developed through trust between health professionals and patients. Most patients who have sexually transmitted diseases such as HIV and others fail to tell the examining doctor about their sexual activity until they develop trust in the person they rely on to tell their secret. This trust mostly came through the health professional's communication skills and friendly approach. Hence, this trust can lead to transparency in the information flow from the patient to the doctor and vice versa. The overall process of friendly approach, trust, and transparency with the patient will lead to a definitive diagnosis of the case and an excellent prognosis.

Staff communication skills, which can be either personal or developed through training, are very useful for the development of the health sector. Communication is the key to every medical treatment. Although there is limited interpersonal training for enhancing communication skills, their existence can bring a lot of change to the skills and confidence of a health professional.

Respect for co-workers and patients in general depends on personal behavior and character. A suitable environment for patients, such as gardens, television, and a clean toilet room, is refreshing. Although having a respectful staff member towards the patients is necessary, having an attractive physical environment in the hospital has no impact on the level of respect the health professional gives the patients.

One of the medical ethics requirements suggests that respect for patients and among themselves is the basic medical ethics requirement. Most hospitals with an attractive physical environment have a lot of medical professionals on staff who treat patients and their

caregivers in different ways. This indicates that most hospitals that have different departments to make the burden distribution fair have different staff members that are stressed with the work load they have in each department's OPD. Most of them treat patients in a way that can solve the current problem, and further questions and conversations are not done in most scenarios. This process deteriorates the respect of both staff members and patients. Hence, respect has no relation to having an attractive physical environment, such as a clean toilet, garden, colorful banners, and television.

For the continuity of a certain hospital's strength, there should be a skilled and knowledgeable health professional in the health system. In order to achieve this, there should be regular technical training for health professionals. Although having a respectful and well-mannered health professional is mandatory, there is no impact on the regular technical training.

For an excellent prognosis for a certain patient, either from admission in the hospital or from a single visit in the OPD, there should be a coordinated action of different health professionals, starting from the nurses to specialist doctors. All this is achieved through treating people with respect and having an honest and transparent information flow. Together with the patient's adherence to all the recommendations, restrictions, and follow-up, there will be an excellent prognosis and full recovery. As a result of the respect the health professionals give to the patients, patients will adhere to all the required actions, such as the recommended foods and drinks to take and also prohibited behaviors like smoking and drinking, that are told while the treatment is taking place.

Most hospitals with well-designed policies and procedures for different departments usually have a strong impact on the continuity of the hospital as an organization. This requires the implementation of the designed policies and procedures from the higher governing bodies up to the staff members who have direct contact with the patients. These policies and procedures do not always require the professionals' respect for patients and between them.

Regular ward rounds are one of the activities that are taken by the health professionals to observe the improvement of their patients throughout the admission. Throughout the process, there will be direct contact between the patients and the health professionals, and there will be interaction between these two parties. If the whole process is not taken seriously with respect to one another, there will be difficult communication, which can hinder and prolong the patient's recovery and discharge date.

Transparent information flow among the health professionals and also with the patients is mandatory for an excellent prognosis throughout the treatment period, despite the nature of the disease. Transparent health professionals who tell each and every detail about the patient's case usually have different personalities; some of them might be respectful towards their patients, or they might be rude, depending on the work load they have. This implies that having respectful staff members does not mean there will be an honest information flow between them.

Interpersonal trainings contain respect, communication, experience sharing on methods to handle a certain case, etc. These are seen in different programs for the better performance and coordination of health professionals. This all means that regular training for certain department staff members can improve the way they give care and treatment to patients.

Hospitals in different towns held some self-developing technical and theoretical trainings, which can all improve the health centers' overall performance. Government hospitals in most places have an environment that can be either attractive or not. The attractiveness of the physical environment in a certain hospital does not limit the health professionals and staff members' ability to have regular technical training. Even though the physical environment has an impact, what patients usually rely on are services that have different technical procedures and theoretical knowledge about medical science.

Discharge of a patient after a long hospital stay is most of the time followed by a certain required action from the patient. This can be either a recommended action, which could be food, exercise, or a restriction such as smoking, stress, etc. This all depends on the relationship between the staff members and the patient, as well as the health professionals' and patients' attentive care towards the case. In the physically attractive environment of a certain hospital, the health professionals or the patient may fail to be attentive to the case due to the work load. Therefore, a neat and attractive environment cannot be correlated with the doctor's recommendation.

Well-designed policies and procedures are completely dependent on the implementing bodies, which could be health professionals or administrative bodies. All this, in most scenarios, may face a problem because of either one of the responsible bodies' failures. Clean and well-designed garden areas in the hospital cannot be related to the implementation of well-designed policies that are needed to govern the health professionals.

From morning until evening, there are a lot of ward rounds in different forms. For example, the morning of each day is busy with the health professionals reviewing each patient's case depending on the schedule. In the evening, where there is a takeover where one health professional finishes his duty and the other receives the responsibility, there will be a fast round. Through all this process, the presence of the patient in its bed and the health professionals with the appropriate documentation will ensure that the round takes place.

Transparency in the process of passing patients' information among the health professionals or even to the patient does not need the patient's bed and room to be full of physically eye-catching environments.

Most hospital administrative bodies, either for their best performance or in order not to be degraded by the evaluation of external and internal governing bodies, always make areas around the admission wards attractive. In most cases, there are a lot of buildings because of a shortage of places to do large buildings. In this scenario, most patients are admitted in closed spaces or buildings. This place, despite their neatness, is not usually attractive compared to the others, but this cannot affect how staff members interact with the patient and cannot define the nature of their communication.

Technical trainings for all departments in the health system are mandatory for all health professionals to be skilled in the treatment process. This all has an impact on the prognosis of the patient. In the health system, we have seen that the training of the health professionals towards COVID-19 prevention and control had an overall excellent result in the elimination of the case. Regularly trained health professionals were actively recommending patients and healthy individuals wash their hands, wear masks while restricting hand shaking, and others.

Most health professionals need regular training on a certain procedure for better performance, while the hospital's administrative or governing bodies suggest and restrict them because of budget problems and a shortage of staff members. This is always observed in every hospital, although there are trainings currently being held that are not inclusive of all health professionals. As a result, it hinders the level of knowledge and skill among staff members. well-designed policy for having participants and inclusive trainings.

Regular ward rounds in the hospitals are useful for the patients' day-to-day improvement, regardless of the disease's nature. Although most rounds are confusing for patients since the rounds are held in English and the usual conversations among professionals are confusing to the patient, the discussion and detailed conversations with the doctor make patients feel calm

about all the worries they had. In order to achieve and fit in the round time, the health professionals should update themselves. This is achieved through learning and taking training regularly. On the contrary, in order to practice and reach perfection in the round process and through out some procedures, there should be a regular round time for the development of skill and knowledge on cases in a certain ward. Therefore, regular training and ward rounds have a relationship.

In a medical OPD, a patient comes with a complaint of different kinds that needs to be treated, and he should also know for what reasons or diseases he gets the treatment. All these imply that transparency in the process of medicine is mandatory. These processes sometimes occur in diseases where the patient's life expectancy is short. In this scenario, unless a well-trained and experienced health professional handles the case, it will be more difficult for the professional and more sudden and shocking for the patient. Most trainings include management of cases that are difficult, such as HIV/AIDS, sexually transmitted diseases, cancer, and lifelong deteriorating diseases.

Technical training for the better performance of patients is useful in the healing process. Throughout the process of treatment, whether through admission or outpatient care, if there is no well-trained health professional on the case, it will be very difficult for the prognosis. While training is important, regular interpersonal training is sometimes given by some professionals. Although both are trainings, there is no correlation that shows the strength of one with the other.

In a health care system, for the implementation of a definite treatment for the patient, there should be a well-designed policy and procedure in the administration process. All this can be useful in the treatment process to ensure a coordinated and meticulous treatment is given to the patient. In well-organized hospitals where there are strong and well-applied organizational policies and procedures, the health system recommends that patients be careful about what they take and do after recovering from a certain disease. These restrictions, recommendations, and limitations in home recovery that can be started in the treatment process can all be applied if there are well-designed policies and procedures in a certain health service sector.

Although regular ward rounds are held in a hospital set up for admitted patients, most patients, after they recover from the disease and after they get discharged, are readmitted with the same case or an exacerbated case of the previously treated one. This is due to either the

patient's adherence to certain recommendations the doctor suggests or their lack of knowledge of what to do after they get discharged. Even though regular rounds are useful, they do not limit patients' ability to be readmitted with the same case.

Most of the time, the information that is transferred from the health professionals in different departments to the patient has either a positive or negative impact. The positive impact can be the restrictive and also recommended actions that the patient can take after a hospital stay if it is told about the readmission of another patient with the same disease. If not, the patient will be readmitted or visit the OPD several times, which can decrease the prognosis and the patient's life expectancy. Therefore, transparent and timely information about the treatment can have an impact on the patient's ability to follow the suggested advice. In most patients, medications are given without telling them the extent of the harm if they are not taken or the disease's behavior. Due to the fact that there is no information, most patients will visit the OPD for the same case.

Doctors that have good interaction with patients most of the time advise patients in a more detailed way, either after discharging the patient or during the OPD visit. This is due to the strong relationship between the two. In most cases, while the patient is being discharged, most of the time the nurses have a contact. In most case reviews, the doctors and nurses are contacted concerning medication dose, discharge, and admission of a certain case. If there is deterioration in a patient's case, their contacts will be less among the health professionals, especially between doctors and nurses. Interpersonal trainings that are held between staff members can have significance for how the patient is discharged or be recommended for some needed activities for full recovery from the disease.

In the hospital setup, the designed strategies that are written under the medical policies suggest that there should be a regular ward round for inpatient patients and a good prognosis for a certain case. In hospitals where there is a regular ward round daily, the patients' recovery and prognosis will be improved, and this shows that policies and procedures that are well designed by the administrative bodies are strong..

