

Patient Perspectives On Satisfaction In Occupational Health Clinics

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Abstract

This study investigates patient satisfaction perceptions in occupational health clinics, based on the SERVPERF model and structural equation modeling (PLS-SEM). The research employed a quantitative approach applied to 154 participants through a structured questionnaire using a 7-point Likert scale, distributed to the human resources departments of companies located in Greater Vitória, Espírito Santo State, Brazil. Results indicated that factors such as tangibility, reliability, responsiveness, and assurance positively influence patient satisfaction, whereas empathy had no significant effect. The proposed model explains 17.4% of the variability in satisfaction, suggesting potential for future improvements. The research contributes to the field of quality management in healthcare services by validating the SERVPERF model in this context, while offering practical recommendations to enhance user experience and organizational loyalty.

Keywords: *Occupational health, SERVPERF, patient satisfaction, structural equation modeling*

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I. Introduction

The perceived quality of healthcare services is a critical factor in patient satisfaction, particularly in contexts where service delivery is directly tied to legal regulations and organizational obligations, such as occupational health clinics. These clinics play an essential role in occupational health, providing mandatory services to companies and ensuring worker well-being. However, compliance with legal requirements may, in some cases, lead to the neglect of factors that effectively shape patient experience and satisfaction.

Established theoretical models, such as SERVPERF, offer a robust framework for assessing perceived service quality based on dimensions like tangibility, reliability, responsiveness, assurance, and empathy (Cronin & Taylor, 1992). Previous studies have shown that these dimensions directly impact quality perception and user satisfaction and are widely applied in sectors such as healthcare, banking, and aviation (Fragoso & Espinoza, 2017; Leong et al., 2015). However, the application of this model to the context of occupational health clinics remains underexplored, particularly in Brazil.

This study, therefore, aims to analyze how perceived quality dimensions influence patient satisfaction in occupational health clinics. Furthermore, it evaluates the mediating role of satisfaction in the relationship between perceived quality and patient loyalty, contributing to both the advancement of the literature and the managerial practice of these organizations.

This research is justified by the relevance of the topic from the perspective of service marketing, especially in the context of occupational health clinics. The imposition of regulatory norms may sometimes lead these clinics to overlook the theoretical foundations that underpin customer satisfaction, reinforcing the need for more in-depth investigations. According to Borba, Mendes, and Silveira (2004), healthcare quality is defined by satisfaction and trust in the services provided, which are central aspects of this analysis.

To test the hypotheses and address the research question, a survey based on the SERVPERF scale proposed by Parasuraman et al. (1988) was conducted. The questionnaire was sent via email to the HR departments of companies from various sectors located in Greater Vitória, Espírito Santo State, Brazil, targeting workers who use the services of specialized occupational health clinics. Data collection was conducted in three waves at 30-day intervals, over a total period of 90 days, resulting in 154 valid responses from 29 companies.

Contributions

This study offers practical guidelines for specialized clinics to more effectively measure and manage client satisfaction. On a theoretical level, the research expands the use of the SERVPERF scale, validating its application in a context that remains underexplored and providing relevant insights for future academic investigations.

The article is structured as follows: The next section presents a literature review and hypothesis formulation. Section 3 outlines the methodology, data collection, structural equation modeling definitions, and formative modeling. Section 4 covers descriptive statistics, validation of the measurement model, structural model, and hypothesis testing. Finally, Section 5 provides the article's conclusion, limitations, and suggestions for future research.

II. Literature Review And Hypotheses

The theoretical foundation presented in this article aims to introduce the sector of specialized occupational health services and support the proposed conceptual model to analyze patient satisfaction perceptions in these services, conceptualized in terms of satisfaction and perceived service quality.

Patient Satisfaction in Healthcare Services

According to Biesaw, Mulugeta, Endalamaw, Yesuf, and Alemu (2021), the level of patient satisfaction with hospital and medical clinic services represents a direct or indirect measure of the services provided. The authors argue that patient satisfaction reflects a significant gap between the current experience and the expected services, which leads patients (clients) to seek healthcare services further away or opt for more expensive private healthcare units to find better quality services. Gill and White (2009) highlight that understanding satisfaction and service quality has long been recognized as crucial for developing service improvement strategies, leading to numerous studies and considerable efforts to measure customer satisfaction levels. However, many reviews are critical of its use, as there is rarely a theoretical or conceptual development of the patient satisfaction concept.

A study by Oktaria (2024) examined the effect of patient satisfaction variables on the measurement of healthcare service quality and facilities' impact on patient loyalty. Using a survey with a sample of 225 patients and applying the PLS-SEM structural equation modeling method, the study found evidence that: **i)** Healthcare service quality has a significant positive effect on patient satisfaction; **ii)** Healthcare facilities have a significant positive effect on patient satisfaction; **iii)** Healthcare service quality has a significant positive effect on patient loyalty; **iv)** Patient satisfaction has a significant positive effect on patient loyalty; **v)** Healthcare facilities have a significant positive effect on patient loyalty; **vi)** Patient satisfaction is positively and significantly capable of mediating the effect of healthcare service quality on patient loyalty; **vii)** Patient satisfaction is positively and significantly capable of mediating the effect of healthcare facilities on patient loyalty.

