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Quality Management and Healthcare Management

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Resumo

As actuais políticas de saúde que colocam uma forte ênfase na qualidade dos cuidados prestados aos doentes incluem a governação clínica e métodos melhorados de gestão dos recursos humanos. Para além de aumentar a eficiência dos recursos, de identificar e minimizar os erros médicos, maximizando a utilização de cuidados eficazes e melhorando os resultados, e de alinhar os cuidados com o que os utentes/doentes querem e com o que precisam, há muitas outras razões pelas quais é crucial melhorar a qualidade dos cuidados de saúde. A qualidade dos cuidados de saúde é, em última análise, avaliada pela forma como satisfazem as necessidades e os níveis de satisfação do doente ou, mais genericamente, da sociedade. Para melhorar a qualidade, temos de começar por analisar em que medida as organizações de cuidados de saúde estão atualmente a satisfazer essas necessidades.

Nos últimos tempos, a avaliação da qualidade passou a centrar-se na satisfação dos doentes, bem como nos aspectos estruturais, processuais e baseados nos resultados da prestação de cuidados de saúde. Quando falamos de qualidade, não estamos a referir-nos apenas à parte científica da medicina. A prestação de serviços de saúde, juntamente com as preocupações sociais e pessoais, é igualmente importante para determinar a qualidade. A iniciativa de melhoria da qualidade começou a pôr gradualmente esta ideia em prática. A responsabilização das instituições de saúde pelos serviços que prestam é uma preocupação crescente da sociedade. Em resposta, o sector dos cuidados de saúde está a salientar a necessidade de identificar as necessidades urgentes da sociedade e de cultivar uma liderança forte. Reconhece também os benefícios do empenhamento voluntário na qualidade.

O método SERVQUAL, frequentemente utilizado nos domínios da qualidade dos serviços e da gestão dos cuidados de saúde, centra-se na avaliação da discrepância entre as expectativas e as impressões dos consumidores relativamente ao serviço recebido. Neste método, são utilizados cinco critérios para avaliar a qualidade do serviço: fiabilidade, garantia, tangibilidade, empatia e capacidade de resposta. Assim, o objetivo deste estudo é explorar e comparar a discrepância entre as expectativas e as percepções dos doentes e identificar os factores que afectam a qualidade, a satisfação e a lealdade dos doentes em unidades de saúde como os Hospitais e Clínicas do Porto, Portugal.

Palavras-chave: Qualidade, Instituições de saúde, questionário SERVQUAL, Satisfação, Lealdade, Doentes, Expectativas, Percepção.

Abstract

The current health policies that place a strong emphasis on patient care quality include clinical governance and enhanced methods of human resource management. In addition to increasing resource efficiency, identifying and minimizing medical errors while maximizing the use of effective care and improving outcomes, and aligning care to what users/patients want in addition to what they need, there are many other reasons why it is crucial to improve the quality of healthcare. The quality of healthcare is ultimately judged by how well it meets the needs and satisfaction levels of the patient, or more broadly, society. To improve quality, we need to start by examining how well healthcare organizations are currently fulfilling these needs.

In recent times, the focus of quality assessment has shifted towards patient satisfaction, as well as the structural, procedural, and result-based aspects of healthcare delivery. When we talk about quality, we're not just referring to the medical science part of it. The delivery of healthcare services, along with the societal and personal concerns, is equally important in determining quality. The quality improvement initiative has started to gradually put the idea into action. Holding healthcare institutions responsible for the services they deliver is a growing societal concern. In response, the healthcare industry is emphasizing the need to identify urgent societal needs and cultivate strong leadership. It also recognizes the benefits of voluntary commitment to quality.

The SERVQUAL method, which is frequently used in the fields of service quality and healthcare management, focuses on assessing the discrepancy between consumers' expectations and impressions of the service they received. Five criteria are used to assess service quality in this method: dependability, assurance, tangibles, empathy, and responsiveness. Therefore, the purpose of this study is to explore and compare the gap between patient expectations and

perceptions, and identify the factors that affect the quality, satisfaction, and loyalty of patients in healthcare units like Hospitals and Clinics in Porto, Portugal.

Keywords: Quality, Healthcare institutions, SERVQUAL survey, Satisfaction, Loyalty, Patients, Expectations, Perception.

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List of Abbreviations

G - Gender

A - Age

ED - Education

I - Income

EM - Employment

Gap T – Gap Tangibles

Gap RL – Gap Reliability

Gap RS – Gap Responsiveness

Gap A – Gap Assurance

Gap E – Gap Empathy

L - Loyalty

S - Satisfaction

Q - Quality

Per – Perception

Exp – Expectation

Avg – Average

SEM - Structural Equation Modeling

Chapter 1

Introduction

1.1. General Framework

We live in an age where patients are becoming increasingly aware of their rights and options in healthcare. They're no longer passive receivers of care but active participants who expect top-notch service. That's why it's crucial for healthcare providers to understand what keeps patients satisfied and loyal. It is essential to examine the larger meanings of "quality," "satisfaction," and "loyalty" within a healthcare context in order to fully grasp the complex dynamics at work. The term "quality" refers to a variety of factors, including effectiveness, safety, and overall patient experience. The term "satisfaction" focuses on how the patient feels about their treatment and how well their expectations were met, in their opinion. Despite being a complex term, "loyalty" largely serves as a predictor of whether patients would go back to the same healthcare provider in the future and whether they will refer others to it. Our study dives into this interesting aspect of healthcare. We aim to find out if there's a connection between the quality of care given by healthcare providers, how satisfied patients are with this care, and whether this satisfaction makes them stick around or recommend the center to others.

1.2. Objectives and Research Methodology

The purpose of this study is to comprehend how loyalty, satisfaction, and quality are related in the context of healthcare management. This study will attempt to provide an answer to the following fundamental question: How does patient

loyalty and satisfaction be affected by the quality of care provided in a healthcare environment? In order to arrive at a conclusion, we must first divide the main question into three smaller questions:

- What factors affect patient loyalty?
- What factors affect patient satisfaction?
- What factors affect quality?

Given the complexity of these concepts (quality, loyalty, and satisfaction) and the need to provide data that is as precise and trustworthy as possible, we have created a research technique that combines tried-and-true technologies with a customized component. The SERVQUAL model will be utilized in our survey to quantify the gap between patients' expectations and impressions of the service they received, as its technique is widely used in the healthcare sector. The five SERVQUAL aspects of tangibility, reliability, responsiveness, assurance, and empathy form the basis of the paradigm. Each variable captures a unique component of service quality, making it possible to conduct an extensive analysis. We have added more specialized questions to the SERVQUAL survey as a result of our recognition that the healthcare industry has some particular features and difficulties. These inquiries are intended to elicit additional significant healthcare-related elements that may affect patients' satisfaction and loyalty. A wide spectrum of individuals who got medical care in hospitals or clinics in the Porto district will be subjected to the study. This quantitative methodology seeks to ensure a thorough investigation of our target by incorporating the tried-and-true SERVQUAL model and the addition of customized questions. Once the data is collected, it will be rigorously analyzed using appropriate statistical tools to identify patterns, trends, and correlations.

1.3. Macrostructure

The structure of this work has been meticulously designed to facilitate a thorough understanding of the subject matter. It is divided into six primary chapters.

Chapter 2, the Literature Review lays the theoretical groundwork for understanding the connection between service quality, patient satisfaction, and loyalty in a healthcare context, and serves as the backbone of this research. An extensive analysis of the available literature related to each of these three notions is presented at the beginning of this chapter.

Chapter 3, Problem Definition and Research Questions, pinpoints the specific challenges and research gaps that this study aims to address. It outlines the core research questions that we endeavour to answer, providing a clear direction for the study.

Chapter 4, the Research Method, describes the approach undertaken to collect and analyze data. It elaborates on the choice of methodology, highlighting its appropriateness for this study and the measures taken to ensure the integrity and reliability of the results.

Chapter 5, Experimental Results, presents the findings from the research. It includes a thorough analysis and interpretation of the results, relating them to the research questions and objectives outlined in Chapter 3.

Finally, Chapter 6 concludes the work by summarizing the key findings, discussing their implications for healthcare management, and suggesting avenues for future research. It also provides recommendations for policy and practice, offering potential strategies for improving quality management in healthcare settings.

Chapter 2

Literature review

2.1. Quality in Healthcare

Quality in healthcare is a multi-faceted concept that reflects the degree to which health services meet or exceed the standards of care, improve health outcomes, and maximize patient satisfaction (Donabedian, 1988). While traditionally, the medical outcomes were the primary focus, contemporary definitions of quality in healthcare consider various dimensions including safety, efficacy, patient-centeredness, timeliness, efficiency, and equity (Agency for Healthcare Research and Quality, 2021)

The main goal of high-quality healthcare is to protect patients from harm caused by the treatment that is meant to benefit them. This includes cutting back on errors and unfavorable incidents (James, 2013). Additionally, high-quality care is patient-centered and sensitive to the preferences, requirements, and values of each individual patient (Epstein & Street, 2011).

Efficiency, or the avoidance of waste, such as the loss of tools, supplies, ideas, or energy, is another crucial component of high-quality care (Porter, 2010). This is closely related to the efficacy of care, ensuring that health services are based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit (avoiding underuse and overuse, respectively) (McGlynn, et al., 2003).

Equity in health care refers to the provision of services that are of equal quality regardless of a patient's gender, race, geography, or socioeconomic level (Smedley, Stith, & Nelson, 2003). Additionally, the timeliness factor assures that both those providing and receiving care have less waiting and occasionally hazardous delays (Institute of Medicine (US) Committee, 2001).

Healthcare quality must be improved by means of ongoing quality improvement, result monitoring, and necessary corrections. These methodical techniques to quality improvement offer businesses a feedback loop for learning and growth (Berwick, 1989).

2.1.1. Importance of quality in Healthcare

The relationship between quality and healthcare is a complex yet critical subject in contemporary health discourse. The (World Health Organization, s.d.) defines health care quality as "the degree to which health care services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." Healthcare systems are complicated; for example, interactions between customer service, quality, insurance, healthcare providers, and legal difficulties frequently occur.