In most well-designed medical procedures, such as lumbar puncture, where the patient's spinal cord space is being injected with a needle to remove a small amount from the cerebrospinal fluid for the confirmation of brain injuries suggestive of infection, the procedure process shall be explained to the patient, which helps in the coordination and also in the meticulous act of the performing doctor. This transparency, along with the well-

designed procedure and policy that advise the health to be safe while performing the task, can have an impact on the definitive diagnosis and treatment of the case.

If the interaction of doctors with nurses and also with patients is not governed by a certain law, most of the time there will be a problem in the treatment process. Even though the job will be done no matter what happens between them, in situations where one suggestion cannot be accepted by the other because of conflict, this can have a significant negative impact on the patient. All this can be sorted out if there is a certain rule suggesting respect for the decision that one makes for the treatment process. In regular ward rounds, where the patients find their first examined and admitted doctor, they are eager to share all their complaints regarding the treatment and the disease. If the patient does not provide honest information, the next procedure or treatment will be more difficult for the nurses or closest caregivers. Therefore, being honest about the treatment will have an impact on the poor and also provide an excellent prognosis for their case throughout the admission or follow-up period.

Most honorable and successful doctors that are found in most hospitals will, whenever they are in charge, have detailed and good conversations with either staff members or patients. This process will develop and increase other health professionals' communication with one another and with patients. This can be supported by trainings that can enhance the experience on how to handle the case and also how to communicate with such health professionals. Therefore, one health professional can use the round-time as interpersonal training for his or her experience and job improvement.

Even though transparency is a core concept in medical procedures and the whole process in general, most interpersonal relations and experiences can limit the achievement of trust in both the patient and the health professional. Though trust between the doctor and the patient is achieved, there are a lot of major factors that can usually affect the honesty of the patient, like the clear information they give about their symptoms out of fear.

3.8.4 Relationship between customer requirement and technical requirement

1-A

Every patient expects St. Paul Hospital to have adequate equipment for the completion of each procedure in the treatment and also for service provision. Although it is budget and organizational capacity dependent, the expectation of the patients is that for every material

their procedure requires, the hospital should provide it unless it is out of its responsibility. The relationships between both scenarios rely on one another.

1-E

Most technical trainings are done by the organizational materials, such as certain procedures in the minor OR rooms that need all the necessary equipment that is prepared for regular surgeries, such as surgical gloves, tissue forceps, gauze, cut gut, and so on. A shortage of those necessary materials can hinder the training process from going according to plan and can also hinder the inclusiveness of all health professionals.

1-F

A shortage of medical equipment, such as one BP apparatus for four OPD rooms, can increase the waiting time and also decrease the time given for advising on the recommendations and some restrictions. Patients who came for other complaints can sometimes be found with the disease of hypertension; if not treated meticulously, the process due to insufficiency of medical equipment will regenerate itself and can be fatal.

1-G

With well-designed policies and procedures in certain hospitals like St. Paul, a lot of patients come for different case managements and need fast and careful treatment of their cases. This all has to do with the presence of enough instruments for all procedures and the adequacy of each useful material in the hospital setup. The policies, especially, are mandatory in the treatment process.

1-H

Most patients who are being treated through inpatient treatment usually expect a daily or periodic visit from the health professionals because of their fear and eagerness not to stay in the hospital. Throughout the visits and round time, most patients are curious about what the doctor will tell them rather than expecting the adequacy of the existing medical equipment. In some scenarios, patients will ask the health professionals if there are any available materials that are useful in the process and why they are not being fulfilled if they have medical knowledge or experience of the same case in other hospitals.

1-I

Usually in the health system, where patients get investigated in more detailed form, the process of information flow will be more honest because most of the time the patients expect that in a detailed investigation and examination they will get more curious, understand the seriousness of the case regardless of the outcome, and ask the health professionals a lot of questions that test the transparency of the health professional. This scenario shows the relation between patients' expectations of St. Paul Hospital having adequate equipment in each department and the transparency of information flow.

2-D

The physical attractiveness of St. Paul Hospital for patients, starting from the outside environment up to the patient's room, needs detailed and meticulous work through planned actions, including hiring regularly working gardeners, flowering, having colorful and attractive banners in each department, TV rooms, clean and neat rooms that are cleaned daily, and so on. All these, along with the strict follow-up and supervision, make the patients expect such refreshing environments, which is helpful for their prognosis.

2-G

In the presence of well-designed policies and procedures for governing the hospital, most health professionals and patients want attractive working and treatment areas in which the policy can easily be recommended, which helps the governing bodies implement what the patients desire. This does not mean that out of the existence of the policy or the required actions, there are some responsible bodies that participate in and perform those processes for the presence of an attractive environment in the compound.

3-B

In all hospital setups, including St. Paul, employees have different working clothes depending on their profession. There is also a dressing code in the general health system's medical ethics, which orders health professionals to dress in an appropriate manner. Even though all this is for the sake of respect and meticulous action in the treatment process, some patients expect health professionals to reach out in a well-dressed manner. Despite the dressing, their communication is very much dependent on both parties' personal behavior and relationships from the beginning.

3-D

In a well-clean and attractive environment, health professionals are expected to be well dressed. The attractiveness of the environment and the surrounding neatness encourage patients and staff members to dress appropriately despite the task being performed. Since all this is eye-catching and every treatment in the hospital starts with psychological treatment, it is crucial to have well-dressed staff members and an attractive environment.

3-E

No matter how the governing rule in the hospital and also the dressing code order staff members to be well dressed in the working environment, it does not limit them from having regular technical training that is held in their department and also from performing their job.

3-G

Despite the dressing code's suggestion to wear a desired cloth in their working environment, there should be a well-designed policy and procedure that controls this. In some private hospitals, their organizational policy strongly supervises the dressing of the staff and punishes accordingly. Usually, this is not seen in government hospitals, including St. Paul Hospital, where the work load is very high for health professionals. Even if the patients expect them, the policy may not strongly supervise and control the case as the organizational policy is more concerned with the service provided.

4-E

Regular technical trainings that are held in St. Paul Hospital for a certain period for different professionals in the health sector require medical equipment to be available in the facility. Although these relationships between medical materials that are used in the training process are important in some scenarios where there is a shortage of such materials that can be replaced by others, the training will continue. These have an impact on the process of implementing the skill on patients after regular training, and if the required material is unavailable, the health professional will be forced to use other interchangeably used materials. This affects the patient's expectation of being appropriately treated. For instance, a pregnant mother who should give birth on a delivery couch during a stressful day where there are a lot of delivering mothers might be forced to use a sleeping bed for giving birth. This will make the mother expect the treatment she should get, and the actual fact will make her

think she was not treated fairly. Therefore, regular technical training and the appropriateness of the physical facilities in accordance with the service given are very important.

4-G

Every procedure that is performed in hospitals has its own performing materials that are used for the whole process. The inconsistency of the material used in all processes in everyday performance can have a lot of impact medically and professionally, which sometimes makes the professionals use other available materials that can make the work finished with or without complications even if the exact and appropriate material is present. Patients now make efforts to know about their case and every procedure they will go through in detail. Therefore, their expectations will be high, and they will follow attentively every procedure they go through. The health professional uses materials that are inconsistent with the procedure being done, and despite the correct result, the patient will feel discomfort. The presence of well-designed policies and procedures helps the professionals perform the tasks appropriately with appropriate materials and can fulfill the patient's expectations for the consistency of service given.

4-H

The regular ward rounds are held for the purposes of follow-up, improvement, early detection of medical complications, teaching, and to hear and correct patient complaints. In the absence of some medical equipment, sometimes some procedures will be performed using other materials, such as a very small urinary catheter. In the absence of a very small urinary catheter, they may be forced to use a small, numbered NG tube. Though it is not appropriate medically, what the doctor focuses on is the outcome. Therefore, if the outcome is successful and the desired result is achieved, they may not overlook complaints about the patient's expectation of appropriate material use in the round process.

4-I

Patients who observe the use of disposable gloves as a tourniquet may feel unsafe during the process. Health professionals who are honest with patients and explain the process they are performing reassure patients that their work is done with care and that there will be no worries for patients, even if they expect consistency from their task.

5-A

A certain accident resulting in brain injury to an individual will cause the person to seek care at St. Paul Hospital. During the detailed investigation of the case after emergency management and admission to the ward, the assigned doctor will order a CT scan or the best imaging, which is an MRI, to rule out the exact case and determine the treatment. If the machine ordered is not working, they will be asked to take the patient to another diagnostic center where the material is available. The whole process will hinder the recovery time and decrease the patient's or caregiver's expectation of timely management of the case.

5-C

Staff members sometimes, despite being disrespectful towards the patient, provide the needed and appropriate treatment for the patient because of medical ethics and moral issues. Even if the patient feels undeniably that there will be no timely service provided, the respect of the health professional and other staff members has no impact on the promised service provision.

5-E

In the OPD of St. Paul Hospital, where there is a lot of waiting time to get each service, from patient clerking up to giving treatment, the patients will be promised that they will get the service appropriately without considering the waiting time. Health professionals having regular technical training have no impact on the expectations of patients about the service delivery in the outpatient department.

5-G

Patients who visit OPD for the follow-up of a specific case, such as epileptic patients, expect the service to be improved on each visit. This promised service delivery can be achieved through strong supervision and procedures that can decrease the waiting time and increase patient satisfaction.

5-H

The timely and accurate provision of services is very much dependent on each department's coordination. In admitted patients, for their results and treatment to be given appropriately, the coordinated action of the laboratory department, nurses and doctors, pharmacy, imaging centers of the hospital, and finance workers is required. Although there is an impact on each

round-time decision since the mentioned departments have contributed to the results and discussion of the case, it will not affect the regular ward being held.