Harahap, Harahap, and Yuniati (2024) analyzed the impact of outpatient healthcare services on patient satisfaction. By measuring factors such as responsiveness, reliability, assurance, care, and physical evidence using a cross-sectional regression model, they found evidence that all factors had a significant influence on patient satisfaction, except for physical evidence, which did not show a strong correlation.

A study by Yunike, Tyarini, Evie, Hasni, and Suswinarto (2023) aimed to determine the quality of healthcare services in relation to patient satisfaction. Using a quantitative research method with a cross-sectional design and accidental sampling techniques with a sample of 66 respondents, the study concluded that there is a relationship between personification, reliability, safety, responsiveness, and empathy in relation to patient satisfaction. Additionally, the provision of quality medical care was found to be an important factor in achieving patient satisfaction.

It is evident that the literature exploring patient satisfaction is extensive. As Kalaja (2023) highlighted in a literature review, the main determinants of satisfaction are demographic characteristics, patient expectations, and experiences. Furthermore, communication is an extremely important element that affects patient satisfaction.

Occupational Health

According to Sakai, Nagata, Mori, Inoue, Fujiwara, Odagami, and Mori (2024), occupational health (also known as occupational medicine) has evolved over time and been influenced by social, economic, and demographic changes, as well as the transformation of production modes. Seminal research by Gardell (1982), Kornhauser (1965), and Karasek (1979, 1985) systematically conceptualized the psychosocial working conditions, addressing issues such as underload and overload in work. These concepts formed the basis for the

seminal job strain model, which links stress to the combination of high demands and low control, later expanded to include job security and social support.

Sakai et al. (2024) highlight that recent studies address emerging issues, such as exposure to nanomaterials, the impacts of telework during the COVID-19 pandemic, and the challenges of precarious work. Additionally, work is considered an important determinant of health, reflecting factors such as socioeconomic inequalities, migration, long work hours, and the effects of climate change. With the aging workforce in many developed countries, there is a growing focus on multifaceted interventions to promote the retention of workers in the labor market throughout their lives.

A study by Butterworth, Leach, Strazdins, Olesen, Rodgers, and Broom (2011) investigated how the psychosocial quality of employment (control, demands, complexity, job security, and fair pay) influences mental health by comparing low-quality jobs with unemployment. Based on longitudinal data from 7,155 participants, the results showed that although employment is generally associated with better mental health than unemployment, low-quality jobs can be as detrimental to mental health as unemployment. Transitioning to high-quality jobs significantly improved mental health, while moving to low-quality jobs was more harmful than remaining unemployed. It was concluded that low-quality psychosocial jobs do not offer the same mental health benefits as high-quality jobs.

Shahidi, Gignac, Oudyk, and Smith (2021) developed a typology of psychosocial profiles in the workplace to understand how work stressors are grouped in the Canadian labor market and their relationship with mental health. Data from 6,408 workers were analyzed using the Copenhagen Psychosocial Questionnaire and latent profile analysis, identifying four distinct psychosocial work environments. The results provide evidence that individuals exposed to a wide range of psychosocial stressors are more likely to experience burnout, stress, and cognitive tension, even after adjusting for demographic factors. Therefore, psychosocial stressors are strongly associated with negative impacts on mental health, reinforcing the need for comprehensive approaches to assess the psychosocial quality of work.

It is clear that occupational health (occupational medicine) is a real and present concern that reaches academic, business, and governmental environments, further reinforcing the relevance of this study.

Service Quality Measurement Models: SERVPERF and SERVQUAL

According to Dimitriadis and Maroudas (2007), service quality is a multidimensional concept and a determinant of customer satisfaction. For this reason, researchers focus on studies and methodologies to measure service quality and user perception, leading to the development of various measurement methodologies and models. Among these, the most well-known and widely used are the SERVQUAL and SERVPERF models (Abdullah, 2006; Andronikidis & Bellou, 2010; Nejati & Nejati, 2008).

The SERVQUAL model definition, proposed by Parasuraman et al. (1988), measures perceived quality based on the difference between customer (patient) expectations and perceptions when using a specific service. In contrast, the SERVPERF model directly measures service quality perceptions without considering expectations (Brady & Cronin, 2001; Cronin & Taylor, 1992). According to Psomas, Bouranta, Koemtzi, and Keramida (2020), both models share the same concept of perceived quality and are composed of five quality dimensions: tangibility, responsiveness, reliability, assurance, and empathy. They differ in how the measurement is calculated.

Table 1
Differences Between the SERVQUAL and SERVPERF Models

Aspect	SERVQUAL	SERVPERF
Definition	Measures perceived quality based on the difference between expectations and perceptions.	Measures the perceived quality directly without considering expectations.
Dimensions	5 dimensions: tangibility, reliability, responsiveness, assurance, and empathy.	Same 5 dimensions as SERVQUAL, but focuses only on perceptions.
Measurement	Evaluates the difference between expectations (E) and perceptions (P): Quality = P - E.	Measures only the perception of service by customers: Quality = P.
Complexity	Requires collection and analysis of two data sets (expectations and perceptions).	Requires the collection and analysis of only one data set (perceptions).
Theoretical Basis	Based on the Gap Model, which focuses on discrepancies between expected and perceived service.	Based on the concept that perception is the main determinant of service quality.
Practical Application	Useful in services where expectations play a crucial role, such as in tourism and hospitality.	More applicable in services with regular customers, where perceptions dominate expectations.
Criticism	May overestimate customer expectations and ignore nuances related to them.	Static expectations may overlook variations related to consumer expectations.

