



A proposed model of user satisfaction with medical emergency services by using the SERVQUAL model

[Un modelo propuesto de satisfacción del usuario de servicios de emergencias médicas mediante el uso del modelo SERVQUAL]

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Abstract

Context: Health care quality has been widely discussed for over 40 years. However, it is still complex to define, understand, and assess it due to the multiple factors it involves, especially in the emergency services.

Aims: To identify the main factors that influence the quality of the medical emergency services provided across the health care network of one of the Health Promoting Entities (abbreviated EPS in Spanish) in Medellín, Colombia.

Methods: An exploratory qualitative study was conducted based on the foundations of the SERVQUAL model. A total of 511 people, selected by means of criterion-based nonprobability sampling, participated in this study.

Results: Three key factors were found to influence users' perceived quality of emergency services in Medellín. The first factor corresponds to assurance and trust; the second, to institutional infrastructure; and the third, to responsiveness and its impact on expected and experienced service. This latter proves that patient follow-up is important to enhance user perception of such services.

Conclusions: Service quality measurement models are a fundamental tool to identify the real variables that affect patients' perception of a service. In addition, they help to improve the value chain processes involved in providing a service that fully satisfies user expectations.

Keywords: health care services; health systems; patients; patient safety; quality management.

Resumen

Contexto: La calidad de la atención sanitaria ha sido ampliamente discutida durante más de 40 años. Sin embargo, todavía es complejo definirla, comprenderla y evaluarla debido a los múltiples factores que implica, especialmente en los servicios de emergencia.

Objetivos: Identificar los principales factores que influyen en la calidad de los servicios de emergencia médica prestados a través de la red de atención sanitaria de una de las Entidades Promotoras de Salud (EPS) de Medellín, Colombia.

Métodos: Se realizó un estudio cualitativo exploratorio basado en los fundamentos del modelo SERVQUAL. Participaron en este estudio un total de 511 personas, seleccionadas por medio de un muestreo no probabilístico basado en criterios.

Resultados: Se encontró que tres factores clave influyen en la calidad percibida por los usuarios de los servicios de emergencia médica en Medellín. El primer factor corresponde a la seguridad y la confianza; el segundo, a la infraestructura institucional; y el tercero, a la capacidad de respuesta y su impacto en el servicio esperado y experimentado. Esto último demuestra que el seguimiento de los pacientes es importante para mejorar la percepción de los usuarios de esos servicios.

Conclusiones: Los modelos de medición de la calidad de los servicios son un instrumento fundamental para identificar las variables reales que afectan a la percepción de un servicio por parte de los pacientes. Además, ayudan a mejorar los procesos de la cadena de valor que intervienen en la prestación de un servicio que satisface plenamente las expectativas de los usuarios.

Palabras Clave: gestión de calidad; pacientes; seguridad de los pacientes; servicios de atención médica; sistemas de salud.

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INTRODUCTION

Health care quality has been widely discussed for over the past 40 years. However, it is still complex to define, understand, and assess it due to the multiple factors it involves (Muhammad and Cyril, 2010). Poor quality in health care services is reflected, for instance, in inefficient services, limited access, increased costs, complaints, users' and health care professionals' dissatisfaction, damage to credibility and, in some cases, loss of human lives (Ibarra et al., 2014).

Service quality can be defined as the difference between customer expectation and customer perception (Kotler et al., 2005). As a result, the concept of satisfaction has progressively evolved because it has clearer elements in terms of perceived quality when health care services are assessed by users (Gómez-Molina et al., 2019). In this regard, Wakelin and Long (2003) stated that, for customer satisfaction metrics to be useful, they should consider the following two aspects: i) customer expectations and preferences regarding the various dimensions of product and service quality, and ii) customer perceptions about how well firms meet those expectations. These two aspects were also pointed out by Ibarra et al. (2014).

