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MEASURING PERCEIVED SERVICE QUALITY AND HEALTH-RELATED QUALITY OF LIFE IN A LONG-TERM CARE INSTITUTION

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Abstract

The long-term care institutions provide both health and social care services, which help patients with dependencies perform their activities of daily life. Additionally, these institutions provide treatment, rehabilitation, and clinical supervision to the patients. With the aging population, chronic diseases, and dementia increasing, the demand for this type of care is expected to increase. Under this context, the principal aim of this research is to analyse if there is an association between the patients' perceptions of the overall perceived service quality of the long-term care institution in study and the health-related quality of life of the patients. For that, it was used a questionnaire composed by 3 sections (relating to the personal characteristics; the assessment of health-related quality of life by QALYs through EQ-5D-3L; and the assessment of perceived service quality by SERVPERF and additional dimension and items) that was administered to 35 patients in two different moments (initial and approximately 30 days after). The statistical procedures used for data analysis were: descriptive statistics, multiple linear regression, hypothesis testing, and correlation coefficients. The findings suggest that the tools used are both reliable, and that in fact there is no association between the overall perceived service quality and the health-related quality of life in this long-term care institution. In general, the personal and service characteristics do not influence neither the perceived service quality or the health-related quality of life. This study presents some limitations, so the results cannot be generalized.

Keywords: Healthcare, Long-term care, Perceived service quality, HRQoL

JEL classification: I9 – Health: Other

M10 – Business Administration: General

Resumo

As instituições de cuidados continuados prestam serviços de cuidados de saúde e apoio social, que ajudam os pacientes com dependências a realizar as suas atividades diárias. Além disso, estas instituições oferecem tratamento, reabilitação e supervisão clínica aos pacientes. Com o aumento do envelhecimento da população, das doenças crónicas e de demência, é esperado que a procura por este tipo de serviços também aumente. Assim, o principal objetivo deste estudo é analisar a existência ou não de uma associação entre a qualidade de vida dos pacientes e a sua perceção da qualidade do serviço da instituição de cuidados continuados em estudo. Para tal foi utilizado um questionário composto por 3 secções (referentes às características pessoais; à avaliação da qualidade de vida pelos QALYs através do EQ-5D-3L; e à avaliação da perceção da qualidade do serviço através do SERVPERF mais uma dimensão e dois itens adicionais) que foi aplicado a 35 pacientes em dois momentos diferentes (inicial e aproximadamente 30 dias depois). Os procedimentos estatísticos utilizados para análise dos dados foram: estatística descritiva, regressão linear múltipla, teste de hipóteses e coeficientes de correlação. Os resultados sugerem que as ferramentas utilizadas apresentam consistência interna e que, de fato, não há associação entre a perceção da qualidade do serviço e a qualidade de vida dos pacientes. Em geral, as características pessoais e as características do serviço não influenciam, nem a qualidade do serviço percebido, nem a qualidade de vida dos pacientes. Este estudo apresenta algumas limitações, logo os resultados não podem ser generalizados.

Palavras-chave: Cuidados de saúde, Cuidados continuados integrados, Qualidade percebida do serviço, Qualidade de vida

Classificação JEL: I9 – Health: Other

M10 – Business Administration: General

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1. Introduction

This chapter starts with the identification of the problem that leads to the present research and denotes the relevance to study such topic. Next, it is defined the general and specific objectives, and consequently the research question to be answered. Afterwards, the research methodology is briefly explained, as well as the scope and structure of the study.

1.1. Context

Everyday many people trust their lives to health systems, which have a crucial role during one's lifetime. Health systems, which core goal is to continually improve health, include all the institutions, organizations and resources that provide health care services (WHO, 2000a).

According to the World Health Organization (2000b), long-term care is the set of structured activities conducted to ensure that a person who is not completely capable of self-care can still have the best quality of life possible (considering the person preferences) with the highest degree of independence possible, autonomy, personal fulfilment, and dignity.

Shugarman *et al*. (2010) add that the self-care incapability of people who need long-term care services is caused by a physical, cognitive, or chronic health condition. "*These care needs may arise from 1) an underlying health condition as is most common among older adults, 2) an inherited or acquired disabling condition among younger adults, and/or 3) a condition present at birth*" (Shugarman *et al*., 2010:1).

Long-term care can be provided either by formal or informal support systems. The former includes health professionals, social services, and others, while the latter includes family, friends, and/or neighbours (WHO, 2000b). So, it "*can be provided in home, institutional, or day-care settings, from public, not-for-profit or for-profit providers, with services varying from alarm systems to 24h/7 days personal care*" (Colombo *et al.*, 2011:39).

In Portugal, long-term care concerns both health and social care services. The social care services (which include laundry services, meals, bathing, among others) are mostly provided by family (informal care), the Misericórdias, and other independent charitable organizations (formal care) – such as day centres, nursing homes or residences for the elderly (Nogueira, 2009; Simões *et al*., 2017). Health care services are provided only by

formal care, which include both private and public hospitals and primary healthcare centres (Nogueira, 2009; Simões *et al*., 2017).

Formal care in Portugal can be provided both by organizations that are part of the National Network for Integrated Continuous Care (Rede Nacional de Cuidados Continuados Integrados – RNCCI) and by organizations that are outside such network - such as nursing homes and day centres (Nogueira, 2009).

The RNCCI was created in 2006 from a partnership between the Ministry of Health and the Ministry of Labour and Social Solidarity as a response to the increase of the elderly population and the increase of disabling chronic diseases and the consequent need for more services (Ministry of Health, 2006; Simões *et al*., 2017). This network gathers teams that provide long-term care, social support, and palliative care within covering hospitals, primary healthcare centres, community services, local social security services, Solidarity Network, municipalities, and non-profit organizations of social services (Simões *et al*., 2017).

According to Decree-law nº101 (Ministry of Health, 2006), this network is composed of four types of services: inpatient units, outpatient units, hospital teams and home teams. The inpatient units provide treatment and clinical supervision to inpatients during and right after the disease. Depending on the needs and time of recovery, this unit can be divided in: convalescence (short-term recovery), medium-term care and rehabilitation, long-term care and maintenance, and palliative care – which nowadays have its own national programme (Ministry of Health, 2006; Simões *et al.*, 2017). The outpatient units concern the services of day care and promotion of autonomy to patient who do not require being inpatients. The hospital teams include both team of hospital discharge and intra-hospital team of support in palliative care. Finally, the home teams consist of teams of long-term care and community teams of support in palliative care that provide their service at the home of the patient (Ministry of Health, 2006; Simões *et al.*, 2017).

Under this context, it is important to understand how the health of the population is nowadays and the consequent need for healthcare services. Reports published by Deloitte (2017) and OECD (2017) reveal that chronic diseases keep rising all over the world, and the elderly population will grow 8% from 559 million in 2015 to 604 million in 2020 as a consequence of the growth of the life expectancy together with the decrease of natality rates. Also, the prevalence of dementia is estimated to rise everywhere in the world

between 2015 and 2050 since it is related with the pace of growth of the older population (Deloitte, 2017; OPSS, 2017).

Portugal is not an exception of the aging population, and the proportion of the Portuguese population aged over 65 years is expected to double from 20% in 2015 to 40% in 2050 (OECD, 2017). The same is expected to happen to the percentage of the Portuguese population aged over 80 years, as it is expected to increase from 6% in 2015 to more than 12% in 2050 (OECD, 2017).

OECD (2017) also reveals that, in Portugal, life expectancy at the age 65 was 19,9 years in 2015. But they also disclose that of those years, only 6,2 years are expected to be of healthy life, which indicate that the remaining years are not lived in good health and free of disability and activity limitation, requiring some type of support.

Regarding this, in 2015 it was estimated that 22,5% of the Portuguese adults aged 65 years and over had some limitations in their daily activities, while 45,5% had severe limitations (OECD, 2017).

Concerning the Portuguese population who received long-term care in 2015, 48% of them were aged over 80, 37% were aged between 65 and 79, and only 15% of them was aged 64 years old or less, which shows that the Portuguese long-term care receivers are mostly elderly people (OECD, 2017).

According to OPSS (2017), in 2017, there was a very high occupation rate (close to 100%) of all the inpatient units of the RNCCI – for example, the units of long-term care and maintenance had an occupancy rate of 99% in Algarve and 97% in the Centre of the country. As the population aged over 65 is expected to constantly grow, there will be an increase of demand for this type of care (OECD, 2017). According to the same source, this expected increase of demand requires that existing units find the service areas that need to be improved, so that they can provide the most efficient service delivery and be able to serve more patients.

However, the efficiency of the service provided should not focus only on the quantity of patients. Considering that long-term care institutions provide treatment, recovery, and clinical supervision to patients, the efficiency of the service provided should also consider the improvement of the quality of life of the patient - how they can perform their daily activities (Muragundi *et al.*, 2012; Simões *et al.*, 2017). Another point to consider in the

efficiency of the service is the impact it has on the patients' perception of the service quality, as through its measurement it is possible to identify the areas that are most fundamental for the patients, the ones that need the most to be improved, and also the ones to focus first (Muragundi *et al.*, 2012).

1.2. Objectives

Based on the challenge identified in the previous section, the general objective of this research is:

- Assess if the health-related quality of life is associated to the perceived service quality in long-term care institutions.

Having this in consideration, the specific objectives are:

- Measure the patients' perception of overall quality and by quality dimension of the service provided in long-term care.
- Examine the influence of patients' personal characteristics and the long-term care service characteristics in the perception of the overall service quality and in each dimension.
- Measure the patients' health-related quality of life.
- Examine the influence of patients' personal characteristics and the long-term care service characteristics in the health-related quality of life.
- Analyse the association between the patients' perceptions of overall service quality and the health-related quality of life in long-term care.
- Develop managerial recommendations to improve the service delivery in long-term care.

1.3. Research question

Concerning the objectives identified previously, the research question to answer with this study is: Is there any association between the health-related quality of life and the perceived service quality?

1.4. Research methodology

The association between perceived service quality and health-related quality of life, to the best of the author's knowledge, is a topic that has not yet been explored. According to Yin (2014), this setting should be addressed with an exploratory approach under a case study perspective.

Yin (2014) notes that there are various research methods. One of those methods is case study, which according to the same author, *"is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-world context"* (Yin, 2014:16). As seen in the previous topics the present study focuses in an existent organization, more precisely a long-term care institution, and its context.

Under this context, and in order to address the proposed objective and research question, a case study analysis will be conducted.

1.5. Scope

The case study will be conducted in a long-term care institution that has a private and a public unit, the latter being part of RNCCI. Both units are divided in temporary services (called medium-term care and rehabilitation in RNCCI) and long-lasting services (called long-term care and maintenance in RNCCI). The two inpatient units have a total of 120 beds. For confidentiality reasons, the name of the institution will not be disclosed.

1.6. Structure

The present study is organized in 5 chapters, which are as follow:

- Introduction: it is explained the problem that is to be studied and the context in which it arises. With this, it is defined the general and specific objectives and the various research questions which are intended to be answered with this study. Following this, the research methodology, the scope of the case study and the project structure are described.
- Literature review: it is presented the theoretical foundation regarding service quality (in general and in healthcare services), quality of life, and the existing tools to measure both.

- Methodology: it is identified and explained the research methodology and the data collection tools to be used. It is formulated the hypotheses to be tested, as well as described the data collection and data analysis to be performed. Finally, it is defined the steps to be taken to achieve the objectives defined previously and answer the research question.
- Case Study: it is described the long-term care institution and the sample of the research. It is performed the data analysis to after developing the discussion, managerial recommendations, and conclusions.
- Conclusion: it is summarized the findings of the study, its contribution, and its limitations, as well as recommendations for future research.

2. Literature Review

2.1. Introduction

In this chapter, it is presented the theoretical framework of this research. It is examined relevant existing literature about service quality and how to measure it in general and then, more specifically to the healthcare sector. Similarly, it is explored the existing literature about the quality of life concept and how to measure it.

2.2. Services

According to Eurostat (2017), in 2016 the services sector accounted for 73,9% of the total gross value added of the European Union 28 countries. In the same year, the Portuguese services sector reported to 75,4%, representing about three quarters of the total gross value added (Eurostat, 2017).

The concept of services does not have a consensual definition, although it has been discussed for many years. Grönroos (2001) defines services as a process where production and consumption occur at the same time and causes a certain outcome. Johnston *et al.* (2012: 6) argue that "*a service is an activity – a process or a set of steps – which involves the treatment of a customer (or user) or something belonging to them, where the customer is also involved, and performs some role in the service process*." Vargo and Lusch (2004) suggest a different approach, one that does not consider the traditional difference between goods and services. These authors argue that there is only service and define it as actions, performances, and processes in which skills and knowledge are applied for the benefit of an entity.

There is no universal definition of services, but among the authors that state that services differ from goods on many levels, it was identified the main unique characteristics of services as intangibility, inseparability, heterogeneity, and perishability (Zeithaml *et al.*, 1985). Later, Fitzsimmons and Fitzsimmons (2010) complemented the list with the following characteristics: customer participation and lack of ownership.

The intangibility feature comes from the fact that services are performances and actions, so they cannot be touched, smelled, or tasted like goods are (Parasuraman *et al.*, 1985; Zeithaml *et al.*, 1985). Also, a service is provided and consumed at the same time, what

explains the inseparability (Parasuraman *et al.*, 1985). Likewise, the transformed resources of services are ideas, concepts, and information, so there is heterogeneity since the service performance depends on the customer, provider, and time (Parasuraman *et al.*, 1985; Zeithaml *et al.*, 1985). A service is perishable, because it is not possible to produce in advance and store it (Zeithaml *et al.*, 1985). The customer participation feature is explained by the fact that a customer is always a participant in the service delivery process (Fitzsimmons and Fitzsimmons, 2010). Finally, the customers do not receive the ownership of service, since they are not purchasing a good, but an asset (human labour, technology, etc.) during a specific period of time (Fitzsimmons and Fitzsimmons, 2010).

2.3. Service Quality

Quality is an ambiguous and illusory concept (Parasuraman *et al.*, 1985). When related to services, it becomes more difficult to understand how customers evaluate and perceive it due to the services' unique characteristics (Parasuraman *et al.*, 1985; Zeithaml, 1981).

Service quality cannot be tested in advance since services are intangible, so service quality is established only on the customers' expectations and feelings (Parasuraman *et al.*, 1985; Zeithaml *et al.*, 1985). Also, it is not possible to provide a consistent and standardized quality level as it depends on the customer, provider, and time – services' heterogeneity (Booms and Bitner, 1981; Parasuraman *et al.*, 1985; Zeithaml *et al.*, 1985). Because of the services' inseparability characteristic, the service quality occurs during the service delivery, which makes it very hard to control and measure as it mostly depends on the customer participation (Lehtinen and Lehtinen, 1982). The stronger the customer interaction is, the harder it is to control the quality – for example, in a hospital appointment, the explanation of the symptoms by the customer will impact the service provision and, consequently, the service quality (Lehtinen and Lehtinen, 1982; Parasuraman *et al.*, 1985).

Thus, it is possible to conclude that the definition and assessment of the service quality is a challenge for the providers (Cronin Jr. & Taylor, 1992).

Grönroos (1984), Lehtinen and Lehtinen (1982), Lewis and Booms (1983), and Parasuraman *et al.* (1988) define service quality as the perception of the customer of the service received, which results from a comparison between the service provided and the

customer expectations. On the other hand, Bitner and Hubbert (1994) define it as the customer's global judgement of superiority or inferiority of the service and the provider.

Additionally, it is important to understand that service quality is not based solely on the outcome of the service, it also includes the way the service is delivered (Grönroos, 1982; Sasser *et al*., 1978).

More recently, Johnston *et al.* (2012) combined all definitions into one: the perceived service quality is the client's judgement of both outcomes and experience during the service delivery, where they compare the benefits they got with the expectations and needs they had.

Hence, most of authors in the academic literature agree that service quality depends also on the customer expectations. As stated by Parasuraman *et al.* (1985), expectations are established by factors such as past experiences, customers' needs, word of mouth, and the company's communication.

To summarize, Parasuraman *et al.* (1985) notes that there are three fundamental topics about service quality: it is harder for the customers to evaluate the services' quality than the quality of goods; the perception of the service quality is the result of the analogy between the customers expectations and the real performance of the service; the assessment of the service quality includes the service outcome and the way the service is provided.

2.3.1. Service Quality Dimensions

Many authors have explored and discussed the service quality possible dimensions. Sasser et al. (1978) remarked that service delivery is divided in three levels: material, facilities, and personnel, which are all associated with the way the service is provided. Grönroos (1982) stated that service quality is the combination of two dimensions: technical and functional quality. Grassing and Hessick (1988) identified six different quality dimensions: accuracy, timeliness, simplicity, consistency, employee attitudes, and cost. On the other hand, Parasuraman et al. (1988) argued towards five service quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy.

In turn, Hedvall and Paltschik (1989) suggest the two following dimensions: willingness and ability to serve, and physical and psychological access. Alternatively, Gummesson

(1993) developed a model for quality assessment known as the 4Q Model, which considers both services and goods and consists of four dimensions: design quality, production and delivery quality, relational quality, and technical quality. Following these models, Rust and Oliver (1994) developed the three-component model, where they identify three dimensions of the service quality: service product, service delivery, and service environment.

From all the suggested dimensions, two perspectives stand out – the Nordic and the American one (Grönroos,1982; Parasuraman *et al.*, 1988).

The Nordic perspective was mainly developed by Grönroos (1984), who was mentioned before, and divides the service quality in two dimensions – technical and functional quality. The first dimension is related to what the customer receives from the service, and the latter refers to the way the service is delivered. The author states that both dimensions are extremely important in the assessment of service quality. However, the perception of quality is not defined based only on these two dimensions, it is also influenced by the customer expectations (Grönroos, 1988).

The American perspective was mainly presented by Parasuraman *et al.* (1985) and Parasuraman *et al.* (1988), who structure the service quality in the five dimensions also previously identified – tangibles, reliability, responsiveness, assurance, and empathy.

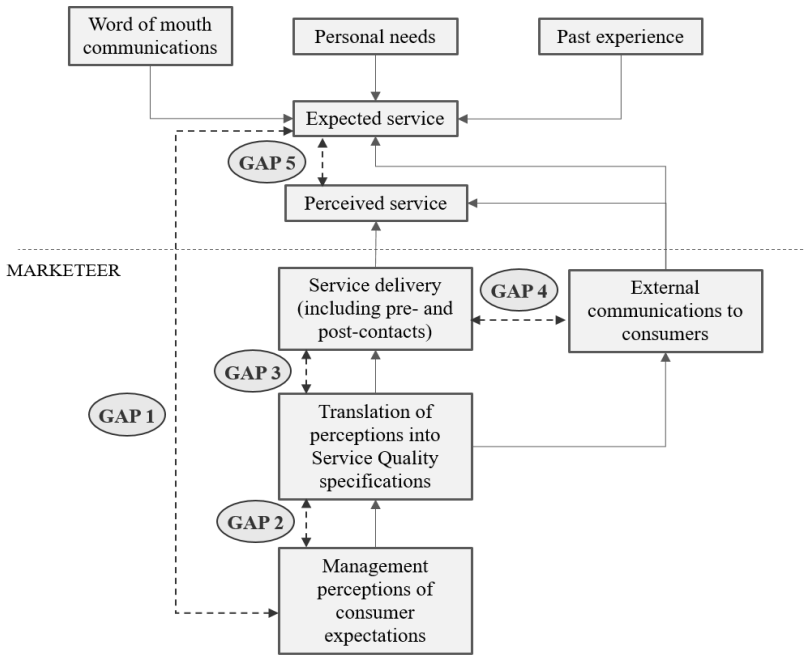


Figure 1 - Parasuraman *et al.* (1985) Gap Model

The mentioned authors developed theirs model based on their previous study, where they identify the gaps (Figure 1), which, according to them, are the origin of the lack of quality in the service delivery.

