

The Effect of Service Quality on Customers' Satisfaction: A Study on Public Healthcare Centers at Yeka Sub-City in Addis Ababa, Ethiopia

Tesfaye Desalegn, MPH, M.Sc.¹, Afework Getachew, Ph.D.²

¹Department of Public Health Research and Emergency Management, Addis Ababa Health Bureau, Addis Ababa 30738, Ethiopia.

²Yom Institute of Economic Development, Addis Ababa 62539, Ethiopia.

ABSTRACT

Objective: The general objective of this research is to identify the effect of healthcare service quality on the customers' satisfaction at the public health centers of the Yeka sub-city in Addis Ababa, Ethiopia.

Material and Methods: This cross-sectional study was conducted in 2020, across public health centers at Yeka sub-city, Addis Ababa; Ethiopia. Using proportional allocation, 567 participants were selected through a systematic exit interview approach at every 7th interval. Data analysis included the frequency distribution of socio-demographic characteristics and satisfaction levels, presented in tables and figures. Logistic regression analysis at a 95% confidence interval was used to identify the predictors of customer satisfaction; at a p-value<0.005.

Results: A total of 567 (69.66% female) study subjects were included. The response rate was recorded to be 98.61%, overall customer satisfaction accounted for 400 (70.55%) [95% Confidence Interval: 66.80%–74.30%]. Logistic regression analysis revealed that responsiveness (odds ratio [OR]=5.21, p-value<0.000), reliability (OR=7.47, p-value<0.000), and empathy (OR=2.44, p-value<0.005), along with other service quality sub-components, had a significant positive impact on customer satisfaction.

Conclusion: The level of customers' overall satisfaction in this study is significantly higher compared to most other studies conducted in Ethiopia. Factors; such as reliability, responsiveness, and empathy were positively linked to customers' satisfaction. To further enhance satisfaction and encourage the use of healthcare services, health centers should focus on improving the quality of their healthcare services.

Keywords: customer; public health centers; service quality; satisfaction

INTRODUCTION

Isaac T. Ampah (2019) stated that healthcare is a vital sector in every country, with quality service delivery being essential for human well-being. He also added that as patient needs grow, methods for delivering quality healthcare must adapt accordingly¹. The World Health Organization² highlights a growing demand for healthcare improvement in sub-Saharan Africa. Service quality is key to improving and differentiating healthcare in institutions^{1,3}. Despite high healthcare spending in the U.S.⁴, defining healthcare service quality remains challenging. Donabedian⁵ defines it as the application of medical science to maximize health benefits, while minimizing risks. Others view service quality as the difference between customer expectations and perceptions; wherein, quality is satisfactory if performance meets expectations⁶. Dlugacz et al.⁷ defined quality as safe, with high-standards and evidence-based care that appropriately utilizes resources.

Customer satisfaction is directly related to service quality, as it reflects the customer's overall judgment of the service provided⁸. One study also showed that service quality is an antecedent to satisfaction⁶. In Ethiopia, health services are limited and of poor quality⁹. The Ethiopian National Health Care Quality Strategy defines quality as safe, effective and patient-centered care¹⁰. Studies in various Ethiopian hospitals indicate client satisfaction ranging from 22.0% to 57.7%^{11,12}. In Addis Ababa, the population continues to grow, having 12 public hospitals and 98 health centers at the end of 2019.

Review of literature

Healthcare service quality is crucial in assessing customers' or patients' satisfaction, as customers are primary evaluators of the services provided in healthcare settings. Their perceptions are often the main indicators when assessing service quality³. In many countries, healthcare service providers tend to focus on scientifically quantifiable standards; such as diagnostic accuracy and

procedural correctness, in determining service excellence. However, these methods often overlook customer opinions, which are critical for maintaining a competitive advantage in healthcare. As a result, it is essential to assess customer satisfaction to improve service quality¹³ consistently.