Likewise, the quality of the relationships with users has become a decisive factor to ensure customer satisfaction. For some years, developed countries have incorporated the opinions of health care users into the concept of health care quality. This has allowed them to improve processes in terms of the elements that are considered when evaluating customer satisfaction and perceived quality of health care services (González et al., 2008).

Besides having the common characteristics of hospital services (e.g., intangibility, heterogeneity, and simultaneity of production and consumption peculiarities), emergency services are characterized by other aspects such as complexity, rapid scientific and technological innovation, and a growing amount of information from users. These

peculiarities make it different from other services but imply higher expectations (López et al., 1999).

When analyses are conducted by service unit, the emergency department may be found to have other singularities, including a growing frequency of use year after year, an inadequate use, and the fact that it is often the first contact of patients with the health system and an important source of complaints. These circumstances, together with the facts that patients in emergency rooms feel highly anxious, the contact is brief, and a subsequent follow-up is hardly performed, make it important to know how patients evaluate the service they receive (Hidalgo et al., 2012).

In this respect, some factors that determine patient satisfaction have been reported in the literature. At first, patient satisfaction was only associated with the quantity and quality of the information patients received from doctors. However, the idea that it was a multidimensional concept quickly spread (Mirra and Aranaz, 2000). Some factors were linked to doctors' professional and personal qualities and the costs and inconveniences of the prescribed cares (Mirra and Aranaz, 2000). For their part, Ware and Snyder (1975) preferred to talk about accessibility, availability of resources, continuity of care, efficacy/outcome of care, financing and humanness, provision of information to patients, access to information, professional competence, and favorable care environment.

Moreover, Feletti et al. (1986) considered ten determinants of said satisfaction: competence in the physical domain, competence in the emotional domain, competence in social relationships, the physician as a model, consultation time, perceived continuity of care, mutual understanding in the doctor-patient relationship, patients' perception of their individuality, type and quality of information, and competence in patients' physical examination.

In view of the above, one may infer that there are different approaches regarding user perception of the quality of the service received. Nevertheless,

according to the model proposed by Brown and Swartz (1989) to evaluate medical service quality, there is a key aspect associated with professionals' ability to sense what their patients expect and their level of satisfaction with the care provided. In this model, promoting value generation becomes important, and, in this respect, experts in the field of administrative sciences have developed theories focused on the study of service value based on quality. For instance, researchers have traditionally used the SERVQUAL model (Xiao and Mei, 2014).

The SERVQUAL model offers interesting opportunities, as a starting point, for service quality assessment. It proposes a scale adaptation that provides a global service quality measure based on five dimensions that determine the quality of a given service (tangibles, responsiveness, reliability, assurance, and empathy) and measures expectations and service quality performance (Xiao and Mei, 2014; Mosquera-González et al., 2019). Given this scenario, we conducted a study to identify the main factors that influence the quality of the emergency services provided across the health care network of one of the Health Promoting Entities (abbreviated EPS in Spanish) in Medellín, Colombia.

MATERIAL AND METHODS

An exploratory qualitative study was carried out from May 2018 to June 2019 to identify the factors that influence the quality of emergency services in Medellín, Colombia. For this purpose, the foundations of the SERVQUAL model were applied. A total of 511 people, who, in the last year, had visited one of the emergency departments attached to the health care network of one of the EPS with the widest coverage in Medellín, participated in this study. These participants were selected by means of criterion-based nonprobability sampling.

Participants were duly informed about the study's objective, benefits, costs, risks, and other data that would ensure their informed consent. Although no experimental tests were conducted, and, thus, the risk was minimal, the Declaration of

Helsinki—considered a benchmark in biomedical research (Mazzanti, 2011)—and, in the context of Colombia, Resolution 8430 of 1993—main guideline for health research—were used as ethical considerations (Mateus et al., 2019). In addition, the study was endorsed by the Ethics Committee of Institución Universitaria Escolme, which, based on the aforementioned Resolution, classified it as of minimal risk because it did not intentionally compromise the individuals' physical, psychological, or social integrity.