Parasuraman *et al.* (1985) define each gap as follows: Gap 1 is the company's misinterpretation of the customers' expectations regarding the service to be delivered. It shows the managers lack of insight about the customers' expectations; Gap 2 is the discrepancy between the company's perception of customers' expectations and the transformation of these into specifications of service quality; Gap 3 emerges when the service actually delivered does not correspond to the service quality specifications; Gap 4 occurs when the service promised by the company's communication does not match the actual service delivered; Finally, gap 5 is the difference between the expectations regarding the service quality and the perception of the actual service quality provided. The authors remark that gap 5 is a consequence of the other four gaps and that it is the only one that can measure the service quality from the customers' perspective.

In the same study, Parasuraman *et al.* (1985), in addition to the five gaps, also identified 10 dimensions, which they call determinants of service quality: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/ knowing the customer, and tangibles.

Later, Parasuraman *et al.* (1988) conducted a study where they developed an instrument to measure the customers' perceptions of service quality, where the 10 dimensions of the previous study converged into the 5 dimensions mentioned earlier.

2.3.2. Measurement of Service Quality

It is fundamental that managers understand service quality in the customers' perspective, how it can affect the business and its success, and in what way it can be enhanced (Cronin and Taylor, 1992).

Regardless the many service quality models available, such as the ones presented previously, there are just a few that were operationalized, being the two more used and analysed the SERVQUAL and SERVPERF scales (Jain and Gupta, 2004).

2.3.2.1. The SERVQUAL Model

Parasuraman *et al.* (1988) conceptualized the multi-item scale SERVQUAL to measure the quality of the service by comparing the expectations the customers have regarding the service with the perception of quality of the service that really was provided.

Its operationalization is done with a questionnaire that is separated in two halves, each with 22- items – the first half is to assess the expectations before the service is delivered and the second one to assess the perceptions after the service is delivered (Parasuraman *et al*., 1988). The items in the questionnaire are divided in five quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman *et al*., 1988).

Parasuraman *et al.* (1988:23) describe each dimension as detailed below:

- "Tangibles: physical facilities, equipment, and appearance of personnel;
- Reliability: ability to perform the promised service dependably and accurately;
- Responsiveness: willingness to help customers and to provide prompt service;
- Assurance: knowledge and courtesy of employees and their ability to inspire trust and confidence;
- Empathy: caring, individualized attention the firm provides its customers."

To evaluate each item, the authors proposed to use a Likert-like scale of 7 points, where 1 is "Strongly Disagree", 7 is "Totally Agree", and the points between 2 and 6 do not have any description.

The SERVQUAL scale has items and dimensions that are not industry specific, so the instrument serves as a base that can be adapted to the characteristics of a particular company or sector (Parasuraman *et al.*, 1988).

Parasuraman *et al.* (1988) affirm that SERVQUAL is a concise model and it has reliability and validity, so it should be used to understand the expectations and perceptions of the customers and identify the areas that need the most to be improved.

However, since the authors presented this model it received some criticisms, both at conceptual and operational level (Buttle, 1996).

To start with, various authors state that service quality should be measured only in terms of the customers' perceptions (Cronin and Taylor, 1992; Babakus and Boller, 1992; Boulding *et al.*, 1993; Buttle, 1996). Babakus and Boller (1992) add that the difference

between the perceptions and expectations does not give any additional information to the already given by the perceptions part. Accordingly, Teas (1993) complement affirming that the definition of expectations by Parasuraman *et al.* (1985) is ambiguous and the corresponding part of the questionnaire can be differently interpreted by respondents.

Regarding the dimensions of the instrument, Carman (1990), Babakus and Boller (1992) and Buttle (1996) agree that both dimensions and items should be adapted to each particular service. However, that is exactly what Parasuraman et al. (1988) remark in their study, that the SERVQUAL scale is just a base, that when necessary should be adapted to the specificities of each company and context. Buttle (1996) adds that some studies have shown that the use of adapted SERVQUAL leads to higher levels of explained variance and, consequently, better validity.

Still regarding the items, Buttle (1996) notes that some are positive sentences, while others are negative sentences, and that this reverse polarity can cause errors in the answers affecting the validity of the scale. Taking this into consideration, Parasuraman *et al.* (1991) reformulated the items that were negative sentences into positive ones.

Cronin and Taylor (1992) and Buttle (1996) also agree that SERVQUAL focus only in the process of service delivery and does not include the outcome of the service.

Lastly, Carman (1990) argues that it is not practical for the respondents to answer to two questionnaires, one before the service is delivered and one right after.

Despite the criticisms, the SERVQUAL scale has been used to measure the service quality in many services, such as banking services (Angur *et al.*, 1999; Jabnoun and Al-Tamimi, 2003; Untaru *et al.*, 2015), higher education services (Smith *et* al., 2007; Đonlagić and Fazlić, 2015; Leonnard, 2018), healthcare services (Babakus and Mangold, 1992; Kalaja *et al.*, 2016), airline services (Chikwendu *et al.*, 2012; Hussain *et al.*, 2015), among many others.

Besides this, there are some operationalized models that are based on the SERVQUAL approach but modified and adapted it to specific types of services. Some of these models are: E-S-QUAL for websites that provide shopping online (Parasuraman *et al.*, 2005); ARCHSECRET for voluntary organizations (Vaughan and Shiu, 2001); M-S-QUAL for mobile services of shopping both virtual and physical products (Huang *et al.*, 2015).

HEALTHQUAL for healthcare services (Lee, 2016); or TOURQUAL for tourist attractions (Mondo and Fiates, 2017).

2.3.2.2. The SERVPERF Model

Cronin and Taylor (1992) were among the critics of SERVQUAL. The authors alleged that the instrument was confusing and that they did not agree with its conceptual base. They were part of the authors who argued that only the perceptions part of the instrument should be used, thereby removing the expectations component. Based on these reviews, these authors proposed the SERVPERF scale, which measures the quality of services focusing solely on the perceptions of the customers regarding the performance of the service.

This scale is composed by the 22 items of SERVQUAL that are related to the service performance and use the same 5 quality dimensions (Cronin and Taylor, 1992). The authors explained that they kept these items since they found them well justified, both with the methods used to develop them and the report of its use in the literature. Likewise, the scale considered to evaluate each item is also the Likert-like scale of 7 points (Cronin and Taylor, 1992).

Cronin and Taylor (1992) conducted a study where they found that the use of SERVPERF leads to better results than SERVQUAL, with more reliability, better validity, and better explained variance.

Since Cronin and Taylor (1992) presented their research, many studies were conducted in different areas using the scale SERVPERF, such as in banking services (Mustafa, 2015; Fragoso and Espinoza, 2017), in healthcare services (Tan Le and Fitzgerald, 2014), in fast food services (Qin and Prybutok. 2008; Ibarra *et al.*, 2015), in hospitality services (Yilmaz, 2009; Zhihui, 2010), among others.

Similar to SERVQUAL, the SERVPERF scale also has adapted versions, such as Hedperf for higher education services (Abdullah, 2006).

The SERVPERF model has been compared to SERVQUAL since it was developed by Cronin and Taylor (1992). Brady *et al.* (2002) and Jain and Gupta (2004) confirmed through their study the superiority of SERVPERF over SERVQUAL. However,

SERVQUAL is better than SERVPERF when it comes to identify the areas that need intervention (Jain and Gupta, 2004).

Salomi *et al.* (2005) concluded that the SERVPERF presented slightly better results regarding validity and reliability. Most authors agree that SERVPERF is more advantageous as it has half of the questions of SERVQUAL, which makes it easier and more convenient to apply, as well as more motivating for the respondents (Brady *et al.*, 2002; Jain and Gupta, 2004; Salomi *et al.*, 2005).

2.4. Healthcare services

The healthcare service industry is constantly growing and evolving all over the world (Lee and Kim, 2017). Hospitals and other healthcare units concern more and more with service quality, so it is important to understand how it is defined in healthcare (Lee and Kim, 2017).

2.4.1. Healthcare service quality

In healthcare, quality is a complex and abstract concept which definition varies according to the interests and views of each person (Mosadeghrad, 2013).

To Donabedian (1980), healthcare service quality is the medical care that uses the knowledge and technology with the purpose of reaching the most benefits to health with the less risk. The main factor when providing health care services is the well-being of the patients (Donabedian, 1980).

According to Schuster *et al.* (1998), a good healthcare service quality implies that services delivered to the patient are technically adequate, done with great communication, the provider shares with the patient the decision making, and respects the different cultures.

To Leebov *et al.* (2003), healthcare care service quality is to do the right thing, to continuously try to improve, get the best outcome possible, have all patients satisfied, preserve the best staff, and, lastly, keep a good financial performance.

Mosadeghrad (2013) presents a more comprehensive definition that combines the view of various stakeholders – patients, relatives, providers, managers, policy makers, payers, accreditation staff, and suppliers. This author states that healthcare service quality can be defined as meeting the patients' needs and making the providers satisfied by delivering

healthcare services that are efficient and effective, and that agree with the most recent standards and guidelines.

The patients are increasingly demanding because of the improvement and evolution of the way of living, education and consciousness (Swain and Kar, 2017). That is why hospitals are investing in the management of service quality, that results in better understanding of the customers' expectations and needs and, consequently, better perceived quality (Lee, 2016; Swain and Kar, 2017).

2.4.2. Measurement of healthcare service quality

The research by Donabedian (1988) suggested that the perceptions of the patients should be included in the evaluation of the healthcare services quality. Since then, managers integrate the perceptions and opinions of the patients as a focal point of its assessment (Serapioni, 2009).

Similar to the measurement of services quality in general, SERVQUAL and SERVPERF are the most applied tools in healthcare (Lee, 2017). Besides those tools, some authors created surveys of their own where they identify their own dimensions (Reidenbach and Sandifer-Smallwood, 1990; Vandamme and Leunis, 1993; Tomes and Peng, 1995; Mejabi and Olujide, 2008; Singh and Prasher, 2017; Swain and Kar, 2017).

There are many suggestions of dimensions of healthcare service quality and, depending on the goal of the researcher, they can have different uses (Lee, 2016). This variety occurs because there is a huge diversity of healthcare services, they differ according to different diseases, and they deal not only with people but also with their life (Lee, 2016). Regarding this, Table 1 identifies healthcare service quality dimensions proposed in some studies.

Focusing on long-term care services, Lin *et al.* (2012) applied the SERVPERF scale in 14 long-term care institutions to understand the perceived service quality. They concluded that the perceived service quality was relatively high and did not mention any disadvantage in the use of the SERVPERF scale (Lin *et al.*, 2012). A thorough search of the relevant literature yielded only this article regarding long-term care.

Study	Dimensions
Reidenbach and Sandifer-Smallwood (1990)	Patients confidence, business competence, treatment quality, support services, physical appearance, waiting time, and empathy.
Vandamme and Leunis (1993)	Tangibles, medical responsiveness, assurance I, assurance II, nursing staff, and personal beliefs and values.
Tomes and Peng (1995)	Empathy, relationship of mutual respect, dignity, understanding of illness, religious needs, food, and physical environment.
Mejabi and Olujide (2008)	Waiting time for service, resource availability, condition of clinic or ward, attitude of doctors and nurses, condition of facility, quality of food, quality of care and attitude of non-medical staff.
Singh and Prasher (2017)	Tangibles, responsiveness, reliability, assurance, empathy, and trustworthiness.
Swain and Kar (2017)	Infrastructure, personalized attention, staff attitude, trustworthiness, quality of outcomes, clinical procedures, resource availability, information availability, administrative procedures, waiting time for services, patient safety and privacy, price, food, continuity, and religious needs.

Table 1 - Studies about healthcare service quality

2.5. Quality of life

WHO (1995:1405) defines quality of life as "*individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns*". According to the same source, the quality of life concept embraces the physical health, the psychological state, the level of independence, the individual's social relationships, the relations with the environment elements, and religion and personal beliefs. This definition suggests that the concept is subjective and multidimensional and that its dimensions can include both negative (such as fatigue and pain) and positive aspects (such as mobility and contentment) (WHO, 1995).

However, throughout history, quality of life has not been studied and defined only as a general and comprehensive concept, but also as more specific to several areas such as politics, economics, sociology, psychology, and health (Holmes, 2005). The definition differs according to the scientific area, for example, in sociology and psychology the concept concerns happiness and satisfaction with life, which is influenced by each person goals, financial situation, socio-economic status, and so on (Holmes, 2005).

With this said, it is important to address both social care-related quality of life (SCRQoL) and health-related quality of life (HRQoL) considering that long-term care consists of both health and social situations.

Regarding the social care area, the quality of life concept is usually mentioned as SCRQoL and consists mostly on aspects of people's life that are considered as personal daily activities, such as dressing, feeding, hygiene, shopping, etc. (Malley *et al.*, 2012; Netten *et al.*, 2012a).

In health, the concept tends to focus only on health-related factors, ignoring the non-related factors, such as economic and political (Holmes, 2005; Karimi and Brazier, 2016). HRQoL concept is closely connected to the definition of health present in the constitution of WHO, which declares that health is not just the nonexistence of disease or feebleness or frailty, but the total well-being in the physical, mental, and social domains (WHO, 2006). Most authors define HRQoL with a similar definition (Karimi and Brazier, 2016).

According to Bowling (2005), the focus of researchers in both health and social care is in the assessment of the outcomes of interventions and treatments. In healthcare, an extensively used measure of the health outcomes is quality-adjusted life years (QALY), which is a summary measure that allows performing comparisons between distinct patients and areas (Whitehead and Ali, 2010). According to the same source, there are other measures of health outcomes, such as disability-adjusted life years (DALY) and healthy years equivalent (HYE), but QALYs are the most used and validated measure.

QALY is a comprehensive instrument that assesses the health outcomes by associating quantity and quality of life into a single index (Prieto and Sacristán, 2003). The quality of life corresponds to a health state that is measured by health utilities and the quantity of life corresponds to the number of years spent with that certain health state (Neumann *et al.*, 2000; Romero *et al.*, 2013). The health utilities are preference weights which are measured using a scale from 0 (dead) to 1 ("perfect" health) (Whitehead and Ali, 2010).

A QALY is obtained by calculating the product between the health utility and the number of years with that health utility (Whitehead and Ali, 2010; Beresniak and Dupont, 2016). According to both Neumann and Cohen (2018) and Beresniak and Dupont (2016), QALYs are valuable as shows individual preferences and enables to assess health gains and compare them across various diseases and treatments. The health gains are calculated by subtracting two different QALYs, for example, when comparing a treatment with no treatment, the health gain is calculated by subtracting the QALYs of the patient with no treatment from the QALYs of the patient with the treatment (Detels *et al.*, 2015).

Despite the principal usage of QALY being economic evaluations, it has been suggested as an indicator to expose changes in the health state (Romero *et al.*, 2013). However, no researches with the same purpose of this study were found, so the examples used from now on are related to economic evaluations.

In order to measure the quality of life, it is not only necessary to have a metric, but there is also the need to have an instrument that assess the health state of the patients. Next it will be revised the relevant literature regarding the instruments that may be used to measure the quality of life as a proxy for QALYs, which can be about general quality of life, SCRQoL, and HRQoL.

2.5.1. General quality of life tools

It was not found empirical evidence about application of broad measures of quality of life and well-being in long-term care. Knowing that Portuguese long-term care patients are mostly elderly people, it is relevant to take into consideration measures used specially for them.

Makai *et al.* (2014) conducted a review of quality of life measures for older people. In that study, the authors identified the four broad measures of quality of life or well-being that are most used on elderly, which include Ferrans and Powers QLI (Ferrans and Powers, 1985), WHOQol OLD (Power *et al.*, 2005), ICECAP-O (Coast *et al.*, 2008) and ASCOT (Netten *et al.*, 2012b). However, according to Malley *et al.* (2012), ASCOT was developed specifically for social care-related quality of life, so it will be addressed later.

In the same line of argument, Bulamu *et al.* (2015) point both WHOQol OLD and ICECAP-O as comprehensive instruments used in residential aged care.

Nevertheless, according to Makai *et al.* (2014), neither Ferrans and Powers QLI or WHOQol OLD have preference-weights, so they are not suitable to calculate QALYs. In contrast, there are preference-weights available for ICECAP-O (Makai *et al.*, 2014).

ICECAP-O is an instrument to measure general quality of life based on the theory of capabilities, which consists of five attributes: attachment (love and friendship), role (having a purpose), enjoyment (pleasure and joy), security, and control (being independent) (Flynn *et al.*, 2011). The authors state that each attribute has a response with four different choices. Its original purpose was for economic evaluation of both health

and social care, however the interest in its usage to identify differences in quality of life has been rising (Flynn *et al.*, 2011).

An advantage of this instrument is that it has adequate number of items and incorporates dimensions that older people usually find important (Makai *et al*., 2014; Bulamu *et al*., 2015). A limitation is the fact that is more recent, so needs more validation (Makai *et al*., 2014).

2.5.2. Social care-related quality of life tools

Forder and Caiels (2011) conducted a study which goal was to measure the value and outcomes of social care of long-term care services using the tool ASCOT. The authors concluded that this tool is able to measure the impact of social care in long-term care institutions and performs better than a HRQoL tool – more specifically EQ-5D, which will be addressed later.

ASCOT is the Adult Social Care Outcomes Toolkit, the only instrument that focuses specifically on the aspects of quality of life that are mostly provided by social care services (Towers *et al.*, 2016). This tool is composed by eight domains – personal cleanliness and comfort, food and drink, control over daily life, personal safety, accommodation cleanliness and comfort, social participation and involvement, occupation, and dignity – which encompasses both the basic and the higher order aspects of SCRQoL (Towers *et al.*, 2016; Malley *et al.*, 2012). Each domain comprehends one item that can be answered with four different options which express distinct outcome states (Malley *et al.*, 2012).

In order to demonstrate the impact of the social care provided in person's SCRQoL, the tool measures both current and expected SCRQoL (Netten *et al.*, 2012a; Towers *et al.*, 2016). As stated by the same sources, the current SCRQoL corresponds to the achieved SCRQoL, while the expected corresponds to the expected SCRQoL in the absence of any intervention.

In relation to long-term care, that was the only study found, however it was found two researches concerning SCRQoL of elderly receiving social care services at institutions, which also use the tool ASCOT (Netten *et al.*, 2012a; Towers *et al.*, 2016).

Netten *et al.* (2012a) concluded that the institutions provided considerable gains in residents' SCRQoL, but more on the basic aspects compared to the higher order aspects. Contrariwise, Towers *et al.* (2016) applied the tool in two moments with a 3 months interval to understand if any improvement existed. They concluded that the residents' ability to do daily activities and their expected needs in the absence of services worsened expressively, and the residents' current SCRQoL also worsened but only lightly.

According to Malley *et al.* (2012) and Makai *et al.* (2014), the ASCOT can be used to generate QALYs as it has preference-weights.

2.5.3. Health-related quality of life tools

Measures of HRQoL are gaining more and more importance to healthcare professionals and researchers (Lam, 1997; Guyatt *et al.*, 1993). Its assessment is crucial to measure the self-perceived well-being and overall health of a patient (Tu *et al.*, 2017).

Tu *et al.* (2017) suggests that HRQoL tools are more valuable when: assessing aspects that are important to the patients and expected to be affected by treatment; are responsive and valid; its outcomes are relevant and useful to determine if the treatment resulted or not.

The instruments to measure HRQoL can be divided in two types: disease-specific and generic (Lam, 1997; Guyatt *et al.*, 1993; Tu *et al.*, 2017).

Disease-specific instruments focus mostly on a specific disease but can also focus on a certain group of patients or a function and the problems that are associated to them (Guyatt *et al.*, 1993; Tu *et al.*, 2017). Some examples of instruments that concentrate on diseases are: PDQ-39 for Parkinson disease, CLDQ for chronic liver disease, and QLQ-C30 and FACT-G for cancer (Luckett *et al.*, 2011; Orr *et al.*, 2014; Tu *et al.*, 2017).

These instruments are more specific as they include only important aspects related to the particular disease, group of patients or function, which increases sensitivity and responsiveness (Guyatt *et al.*, 1993; Lam, 1997). They are important to assess the effects of a disease and improvements of the treatment, which helps to guide the treatment plans (Tu *et al.*, 2017). However, they are not suitable for persons with more than one disease and to make comparison between distinct patient groups (Lam, 1997).