Theoretical literature review

Healthcare service quality

Measuring healthcare service quality can be challenging because of its unique nature¹⁴. Numerous theorists have defined service quality and its dimensions in various ways. Gronroos, under the citation Lam (1997), proposed that service quality is composed of two main aspects¹⁵: technical quality and functional quality. In the healthcare context, technical quality refers to the accuracy of medical diagnoses and procedures, while functional quality focuses on how services are delivered to patients³. Other authors have defined service quality as the difference between customer expectations and perceptions, with satisfaction occurring when performance meets expectations¹⁶.

Donabedian⁵ defined healthcare quality as: "the application of medical science and technology in a manner that maximizes its benefit to health without correspondingly increasing the risk". Additionally, Dlugacz et al. defined healthcare quality as care that is safe, of the highest standard, evidence-based, and uniformly delivered, while utilizing resources appropriately⁷. In line with Parasuraman et al., service quality, in general, is defined as the overall excellence or superiority of the service¹⁷.

The SERVQUAL model, developed by Parasuraman et al.¹⁶, identified five key dimensions of service quality: tangibles, reliability, responsiveness, assurance, and empathy. These dimensions have been broadly used in various studies to measure healthcare service quality^{18,19}. In addition, Parasuraman et al. defined the SERVQUAL model dimensions as: "Tangibles refers to the appearance of facilities, equipment, personnel, and other physical

elements of the service environment. Reliability refers to the ability to perform promised services dependably and accurately. Responsiveness pertains to the willingness and readiness to provide prompt services to customers. Assurance involves the knowledge, courtesy, and ability of staff to instill confidence in patients; and empathy is the level of caring and individualized attention provided to customers¹⁶.

Customers/clients satisfaction

Customer satisfaction in healthcare is a critical factor in maintaining and enhancing service quality²⁰. In addition, the customer satisfaction index, which originated in Sweden in 1989, has been widely applied across the EU in various service sectors; including healthcare²⁰. Moreover, customer satisfaction is often assessed through factors; such as their perception of service quality, the likelihood of returning for future services and recommendations to others¹⁴. Alghamdi also noted that satisfaction is strongly influenced by the empathy dimension of healthcare service quality in Saudi Arabia²¹. While measuring customer satisfaction directly is challenging, it can be assessed through several indicators; including patients' emotional response to services, their likelihood of returning, and their overall perception of the healthcare facility's management²².

Empirical literature review

Several empirical studies have explored the relationship between healthcare service quality and customer satisfaction. A study conducted in public hospitals in Lahore, Pakistan, found that elements; such as timeliness, staff friendliness, reliability, empathy and the physical environment, significantly enhanced perceptions of service quality²³. In Croatia, a study found that service quality dimensions; such as output quality, assurance and reliability, significantly influenced customer satisfaction²⁴.

In Albania, a study on healthcare service quality at the regional hospital in Durres found that reliability, responsiveness, and empathy had a positive impact on

patient satisfaction³. Among these, reliability had the highest impact (54.0%), followed by responsiveness (51.0%), while tangibility had the least impact (14.0%)³. In Pakistan's private healthcare sector, empathy, assurance, and tangibles were identified as key determinants of patient satisfaction⁶.

A study conducted in rural Bangladesh conveyed that the politeness and respect for privacy of healthcare providers were the most significant predictors of patient satisfaction, with these factors contributing to overall satisfaction²⁵. In Nyandarua County, Kenya, a study found that service tangibility scored the highest satisfaction level (69.0%), followed by reliability (48.0%) and responsiveness (55.0%), with the overall satisfaction score being 56.0%²³. In Ethiopia, several studies have identified key determinants of patient satisfaction; including the knowledge and skill of healthcare providers, waiting time, and privacy during consultations^{26,27}. Studies conducted in various Ethiopian hospitals; including Jimma University Hospital and Yekatit 12 hospital medical college, revealed varying levels of patient satisfaction, ranging from 22.0% to 57.7%^{11,26}. These findings underscore the importance of improving healthcare service quality to enhance customer satisfaction.

Therefore, this study aimed to determine the effects of healthcare service quality on the customers' perceived satisfaction at the public health centers in Addis Ababa, Ethiopia.

Research questions

The following questions were aimed to be addressed through this study:

RQ1. What is the status of healthcare service quality at public health centers in the Yeka sub-city?