Service quality has been the subject of considerable interest by both practitioners and researchers in recent years, spurred on by the original work by (Parasuraman, Zeithaml, & Berry, 1985). Numerous studies highlight the intricate relationship between these aspects of quality and their collective influence on healthcare outcomes. A significant body of research, for instance, indicates that higher quality care - particularly in terms of safety and effectiveness - leads to better patient outcomes (Wachter & Pronovost, 2009). Additionally, patient satisfaction, often viewed as an indicator of quality, is closely linked to both clinical outcomes and patient loyalty (Boulding, Glickman, Manary, Schulman, & Staelin, 2011). According to (Bitner & Hubbert, 1994) is "the consumer's overall impression of the organization's and its services' relative inferiority/superiority." The ability of a service to consistently meet or surpass the expectations of its customers is what is meant when a service's quality is assessed. Regions and industries have different levels of service consistency. Service quality, in contrast to product quality, is difficult to describe and quantify as linkages between user expectations and the impact on service features such

intangibility, inseparability, heterogeneity, and perishability (Koteswara, Kondasani, & Panda, 2015).

Healthcare institutions striving to enhance their quality often implement quality improvement strategies. Such strategies, including clinical audits and feedback, have been shown to effectively improve healthcare quality and patient outcomes (Ivers, et al., 2012).

The relationship between quality and healthcare is pivotal to improving patient outcomes, enhancing patient satisfaction, and fostering patient loyalty. This makes understanding and improving quality essential for advancing healthcare delivery and outcomes.

2.2. SERVQUAL in Healthcare

Since its introduction in 1985, SERVQUAL has gained popularity as a tool for assessing and controlling service quality. It is a multi-item scale developed by (Parasuraman, Zeithaml, & Berry, 1985) to assess customer perceptions of service quality in various sectors, including healthcare. This instrument measures the gap between customer expectations and perceptions, providing a detailed understanding of the components of service quality.

SERVQUAL has been widely adopted in numerous sectors due to its flexibility and comprehensive approach to measuring service quality. It helps organizations identify where service improvements are needed, which is crucial for enhancing customer satisfaction and loyalty (Ladhari, 2009).

This method, as a service quality measurement model, has become increasingly relevant in the healthcare sector. Given the patient-centered orientation of modern healthcare, understanding and improving service quality is essential to enhance patient satisfaction and care outcomes (Ladhari R. , 2009).

In the context of healthcare, the five variables of SERVQUAL retain their fundamental meanings, but can take on additional nuances:

- Tangibles can refer to the cleanliness and comfort of the hospital environment, the state-of-the-art medical equipment, and the professional appearance of healthcare staff (Lee, Delene, Bunda, & Kim, 2000).
- Reliability might include the accurate diagnosis and effective treatment of illnesses, the timely delivery of test results, and maintaining appointment schedules (Lee, Delene, Bunda, & Kim, 2000).
- Responsiveness could encompass prompt emergency response, attentive nursing care, and efficient administrative procedures (Mosadeghrad, 2013).
- Assurance would cover the competence and politeness of the medical staff, maintaining patient confidentiality, and providing clear and reassuring communication about the patient's condition and treatment options (Buttle, 1996).
- Empathy, perhaps the most significant variable in healthcare, might include the provision of personalized care, empathetic communication, and emotional support to patients and their families (Tan & Pawitra, 2001).
- Responsiveness, in the healthcare context, refers to the readiness or speed with which healthcare services are delivered (Parasuraman, Zeithaml, & Berry, 1988). In practice, this could include the timely attention of healthcare personnel to patient needs, swift response to emergency situations, rapid delivery of test results, and the efficiency of scheduling and administrative procedures (Mosadeghrad, 2013).

Numerous studies have applied SERVQUAL in healthcare settings, showing its utility in assessing and improving service quality. For instance, a study by

(Lee, Delene, Bunda, & Kim, 2000) used SERVQUAL to identify critical service quality attributes in a hospital setting and found that “reliability” was the most significant factor influencing patient satisfaction. Another study by (Tan & Pawitra, 2001) found that “empathy” was the most crucial variable in determining patient satisfaction in an Indonesian hospital.

SERVQUAL provides a valuable framework for assessing service quality in healthcare settings, guiding improvements in service delivery, and enhancing patient satisfaction. However, given the unique aspects of healthcare services, adaptations, or supplements to the SERVQUAL model may be necessary to capture a comprehensive view of healthcare quality. Some scholars argue that SERVQUAL doesn’t fully encompass specific elements of healthcare quality, like medical outcome or safety (Sohail, 2003). Others suggest developing healthcare-specific service quality models (Babakus & Mangold, 1992).

According to Figure 1, the perceived service quality is represented by Gap. This discrepancy quantifies the discrepancy between consumer expectations and consumer knowledge (Azmi, AL-Lozi, & Al-Zu’bi, 2012).

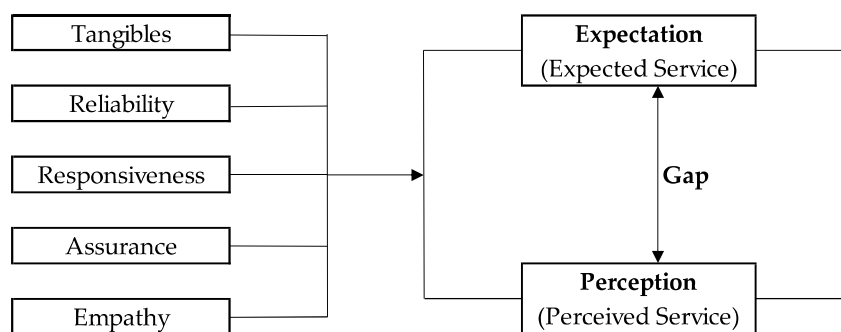


Figure 1-Measuring Service effectiveness using SERVQUAL Model (Kumar et. al., 2009)

2.2.1. Differences between SERVQUAL and SERVPERF

The SERVQUAL and SERVPERF models are two of the most influential instruments in the field of service quality measurement. They have been widely used in various sectors, including healthcare, to understand and improve service delivery (Cronin Jr & Taylor, 1992). SERVQUAL is a multi-item scale developed to assess customer perceptions of service quality in various businesses and industries. It measures the gap between customer expectations and perceptions across five variables (Parasuraman, Zeithaml, & Berry, 1988). The primary strength of SERVQUAL is its ability to pinpoint where service quality deficiencies might occur, allowing for targeted improvement efforts. In contrast, SERVPERF abandons the expectations component and relies solely on performance measures to assess service quality (Cronin Jr & Taylor, 1992). This model suggests that measuring perceptions of performance alone is sufficient, simpler, and more predictive of overall service quality. Even though both models have their advantages, SERVQUAL has clear advantages over SERVPERF in the context of healthcare management since healthcare is a complicated service where patients' expectations and experiences are crucial. The strength of SERVQUAL is its thorough investigation of service quality, which makes it a crucial instrument for monitoring and raising quality in the healthcare industry (Kilbourne, Duffy, Duffy, & Giarchi, 2004).

2.3. Relationship between Patients' Features and their Expectations and Perceptions

Understanding the intricacies of patient expectations and perceptions towards healthcare services has emerged as a cornerstone in quality management and healthcare management. The expectations and perceptions of patients are influenced by a myriad of factors or 'patient features', which include but are not

limited to demographic characteristics (e.g., age, gender), socio-economic status, cultural background, health status, and prior healthcare experiences (Carman, et al., 2013).

Age has been identified as a significant factor in shaping the patient's expectations and perceptions about healthcare services. A study conducted by (Hudak, et al., 2017) revealed that older adults tend to have different healthcare needs, expectations, and perceptions than younger individuals. This discrepancy could be attributed to the unique health conditions they experience, their generational perspectives on healthcare, and their collective experiences with health services over the years. Moreover, older adults are more likely to suffer from chronic diseases, which may lead to more interactions with healthcare systems, thus raising their level of expectation from healthcare providers.

The expectations and views of patients about healthcare services are substantially influenced by gender. Men and women typically have differing perspectives on how well healthcare services are provided, claim (Bertakis, Azari, Helms, Callahan, & Robbins, 2000). Men and women have different health demands, attitudes, and experiences with healthcare, which can be attributed to this difference. Women are more likely than men to engage in preventative care and routine checkups, for example, which affects how they interact with healthcare professionals and the system.

Socio-economic status and cultural background cannot be ignored when exploring the factors influencing patient expectations and perceptions. Research suggests that individuals from higher socio-economic groups tend to exhibit higher expectations from healthcare services due to their access to a wealth of resources and information (Bleich, Özaltin, & Murray, 2009). In terms of cultural background, healthcare perceptions can be vastly different among patients. Some cultures may place importance on community and family involvement in healthcare decisions, while others may value individual autonomy and decision-making (Saha, Beach, & Cooper, 2008). This underscores the significance of

cultural competency among healthcare providers, emphasizing the need for personalized care that respects and acknowledges cultural diversity.

The influence of health status and prior experiences with healthcare on patient expectations and perceptions is well-established. Patients with chronic conditions, due to their frequent encounters with healthcare systems, often have more refined and elevated expectations for healthcare quality (Coulter & Jenkinson, 2005). Furthermore, past experiences play an influential role in shaping future expectations and perceptions of healthcare. As (Doyle, Lennox, & Bell, 2013) found, positive past experiences can bolster future expectations, whereas negative experiences can engender skepticism or apprehension.

2.4 Loyalty, Satisfaction and Quality

Understanding the complex dynamics of loyalty, satisfaction, and quality in the healthcare system is critical for optimal patient care and the overall performance of health institutions. These three concepts act as pillars of successful healthcare delivery and their interdependence cannot be overstated (Baljeet, 2018).

Quality of care is a multi-dimensional concept that includes the efficiency, efficacy, and safety of health services. Its emphasis is not only on the technical aspects of care but also the interpersonal elements, like patient-provider communication, empathy, and respect (Institute of Medicine, 2001). Evidence suggests that the quality of healthcare services directly influences patient satisfaction and loyalty (Trzeciak & Mazzairelli, 2019).