5-I

Since transparency is the basic issue in the medical sector, reassuring the patient that the service for every complaint they have will be given on time is dependent on a transparent information exchange between the health professional and the patient.

6-B

In the medical sector, the extent of the case is usually seen in the sympathetic and reassuring response of the health professionals towards the patient. Since they face a lot of serious problems that need serious and fast measures, some complaints of patients in the inpatient department may not have the attention of the health professional. This might be due to different reasons, which can not always be the communication skills of staff members.

6-C

Staff respect sometimes has an impact on the way they treat their patients. The value and respect they give sometimes make them take the patient's complaint seriously, reassure them, and take sympathetic measures. Some staff members in St. Paul Hospital face their socials in the hospital and show very caring and protective measures, such as visiting them with a lot of other staff members, like specialist doctors, to see the case, measuring their vital signs in a way that is more than the required and ordered interval, etc. This is out of respect for the patient.

6-J

Interpersonal trainings among staff members and also from external bodies will have a lot of importance for the health professional in terms of how to handle the patient's case and also how to sympathize with and reassure patients whenever they feel certain problems. This capacity-building training is basic to the handling of patients with care.

7-A

In the documentation and recording of patient information and complaints, the instruments that we use are mandatory. In situations where there is no available vital sign instrument such as a thermometer, pulse oximetry, or BP apparatus, the health professionals use terms like "afebrile to touch" in the case of temperature and "measuring the pulse with a watch." This

will affect the patient's perception that the health professionals are measuring and recording appropriately and will make them think that there is an error. Therefore, medical equipment's availability in an adequate amount has an impact on the error-free documentation of patient records.

7-D

Error-free documentation of patient records either in the OPD or ward is relatively affected by the physical environment's attractiveness and suggestive measures such as a clean room, a garden area with flowers, and fountains. All these requirements for an attractive environment have no relation to the documentation and recording unless the environment has an impact on the measured sign, such as temperature, which can be affected by an environment where there is no cool air, an annoying and distracting environment such as a loud TV voice, or around trading areas where the patient cannot feel relaxed. The pulse of the patient will not be as expected and will not be exactly related to the disease or the complaint.

7-E

Well-trained and qualified health professionals perform their activities meticulously in a way that cannot arouse doubt in the patient's mind while recording and documenting the required information. All this can be achieved through regular technical training that is useful for recording documents. Therefore, training health individuals regularly can make documentation and recordings error-free.

7-F

Currently, there is a shortage of health professionals in the health care system, which increases the work load for each professional. Restrictions and requirements are not being explained appropriately, and admissions of the same cases are being observed frequently. Problems that arise with the appropriate documentation are not always seen after a certain period of time where the patient gets readmitted again. This implies that despite documentation and records having errors, the health professional has no limitations on telling the patient that case recommendations, restrictions, and requirements regarding that are necessary.

7-G

With well-designed policies and procedures that suggest appropriate documentation and patient records should be accurate, there will be supervision and review of the cases as a control measure that can control any inappropriate error in the records.

7-H

Regular ward rounds that oversee the patients' cases and documented files have a higher tendency for doctors to find out any errors in the recording system. This can all make the patient feel safe about the records.

7-I

A transparent health professional in every procedure and measure he or she takes in the treatment and follow-up process will reassure the patient about his task and can decrease any expectation of the patient that there is an error.

8-C

In the process of the health service system, since every health professional stands for the patient's safety, being willing to help patients and also being positive are mandatory and part of the job's obligations. Therefore, being respectful, positive, and helpful for patients are interrelated and supportive of each other.

8-J

Health professionals who have good interpersonal skills in identifying patients' problems and discussing patient complaints are always willing to help. Trainings that enhance such problem-solving skills can encourage health professionals to help patients and be positive towards them.

9-C

Respectful staff members towards each other and patients give priority to requests that arise regarding the treatment process. Patients' requests and questions are always different, and they may not be related to the whole treatment process or the complaint regarding the disease. Even though respect is mandatory for patients as a major ethical requirement, giving priority to all their requests depends on the severity of the requested case.

9-E

Technical training is very important for the excellent performance of health professionals. This process also includes ruling out certain patient requests that were made prior to their hospital stay. In the surgical ward, some patients request an anti-pain injection every time they feel pain, while another patient is in the immediate post-operative period and experiences severe pain. Although giving attention to both is crucial, knowing to whom to give priority is also needed.

9-J

Health professionals who communicate and interact with patients in appropriate ways give priority to the requests made by patients accordingly. Therefore to make all professionals reach to this level trainings are needed.

10-A

In most hospitals that are famous for their technologies and machines available, patients always feel safe with the diagnosis and medication, no matter what the outcome is. This is a result of the available materials and their adequacy, which does not make patients and caregivers doubtful about the entire treatment process. This happens most of the time in the OPD and in inpatient treatment and care. Though it is significant, the alternative mechanisms that the doctors use for unavailable machines and materials will be consistent with the actual procedure, which will make the relationship less.

10-B

The communication between the patient and the doctor can have less impact on the perception that the diagnosis and treatment given are not safe. Because of the detailed questions and investigations the patient passes, it will not have that much effect whether the nurse or doctor communicates friendly or not.

10-D

The medication and diagnosis of the patients' case, compared to the physical environment of the hospital, depend on what treatment is given and what diagnosis is made since the patients' main concern is regarding their complaint.

10-E

Medicine always needs self-updating health professionals and meticulous care for patients. Known health professionals, usually found in St. Paul hospitals, are known for their knowledge and skills, which they develop through reading and participating in different trainings for experience development. This will reassure and increase the safety of their patients during the treatment process.

10-F

Although the diagnosis and medications given during the hospital stay or visit period are mandatory for the next health professional measures, such as advice on recommended and restricted actions, their significance is not mostly seen. A patient who was being treated for DKA, which is a severe complication of type 1 diabetes mellitus, throughout the process of treatment will be provided with appropriate medications. After the patient's recovery from the complication, the health professional will advise on how to decrease the occurrence of the complication. If the health professional fails to give advice, that doesn't mean the treatment given throughout the admission period was not safe enough.

10-G

Well-designed policies and procedures are mandatory for the overall functionality of the hospital. It has an impact on all the details of the process. The patient can feel unsafe in the medication process as a result of the doctors' and nurses' service provision, which is led by the designed policy. The designed policies and procedures can reassure the patient's safety through complaints to higher managers, and such activities are encouraged if they are stated in the policy.

10-H

Regular ward rounds are also for asking patients about their safety in the treatment process, in addition to reviewing their case and prognosis. Therefore, any patient who has a complaint can raise it with the assigned closely observing doctor or nurse for corrective measures.

10-I

Cancer patients in most cases where their case is being held secret between the caregiver and the doctors for their sake feel unsafe every time they get any treatment and pain relieving medications because of the transparent information flow. Thanks to the technology available,

such as chemotherapy and radiotherapy, cancer patients of different stages know their case in detail and will understand each treatment they get. This is due to the honest information flow between the patient and the health professionals.

10-J

Communication is always a key to the comfort and improvement of the patient's case. In St. Paul Hospital and such governmental hospitals where there are a lot of patients coming from rural and urban areas, what patients need is an outgoing and friendly health professional, which can increase their safety with the treatments provided.

11-A

The knowledge of the health professionals is seen in their technical and theoretical skills while treating patients in difficult situations. The knowledge of health professionals is not necessarily dependent on the adequacy of needed equipment.

11-E

The knowledge of all health professionals while treating patients needs skill and technical knowledge. Therefore, training for capacity building in the health professionals' knowledge and technical skills is mandatory.

11-F

Certain diseases need restrictions and recommendations after full recovery. These should be told to every patient. In order to give advice, health professionals should know these things and how to tell the patient and the caregivers. This advice itself has a department, especially for AIDS patients, because of the difficulty and complications of the case. In each department, they assign knowledgeable and experienced professionals.

11-G

The knowledge of health professionals is independent of certain health organizations' policies and procedures.

11-H

Regular ward rounds are useful for the examination of each individual health professional's knowledge in the teaching hospitals' setups.

Transparent health professional individuals show their knowledge through the conversations they have while discussing the issues with fellow workers and patients, and it always shows transparency.

3.8.5 FMEA Analysis

Failure mode and effect analysis in this research is used to identify the critical customer-oriented failures. The failure modes in the FMEA analysis are identified from the service quality gap analysis. Using FMEA analysis, the critical failures in the hospital are identified as follows:

Quality Tools

Failure Mode and Effects Analysis

Description

This template illustrates a Failure Mode and Effects Analysis (FMEA), also referred to as a Potential Failure Mode and Effects Analysis (PFMEA) or Failure Modes, Effects and Criticality Analysis (FMECA). A detailed discussion can be found at www.ASQ.org

[Learn About FMEA](#)

Please follow the link for detailed instructions for data entry

Initiate action to reduce the RPN

Re-evaluate the RPN value after completion of the recommended actions

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FAILURE MODE AND EFFECTS ANALYSIS

process: patient treatment process

Model: Current Prepared by: kiya beyecha

Core Team: Saint paulos hospital quality control and assurance office and kiya beyecha