RQ2. What is the level of client satisfaction with the healthcare services at public health centers in the Yeka sub-city?

RQ3. What is the effect of healthcare service quality on customers' satisfaction at public health centers in the Yeka sub-city?

MATERIAL AND METHODS

A health facility-based cross-sectional study was applied, and the study period was from September 2019 to July 2020; which included the period of title approval up until the final thesis work defense. However, the data collection was carried out from 17 February to 17 March 2020, to assess the effect of service quality on customer satisfaction in public healthcare centers in the Yeka sub-city, Addis Ababa, Ethiopia. The sub-city is highly populous, with 14 district administration offices and 15 public health centers.

In the Ethiopian health system, woreda (district) administration offices serve as the local government entities responsible for overseeing public services; including health, education and development programs. They supervise and coordinate the activities of health centers within their jurisdiction and play a key role in resource allocation, supervision, and local planning. Whereas, public health centers in Ethiopia are government-led primary healthcare facilities that provide mainly outpatient (OPD) and sometimes inpatient services. These include preventive and curative care; such as maternal and child health services, immunization, family planning, delivery, emergency, diagnosis; and treatment of common illnesses, basic laboratory tests and referrals to the secondary and tertiary level health care (hospitals), when necessary.

The study used proportional sample allocation across health centers, and included 567 participants. Data were collected via exit interviews on every 7th customer. Logistic regression (logit model), with a 95% confidence interval (95% CI), was applied to determine the association between the outcome and independent variables: variables with a p -value < 0.05 were considered statistically significant.

Study variables

Dependent variable

Customer satisfaction: measured using a composite indicator, based on 10 satisfaction-related items.

Independent variables

Service quality dimensions (from SERVQUAL)

Tangibles, reliability, responsiveness, assurance, empathy: each of these five dimensions was measured through several subcomponent questions (23 items total), as adapted from the validated SERVQUAL tool.

In addition, the study included socio-demographic variables; such as age, gender, marital status, education, income level, frequency of visits and travel time to the health center, which were used in descriptive and bivariate analyses.

Operational definition

The overall Client satisfaction was measured using a composite indicator, based on 10 satisfaction-related items. Respondents that answered: “Yes” to at least 5 out of 10 items (50% or more) were considered “satisfied”, and this binary outcome (satisfied/not satisfied) was used in logistic regression analysis.

Data collection tool and procedures

The questionnaire was adapted from the validated SERVQUAL tool, with 23 sub-components on service quality dimensions. It was initially prepared in English, translated into Amharic, and back-translated to ensure consistency. It was used to measure five dimensions of healthcare service quality: tangibles, assurance, empathy, responsiveness and reliability. Additionally, client satisfaction levels were assessed. The tool was pre-tested for appropriateness in healthcare settings. The data were gathered through interviews by 16 trained data collectors. According to Mugenda and Mugenda (2003), reliability indicates the consistency of research instruments in reducing random error. In this study, Cronbach's alpha was used to measure internal consistency for each scale as well as the overall test scale. The overall Cronbach's alpha value was 0.8209, which exceeds the acceptable threshold of 0.70 (Nunnally, 1978), indicating strong instrument reliability.

Data analysis

The study used logistic regression to determine the odds ratios for each independent variable (healthcare service quality dimensions). The regression equation was formulated as follows:

$$\log(p/1-p) = b_0 + b_1\text{Assurance} + b_2\text{Responsiveness} + b_3\text{Reliability} + b_4\text{Tangible} + b_5\text{Empathy}$$

Missing data were assessed for each variable, and pairwise deletion was used for descriptive statistics or bivariate analysis. Listwise deletion was applied for logistic regression models. Variables with more than 20% missing data were excluded from the analysis, so as to minimize bias and maintain data quality.

Multicollinearity was checked using the Variance Inflation Factor (VIF), ensuring no VIF exceeded 10. Data were entered into Epi-Info version 7.2.2.16 and analyzed in STATA version 14, using descriptive and regression analyses to determine satisfaction levels and relationships. The Binary Outcome Marginal Effects of the Model were also used to see how a one-unit change in an independent variable (X) affects the predicted probability of the outcome variable (customer satisfaction), holding other variables constant. It was interpreted that a one-unit increase in an independent variable increases the probability of the outcome by a percentage point, holding other variables constant.