Generic instruments summarize various health dimensions broadly, so it can be applied to every patient regardless their disease and even if the patient has multiple diseases (Lam, 1997; Tu *et al.*, 2017). The most used generic instruments are: 36-Item Short-Form Health Survey (SF-36) and EuroQol 5 dimensions instrument (EQ-5D) (Haywood *et al.*, 2005).

Regarding long-term care, Kanwar *et al.* (2013) assessed the association between HRQoL and frailty of the residents in two long-term care institutions. These authors used the SF-36 tool to measure the HRQoL, which, as mentioned, is a generic instrument to evaluate health status. The instrument is composed by 36 questions grouped into 8 dimensions – physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health (Ware and Gandek, 1998; Kanwar *et al.*, 2013). In addition to the scores per item and dimension, it can be divided into physical and mental component score, where the first four dimensions mentioned belong to the physical component, and the latter four belong to the mental component (Ware and Gandek, 1998). Each item has different response options that then are converted into scores from 0 to 100 (Ware and Gandek, 1998; Kanwar *et al.*, 2013).

According to Kanwar *et al.* (2013), this tool has great validity, prognostic value and it is easy to reproduce. However, Bowling (1998) mentions that both this instrument and its short version (SF-12) are not suitable for residents of long-term care institutions as they include items that do not fit daily life in this type of institutions. The same author affirms that an item about walking long distances or lifting and carrying groceries is not appropriate since it is not just about the patient being capable to do it or not, it is about not having the opportunity to do it in such environment.

Kerse *et al.* (2008) also conducted a study in long-term care facilities where they assessed if an activity programme with the purpose of improving function had an impact over time in the quality of life of the residents and probability of falling. These authors used the EQ-5D visual analogue scale to measure the overall perceived quality of life. They concluded that existed minimal or none improvement over time and no disadvantages or problems are stated regarding the tool used.

Still regarding long-term care, it was not found more empirical evidence of measurements of HRQoL. Nevertheless, Bulamu *et al.* (2015) review the literature concerning measures of aged care, where the most used HRQoL instrument is EQ-5D with 6 studies being about its application in residential care.

The EQ-5D is a generic and standardized health status instrument, which comprises a descriptive system and an overall index, called EQ VAS (Euroqol, 2018; Devlin and Brooks, 2017). The descriptive system consists of five dimensions (mobility, self-care, usual activities, Pain/Discomfort, and Anxiety/Depression), which can have 3 or 5 types of responses depending on the version of the instrument – EQ-5D-3L or EQ-5D-5L respectively (Euroqol, 2018). The same source explains that the descriptive system can have 243 different combinations of answers, which scores can be shown as health profile or transformed into a single utility index which translates preferability in comparison to other health profiles. To complement, the EQ VAS captures the respondent's self-rated health status with a vertical visual analogue scale from 0 to 100, where 0 signifies worst imaginable health state and 100 signifies best imaginable health state (Euroqol, 2018).

In order to convert the responses of the descriptive system into a single utility index, it is needed a value set, which is a group of preference weights to each level of each dimension (Euroqol, 2018). According to the same source, this value set is specific for each country. In the case of Portugal, the EQ-5D-3L is the only version that has a valid value set (Euroqol, 2018). It was generated by Ferreira *et al.* (2013), who provided a Portuguese population-based predicted preference weights for all the 243 health states.

EQ-5D can be used to obtain QALYs as it is a preference-based instrument (Bulamu *et al.*, 2015). This tool has been extensively used due to its high reliability, responsiveness, good validity, and short completion time (Euroqol, 2018). Bulamu *et al.* (2015) note that EQ-5D presents practical benefits as it has only 5 dimensions, so it is shorter when compared to other generic instruments, which make it easy to apply. Haywood *et al.* (2005) state that this instrument should be used when a briefer assessment is needed, especially when is expected a considerable change in health.

Lastly, it is crucial to understand which version (3L or 5L) of the EQ-5D is the most appropriate for the group in study. EQ-5D-5L has more levels of response, which, according to Janssen *et al.* (2013), allows to reduce the ceiling effect, increase reliability, and increase the discrimination between health states. However, this version has not been validated as much as EQ-5D-3L has (Euroqol, 2018). Likewise, as Leeuwen *et al.* (2015b) note, for elderly is better the version with less response levels as it is simpler and easier to understand and distinguish the options. Finally, a fundamental point to decide which version is better is the need to have a value set valid to use in Portugal, which as mentioned previously, currently only the EQ-5D-3L has (Euroqol, 2018).

2.5.4. Comparison of the tools

As identified previously, the most used and most appropriate instruments for elders living in an institution that enable the calculation of QALYs are ICECAP-O for general quality of life, ASCOT for SCRQoL, and EQ-5D-3L for HRQoL. There are a few studies that compare these three tools, but no study was found regarding long-term care.

Leeuwen *et al.* (2015a) conducted a study within the context of frail elderly receiving home care. The authors remarked minor differences in reliability between the three instruments. They also observed by analysing responsiveness and validity that EQ-5D-3L concentrates more on health, while the other two concentrate more on comprehensive areas of quality of life, not measuring health directly.

Malley *et al.* (2012) state that EQ-5D-3L focus more on functional abilities, overlooking the impact that the social support provided may have in quality of life. The authors affirm that, on the contrary, ASCOT is more sensitive to capture the impact of social care services. Bulamu *et al.* (2015) and Leeuwen *et al.* (2015a) agree that both ASCOT and ICECAP-O are relevant when measuring quality of life regarding broad aspects beyond healthcare, such as innovations in care for elderly. The two same sources add that EQ-5D-3L is better for interventions which goal is to preserve or improve health.

According to Leeuwen *et al.* (2015a:), "AS*COT is the most responsive to changes in quality of life from a broad perspective, ICECAP-O to changes in the impact of mental health and in ADL limitations, and the EQ-5D-3L to changes in the impact of physical limitations*".

Leeuwen *et al.* (2015b) lead a research with community-dwelling frail older adults, and it is not mentioned if they receive any type of care. However, being the sample in study frail elderlies, it is pertinent to understand how they interpreted the three instruments in comparison. Leeuwen *et al.* (2015b) state that EQ-5D-3L was the easiest tool for the elderly to answer as the response options are easily differentiated and well understood. The authors observed that more response options lead to more issues of interpretation– unlike EQ-5D-3L, both ICECAP-O and ASCOT contained questions and respective answers options that were misunderstood by the elderly.

Concerning the calculation of QALYs, Makai *et al.* (2014) state that ICECAP-O and ASCOT lack validation. Leeuwen *et al.* (2015a) note that despite the health not being the

only relevant area for elders, it is a very important one, and more researches are needed to understand if ICECAP-O and ASCOT can capture changes in health.

2.6. Conclusion

Services (including healthcare services) have some unique characteristics. Consequently, it is not possible to find an agreement on the definition and dimensions that compose both services in general and healthcare services in particular.

However, it is possible to agree that in both cases the two most used instruments in the assessment of service quality are SERVQUAL and SERVPERF.

In long-term care, the patients are mostly elderly that are frail and adults of any age with chronic diseases. Both aging and chronic diseases cause functional and mental disabilities, as well as affect the psychological state of the person. These disabilities are what cause the person's dependency, and the goal of long-term care is to reverse and recover from these disabilities.

With this said, the most appropriate tool to use to measure the long-term care institution's perceived service quality is SERVPERF. As stated previously, when compared to SERVQUAL, it is superior, presents better results regarding validity and reliability, and since it is smaller it is easier to apply and less frustrating. Also, in the only study found concerning long-term care it is applied the SERVPERF tool.

Regarding the assessment of quality of life, the most adequate instrument is QALYs, where it is calculated the improvement in health caused by an intervention, which in this study is the rehabilitation provided to the patients at the long-term care institution. In this specific context, the improvement is calculated without the quantity of life aspect, as in long-term care the purpose of the treatment is only to increase the quality of life, it does not influence the length of life as it is not a medical intervention.

To measure the quality of life aspect of the QALYs, the most appropriate tool is EQ-5D-3L, because as explained before it has been widely validated and it is the easiest tool for the elders to understand and answer. Furthermore, it focuses on health-related factors of quality of life, which concern physical disabilities that cause dependency and the psychological state of the respondents.

Between the two versions of EQ-5D, the 3L is the better to apply as it has been more validated, and it has less response options what makes it easier for the elders to understand. Also, EQ-5D-3L is the only version that has a Portuguese value set, which is needed to convert the responses.

3. Methodology

3.1. Introduction

In this chapter, it is explained and contextualized the research methodology of the present study. Then, it is identified and justified the hypotheses to be tested with this research. Afterwards, the data gathering tools that will be used are described, it is given details on the data collection sample of this specific case study, and the data analysis methods are also described. Finally, it is defined the sequence of steps that have to be performed in order to answer the research question and achieve the objectives defined earlier.

3.2. Case study approach

As explained previously, the present study follows a case study approach. Yin (2014) distinguishes the case study research into two kinds: single and multiple, depending in the number of cases to be analysed. Since this study focuses in the particular case of a long-term care institution, it can therefore be considered a single case study research.

Yin (2014) argues that all researches are used for a purpose, which can be: descriptive, explanatory, and exploratory. This study research purpose is both descriptive and exploratory, since it is meant to test hypotheses that have been tested previously in other studies in healthcare, but not in a long-term care institution, as well as new hypotheses relevant for the context of this case study.

Above all, it is important to note that the findings of this type of research cannot be generalized since it is about a unique case under its specific conditions (Yin, 2014; Eisenhardt, 1989).

3.3. Investigation hypotheses

The most adequate tool to measure the long-term care institution's service quality is, as stated previously, the SERVPERF, especially because it is shorter and easier to apply for the elderly, as well as, it is the tool applied in the only study found regarding long-term care which showed no weaknesses (Brady *et al.*, 2002; Jain and Gupta, 2004; Salomi *et al.*, 2005; Lin *et al.*, 2012).

Parasuraman *et al.* (1988) proposed five quality dimensions (Tangibles, Reliability, Responsiveness, Assurance and Empathy), which were used by Cronin and Taylor (1992) in the SERVPERF.

Additionally, Tomes and Peng (1995), by interviewing patients and hospital staff, found that food is also an important dimension to the in-patients. Similarly, Swain and Kar (2017) reached the same conclusion by reviewing 20 studies. Its importance is explained by the fact that being in a hospital all day can be boring as the patients do not have much to do, so the meals help to break the monotony (Tomes and Peng, 1995). Hence, it is considered relevant for this study to add a dimension called Food.

Parasuraman et al. (1988) suggest that the items proposed should be adapted to the context when necessary. Buttle (1996) complements stating that adapted items have shown superiority and better validity.

With this said, it is relevant to understand if the additional food dimension contributes to a better explanatory power of the overall perceived quality (measured by the item 29), as well as to understand if the five service quality dimensions presented by Parasuraman *et al.* (1988) and the food dimension all have the same contribution to the overall perceived quality. Thus, the following hypotheses emerge:

> **H1:** The service quality dimensions considered by Parasuraman *et al.* (1988) and the food dimension combined have better explanatory power of the overall perceived service quality than just the dimensions considered by Parasuraman *et al.* (1988).
>
> **H2:** The service quality dimensions considered by Parasuraman *et al.* (1988) and the food dimension contribute in the same way to the overall perceived quality.

Mosadeghrad (2013) found that the price is an important factor and that the service provided by a healthcare unit has to worth the money paid, so one of the dimensions he identified is the price. Likewise, Swain and Kar (2017) also identified the price as a relevant dimension. With this said, the following hypothesis is proposed:

> **H3:** Price influences the overall perceived service quality.

Lin *et al.* (2012) use in their study in long-term care the characteristics: age, gender, and education level. However, the authors did not find evidence that these influence the perceived service quality. Ahmed *et al.* (2017) also considers marital status as personal

characteristic, and they note that single patients have a more positive perceived service quality when compared to the married patients. Another aspect included by Zarei *et al.* (2012) is the place of residence, whose influence in the perceived service quality is not analysed.

Considering the context of this study, it may also be relevant to understand the influence of the previous location of the patient, that is, where the patient was before coming to this long-term care institution, as it can influence how the quality of the service is perceived. Similarly, it may also be relevant to analyse the influence of living home alone or accompanied in the respondents' perception of service quality, as being around other persons, with eventual possibility to receive additional care, can influence how the service is perceived.

Ahmed *et al.* (2017) compare the perceived service quality between patients of private and public hospitals, and they found that patients of private hospitals have better service quality perceptions. Hence, it is appropriate to analyse if similar situation occurs in the long-term care institution in study, as it is divided in the units private and public.

Zarei *et al.* (2012) also include in their research the distinction of hospital ward but do not reach any conclusion regarding the differences between the perception of the patients. This characteristic can be adapted to this research since the long-term care institution in study is divided in two distinct typologies: temporary and long-lasting care. The service provided is equal for both typologies, however the time of stay may influence the perception of the service quality.

Hence, for this case study, it is important to test the influence of personal characteristics (age, gender, education level, marital status, place of residence, previous location, and living home) and service characteristics (unit and typology) in the perceived service quality, therefore the following hypotheses are formulated:

> **H4a: i)** The personal characteristics of the patient influence the overall perceived service quality. **ii)** The service characteristics of the patient influence the overall perceived service quality.
>
> **H4b: i)** The personal characteristics of the patient influence the service quality dimensions considered by Parasuraman *et al.* (1988) and the food dimension.

ii) The service characteristics of the patient influence the service quality dimensions considered by Parasuraman *et al.* (1988) and the food dimension

H4c: i) The personal characteristics of the patient influence the perceived quality of price. **ii)** The service characteristics of the patient influence the perceived quality of price.

The most broadly used measure of health outcomes is QALYs, which show individual preferences, allows to do comparisons across diseases, treatments, and patients, as well as expose changes in the health state (Whitehead and Ali, 2010; Neumann, 2016; Beresniak and Dupont, 2016; Romero *et al.*, 2013). The instrument that will be used to measure quality of life, to next calculate QALYs, is the EQ-5D-3L.

According to Euroqol (2018), the EQ-5D-3L encompasses a descriptive system (composed by 5 dimensions) and an overall index (called EQ-VAS), therefore it is relevant to calculate both descriptive system and EQ-VAS as a proxy for QALYs. Considering that in long-term care the purpose of the treatment is to just increase the quality of life, not influencing the length of life (as it is not a medical intervention), the improvement is calculated without the quantity of life aspect. Thus, the improvement calculated regarding the descriptive system will be called from now on as improvement of HRQoL and the one regarding the EQ-VAS will be called improvement of self-rated health.

Like in the perception of the service quality, Huang *et al.* (2017) analysed the influence of age, gender, education level, marital status, and place of residence in the health-related quality of life measured with EQ-5D-3L. They concluded that the quality of life declines as the age increases, the lower the education level the worse the quality of life, and did not find any association between gender, marital status, and place of residence in the health-related quality of life.

Accordingly, it is also relevant to understand the influence of the previous location, living home alone or accompanied, the unit (private or public), and the typology (temporary or long-lasting care) in the health-related quality of life. Thus, the influence of the personal and service characteristics in both HRQoL improvement and self-rated health improvement will be tested with the following hypotheses:

H5a: i) The personal characteristics of the patient influence the self-rated health improvement. **ii)** The service characteristics of the patient influence the self-rated health improvement.

H5b: i) The personal characteristics of the patient influence the HRQoL improvement. **ii)** The personal characteristics of the patient influence the HRQoL improvement.

As explained, the EQ-5D-3L provides two distinct scores (by the descriptive system and the EQ VAS), Cardoso *et al.* (2016) tests if there is an association between both, concluding that indeed there is an association. Regarding the scope of this study, it is adequate to compare both improvements in order to understand their association. With this said, the following hypothesis is formulated:

H6: The HRQoL improvement is associated to the self-rated health improvement.

Being the main goal of this research to analyse if the perceived service quality and the health-related quality of life have any association, then it is relevant to test the following hypothesis:

H7: The overall perceived service quality is associated to the HRQoL improvement.

In Figure 2, it is represented the conceptualization model of the previously defined investigation hypotheses.

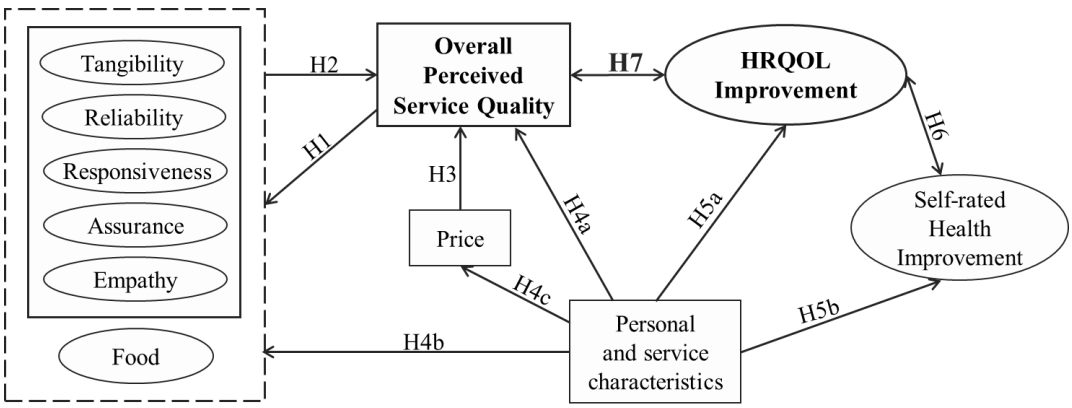


Figure 2 - Investigation hypotheses' model

3.4. Data collection tool

This research will be conducted by using one data collecting method of case study: interview surveys. Yin (2014) states that this method is an interview where it is used a structured questionnaire. Its outputs are quantitative data and evidence of the case study (Yin, 2014). This is the most appropriate method as the sample is mostly elders who may not be able to read or write easily.

The questionnaire to be used (see Appendix 1 and Appendix 2) consists of three sections, the first one consists of the characteristics of the patient, the second consists of the EQ-5D-3L items and EQ-VAS, and the final one consists of the SERVPERF tool with additional dimensions and items. The first section will be used to get information about age, gender, marital status, education, place of residence, previous location, and living home. The second section measures the health-related quality of life of the patients and consists of the descriptive system with 5 dimensions (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression) and the EQ-VAS. The latter section will be used to assess the perceived service quality of the long-term care institution – it comprises the 5 dimensions of SERVPERF (tangibility, reliability, responsiveness, assurance, and empathy), an additional dimension called food and two additional items related to price and the perception of the service quality in general.

The characteristics of the patient will be measured using predefined options. The options for age are the intervals according to INE until 60 years old, and since then the intervals are every 5 until 85 years old (18-24, 25-44, 45-59, 60-64, 65-69, 70-74, 75-79, 80-84, >85). This is due the fact of long-term care patients being generally elderly, so it is important to have narrower intervals to better capture the differences.

According to INE, the options for gender are female or male, and for marital status are single, married, divorced, or widowed. Also, according to INE, the education level is divided into the following options: none, 3rd grade, 4th grade, 6th grade, 9th grade, 12th grade, bachelor's degree, master's degree, and PhD degree. It is included the 3rd grade as, in Portugal, it was the compulsory education between 1930 and 1960 (Alves *et al.*, 2010). For place of residence is distinguished between the options rural and urban as used by Zarei *et al.* (2012).

For the previous facility the choices are, as suggested by Boto *et al.* (2014), home, hospital, nursing home, other unit of long-term care, other typology of long-term care. For who the patient lived with when was at home the options are alone or accompanied.

The EQ-5D-3L measurement scale is of 3 levels (no problems, some problems, and extreme problems). Beyond that, this tool also considers the patient's self-rated health state in a scale from 0 to 100.

All items of SERVPERF and the additional items will be measured using a Likert-like scale from 1 to 7, where 1 is "Totally disagree" and 7 is "Totally agree". Except for the 29th item, that was added to assess the patient's overall perceived service quality, and where 1 is "Very poor" and 7 is "Excellent".

The Pre-Test of all the three parts of the questionnaire was done with 6 people with ages ranging from 60 to 93 years old, of which 4 were female and 2 were male. It was performed with people with that age, because, according to OECD (2017), the Portuguese long-term care receivers are typically elderly. All the three parts of the questionnaire performed well, only being needed to do very few adjustments on the wording.