Process Function	Potential Failure Mode	Potential Effect(s) of Failure	S v	Potential Cause(s)/ Mechanis	O c	Current Process Controls	D t	R P N	Recommended Action(s)
during preoperative, operative and post operative care	No adequet equipments	diesease complication and death	8	not proper handling, stock managemnt problem & not adequet budget rising	8	ordering patients to purchase, maintainance for machinaries	5	320	proper stock management,maintenance & invest in technology
surrounding environment	not sufficient attractive service environment	patients and employees discomfort and stress	5	lack of cooperatio and focus n	5	there are garden expertes employeed,and wall painting in pediatrics opd wall for childrens	3	75	creat cooperation over all the hospital & hire more garden and art experts

diagnosis process	service process and facilities are not consistent	medical error, long service time	5	lack of knowledge, shortage of equipment and carelessness	5	surveillance and case management trainings	2	50	inclusive theoretical and technical trainings for all departments
waiting time in opd	no on time service delivery	serious health complication even death	10	number of employees and patients is not proportional & lack of equipments	9	hiring health professionals of different departments from the collage itself	3	270	rather than only hiring top scorer students some times its better to hire specialists for work effectiveness and efficiency
patient treatment process	not sympathetic & reassuring employees	patients discomfort and feeling unsafe	2	personal behaviour	5	peer suggestions and to correct the actions	7	70	give proper interpersonal training for employees
diagnosis process	not accurate (error) medical records	disease complication and death	10	lack of knowledge, stress, carelessness	5	strict policies for the punishment of such actions	7	350	create culture of recognizing safety rather than introducing the punishment and shame of creating error
round time, OPD visits, follow up times	patients doesn't feel safe during diagnosis	psychological stress on patients	5	lack of faith on employees & employees response	57	having conversation out of the medical issue, encouraging patients for their improvements	5	125	proper and regular interpersonal training
ward round process	no service in inconvenient Hrs	disease complication and death	7	sleep and laziness	3	serious supervision by governing bodies	5	105	reduce employees load more serious supervision

opd and ward rooms during communication	understanding problem	error in medication	7	lack of language skill	5	language translator	5	175	treating patients in a good manner and use language translator
inpatient treatment and care	lack of care and attention	error in medication and patient discomfort	8	personal behaviour	2	serious orders of doctors for nurses to strictly follow	7	112	provide proper interpersonal training

Figure 3.3 Quality tool FMEA

Note: the failures identified by patient expectation and perception analysis is doesn't mean the problem/failure is occurred continuously and always. And the failures identified by patients is again check and examined by 3 medical staffs and 2 quality control staffs to avoid subjective judgment.

CHAPTER FOUR

4 RESULT AND DISCUSSION

4.1 Quality function deployment result

Using the quality function deployment analysis, technical requirements are prioritized based on the relationship between customer requirements and the interrelationship between technical requirements. According to the analysis, the most critical technical requirements that are used to fulfill the customers' requirements are prioritized as follows:

Table 4.1 Quality function deployment analysis result

No.	Tecnical requirnmnts	Relativetechncal importance
1	Regular technical training	22%
2	Transparent information flow	22%
3	Designof policies & procedures	12%
4	Regular iterpersonnal training	11%
5	Uptodated medical equipments	11%
6	Attractive hospital environment	7%
7	Regular ward round	6%
8	Restriction,recommendation and requirnmnts	4%
9	Staff respectfulness	3%
10	Staff communication skill	2%

4.2 Service design

4.2.1 Technical training

According to the results of the quality function deployment analysis, the first crucial technical requirement is conducting regular technical training, so to ensure the continued set-up of the work force for success, continuous skill and knowledge training is essential. A training program is a well-thought-out, formal earning policy.

As health care provider shortages loom, hospital training and development programs become increasingly important. Such programs can help retain employees, improve their skills, and positively impact the overall quality of the health system. Yet in St. Paul's hospital, training and development initiatives aren't often a top concern for the management. In the world's health care system, the system offers thousands of training courses each year, both mandatory and optional by role. Mandatory trainings include those for compliance, privacy, clinical skill

development, etc. Examples of occupational training include continuing medical education and leadership development opportunities.

The hospital has to design the training program as such in order to provide essential training and development.

1. Understanding the needs(problems):

Needs assessment surveys

- ✓ interviews with OPD and ward patients and employees
- ✓ Observations and shadowing, as well as following patients as they navigate the OPD and the ward,
- ✓ Review of medical records and patient input Examining medical records and patient feedback
- ✓ Collaborating with medical professionals to have insight into areas where they think employees could need more training

The training requirements for OPD and ward employees can be fully understood by combining various assessment techniques. Using this knowledge training programs can subsequently be created to meet the needs and problems of these employees.

Understanding the specific needs of both patients and healthcare professionals is the first step in creating a training program that works. Surveys, interviews, and observational studies can be used to pinpoint the particular difficulties they confront and the abilities they need. This information helps in the creation of customized training courses.

Using servqual analysis 10 major hospital service quality problems are identified, among those 10 majore problems, While identifying or assessing the major problem of the hospitals which are solved by providing technical training, the following problems were identified using direct observation and informal communication with patients and doctors.

✚ Medical error and

✚ No on time service delivery.

- **medical error problems:** the main cause of omitting medical error during medication process is the problem of prescription (a physician's order for the preparation and administration of a drug or deice for a patient), and patient history writtig (document of patient total past and current status of the disease). since saint paulos hospital is a medical college there are many practitioner students who are serving as assistant

doctors, so this prescription problem occurs due to their lack of long lasting experience.

- **No on time service delivery:** During diagnosis process in each department there are different specialist doctors assigned. so the time duration of patients in OPD room is mostly depend on the doctors service time. so patient service time management training is essential for doctors and receptions in OPD of Saint paulos hospital.

2. Is really the problem tied to need?

Since this research is dealing about service quality issues in health care center, time and accuracy of medication process have very significant effect, as long as it's a matter of life and death of human beings. such kind of problems such as medical error and not having on time service delivery is the major service quality dimensions of the hospital. Waiting for long time having health problem may leads to another disease complication and even to death, and also the occurrence of medical error by medical employees may cause critical health complication and also may lead to death. so reducing this to problems is a need for the hospital service quality improvement.

3. Is the problem skill/knowledge deficiency?

Any Medical schools give knowledge about Physical examination and patient history recording. physical examination taking, patient history recording and description order is different for each type of disease. for the major clinical courses there is one chapter about physical examination, patient history recording and description order. so its difficult to say the problem is knowledge deficiency, so the problem is caused by skill deficiency which is solved by frequent observation and practice. in order to shorten the time periode of skill development of interns and nurses commonly this type of problem is reduced by providing training.

4. Who is the trainee for this training?

In saint paulos hospital medical error is occurred most frequently by nurses and intern doctors so because of conducting physical examination, patient history documentation and prescription is a knowledge or skill which is developed through time while conducting many patients. Many Doctors in this hospital have long work experience so the error occurring possibility goes to junior nurses and intern doctors.

Long service time problem is observed mostly in OPD of saint paulos hospital. in this department the even if there are many factors for the delay of process such as:

- ❖ Saint Paulo's hospital is the major referral hospital in the country all over
- ❖ There is imbalance between service providers and patients

- ❖ Medical equipment shortage
- ❖ Technology usage et..

The major causes for the process delay and long service time is at reception office and during diagnosis period by doctors.

During diagnosis process in each department there are different specialist doctors assigned.so the time duration of patients in OPD room is mostly depend on the doctors service time.so patient service time management training is essential for doctors and receptions in OPD of Saint paulos hospital.

Another factor for long time service in OPD of saint paulos hospital is patients come from different areas of Ethiopian region, with different educational level so there would be miss communication and miss understanding between patients and doctors so patiens also will be parts of the training.

5. Is the selected training design appropriate way to fix this deficiency

For the medical error problem Medication error encouragement training (MEET) is selected.MEET is now recently known traning. Its most effective because the trainings conducted previously ‘the correct principles of conduct’ is not enough to guarantee the competency required in real life clinical situtions.training that focuses on the correct principles of conduct has its limitations in its inability to anticipate errors or manage errors in clinical situations.to over come this limitation error training could come in to effect. Error encouragement training presents possible real life errors in safe training environments beforehand, and induces errors.through this training learners are able to studying how errors were made determine the reasons behind the errors and understand the knowledge and technology that are relatively sensitive to errors.

For time management and communication problem of patients, doctors and receptionists, the slected appropriate training type is customer service training.customer service training:

- Increase engagement among staff and patients
- Investing in such training makes workers feel valued
- Satisfied patients
- Ease of simple communication

the training in general includes:

- ❖ Way of easily understanding patient problem training programs
- ❖ Handling angry or upset patients
- ❖ Service time management skills

Patient Training:

- Patients who are empowered participate actively in their own healthcare. Patient education programs can be created to teach patients how to take care of themselves, manage their illnesses, and take preventative actions. Interactive seminars, educational videos, and user-friendly mobile applications can all be used to do this.
- Technical abilities can be taught to carry out simple medical tasks, including taking vital signs, giving medication, or treating wounds. This frees up patients to take charge of their own health and lessens the workload for medical staff.

6. Is the cost of training greater than cost of current problem

The training is designed to be given by senior specialist staffs and active participant patients. The cost of delivering this training will not be that much costly. No matter the cost of production is incurred it doesn't be greater than human beings life.

7. Time, place, frequency and way of training given

MEET training is better to be given for intern doctors and junior nurses so the appropriate time for training is during round time in ward rooms. Since this training is practical skill based training, to have full knowledge about patient history writing, description writing and physical examination taking from different types of patients in wards it's better to give the training during round time in ward by department specialist doctors.

Another problem which needs technical training is time management problem in OPD rooms by doctors.

Create content: preparing training content

This can be done in two ways: top-down and bottom-up.

Top-down: the hospital hires learning and development professionals who are responsible for creating and maintaining all the learning content themselves.

Bottom up: The hospital gives employees themselves the tools to create and maintain their own learning resources.

In Saint Paulos hospital there are many specialist professors in each departments. So hiring professionals from other organization and incurring cost for this training is not appropriate. The preferable way is using Bottom up content creating way. The hospital gives professional employees themselves the tools to create and maintain their own learning resources.

8. **Evaluate the training program:** evaluate the training program through assessments before and after the training. Conduct a pretest before and a posttest after the training, and then compare the results.