Ethical considerations

Ethical approval was received from the Addis Ababa Public Health Research and Emergency Management Department. Participants provided informed consent, were assured of their right to withdraw, and confidentiality was maintained throughout the study.

RESULTS

After the data entry was completed, data cleaning, coding, generating new variables, and various statistical

techniques were applied; including descriptive statistics, pairwise correlation, multicollinearity tests, reliability checks and econometric analysis (logit and marginal effects). This section covers participants' socio-demographic data, measures of customer satisfaction, evaluation of healthcare service quality, key statistical test findings, and insights from the regression analysis.

Socio-demographic characteristics of study participants

In total, 567 respondents participated in the study, yielding a response rate of 98.6%. The gender distribution revealed that 69.7% of the respondents were female, and 67.5 participants were married. The age distribution showed that the largest group (56.2%) was between 26 and 45 years old, with a mean age of 35.86 years (S.D.=14.01). The age range spanned from 18 to 89 years.

Regarding healthcare visits, 41.3% of the respondents had visited health centers more than four times in the last year, while 15.0% visited only three times. In terms of educational background, 32.3% of respondents had completed secondary education (grades 9–12), while 27.7% had completed primary education (grades 1–8). The average monthly household income revealed that over half (57.6%) earned less than or equal to 3,000 Ethiopian birrs per month.

Regarding the travel time taken to healthcare centers, 80.9% of participants traveled for 30 minutes or less. On the other hand, only 49.7% of respondents paid for healthcare services, but the majority of them (75.8%) only paid ≤50 ETB (Table 1).

Healthcare service quality dimensions

This study assessed the impact of five healthcare service quality dimensions on customer satisfaction. As shown in Table 2, the dimension with the highest proportion of positive effects was Assurance (75.8%), followed by responsiveness (71.4%) and Tangibles (70.9%); whereas,

reliability came in last place (6.5%). All dimensions showed a positive impact on customer satisfaction, with a higher proportion of respondents expressing satisfaction.

Customer satisfaction

Table 3 summarizes customer satisfaction across ten dimensions. The overall customer satisfaction was 70.6; wherein, the satisfaction level of each dimension ranged from 81.1% (satisfaction with health center management) to 96.7% (satisfaction with the health center's location). Notably, 96.7% of participants were satisfied with the location of the health center, which aligns with the fact that 80.9% of customers traveled 30 minutes or less to reach the center.

Reliability and multicollinearity tests

Reliability and multicollinearity tests were conducted to ensure the consistency of the data and the absence of multicollinearity among the variables. The Cronbach's alpha values ranged from 0.7590 to 0.8512, confirming internal consistency (above the 0.70 threshold). The VIF values ranged from 1.17 to 2.15, indicating no multicollinearity problems. Tolerance values ranged from 0.46 to 0.85, further supporting the absence of multicollinearity.

Correlation between service quality dimensions

Pearson's correlation analysis revealed that all healthcare service quality dimensions were significantly correlated with each other at a p -value < 0.001. The highest positive correlation was between reliability and empathy ($r=0.8181$), while the lowest was between responsiveness and tangibles ($r=0.3809$). All correlations were positive, suggesting a strong relationship between the various service quality dimensions (Table 4).

Econometrics analysis (logit model)

To identify determinants of customer satisfaction, a logit model was used, as the dependent variable

(customer satisfaction) was categorical. The model included five independent variables: assurance, responsiveness, reliability, tangibles and empathy. The logit model was statistically significant, with an LR-chi-squared value indicating a good fit.

The logistic regression equation derived from the model is as follows:

$$\log(p/(1-p)) = -1.9678 + 0.1136 \times \text{Assurance} + 1.6503 \times \text{Responsiveness} + 2.0110 \times \text{Reliability} - 0.0193 \times \text{Tangible} + 0.8902 \times \text{Empathy}$$

Significant, positive correlations were observed for Responsiveness, Reliability, and Empathy. For example; a one-unit increase in responsiveness increased the log-odds of customer satisfaction by 1.65, while Reliability had a greater impact (2.01), and Empathy added 0.89 to the log-odds (Table 5).