Patient satisfaction is a vital determinant of loyalty in the healthcare system. It is influenced by several factors including the quality of healthcare services, the interpersonal skills of the healthcare staff, waiting times, and the physical environment (Trzeciak & Mazzairelli, 2019). Satisfaction is a subjective

perception, and its measurement is often challenging, but it remains an important performance indicator for health institutions (Bleich, Ozaltin, & Murray, 2009)

Healthcare organizations that prioritize patient satisfaction foster higher levels of loyalty. Loyal patients tend to seek care consistently from the same providers, follow medical advice more closely, and are less likely to switch providers (Chahal & Kumari, 2012). Moreover, they are more likely to recommend their healthcare providers to others, thereby increasing patient base and institutional reputation (Boulding, Kalra, Staelin, & Zeithaml, 2003). A study by (Andaleeb, 2001) found a strong correlation between patient satisfaction and loyalty. The study argued that patients' perceived value and quality of service played a significant role in determining their loyalty. It emphasized the importance of healthcare institutions continuously improving their service quality to increase satisfaction and subsequently, loyalty.

The interrelation of these three concepts presents a dynamic that healthcare systems need to exploit strategically. By focusing on improving quality, healthcare providers can enhance patient satisfaction, and by extension, foster loyalty. A satisfied patient becomes a loyal one, leading to continuous patronage and increased revenue (Kumar & Reinartz, 2012).

The healthcare landscape is becoming increasingly competitive, with patients having more choices in terms of service providers. In such an environment, understanding and integrating the concepts of quality, satisfaction, and loyalty becomes imperative. Future research should explore more nuanced mechanisms of these dynamics and their implications for healthcare systems in different socio-cultural contexts.

Chapter 3

Problem Definition and Research Questions

3.1. Problem Definition

The healthcare industry has traditionally placed a strong emphasis on service quality because of how directly it affects people's health and wellbeing. The views of service quality are a key factor in determining how satisfied a patient is, and these perceptions have a substantial impact on their whole experience, trust, and confidence in the medical facility.

In the past, hospitals have evaluated their services based on several important criteria, including the following: tangibles, reliability, responsiveness, assurance, and empathy. A set of SERVQUAL questions (45 in total) were included for each variable in the survey that was accessible through web platforms. In Table 1, we can check the five tangible questions, five reliability questions, five responsiveness questions, three assurance questions, three empathy questions and one for loyalty, one question about satisfaction and the last one for quality. The possible mismatch between patients' expectations and their actual impressions of service quality, however, is a persistent problem. This "gap" can have a big impact on patient satisfaction and the hospital's reputation.

The physical aspects of service delivery, such as cleanliness, parking availability, staff appearance, and the existence of contemporary equipment, are all considered tangibles (T).

Reliability (RL) is concerned with the reliability and accuracy of the services provided, such as the timeliness and accuracy of expenditure and medical reports. The hospital staff's readiness to assist patients by offering prompt assistance and information that is easily accessible is measured by responsiveness (RS). Hospital staff's regard, compassion, and the trust and confidence they foster are all part of assurance (A).

Empathy (E) measures how well a patient is given individualized care and understanding, including medical care and awareness of their distress.

Expectation	Variable	Items
	T^{Exp} : Tangibles	T_1^{Exp} : Hospital's cleaning and hygiene should be excellent
		T_2^{Exp} : Hospitals should always have visitors parking available
		T_3^{Exp} : Hospital's personnel should appear neat
		T_4^{Exp} : Hospital's staff should be pleasant to deal with
		T_5^{Exp} : Hospital should have up-to-date equipment
	RL^{Exp} : Reliability	RL_1^{Exp} : Hospital should offer prompt service every time
		RL_2^{Exp} : Hospital's medical reports should be accurate
		RL_3^{Exp} : Hospital's expense reports should be accurate
		RL_4^{Exp} : Hospital should provide me with adequate information about medical condition
		RL_5^{Exp} : I should feel confident when receiving medical treatment at hospital
	RS^{Exp} : Responsiveness	RS_1^{Exp} : Hospital's administration staff should be efficient dealing with my queries
		RS_2^{Exp} : Hospital's employees should inform me exactly when services would be performed
		RS_3^{Exp} : Hospital should offer convenient times to use their hospital services
		RS_4^{Exp} : There should be experienced personnel on duty on weekends at hospital
		RS_5^{Exp} : Hospital's reception should answer my phone calls promptly
	A^{Exp} : Assurance	A_1^{Exp} : Hospital's employees should always respect my privacy
		A_2^{Exp} : Hospital's employees should be caring

Perception		A_3^{Exp} : Hospital should make use of proficient medical staff
	E^{Exp} : Empathy	E_1^{Exp} : Hospitals' employees should give individuals medical attention
		E_2^{Exp} : Hospital should always show understanding towards my feeling of discomfort
		E_3^{Exp} : I should be treated with warm and caring attitude in hospital
	T^{Per} : Tangibles	T_1^{Per} : Hospital's cleaning and hygiene are excellent
		T_2^{Per} : Hospitals always have visitors parking available
		T_3^{Per} : Hospital's personnel appear neat
		T_4^{Per} : Hospital's staff are pleasant to deal with
		T_5^{Per} : Hospital has up-to-date equipment
	RL^{Per} : Reliability	RL_1^{Per} : Hospital offers prompt service every time
		RL_2^{Per} : Hospital's medical reports are accurate
		RL_3^{Per} : Hospital's expense reports are accurate
		RL_4^{Per} : Hospital provided me with adequate information about medical condition
		RL_5^{Per} : I feel confident when receiving medical treatment at hospital
	RS^{Per} : Responsiveness	RS_1^{Per} : Hospital's administration staff were efficient dealing with my queries
		RS_2^{Per} : Hospital's employees informed me exactly when services would be performed
		RS_3^{Per} : Hospital offered convenient times to use their hospital services
		RS_4^{Per} : There are experienced personnel on duty on weekends at hospital
		RS_5^{Per} : Hospital's reception answered my phone calls promptly
	A^{Per} : Assurance	A_1^{Per} : Hospital's employees always respected my privacy
		A_2^{Per} : Hospital's employees are caring
		A_3^{Per} : Hospital makes use of proficient medical staff
	E^{Per} : Empathy	E_1^{Per} : Hospitals' employees gave individuals medical attention

		E_2^{Per} : Hospital always showed understanding towards my feeling of discomfort
		E_3^{Per} : I was treated with warm and caring attitude in hospital

Table 1- SERVQUAL variables

The dependent variables presented in Table 2 are loyalty, satisfaction, and quality, each with special implications:

1. Loyalty (L): This refers to a patient's desire for or propensity to return to the same institution if future medical treatments are required. This variable represents the patient's total patient experience by measuring their level of trust and confidence in the healthcare professional.
2. Satisfaction (S): This variable gauge how happy patients are with the care they receive from the hospital. It includes a variety of factors, including the effectiveness of the therapies, the staff's professionalism, and bedside manner, as well as the facilities' cleanliness and comfort.
3. Quality (Q): This is a wide indicator that assesses the hospital's overall standards, considering both tangible features like cutting-edge equipment and intangible components like the staff's knowledge and skill. It's a thorough measure of how well the hospital delivers healthcare services that meet or exceed patients' expectations.

Dependent variables:	L: Loyalty	I would prefer this hospital again if I need it.
	S: Satisfaction	I am satisfied with the services provided.
	Q: Quality	The general quality of the hospital is good.

Table 2-Dependent Variables

While the "perceived" service level indicates the patient's actual experience with the service, the "expected" service level shows the patient's expectation of

the service quality. The difference between these two levels represents the discrepancy between patients' expectations and experiences as they are.

This study intends to fill up this gap and identify the variables that affect both expected and perceived service quality. The measurement of this disparity between the parameters of healthcare service quality could reveal important service areas that need to be improved. In order to improve patient satisfaction and overall service quality in healthcare institutions, this research tries to pinpoint these service delivery flaws.

Equations (1) - (10) stand for the average (or mean) predicted service quality across multiple service characteristics in the hospital setting. Each equation accounts for a distinct service quality variable.

$$T^{Exp} = \frac{T_1 + T_2 + T_3 + T_4 + T_5}{5} \quad (1)$$

$$RL^{Exp} = \frac{RL_1 + RL_2 + RL_3 + RL_4 + RL_5}{5} \quad (2)$$

$$RS^{Exp} = \frac{RS_1 + RS_2 + RS_3 + RS_4 + RS_5}{5} \quad (3)$$

$$A^{Exp} = \frac{A_1 + A_2 + A_3}{3} \quad (4)$$

$$E^{Exp} = \frac{E_1 + E_2 + E_3}{3} \quad (5)$$

$$T^{Per} = \frac{T_1 + T_2 + T_3 + T_4 + T_5}{5} \quad (6)$$

$$RL^{Per} = \frac{RL_1 + RL_2 + RL_3 + RL_4 + RL_5}{5} \quad (7)$$

$$RS^{Per} = \frac{RS_1 + RS_2 + RS_3 + RS_4 + RS_5}{5} \quad (8)$$

$$A^{Per} = \frac{A_1 + A_2 + A_3}{3} \quad (9)$$

$$E^{Per} = \frac{E_1 + E_2 + E_3}{3} \quad (10)$$

3.1.1. Gap between Expectations and Perceptions

The crux of our research revolved around gap analysis, a powerful tool used to understand the divergence between the expected and actual experience of service quality in the healthcare setting. We calculated this gap as the absolute difference between the anticipated (expected) and the real (perceived) quality of service across five critical variables.

It's essential to understand that by design, this gap cannot be negative. A zero-gap indicates that the service provided by the hospital aligns perfectly with what the patient expected. On the other hand, a positive gap highlights areas where the hospital's service falls short of patient expectations. Larger positive values demonstrate a more significant shortfall, signalling areas in dire need of improvement.