Source: Authors (adapted from Andronikidis & Bellou, 2010; Brady & Cronin, 2021; Cronin & Taylor, 1992; Parasuraman et al., 1988; Psomas et al., 2020)

Parasuraman et al. (1985) conducted an exploratory study to investigate the concept of service quality, driven by the dynamic market demands for providing excellent services to customers, going beyond the delivered results. The authors identified that judgments about quality, whether high or low, depend directly on how customers perceive the performance of services provided by companies. Thus, service quality was defined as the difference between customer expectations and their perceptions of service performance.

In this context, the pioneering study by Parasuraman, Zeithaml, and Berry (1985) established the key determinants that consumers consider when interpreting service quality, as presented in Table 2.

Table 2
Variables and Measures

Variable	Measure
Reliability	Consistency of performance, billing accuracy, maintaining records, delivering services on time.
Responsiveness	Willingness or readiness of employees to provide service, punctuality, prompt service.
Competence	Necessary skills and knowledge to perform the service, personal contact knowledge and support, organizational research capability.
Access	Accessibility and ease of contact, service availability by phone, wait times, convenient operating hours, convenient service location.
Courtesy	Courtesy, respect, consideration, friendliness of staff, consideration of customer property, clean and neat appearance of public contact staff.
Communication	Keeping customers informed in a language they can understand, explaining the service and costs, ensuring the consumer that a problem will be resolved.
Credibility	Trustworthiness, credibility, honesty, reputation of the company, personal characteristics of the staff.
Security	Freedom from danger, risk, or doubt, physical safety, financial safety, confidentiality.
Understanding/Knowing the Customer	Understanding customer needs, learning specific requirements, paying individualized attention, recognizing regular customers.
Tangibles	Physical evidence and representations of the service, other customers in service facilities.

Source: Authors, adapted from Parasuraman et al. (1985)

Cronin and Taylor (1992) developed the SERVPERF model, based on the dimensions of SERVQUAL, using only performance perception measures. In their studies, the SERVPERF scale demonstrated superiority over SERVQUAL by reducing the number of items evaluated by 50%. According to Boulding et al. (1993), the SERVPERF scale is more efficient and has been widely validated in subsequent studies, such as those by Jain and Gupta (2004), who highlighted its superiority in terms of validity, reliability, and methodological robustness in assessing service quality. Additionally, SERVPERF provides more convergent and discriminant explanations of the analyzed data.

This efficiency has led to the broad use of the scale in different contexts. For instance, Fragoso and Espinoza (2017) investigated service quality and customer perception in the banking sector, while Leong et al. (2015) studied customer satisfaction and loyalty in airlines using the SERVPERF model.

From this perspective, high service quality is directly related to higher customer satisfaction and loyalty, as well as encouraging recommendations, reducing complaints, and improving customer retention rates (Zeithaml, Berry, & Parasuraman, 1996).

Relationship Between Quality, Satisfaction, and Loyalty

The measurement of service quality, customer satisfaction, and loyalty has been applied across various sectors, particularly in healthcare. In the study by Singh and Sidhu (2023), a modified version of the SERVQUAL model was used to investigate the satisfaction of oncology patients in the Punjab state of India, comparing their pre-hospitalization expectations with their perceptions of the services received. With a sample of 202 patients who completed their treatment, statistical analysis using t-tests, ANOVA, and exploratory factor analysis revealed a significant average statistical difference (-1.44) between patient expectations and service delivery. Moreover, during the COVID-19 pandemic, this difference increased (-2.02), indicating a greater decline in satisfaction.

Han, Wei, Wang, Cai, Zhu, Chen, and Li (2024) assessed the quality of services provided by digital hospitals (internet hospitals) in China, exploring patient familiarity, willingness, and satisfaction based on the SERVQUAL dimensions. The study, conducted from June to September 2022 with a sample of 1,481 patients recruited from 31 provinces in China, used statistical analyses including linear regressions and importance-performance analysis to identify patient expectations and perceptions regarding service quality. The results showed that, despite 51.2% of patients having used the services, many reported low familiarity, and the perception of quality did not meet expectations, especially in the responsiveness dimension. Tangibility and empathy were

positively associated with satisfaction, while responsiveness had a limited impact due to the large gap between expectations and perceived delivery.

Psomas et al. (2020) explored the impact of service quality in citizen service centers (CSCs) on citizen satisfaction, based on their perceptions. The research, conducted with a sample of 1,226 respondents using the SERVPERF model, showed that service quality dimensions significantly impact citizen satisfaction, with notable differences between citizen groups. The study provided important insights for public organizations and policymakers, considering the demographic characteristics of citizens.

Wong, Amezcua, and Pando (2024) conducted a study from a healthcare marketing perspective, using the SERVPERF model with its variables (responsiveness, trust, tangibles, empathy, and assurance) to measure the relationship between service quality and patient satisfaction in dental clinics. Using structural equation modeling (SEM) and partial least squares (PLS) analysis with Smart PLS software, the results indicated that the estimates obtained had a significant impact on user satisfaction, with an R^2 value of 0.781, validating the relationship explained by the confirmatory model.