Marginal effects of the model

The marginal effects analysis revealed that an increase in the positive effects of responsiveness increased the likelihood of customer satisfaction by 28.3%, while reliability increased it by 34.5%. Empathy increased the probability of customer satisfaction by 15.3% (Table 6).

Logistic regression and odds ratios

Logistic regression analysis also provided odds ratios for the service quality dimensions. responsiveness, reliability, and empathy showed strong positive effects on customer satisfaction, with significantly high odds ratios for these dimensions. The odds for responsiveness indicated a positive effect, increasing the likelihood of satisfaction by 5.21 times ($OR=5.21$, p -value=0.000). Reliability had a 7.47 times stronger association ($OR=7.47$, p -value=0.000), and empathy increased customer satisfaction by 2.44 times ($OR=2.44$, p -value=0.005) (Table 7).

Logistic regression on service quality subcomponents

Table 8 summarizes the logistic regression analysis for service quality subcomponents. Several specific factors were identified that significantly impact customer satisfaction. Among the 23 subcomponents, six were found to have positive effects on satisfaction. Responsiveness (health center staff meet customer

needs OR=7.07, p-value=0.000), Reliability (clients feeling confident, OR=3.77, p-value=0.048; solving problems, OR=5.44, p-value=0.001; timely service provision OR=3.37, p-value=0.001), tangible (employee appearance, OR=5.32, p-value=0.044), and empathy (responding to complaints, OR=3.80, p-value=0.005) significantly impacted customer satisfaction.

Table 1 Socio-demographic characteristics of the respondents at the health centers of Yeka sub-city, Addis Ababa, Ethiopia; in 2020

Characteristic	Frequency	Percent	Min	Max	Mean	S.D.
Gender (N=567)						
Male	172	30.34				
Female	395	69.66				
Marital status (n=566)						
Married	382	67.49				
Other (single, divorced, widowed, others)	184	32.51				
Age (years) (n=561)						
≤25	127	22.64				
26–45	315	56.15	18	89	35.86	14.01
≥46	119	21.21				
Monthly household income (Ethiopian Birr) (n=479)						
≤3,000	276	57.62				
3001–5000	123	25.68	300	50,000	3,958.77	4,306.7
≥5,001	80	16.70				
Educational status (n=566)						
Unable to read and write	54	9.54				
Able to read and write	48	8.48				
Primary (1–8)	157	27.74				
Secondary (9–12)	183	32.33				
College diploma and above	124	21.91				
Frequency of health center visit (N=567)						
First time	128	22.57				
Second time	120	21.16				
Third time	85	14.99				
Fourth time and above	234	41.27				
Average time taken from home to HC (n=559)						
≤30 minutes	452	80.86				
31–60 minutes	94	16.82	2	360	27.13	25.76
>60 minutes	13	2.33				
Money paid for services (n=558)						
0 Birr	285	51.1				
≤50 Birr	207	37.1	0	500	44.30	49.86
50.1–100 Birr	47	8.4				
≥100.1 Birr	19	3.4				

Table 1 (continued)

Characteristic	Frequency	Percent	Min	Max	Mean	S.D.
Occupation status (n=563)						
Gov.t employee	88	15.63				
NGO employee	36	6.39				
Private sector employee	86	15.28				
Self-employed	54	9.59				
Daily laborer	48	8.53				
Housewife	176	31.26				
Retiree	31	5.51				
Other	44	7.82				

S.D.=standard deviation; NGO=non-governmental organization

Table 2 The status of healthcare service Quality Dimensions at the public health centers in Yeka sub-city, Addis Ababa, Ethiopia; in 2020

Healthcare service quality dimension	Frequency	Percent
Does assurance have positive effects on customer satisfaction?		
No	137	24.16
Yes	430	75.84
Total	567	100.00
Does responsiveness have positive effects on customer satisfaction?		
No	162	28.57
Yes	405	71.43
Total	567	100.00
Does reliability have positive effects on customer satisfaction?		
No	184	32.45
Yes	383	67.55
Total	567	100.00
Does tangible have positive effects on customers' satisfaction?		
No	163	29.06
Yes	398	70.94
Total	561	100.00
Does empathy have positive effects on customer satisfaction?		
No	167	29.45
Yes	400	70.55
Total	567	100.00