The patient experience can be revolutionized, and healthcare workers can be empowered, by using a service design strategy that emphasizes technical training in OPD and ward settings. We can raise the standard of treatment, boost patient outcomes, and increase the efficiency of the entire healthcare delivery system by combining patient education, improved technical training, and technological integration. This service design strategy has the ability to transform the healthcare industry by ensuring that patients and healthcare professionals have the information and skills necessary to succeed in a setting where the healthcare industry is continually changing.

4.2.2 Designing policies and procedures in hospital

Policies and procedures in health care are far more than just general guidelines. Policies and procedures set expectations and proper ways of doing things. and also policies and procedures that guide day-to-day activities, helping promote consistency in practices, reduce mistakes, and keep patients and staff safe. Health care workers regularly deal with life-or-death scenarios. Having proper procedures in place helps them make good decisions and provide the best possible care to patients.

As is known, writing policies and procedures in healthcare is tricky. It's very difficult to create a detailed procedure for every possible scenario; it should try to cover all bases. like patient care, data security, employee handling, billing, operating procedures, etc.

The current St. Paul's hospital policy is relatively well designed and established, but as it is required and must be, the hospital policies and procedures don't give much attention to pre-service failure prevention mechanisms like failure dissatisfaction analysis, patient complaint recording, and employee complaint management procedures. So the hospital management should revise the hospital policies and procedures by considering:

- ✓ patient-oriented service process
- ✓ complaint management procedure
- ✓ customer requirement assessment more technology-oriented equipment

4.2.3 Inter personal training

Better interpersonal skills between patients and medical staff are correlated with improved patient outcomes. Due to interviews with medical employees, it was observed that many

employees believed that being good with people was an innate talent, but the reality is that good interpersonal skills can be taught to anyone, and anyone can have good interpersonal skills through training and education. This research identified that due to a lack of communication among employees, disrespectfulness, carelessness, and not being sympathetic, the hospital's service process is being negatively affected. So in order to solve this problem, conducting regular interpersonal training is crucial.

While providing interpersonal training, the core concept that should have been given focus is emotional intelligence. It's the ability to recognize emotions in themselves or others and to use this knowledge to help patients both feel at ease asking questions and better understand the answers they are given.

Need assessment : major problems of employees which can be developed by providing interpersonal training are:

- Lack of care and attention
- No service in inconvenient hours
- Not being sympathetic and reassuring

Is the problem really tied to the need?

More research is showing that a physician's bedside manner can improve patient health outcomes. When doctors and patients are able to engage in effective and meaningful communication, patients are empowered to participate more in their care, leading to better and faster recoveries.

It may seem obvious, but a physician who possesses certain interpersonal skills can actually achieve better clinical results. Empathy allows for doctors to better understand and relate to their patients. Communication skills are critical to learn about patients and delivering the most effective treatments possible. Motivating skills can help doctors to engage their patients in participating in their health care and to take up the most critical part of most treatment plans.

Medical schools and residency programs offer little education on communication skills.

According to the previous study in Saint Paul's Hospital, two-thirds of patients are discharged from the hospital without understanding their diagnosis, and sixty percent of patients misunderstand their discharge instructions.

This all the above issues describe that developing interpersonal skill is an important factor for service quality improvement in saint Paulo's hospital.

Is the problem skill/knowledge deficiency?

Interpersonal skills are not an innate behaviors, those skills can be developed through interpersonal trainings.as the term indicates it's a skill so the problem is skill deficiency.

Who is the trainee for this training?

This problem is mostly observed and most patients complain about interpersonal problem of nurses and doctors.and also actually this two participants have high communication rate with patients relative to other employees.so due to the cost, and time of training the participantes of the training in the selected department will be doctors and nurses.

Time place frequency and way of training given:

As its mentioned before this hospital have many proffetionals who have very high skill in interpersonal interaction,again to provide this training its not preferable to hire proffesionals from other departments.since this type of training is which is given mostly in lecture form its betterto provide the training in seminar room for 5 days, by scheduling free time of trainees.

The hospital management have to provide interpersonal skills like:

- Emotional intellegence
- Conflict management
- Motivation skills
- Active listning skills
- How to deal with difficult people
- Empathy in work place skills
- Communication skill
- Assertiveness training
- Intercultural communication
- Anger management

4.2.4 Transparent information flow

The current patient information flow in saint paulos hospital takes time since there is high patient arrival in the hospital.

In saint paulos hospital there are around 18 departments such as Internal medicine, Forensic medicine, Neurology, General surgery, ENT, Psychiatry, Ophthalmology, Dentistry,

Maxillofacial surgery, Radiology, Dermatology, Obstetrics and Gynecology, Pediatrics, Biomedicine, Emergency medicine and critical care, Neurosurgery, Orthopediacs and Traumatology, and Neurosurgery.

Any patient first join main reception and after registration goes to internal medicine department the GP(General practitioner)Doctor in this room with the help of one resident doctor identifies the type of patient diseases and sent to specific department then the patient will again wait a long time in each specific department to meet the specialist.

This kind of information and patient flow takes time, some patients desiease symptoms can be easily identified so instead of sending all patient document to internal medicin deparment its better to redesign the patient information by adding one general practitioner (GP) doctor and one resident doctor. if those two doctors are added to reception beside, the number of patients in internal medicine room will be reduced and information flow of patients will be easier.