Although this method obscures instances where the perceived service quality may surpass expectations (as a negative difference would simply translate to a positive value), our research focus was to identify and tackle areas that require enhancement in service quality. Hence, the use of absolute differences in this context is justified. Gaps are defined in Equation (11) to (15):

$$GAP^T = |T^{Exp} - T^{per}| \quad (11)$$

$$GAP^{RL} = |RL^{Exp} - RL^{per}| \quad (12)$$

$$GAP^{RS} = |RS^{Exp} - RS^{per}| \quad (13)$$

$$GAP^A = |A^{Exp} - A^{per}| \quad (14)$$

$$GAP^E = |E^{Exp} - E^{per}| \quad (15)$$

Taking a closer look, for example, at the variable E, a zero-gap score suggests that hospitals are meeting patients' expectations in providing individual care and attention. This aspect of service includes the medical attention provided,

understanding a patient's discomfort, and treating patients with a warm, caring attitude.

A gap analysis in healthcare service quality helps identify areas for improvement, suggesting strategies to enhance care quality and patient satisfaction by identifying significant gaps.

3.2. Research Questions

The research questions that are addressed in this dissertation are presented in Table 3.

Research Questions	Objectives
How does patient loyalty and satisfaction be affected by the quality of care provided in a healthcare environment?	Analyze how patient satisfaction and loyalty are affected by the quality of healthcare services to comprehend the scope and nature of this relationship.
What factors affect patient loyalty?	Determine and examine the critical characteristics that significantly influence patient loyalty in the healthcare setting and comprehend how these components affect patients' decisions and long-term preferences.
What factors affect patient satisfaction?	Examine and understand the key elements that influence patient happiness in healthcare settings, as well as how these elements impact the total patient experience and sense of quality.
What factors affect quality?	Examine and outline the essential components that affect how quality is perceived in healthcare settings and consider how these elements impact the level of care and the provision of services.

Table 3-Research Questions and Objectives

Chapter 4

Research Method

4.1 Method Definition

The choice of a methodological paradigm is critical in guiding the research process, shaping the tools we use, the data we collect, and how we interpret the results. Within the realm of healthcare quality management, employing a methodological paradigm can facilitate the understanding and enhancement of service delivery, leading to improved patient outcomes.

The present research hinges on a methodological paradigm that utilizes a quantitative approach, leveraging surveys and the SERVQUAL model. This approach aims to generate objective measurements that can be used to understand and improve quality in healthcare management.

Surveys are a common quantitative tool that enables the systematic collection of data from a particular population (Creswell & Creswell, 2017). They can provide essential data, such as demographic information, and can be tailored to gain insights into patients' experiences and perceptions of healthcare services (Kelley, Clark, Brown, & Sitzia, 2003). By collecting and analyzing these data, researchers can identify trends, compare different groups, and draw conclusions about the population.

Within the survey framework, this research employs the SERVQUAL model. Developed by (Parasuraman, Zeithaml, & Berry, 1988), SERVQUAL is a multi-dimensional research instrument designed to capture consumer perceptions and expectations of service quality. This model is particularly effective in the healthcare sector, offering a comprehensive approach to assessing service quality. Using this model/method within the survey method allows for the collection of robust, quantifiable data. This data can be used to identify the factors

that affect the quality, satisfaction, and loyalty of patients in healthcare and how these factors are related.

The SERVQUAL model served as a base for our survey, even so, we aimed to improve this model by adding new questions¹ that are essential in healthcare scenarios. For instance, some questions like "Do you have health insurance?" were included to better understand each person's ability to access healthcare services and gauge their financial capabilities. Knowing whether a patient has insurance can reveal a lot about their decision-making process, particularly when cost is a factor. We also checked out what kind of healthcare services folks had last used, and if these were from private or public providers. This helped us learn more about the range of medical services people are using and if they tend to favor private or public healthcare.

In order to determine whether there is a trend in the patients' preference for the public or private sectors, we also questioned if they tend to stick to one sector or if their decision is more influenced by the particular service they currently require. To determine how devoted patients are to their healthcare providers and whether this loyalty is tied to a specific service or varies depending on factors like the ease of making an appointment, the urgency of the need, or the quality of the service, similar questions were asked, such as which hospital or clinic they most recently visited.

In terms of costs, we want to know how much people were paying for the health services they received and whether they would be willing to pay more for a higher-quality service in the future. This issue may be linked to the issue of health insurance because there are policies that significantly influence the hospital choice due to the costs each one entails. In this way, the questions together help to clarify how patients balance cost and quality while choosing healthcare services.

¹ The new questions are available in appendix.

Finally, to understand what influences patients' decisions, the most and, consequently, what can encourage their loyalty, we asked respondents to rank various factors, such as quality, waiting time, price, and distance, in terms of their influence on their choice of hospital or clinic.

We believe that by incorporating these new questions into the traditional SERVQUAL model, this study offers a deeper and more comprehensive understanding of the factors that influence quality, loyalty, and satisfaction for patients.

4.1.1. Data collection and measurement instruments

For this investigation, several private hospitals were contacted between January and March, to obtain a much deeper and more accurate analysis without ever jeopardizing the privacy of the patients, we contacted these private institutions and invited them to take part in the study. No feedback has been received.

Considering this, the numerous private and public health institutions in Porto are the subject of our study. The survey was made available online via multiple digital channels, including Instagram, Facebook, and LinkedIn, in an effort to gather as much information as possible. The survey was available on these platforms from March to July 2023.

One of the most important things to think about when conducting a survey or study is sample size, as this has an impact on the validity and accuracy of your results. The number of replicas or observations we include in our statistical sample is known as the sample size.

In this study, at least a sample size of 83 surveys is required to get a 90% level of confidence. The sample size is calculated as in Equation (16):

$$\text{Sample size} = \frac{(Z\text{-score})^2 * \text{StdDev} * (1 - \text{StdDev})}{(\text{confidence interval})^2} \quad (16) \text{ (Kibuacha, 2021)}$$

The Z-score in this formula represents how distant a data point is from the "average," and "StdDev" stands for standard deviation, which represents the dispersion or variability in the expected answers.

The confidence level affects the values of the z-score. Table 4 demonstrates them. In this case, 90% confidence level is being used to express how certain we are that the findings from the sample of 83 people represent the entire population.

$$\text{Sample size} = \frac{0.680}{0.81} = 0.83$$

Confidence level	z-score
80%	1.28
85%	1.44
90%	1.65
95%	1.96
99%	2.58

Table 4-Confidence Level (Kibuacha, 2021)

This degree of assurance serves to express how uncertain we are about our sample estimations. We have a sample size of 112 responses, which is more than the sample size required to achieve the 90% confidence level.

4.2. Regression Analysis

Think of regression analysis as a sort of relationship counsellor for data: it's a statistical approach that can help us understand how different variables are connected. This technique was born in the world of statistics, but it's been welcomed with open arms in many fields, from healthcare to social sciences to business. Regression analysis lets us peek into how a particular variable (we call this the dependent variable) changes when other variables (the independent variables) are tweaked, giving it a starring role in various research scenarios (Aiken, West, & Reno, 1991).

4.2.1. Multiple linear regression model

A linear regression model explains the correlation between one or more independent variables (X) and a dependent variable (Y). The term "response variable" also applies to the dependent variable. Explanatory or predictive variables and independent variables both have similar meanings (Wong, 2020).

Multiple linear regression analysis was carried out in this study using Microsoft Excel Data Analysis ToolPak. With this kind of regression analysis, it is possible to simultaneously look at how many independent factors affect the dependent variable and investigate the relationship between these factors and numerous predictor variables.

Therefore, this model was utilized to get a better knowledge of patient loyalty, satisfaction, and quality toward health service providers. The multiple linear regression model offers a reliable statistical method for examining the correlation between these elements and various predictor variables. It has been chosen because of how easy it is to understand.

4.2.2. P-value

The p-value is a crucial component in statistical hypothesis testing. It represents the probability that the observed data, or data more extreme, could have occurred under the null hypothesis, which typically posits no effect or relationship. A small p-value (generally, less than 0.05) suggests that the observed data is unlikely under the null hypothesis, providing evidence to reject it in favor of the alternative hypothesis. Conversely, a large p-value indicates that the observed data is plausible under the null hypothesis, providing insufficient evidence to reject it. Therefore, the p-value serves as a tool to weigh the strength of evidence against the null hypothesis based on the observed data (Frost, 2022).

The p-value indicates how probable the results are due to chance:

- $p=0.05$ means that there is a 5% probability that the results are due to random chance.
- $p=0.001$ means that the chances are only 1 in a thousand.

The choice of significance level at which you reject null hypothesis is arbitrary. Conventionally, 5%, 1% and 0.1% levels are used.

Table 5 shows the explanations for the statistical conclusions that show the strength of the evidence related to various p-values:

$P \geq 0.1$	Absence of evidence against the null hypothesis: data consistent with the null hypothesis.
$0.05 \leq P < 0.1$	Low evidence against the null hypothesis in favour of the alternative.

$0.01 \leq P < 0.05$	Moderate evidence against the null hypothesis in favour of the alternative.
$0.05 \leq P < 0.001$	Good evidence against the null hypothesis in favour of the alternative.
$0.001 \leq P < 0.01$	Strong evidence against the null hypothesis in favour of the alternative.
$P < 0.001$	Very strong evidence against the null hypothesis in favour of the alternative.

Table 5-Significance Level (Singh, 2013)

4.2.3. Significance F

The F-statistic is generally referred to by the symbol "f" in regression analysis. The F-statistic is used to determine whether a regression model is statistically significant overall or whether a set of predictor variables is statistically significant in explaining the variation in the dependent variable. The F-statistic is obtained during regression analysis by contrasting the variability unexplained variability (residual sum of squares) to the variability explained by the regression model (regression sum of squares). The statistical significance of the regression model is assessed using this comparison. A significant regression model is one in which the estimated F-statistic, which shows that at least one of the predictor variables is significantly explaining the variation in the dependent variable, is large enough to exceed a critical value. The F-statistic is frequently utilized in hypothesis testing, where the null hypothesis is that there is no link between the predictor variables and the dependent variable and that all regression coefficients

are zero. The regression model is likely useful and offers important insights into the relationships between the variables if the F-statistic gives enough evidence to reject the null hypothesis (Sureiman & Mangera, 2020).