Assurance: Refers to the competence, courtesy, credibility, and security provided by healthcare staff. Empathy: The provision of caring; individualized attention to patients by healthcare providers. Reliability: The ability to perform the promised health care service dependably and accurately. Responsiveness: The willingness to help outpatients and to provide prompt services. Tangibles: The appearance of physical facilities, equipment, and the appearance of personnel

Table 3 Descriptive statistics of the customers' satisfaction at the health centers at Yeka sub-city, Addis Ababa, Ethiopia; in 2020

Satisfaction variables	Frequency (N=567)	Percent
Satisfied/happy with the health center location		
No	19	3.35
Yes	548	96.65
Satisfied with the hospitality/care		
No	75	13.23
Yes	492	86.77
Satisfied with the medical care service		
No	71	12.52
Yes	496	87.48
Satisfied with the health center's management system		
No	107	18.87
Yes	460	81.13
Encourage/recommend friends to come to this health center		
No	65	11.46
Yes	502	88.54
Have positive feelings towards this health center		
No	54	9.52
Yes	513	90.48
Feel good while coming to the health center		
No	58	10.23
Yes	509	89.77
Say/tell positive things to other people about the health center		
No	65	11.46
Yes	502	88.54
Health professionals give enough privacy to clients		
No	56	9.88
Yes	511	90.12
Intend to continue using the services at the health center		
No	61	10.76
Yes	506	89.24
Satisfied with the overall healthcare services received at the health center		
No	167	29.45
Yes	400	70.55

Each variable reflects patient-reported satisfaction with specific aspects of the health center's services and environment. Responses are categorized as: "yes" (satisfied or agree) and "no" (not satisfied or disagree)

Table 4 The correlations between variables (between service quality dimensions) in 2020

Variables	Assu	Resp	Reliab	Tang	Emp
Assu	1.0000				
	567				
Resp	0.6911	1.0000			
	0.0000				
	567	567			
Reliab	0.7379	0.7607	1.0000		
	0.0000	0.0000			
	567	567	567		

Table 4 (continued)

Variables	Assu	Resp	Reliab	Tang	Emp
Tang	0.4280 0.0000 561	0.3809 0.0000 561	0.4688 0.0000 561	1.0000 561	
Emp	0.7032* 0.0000 567	0.6941 0.0000 567	0.8181 0.0000 567	0.4879 0.0000 561	1.0000 567

*Pearson correlation matrix (N=561–567), Assu=assurance, Resp=responsiveness, Reliab=reliability, Tang=tangibles, Emp=empathy

Table 5 Parameter estimates (Diagnostic tests of the logit Model) for logistic regression

Predictor	Coef.	Std. Err.	z	p> z	95% Confidence interval	
Assurance	0.1136002	0.3482505	0.33	0.744	–0.5689583	0.7961587
Responsiveness	1.650312	0.3050627	5.41	0.000	1.0524	2.248224
Reliability	2.011048	0.3108904	6.47	0.000	1.401714	2.620382
Tangible	–0.0193271	0.3439002	–0.06	0.949	–0.6149606	0.5763064
Empathy	0.8902383	0.3184472	2.80	0.005	0.2660934	1.514383
_cons (Intercept)	–1.967821	0.2905926	–6.77	0.000	–2.537372	–1.39827

z=z-score, p=p-value, coef.=coefficient

Table 6 Marginal effects of a binary outcome model

Predictor	dy/dx	p> z	95% Confidence interval	
Assurance	0.01949	0.745	–0.0977859	0.136659
Responsiveness	0.2831379	0.000	0.1760757	0.3902001
Reliability	0.3450281	0.000	0.2401891	0.449867
Tangible	–0.0033159	0.949	–0.1054902	0.0988584
Empathy	0.1527349	0.006	0.0439194	0.2615504