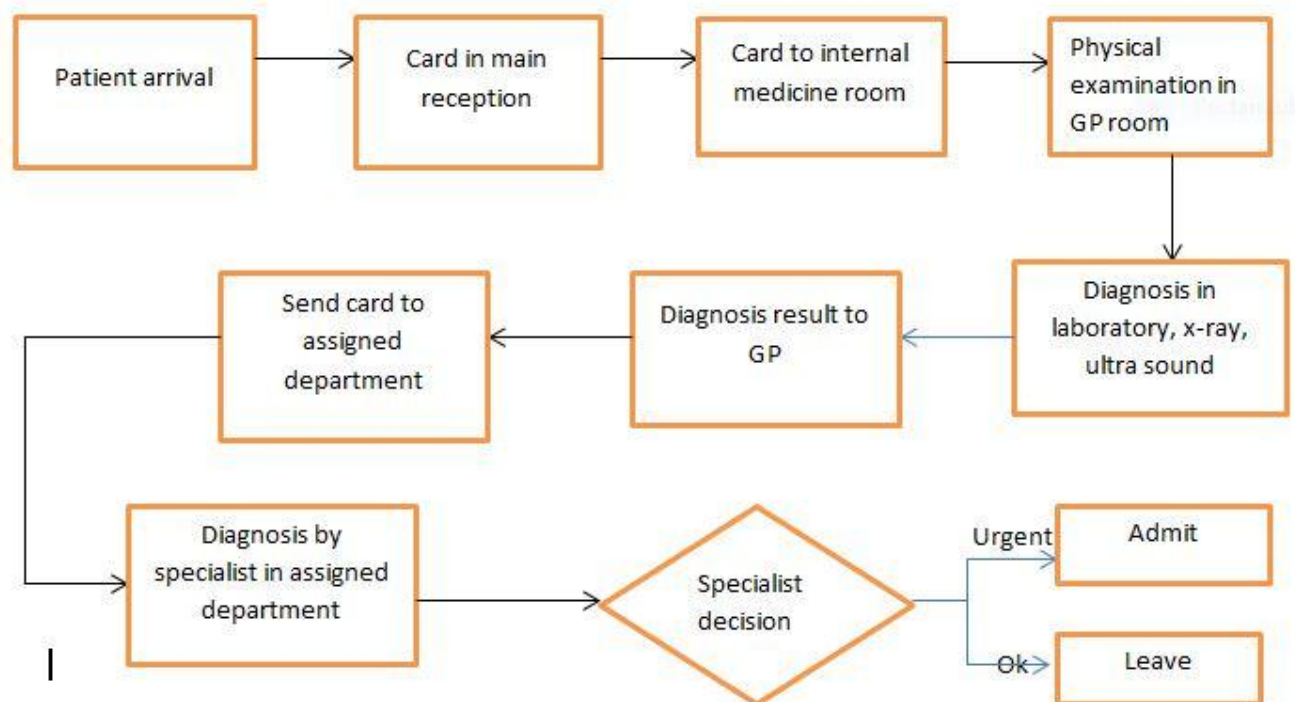


Figure 4.1 Current patient information flow at St. Paulos hospital

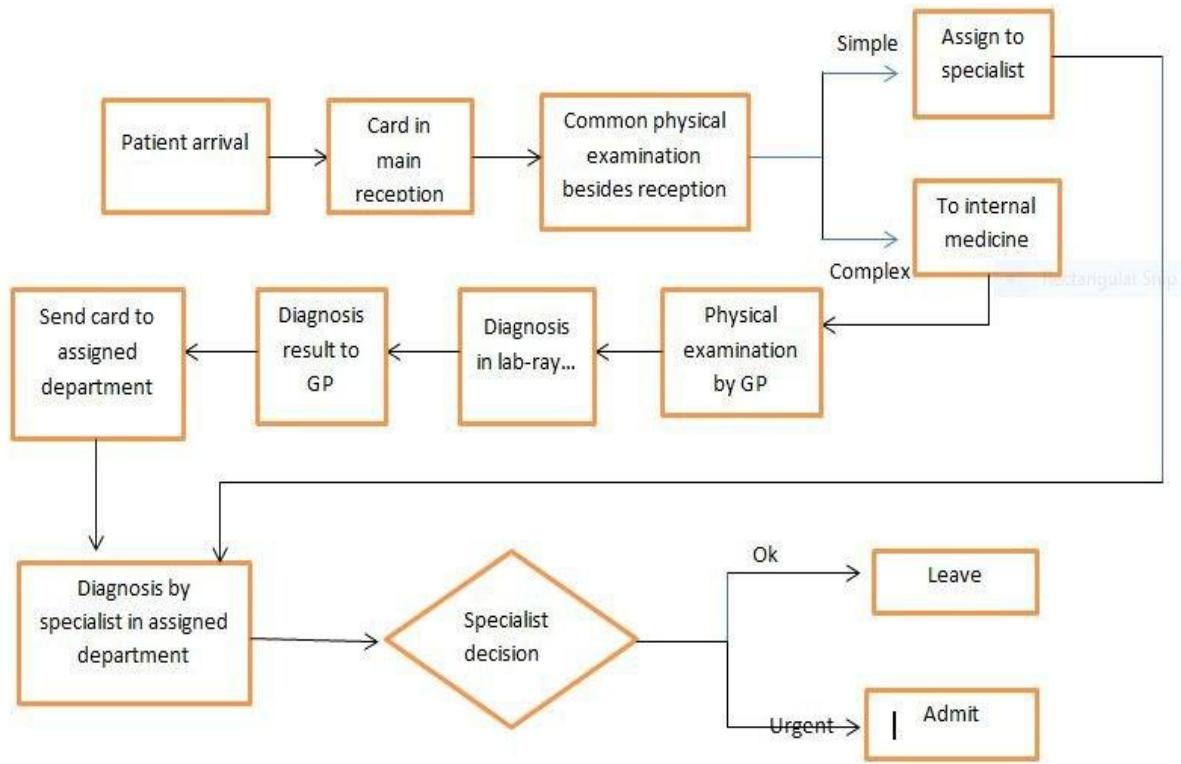


Fig 4.2 new saint paulos hospital patient flow diagram

Usually, in Saint Paulo Hospital, information flow and recording are paper-based. In order to increase service quality in the health care system, an electronic healthcare information system has to be introduced.

In order to conduct electronic health information flow, hospital management should:

- Medical employees should be equipped with the appropriate skills, information, and knowledge of how to effectively deploy electronic health care systems.
- Formulation of policies that support the e-health system
- Provision of adequate power and internet supply
- Security of health related information management
- Integrating all the elements of the hospital in this e-health information flow system

4.2.5 Medical equipment's

Medical equipment is vital to delivering quality services in health facilities, and the role of medical equipment is a well-founded reality. As per the data from the hospital, the hospital

management has recognized that managing medical equipment, especially the utilization phase of medical equipment, was not well handled in Saint Paul's Hospital.

In the hospital, effective maintenance and proper management are major utilization issues to provide quality services while saving scarce resources with the patient trend. As a recommendation to overcome the stated problem, medical equipment management is an important part of the management of resources to successfully operate in health care. It has many elements like procurement, proper utilization, maintenance services, storage, and disposal.

In order to properly use and manage the hospital equipment, hospital management should:

- Revise and properly manage the equipment procurement process. This process begins in the hospital with organizing the purchase order and is finalized with receiving the equipment.
- Proper inventory management
- Understanding what commodities are to be handled and performing inspections of them

In countries like Ethiopia (developing countries), a variety of equipment is not functional. Of the total donated medical equipment, up to 50%, like laboratory machinery, is not in use in lower-income countries.

Revise the policy of medical equipment management, incorporating procurement, maintenance, and utilization of medical equipment, and provide guidelines with the newly revised WHO medical equipment management policy.

4.2.6 Attractive hospital environment

Calming environment

One of the most important thing that need to consider when building a hospital is ensuring that it is a safe and welcoming place for patients.if the hospital environment is hostile, it will only create more anxiety for both patients and staff.happy staff equals well-cared-for patients, so saint paulos hospital will be massively improving patient care if they take the time to focus on improving the hospital environment.

According to patients feedback and international experience of hospitals, saint paulos hospital environment is not properly designed according to patient healing process.this makes

patients to go through a physically traumatic experience. But they need to be in calm environment if they are to heal properly.

So in order to create a calming and relaxing environment it's preferable to paint the rooms with calming colors. Many rooms of Saint Paul's Hospital wall is white colored, which is currently according to international experience not always conducive to healing and relaxation. So sage green, lilac, and baby blue colors are all known to be very calming for people.

Create a relaxing staff room

While it's important to create a welcoming environment for patients, it must also ensure that there is a comfortable space for staff to relax. Even if in Saint Paul's Hospital there are break rooms, the hospital should invest in some comfortable furniture and even consider adding some couches in the breakrooms too, so that any one can have a quick power nap before they go back to work.

Design welcoming reception

Saint Paul's Hospital's reception waiting area is somewhat dingy and dark. So the hospital reception should be full of modern and comfortable furniture, and ensure that reception staff have all the tools they need to do their job. It would be best if the reception area is large. Also in Saint Paul's Hospital reception room is not warm, and calming colors that will help put everyone at ease. And it's better if some TVs are mounted on the wall because as it's stated before there is a high waiting line in this room. So people at least have something to keep them entertained while they are waiting.

4.3 Failure mode and effect analysis (FMEA) results

According to the failure mode and effect analysis result, the most critical failures are identified, and the medical expertise opinion and recommended action in order to reduce, eliminate, and provide quality service to satisfy patients are provided. The prioritization of failures according to their criticality is summarized as follows:

Table 4.2 Failure mode and effect analysis result

No	Potential Failures	RPN
1	Not accurate(error) medical records	350
2	Shortage of medical equipments	320

3	No on time service	270
4	Patient understanding problem	175
5	Paients doesn feel safe during diagnosis	125
6	Lack of care and attention	112
7	No service in inconvenient Hrs	105
8	Not attractive serice environent	75
9	Not sympathetic and reassuring	70
10	Service process and facilities are inconsistence	50

4.4 How to solve the failures

A solution for the significant failures based on the qualitative and quantitative Failure Mode and Effect Analysis (FMEA) data provided for St. Pulos Hospital's OPD and ward patients, which is presented below,

1. Not accurate (error) medical records

- Put in place reliable processes for fast and accurate patient record documentation.
- Health care professionals should receive training on good record-keeping procedures.
- To find and fix problems in medical records, conduct routine audits and quality checks.

In General, there are two types of medical error that are presented in St. Pulos Hospital

- Error of omission occur as a result of actions not taken
- Error of commission occurs as a result of the wrong action taken

As it's known, there are two main reasons why medical errors occur: knowledge and skill shortages or the personal status of medical employees. Healthcare professionals experience profound psychological effects such as anger, guilt, inadequacy, and depression. This feeling of change has its own effect on their work environment.

During the data collection process, the hospital management was not willing to openly speak and give data for the research, but the data from patients' experiences shows that medical errors occur in the hospital's medication process.

The behavior of the medication process requires rapid decision-making and an instant need for life-saving drugs and procedures. This situation creates a very high probability of error occurrence. Fear of punishment makes healthcare professionals reluctant to report errors. While they fear for patients' safety, they also dread disciplinary action. But while they fail to report, they contribute to the likelihood of serious patient harm. Saint Paul's hospital has rigid policies in place that also create an adversarial environment. This can cause staff to hesitate to report an error, cover the issue rather than minimize the problem, or document the issue.

As a recommendation, the hospital should work collaboratively with governmental, legal, and medical institutions to remove the culture of blame while retaining accountability. and maintain a culture that works toward recognizing safety challenges and implementing viable solutions rather than harboring a culture of blame, shame, and punishment.

The following tactics are taken into consideration to lower medical errors and improve service quality at St. Pulos Hospital:

1. Put in patient safety protocols. To ensure consistent and secure care delivery, standardize patient safety protocols and guidelines and use them. This includes guidelines for administering medications, performing surgery, preventing infections, and maintaining good hand hygiene.
2. Improve communication and teamwork, promote efficient communication and teamwork among hospital staff members who are involved in patient care. This accomplished by holding regular team meetings, working together across departments, and using communication tools like electronic health records (EHRs) to accurately and effectively exchange patient data.
3. Ongoing education and training; offer healthcare professionals programs that help them expand their knowledge and abilities. This includes instruction in cutting-edge technologies, research-based techniques, patient safety, and techniques for quality enhancement.
4. Encourage reporting and learning from mistakes, and create a culture of doing so inside the hospital. Promote the reporting of occurrences and near-misses by healthcare professionals,

and carry out rigorous investigations to determine the underlying causes. Used corrective measures and communicate lessons gained to avoid repeating the same mistakes.

5. Ensure accurate and safe drug delivery by improving medication management and putting medication reconciliation mechanisms in place. This include checking prescription records, settling disagreements, and giving patients detailed directions on how to take their medications.

6. Standardize surgical procedures and create checklists and guidelines to provide reliable and secure surgical care. This comprises procedures for pre-operative verification, surgical site marking, and post-operative supervision.

7. Implement technological solutions, make use of technological solutions including computerized physician order entry (CPOE) systems, automated alarms for potential pharmaceutical errors, and barcode scanning for drug administration.

8. Engage patients and their families in their treatment by giving them accurate information, including them in decision-making, and empowering them to voice their questions and concerns.

9. Monitor and evaluate performance, consistently track and assess performance metrics pertaining to the standard of care and patient safety. Tracking prescription errors, infection rates, readmission rates, and patient satisfaction ratings are a few examples of this. Use this information to pinpoint problem areas and make the required adjustments.

St. Pulos Hospital aim to lessen medical errors, enhance patient safety, and give patients high-quality treatment by putting these principles into practice. To make sure that these techniques are implemented successfully, hospital managers, medical experts, and patients involved in the process.

2. Shortage of medical equipment

- Make sure there is a sufficient supply of necessary medical equipment and conduct a complete assessment of equipment requirements.
- Create a maintenance schedule to make sure the machinery is up to date and accessible as required.
- Establish a system to track inventory and promptly address any equipment shortages.

3. No on-time service

- Simplify procedures and workflows to cut down on wait times and boost productivity.
- Distribute the proper resources to manage the patient load and reduce delays.
- Establish clear channels of communication to let patients know if there are any delays or schedule modifications.