Chapter 5

Experimental Results

5.1. Dataset Characterization

A questionnaire that was accessible on several web platforms was used to compile our database. 60 questions total, 45 of which are from the SERVQUAL model and the remaining 15 were added to allow for a more thorough analysis. A total of 112 answers were collected, and their relationships were examined and analyzed.

We deal with two different sorts of variables in multiple linear regression: the dependent variable (also known as the response variable) and the independent variable (also known as the explanatory variable). The aim is to understand how the dependent variable changes as the independent variable changes. In this study, we have 3 dependent variables (Quality, Satisfaction, and Loyalty) and 5 independent variables (Gender, Age, Income, Education Level, Employment).

5.2. Descriptive Analysis

We conducted a thorough descriptive analysis to learn more about the socioeconomic and demographic features of the survey participants. Age, education, income, employment, and gender are the five main independent variables that this research is based on. To better capture the diversity of replies to our survey, we split each of the five categories into many classes in our dataset, which consists of responses from 112 individuals. To better understand our response group, this analysis aims to provide a detailed, quantitative description of our data.

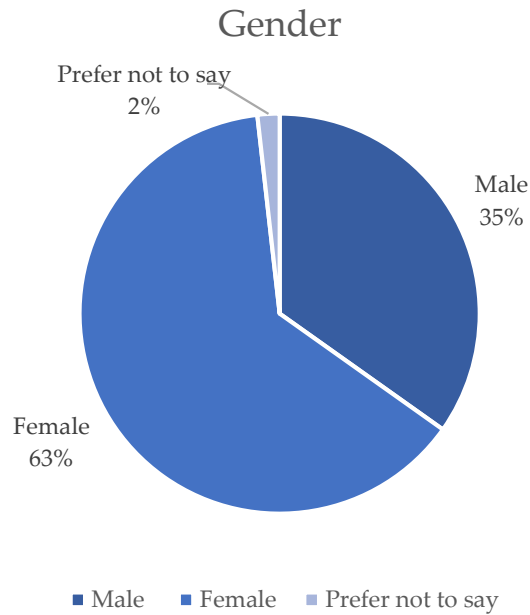


Figure 2-Gender graphic

Figure 2 shows that women made up most survey respondents with 63% of 112, while men made up a smaller portion with 35%. Certain individuals opted to remain anonymous.

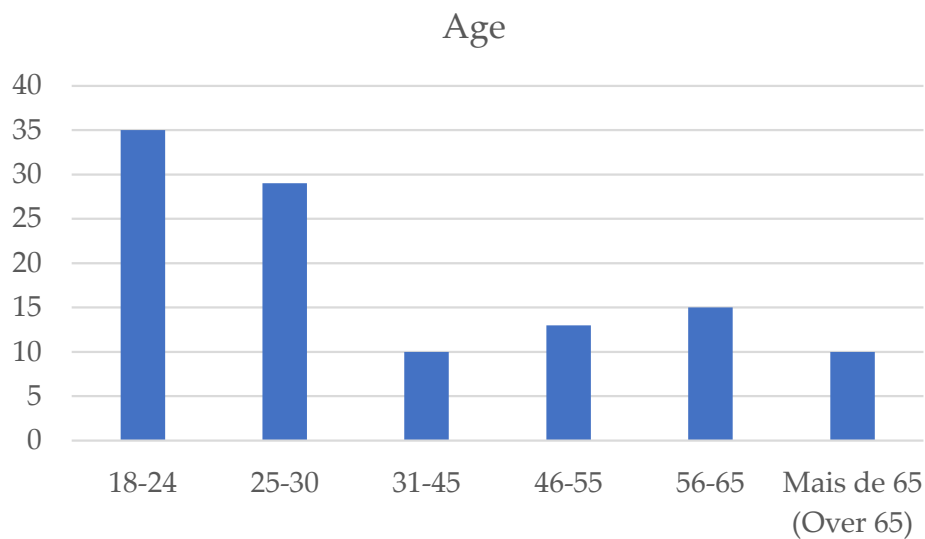


Figure 3-Age graphic

Figure 3 shows most respondents are between 18 and 24 years old. The smallest number of people is in the 31-45 age group. Overall, we have more young people in this survey.

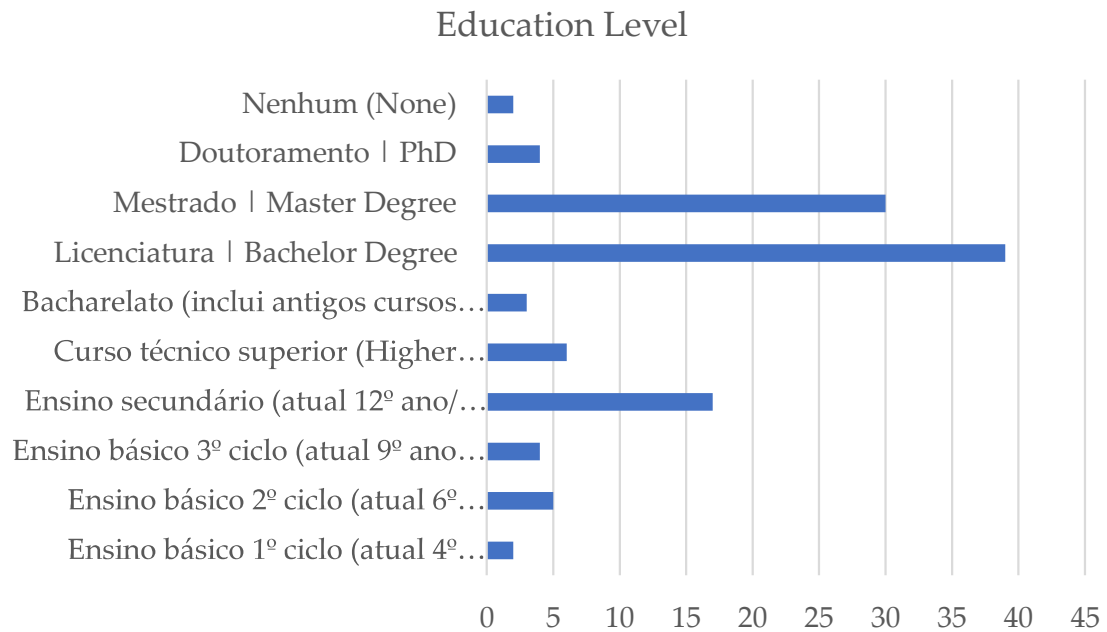


Figure 4-Education level graphic

Figure 4 shows that the majority of those who took part in this study have bachelor's degrees. Only a small percentage of people (if we exclude those who selected "None") have a "Bachelor" degree. It appears that a sizable portion of the poll respondents have pursued education beyond the secondary level, with many holding master's degrees.

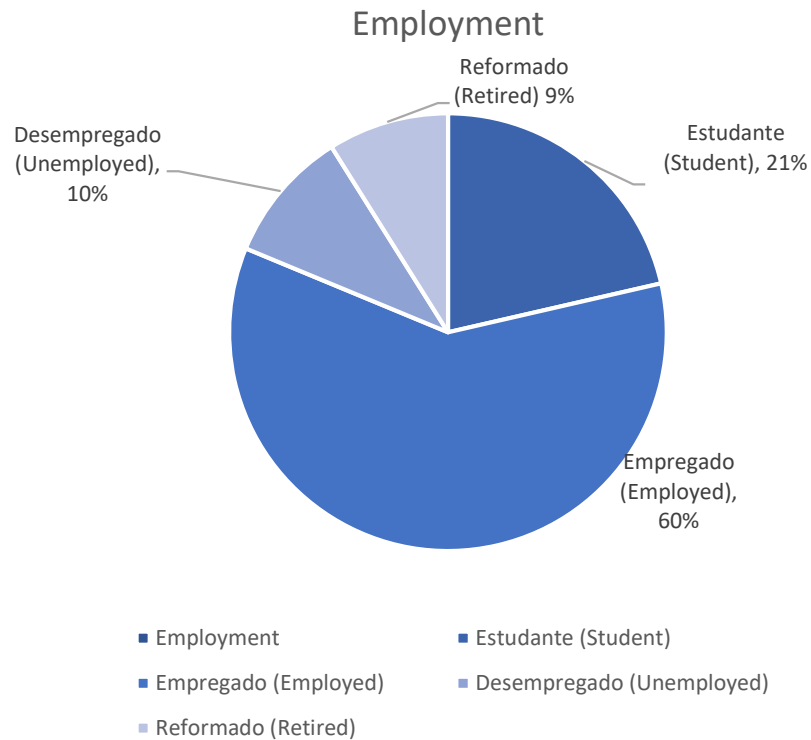


Figure 5-Employment graphic

Figure 5 shows that compared to respondents who are employed, respondents who are students make up a smaller portion of the respondents. The majority of respondents are employed. The numbers of unemployed and retired people are almost the same, but in general they constitute a small fraction of this group. Thus, we can say that most of the people who participated in our survey are currently in the labor market.