3.5. Data collection methodology

The questionnaire will be applied in two distinct periods. In the initial moment, it will be applied the sections with characteristics of the patient and the EQ-5D-3L. In the second moment (approximately 30 days after), it will be applied the EQ-5D-3L once more, the SERVPERF and additional dimension and items.

The EQ-5D-3L tool will be applied twice as the goal is to compute the improvement in health caused by the rehabilitation provided in the long-term care institution. This calculation can only be done by subtracting the result of EQ-5D-3L initial from the results of after 30 days.

The sample of this study will consist of patients of both private and public unit and both long-lasting and temporary care typologies. The selection of patients will be done with the help of the social workers for the public unit and the nurses for the private unit, as they are the ones who know each patient's case and history. This selection will consider some criteria: the patients that will be discharged in less than 30 days, the ones who have dementia, and the ones who have other conditions that makes them incapable of

answering. The patients that involve at least one of these criteria will not be included in the sample.

It is also the social workers and nurses that will inform which unit (private or public) and typology (temporary care or long-lasting care) each patient is in.

3.6. Data analysis tools

Once data collection is completed, data analysis will be conducted using various statistical procedures. Firstly, it will be used descriptive statistics (frequency distributions, mean, and standard deviation) to characterize the sample and perform a global analysis of the results of the questionnaire. After, it will be conducted a multiple linear regression, hypotheses testing, and calculated correlation coefficients in order to test the investigation hypotheses previously defined. This data analysis will be conducted through the software SPSS, version 25.

3.6.1. Multiple linear regression

A multiple linear regression consists on analysing if and how the independent variables explain and contribute to the variation of the dependent variable (H1 and H2).

According to Marôco (2014), when conducting a multiple linear regression, the goal is to estimate the coefficient of determination (R^2) and the regression model coefficient (β). The first indicates how the independent variables as a whole explain the variation of the dependent variable, while the latter determines the contribution of each independent variable in the variation of the dependent variables (Marôco, 2014).

The same source explains that each coefficient is associated to a test that demonstrates if the independent variables are statistically significant to explain and contribute to the variation of the dependent variable. The ANOVA test is related to R^2 and evaluates if the adjustment of the model to the data observed is statistically significant, in other words, if at least one of the independent variables explain the variation of the dependent variable (Marôco, 2014). The T-Test is associated to the β and it determines if each independent variable is statistically significant to contribute to the variation of the dependent variable (Marôco, 2014). The author also notes that the result of these two tests is especially important to state if can be done statistical inference or not.

Before doing all this, it is necessary to verify the following assumptions: (1) Errors follow approximately normal distribution with mean equal to zero; (2) Errors are independent; (3) Linearity; (4) Homoscedasticity of the errors; and (5) Multicollinearity (Marôco, 2014).

3.6.2. Hypotheses testing

To understand if an independent variable influences a dependent variable (H4 and H5), it can be tested if the means between groups are equal or not. If equal there is no influence of the independent variable, if different there is a possible influence. According to Laureano (2013), the statistical procedure to do this is hypotheses testing.

The author explain that the purpose of hypotheses testing is to verify if exists statistical evidence that determines the rejection or not of the hypotheses. The same source affirms that the hypotheses are always two – called null (H_0) and alternative (H_1) – which are competitors, mutually exclusive, and collectively exhaustive. The H_0 is the more restrictive and is the one that is intended to be tested, leading to the rejection or not. If the H_0 is rejected, then it is accepted that H_1 is true.

The value that determines if the H_0 is rejected or not is called significance level (α) and in this research will be considered a α of 0,05 as suggested by Laureano (2013) and Marôco (2014). Once the tests are applied, it is calculated the *p-value* (in the SPSS software it is called sig.) that is compared to the α: if *p-value* lower or equal to α then reject H_0; if *p-value* higher than α then not reject H_0 (Laureano, 2013).

According to Laureano (2013) and Marôco (2014), there are two types of tests to do the hypotheses testing: parametric and nonparametric. These two sources explain that the first are applied to quantitative variables and require the verification of assumptions: variables follow a normal distribution and the variances are equal (only required for some tests). They note that if any of these assumptions fails, then a nonparametric test should be applied. The nonparametric tests are also conducted when the variables in study are qualitative, and it is not required the confirmation of any assumption (Laureano, 2013; Marôco, 2014).

The normality assumption is verified by employing the Kolmogorov-Smirnov test when the sample is higher or equal to 50, and Shapiro-Wilk test when the sample is smaller

than 50 (Laureano, 2013; Marôco, 2014). It can also be used the Central Limit Theorem, which assumes that the sample follows a normal distribution, when the sample is equal or bigger than 30 (Marôco, 2014).

The variances equality assumption can be verified with the Levene's test (Marôco, 2014).

The choice of the test to use depends on: the dependent variables being quantitative or qualitative; the assumptions being fulfilled; the number of sample groups; and the samples being independent or related (Laureano, 2013; Marôco, 2014).

3.6.3. Measures of association

In order to measure the association between two quantitative variables (hypotheses H6 and H7), it is used correlation coefficients which assesses the intensity and direction of the association. As stated by Marôco (2014), when the correlation is between two variables, it is called bivariate. The author explains that correlation coefficients can be linear or non-linear and parametric or non-parametric respectively. He notes that the Pearson correlation coefficient measures the linear association between quantitative variables, so to apply this coefficient the relation between the variables must be linear, and being a parametric measure, the variables must follow normal distribution. When these are not verified, it should be used the non-linear and nonparametric measure – the Spearman correlation coefficient (Marôco, 2014).

According to Marôco (2014), both these coefficients can vary between -1 and 1, and as closer the coefficient is to -1 and 1 the stronger the relation is. The author also explains that when the coefficient is higher than 0, the variables have the same behaviour and vary in the same direction. In contrast, when the coefficient is lower than 0, the variables have opposite behaviour and vary in opposite direction.

The hypotheses to test with significance level are: H_0 – There is no statistically significant association between variables; H_1 - There is a statistically significant association between variables. When the significance level is higher than 0,05, the null hypothesis is rejected.

3.7. Sequence of steps

In Figure 3, it is summarized the sequences of steps necessary to achieve the objectives defined in the first chapter.

The first step of this case study research consists of gathering the data needed to create the questionnaire to be applied (based on EQ-5D-3L, SERVPERF and additional dimension and items) and to pre-test it to know if it can be understood and applied well. In this step if necessary, and as consequence of the pre-test, adjustments to the questionnaire can be introduced.

The second step of this case study research is to collect data in the field through the questionnaire developed in the first step: the section with characteristics of patients, EQ-5D-3L, SERVPERF and additional dimension and items.

The third step is to analyse the data that was collected in order to test the investigation hypotheses and understand the sample and their perception of the service quality and their health-related quality of life.

The final step is to discuss the results obtained by comparing them with previous studies, develop managerial recommendations on what can be improved and, finally, reach conclusions.

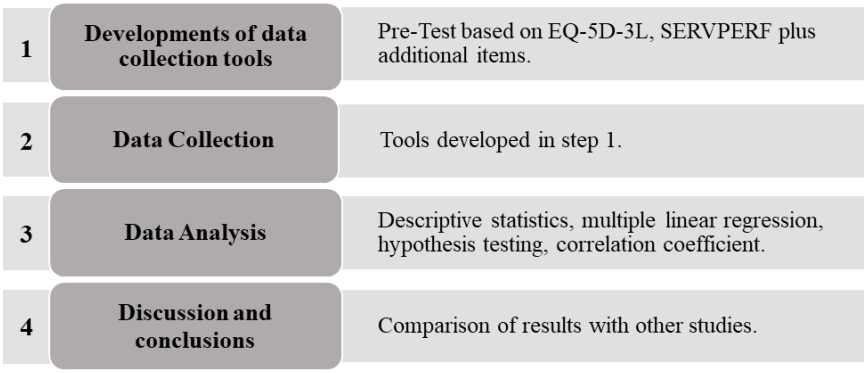


Figure 3 - Sequence of steps

3.8. Conclusion

In this chapter it was presented the methodology that has to be followed in order to test the investigation hypotheses and, consequently, achieve the goals and answer the research question. In Table 2 it is presented a summary that includes each specific goal of this study and the correspondent investigation hypotheses and data analysis tools.

Research question	Specific objectives	Data analysis
Is there any association between the health-related quality of life and the perceived service quality?	Measure the patients' perception of overall quality and by quality dimension of the service provided in long-term care.	Descriptive statistics; Multiple linear regression for H1 and H2; Hypothesis testing for H3.
	Examine the influence of patients' personal characteristics and the long-term care service characteristics in the perception of the overall service quality and in each dimension.	Hypotheses testing for H4a, H4b and H4c.
	Measure the patients' health-related quality of life.	Descriptive statistics; Correlation coefficient for H6.
	Examine the influence of patients' personal characteristics and the long-term care service characteristics in the health-related quality of life.	Hypotheses testing for H5a and H5b.
	Analyse the association between the patients' perceptions of overall service quality and the health-related quality of life in long-term care.	Correlation coefficient for H7.
	Develop managerial recommendations to improve the service delivery in long-term care.	Qualitative analysis.

Table 2 - Summary of goals, research question and data analysis methods

4. Case Study

4.1. Introduction

This chapter is about the case study and respective analysis. It starts with the description of the long-term care institution in study and after it is characterized the sample of the research. The analysis starts with a more global view, after it is examined the reliability of the measures and only then it is done the more detailed analysis where the investigation hypotheses previously identified are tested. Lastly, it is conducted the discussion of results, it is presented managerial recommendations, and reached conclusions.

4.2. Long-term care institution's description

The long-term care institution in study is a Private Institution of Social Solidarity (IPSS – *Instituição Particular de Solidariedade Social*), which provides both social and healthcare services to people, which regardless of age, is dependent at some level. The main goals are to provide comfort to the patients, and simultaneously promote their recovery, autonomy, and improvement of quality of life.

This institution provides support to a Hospital that is located in the same area. The residents are people who live in the surrounding areas, being mostly elders.

The institution is composed by six services, of which only the two inpatient units are relevant for this study: the private and public long-term care units. Both of them are divided in two distinct typologies, one is related to temporary services, while the other is related to permanent and long-lasting services. The total number of beds in the institution is 120.

Both private and public units provide daily care assistance to ensure the patient's social reinsertion, health improvement, and both physical and psychological recovery. It includes services, such as: food, hygiene, healthcare, physiotherapy, occupational therapy, and animation during free time.

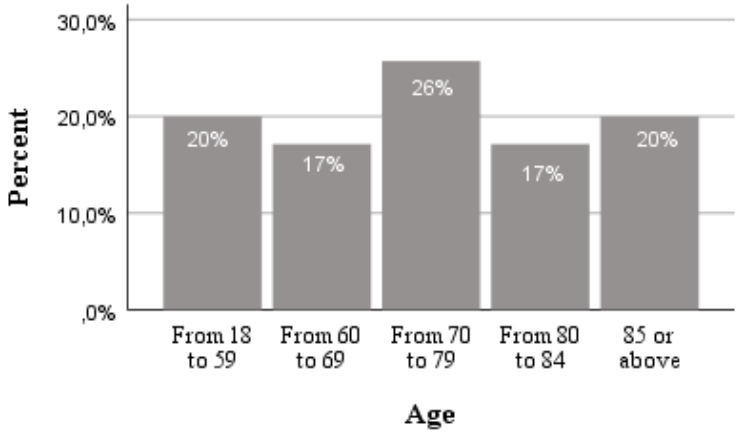
The public long-term care unit belongs to the RNCCI, so the typologies are called medium-term care and rehabilitation, and long-term care and maintenance. According to Decree-law nº101 (Ministry of Health, 2006), in the first typology the length of stay is up to 90 days, while in the latter it is longer than 90 days. Both typologies are composed by 30 beds, which make a total of 60 bed for the public unit.

In the private long-term care unit, the typologies are distinguished by floor. The 2nd floor is related to more temporary stays, and the 3rd floor is related to more long-lasting stays. Each floor has 30 beds, also making a total of 60 beds in the private unit. Unlike the public unit, the length of stay is not predefined and can vary according to each patient needs.

4.3. Sample characterization

The sample of this research consists of 35 residents of the long-term care institution in study. The questionnaires were administered through interviews conducted by the author of this study, except for two respondents who could not talk and therefore answered themselves. This sample can be characterized by seven personal characteristics, which are independent variables. Both absolute and relative frequencies of each of the seven independent variables are presented in Appendix 3.

Starting with the independent variable Age, all the respondents of the questionnaire are aged above 45 years old. The groups 45-59, and 85 or above are the ones more represented in the sample (20% each). Most of the sample is aged above 65 years old, with a summed percentage of 74%, which shows that the residents of the long-term care institution in study are mostly elders. In order to allow conducting the analysis, this variable was recoded into a new one, where the groups with no responses or less than 3 answers were combined with other groups. Thus, the new groups are 18-59, 60-69, 70-79, 80-84, and 85 or above. With this alteration the percentages of each new group are more equally distributed (see Graph 1), with the lowest percentages being 17% (60-69 and 80-84) and the highest being 26% (70-79). From now on, this will be the groups used in the analysis.



Graph 1- Relative frequencies of the recoded variable Age

The sample is evenly distributed regarding the variable Gender, with 49% females and 51% males. Concerning the Education Level variable, the level with the highest percentage is the 4th grade (31%), followed by 9th grade (17%) and no education and 3rd grade (14% each). To allow running the tests, the options that have none or only 2 answers (6th grade, bachelor's degree, master's degree, and PhD) are regrouped. The new groups are: none, 3rd class, 4th class, 6th/9th class, 12th class, and superior education.

For the Marital Status, almost half of the patients are widowed (46%), 26% are single, 14% are married, and 14% divorced. As for Place of Residence, the big majority of the sample lives in the urban area (86%).

Regarding the Previous Location of the respondents, the option with the biggest percentage is home (46%) with hospital coming right after (37%). In this variable both nursing home and other typology of long-term care did not have any response, so they are removed from analysis, being the final groups: home, hospital, and other long-term care institution.

Finally, when the patient was living at home, most of them lived alone (57%) but not with a great difference from the ones living accompanied (43%).

Similarly, the sample can be characterized by two service characteristics, which also are independent variables. Both absolute and relative frequencies of each these variables are presented in Table 3.

		Absolut Frequency	Relative Frequency
Unit	Private	14	40%
	Public	21	60%
Typology	Temporary care	17	49%
	Long-lasting care	18	51%

Table 3 – Frequency distribution of service characteristics

About the Units of the long-term care institution, 60% of the sample collected are residents of the public unit, while the remaining 40% are residents of the private unit. For the service Typology, the sample is relatively balanced with 49% being in temporary care and 51% being in long-lasting care.

4.4. Reliability of the measures

Before starting the analysis of the perception of service quality and quality of life, it is important to evaluate the reliability of the measures used. For this, the most used indicator is Cronbach's alpha, which assesses the extent to which all the dimensions that compose a measure (or all items that compose a dimension) measure the same aspect – internal consistency (Pallant, 2016). The Cronbach's alpha varies from 0 to 1, and higher values mean that the measure has better reliability (Marôco and Garcia-Marques 2006; Pallant, 2016). Nunnally (1978) states that an alpha equal or superior to 0,7 represents a reliable instrument.

Starting with the perception of service quality, the Cronbach's alpha of the global measure (with both the 5 dimensions of SERVPERF and the Food dimension) is 0,933, which is a very high value that indicates that the instrument is very reliable. By analysing the Cronbach's alpha if each dimension was deleted (see Table 4), it is possible to understand that the Cronbach's alpha would decrease regarding all dimensions of SERVPERF and would increase a little if the Food dimension was removed. However, the difference with and without the Food dimension is not relevant.

	Cronbach's Alpha if Item Deleted
Tangibility	0,921
Reliability	0,917
Responsiveness	0,909
Assurance	0,906
Empathy	0,913
Food	0,954
Cronbach's Alpha	**0,933**

Table 4 - Cronbach's alpha for the global measure of perceived service quality

In Table 5 is presented the Cronbach's alpha of each dimension, which all have a value higher than 0,8, so they all present very good internal consistency. All of the dimensions, except the Food, have an item that if deleted would increase the Cronbach's alpha of the dimension. However, this increase is not substantial.

Dimension	Cronbach's Alpha	Item	Cronbach's Alpha if Item Deleted
Tangibility	0,848	I1.	0,769
		I2.	0,861
		I3.	0,831
		I4.	0,744
Reliability	0,898	I5.	0,850
		I6.	0,881
		I7.	0,876
		I8.	0,840
		I9.	0,913
Responsiveness	0,842	I10.	0,892
		I11.	0,737
		I12.	0,792
		I13.	0,720
Assurance	0,918	I14.	0,888
		I15.	0,850
		I16.	0,897
		I17.	0,931
Empathy	0,949	I18.	0,929
		I19.	0,955
		I20.	0,929
		I21.	0,942
		I22.	0,926
Food	0,872	I23.	0,822
		I24.	0,869
		I25.	0,839
		I26.	0,838
		I27.	0,856

Table 5 - Cronbach's alpha for each dimension of perceived service quality

Passing to the perception of HRQoL, the Cronbach's alpha is calculated considering the 5 dimensions of EQ-5D for the two measurements (initial and 30 days after), as presented in Table 6. For both assessments the alpha is superior than 0,7 so the instrument is reliable. The 30 days after measurement presents a slightly higher alpha.

	INITIAL	30 DAYS AFTER
	Cronbach's Alpha if Item Deleted	Cronbach's Alpha if Item Deleted
Mobility	0,704	0,763
Self-care	0,719	0,759
Usual activities	0,759	0,759
Pain/Discomfort	0,795	0,804
Anxiety/Depression	0,815	0,831
Cronbach's Alpha	**0,800**	**0,821**

Table 6 - Cronbach's alpha for the measure of HRQoL

In conclusion, the global measure of perceived service quality, each of its dimensions, and the measure of HRQoL have all high Cronbach's alpha, demonstrating that they are reliable and have internal consistency.

4.5. Global analysis

In this subchapter, the perceived service quality dimensions and respective items are going to be analysed, as well as the additional variables concerning Price and Overall Perceived Quality. Following this, the health-related quality of life will also be analysed in terms of items, self-rated health, and improvements of each.

4.5.1. Global analysis of perceived service quality

To analyse the perceived service quality, it is calculated the relative frequencies, mean, and standard deviation (SD) of each item (see Appendix 5). Additionally, it is calculated the mean and standard deviation of the dimensions, as shown in Table 7.

	Mean	Standard Deviation
Tangibility	6,057	0,928
Reliability	5,634	1,131
Responsiveness	5,664	1,091
Assurance	6,121	1,021
Empathy	5,834	1,166
Food	5,189	1,274

Table 7 – Descriptive statistics of perceived service quality by dimension

Regarding the 5 dimensions of the SERVPERF tool, the dimension that has the highest perceived service quality is Assurance (mean = 6,121), while Reliability (mean = 5,634) is the one with the lowest perceived service quality. Empathy is the dimension that presents less consensus as its standard variation is the highest (SD = 1,166). In contrast, the dimension Tangibility is the one with the less variation in responses (SD = 0,928).

When considering the additional dimension Food, it is possible to understand that it has the lowest perceived service quality of them all (mean = 5,189). It also is the dimension that presents less agreement within responses with a standard deviation of 1,274.

Regarding all the items, only one has a perceived service quality under the average value of the 7-points Likert scale, which is the item I24 (“In this long-term care institution, the food served is always tasty.”) with mean of 3,91. It is followed by the item I23 (“In this long-term care institution, the meals are served at proper temperature”) with mean of 4,77, which, in contrast, is above the average value. Both items are part of the Food dimension

and present the highest variation in responses with standard deviation values of 1,716 and 1,652 for the items I23 and I24 respectively.

The rest of the dimensions have the mean with values between 5 and 6, being the item with the highest perceived service quality the I3 ("The employees are well dressed and appear neat") with mean of 6,34. Yet, it is important to state that the difference between the perceived service quality of this item and other items is minimal. This item also presents one of the lowest standard deviation (SD = 0.906) when compared with the rest of the items. The two items which present more consensus within responses are I9 ("This long-term care institution keeps its records accurately") and I10 ("The employees tell exactly when the services will be performed") with a standard deviation of 0,860 and 0,893 respectively.