Once the participants were selected, and to collect data, a self-administered questionnaire with categorical, dichotomous, and Likert scale questions was designed based on the SERVQUAL model. For this purpose, the different notions of service and the most recognized and recent models for evaluating perceived service quality were analyzed. As a result, a measurement model that would allow us to answer the following questions was developed: What factors explain the relationship between customer satisfaction and service? What individual elements indirectly influence user perception of emergency services? How could the quality model proposed by Parasuraman et al. (1988) be applied to examine the factors that affect the perception of emergency services among the inhabitants of Medellín?

According to the SERVQUAL model, the results of a service quality assessment are the product of comparing users' perception of an experienced service and their prior expectations of what the service should be (Choi et al., 2004). To establish said relationship, it proposes the following five dimensions (described in Fig. 1): i) trust or empathy: interest and individualized attention that entities show and provide to users (including accessibility, communication, and understanding users); ii) reliability: entities' ability to perform the promised service; iii) assurance: employees' security, knowledge, and service, and their ability to inspire credibility and trust (including competence, courtesy, credibility, and security); iv) responsiveness: entities' willingness to help users and provide them with prompt service; and v) tangibles: appearance of physical facilities, equipment, person-

nel, and communication materials (Mashhadiabdol et al., 2014).

Statistical analysis

To verify the reliability of the instrument in each of the constructs of the SERVQUAL model, Cronbach’s alpha was used in performing the calculation for each of the sub questionnaires specific to each factor. The validity of the measurement scales used, as well as each of the constructs and the instrument in general, were checked by a confirmatory factor analysis. In the measurement model, both convergent and discriminant validity were tested through analysis using the Statistical Package for Social Science (SPSS) software version 22.0. Its assessment is carried out at two levels: reliability of observable items and reliability of constructs (Calvo et al., 2013). A model with a reliability coefficient greater than 0.6 is reliable (Bagozzi and Yi, 1988). Other authors suggest that construct reliability refers to the degree to which an observable variable reflects a factor, and constructs with a value above 0.7 are considered acceptable (Hair et al., 2001).

In this study, a discriminant validity analysis was performed making sure that the confidence interval in estimating the correlation between each pair of factors did not contain the value 1 (Ander-

son and Gerbing, 1988). Subsequently, the reliability of the measurement scale was determined to test the explanatory capacity of the proposed model. For this purpose, the Cronbach's alpha of each construct’s measurement scale was computed (Frias, 2006).

Finally, the developed hypotheses were gathered, and their level of association was calculated by means of the Somers’ D - a measure of association between two ordinal variables which takes values between -1 and 1. Values close to an absolute value of 1 suggest a strong relationship between the two variables, while those close to 0 indicate that there is little or no relationship between them (Grande and Abascal., 2005).

RESULTS AND DISCUSSION

The variables of the model to be studied were selected. They focused on the following constructs: reliability, tangibles/infrastructure, responsiveness, experienced service (in terms of assurance), and expected service (in terms of empathy). As explained in the theoretical model, those that are defined as predictors or related to service quality perception and expectation were chosen. Subsequently, a confirmatory factor analysis was conducted. The results of this analysis are presented below.