Du Thanh, Quynh, Thi, and Minh (2023) evaluated an adapted SERVPERF model in the context of a public oncology hospital in Vietnam, using data from 227 hospitalized patients. The analysis revealed that the modified tool, with five reorganized factors (responsiveness, empathy, reliability, tangibility, and assurance), demonstrated high reliability (Cronbach's $\alpha = 0.94$) and confirmed validity through factor analysis (CFA) with fit indices (CFI = 0.85, TLI = 0.83, RMSEA = 0.08). These results confirmed patients' perceptions of healthcare service quality at other public oncology hospitals in Vietnam.

Cabedo-Ferrero, Vicente-Hernández, Manresa-Domínguez, Gómez-Masvidal, Montero-Pons, Reyes-Lacalle, and Falguera-Puig (2022) validated a SERVPERF scale to assess perceived care quality during medical abortion procedures performed at home in Spain, where Organic Law 2/2010 legalizes abortion up to 14 weeks of gestation. The research involved 289 patients who completed a questionnaire with 26 items previously evaluated by a panel of experts. Using exploratory factor analysis, the study provided evidence showing that effective abortion care is safe, though patient satisfaction still needs further evaluation. The validated scale offers a reliable tool for measuring perceived care quality, quality experiences, and person-centered care, which are essential for the overall evaluation of service quality.

Other studies have used the SERVQUAL model to measure patient satisfaction and loyalty, such as the study by Chen, Hsiao, Chang, and Lai (2022), who used the Donabedian SPO theoretical model and SERVQUAL scale to measure the perceived quality of services in Taiwan's National Health Insurance system, for outpatient patients, academic medical centers, metropolitan hospitals, and community hospitals. With a sample of 315 validated questionnaires, the results revealed that "Assurance" positively impacted perceived quality, suggesting that healthcare institutions should prioritize professional knowledge, healthcare team behavior, treatment methods, and processes over tangible aspects, despite their importance in the process.

Hosseinzadeh, Pouladzadeh, and Eskandari (2024) assessed the service quality of Golestan Hospital in Iran, based on patient satisfaction using the SERVQUAL model. With a sample of 200 patients, the results showed a negative gap between patient expectations and perceptions, especially in the dimensions of responsiveness and empathy. The highest score was obtained for tangibility, and the lowest for assurance. The study also revealed that factors such as age and marital status influenced patient perceptions.

Msacky (2024) analyzed healthcare service delivery in local government authorities in Tanzania using Parasuraman's SERVQUAL scale. With a sample of 400 families, and using binary logistic regression to assess the influence of demographic dimensions on health service quality perceptions, the study presented evidence indicating that healthcare services do not meet user expectations. Factors such as residence area, education, and occupation showed significant associations with service quality perceptions, reinforcing the need for local authorities in Tanzania to strengthen the monitoring and evaluation of healthcare services in public units.

This literature review highlights the relevance of perceived service quality and its relationship with patient satisfaction and loyalty in different contexts, including occupational health, hospital services, and specialized clinics. Models like SERVQUAL and SERVPERF are effective tools for measuring quality, widely applied in studies analyzing factors such as responsiveness, empathy, reliability, tangibility, and assurance.

In the context of occupational medicine, these issues become even more critical due to the interaction between legal obligations and the pursuit of efficiency and worker satisfaction. Thus, the theoretical foundation reinforces the applicability of the SERVPERF model to assess the perception of service quality in occupational health clinics, contributing to advancements in management and continuous improvement of these services.

Hypotheses and Conceptual Model

To assess the perception of satisfaction regarding the services offered by specialized occupational health clinics, five hypotheses were formulated, based on the constructs of the structural model proposed by Cronin and Taylor (1992). As highlighted in the literature review, studies by authors such as Parasuraman (1996), Cronin and Taylor (1992), Al-Neyadi, Abadallah, and Malik (2018), and Hosseinzadeh et al. (2024), indicate that service

quality significantly influences customer satisfaction. Thus, this research establishes the five hypotheses based on the constructs defined in the theory, widely used by researchers working with the SERVQUAL and SERVPERF models, considering them as key indicators of perceived satisfaction.

- H1: Tangible resources positively influence customer satisfaction perception.
- H2: The perception of trust reflects and positively influences customer satisfaction.
- H3: Service quality (attentiveness) positively influences customer satisfaction perception.
- H4: Assurance of the services provided positively influences customer satisfaction perception.
- H5: Empathy positively influences customer satisfaction perception.

The specification of the proposed structural model assumes that service quality directly influences customer satisfaction. Therefore, the quality constructs [tangibility, reliability, attentiveness, assurance, empathy] were used as indicators of satisfaction, as shown in Figure 1 below.