The question about the Price (I28 – "In this institution, the price is adequate to the service that is provided") was answered only by 3 respondents out of 35, so its analysis has no meaning. Most of the respondents explained that they do not have information about it as it is paid by relatives, insurance, etc.

Concerning the overall service quality (I29), the mean is 5,46, which is above the average value of the 7-points Likert scale. The standard deviation is 1,039, which shows some variation in the responses. The most frequent answer of the 7-points Likert scale is 6 with 48,6%. These results show that, overall, patients are very pleased with the quality of the service they receive.

With this analysis it is also possible to understand that not all items and dimensions have the same perceived service quality by the residents of the long-term care institution in study.

4.5.2. Global analysis of health-related quality of life

To analyse the HRQoL, it is computed the relative frequencies, mean and standard deviation of each of the 5 dimensions of EQ-5D-3L and the EQ-VAS of the initial moment and after 30 days (see Table 8 and Appendix 6). The relative frequencies statistics are also computed for the HRQoL and Self-Rated Health Improvements and are shown in Appendix 6.

Concerning each of the 5 dimensions of EQ-5D-3L of both moments (initial and after 30 days), the dimension with the worst HRQoL is Mobility with mean scores of 2,37 and 2,43 as more than half of the respondents chose the level 3 ("I am confined to bed"). The rest of the dimensions have means around the value 2 as it is the level that was the most frequently chosen. All of the dimensions present a standard deviation lower than 0,800 which demonstrates that the health state of the residents of the long-term care institution in study does not vary a lot between them.

	INITIAL		**30 DAYS AFTER**	
	Mean	Standard Deviation	Mean	Standard Deviation
Mobility	2,37	0,770	2,43	0,739
Self-care	2,03	0,785	2,06	0,765
Usual activities	1,94	0,639	1,97	0,618
Pain/Discomfort	2,03	0,747	2,06	0,684
Anxiety/Depression	2,00	0,686	2,00	0,642
VAS	49,71	23,293	54,71	22,061

Table 8 - Descriptive statistics of EQ-5D dimensions

The EQ-VAS scores have a high standard deviation of 23,293 and 22,061 for the initial and 30 days after moments respectively. So, the responses are very dispersed as the scale includes values from 0 to 100. For both measurements the mean scores are around 50, being the mean from the second moment (30 days after) a little higher.

Regarding the HRQoL Improvement, which considers the 5 dimensions of EQ-5D, 18% of the respondents underwent a decline in their health state, while 63% stayed the same, and only 21% experienced an improvement in their health state. As for the Self-Rated Health Improvement, which considers the EQ-VAS scores, 31% of the respondents had a deterioration of their health, 3% maintained their health state, and the remain 66% improved their health state.

Thereby, it is possible to understand that some dimensions of EQ-5D have worst scores than others and that the improvement is very different regarding the descriptive system and the EQ-VAS.

4.6. Analysis

4.6.1. Explanatory power of the 5 dimensions of SERVPERF and the Food dimension in the overall perceived service quality

To understand the explanatory power of the dimensions of SERVPERF and the Food dimension in the overall perceived service quality, it is used multiple linear regression (more specifically R^2). The multiple linear regression will be conducted twice as the goal is to understand if the addition of the Food dimension leads to a better explanatory power of the dimensions in the overall perceived service quality. It will be conducted once with the six dimensions (5 dimensions of SERVPERF and Food dimension) and a second time with just the 5 dimensions of SERVPERF.

The variable used as dependent in these analyses is Overall Perceived Quality, while the independent variables are: Tangibility, Reliability, Responsiveness, Assurance, Empathy, and Food.

Before performing this type of analysis, it is needed to verify some assumptions: (1) Errors follow approximately normal distribution with mean equal to zero; (2) Errors are independent; (3) Linearity; (4) Homoscedasticity of the errors; and (5) Multicollinearity. The assumptions for both multiple linear regressions models will be analysed simultaneously. The outputs regarding the assumptions are shown in Appendix 7.

To start, the first assumption can be verified through the Graphs A7.1, A7.2, A7.3 and A7.4. In the first two Graphs (histograms), it is possible to understand that the errors do follow approximately the normal distribution, as well as in the last two graphs since the errors values are distributed across the diagonal represented. Also, the mean of the errors is null as can be seen through the residual statistics – Table A7.1.

To verify if the errors are independent it is used the Durbin-Watson test, which, according to Marôco (2014), tests the autocorrelation between errors. The value of the test varies from 0 to 4 and when it is approximate to 2 it is possible to state that do not exist autocorrelation between errors (Marôco, 2014). For both models, the errors are independent as the value of the Durbin-Watson test is 2,106 and 2,143 (see Table A7.2), which are really close to 2. Thus, it is possible to conclude that the errors are not autocorrelated and the second assumption is confirmed.

Both linearity and homoscedasticity of the errors assumptions are verified through Graphs A7.5 and A7.6. It can be considered that the values are randomly dispersed through the line if having in consideration that the values of the independent variables are means of 7-point Likert scale items. Although they are continuous variables the values vary around those numbers (1 to 7). However, the values are more concentrated on the right side of the graph. Therefore, it can be considered that the linearity assumption is somewhat fulfilled, while the homoscedasticity of the errors is not.

Finally, in the Tables A7.3. and A7.4. are presented the collinearity diagnostics where the values should be lower than 0,75 to not exist collinearity. It is possible to identify only one value (0,85 and 0,87) higher than 0,75 in each model, so it is not meaningful and will be considered that there is not multicollinearity, being the last assumption confirmed for both models.

Another aspect to take in consideration is the existence of outliers or not. As can be seen in the Graphs A7.5 and A7.6, there is two possible outliers in the left side. However, when conducted the Casewise Diagnostics to identify outliers (standardized errors which are superior to 3), does not appear any case for any model. Therefore, is considered that the models are not influenced by outliers.

The violation of one assumption (homogeneity of the errors variances) allows to still perform the multiple linear regressions, but not to do statistical inference from the results of this analysis. That is, the results gotten cannot be generalized from this sample to the population.

Now that the assumptions are verified, it is possible to analyse the explanatory power of the dimensions in study. To start, it is possible to state that these regression models are statistically significant to explain the relation between the dimensions and the Overall Perceived Quality (ANOVA test with sig < 0,05 – see Table A7.5.). In other words, the dimensions have a significant effect on the Overall Perceived Quality variation. Accordingly, the 6 dimensions in study explain 74,1% of the variation of the Overall Perceived Quality as the coefficient of determination (R^2) is 0,741 (see Table 9). While the 5 dimensions of SERVPERF explain 72,3% (R^2 = 0,723) of the variance of the perceived service quality.

	R	R Square	Adjusted R Square	Std. Error of the Estimate
6 dimensions	0,861	0,741	0,685	0,583
5 dimensions	0,850	0,723	0,675	0,592

Table 9 - Coefficients of determination of the multiple linear regressions

According to Marôco (2014), the coefficient of determination increases as independent variables are added without taking into consideration if it has low or none influence in the dependent variable. A statistic that has that in consideration is the adjusted coefficient of determination (R^2_a). Considering the R^2_a of both models, the 6 dimensions explain 68,5% of the variation of the Overall Perceived Quality ($R^2_a = 0,685$ – see Table 9), while the 5 dimensions explain 67,5%. The difference between the R^2 and R^2_a of both models is not big, and the dimensions still explain a great proportion of the variation of the Overall Perceived Quality.

Thus, it is possible to conclude that the service quality dimensions considered by Parasuraman *et al.* (1988) and the Food dimension have better explanatory power of the overall perceived service quality than just the dimensions considered by Parasuraman *et al.* (1988). So, the investigation hypothesis H1 is not rejected. However, it is important to consider that the difference is not large, especially for R^2_a, which takes in consideration if the added variable (Food in this case) has influence or not in the Overall Perceived Quality.

4.6.2. Contribution of the 5 dimensions of SERVPERF and the Food dimension in the overall perceived service quality

To determine the contribution of each of the 5 dimensions of SERVERF and the Food dimension in the overall perceived service quality, it is conducted a multiple linear regression. For this analysis, the dependent variable is Overall Perceived Quality and the independent variables are: Tangibility, Reliability, Responsiveness, Assurance, Empathy, and Food.

Considering that this multiple linear regression was conducted in the previous section, it is going to be analysed just the relevant outcomes for this analysis.

In order to ascertain the contribution of each dimension in study, it is appropriate to analyse the regression coefficients. According to the results presented in Table 10, none of the 6 dimensions' coefficient is significant as all sig > 0,05. This indicates that these parameters are not valid for statistical inference, however, the coefficients can still be analysed for this research purpose.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0,073	0,689		-0,106	0,917
Tangibility	0,352	0,226	0,314	1,553	0,132
Reliability	0,256	0,214	0,278	1,197	0,241
Responsiveness	0,308	0,249	0,324	1,237	0,226
Assurance	0,208	0,320	0,205	0,651	0,520
Empathy	-0,310	0,228	-0,348	-1,361	0,184
Food	0,144	0,104	0,177	1,385	0,177

Table 10 - Coefficients of 6 dimensions multiple linear regression

As the goal of this analysis is to compare each variable coefficient, the most appropriate coefficient to use is the standardized β. With this said, the model is represented as:

Overall Perceived Quality = –0,073 + 0,314 Tangibility + 0,278 Reliability + 0,324 Responsiveness + 0,205 Assurance – 0,348 Empathy + 0,177 Food

The dimension that has the less contribution is Food (β = 0,177), while the one that contributes the most is Empathy (β = – 0,348). However, the Empathy coefficient is a little odd as it means that the greater the Empathy dimension is, the worse the Overall Perceived Quality dimension is.

This analysis allows to reject the investigation hypothesis H2 as the service quality dimensions considered by Parasuraman *et al.* (1988) and the Food dimension do not contribute in the same way to the Overall Perceived Quality. All the dimensions in this study have different contributions to the Overall Perceived Quality. Next, they are ordered from higher to lower contribution: Empathy, Responsiveness, Tangibility, Reliability, Assurance, and Food.

4.6.3. Influence of the price in the overall perceived service quality

As mentioned previously, only 3 out of 35 respondents answered the question regarding the Price, so it is not possible to analyse its influence in the overall perceived service quality. Thus, the hypothesis H3 cannot be tested.

4.6.4. Influence of both personal and service characteristics

In this chapter, it is going to be analysed the influence of the personal and service characteristics in: (1) the Overall Perceived Quality; (2) the 5 dimensions of SERVPERF; (3) the Food dimension; (4) the additional item Price; (5) HRQoL Improvement; and (6) Self-Rated Health Improvement. Once again, since the Price variable only got 3 answers, it is not relevant (investigation hypothesis H4c cannot be tested).

The analysis that will be used is hypotheses testing, which can include parametric and nonparametric tests.

The personal characteristics and service characteristics are independent variables. The goal is to understand if these variables impact the dependent ones. The dependent variables that will be used for the analysis are: Overall Perceived Quality, Tangibility, Reliability, Responsiveness, Assurance, Empathy, Food, HRQoL Improvement, and Self-Rated Health Improvement.

Each independent variable is going to be analysed separately and depending on the number of groups it is composed by, the test may differ.

Considering that the dependent variables are quantitative, the tests to apply are parametric. Before doing these tests, it is necessary to verify two assumptions: the dependent variable follows a normal distribution in every group of the independent variables; and the homogeneity of variances of the groups. If any of the assumptions is not verified, then a nonparametric test is applied. Since the sample is 35 and it is divided into at least 2 groups in every analysis, the groups are always less than 50, so the test to use to assess the normality assumption is Shapiro-Wilk.

In the Figure 4 is represented the paths that should be followed to conduct these analyses considering that the number of the groups of the independent variables are always 2 or more and that the groups are independent.

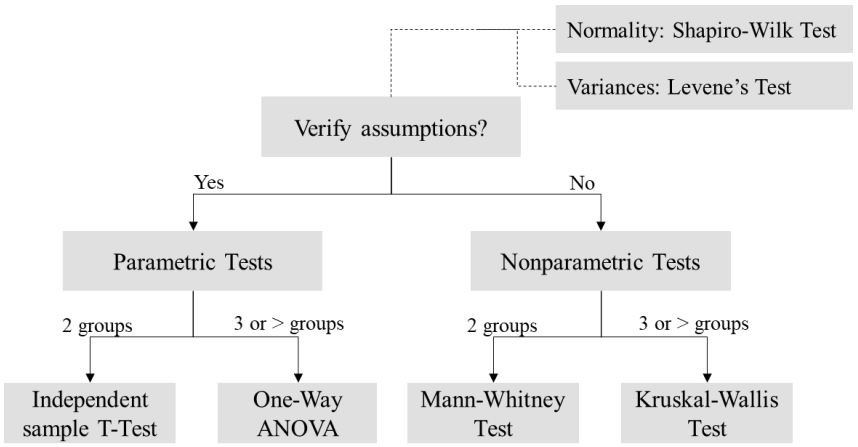


Figure 4 - Representation of hypotheses testing possibilities (Source: Marôco, 2014)

After conducting the Shapiro-Wilk normality test to every dependent variable in all independent variables groups (see Appendix 8), it is verified which do and which do not follow a normal distribution. If at least one sig in every group is lower than 0,05, then the null hypothesis is rejected, and they do not follow a normal distribution. If all the sig of every group is higher than 0,05, then the null hypothesis is not rejected, and they follow a normal distribution.

For the cases that verify the normality test, the assumption of homogeneity of variances must also be verified, which is conducted through the Levene's Test (see Appendix 9). It is verified the equality of variances when the sig of the Levene's Test is higher than 0,05.

		Parametric Test	**Nonparametric Test**
Personal characteristics	Age	One-Way ANOVA	Kruskal-Wallis Test
	Gender	Independent-sample T Test	Mann-Whitney Test
	Education level	One-Way ANOVA	Kruskal-Wallis Test
	Marital Status	One-Way ANOVA	Kruskal-Wallis Test
	Place of residence	Independent-sample T Test	Mann-Whitney Test
	Previous location	One-Way ANOVA	Kruskal-Wallis Test
	Living home	Independent-sample T Test	Mann-Whitney Test
Service characteristics	Unit	Independent-sample T Test	Mann-Whitney Test
	Typology	Independent-sample T Test	Mann-Whitney Test

Table 11 - Summary of the independent variables and respective parametric and nonparametric tests to be conducted

The dependent variables that verify both assumptions in each group of an independent variables are represented in black in Table 12. For these, it is going to be applied the appropriate parametric test (see Table 11).

The variables that do not verify at least one of the assumptions are represented in white in Table 12, and for them is going to be conducted the adequate nonparametric test (see Table 11).

Dependent variables / Independent variables	Overall Perceived Quality	Tangibility	Reliability	Responsiveness	Assurance	Empathy	Food	HRQoL Improvement	Self-Rated Health Improvement
Age	0,380	0,203	0,373	0,589	0,408	0,414	0,614	0,686	0,766
Gender	0,915	0,483	0,551	0,584	0,919	0,803	**0,048**	0,805	1,000
Education level	0,749	**0,046**	0,479	0,162	0,633	0,672	0,373	0,441	0,493
Marital Status	0,397	0,502	0,297	0,924	0,364	0,204	0,387	0,823	0,091
Place of residence	**0,039**	0,133	0,163	0,368	0,115	0,253	0,925	0,384	**0,004**
Previous location	0,824	0,258	0,469	0,647	0,614	0,868	0,274	**0,001**	0,689
Living home	0,176	0,787	0,056	0,339	0,093	0,163	0,366	0,644	0,344
Unit	0,466	0,746	0,417	0,722	0,959	0,878	0,800	0,193	0,168
Typology	0,630	0,828	0,716	0,327	0,541	0,790	**0,018**	0,542	0,790

Table 12 - Summary of the *p-values* from the parametric (in black) and nonparametric (in white) tests conducted to the dependent variables for each independent variable

In Table 12, it is presented the sig of the correspondent parametric and nonparametric tests applied. For the majority of the cases, the sig is higher than 0,05, so the null hypothesis is not rejected, which indicates that there is not a statistical significant difference between the groups, they are equal. Thus, it is possible to conclude that in these cases the independent variable does not influence the dependent variable.

Nevertheless, there are six cases where the null hypothesis is rejected (sig < 0,05), which indicates that there is a statistical significant difference between the groups and therefore the independent variable does impact the dependent one. The six cases are:

- Gender influences the service quality perception of the Food dimension;
- Education Level influences the service quality perception of the Tangibility dimension of SEVPERF;
- Place of Residence influences the Overall Perceived Quality;
- Place of Residence influences the Self-Rated Health Improvement;
- Previous Location influences the HRQoL Improvement;
- Typology of service influences the service quality perception of the Food dimension.

The cases in which the independent variable only has two groups, it is possible to understand how the independent variable influences the dependent one by analysing the median and interquartile range. However, the cases in which there are more than two groups, it is necessary to understand between which groups there is a statistically significant difference. For that, according to Marôco (2014), it is conducted a multiple comparison analysis testing. The two cases to analyse are: Education Level impact in Tangibility, and Previous Location impact in HRQOL Improvement.

For both cases, the test previously conducted was Kruskal-Wallis, so, according to Marôco (2014), the multiple comparison analysis to conduct in these cases is the LSD method of Fischer. The results of this test are shown in Table 13.

	Pairwise Comparison	**Sig.**
Tangibility	None - 3rd class	0,454
	None - 4th class	0,275
	None - 6th/9th class	0,073
	None - 12th class	0,290
	None - Superior education	0,098
	3rd class - 4th class	0,826
	3rd class - 6th/9th class	0,294
	3rd class - 12th class	0,720
	3rd class - Superior education	0,022
	4th class - 6th/9th class	0,307
	4th class - 12th class	0,835
	4th class - Superior education	0,006
	6th/9th class - 12th class	0,536
	6th/9th class - Superior education	0,001
	12th class - Superior education	0,013
HRQoL Improvement	Home - Hospital	0,000
	Home - Other long-term care institution	0,680
	Hospital - Other long-term care institution	0,001

Table 13 - Multiple comparison analysis of the LSD method of Fischer

By analysing the multiple comparison analysis results (Table 13), it is possible to note that regarding the Education Level impact in Tangibility, the statistically significant differences occur between Superior Education and 3rd class, 4th class, 6th/9th class, and 12th class (sig < 0,05). Table 14 results suggest that the respondents of the sample with Superior Education have a lower service quality perception of the Tangibility dimension. Also, the interquartile range is a lot higher for Superior Education.

Regarding the Previous Location impact in HRQoL Improvement, there is statistically significant difference between the group Hospital and the other two groups (Home and Other Long-term Care Institution) – sig is lower than 0,05 (see Table 14). The medians of HRQoL Improvement show that the participants coming from the Hospital have a slightly better improvement than the ones coming from Home or Other Long-term Care Institution.

		Median	Interquartile Range
Food	Female	5,60	0,70
	Male	5,10	1,85
Tangibility	None	6,00	0,88
	3rd class	6,00	0,63
	4th class	6,50	1,00
	6th/9th class	6,50	0,81
	12th class	6,50	2,00
	Superior education	4,75	2,81
Overall Perceived Quality	Rural	5,00	2,00
	Urban	6,00	1,00
Self-Rated Health Improvement	Rural	20,00	13,00
	Urban	5,00	20,00
HRQoL Improvement	Home	0,00	0,03
	Hospital	0,01	0,05
	Other long-term care institution	0,00	0,20
Food	Temporary care	5,20	1,30
	Long-lasting care	5,80	0,75

Table 14 - Median and interquartile range of groups per dependent variable

The medians presented for the Food dimension suggests that the perception of its service quality is higher for female than male as the median is higher, and it also shows more consensus for female since the interquartile range is lower. It is similar for the Typology care – the perception of service quality of the Food dimension is higher in long-lasting care than temporary care and it also presents a lower interquartile range.