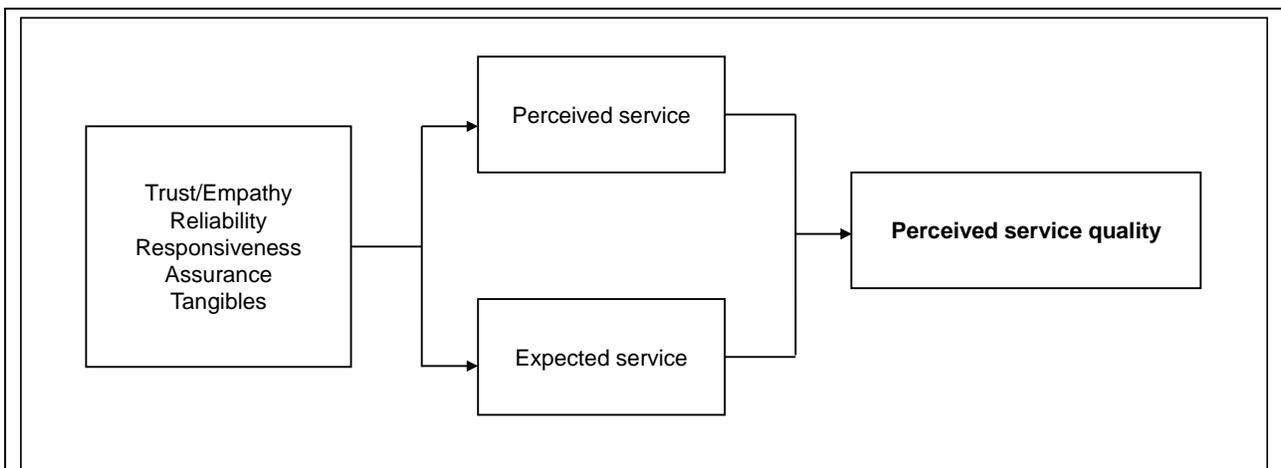


Figure 1. Baseline model of the study.
Source: model proposed by Parasuraman et al. (1988).

Convergent validity

Likert scale questionnaires are currently the most widely used data collection tool in social research, as they are effective and inexpensive. In addition, they make it possible to survey many people with relative ease (González and Scublinksky, 2011). In this study, the measurement scales, as well as each construct and the overall data collection instrument, were validated via confirmatory factor analysis. This statistical method was performed using the SPSS software.

Reliability is defined as the extent to which an instrument accurately (error free) measures what it is supposed to measure; it indicates whether an instrument is reliable or not (Arribas, 2004). Based on the above, during validity assessment, no indicator required to be removed because they all had a standardized factor loading greater than 0.6 (which indicates that the model is reliable). In addition, the average factor loading was above 0.7 for all constructs, as shown in Table 1.

Table 1. Convergent validity of the standardized factor loadings.

Construct	Item	Standardized factor loadings	Average standardized factor loadings
Reliability	RE1	0.905	0.900
	RE2	0.900	
	RE3	0.896	
Empathy	EM1	0.723	0.791
	EM2	0.798	
	EM3	0.852	
Tangibles/Infrastructure	IN1	0.790	0.830
	IN2	0.862	
	IN3	0.816	
	IN4	0.853	
Responsiveness	RE1	0.831	0.825
	RES2	0.837	
	RES3	0.808	
Assurance	AS1	0.825	0.850
	AS2	0.859	
	AS3	0.869	
	AS4	0.868	
	AS5	0.823	
	AS6	0.857	

Source: Authors' own work supported by SPSS statistical software. The alphanumeric codes refer to the set of questions formulated to measure each of the constructs. RE1-3: Reliability; EM1-3: Empathy; IN1-3: Tangibles/Infrastructure; RES1-3: Responsiveness; AS1-3: Assurance.

Table 2. Convergent validity of Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity.

Factor	KMO value	Bartlett's test of sphericity value	Meets criteria?
Reliability	0.746	0.00	Yes
Empathy	0.636	0.00	Yes
Tangibles/Infrastructure	0.806	0.00	Yes
Responsiveness	0.696	0.00	Yes
Assurance	0.919	0.00	Yes

Source: Authors' own work supported by SPSS statistical software.

Regarding correlation between the variables, the Bartlett's test of sphericity was applied, and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was calculated. As a result, the values required to carry out a factor analysis were obtained. In the proposed model, the values of Bartlett's test of sphericity were below 0.05, which suggests that there are significant correlations between the variables. Moreover, with respect to the KMO measure of sampling adequacy, the coefficients provided by the SPSS software for each construct meet the minimum criteria set forth by Lévy et al. (2006), as shown in Table 2. This indicates that data reduction can be performed.