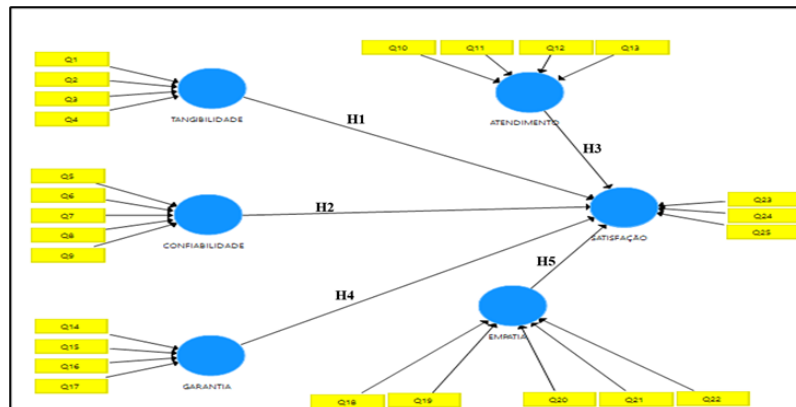


Figure 1 – Specification of the Structural Model

III. Methodology

The methodology of this research is classified as descriptive, with a quantitative approach. According to Vergara (2004), descriptive research aims to characterize a specific population. Regarding the application method, this research adopts the survey approach, as described by Malhotra (2019), which involves questioning participants about behaviors, intentions, attitudes, perceptions, motivations, and demographic and lifestyle characteristics. According to Malhotra (2019), a survey consists of a structured questionnaire applied to a representative sample of the population, aiming to collect specific information from the respondents. In this study, an electronic questionnaire with a 7-point Likert scale was used. The link to the questionnaire was sent via email, WhatsApp, and to the human resources departments of companies in the industrial, service, and commerce sectors.

To increase the response rate, the questionnaires were applied in waves with a 30-day interval between them, totaling 90 days for the data collection period. Additionally, weekly reminders were sent to participants who had not yet responded. It was observed that the use of WhatsApp had a positive impact on the response rate, being adopted starting from the second wave of the questionnaire application.

To enable data collection, the model developed by Cronin and Taylor (1992) and adapted by Soares, Gosling, and Borges (2017) for dental clinics was used. The electronic questionnaire applied consisted of 26 questions, distributed among the constructs as presented in Table 2 below.

Tabela 3
Dimensões da qualidade, indicador e referência

Variables	Indicator
Facilities	Q1 - Does the clinic have up-to-date and modern equipment?
	Q2 - Does the clinic have an air-conditioned, pleasant, and clean environment?
	Q3 - Does the clinic have uniformed staff with badges for easy identification?
	Q4 - Does the clinic have a physical space compatible with the offered services?
Reliability	Q5 - Does the clinic demonstrate reliability?
	Q6 - Does the clinic perform procedures within the regulatory time frame for each procedure?
	Q7 - Does the clinic keep records and files archived, facilitating future consultations?
	Q8 - Does the clinic comply with all procedures as required by legislation and contract with the company?
	Q9 - Does the clinic comply with all procedures as required by legislation and contract with the company?
Service	Q10 - Does the clinic orient and explain the procedures that will be necessary for each occupation type?
	Q11 - Does the clinic have staff available for orientation and emergency care?
	Q12 - Does the clinic have staff to help and assist on busy days?
	Q13 - Does the clinic have staff to meet the increasing demand?

Guarantee	Q14 - Does the clinic demonstrate reliable staff?
	Q15 - Do you feel secure with the procedures performed by the clinic?
	Q16 - Does the clinic have educated staff, demonstrating training and confidence in performing procedures?
	Q17 - Does the clinic provide support to staff for the execution of procedures?
Empathy	Q18 - When you used the clinic's services, did you receive special attention?
	Q19 - Does the clinic have staff that provide special attention to users?
	Q20 - Does the clinic have a team with knowledge of the procedures required by PMCSO?
	Q21 - Did the clinic demonstrate attention and knowledge regarding the required procedures?
Satisfaction	Q22 - Does the clinic have convenient operating hours?
	Q23 - When you used the clinic's services, did you receive special attention?
	Q24 - Does the clinic have staff that provide special attention to users?
	Q25 - Does the clinic have a team with knowledge of the procedures required by PMCSO?

Fonte: Autores (2024) - Adapted from Cronin and Taylor (1992)

To evaluate the conceptual model and test the proposed hypotheses, analyses were conducted on the reflective measurement model using the R software. During the process, procedures for constructing structural equation modeling (PLS-SEM) were carried out to verify the adequacy of the proposed model. The analysis focused on assessing the relationships between the constructs, considering path coefficients, standard errors, and other relevant statistical indicators in order to validate the hypotheses that support the impact of independent variables on the customer satisfaction perception.

IV. Results

This chapter presents the data regarding the response rate obtained during the data collection, as well as the validation of the formative measurement model, performed based on the criteria established by Hair et al. (2014).

Research Sample

According to the adopted methodological procedure, the electronic questionnaire was sent to the human resources department of 20 companies from the industrial, services, and commerce sectors, totaling 285 expected responses, resulting in a total of 154 valid responses, with a response rate of 54.04%. The distribution of respondents by gender is detailed in Table 4 presented below.

Tabela 4
Amostra da pesquisa

Gender	N = 154	
	Frequency	%
Male	72	46,75%
Female	82	53,25%

Source: Authors (2024)

Evaluation of the Reflective Measurement Model

Before testing the relationships between the constructs, it is necessary to validate them based on their respective indicators, as recommended by Hair et al. (2014) and Sanchez (2013). For this, this study uses reflective measurements, whose evaluation includes the following criteria: unidimensionality, internal consistency, convergent validity, and discriminant validity.

Unidimensionality and Internal Consistency

Table 5 presents the results of the first analysis of the measurement model, related to the reliability of internal consistency. The indicators evaluated include Cronbach's Alpha, Dillon-Goldstein's rho, and principal component analysis, which help verify the unidimensionality and robustness of the proposed model.