4. Patient understanding problem

- Strengthen patient education and communication initiatives to guarantee efficient and understandable dialogue between healthcare professionals and patients.
- To increase patient comprehension of medical information, use visual aids, clear language, and other communication methods.
- Encourage patients to clarify any misunderstandings and to ask questions.

5. Patients don't feel safe during diagnosis

- Provide patients with a secure and encouraging environment while they undergo diagnostic testing.
- Increase patient communication regarding the goal and possible hazards of diagnostic techniques.
- Make sure that during the diagnostic procedure, patient confidentiality and privacy are respected.
- The relationship between patients and their medical employees is crucial to the appropriateness of treatment. A lot of patients complain that they don't feel comfortable in medical treatment process. Due to their and others patients bad experience, the type of disease itself, fear of treatments like injections, procedures and medicines, patients get in to stress and trauma in the hospital.
- The medical employees should be polite to patients to ensure patients that all the staff members know how to talk to patients and keep comfortable. Creating nonthreatening surroundings. Preparing kid-friendly furniture, toys, and play areas can also make doctor's office more accommodating especially for kids.
- Establish a method to talk to patients that include using the right language, words and tone. Explaining. what type of medication is going to be taken for example: while taking blood sample the nurse should tell to the patient that she is going to take blood sample and do not worry it will take a short time and its purpose also.
- The following actions can be performed at St. Pulos Hospital to ensure patient safety throughout the diagnostic process and to deliver high-quality care:

- 1. Clear Communication, healthcare providers describe the diagnostic process to patients clearly, including the tests, treatments, and expected results. Patients encouraged to express their concerns and ask questions.
- 2. Patients are handled with respect and dignity at all times during the diagnostic process. This entails preserving confidentiality, offering cozy and spotless exam rooms, and guaranteeing cultural sensitivity.
- 3. Patients give their informed permission after being fully informed of the diagnostic tests being conducted, their risks and benefits, and any accessible substitutes. Before beginning any diagnostic procedures, informed consent obtained.
- 4. Patient education, inform patients about the diagnostic processes and tests they are subjected to by providing them with informational materials or resources. By doing so, patients are empowered to take an active role in their own treatment and their anxiety is reduced.
- 5. Timely diagnosis, to minimize waiting periods and lessen patient anxiety, make sure that diagnostic tests and treatments are carried out promptly. For quick diagnosis and treatment, it's crucial that diagnostic services are efficiently scheduled and coordinated.
- 6. Thorough documenting of patient data, including medical history, symptoms, and test findings, is essential for correct diagnosis. This facilitates the decision-making process and reduces errors for healthcare providers.
- 7. Put quality control systems in place to guarantee the precision and dependability of diagnostic testing. It is crucial to do routine equipment calibration and maintenance, follow set guidelines, and provide workers with ongoing training.
- 8. Encourage patients to share their experiences with the diagnostic process in the form of feedback. Surveys, suggestion boxes, and internet tools can all be used for this. Patient satisfaction is increased by actively listening to patient comments to help discover areas for improvement.
- 9. Through continuing education programs, healthcare practitioners keep up with the most recent developments in diagnostic procedures and technologies. Patients provided with the most precise and effective diagnostic services possible as a result.
- St. Pulos Hospital assist patients feel safe and secure during the diagnosis process and offer top-notch medical care by putting these principles into practice. It's critical to

establish a setting that prioritizes the needs, preferences, and concerns of each individual patient.

6. Lack of care and attention

- Continued instruction and education on the value of compassionate care for medical professionals.
- Put in place procedures for routinely gauging patient satisfaction and handling any issues or complaints.
- Encourage a caring, patient-centered culture inside the institution.

7. No service in inconvenient hours

- Evaluate the demand for services during unfavorable times and think about extending working hours to meet patient needs.
- Put in place a system for scheduling appointments on the weekends or in the nights.
- Let patients and the public know that services are available at unfavorable times.

8. Not attractive service environment

- Enhance the hospital's physical space to give patients a warm and comfortable environment.
- Improve the aesthetics, amenities, and cleanliness of the waiting rooms and patient spaces.
- Include patient-centered design components to improve the aesthetics and calming effects of the space.

Green areas have been used to help recover from stress and find peace. A green area can improve the health of patients' family members and staff. Nature has many restorative factors, including relief from disease, reduced stress, and increased overall wellbeing. As a recommendation, since there are different types of healing gardens, Saint Paul's Hospital has some garden areas that have the first type of garden, which has a passive effect on overall health. Patients can benefit simply by walking or sitting on it. They can even begin to feel relaxed and refreshed just by viewing the garden.

The other type of garden that is not available in Saint Paul's Hospital and is the most recommended type of green area for hospitals is an enabling garden. This type of garden allows visitors to actively participate in gardening activities such as planting flowers,

watering plants, and harvesting fruits and vegetables. Enabling gardens allow patients to get fresh air and spend more time outdoors.

But while creating this environment, the hospital should consider:

- The garden needs to contain real elements.
- The garden should be interesting and interactive by adding additional features like fountains, lights,...
- There should be beautiful sights. pleasant sounds and smells

When patients stay in the hospital, they have a lot of stress due to the fact that they may pass through complex diagnoses, and they may look for a way to take their minds off it. When patients have a chance to be in nature and absorb the scenery, they are provided with a positive distraction from pain and discomfort. And also, for the hospital employees, it's important to relax on their break in order to refresh their minds and not have to worry about everything else going on in the hospital.

9. Not sympathetic and reassuring

- Through education and awareness campaigns, foster a compassionate and empathic workplace culture among healthcare professionals.
- Motivate employees to empathize with patients' worries and actively listen to them.
- Put procedures in place to deal with patients' worry and anxiety during their time receiving medical care.

10. Service process and facilities are inconsistent

- To guarantee consistency in service delivery, standardize procedures and practices across several sites and divisions.
- Perform routine quality checks and audits to spot and correct any irregularities in service procedures.
- Promote departmental cooperation and communication in order to improve processes and the patient experience.

In the case of hospital facilities, inconsistency with the service given is sometimes observed, and patients also complain about it. This problem occurred because of a shortage of some medical equipment. Medical staff use different pieces of equipment interchangeably, which is not consistent with the service provided.

In the process of preoperative care, most health professionals fail to use surgical gloves or disposable gloves while inserting a urinary catheter because of shortage, which can exacerbate the occurrence of infection after the process. Further, in cases where patients are admitted, there are some who are suffering from stroke or sudden brain injury. In the diagnosis of such cases, an MRI or CT scan is needed for a definitive diagnosis. In St. Paul Hospital, where there are a lot of patients being treated at one time, they sometimes send patients out for investigation in other diagnostic centers.

Sometimes this failure occurs due to knowledge and skill shortages and due to stress and carelessness. To overcome this problem, hospitals should

- give proper technical training
- reduce workload from employees and
- fulfill equipment shortages

Inconsistencies in the care patients receive at St. Pulos Hospital result in complaints. This problem may occur for a number of reasons, including a lack of medical equipment and the interchangeability of equipment that does not provide the essential service.

- Shortage of medical equipment

The lack of essential medical equipment in St. Pulos Hospital is one element in the inconsistent quality of service. Because of the shortage, medical staff began utilizing various pieces of equipment interchangeably, which could lower the standard of service. Due to a lack of adequate equipment, medical practitioners performing pre-operative care may choose to implant a urinary catheter using disposable gloves rather than surgical gloves. The risk of infection following the procedure rise as a result of this technique.

- Diagnostic investigations

Prompt and correct diagnosis in St. Pulos Hospital is essential when patients are admitted with diseases like stroke or abrupt brain injury. To facilitate a conclusive diagnosis, it is occasionally necessary to refer patients to outside diagnostic facilities for MRI or CT scans in hospitals with a heavy patient load.

- Knowledge and skill shortage

Inconsistencies in service also occur due to a shortage of knowledge and skills among healthcare professionals, as well as issues related to stress and carelessness. To address this problem, St. Pulos Hospital consider the following measures:

- Proper technical training

Technical training that is thorough and ongoing for healthcare workers can assist guarantee that they have the information and abilities needed to provide consistent, high-quality care.

- Reducing workload

Overburdening staff members in St. Pulos Hospital lead to stress and negligence in healthcare workers, St. Pulos Hospital assess the situation and take appropriate action. Maintaining enough staffing numbers enable workers to give patients the best care possible.

- Fulfilling equipment shortage

By maintaining a sufficient supply of essential medical equipment, St. Pulos Hospital place a priority on addressing equipment shortages. As a result, the consistency of care can be enhanced and inappropriate or interchangeable equipment can be avoided.

By putting these procedures in place, St. Pulos Hospital seek to reduce service irregularities and give OPD and ward patients better treatment. Recognizing the significance of addressing these challenges and taking proactive measures to enhance the general quality and consistency of healthcare delivery are imperative for hospital executives and employees.

It's crucial to remember that fixing these serious flaws can necessitate a multidisciplinary strategy combining hospital administration, medical experts, and employees. The success of the solutions put into place ensured by regular monitoring, evaluation, and feedback from patients and staff, which assist identify areas for improvement.

- Enhance registration process:
 - Use a consistent registration process to guarantee accurate and comprehensive patient data.
 - To reduce mistakes, give staff training on proper registration procedures.
 - Frequently audit patient records to ensure their accuracy.
- Improve medication safety:
 - Establish precise procedures for administering medications, including verifying patient identification and prescription orders.
 - To verify that the right drug and dosage are provided, use barcode scanning technology.
 - Impart thorough instruction to health professionals are professionals on medication safety practices.
- Strengthen communication:

- Create efficient avenues of communication between healthcare professionals, such as regular team meetings and organized documentation procedures.
- To quickly resolve any miscommunications, promote open and honest communication.
- Utilize technology, such as secure messaging systems, to facilitate communication among healthcare teams.
- Ensure equipment reliability:
 - Create a thorough schedule for equipment maintenance that includes routine equipment inspections, calibrations, and repairs.
 - Keep track of vital equipment and make sure to replace or fix it as soon as it breaks.
 - Train the personnel on how to maintain and operate medical equipment properly.
- Improve staff training and competency:
 - Create a thorough training program for all medical staff members with a focus on standard procedures, good communication, and patient safety.
 - Provide opportunities for ongoing education and professional development for staff members.
 - Encourage a culture of learning where employees are encouraged to share mistakes or near-misses and learn from them.