Table 7 The effect of service quality dimensions on customers' satisfaction at public health centers in Yeka sub-city, Addis Ababa; in 2020

Predictor	Odds ratio	P> z	95% Confidence interval	
Assurance	1.120304	0.744	0.5661149	2.217008
Responsiveness	5.208603	0.000	2.864517	9.470897
Reliability	7.471144	0.000	4.062155	13.74096
Tangible	0.9808584	0.949	0.5406622	1.779454
Empathy	2.435771	0.005	1.304857	4.546616
_cons (Intercept)	0.1397611	0.000	0.0790739	0.2470239

Table 8 Logistic regression analysis to determine the effect of healthcare service quality dimension subcomponents on the customers' satisfaction at public health centers in the Yeka sub-city, Addis Ababa, Ethiopia; in 2020

Overall satisfaction	Odds ratio	p-value	95% Confidence interval	
Assu1	1.295999	0.661	0.406363	4.133285
Assu2	0.2716789	0.088	0.060776	1.214418
Assu3	2.154221	0.108	0.844987	5.492
Assu4	0.5962561	0.331	0.210105	1.692112
Resp1	7.067171	0.000	3.505078	14.2493
Resp2	1.017619	0.974	0.3541255	2.92424
Resp3	1.95643	0.350	0.4787052	7.995775
Resp4	1.030196	0.963	0.2965579	3.578741
Relia1	1.396058	0.547	0.4714552	4.133961
Relia2	0.6679406	0.460	0.229058	1.947736
Relia3	3.765379	0.048	1.010339	14.03299
Relia4	5.43561	0.001	2.06594	14.30141
Relia5	3.367058	0.001	1.600066	7.085382
Tan1	1.453812	0.206	0.8140234	2.59645
Tan2	0.8610296	0.665	0.437801	1.693399
Tan3	1.103964	0.811	0.4911862	2.481209
Tan4	1.555652	0.440	0.5071009	4.77233
Tan5	5.317971	0.044	1.04748	26.9989
Emp1	1.042654	0.943	0.331539	3.279029
Emp2	0.4746756	0.208	0.148858	1.513638
Emp3	2.055813	0.166	0.7424109	5.692758
Emp4	3.797628	0.005	1.504217	9.587699
Emp5	0.6143666	0.475	0.1612322	2.341011
_cons	0.0011388	0.000	0.0001127	0.0115102

Resp1=responsiveness question #1: Did the health center staff meet your needs? Relia3=reliability question #3: Do you feel confident when you receive medical services? Relia4=reliability question #4: Do service providers have a sincere interest in solving your problems? Relia5=reliability question #5: Did you receive the service within the time from the health center? Tan5=tangible question #5: Are the employees clean and have a professional appearance? Emp4=empathy question#4: Do medical staff respond to clients' complaints?

DISCUSSION

This study examined customer satisfaction with healthcare service delivery at public healthcare centers in the Yeka sub-city, Addis Ababa, Ethiopia; during 2020. It also evaluated the effect of five healthcare service quality dimensions: responsiveness, reliability, assurance, tangibles and empathy as well as their 23 subcomponents on customer satisfaction.

The study found that 70.6% of customers were satisfied with the services: with 72.2% reporting satisfaction being females. Other studies conducted in Nigeria (96.1%) and India (89.1%) reported higher satisfaction rates than our study, while lower satisfaction rates were found in regions like Nyandarua, Kenya (56.0%), and Pakistan (41.3%)^{9,23,26}.

These differences might stem from the specific contexts of the studies; such as service accessibility and local healthcare infrastructure.

In Ethiopia, studies from various regions have shown lower customer satisfaction than in our study. For example; the findings of a study conducted in Jigjiga town public health facilities (41.7%) showed lower satisfaction levels²⁶. One reason for the higher satisfaction in Yeka sub-city could be the accessibility of healthcare services; 80.9% of respondents in our study traveled less than 30 minutes to the healthcare centers. Additionally, the availability of multiple nearby health centers may have reduced overcrowding and waiting times, leading to a better service experience.