Table 5
Unidimensionality and Internal Consistency

Constructs	One-Dimensionality -Internal Consistency				Alpha de Cronbach of correlated searches	Constructs	One-Dimensionality -Internal Consistency				Alpha de Cronbach of correlated searches
	Alpha de Cronbach	Dillon-Goldstein's rho	eig.1st	eig.2st			Alpha de Cronbach	Dillon-Goldstein's rho	eig.1st	eig.2st	
Tangibility	0,828	0,886	2,650	0,621	(Chen et al., 2004) $\alpha = 0,86$ (Carr; Pearson, 1999) $\alpha = 0,88$	Warranty	0,916	0,941	3,202	0,3740	(Devaraj et al., 2012) $\alpha = 0,72$ (Das; Narasimhan, 2001) $\alpha = 0,89$ (Krause et al., 2001) $\alpha = 0,77$
Reliability	0,863	0,901	3,236	0,56	(González-Benito, 2004) $\alpha = 0,88$ (Zsidisin; Ellram, 2001) $\alpha = 0,68$	Empathy	0,864	0,903	3,273	0,825	(Chen et al., 2004) (González-Benito, 2007) $\alpha = 0,81$
Service	0,893	0,926	3,035	0,439	(Devaraj et al., 2012) $\alpha = 0,90$ (Zhang et al., 2003) $\alpha = 0,90$ (Krause et al., 2001) $\alpha = 0,86$	Satisfaction	0,801	0,883	2,146	0,435	(Chen et al., 2004) $\alpha = 0,82$ (González-Benito, 2007)

Note: eig.1st = first eigenvalue; eig.2nd = second eigenvalue

Source: Authors (2024)

The results show that the Cronbach's Alpha for the constructs exceeds the established limits, being above 0.60 (Hair et al., 2014) and 0.70 (Sanchez, 2013). This indicates that the indicator blocks adequately measure their respective latent variables, showing a high correlation between the indicators. This result is expected since the constructs are reflective, and therefore a high correlation between the indicators is desired. Additionally, the Dillon-Goldstein's rho statistic reinforces this analysis, with values above 0.70 (Sanchez, 2013), confirming that the constructs established in the model meet the internal consistency criteria. Finally, the principal component analysis shows that unidimensionality was confirmed, as the eigenvalue of the correlation matrix for each set of indicators presents the first eigenvalue greater than 1 and the second smaller than 1.

Therefore, it is concluded that all constructs have internal consistency, allowing for the continuation of the analysis with convergent validity.

Convergent Validity

The analysis of convergent validity was performed using the outer loadings of the indicators (communalities) and the average variance extracted (AVE). The results of these analyses are presented in Table 6 below.

Table 6
Convergent Validity

Constructs	Indicator	Load	Commonality	AVE	Constructs	Indicator	Load	Commonality	AVE
Tangibility	Q1	0.703	0.49	0.6614045	Location	Q14	0.872	0.76	0.8003476
	Q2	0.844	0.71			Q15	0.899	0.80	
	Q3	0.815	0.66			Q16	0.886	0.78	
	Q4	0.878	0.77			Q17	0.919	0.84	
Reliability	Q5	0.803	0.64	0.6465751	Empathy	Q18	0.817	0.66	0.6542409
	Q6	0.790	0.62			Q19	0.820	0.67	
	Q7	0.805	0.64			Q20	0.861	0.74	
	Q8	0.813	0.66			Q21	0.878	0.77	
	Q9	0.806	0.65			Q22	0.644	0.41	
Service	Q10	0.811	0.65	0.7589140	Satisfaction	Q23	0.844	0.71	0.7153792
	Q11	0.895	0.80			Q24	0.832	0.69	
	Q12	0.898	0.80			Q25	0.859	0.73	
	Q13	0.876	0.76						

Source: Authors (2024)

The analysis of the loadings was conducted following the verification of unidimensionality, as recommended by Sanchez (2013). The loadings represent the correlations between the latent variable and its indicators, while the communalities correspond to the squared correlations. According to Hair et al. (2014), outer loadings should have values equal to or greater than 0.708, as they are statistically significant, indicating that the indicators associated with the construct substantially share common characteristics, confirming their reliability.

Indicators with loadings between 0.40 and 0.70 may be considered for removal only if their exclusion results in a significant increase in composite reliability or average variance extracted (AVE). However, in this study, indicator Q22 had a loading below the threshold (0.64) but was retained because it is relevant to the model, and its exclusion would not result in significant improvements in composite reliability, besides being close to the minimum required standard.

Regarding convergent validity, all constructs showed AVE values greater than 0.50, meeting the established criteria. AVE reflects the average squared loadings of the indicators associated with the construct, being equivalent to its communality. An AVE value equal to or greater than 0.50 indicates that the construct, on average, explains more than half of the variation in its indicators. Values below 0.50 suggest that, on average, the errors in the items are greater than the variance explained by the construct (Hair et al., 2014). Therefore, the results confirm the convergent validity of the measurement model, allowing the analysis to proceed to the next step: the evaluation of discriminant validity.

Discriminant Validity

Discriminant validity was assessed based on the cross-loadings of the indicators. According to Hair et al. (2014), the general rule is that an indicator's loading on its associated construct should be greater than its loadings on other constructs. This criterion ensures that the indicators are more strongly related to their main construct than to any other.