It is critical to involve hospital managers, healthcare workers, and support staff in the process of putting these solutions into practice. To achieve long-term improvement, it is also necessary to continuously monitor and assess how well these solutions are working.

4.5 Root Causes of failures

As its stated in the research question one of the objective of this research is identifying the root cause of customer orientd failures.in order to identify the root causes fish bone tool is used.this analysis is essential to avoid or reduce customer oriented failures.once the root cause of the failures is identified reducing he failures will be more easier.the most common identified root causes are:

- ❖ Lack of skill
- ❖ Work stress
- ❖ Shortage of medical equipments
- ❖ Old and not attractive wall paintings

- ❖ No enough green area
- ❖ Improper stock management
- ❖ bad personal behaviours
- ❖ language difficulty
- ❖ time management problem

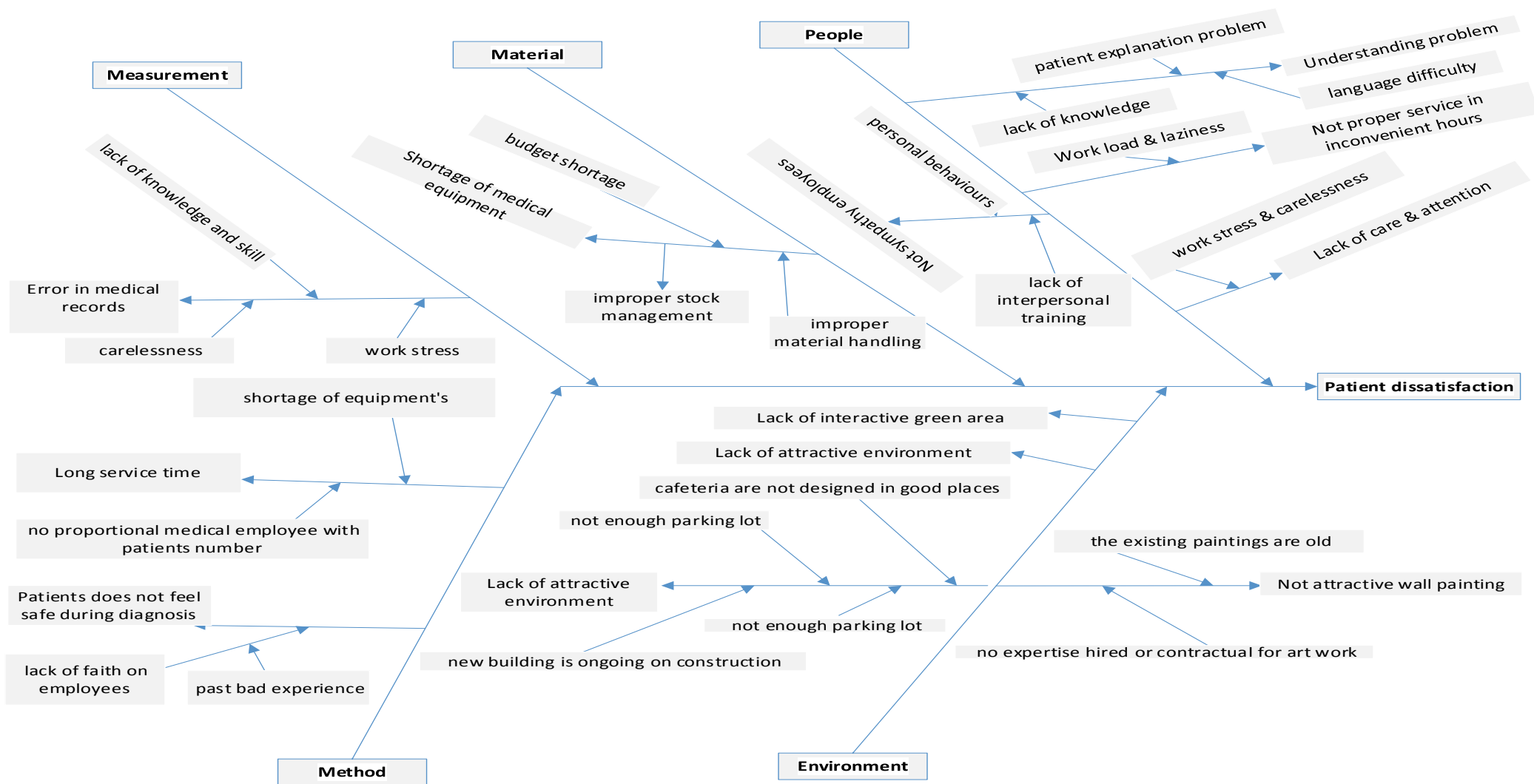


Figure 4.1 cause and effect diagram

CHAPER FIVE

5 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

In today's highly competitive environment, organizations need an extra edge to enhance and build up their relationships with customers. The health care industry is the one that contributes to a country's citizens' well-being. Improving the service quality of healthcare centers is a matter of determining life and death. This research paper is focused on customer-oriented service quality improvement. The objective of the research paper was to improve service quality in St. Paul's Hospital by reducing customer-oriented failures by providing measurement of service quality, technical characteristics that should be considered to meet customer requirements for service design, and identification and reduction of customer-oriented failures during service delivery.

In order to meet the research objective, SERVQUAL, QFD, and FMEA tools are used. The SERVQUAL model is used to identify the patient expectation and perception gap. This patient gap is used in FMEA analysis as a potential failure point. Using FMEA analysis, critical failures are identified, and the recommended solution by expert opinion is provided. The patient requirement and importance rating taken from the servqual model are used in QFD analysis, and using QFD analysis, the most important technical requirements are identified.

Generally, to improve the service quality of health care centers, it is very important to consider patient requirements and complaints. Customer requirement analysis makes health care centers more focused on customer-based technical requirements; this helps the organizations consume less time and cost and easily satisfy customers. Assessing patient complaints can help health centers easily identify the failures that cause patient dissatisfaction and even more complex health problems.

5.2 Recommendation

In order to improve the service quality of Saint Paul's Hospital, the hospital management should:

- ✓ Give focus to customer-oriented service processes.
 - Prepare a well-organized customer complaint management procedure.
 - Regularly assess customers' requirements.
- ✓ Provide regular interpersonal and technical training.

- ✓ Hire a language translator or make employees skilled in different languages.
- ✓ Create a culture of recognizing safety rather than introducing punishment when medical error occurs.
- ✓ Create cooperation among employees and patients to create a clean and attractive hospital environment.
- ✓ Conduct Proper stock management, regular equipment maintenance, and
- ✓ Using updated procedures with the latest and most technological equipment

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APPENDIX

- St. Pualos hospital location



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ሆስፒታል ሚሊኒየም ሕክምና ኮሌጅ
St. Paul's Hospital Millennium Medical College



Customer service expectation questioner

NO	Questionnaire	1	2	3	4	5
1	Did you expect SPH have up-to-date equipment's?					
2	Did you expect SPH facilities will be physically attractive?					
3	Did you expect SPH employees will be well dressed?					
4	Did you expect SPH physical facilities appearance will be consistence with the type of service given?					
5	Did you expect the hospital will deliver service on time as promised?					
6	Did you expect that when patients face problems employees of SPH will be sympathetic and reassuring?					
7	Did you expect SPH employees will keep accurate (error free) records?					
8	Did you expect employees will be positive and willing to help patients?					
9	Did you expect employees will give priority to your any request?					
10	Did you expect that you will Feel safe in the medication/diagnosis process?					
11	Did you expect that SPH staffs will have enough Knowledge?					
12	Did you expect SPH will give service in inconvenient hours?					
13	Did you expected medical employees will easily understand patients?					
14	Did you expected medical employees will have care and attention for patients?					

Customer service perception questioner							
No	Questioner	CR weight	1	2	3	4	5
1	SPH have up-to-date equipment's						
2	SPH facilities are physically attractive						
3	SPH employees are well dressed						
4	SPH physical facilities appearance is consistence with the type of service given						
5	The hospital delivers service on time as promised						
6	When patients face problems employees of SPH are sympathetic and reassuring						
7	SPH employees keep accurate/error free records						
8	Positive and willing to help patients						
9	Employees give priority to your any request						
10	Did you feel safe in the medication/diagnosis process						
11	In SPH there is enough Knowledge and skill of staff						
12	SPH gives service in inconvenient hours						
13	Medical employees easily understand patients						
14	Medical employees have care and attention for patients						

Name: Kiya Beyecha

MSc Research title: service quality improvement through customer oriented failure reduction case company (St Paulos Hospital)

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As part of my MSc research thesis at Addis Ababa University Institute of Technology, I am conducting a survey that investigates the patient's expectation before they receive service from the hospital and patients perception after they served by the hospital. I will appreciate if you could fill and complete the following tables. Any information obtained in connection with this study that can be identified with you will remain confidential.

Respondents Details:

Gender: Female ☐ Male ☐

Age: Below 18 ☐ Between 18-50 ☐ Above 50 ☐

Where you have been served: _____

Time duration you spent in the hospital: _____

Educational background: below high school ☐ certificate and above ☐

Please tick on the scales the scale represents :

Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
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Please put the weight numbers, The weight numbers represent:

Very important(5)	Important (4)	Neutral (3)	Unimportant(2)	Very unimportant(1)
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Please put the scale for your perception, the scale represents

Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
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