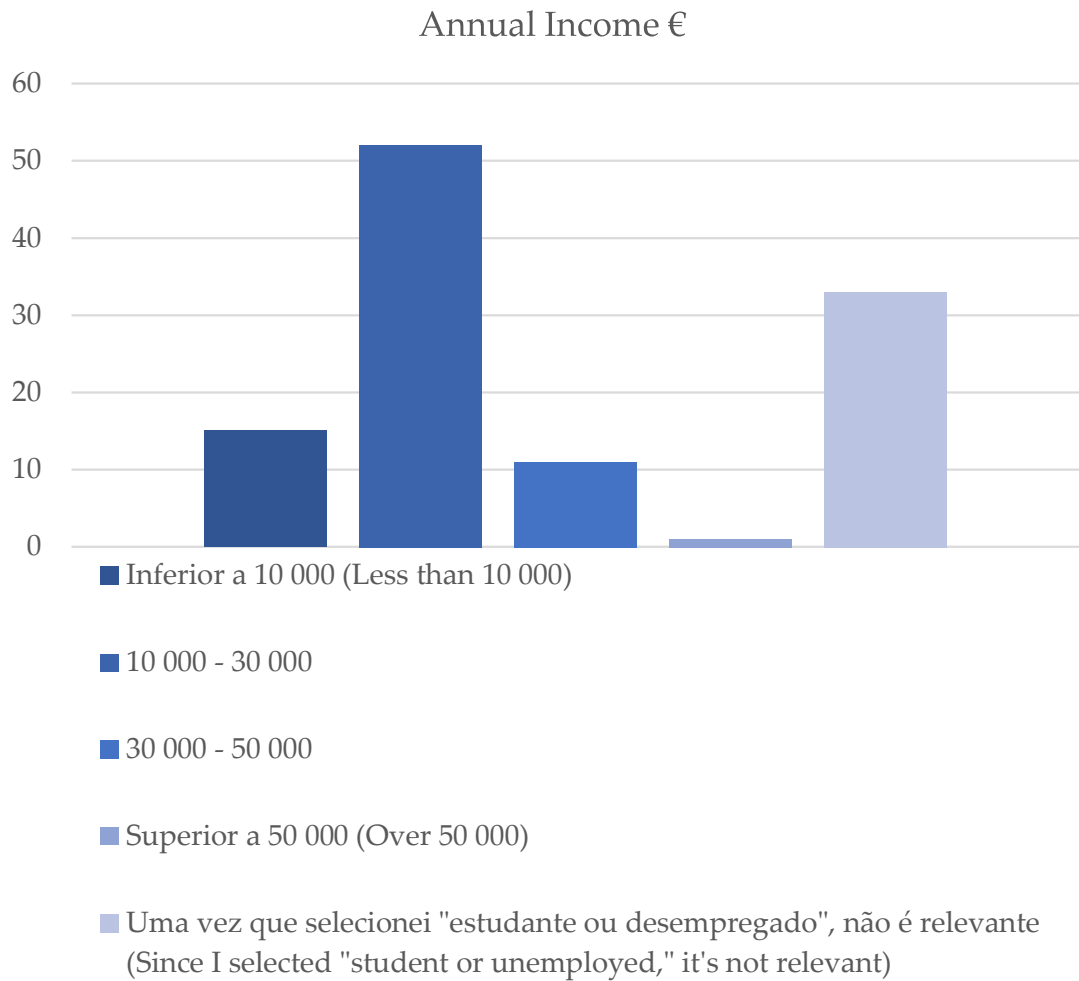


Figure 6-Annual Income graphic

Figure 6 shows that most of the respondents to the poll have incomes between 10,000€ and 30,000€. Almost no one claimed to make more than 50,000€. The majority, we discovered, make less than that. Some respondents claimed that their money was irrelevant, presumably because they were students or did not currently have a job.

5.3. Results and Discussion

The correlation coefficients between the different pairs of variables in our data are displayed in this correlation matrix. Statistics called correlation coefficients indicate how much two variables move in respect to one another. They vary from -1 to 1, with a value of -1 representing a perfect negative correlation (as one variable rises, the other falls), a value of 1 denoting a perfect positive correlation (as one variable rises, the other rises), and a value of 0 denoting no correlation.

Table 6 shows how different things relate to each other. Each cell in the table is telling us if two things (e.g., Age and Employment) are connected, and how they move together.

	G	A	Ed	I	Em	GAP T	GAP RL	GAP RS	GAP A	GAP E	L	S	Q
G	1												
A	-0.0061	1											
Ed	0.0194	-0.4374	1										
I	-0.0473	-0.2220	0.0781	1									
Em	-0.0796	0.7352	-0.3710	-0.3348	1								
GAP T	-0.0586	-0.0204	-0.0797	0.0597	0.1209	1							
GAP RL	-0.0618	0.0398	-0.1181	0.0009	0.1144	0.6931	1						
GAP RS	-0.0035	0.0365	-0.1199	-0.0076	0.1165	0.6832	0.6492	1					
GAP A	-0.0681	0.0987	-0.1749	0.0178	0.2253	0.6929	0.6935	0.7024	1				
GAP E	0.0106	0.0681	-0.2196	0.0957	0.1525	0.6438	0.6423	0.7174	0.8893	1			
L	-0.1229	-0.1022	0.1151	0.2205	-0.0741	-0.2258	-0.1757	-0.1362	-0.2209	-0.2216	1		
S	-0.1662	-0.1047	0.0718	0.1289	-0.0354	-0.0992	-0.0966	-0.0764	-0.1167	-0.0802	0.8007	1	
Q	-0.0623	-0.1359	0.0673	0.1814	-0.0941	-0.1634	-0.1128	-0.1032	-0.1124	-0.0775	0.8082	0.8065	1

Table 6-Correlation Matrix of Variables Affecting Loyalty, Satisfaction, and Quality

For example, let's look at Employment and Age. They have a value of 0.7352 which is close to 1. This tells us that when Age goes up, Employment tends to go up too, and vice versa. It's like they're tied together.

On the other hand, Education and Age have a value of -0.4374. This negative value means that when Age goes up, variable Ed tends to go down. It's like they're on a seesaw, when one goes up, the other goes down.

Then we have stuff like Gap T, Gap RL, Gap RS, Gap A, and Gap E. These all seem to move together - when one goes up or down, the others tend to do the same.

The same thing happens with variable L, S, and Q. They move together, but they usually do the opposite of what other things are doing.

Remember though, this table isn't saying that one thing is causing the other to change. It's just showing that they seem to move together or opposite each other. And, this table only works well when things have a straightforward (or linear) relationship.

5.3.1. Regression

Model 1

This analysis is trying to figure out how ten variables, (G, A, Ed, I, Em, GAP T, Gap RL, Gap RS, Gap A, Gap E), influence patients Loyalty as defined in Equation (17).

$$L = 3.71 - 0.23G - 0.09A + 0.03Ed + 0.20I + 0.24Em - 0.45Gap\ T + 0.04Gap\ RL + 0.27Gap\ RS - 0.07Gap\ A - 0.27Gap\ E + E \quad (17)$$

The following regression statistics are provided in Table 7:

- The Multiple R value is 0.41, which implies that these factors together have a moderate relationship with Loyalty.
- The R Square value, or 0.16, means that about 16% of the variation in Loyalty can be explained by these factors. Although this value is higher than in the previous examples, it still indicates a large portion of variation in Loyalty that's unaccounted for by these variables.
- The Adjusted R Square, at 0.08, adjusts for the number of predictors in the model. This figure is quite low, suggesting these variables aren't very powerful in predicting Loyalty when considered together.
- The Standard Error of 1.01 is a measure of the average difference between the predicted and actual Loyalty. This error is fairly large, indicating that the predictions could potentially be off by a good amount.

<i>Regression Statistics</i>	
Multiple R	0.41
R Square	0.16
Adjusted R Square	0.08
Standard Error	1.01
Observations	112

Table 7-Regression Statistics for Loyalty

Based on Table 8, the F statistic of 1.99, with a corresponding p-value of 0.04, tells us that the variables together are statistically significant in predicting Loyalty, as the p-value is less than 0.05. This means the combined effect of these variables on Loyalty is likely not due to random chance.

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	10	20.40	2.04	1.99	0.04
Residual	101	103.56	1.03		
Total	111	123.96			

Table 8- ANOVA for Loyalty

In Table 9, we can examine how the variables are related. As for the individual variables, only variable *I* show a significant impact on Loyalty because its p-value is less than 0.05. The coefficient of variable *I* is 0.198, indicating that for every one unit increase in variable *I*, Loyalty is expected to increase by 0.198, assuming all other variables remain constant. The range given by the 'Lower 95%' and 'Upper 95%' for variable *I* indicates a 95% confidence that the true value of the variable *I* coefficient lies between 0.056 and 0.339.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.71	0.70	5.33	0.00	2.33	5.09	2.33	5.09
G	-0.23	0.19	-1.19	0.24	-0.61	0.15	-0.61	0.15
A	-0.09	0.09	-1.06	0.29	-0.27	0.08	-0.27	0.08
Ed	0.03	0.05	0.50	0.62	-0.08	0.14	-0.08	0.14
I	0.20	0.07	2.78	0.01	0.06	0.34	0.06	0.34
Em	0.24	0.19	1.28	0.20	-0.13	0.61	-0.13	0.61
GAP T	-0.45	0.26	-1.74	0.09	-0.96	0.06	-0.96	0.06
GAP RL	0.04	0.26	0.14	0.89	-0.48	0.56	-0.48	0.56
GAP RS	0.27	0.21	1.30	0.20	-0.14	0.69	-0.14	0.69
GAP A	-0.07	0.34	-0.21	0.83	-0.74	0.60	-0.74	0.60
GAP E	-0.27	0.30	-0.91	0.37	-0.87	0.32	-0.87	0.32

Table 9-Multiple Linear Regression Analysis Results for Loyalty

Model 1 only finds variable I as a significant predictor of Loyalty, explaining only a small portion of variation. Other variables have p-values above 0.05, indicating their effects on loyalty are not statistically significant. The findings may not be useless, but more data may be needed for more accurate predictions.

Model 2

This analysis is trying to figure out how ten variables, (G, A, Ed, I, Em, Gap T, Gap RL, Gap RS, Gap A, Gap E), influence Satisfaction as defined in Equation (18).

$$S = 4.24 - 0.30G - 0.10A + 0.02Ed + 0.08I + 0.20Em - 0.14Gap\ T - 0.02Gap\ RL + 0.06Gap\ RS - 0.30Gap\ A + 0.17Gap\ E + E \quad (18)$$

The following regression statistics are provided in Table 10:

- The Multiple R value is 0.29, which implies that these factors together have a weak relationship with Satisfaction.
- The R Square value, 0.08 means that the model explains 8% of the variability in the response variable. This is a fairly low value, indicating

that the model might not be very effective in explaining the variability in the response variable.