Discriminant validity

Discriminant validity serves to evaluate the measurement scales of latent constructs in social sciences. For measures to be valid, those of the same construct must strongly correlate with each other. In addition, such correlation must be greater than that between said measures and those proposed for a different construct (Martinez and Martinez, 2009).

The following are the reliability coefficients (Cronbach's alpha) obtained for each factor in the proposed model: 0.935 (reliability), 0.830 (empathy), 0.901 (tangibles/infrastructure), 0.872 (responsiveness), and 0.941 (assurance). Based on this, the results of such confirmatory analysis indicate the existence of a sustainable factor model that can help to identify the factors that influence

users' perception of the quality of emergency services in Medellín.

Hypothesis testing

The proposed structural model was estimated to evaluate on what basis people in Medellín determine the quality of emergency services. For this purpose, the developed hypotheses were gathered, and their level of association was calculated by means of the Somers' D (Grande and Abascal, 2005). Table 3 presents the obtained coefficients of association (Somers' D).

Fig. 2 shows the proposed model and the coefficients of association between the variables. The arrows represent the hypotheses that were tested in the study.

The dependent variables were experienced service regarding assurance and expected service regarding empathy, and the independent variables were reliability, tangible assets/infrastructure, and responsiveness. The level of correlation of the dependent variables was calculated to define the structure of the model.

The results obtained from these hypothetical associations show that experienced service in terms of responsiveness has a significant correlation with reliability (0.655). This suggests that the trust conveyed by the health care personnel during consultation can generate a positive experience for patients. In addition, it is key to change or enhance patients' perception of the service because, through their contact with doctors, their different

needs can be met, thus increasing their level of satisfaction. Similarly, expected service in terms of empathy has a strong correlation with reliability (0.488). This level of correlation suggests that doctors' interest in helping patients with their health problem has a positive influence in user satisfaction with the service. This confirms the importance of doctor-patient communication in patients' perception of the service and care provided.

Moreover, tangibles/infrastructure shows a high level of association with experienced service

in terms of assurance and expected service in terms of empathy. This could indicate that physical facilities, equipment, personnel, and communication materials allow users to interact with the health care provider and receive individualized attention. Also, they enable them to create a physical link with the firm, and, thus, obtain benefits through communication channels that disseminate information regarding new customer service lines and locations, better service policies, and any other type of information that is exclusive for old users and provide assurances to new ones.

Table 3. Hypothesis testing (Somers' D).

Hypothesis	Somers' D
H1: Reliability → Experienced service	0.655
H2: Tangibles/Infrastructure → Experienced service	0.591
H3: Responsiveness → Experienced service	0.565
H4: Reliability → Expected service	0.488
H5: Tangibles/Infrastructure → Expected service	0.405
H6: Responsiveness → Expected service	0.508
H7: Responsiveness → Tangibles/Infrastructure	0.526
H8: Tangibles/Infrastructure → Reliability	0.570

Source: Authors' own work supported by SPSS statistical software.