The study also found that five service quality dimensions positively influenced customer satisfaction; with reliability having the highest positive effect at 75.8%, followed by responsiveness at 71.4%, and the tangible and empathy dimensions, which had 70.5% and 70.5% positive effects, respectively. However, the assurance dimension had the smallest positive effect at 67.5%. These results contrast with studies from Albania, Turkey, and Kenya where dimensions like reliability and tangibles had lower impacts on customer satisfaction. For instance; in Albania, the impact of reliability was only 54.0%, and tangibles had a mere 14.0% impact on satisfaction³, while a study in Nyandarua County, Kenya, reported that tangibility (69.0%) had the highest effect, followed by assurance (59.0%) and responsiveness (55.0%)²³. The variations between studies could be due to differences in healthcare settings and geographical locations.

To further analyze the relationship between service quality and satisfaction, Pearson's correlation was performed. This revealed statistically significant positive correlations between the service quality dimensions, with correlation coefficients ranging from moderate ($r=0.3809$) to strong ($r=0.8181$). These findings support the results of studies in Pakistan's private healthcare industry and South African private hospitals^{6,13}.

The logistic regression also showed that three service quality dimensions: responsiveness, reliability and empathy, were significantly associated with customer satisfaction. The odds of responsiveness having a positive effect were found to be 5.21 times higher ($p\text{-value}<0.001$), while reliability had 7.47 times higher odds ($p\text{-value}<0.001$), and empathy had 2.44 times higher odds ($p\text{-value}<0.01$) of positively influencing satisfaction. These findings are supported by studies at Marmara University Hospital in Turkey and in Croatia and Jordan, which found responsiveness to be the second most significant factor affecting customer satisfaction^{3,22,24}.

Additionally, logistic regression of the 23 subcomponents of service quality revealed that six subcomponents had significant, positive associations with customer satisfaction. Notably: "health center staff meet customers' needs" was the most significant factor ($p\text{-value}<0.001$), which aligns with findings from studies in Ethiopia and Croatia^{9,24}. Other significant subcomponents included: "clients feel confident when they receive medical services" ($p\text{-value}<0.05$); "service providers have a sincere interest in solving clients' problems" ($p\text{-value}<0.001$), and: "clients receive service within a timely manner" ($p\text{-value}<0.001$), all of which are consistent with findings from public and private hospitals in Kenya²³.

In terms of the tangible dimension: "cleanliness and professional appearance of employees" ($p\text{-value}<0.044$) was also significantly associated with customer satisfaction. This finding was not observed in other studies, indicating a unique aspect of service delivery in the Yeka sub-city healthcare centers. Lastly, the subcomponent: "medical staff respond to clients' complaints" ($p\text{-value}<0.01$) was another significant factor contributing to customer satisfaction, which has not been widely reported in prior research.

CONCLUSION

This study found a relatively high level of customer satisfaction (70.6%) with healthcare services at public health centers in Yeka sub-city, Addis Ababa. Among the five dimensions of service quality, assessed using the SERVQUAL model: reliability, responsiveness and empathy were the most significant predictors of satisfaction. Moreover, the other service quality dimension subcomponents; such as timely service delivery, staff attentiveness to needs and appropriate complaint handling, were particularly influential. The positive associations indicate that even in resource-constrained settings, enhancing interpersonal care and operational efficiency can lead to measurable improvements in service perception.

Therefore, future longitudinal studies should be applied to prioritize service quality aspects that showed the strongest influence on satisfaction; particularly responsiveness, reliability and empathy. Additionally, specific attention should be given to monitoring improvements in timely service delivery, staff attentiveness, and responsiveness to client feedback. At the policy level, health managers and decision-makers should integrate regular client satisfaction assessments into routine health system monitoring and strengthen accountability mechanisms to ensure sustained service improvements.

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Author's contributions

TDB, and AG: designed the study. TDB and AG obtained and analyzed data. TDB and AG obtained the resources and validated data; TDB wrote the original draft, and TDB and AG reviewed and edited the final manuscript. All authors contributed to the interpretation of results and

critical revision of the manuscript for intellectual content and have given final approval of the version to be published.

CONFLICT OF INTEREST

No conflicts of interest for any author.

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