The respondents who live in a rural area have a lower perception of the Overall Perceived Quality when compared to the respondents living in an urban area. In contrast, the respondents living in a rural area experience a significant improvement in the Self-Rated Health Improvement (median = 20), while the ones living in the urban area experience a much smaller improvement (median = 5,00).

With all this explained, it is possible to conclude that all the investigation hypothesis regarding the influence of the personal characteristics or the service characteristics (H4a, H4b, H5a and H5b) are rejected as the evidence shows that only very few have influence.

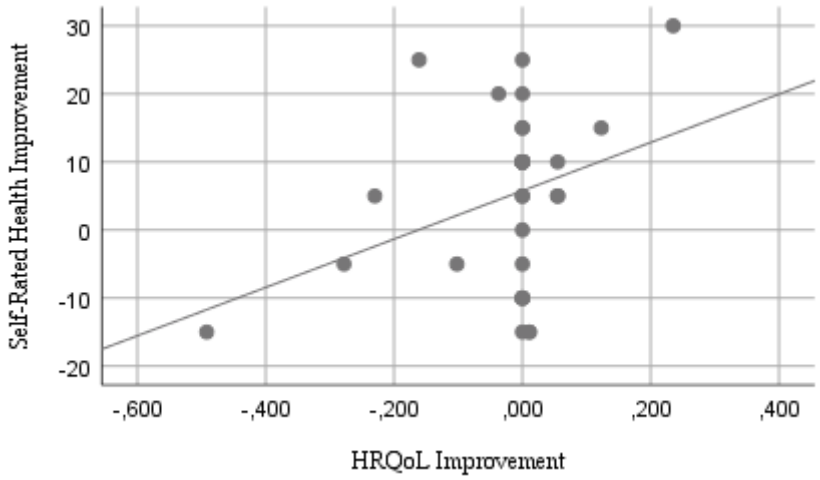
4.6.5. Association between HRQoL Improvement and Self-Rated Health Improvement

To analyse the association between HRQoL Improvement and Self-Rated Health Improvement, it is verified if the two variables follow a normal distribution and if their relation is linear. The sample is 35 which is above 30, so it agrees with the central limit theorem, however considering that the sample is very close to 30, the Shapiro-Wilk normality test will be conducted anyway.

As shown in Table 15, none of the variables follow a normal distribution as the sig is lower or equal to 0,05, so the null hypothesis is rejected. Similarly, the relation of the variables is not linear as can be seen in Graph 2.

	Kolmogorov-Smirnov			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
HRQoL Improvement	0,401	35	0,000	0,664	35	0,000
Self-Rated Health Improvement	0,171	35	0,011	0,938	35	0,050

Table 15 - Normality test of the variables HRQoL Improvement and Self-Rated Health Improvement



Graph 2 - Relation between the variables Self-Rated Health Improvement and HRQoL Improvement

Thus, the Pearson correlation coefficient cannot be used, and the Spearman correlation coefficient will be used instead. The correlation coefficient is 0,082 (see Table 16), which represents a weak relation between the two variables since it is distant from 1. It also is positive, so the variables have the same behaviour, when one increases or decreases, the other does the same. The sig is 0,638, which is high than 0,05 so the null hypothesis is not rejected – there is no statistically significant association between the two variables.

With this said, it is possible to conclude that the investigation hypothesis H6 is rejected, as there is evidence that the variables HRQoL Improvement and Self-Rated Health Improvement are not statistically significantly associated.

			HRQoL Improvement	**Self-Rated Health Improvement**
Spearman's rho	HRQoL Improvement	Correlation Coefficient	1,000	0,082
		Sig. (2-tailed)	.	0,638
		N	35	35
	Self-Rated Health Improvement	Correlation Coefficient	0,082	1,000
		Sig. (2-tailed)	0,638	.
		N	35	35

Table 16 - Spearman's correlation coefficient for HRQoL Improvement and Self-Rated Health Improvement

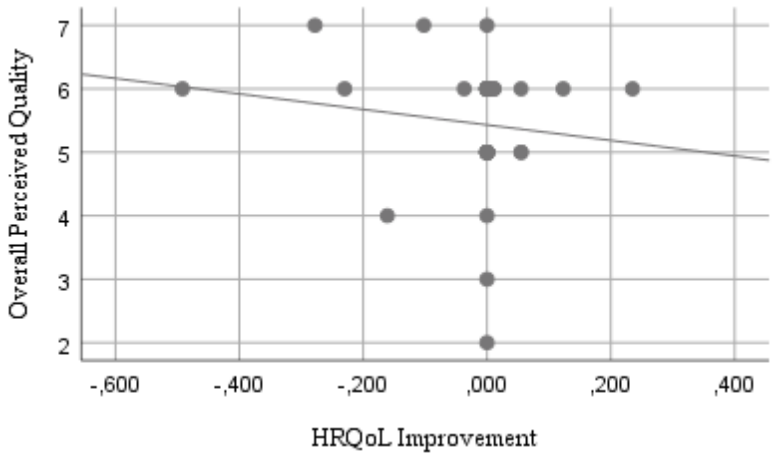
4.6.6. Association between overall perceived service quality and HRQoL Improvement

As in the previous section, it is constructed the graph to test if the variables relationship is linear and it is conducted the normality test (Shapiro-Wilk).

In Table 17, it is possible to verify that the sig is lower than 0,05 so the null hypothesis is rejected and both variables do not follow a normal distribution. As seen in Graph 3, the relationship between the two variables is not linear.

	Kolmogorov-Smirnov			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Overall Perceived Quality	0,271	35	0,000	0,821	35	0,000
HRQoL Improvement	0,401	35	0,000	0,664	35	0,000

Table 17 - Normality test of the variables Overall Perceived Quality and HRQoL Improvement



Graph 3 - Relation between the variables Overall Perceived Quality and HRQoL Improvement

With this said, the Pearson correlation coefficient cannot be applied and therefore the Spearman correlation coefficient will be applied.

The output of the Spearman's correlation coefficient analysis is shown in Table 18. The correlation coefficient is -0,111, so it represents a weak association between the two variables since it is distant from 1. Additionally, the correlation coefficient is negative, so the variables have the opposite behaviour, when one increases or decreases, the other does the contrary. Also, the null hypothesis is not rejected as the sig is 0,525, which is higher than 0,05 and therefore there is not statistically significant association between the two variables.

Thus, there is evidence that the variables Overall Perceived Quality and HRQoL Improvement are not statistically significantly associated, so it is possible to conclude that the investigation hypothesis H7 is rejected.

			Overall Perceived Quality	**HRQoL Improvement**
Spearman's rho	Overall Perceived Quality	Correlation Coefficient	1,000	-0,111
		Sig. (2-tailed)	.	0,525
		N	35	35
	HRQoL Improvement	Correlation Coefficient	-0,111	1,000
		Sig. (2-tailed)	0,525	.
		N	35	35

Table 18- Spearman's correlation coefficient for Overall Perceived Quality and HRQoL Improvement

4.6.7. Summary

Now that all investigation hypotheses have been tested, it is important to summarize the results (see table 19).

Investigation hypotheses	Result	Conclusion
H1: The service quality dimensions considered by Parasuraman et al. (1988) and the Food dimension combined have better explanatory power of the overall perceived service quality than just the dimensions considered by Parasuraman et al. (1988).	Not rejected	The explanatory power of the model with the Food dimension included is slightly higher than without it. This proves its adequacy to the present study.
H2: The service quality dimensions considered by Parasuraman et al. (1988) and the Food dimension contribute in the same way to the Overall Perceived Quality.	Rejected	All the dimensions have different contributions – Empathy presents the higher contribution, while Food presents the lowest.
H3: Price influences the overall perceived service quality.	Not possible to analyse	Only 3 out of 35 of the respondents were able to answer this item, so it was removed from the analysis. Similarly, hypothesis **H4c** was also eliminated from the analysis.
H4a, H4b: The personal and service characteristics of the patient influence the overall perceived service quality, the service quality dimensions considered by Parasuraman et al. (1988) and the Food dimension.	Rejected	The personal and service characteristics do not influence the variables regarding the perceived service quality.
H5a, H5b: The personal and service characteristics of the patient influence the HRQoL and Self-Rated Health Improvements.	Rejected	As in the previous hypotheses, the personal and service characteristics do not influence the health-related quality of life improvements.
H6: The HRQoL Improvement is associated to the Self-Rated Health Improvement.	Rejected	In fact, there is no association between both improvements, which can be due to the higher subjectivity of the EQ-VAS.
H7: The overall perceived service quality is associated to the HRQoL Improvement.	Rejected	This hypothesis answers the research question and main goal of this study. As already stated, there is no association.

Table 19 - Summary of the results of the investigation hypotheses

4.7. Discussion

The participants of this study were aged mostly above 60 years old with only 20% being aged less than that, which agrees with the 15% observed by OECD (2017). This shows that in fact the residents of the long-term care institution in study are, as expected, mostly elders. However, the findings of this study show that the biggest percentage is 43% for patients aged between 60 and 79, which does not coincide with the majority of the

Portuguese long-term care receivers reported by OECD (2017) which are aged 80 years old or above.

This research concerns various specific goals, which results are going to be discussed ahead. First, the Reliability of the measures that compose the questionnaire used is very good for all the dimensions and the measures in general. For the perception of service quality, the Cronbach's alpha is higher than 0,9, which demonstrates an excellent internal consistency. This result is in line with Lin *et al.* (2012), who present a Cronbach's alpha of 0,93. The only dimension that would increase the Cronbach's alpha if deleted, even though not that significantly, is the Food dimension. This can be explained by the fact that the five dimensions are all part of the SERVPERF questionnaire, which makes them more concise and robust. However, even with the additional dimension the measure presents an excellent Reliability.

Furthermore, the Cronbach's alpha of each of the 5 dimensions of SERVPERF and the Food dimension range from 0,84 to 0,95, which outperforms the findings of Ahmed *et al.* (2017) whose Cronbach's alpha of the dimensions range from 0,81 to 0,9. This suggests that the dimensions analysed are more appropriate for the sample of this study than for the sample of Ahmed *et al.* (2017). Since the sample of Ahmed *et al.* (2017) is from all types of healthcare services, it might be possible to conclude that the results are more reliable regarding a single type of healthcare service.

For the perception of quality of life, the Cronbach's alpha of the descriptive system of EQ-5D-3L for the two measurements (initial and 30 days after) is lower than the previous tool, but they still are very good as both are above 0,8. Moreover, it exceeds the Cardoso *et al.* (2016) findings of 0,674 as Cronbach's alpha. Once again, this suggests that de descriptive system of EQ-5D-3L is more adequate for the sample of this study than for the sample of Cardoso *et al.* (2016). That is, it appears to be more adequate for a sample concerning individuals receiving long-term care than a sample concerning individuals with type 2 diabetes mellitus.

Regarding the assessment of perceived service quality, the Food dimension is the worst perceived when compared with the other 5 dimensions. It was expected that indeed the Food dimension would be the worst perceived by the participants as in the application of the first part of the questionnaire, some of the respondents did some observations regarding the food (such as its taste, quality, and variety) despite that part not being about

service quality. Tomes and Peng (1995) note in their study that Food is the most important dimension of perceived service quality for inpatients along with tangibility. Having this in consideration, the institution is not seizing this matter as an opportunity to please the patients and therefore make them have a better perception of the service.

Apart from the Food, the items with the worst perceived service quality are I5, I8, I11, and I13, which concern delivering the service at the time promised, prompt and fast service, and the employees never being too busy to respond. These items are all related to the waiting time for the service to be provided, which might indicate a need of understanding what causes these waiting times.

The overall perceived service quality presents a mean score of 5,46, which is above the average point of the 7-point Likert scale and agrees with the results of Lin *et al.* (2012) and Zarei *et al.* (2012). Both sources use a 5-point Likert scale, but after calculating the proportion for a 7-point Likert scale, they present mean scores of 5,43 and 5,63 respectively, which are approximate to this study mean. This suggests that long-term care overall service quality is very similar despite this study being in Portugal and Lin *et al.* (2012) being in Taiwan. Although the service provided might have differences between countries, and the patients' expectations might be different as well, in the end they perceive the service quality similarly in both studies.

Concerning Price, it was not expected that most of respondents could not answer the question about it. However, it is comprehensible as the respondents, which are mostly elderly, do not have much information regarding the Price since it is their relatives, health insurance, etc. who are usually responsible of the payment.

The findings of this study suggest that the addition of the food dimension to the 5 dimensions of SERVPERF lead to a better explanatory power of the Overall Perceived Quality. Although the difference between with and without the additional dimension is not huge, with the Food dimension still leads to a better explanatory power from the model. This might show that the Food dimension should in fact be included in the assessment of the service quality of this type of healthcare services.

The results also show that each dimension of the SERVPERF and the Food dimension contribute differently to the Overall Perceived Quality. The dimensions are presented from higher to lower contribution as follows: Empathy, Responsiveness, Tangibility, Reliability, Assurance, and Food. Once again this might show that the institution is not

giving enough attention to the food aspect, what would make the patients have a better perception of the service quality regarding food and therefore, might increase its contribution in the overall perceived quality.

The dimension Empathy is the one that presents higher contribution to explain the overall perceived quality of the service, however the value is negative, which means that as the Empathy dimension decreases, the Overall Perceived Quality increases. This is an odd and unexpected result. An explanation might be that since most of the participants are in this institution for at least one month and some for more than a year, and they spend the whole day with the staff, they are comfortable and feel free to criticize them.

In this study, regarding the HRQoL and the two measurements (initial and after 30 days), the participants chose more often the level 2, which concerns some problems regarding the dimensions of EQ-5D-3L. An exception was the dimension Mobility where the percentage of respondents who chose the level 3 (extreme problems) is higher. These results corroborate with the research of Borowiak and Kostka (2004) regarding the dimensions Pain/Discomfort and Anxiety/Depression, but discords regarding the remaining three dimensions. In their study, the level with the highest percentage for Mobility is 2, for Self-Care is 1 and for Usual Activities it is balanced between the three levels. As for the VAS score, the results of this study are very similar to the one of Borowiak and Kostka (2004), which shows some evidence that institutionalised elders do not have a high perception of their HRQoL.

The difference between the result of this study and the study of Borowiak and Kostka (2004) regarding Mobility, might be caused by the interpretation of the level 3 as its statement is “I am confined to bed”. This level corresponds to the extreme problems regarding Mobility, that is, being unable to walk. However, the way the statement is written it implies that the participants stay in bed all day. Yet, a lot of the participants are unable to walk but use a wheelchair to move. If the questionnaire was self-administered it would probably cause confusion regarding this level and its statement, but in this study, it was administered in an interview by the author, so the respondents could clarify their doubts. This agrees with the findings of Selivanova *et al.* (2018), which noted that by modifying the wording from “I am confined to bed” to “I am unable to walk” led to more participants choosing the level 3 of Mobility. They also suggest that being confined to bed indicates more dependence and isolation.

The difference between the results of these two studies regarding Self-Care, might also be caused by the wording of the level 1 ("I have no problems with self-care"), which leaves to interpretation what self-care is. While the other two levels specify that it is about washing and dressing specifically. Once again, when conducting the questionnaire in an interview, it is possible to clarify some doubts, which is not possible when it is self-applied.

Lastly, the difference between the results of these studies regarding Usual Activities, might regard what the participants of the study include in the usual activities. Also, the activities performed at the long-term institution of this study may differ from the institutions in the study of Borowiak and Kostka (2004), as well as the opportunity to perform the activities may differ.

Wolfs *et al.* (2007) in their study compute the changes in health with three different moments: the initial with after 6 months and the initial with after 12 months. Concerning both HRQoL Improvement and Self-Rated Health Improvement, it was found that the means are better in the present study than the ones found in the research of Wolfs *et al.* (2007), except for the change in the EQ-5D-3L descriptive system within 6 months. However, these differences can be explained by the different time windows used in the two studies.

Also, in this study, the percentage concerning a decline in the health state within 30 days is of 18% for the variable HRQoL Improvement and 31% for the Self-Rated Health Improvement. These were not expected regarding such small time window, however it might be explained by the fact that the long-term care patients are elders to who is more difficult to rehabilitate and improve the health state and physical impairments, as well as their health state can get worse at any time. Also, the results of EQ-VAS are very subjective, and small matters can make the participants feel worse in that day – for example, as the rooms can be shared, if the patient who they share the room with does not feel well during the night, it may cause the participant to not sleep well that night and therefore feel more tired the next day, causing a decrease in their health state despite the health problem not being related to him/her.

Furthermore, it was found some differences between the HRQoL Improvement and Self-Rated Health Improvement. By computing the HRQoL Improvement variable, it is possible to understand that 63% of the participants maintained the exact same health state

within 30 days. However, by calculating the Self-Rated Health Improvement variable, it shows that 66% of the respondents experienced an increase in health state within the 30 days. The reason for this difference might be that the 5 dimensions of EQ-5D are specific to certain aspects and have only three possible responses. While when asking for how the respondent health state is in that moment (EQ-VAS), it is a lot more subjective regarding the specific moment, day, mood, and what the respondent consider as health state. For example, one of the 5 dimensions is Mobility, which for most of the respondents is already a normal state to not be able to walk, so they might not consider it as bad as they are used to it. Therefore, it does not influence their self-perception of their health state measured by EQ-VAS, yet it does influence the result of the EQ-5D descriptive system. More than half of the participants maintaining their health state within 30 days might be caused by how long they are inpatient. Some of the participants are in the institution in study for months and some for years, so they have passed the phase where a lot of improvement is possible and have entered the stagnation phase where very little improvements are made, which may not be captured by the only three levels of the EQ-5D descriptive system.

The findings of this study suggest that there is not a statistically significant association between the variables HRQoL Improvement and Self-Rated Health Improvement, which makes sense regarding what was described before. This contradicts the results of Cardoso *et al.* (2016), which find an association between both variables, however the context and the sample might clarify the differences considering what was explained in the previous paragraph.

In general, the personal and service characteristics do not influence neither the Overall Perceived Quality, the perception of quality in each of the 5 SERVPERF dimensions, the perception of quality in the Food dimension, the HRQoL Improvement or the Self-Rated Health Improvement. Yet, there are six exceptions where the personal and service characteristics do have influence in these variables.

Regarding the perceived service quality: Age, Gender, and Education Level do not have impact in any of the variables mentioned in the previous paragraph, which is in line with Lin *et al* (2012) findings. However, there is an exception as the Gender influences the perception of quality regarding the Food dimension and the Education Level influences the perception of quality in the Tangibility dimension. Therefore, the latter result contradicts the findings of Lin *et al* (2012) considering they only assess the perceived service quality of the 5 dimensions of SERVPERF.

In this study, the influence of the Education Level in the Tangibility dimension regards the patients with Superior Education as their service quality perception is lower than the rest. This difference might be caused by the fact that years ago, having a degree led to more income and therefore a better and different lifestyle, which makes them more demanding. This result differing from Lin *et al.* (2012), whose study also regards long-term care patients and also includes participants with superior education, must be caused by cultural issues.

Both Marital Status and Unit do not show evidence of any effect in the Overall Perceived Quality, in the perceptions of quality in the 5 SERVPERF dimensions, and in the perception of quality in the Food dimension. These findings are not aligned with the findings of Ahmed *et al.* (2017). It was expected that the respondents from the private unit presented better perceived service quality, but it was not found any significant difference. This might show that the service provided at both units is similar.

The Place of Residence does not influence the perceived service quality in any of the 5 SERVPERF dimensions and in the perception of quality in the Food dimension, but it revealed influence in the Overall Perceived Quality. Similarly, the service Typology does not influence the Overall Perceived Quality and the perception of service quality in any of the 5 SERVPERF dimensions, yet it does influence the perceived service quality of the Food dimension. The health condition of the patients might explain this latter influence – the patients in long-lasting care usually are in worse situations and are staying in the long-term care institution for longer time, so they might already be used to its service. Hence, they have less expectations and therefore have higher perceptions of the service quality of the Food dimension.

As for the Previous Location and Living Home, they do not influence any of the perceived service quality variables. Having this in consideration, there is no evidence of being necessary to adapt the service regarding the previous location (home, hospital, other long-term care institution) or having company or not at home.