Hamdollah and Baghaei (2016) emphasize that discriminant validity is an essential tool for verifying how distinct a construct is from others, ensuring the fidelity of the indicators to the latent variable they belong to. The results presented in Table 7 confirm that, in all cases, the indicators associated with the constructs have higher loadings on their respective construct than on others, validating the discriminant validity analysis.

Table 7

Discriminant Validity

Construct	Indicator	TAN	COM	ATE	GAR	EMP	SAT	AVE	Construct	Indicator	TAN	COM	ATE	GAR	EMP	SAT	AVE
Tangibility	Q1	0.703	0.441	0.476	0.462	0.396	0.553	0.813	Warranty	Q14	0.627	0.709	0.643	0.872	0.671	0.621	0.894
	Q2	0.844	0.610	0.491	0.627	0.515	0.814			Q15	0.620	0.680	0.658	0.899	0.663	0.577	
	Q3	0.815	0.572	0.560	0.518	0.429	0.807			Q16	0.620	0.600	0.590	0.886	0.643	0.634	
	Q4	0.878	0.690	0.590	0.599	0.516	0.849			Q17	0.568	0.631	0.669	0.919	0.700	0.562	
Reliability	Q5	0.670	0.803	0.598	0.771	0.593	0.632	0.804	Empathy	Q18	0.499	0.422	0.539	0.578	0.817	0.464	0.808
	Q6	0.534	0.790	0.464	0.477	0.394	0.576			Q19	0.446	0.363	0.555	0.573	0.820	0.424	
	Q7	0.548	0.805	0.475	0.483	0.398	0.529			Q20	0.478	0.624	0.630	0.662	0.861	0.454	
	Q8	0.562	0.813	0.543	0.578	0.540	0.515			Q21	0.539	0.627	0.611	0.728	0.878	0.536	
	Q9	0.568	0.806	0.612	0.609	0.559	0.541			Q22	0.333	0.443	0.302	0.448	0.644	0.400	
Service	Q10	0.535	0.619	0.811	0.620	0.554	0.488	0.871	Satisfaction	Q23	0.810	0.561	0.474	0.598	0.480	0.844	0.845
	Q11	0.600	0.593	0.895	0.690	0.610	0.537			Q24	0.767	0.521	0.541	0.520	0.431	0.832	
	Q12	0.600	0.550	0.898	0.597	0.570	0.562			Q25	0.815	0.682	0.547	0.582	0.524	0.859	
	Q13	0.535	0.586	0.876	0.588	0.569	0.555										

Fonte: Autores (2023)

A more conservative criterion, known as the Fornell-Larcker criterion, was also used to assess discriminant validity, as shown in Table 8. This criterion establishes that the indicators of each construct should have values higher than the largest correlations with other constructs in the model.

Based on the results obtained, it can be stated that the measurement model possesses discriminant validity. Thus, it is possible to proceed to the second phase of the analysis, which involves evaluating the structural model and verifying the research hypotheses.

Table 8

\sqrt{AVE} Critério de Fornell-Larker ()

Construct	AVE	Fornell-Larker \sqrt{AVE}	Correlation coefficient					
			TAN	COM	ATE	GAR	EMP	SAT
TAN	0.661	0.813	0,813					
COM	0.646	0.804	0,721	0,804				
ATE	0.758	0.871	0,652	0,6720	0,871			
GAR	0.800	0.894	0,683	0,7340	0,715	0,894		
EMP	0.654	0.808	0,574	0,6210	0,749	0,749	0,808	
SAT	0.715	0.845	0,794	0,6990	0,672	0,568	0,568	0,845

Note: TAN = tangibility; COM = reliability; ATE = service; GAR = assurance; EMP = empathy; SAT = satisfaction; AVE = average variance extracted.

Source: Authors (2024).

Evaluation of the Structural Model

After the validation of the reflective measurement model, the evaluation of the structural model was conducted, following the guidelines established by Hair et al. (2014). The objective of this step was to examine the relationships between the constructs, the quality of the model, and its predictive ability. The evaluation of the structural model involved the following aspects.

Collinearity Issues

Collinearity between the variables was assessed through the VIF (Variance Inflation Factor) values. All the VIFs obtained for the analyzed paths were below 5, indicating the absence of problematic collinearity between the constructs in the model. For example, the VIF for the path between tangibility (TAN) and satisfaction (SAT) was 4.473, and for trust (CON), it was 1.143, both indicating that collinearity is not a critical concern, as the values are well below the threshold of 5.

Relationships in the Structural Model – Path Coefficient

The path coefficients indicate the direct impact of the independent variables on the dependent variable, in this case, customer satisfaction (SAT). The analysis of the path coefficients revealed the following relationships:

- The path coefficient from the construct CON (trust) to SAT (satisfaction) was 0.38 ($t = 2.88$), with a p-value of 0.003, indicating a positive and significant relationship.
- The path coefficient from the construct TAN (tangible resources) to SAT was 0.45 ($t = 2.77$), with a p-value of 0.006, also indicating a positive and significant relationship.
- The path coefficient from the construct EMP (empathy) to SAT was 0.25 ($t = 1.80$), with a p-value of 0.072, which is not significant at the 5% level, suggesting that empathy has an insignificant effect on customer satisfaction.
- The path coefficient from the construct GAR (assurance) to SAT was 0.30 ($t = 2.30$), with a p-value of 0.02, indicating a positive and significant relationship.