- The Adjusted R Square of -0.01 is quite low (even negative) and suggests that after adjusting for the number of predictors, the model might be performing worse than a naive model with no predictors. This often implies that some of the predictors might not be needed or that the model is overfitting to the noise in the data.
- The Standard Error of 0.89 can be interpreted in the context of the unit of the dependent variable. It gives an idea of the average distance that the observed values fall from the regression line.

<i>Regression Statistics</i>	
Multiple R	0.29
R Square	0.08
Adjusted R Square	-0.01
Standard Error	0.89
Observations	112

Table 10-Regression Statistics for Satisfaction

Based on Table 11, the F-statistic is 0.93, indicating that the model is not effectively accounting for more variance than random fluctuations. The p-value is 0.51, indicating that the predictors are not collectively explaining significant variance in the dependent variable.

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	10	7.43	0.74	0.93	0.51
Residual	101	80.82	0.80		
Total	111	88.25			

Table 11-ANOVA for Satisfaction

The p-value can be used to determine if study results are likely to be the result of pure chance. The results are considered significant if the p-value is less than 0.05, which indicates that they are unlikely to be the result of chance.

According to Table 12, we can see that all the p-values for the various research factors are higher than 0.05. This indicates that the outcomes may have easily occurred by pure accident. Therefore, we cannot state with certainty that these factors have an impact on the outcome under study.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.24	0.61	6.90	0.00	3.02	5.46	3.02	5.46
G	-0.30	0.17	-1.75	0.08	-0.64	0.04	-0.64	0.04
A	-0.10	0.08	-1.23	0.22	-0.25	0.06	-0.25	0.06
Ed	0.02	0.05	0.37	0.71	-0.08	0.11	-0.08	0.11
I	0.08	0.06	1.29	0.20	-0.04	0.21	-0.04	0.21
Em	0.20	0.17	1.20	0.23	-0.13	0.53	-0.13	0.53
GAP T	-0.14	0.23	-0.61	0.54	-0.59	0.31	-0.59	0.31
GAP RL	-0.02	0.23	-0.07	0.94	-0.47	0.44	-0.47	0.44
GAP RS	0.06	0.18	0.31	0.76	-0.31	0.42	-0.31	0.42
GAP A	-0.30	0.30	-1.02	0.31	-0.89	0.29	-0.89	0.29
GAP E	0.17	0.27	0.65	0.51	-0.35	0.70	-0.35	0.70

Table 12-Multiple Linear Regression Analysis Results for Satisfaction

Model 3

This analysis is trying to figure out how ten variables, (G, A, Ed, I, Em, Gap T, Gap RL, Gap RS, Gap A, Gap E), influence Quality as defined in Equation (19).

$$Q = 3.97 - 0.12G - 0.11A + 0.01Ed + 0.12I + 0.16Em - 0.36Gap\ T + 0.03Gap\ RL + 0.04Gap\ RS - 0.11Gap\ A + 0.11Gap\ E + E \quad (19)$$

The following regression statistics are provided in Table 13:

- The Multiple R of 0.30 is a rough indicator of how strongly the combined independent variables can predict the Quality. It's a moderate relationship, but it's not very strong.
- R Square, or 0.09, is saying that around 9% of the variation in Quality can be explained by these variables. This isn't a large amount, indicating that these variables might not be the best ones to predict Quality.
- Adjusted R Square, which is -0.00, is a version of R Square that accounts for the number of predictors in the model. The negative value here suggests this model may be including too many variables that don't improve the prediction of Quality.
- The Standard Error of 0.95 is how much, on average, the model's predictions might be off. It indicates quite a large potential error in the predictions.

<i>Regression Statistics</i>	
Multiple R	0.30
R Square	0.09
Adjusted R Square	0.00
Standard Error	0.95
Observations	112

Table 13-Regression Statistics for Quality

The F-statistic of 0.97 displays the ratio of explained variation to unexplained variance based on Table 14. The model may not perform much better than simply forecasting the mean for each observation if the value is near to 1. This p-value is fairly high (0.48), indicating that your model does not meaningfully account for the variance in the dependent variable.

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	10	8.74	0.87	0.97	0.48
Residual	101	91.23	0.90		
Total	111	99.96			

Table 14-ANOVA for Quality

Regarding the independent variables, none of them shows a significant impact on Quality because all their p-values are higher than 0.05, as seen in Table 15. Normally, a p-value below 0.05 indicates a statistically significant effect on the outcome. Coefficients represent the change in Quality with a one-unit change in the corresponding variable, assuming all else stays the same. For instance, the coefficient for variable *I* is 0.120. This means if variable *I* goes up by 1, Quality would increase by 0.120, given all other factors remain constant. However, considering the p-value for variable *I* is higher than 0.05, this observed effect could just be due to chance.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.97	0.65	6.08	0.00	2.67	5.26	2.67	5.26
G	-0.12	0.18	-0.64	0.52	-0.48	0.24	-0.48	0.24
A	-0.11	0.08	-1.33	0.19	-0.27	0.05	-0.27	0.05
Ed	0.01	0.05	0.11	0.91	-0.10	0.11	-0.10	0.11
I	0.12	0.07	1.80	0.07	-0.01	0.25	-0.01	0.25
Em	0.16	0.18	0.92	0.36	-0.19	0.51	-0.19	0.51
GAP T	-0.36	0.24	-1.51	0.14	-0.84	0.12	-0.84	0.12
GAP RL	0.03	0.25	0.11	0.91	-0.46	0.51	-0.46	0.51
GAP RS	0.04	0.20	0.21	0.83	-0.35	0.43	-0.35	0.43
GAP A	-0.11	0.32	-0.35	0.73	-0.74	0.52	-0.74	0.52
GAP E	0.11	0.28	0.39	0.70	-0.45	0.67	-0.45	0.67

Table 15-Multiple Linear Regression Analysis Results for Quality

The 'Lower 95%' and 'Upper 95%' values provide a range where we can be 95% sure the true coefficient value lies. For variable *I*, this range is from -0.012 to 0.253.

This wide range suggests a lot of uncertainty about the actual influence of variable *I* on Quality.

In conclusion, the model's ability to predict Quality using these variables seems quite limited. This doesn't mean the analysis is worthless; it simply implies that there might be other variables that could better predict Quality, or perhaps more data are needed.

5.3.2. GAP analysis between expectations and perception

In Table 16, the average expectation and average perception are compared, with the gap serving as a measure of the discrepancy between the two metrics. The positive gap values show that expectations are generally higher than perceptions in all instances. This shows that patients have higher expectations for the standard of and accessibility to healthcare services.

Avg Exp	Avg Per	Gap
4.21	4.02	0.18
4.21	4.15	0.06
4.13	3.82	0.32
4.20	4.09	0.11
4.13	3.99	0.15

Table 16-Comparison of Average Expectations and Perceptions

The most notable change may be seen in the third row, where the gap is 0.32. This shows that, in contrast to the other situations, the perceived value in this instance was significantly below what was expected. The second row, on the other hand, shows the closest match between expectation and perception, with a gap of just 0.0625.

Table 17 presents the average difference between expectations and perceptions (average gap) in various categories (represented by variables T , RL , RS , A , E). The category Responsiveness shows the highest average gap, which implies the most significant disparity between expectations and perceptions in this domain. In contrast, the Reliability category shows the lowest mean difference, which indicates a closer match between expectations and perceptions.

Avg Gap T	0.59
Avg Gap RL	0.40
Avg Gap RS	0.64
Avg Gap A	0.54
Avg Gap E	0.62

Table 17-Average gaps

In conclusion, these tables seem to indicate a consistent theme where expectations exceed perceptions. This may suggest the need to improve service delivery, product quality or communication to better meet customer expectations.

Chapter 6

Conclusions

6.1. General Conclusions

An examination of multiple linear regressions was carried out in Excel. The simultaneous investigation of the impact of numerous independent factors on the dependent variable was made possible by this kind of regression analysis. A reliable statistical method to investigate the relationship rapidly and readily between these factors and a few predictor variables is the linear regression model. Our model aims to learn more about patients' satisfaction, loyalty, and quality of care toward healthcare providers.

In this analysis, several regression tables were examined, illustrating the degree of influence that various variables exerted on the dependent variable, 'Loyalty'. These variables included 'G', 'A', 'Ed', 'T', 'Em', and several 'GAP' indicators.

The examination revealed that the influence of these variables on 'Loyalty' was not statistically significant. A p-value less than 0.05 typically indicates a statistically significant result. However, in this analysis, most p-values were above this threshold, suggesting that these variables do not have a substantial effect on 'Loyalty'.

Two tables comparing 'Avg Exp' (Average Expectation) and 'Avg Per' (Average Perception) were also analyzed. The data indicated that, on average, expectations were higher than perceptions. This 'gap' represents a discrepancy between what was anticipated and what was experienced.

The largest gaps were observed in the 'RS' category and in the third row of the first table. These areas of maximum discrepancy warrant further investigation to understand why experiences are not meeting expectations.

On average, 81 out of the 112 respondents who expressed their preferences, or 72%, preferred the private sector. This could be one of the causes of the results being a little bit unexpected when compared to other research of similar type, which makes us believe that the relationship between the dependent and independent variables is harmed, significantly affecting the results.

In conclusion, the results offer an initial direction for investigation. Areas where experiences are failing to meet expectations have been identified, but more analysis is necessary to gain a comprehensive understanding of the phenomena at hand and to identify potential strategies for improvement.

6.2. Theoretical Contributions

The present study adds various theoretical insights to the area of patient loyalty. First off, it provides a framework that may be modified in future studies by showing how to apply multiple regression analysis to study the drivers of loyalty, satisfaction, and quality.

The study also introduces the idea of Gaps', or the discrepancy between customers' expectations and perceptions, as potential factors influencing loyalty. Although Gaps were not shown to be important predictors in this study, their inclusion in the model broadens the theoretical approach and encourages additional investigation into the interactions between expectations and perceptions to influence customer attitudes.