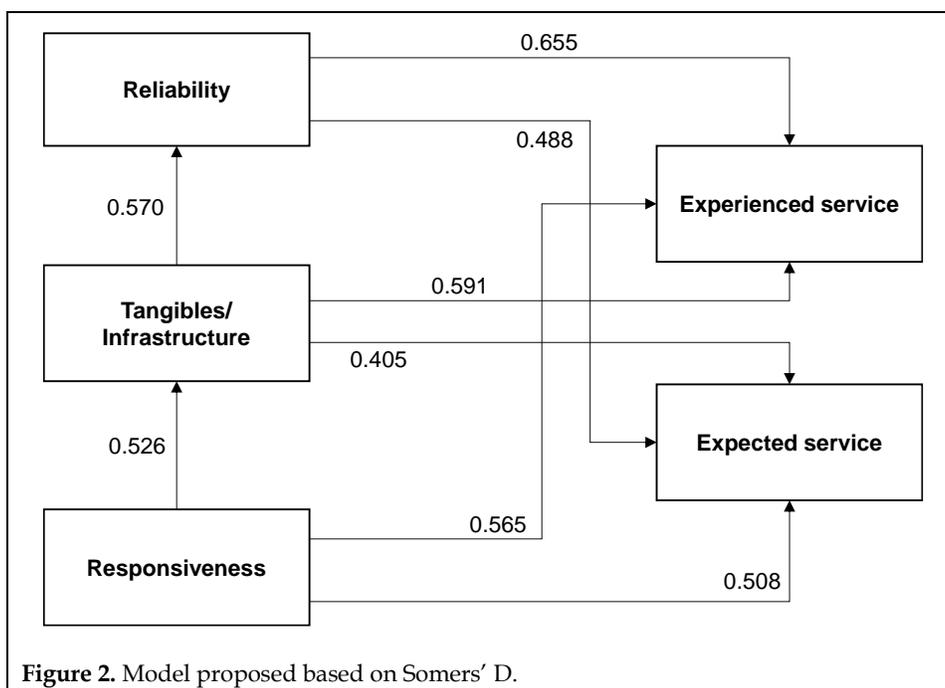


Figure 2. Model proposed based on Somers' D.

Another significant relationship in the model is that of experienced service and expected service with responsiveness. This relationship proves that adequate patient support and follow-up helps to shape users' perception regarding the benefits they obtain from health care entities. Additionally, it may represent a reference point to determine how likely users will accept or reject a service provided by another entity in the sector.

Furthermore, as an addition to the applied model, significant correlations were observed between responsiveness, tangibles/infrastructure, and reliability. This reveals that, when users' expectations and needs are met, they tend to be more satisfied with the service and feel more motivated to continue using the services provided by health care institutions.

Health care quality has gradually become a priority in the countries' health agendas due to various reasons, including improper behavior toward patients, shortcomings in the administrative process, lack of facilities, and users' and health care professionals' dissatisfaction. Given this situation, the World Health Organization (WHO) has called upon health care providers to ensure satisfactory care. This is of utmost importance if we consider that health is a fundamental right linked to basic dimensions, such as social well-being (Bernal et al., 2015).

Therefore, conducting studies into this matter constitutes a fundamental contribution of academics to its articulation with the production sector and the government, especially if we consider that improving the organizational capability of health care institutions (by strengthening the quality of the services they provide) has a direct impact on cost reduction for health systems. This requires having not only the necessary infrastructure, human talent, and other resources but also an appropriate information management system (Saturno et al., 2015).

The results of this study clearly reveal, based on the SERVQUAL model, the influence of three key factors on users' perceived quality of emergency services in Medellín. The first factor corresponds

to assurance and trust; the second, to institutional infrastructure; and the third, to responsiveness and its impact on expected and experienced service. This latter proves that patient follow-up is important to enhance user perception of such services.

Comparing our findings with other existing approaches in the literature makes us realize that the SERVQUAL model is frequently used in studies into health care quality, particularly in outpatient services. For instance, the results reported by Ibarra et al. (2014), who evaluated the quality of the services provided by a public hospital in Mexico, are in line with those of this study. In particular, reliability, assurance, and empathy were also found to be highly valued by users of such services.

Similarly, in the study conducted by Pedraza et al. (2014) with patients from six Mexican health care institutions, empathy, reliability, and infrastructure were reported to be the dimensions with the best results when measuring service quality. Leyzeaga et al. (2014) also came to this conclusion in a research they carried out at a private health care entity in Valencia, Venezuela (Pedraza et al., 2014).