Regarding the HRQoL: Age and Education Level do not affect the HRQoL Improvement and Self-Rated Health Improvement, which diverges from the Huang *et al.* (2017) results. Similarly, the Gender, Marital Status, Living Home, Unit and Typology do not influence those same variables. Thus, the Gender and Marital Status findings are conforming the Huang *et al.* (2017) ones.

In this study, the Place of Residence has impact in the Self-Rated Health Improvement, but does not in the HRQoL Improvement, so the first part contradicts Huang *et al.* (2017) and the latter concurs. In contrast, the Previous Location influences the HRQoL Improvement, but does not influence the Self-Rated Health Improvement.

All these differences between this study and the one of Huang *et al.* (2017) might be caused by the difference between this study's sample and the sample of Huang *et al.* (2017). Their study has a sample of more than 1000 participants, which regards adults of all ages who are mostly healthy.

Finally, the main goal of this investigation is to understand if there is an association between the HRQoL and the perceived service quality. By computing the Spearman's correlation coefficient between the variables HRQoL Improvement and Overall Perceived Quality, it was possible to conclude that in fact there is no significant or relevant association between both. It was not found any previous study with the same purpose, so it is not possible to compare results. However, such association was expected since the long-term care institution in study provides rehabilitation and clinical supervision. Thus, it was expected that the better the improvement in the patient HRQoL, the better perception of service quality the patient would have. Nevertheless, that was not the result, which might be caused by the unexpected results regarding the HRQoL Improvement, which have been addressed above and summarizes as follows: the sample dimension is small; the patients after treatment feel sore and might consider that they are worse than before; the patients for being in the institution for months or years have entered the stagnation phase of their health state, so very little improvements are made; the patients are elders who are frail and can get worse at any time.

This study presents new findings regarding the long-term care, especially the assessment of the association between the HRQoL of the patients and their perception of the service quality.

4.8. Managerial recommendations

From the findings of this research, it is possible to understand that all dimensions in study contribute to the Overall Perceived Quality. Although the Overall Perceived Quality was higher than the average point of the 7-point Likert scale, there is always space for improvement.

Below it is presented some suggestions regarding every dimension. Considering the contribution of each, the order to which they should be considered is: Empathy, Responsiveness, Tangibility, Reliability, Assurance, and lastly Food.

As for Reliability and Responsiveness, the recommendation is to understand why the patients do not perceive the service provided as promptly, fast, and in the time promised. This matter can be analysed not only with the patients, but also the staff. Considering that the staff are the ones providing the service considered not fast and prompt enough, it can be understood with them if there are aspects that can in fact be adjusted to make the service delivery faster. This can be regarding time, materials, or human resources, but the main point is to understand the cause.

For Empathy and Assurance, it is possible to suggest training the staff in order to strengthen the relationship between the staff and the patients, so that the patients feel more individualized attention, more safety, more confidence, and more sympathy. It is important to communicate to the staff that the individuals in such institutions can be frail, lonely, depressed, and anxious, so they need more attention, understanding, and compassion.

Even though the Tangibility presents one of the highest scores in terms of perceived service quality, it is possible to recommend trying to make the patients room more personal as they spend a lot of time in it, and it would make it more visual appealing. Thus, they could feel more comfortable and more like at home, which might improve their anxiety and depression levels.

The Food is the worst perceived dimension, especially its taste, so the recommendation would be to talk with the patients to understand exactly what they do not like and appreciate and what they think should be changed and improved. It would also be important to talk with the doctors to understand the dietary restrictions. This subject should be investigated as it is a crucial part of everybody's day, various questions should

be asked, such as: Why do you not like the Food? Is it not well cooked? There is not enough variety? Is it adequate for your diet? What type of Food would you like to eat?

Considering the 5 dimensions of the EQ-5D, the Anxiety/Depression presents a mean score around the level 2. The rest of the dimensions are more related to the physical impairments and their disease condition, so are more difficult to improve. However, this one can be related to missing their home, families, and friends. They might need someone to talk and activities that keep their mind busy. A recommendation would be to understand if it is possible to implement more activities that the majority of patients would enjoy.

These recommendations could improve the perceived service quality and some aspects of the quality of life of the patients, what would make the institution more attractive for both present and future patients and their relatives.

4.9. Conclusion

The sample analysed consists of 35 residents of the long-term care institution, which are all above 45 years old, even regarding Gender, almost half are widowed, the great majority live in an urban area, almost half was at home before coming to this institution, more than half lived alone when living at home, and the 4th grade was the Education Level with biggest percentage (35%). This long-term care institution is divided in two units: public and private. More than half of the sample was from the public unit. In contrast, the sample was evenly distributed between the two typologies: temporary and long-lasting care.

From the analysis conducted with the data collected from this sample, the discussion, and the managerial recommendations suggested, and it was possible to achieve the main and specific goals.

5. Conclusion

This research was conducted on a long-term care institution in order to measure the patient's perceived service quality and their self-perceived HRQoL. For that purpose, it was administered a questionnaire that consisted of 3 sections (concerning the personal characteristics, the assessment of HRQoL, and the assessment of perceived service quality) and that was applied in two different moments (initial and approximately 30 days after). The questionnaire was applied through interviews to 35 patients of the long-term care institution in study.

The findings showed that the tools used (SERVPERF and the additional dimension Food for perceived service quality; and EQ-5D-3L for HRQoL) are reliable.

Considering the 5 dimensions of SERVPERF and the additional dimension Food, it was possible to understand that Assurance is the dimension with the highest perceived service quality and Food is the dimension with the lowest perceived service quality.

Regarding the HRQoL improvement, which regards the descriptive system of EQ-5D, the majority of the sample (63%) maintained their health state within 30 days. As for the Self-Rated Health Improvement, which regards the EQ-VAS, most of the participants (66%) improved their health state within 30 days.

Through hypothesis testing using parametric and nonparametric tests, it was possible to conclude that, in general, the personal and service characteristics do not influence any of the variables considering perceived service quality and HRQoL.

The main goal and research question of this investigation was to understand if there was any association between the HRQoL and the perceived service quality. It was possible to conclude that in fact does not exist any association between both concepts in the sample of this study.

In order to answer that, it was completed the specific objectives defined in the Chapter 1. All the specific goals were achieved in the chapter 4 through the data analysis methods described in the Chapter 3. The investigation hypotheses that concern the specific objectives were also tested in Chapter 4.

The findings of this study show some limitations. Being this research a case study, the main limitation is, according to Yin (2014), that the results cannot be generalized. Also, the results obtained in the analysis of the hypotheses H1 and H2 show that it cannot be

generalized as one of the assumptions does not verify. Another limitation is the size of the sample and the fact that it was not a random one. Likewise, this research considers only the patients perspective, so this focus is also a limitation of the results. Thus, the findings are only valid under the scope of the services and quality of life of the patients of the long-term care institution analysed on this study.

The results found in this study and the managerial recommendations given might be beneficial for the long-term care institution. Considering that the implementation of the recommendations was not part of the scope of this study, it is not possible to understand its adequacy and results, which is also a limitation of the study regarding generalization. However, they are good to take in consideration and use as base for similar institutions.

Although the results cannot be generalised to other studies regarding long-term care, health and social care for elders, or even other healthcare areas, it still provides important data for other researchers. This study contributes to extend the areas of application of SERVPERF (with an additional dimension) and the EQ-5D-3L as it was only found very few studies regarding long-term care. Additionally, it compares and analyses both HRQoL and perceived service quality in long-term care, which also was not found any study neither in long-term care or other healthcare area with such purpose.

This investigation contributed to fill the gap in the literature regarding the association between HRQoL and perceived service quality in long-term care. For future research, it would be interesting to do more researches regarding this scope and purpose, especially with bigger samples.

For future research, it would also be interesting to include in the Food dimension, items more related to the food itself (if its properly cooked, if it is well seasoned, if it has enough variety, etc.). It would also be interesting to ask the relatives about the Price, so that it could be analysed. Additionally, it would be interesting to understand the perspective of the service providers.

Considering that does not exist any association between the Overall Perceived Quality and the HRQoL Improvement, it would be interesting for future research to assess the association between the overall perceived service quality and the Self-Rated Health Improvement as its assessment is more subjective.

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Appendix 1 – Questionnaire in Portuguese

Section 1

O presente questionário destina-se à realização de um estudo para uma tese de Mestrado em Gestão dos Serviços e da Tecnologia, do ISCTE-IUL.
Todas as respostas dadas são confidenciais e anónimas.

Género

Feminino ❑
Masculino ❑

Estado Civil

Solteiro/a ❑
Casado/a ❑
Divorciado/a ❑
Viúvo/a ❑

Idade:

18-24 ❑
25-44 ❑
45-59 ❑
60-64 ❑
65-69 ❑
70-74 ❑
75-79 ❑
80-84 ❑
> 85 ❑

Escolaridade

Não completou 3º ano ❑
3º ano ❑
4º ano ❑
6º ano ❑
9º ano ❑
12º ano ❑
Licenciatura ❑
Mestrado ❑
Doutoramento ❑

Área de residência:

Rural ❑
Urbana ❑

Quando estava em casa, vivia:

Sozinho/a ❑
Acompanhado/a ❑

Onde se encontrava antes de ser internado nesta unidade:

Casa ❑
Hospital ❑
Lar ❑
Outra instituição de cuidados continuados ❑
Outra tipologia de cuidados continuados ❑

Section 2

Por baixo de cada título assinale o quadrado que descreve melhor como a sua saúde está HOJE.

MOBILIDADE

Não tenho problemas em andar ❑

Tenho alguns problemas em andar ❑

Estou confinado/a à cama ❑

CUIDADOS PESSOAIS

Não tenho problemas com os cuidados pessoais ❑

Tenho alguns problemas em me lavar ou vestir ❑

Sou incapaz de me lavar ou vestir sozinho/a ❑

ATIVIDADES HABITUAIS *(ex. trabalho, estudos, atividades domésticas, atividades em família ou de lazer)*

Não tenho problemas em desempenhar as minhas atividades habituais ❑

Tenho alguns problemas em desempenhar as minhas atividades habituais ❑

Sou incapaz de desempenhar as minhas atividades habituais ❑

DOR / MAL-ESTAR

Não tenho dores ou mal-estar ❑

Tenho dores ou mal-estar moderados ❑

Tenho dores ou mal-estar extremos ❑

ANSIEDADE / DEPRESSÃO

Não estou ansioso/a ou deprimido/a ❑

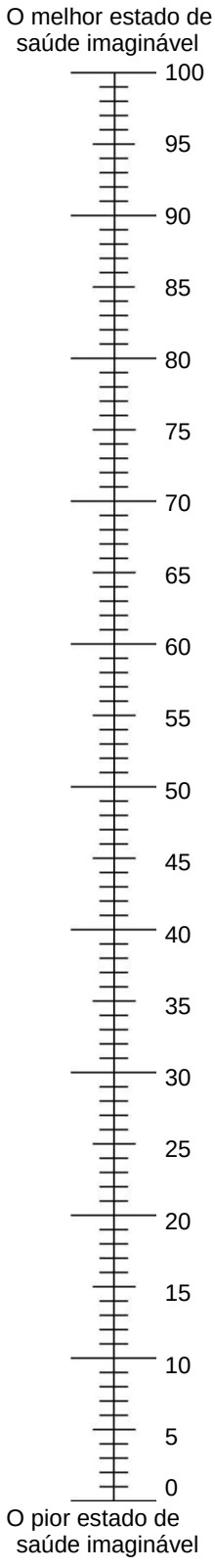
Estou moderadamente ansioso/a ou deprimido/a ❑

Estou extremamente ansioso/a ou deprimido/a ❑

Section 2 (continuation)

- Gostaríamos de saber o quão boa ou má está a sua saúde HOJE.
- A escala está numerada de 0 a 100.
- 100 significa o melhor estado de saúde imaginável.
  0 significa o pior estado de saúde imaginável.
- Coloque um X na escala de forma a indicar como a sua saúde se encontra HOJE.
- Agora, por favor escreva o número que assinalou na escala no quadro abaixo.

O SEU ESTADO DE SAÚDE HOJE = ☐



Section 3

Indique qual o seu grau de concordância com cada uma das seguintes afirmações através de uma escala de 1 a 7, em que 1 representa "Discordo totalmente" e 7 representa "Concordo totalmente". Note: Quando é mencionado funcionários, refere-se a todos os colaboradores da unidade.		**Discordo totalmente**						**Concordo totalmente**
I1.	A unidade de cuidados continuados da LAHGO tem equipamentos recentes e modernos.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I2.	As instalações da unidade de cuidados continuados da LAHGO são visualmente apelativas.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I3.	Os funcionários da LAHGO têm uma aparência cuidada.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I4.	Na LAHGO, os materiais utilizados são visualmente apelativos.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I5.	Quando a LAHGO promete fazer algo em determinado momento, cumpre.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I6.	Quando tenho um problema, a LAHGO mostra interesse em resolvê-lo.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I7.	A LAHGO presta os serviços corretamente logo da primeira vez.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I8.	A LAHGO presta os serviços no tempo prometido.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I9.	A LAHGO insiste em manter registos sem erros.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I10.	Os funcionários da LAHGO informam-me exatamente sobre quando os serviços serão prestados.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I11.	Os funcionários da LAHGO prestam um serviço rápido e imediato.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I12.	Os funcionários da LAHGO estão sempre dispostos a ajudar.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I13.	Os funcionários da LAHGO nunca estão demasiado ocupados para responder aos meus pedidos.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I14.	O comportamento dos funcionários da LAHGO transmite confiança aos utentes.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I15.	Sinto-me seguro na interação com os funcionários da LAHGO.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I16.	Os funcionários da LAHGO são sempre atenciosos e simpáticos.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I17.	Os funcionários da LAHGO demonstram conhecimentos sobre o tratamento/procedimento o a realizar.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I18.	Na unidade de cuidados continuados da LAHGO é-me dada atenção individualizada.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I19.	Os vários serviços da unidade de cuidados continuados da LAHGO têm um horário de funcionamento que é conveniente às minhas necessidades.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I20.	Os funcionários da LAHGO prestam-me atenção individualizada	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I21.	A unidade de cuidados continuados da LAHGO demonstra procurar o que é melhor para mim.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I22.	Os funcionários da LAHGO entendem as minhas necessidades individuais.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I23.	Na unidade de cuidados continuados da LAHGO, a comida quando é servida tem sempre a temperatura adequada.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I24.	Na unidade de cuidados continuados da LAHGO, a comida é sempre saborosa.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I25.	Na unidade de cuidados continuados da LAHGO, as refeições são sempre servidas a horas.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I26.	Na unidade de cuidados continuados da LAHGO, a quantidade de comida servida é sempre adequada.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I27.	Na unidade de cuidados continuados da LAHGO, os pratos e lixo são levantados assim que a refeição termina.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I28.	Na unidade de cuidados continuados da LAHGO, o preço é adequado aos serviços prestados.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Tendo em conta uma escala de 1 a 7 pontos, em que 1 corresponde a "Muito mau" e 7 a "Excelente", responda à seguinte questão:		**Muito mau**						**Excelente**
I29.	Como classifica a qualidade geral do serviço de cuidados continuados prestado pela LAHGO?	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Appendix 2 – Questionnaire in English

Section 1

The present questionnaire is part of a study regarding a master's thesis in Management of Services and Technology, from ISCTE-IUL.
All answers given are confidential and anonymous.

Gender:

Female ❑
Male ❑

Marital Status:

Single ❑
Married ❑
Divorced ❑
Widowed ❑

Age:

18-24 ❑
25-44 ❑
45-59 ❑
60-64 ❑
65-69 ❑
70-74 ❑
75-79 ❑
80-84 ❑
> 85 ❑

Education:

Did not complete 3rd grade ❑
3rd grade ❑
4th grade ❑
6th grade ❑
9th grade ❑
12th grade ❑
bachelor's degree ❑
master's degree ❑
PhD ❑

Place of residence:

Rural ❑
Urban ❑

When living at home, lived with:

Alone ❑
Accompanied ❑

Previous location:

Home ❑
Hospital ❑
Nursing home ❑
Other long-term care institution ❑
Other long-term care typology ❑

Section 2

Below each title, please tick the box corresponding to the statement that best describe your health TODAY.

MOBILITY

I have no problems in walking about ❑

I have some problems in walking about ❑

I am confined to bed ❑

SELF-CARE

I have no problems with self-care ❑

I have some problems washing or dressing myself ❑

I am unable to wash or dress myself ❑

USUAL ACTIVITIES *(e.g. work, study, housework, family or leisure activities)*

I have no problems with performing my usual activities ❑

I have some problems with performing my usual activities ❑

I am unable to perform my usual activities ❑

PAIN/DISCOMFORT

I have no pain or discomfort ❑

I have moderate pain or discomfort ❑

I have extreme pain or discomfort ❑

ANXIETY/DEPRESSION

I am not anxious or depressed ❑

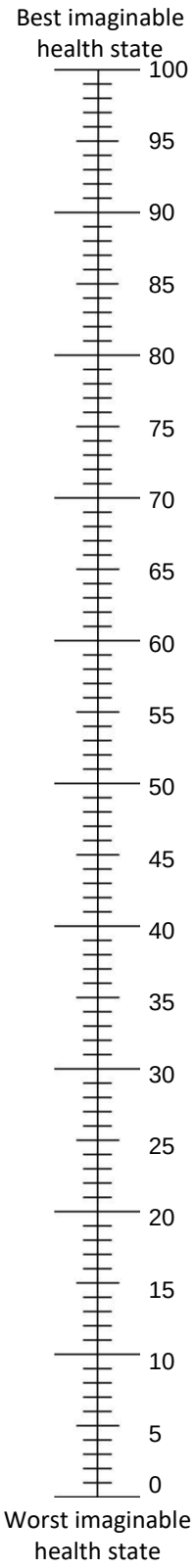
I am moderately anxious or depressed ❑

I am extremely anxious or depressed ❑

Section 2 (continuation)

- We would like to know how good or bad your health is TODAY.
- The scale ranges from 0 to 100.
- 100 indicates the best imaginable health state.
  0 indicates the worst imaginable health state.
- Please draw an X in the scale to indicate how your health is TODAY.
- Now, please write the number that you indicated on the scale in the box below.