6.3. Managerial Implications and Recommendations

The study highlights the importance of meeting and exceeding customer expectations in order to maintain loyalty. It emphasizes the need for personalized service, addressing perception gaps, and fostering emotional connections with customers. Managers should also conduct thorough customer research to identify additional factors impacting customer loyalty.

Policymakers should consider regulations that ensure consistent service delivery across multiple businesses, ensuring client expectations are consistently met. Promoting transparency in business operations, such as open dialogue, truthful advertising, and thorough disclosure of product features, can help align consumer expectations and perceptions. Protecting customers' rights, such as handling complaints when expectations are not met, is also crucial.

Incentives should be offered to healthcare facilities to foster personal connections with their clients, rewarding organizations with high levels of loyalty and satisfaction. Access to tools and resources for customer research can encourage continuous learning and a focus on regular feedback and research as fundamental aspects of operations.

6.4. Limitations and Future Research

The fact that we were unable to concentrate our research on a single structure is a significant drawback of this study. In this study, Excel was used to analyze each factor as a single independent variable, simplifying our initial understanding of their individual effects. This approach provided us with critical insight into the role each variable plays independently. In the future, the power of multivariable analysis could be harnessed and used. Multivariable analysis allows us to consider several factors simultaneously and understand their combined influence on the dependent variable. This advanced approach is crucial as it not only provides a more comprehensive view of relationships, but also helps uncover any potential interactions or correlations between independent variables, thus offering a more robust and holistic perspective.

Since the survey was made available online, we had no control over who responded. Using social media polls as a data source can have significant limitations because they might not give a complete picture of the population. The study's findings may be biased due to the specific group of social media users,

which may not accurately represent the general population's diversity. This limitation limits the broad applicability of the findings. Future studies should consider this limitation when interpreting results and designing future studies. If hospitals had participated, more trustworthy responses could have been obtained to understand factors influencing patient loyalty, satisfaction, and quality.

The use of more sophisticated methods in future study, such as Structural Equation Modeling (SEM), may offer a deeper comprehension of the complex interrelationships between variables. SEM is a powerful statistical method, it is well suited to investigating the complex causal linkages that exist between observable and latent variables, as well as the multifarious character of customer loyalty, satisfaction, and perceived quality.

The analysis found insignificant predictors of customer loyalty, suggesting that other variables may significantly influence loyal customer behavior. Future studies could include these unique characteristics or consider the introduction of Gaps, the discrepancies between expectations and perceptions. These factors add an intriguing layer to the model, and future research could explore variations of these Gaps or focus on specific situations where expectations and perceptions diverge more sharply.

Exploring potential non-linear correlations between the variables and customer loyalty is another attractive area for future research. Although a linear regression model was used in this study, it's likely that the associations aren't completely linear. Examining potential non-linear correlations in models may reveal key predictors that were missed in this investigation.

Finally, the results' real-world applications offer still another chance for further study. Through additional research, it may be possible to turn these conclusions into suggestions that can help organizations increase customer loyalty and happiness. This could entail creating industry- or context-specific models of client loyalty, which could give companies more precise information.

In conclusion, while this study did not identify significant predictors of loyalty within the chosen set of variables, it opens several paths for future research, furthering our understanding of customer loyalty and its many potential determinants.

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Appendix

The questionnaire used to collect data for this research includes the following questions:

Questões do questionário Survey questions	
Additional questions	Qual é o género com que se identifica? (What is the gender you identify with?)
	Qual é a sua idade? (What is your age?)
	Qual o nível de escolaridade mais elevado que completou? (What is the highest level of education you have completed?)
	Qual é a sua profissão principal? (What is your main profession?)
	Rendimento anual em € (Annual income in €)
	Tem algum seguro de saúde? (Do you have health insurance?)
	Que serviço de saúde recebeu recentemente? (Which health service did you most recently receive?)
	De que sector recebeu este serviço de saúde? (From which sector did you receive this service?)
	Normalmente prefere o setor escolhido acima, ou foi apenas para esse serviço? (Do you prefer the same sector in general, or was it just for that service?)
	Quanto pagou pelo serviço de saúde, em €? (How much did you pay for the service, in €?)

Added questions	De que hospital/clínica recebeu este serviço de saúde? (From which hospital/clinic did you receive this service?)
	Quais são os seus critérios (qualidade, tempo de espera, preço, distância, credibilidade do local) para escolher um hospital/clínica para este serviço? Sendo 1 o menos importante, e 5 o mais importante. Escolha os critérios que têm o maior impacto na sua escolha. (What are your criteria (quality, waiting time, price, distance, reliance) for choosing a hospital/clinic for this service? With 1 being the least important and 5 being the most important, choose the criteria that have the biggest impact on your choice.)
SERVQUAL questions	A limpeza e higiene do hospital deve ser excelente (Hospital's cleaning and hygiene should be excellent)
	Os hospitais devem ter sempre estacionamento disponível para os visitantes/pacientes (Hospitals should always have visitors/patients parking available)
	Os colaboradores do hospital devem estar asseados (Hospital's personnel should appear neat)
	Os colaboradores do hospital devem ter uma postura agradável no trato com os pacientes (Hospital's staff should be pleasant to deal with)
	O hospital deve ter equipamento atualizado (Hospital should have up-to-date equipment)
	O hospital deve oferecer um serviço rápido (Hospital should offer prompt service every time)
	Os relatórios médicos devem ser exatos e perceptíveis (Hospital's medical reports should be accurate)

SERVQUAL questions	As faturas de despesas do hospital devem ser exatas e perceptíveis (Hospital's expense reports should be accurate)
	O hospital deve fornecer-me informação correta sobre o meu estado de saúde (Hospital should provide me with adequate information about medical condition)
	Devo sentir-me confiante e segura ao receber tratamento médico (I should feel confident when receiving medical treatment at hospital)
	Os colaboradores administrativos devem ser eficientes no esclarecimento das minhas dúvidas (Hospital's administration staff should be efficient dealing with my questions)
	Os colaboradores do hospital devem informar-me com precisão quando os serviços de saúde serão prestados (Hospital's employees should inform me exactly when services will be performed)
	O hospital deve oferecer horários convenientes para a utilização dos seus serviços (Hospital should offer convenient times to use their hospital services)
	Deve haver colaboradores experientes em serviço aos fins-de-semana no hospital (There should be experienced personnel on duty on weekends at hospital)
	A recepção do hospital deve responder prontamente às minhas chamadas telefónicas (Hospital's reception should answer my phone calls promptly)
	Os colaboradores do hospital devem sempre respeitar a minha privacidade (Hospital's employees should always respect my privacy)

SERVQUAL questions	Os colaboradores do hospital devem ser atenciosos e serenos (Hospital's employees should be caring)
	O hospital deve ter pessoal médico qualificado (Hospital should make use of proficient medical staff)
	Os colaboradores dos hospitais devem dar atenção médica individual (Hospitals' employees should give individuals medical attention)
	Os colaboradores dos hospitais devem sempre demonstrar compreensão quando apresento um sentimento de desconforto (Hospital should always show understanding towards my feeling of discomfort)
	Devo receber um tratamento atencioso e respeitoso enquanto estiver no hospital (I should be treated with warm and caring attitude in hospital)
	A limpeza e higiene do hospital são excelentes (Hospital's cleaning and hygiene are excellent)
	Os hospitais têm sempre estacionamento disponível para os visitantes/pacientes (Hospitals always have visitors parking available)
	Os colaboradores do hospital apresentam estar asseados (Hospital's personnel appear neat)
	Os colaboradores do hospital têm uma postura agradável no trato com os pacientes (Hospital's staff are pleasant to deal with)
	O hospital tem equipamento atualizado (Hospital has up-to-date equipment)
	O hospital oferece um serviço rápido (Hospital offers prompt service every time)

SERVQUAL questions	Os relatórios médicos são exatos e perceptíveis (Hospital's medical reports are accurate)
	As faturas de despesas do hospital são exatas e perceptíveis (Hospital's expense reports are accurate)
	O hospital fornece-me informação correta sobre o meu estado de saúde (Hospital provided me with adequate information about medical condition)
	Sinto-me confiante e segura ao receber tratamento médico (I feel confident when receiving medical treatment at hospital)
	Os colaboradores administrativos são eficientes no esclarecimento das minhas dúvidas (Hospital's administration staff were efficient dealing with my questions)
	Os colaboradores do hospital informam-me com precisão quando os serviços de saúde serão prestados (Hospital's employees informed me exactly when services would be performed)
	O hospital oferece horários convenientes para a utilização dos seus serviços (Hospital offered convenient times to use their hospital services)
	Os hospitais têm colaboradores experientes em serviço aos fins-de-semana (There are experienced personnel on duty on weekends at hospital)
	A recepção do hospital responde prontamente às minhas chamadas telefónicas (Hospital's reception answered my phone calls promptly)

SERVQUAL questions	Os colaboradores do hospital respeitam sempre a minha privacidade (Hospital's employees always respected my privacy)
	Os colaboradores do hospital são atenciosos e serenos (Hospital's employees are caring)
	O hospital tem pessoal médico qualificado (Hospital makes use of proficient medical staff)
	Os colaboradores dos hospitais dão atenção médica individual (Hospitals' employees gave individuals medical attention)
	Os colaboradores dos hospitais mostram sempre compreensão quando apresento um sentimento de desconforto (Hospital always showed understanding towards my feeling of discomfort)
	Recebo um tratamento atencioso e respeitoso enquanto estou no hospital (I was treated with warm and caring attitude in hospital)
	Os cuidados médicos que recebi satisfizeram os meus requisitos (The medical care I received met my requirements)
	A qualidade global do hospital é boa (The general quality of the hospital is good)
	Em troca de um serviço de maior qualidade, estou disposto a pagar mais (In exchange for a higher-quality service, I'm willing to pay more)
	Da próxima vez, selecionaria o mesmo hospital/clínica para o mesmo tratamento/serviço (Next time, I would select the same hospital/clinic for the same treatment/service)