Other studies that have also applied the SERVQUAL model have reported interesting results that were not discussed in this study. For instance, in the Mexican context, Villagarcía et al. (2017) found three aspects (patients' first contact with health care institutions, trust in the nursing staff, and confidence regarding the procedures to be carried out at the health care entity) to be key in assessing service quality. In Colombia, Zapata (2014) considered factors, such as continuity, adequacy, integrity, and humane care to measure health care service quality. Likewise, it is important to emphasize the study conducted by Sihuin et al. (2015), who evaluated the quality of the health care services provided at the inpatient unit of a health care institution in Peru. Their study is highly interesting if we consider that research in this field usually focus on outpatient services. By means of a bivariate and multivariate analysis

combined with logistic regression, the authors observed significant relationships between patients' level of satisfaction, the inpatient unit where they were admitted (surgery), and their level of education.

Regarding the practical and theoretical implications of this study, the findings allow us to validate the factors that have been previously identified in other contexts (especially in Mexico where several related studies have been conducted). Based on this, decision-makers in health care institutions could focus their efforts on aspects such as assurance, infrastructure, and responsiveness and channel resources towards strategies that enhance the quality of the services provided.

Additionally, for the academic community, this work not only contributes to the study into health care quality but also provides a route to delve into these findings from other perspectives, such as contrasting the factors that have an impact on service quality with user perceptions. For this purpose, these results should be complemented with qualitative studies, especially given the subjective nature of health care quality, as stated by Rodríguez (2016).

However, although this study represents a significant contribution to the literature into health care quality (specifically in the Colombian context), it presents some limitations regarding the incorporation of associations between sociodemographic variables and service quality, as has occurred with studies such as that of Sihuin et al. (2015). This is important in a context such as that of Latin America where the constant structural policies developed to intervene in political, social, and economic matters influence the operation of the health systems, and, thus, of the institutions that comprise them and their performance in terms of patient care. As a result, service quality is affected directly or indirectly.

CONCLUSIONS

After users' opinions regarding the positive and negative aspects of care were gathered and the concepts associated with quality of care were

characterized, the five elements under analysis were found to be of great importance in the care process. These elements refer to factors such as personal qualities, examination and diagnosis, information received during consultation, accessibility to services (e.g., waiting times and cost of care), and aspects related to infrastructure (e.g., enough materials, equipment, and technical training of the health care personnel).

The relationships observed in this study indicate that a quality service is perceived when users' experience is satisfactory or when the experienced service is in line with their expectations regarding the service. Therefore, users are influenced by the result of the service but also by their experience and their expectation before receiving it. This combination of elements occurs because expectation (or expected quality) depends on factors, such as reliability, responsiveness, and infrastructure, which seek to meet user needs.

Moreover, service quality measurement models were found to be an essential tool to identify the real variables that influence patients' perception of a service. In addition, these models help to improve the value chain processes involved in providing a service that fully satisfies user expectations.

Finally, although this study made it possible to investigate user perception of the quality of services provided by health care entities, we propose, for a second phase of this study, to validate the gaps mentioned in the SERVQUAL structural model—introduced by Parasuraman, Zeithaml, and Berry—between perceptions and expectations for each pair of statements that can result from the following three situations: (i) perceptions exceed expectations, which means high levels of quality; (ii) perceptions are lower than expectations, which suggests a low level of quality; and (iii) perceptions match expectations, which denotes modest levels of quality.

CONFLICT OF INTEREST

The authors declare no conflicts of interests.

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AUTHOR CONTRIBUTION:

Contribution	Bermúdez-Hernández J	Palacios-Moya L	Valencia-Arias A	Brand-Piedrahita L
Concepts or ideas	x	x	x	
Design	x	x	x	
Definition of intellectual content	x	x	x	x
Literature search			x	x
Experimental studies	x			
Data acquisition	x	x		
Data analysis	x	x		
Statistical analysis	x	x		x
Manuscript preparation	x			
Manuscript editing	x			
Manuscript review	x	x	x	x

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