These results suggest that the proposed relationships between the constructs, such as the influence of TAN (tangible resources), CON (trust), and GAR (assurance), are significant and positive for customer satisfaction. On the other hand, the relationship between EMP (empathy) and SAT was not confirmed as significant.

Coefficients of Determination (R^2)

The coefficients of determination were calculated to assess the explanation of variability in the dependent variable. The R^2 value for SAT was 0.174, indicating that the structural model explains 17.4% of the observed variability in customer satisfaction. Although this value is relatively low, it can still be considered a promising start, especially given the context of a model with multiple constructs and the nature of the variables.

Effect Size (f^2)

Effect size was calculated to assess the contribution of each independent variable in explaining the dependent variable. The obtained f^2 values indicate that the effect of empathy (EMP) on satisfaction (SAT) was moderate, with a value of 0.184. The effect of TAN was virtually null ($f^2 = 0.000$), indicating that this variable has a very limited impact on customer satisfaction. Other constructs, such as CON and GAR, showed f^2 values above 0.1, suggesting small to moderate effects on the dependent variable.

Predictive Relevance (Q^2) – Redundancy

Predictive relevance was assessed through the Q^2 value, which indicated a positive value of 0.26. This suggests that the model has good predictive ability, with considerable performance in forecasting the variables. This value is greater than 0.00, indicating that the model has a moderate predictive capacity and is able to explain variability in unobserved data.

After this detailed analysis of the structural model, the formulated hypotheses were subjected to statistical verification to confirm their theoretical and practical implications. The results of the structural model evaluation are presented in Table 9.

Table 9
Structural Model Results

Hypothesis	Path	Path Coefficient	Value t	p-Value	f ² (Effect Size)	VIF	R ²	Conclusion
H1	TAN → SAT	0,45	2,77	0,006	0	4,473	0,17	Confirmed (tangible resource positively influences satisfaction)
H2	CON → SAT	0,38	2,88	0,003	0,08	10,14	0,17	Confirmed (trust positively influences satisfaction)
H3	ATE → SAT	0,5	3,55	0	0,05	4,9	0,17	Confirmed (service positively influences satisfaction)
H4	GAR → SAT	0,3	2,3	0,02	0,06	3,602	0,17	Confirmed (guarantee positively influences satisfaction)
H5	EMP → SAT	-0,71	5,04	0	0,184	4,295	0,17	Rejected (empathy negatively influences satisfaction)
<i>Pseudo Goodness of fit (Gof)</i>		0,7914						

Fonte: Autores (2024)

Based on the detailed analysis of the structural model, we observed that most relationships between the constructs were significant, with the positive and significant impacts of tangible resources (TAN), trust (CON), and assurance (GAR) on customer satisfaction (SAT) standing out. However, the relationship between empathy (EMP) and satisfaction was not confirmed as significant, suggesting that, in this specific context, empathy does not have a direct, relevant impact on customer satisfaction perception.

The R² value for satisfaction, 0.174, indicates a moderate explanation of the observed variability in satisfaction, which is consistent with the complexity of the model involving multiple constructs. Predictive relevance, assessed by Q², was 0.26, suggesting the model has moderate predictive ability. While the R² value is relatively low, the good predictive capacity and significant results of the variables indicate that the model provides a solid foundation for future investigations, although there is room for improvement.

V. Conclusion

This research aimed to assess patient satisfaction perceptions in occupational health clinics, based on the SERVPERF model, using PLS-SEM structural equation modeling and R software for data analysis and hypothesis testing. The main findings of this study reveal that the tangible, reliability, service, and assurance dimensions have a positive influence on patient satisfaction in occupational health clinics, while empathy did not show a significant impact. This result emphasizes the importance of focusing on modernizing facilities, meeting deadlines, and training the staff to ensure trust and safety for patients. The study also demonstrated that the SERVPERF model is suitable for evaluating perceived quality in this specific context, contributing to the literature by validating its dimensions in an underexplored environment.

The research offers valuable insights for clinic managers, suggesting strategies such as improving infrastructure, enhancing communication with patients, and implementing regular training for employees to increase the perception of reliability and assurance in the services provided.

Regarding the construct of empathy not having an influence on patient satisfaction in occupational health clinics, one possible explanation lies in the context of the service. Since occupational health exams, such as admission and termination exams, are mandatory by law for companies, they are not a choice of the patients. This could explain why empathy might not be as important to patients, compared to services in clinics where patients choose to undergo clinical exams.

Despite the significant results, some limitations should be considered. The sample was limited to a small number of clinics and regions, which may not capture cultural or operational variations in other locations. Additionally, the model explained only 17.4% of the variability in satisfaction, suggesting that other factors, not included in the scope of the research, could also influence patient perceptions. Furthermore, the construct of location was not considered in this study, as companies typically contract with specific occupational health clinics, meaning the clinic choice is not an option for the worker using the services.

Future studies could explore broader and more diverse samples, covering different regions and types of clinics. It is also recommended to investigate the impact of factors such as price, accessibility, and aspects related to health communication. Including longitudinal analysis could provide a better understanding of changes in quality perception over time. Other approaches, such as combining qualitative and quantitative data, could offer a more comprehensive view of the factors influencing patient satisfaction. Additionally, a comparative study with other types of clinics would be valuable to understand if there are differences across these sectors.

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