YOUR HEALTH STATE TODAY = ☐



Section 3

Indicate how much you agree with each of the following statements on a scale of 1 to 7, where 1 represents "Strongly Disagree" and 7 represents "Strongly Agree". Note: When it is mentioned employees, it refers to all employees of the unit.		**Strongly disagree**						**Strongly agree**
I1.	This long-term care institution has up-to-date equipment.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I2.	The physical facilities of this institution are visually appealing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I3.	The employees of this institution are well dressed and appear neat.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I4.	The materials used in this institution are visually appealing.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I5.	When this institution promises to do something by certain time, it does so.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I6.	When you have problems, the institution shows interest in solving them.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I7.	This institution delivers its services well at the first time.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I8.	This institution provides its services at the time it promises to do so.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I9.	This institution keeps its records accurately.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I10.	The employees tell exactly when the services will be performed.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I11.	The employees provide prompt and fast service.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I12.	The employees are always willing to help.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I13.	The employees are never too busy to respond to your requests.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I14.	The employees' behaviour is trustworthy.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I15.	You can feel safe in your transactions with the employees.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I16.	The employees are polite and attentive.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I17.	The employees show knowledge about the procedures they perform.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I18.	The institution gives you individual attention.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I19.	The institution has operating hours convenient to your needs.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I20.	The employees give you personal attention.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I21.	The institution shows that have your best interests at heart.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I22.	The employees understand your individual needs.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I23.	In this institution, the meals are served at proper temperature.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I24.	In this institution, the food served is always tasty.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I25.	In this institution, the meals are always served in time.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I26.	In this institution, the quantity of food served is always adequate.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I27.	In this institution, the dirty dishes are always promptly removed after eating.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I28.	In this institution, the price is adequate to the service that is provided.	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Considering a scale from 1 to 7 points, where 1 corresponds to "Very bad" and 7 to "Excellent", answer the following question:		**Very bad**						**Excellent**
I29.	How do you classify the general service quality of this long-term care institution?	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Appendix 3 – Descriptive statistics of personal characteristics

		Absolut Frequency	Relative Frequency
Gender	Female	17	49%
	Male	18	51%
Age	From 18 to 24	0	0%
	From 25 to 44	0	0%
	From 45 to 59	7	20%
	From 60 to 64	2	6%
	From 65 to 69	4	11%
	From 70 to 74	6	17%
	From 75 to 79	3	9%
	From 80 to 84	6	17%
	85 or above	7	20%
Education Level	None	5	14%
	3rd grade	5	14%
	4th grade	11	31%
	6th grade	0	0%
	9th grade	6	17%
	12th grade	4	12%
	Bachelor's degree	2	6%
	Master's degree	0	0%
	PhD	2	6%
Marital status	Single	9	26%
	Married	5	14%
	Divorced	5	14%
	Widowed	16	46%
Place of residence	Rural	5	14%
	Urban	30	86%
Previous location	Home	16	46%
	Hospital	13	37%
	Nursing home	0	0%
	Other long-term care institution	6	17%
	Other long-term care typology	0	0%
Living home	Alone	20	57%
	Accompanied	15	43%

Table A3.1 – Frequency distribution of personal characteristics

Appendix 4 – Descriptive statistics of personal characteristics recoded

		Absolut Frequency	Relative Frequency
Age recoded	From 18 to 59	7	20%
	From 60 to 69	6	17%
	From 70 to 79	9	26%
	From 80 to 84	6	17%
	85 or above	7	20%
Education Level recoded	None	5	14%
	3rd class	5	14%
	4th class	11	31%
	6th/9th class	6	17%
	12th class	4	12%
	Superior education	4	12%
Previous Location recoded	Home	16	46%
	Hospital	13	37%
	Other long-term care institution	6	17%

Table A4.1 – Frequency distribution of personal characteristics recoded

Appendix 5 – Descriptive statistics of service quality items

		N		Mean	Standard Deviation
		Valid	Missing		
Tangibility	I1. This long-term care institution has up-to-date equipment.	35	0	5,77	1,190
	I2. The physical facilities of this institution are visually appealing.	35	0	6,20	1,079
	I3. The employees of this institution are well dressed and appear neat.	35	0	6,34	,906
	I4. The materials used in this institution are visually appealing.	35	0	5,91	1,269
Reliability	I5. When this institution promises to do something by certain time, it does so.	35	0	5,40	1,519
	I6. When you have problems, the institution shows interest in solving them.	35	0	5,94	1,349
	I7. This institution delivers its services well at the first time.	35	0	5,74	1,400
	I8. This institution provides its services at the time it promises to do so.	35	0	5,37	1,477
	I9. This institution keeps its records accurately.	35	0	5,71	,860
Responsiveness	I10. The employees tell exactly when the services will be performed.	35	0	5,71	,893
	I11. The employees provide prompt and fast service.	35	0	5,34	1,454
	I12. The employees are always willing to help.	35	0	6,17	1,272
	I13. The employees are never too busy to respond to your requests.	35	0	5,43	1,577
Assurance	I14. The employees' behaviour is trustworthy.	35	0	6,09	1,173
	I15. You can feel safe in your transactions with the employees.	35	0	6,14	1,141
	I16. The employees are polite and attentive.	35	0	6,17	1,150
	I17. The employees show knowledge about the procedures they perform.	35	0	6,09	1,095
Empathy	I18. The institution gives you individual attention.	35	0	5,63	1,239
	I19. The institution has operating hours convenient to your needs.	35	0	6,00	1,283
	I20. The employees give you personal attention.	35	0	5,60	1,265
	I21. The institution show that have your best interests at heart.	35	0	6,14	1,332
	I22. The employees understand your individual needs.	35	0	5,80	1,279
Food	I23. In the long-term care unit, the meals are served at proper temperature.	35	0	4,77	1,716
	I24. In this institution, the food served is always tasty.	35	0	3,91	1,652
	I25. In this institution, the meals are always served in time.	35	0	5,80	1,431
	I26. In this institution, the quantity of food served is always adequate.	35	0	5,26	1,540
	I27. In this institution, the dirty dishes are always promptly removed after eating.	35	0	6,20	1,471
	I28. In this institution, the price is adequate to the service that is provided.	3	32	2,00	1,000
	I29. How do you classify the general service quality of this long-term care institution?	35	0	5,46	1,039

Table A5.1 – Descriptive statistics of service quality items

		7-point Likert Scale						
		1	2	3	4	5	6	7
Tangibility	I1. This long-term care institution has up-to-date equipment.	0%	2,9%	5,7%	2,9%	11,4%	54,3%	22,9%
	I2. The physical facilities of this institution are visually appealing.	0%	2,9%	2,9%	0%	2,9%	48,6%	42,9%
	I3. The employees of this institution are well dressed and appear neat.	0%	0%	2,9%	2,9%	2,9%	40%	51,4%
	I4. The materials used in this institution are visually appealing.	0%	5,7%	2,9%	0%	8,6%	51,4%	31,4%
Reliability	I5. When this institution promises to do something by certain time, it does so.	2,9%	2,9%	11,4%	2,9%	11,4%	51,4%	17,1%
	I6. When you have problems, this institution shows interest in solving them.	0%	5,7%	2,9%	2,9%	8,6%	40%	40%
	I7. This institution delivers its services well at the first time.	2,9%	0%	8,6%	0%	17,1%	40%	31,4%
	I8. This institution provides its services at the time it promises to do so.	2,9%	0%	11,4%	8,6%	20%	34,3%	22,9%
	I9. This institution keeps its records accurately.	0%	0%	2,9%	0%	37,1%	42,9%	17,1%
Responsiveness	I10. The employees tell exactly when the services will be performed.	0%	0%	0%	11,4%	22,9%	48,6%	17,1%
	I11. The employees provide prompt and fast service.	0%	8,6%	5,7%	2,9%	28,6%	34,3%	20%
	I12. The employees are always willing to help.	2,9%	0%	2,9%	0%	11,4%	31,4%	51,4%
	I13. The employees are never too busy to respond to your requests.	5,7%	2,9%	0%	8,6%	25,7%	31,4%	25,7%
Assurance	I14. The employees' behaviour is trustworthy.	2,9%	0%	0%	5,7%	2,9%	51,4%	37,1%
	I15. You can feel safe in your transactions with the employees.	2,9%	0%	0%	2,9%	5,7%	48,6%	40%
	I16. The employees are polite and attentive.	0%	2,9%	2,9%	0%	11,4%	34,3%	48,6%
	I17. The employees show knowledge about the procedures they perform.	0%	2,9%	0%	5,7%	8,6%	42,9%	40%
Empathy	I18. This institution gives you individual attention.	2,9%	2,9%	0%	0%	28,6%	48,6%	17,1%
	I19. This institution has operating hours convenient to your needs.	2,9%	0%	2,9%	5,7%	2,9%	48,6%	37,1%
	I20. The employees give you personal attention.	2,9%	2,9%	0%	2,9%	25,7%	48,6%	17,1%
	I21. This institution shows that have your best interests at heart.	2,9%	0%	2,9%	2,9%	11,4%	25,6%	54,3%
	I22. The employees understand your individual needs.	2,9%	2,9%	0%	0%	20%	48,6%	25,7%
Food	I23. In this institution, the meals are served at proper temperature.	5,7%	5,7%	14,3%	8,6%	25,7%	25,7%	14,3%
	I24. In this institution, the food served is always tasty.	5,7%	17,1%	22,9%	14,3%	17,1%	20%	2,9%
	I25. In this institution, the meals are always served in time.	2,9%	2,9%	2,9%	5,7%	5,7%	48,6%	31,4%
	I26. In this institution, the quantity of food served is always adequate.	5,7%	2,9%	2,9%	8,6%	22,9%	42,9%	14,3%
	I27. In this institution, the dirty dishes are always promptly removed after eating.	2,9%	2,9%	2,9%	2,9%	0%	28,6%	60%
	I28. In this institution, the price is adequate to the service that is provided.							
	I29. How do you classify the general service quality of this long-term care institution?	0%	2,9%	2,9%	5,7%	31,4%	48,6%	8,6%

Table A5.2 – Frequency distribution of the 7-point Likert scale per service quality item

Appendix 6 – Descriptive statistics of health-related quality of life variables

		INITIAL		AFTER 30 DAYS	
		Absolut frequency	Relative frequency	Absolut frequency	Relative frequency
MOBILITY	I have no problems in walking about	6	17,1%	5	14,3%
	I have some problems in walking about	10	28,6%	10	28,6%
	I am confined to bed	19	54,3%	20	57,1%
SELF-CARE	I have no problems with self-care	10	28,6%	9	25,7%
	I have some problems washing or dressing myself	14	40,0%	15	42,9%
	I am unable to wash or dress myself	11	31,4%	11	31,4%
USUAL ACTIVITIES	I have no problems with performing my usual activities	8	22,9%	7	20,0%
	I have some problems with performing my usual activities	21	60,0%	22	62,9%
	I am unable to perform my usual activities	6	17,1%	6	17,1%
PAIN/ DISCOMFORT	I have no pain or discomfort	9	25,7%	7	20,0%
	I have moderate pain or discomfort	16	45,7%	19	54,3%
	I have extreme pain or discomfort	10	28,6%	9	25,7%
ANXIETY/ DEPRESSION	I am not anxious or depressed	8	22,9%	7	20,0%
	I am moderately anxious or depressed	19	54,3%	21	60,0%
	I am extremely anxious or depressed	8	22,9%	7	20,0%

Table A6.1 – Frequency distribution of EQ-5D-3L descriptive system

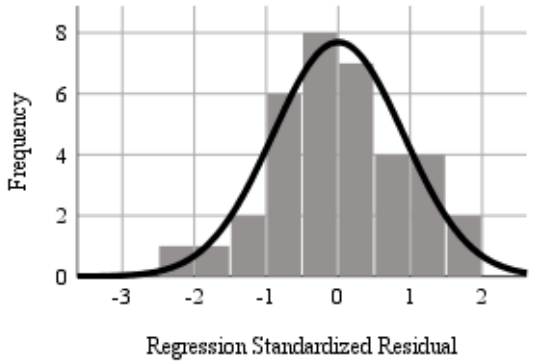
	Absolut frequency	Relative frequency	
-0,492	1	3%	18%
-0,278	1	3%	
-0,230	1	3%	
-0,161	1	3%	
-0,102	1	3%	
-0,037	1	3%	
0,000	22	63%	63%
0,011	2	6%	21%
0,055	1	3%	
0,055	1	3%	
0,055	1	3%	
0,123	1	3%	
0,235	1	3%	

Table A6.2 – Frequency distribution of HRQoL improvement

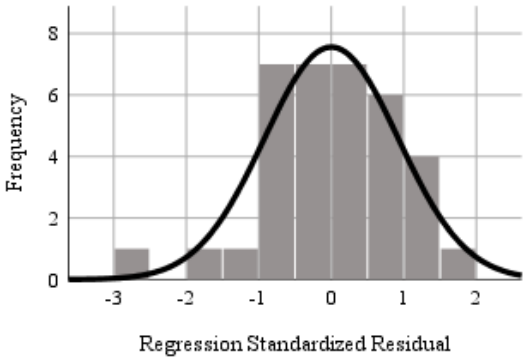
	Absolut frequency	Relative frequency	
-15	4	11%	31%
-10	4	11%	
-5	3	9%	
0	1	3%	3%
5	5	14%	66%
10	10	28%	
15	3	9%	
20	2	6%	
25	2	6%	
30	1	3%	

Table A6.3 – Frequency distribution of global health improvement

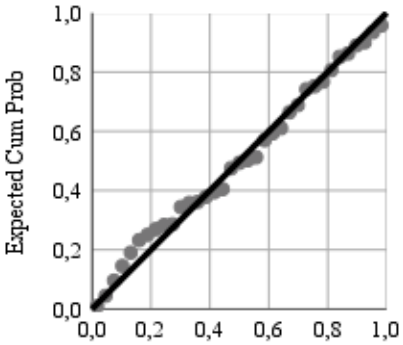
Appendix 7 – Multiple Linear Regression



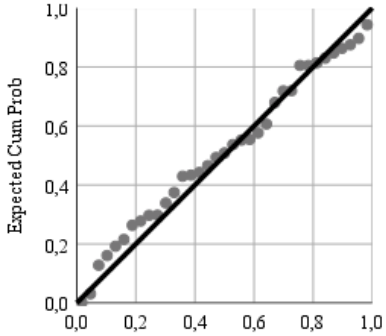
Graph A7.1 - Histogram for 6 dimensions model



Graph A7.2 - Histogram for 5 dimensions model



Graph A7.3 – Normal P-P Plot for 6 dimensions model



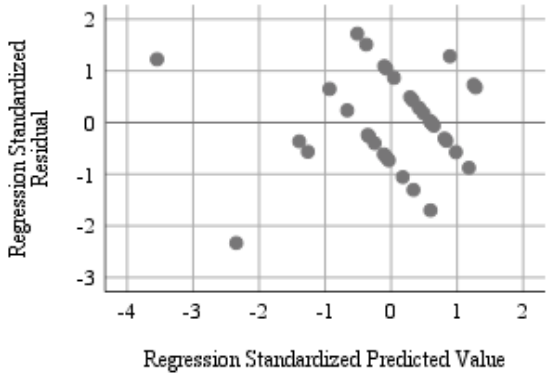
Graph A7.4 – Normal P-P Plot for 5 dimensions model

	6 dimensions		5 dimensions	
	Mean	Std. Deviation	Mean	Std. Deviation
Predicted Value	5,46	0,894	5,46	0,883
Residual	0,000	0,529	0,000	0,546
Std. Predicted Value	0,000	1,000	0,000	1,000
Std. Residual	0,000	0,907	0,000	0,924

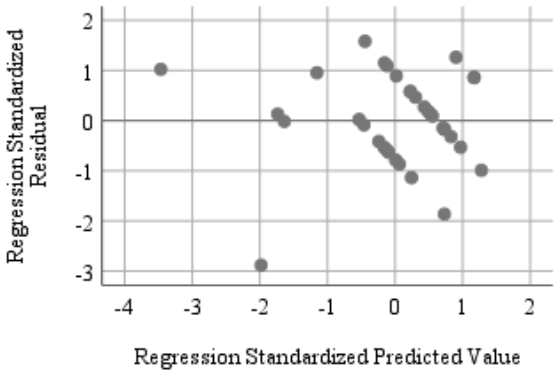
Table A7.1 – Residual statistics

	Durbin-Watson
6 dimensions	2,106
5 dimensions	2,143

Table A7.2 – Durbin-Watson Test



Graph A7.5 – Scatter plot for 6 dimensions model



Graph A7.6 – Scatter plot for 5 dimensions model

Dimension	(Constant)	Tangibility	Reliability	Responsiveness	Assurance	Empathy	Food
1	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	0,00	0,00	0,02	0,01	0,00	0,01	0,69
3	0,61	0,00	0,02	0,01	0,00	0,01	0,09
4	0,13	0,15	0,33	0,01	0,02	0,08	0,07
5	0,09	0,21	0,00	0,19	0,01	0,27	0,07
6	0,17	0,22	0,40	0,63	0,11	0,14	0,08
7	0,00	0,41	0,24	0,16	0,85	0,49	0,00

Table A7.3 – Collinearity diagnostics for 6 dimensions model

Dimension	(Constant)	Tangibility	Reliability	Responsiveness	Assurance	Empathy
1	0,00	0,00	0,00	0,00	0,00	0,00
2	0,53	0,01	0,03	0,01	0,00	0,02
3	0,26	0,25	0,28	0,00	0,01	0,02
4	0,06	0,13	0,04	0,15	0,02	0,35
5	0,15	0,15	0,42	0,68	0,10	0,11
6	0,00	0,45	0,24	0,15	0,87	0,50

Table A7.4 – Collinearity diagnostics for 5 dimensions model

	ANOVA	
	F	Sig.
6 dimensions	13,348	0,000
5 dimensions	15,155	0,000

Table A7.5 – ANOVA Test

Appendix 8 – Hypotheses testing Normality Test

		Shapiro-Wilk		
AGE		Statistic	df	Sig.
Overall Perceived Quality	From 18 to 59	0,960	7	0,819
	From 60 to 69	0,634	6	0,001
	From 70 to 79	0,873	9	0,132
	From 80 to 84	0,827	6	0,101
	85 or above	0,664	7	0,001
Tangibility	From 18 to 59	0,915	7	0,430
	From 60 to 69	0,719	6	0,010
	From 70 to 79	0,938	9	0,557
	From 80 to 84	0,876	6	0,252
	85 or above	0,773	7	0,022
Reliability	From 18 to 59	0,944	7	0,673
	From 60 to 69	0,844	6	0,140
	From 70 to 79	0,819	9	0,034
	From 80 to 84	0,921	6	0,515
	85 or above	0,989	7	0,992
Responsiveness	From 18 to 59	0,975	7	0,934
	From 60 to 69	0,820	6	0,088
	From 70 to 79	0,800	9	0,020
	From 80 to 84	0,811	6	0,074
	85 or above	0,972	7	0,915
Assurance	From 18 to 59	0,697	7	0,003
	From 60 to 69	0,879	6	0,266
	From 70 to 79	0,792	9	0,017
	From 80 to 84	0,775	6	0,035
	85 or above	0,671	7	0,002
Empathy	From 18 to 59	0,708	7	0,005
	From 60 to 69	0,958	6	0,804
	From 70 to 79	0,712	9	0,002
	From 80 to 84	0,884	6	0,286
	85 or above	0,589	7	0,000
Food	From 18 to 59	0,947	7	0,700
	From 60 to 69	0,885	6	0,291
	From 70 to 79	0,938	9	0,559
	From 80 to 84	0,770	6	0,031
	85 or above	0,970	7	0,897
Self-Rated Health Improvement	From 18 to 59	0,884	7	0,247
	From 60 to 69	0,812	6	0,075
	From 70 to 79	0,915	9	0,351
	From 80 to 84	0,941	6	0,664
	85 or above	0,932	7	0,568
HRQoL Improvement	From 18 to 59	0,772	7	0,021
	From 60 to 69	0,827	6	0,101
	From 70 to 79	0,546	9	0,000
	From 80 to 84	0,527	6	0,000
	85 or above	0,825	7	0,071

Table A8.1 – Shapiro-Wilk test for Age

		Shapiro-Wilk		
GENDER		Statistic	df	Sig.
Overall Perceived Quality	Female	0,889	17	0,044
	Male	0,740	18	0,000
Tangibility	Female	0,882	17	0,035
	Male	0,751	18	0,000
Reliability	Female	0,881	17	0,033
	Male	0,917	18	0,115
Responsiveness	Female	0,827	17	0,005
	Male	0,917	18	0,114
Assurance	Female	0,835	17	0,006
	Male	0,616	18	0,000
Empathy	Female	0,692	17	0,000
	Male	0,709	18	0,000
Food	Female	0,969	17	0,793
	Male	0,891	18	0,040
Self-Rated Health Improvement	Female	0,924	17	0,170
	Male	0,948	18	0,399
HRQoL Improvement	Female	0,631	17	0,000
	Male	0,683	18	0,000

Table A8.2 – Shapiro-Wilk test for Gender

		Shapiro-Wilk		
PLACE OF RESIDENCE		Statistic	df	Sig.
Overall Perceived Quality	Rural	0,961	5	0,814
	Urban	0,772	30	0,000
Tangibility	Rural	0,767	5	0,043
	Urban	0,868	30	0,002
Reliability	Rural	0,916	5	0,506
	Urban	0,933	30	0,059
Responsiveness	Rural	0,850	5	0,193
	Urban	0,946	30	0,130
Assurance	Rural	0,892	5	0,367
	Urban	0,902	30	0,010
Empathy	Rural	0,808	5	0,094
	Urban	0,954	30	0,216
Food	Rural	0,862	5	0,235
	Urban	0,866	30	0,001
Self-Rated Health Improvement	Rural	0,902	5	0,421
	Urban	0,924	30	0,034
HRQoL Improvement	Rural	0,552	5	0,000
	Urban	0,668	30	0,000

Table A8.3 – Shapiro-Wilk test for Place of Residence

EDUCATION LEVEL		Shapiro-Wilk		
		Statistic	df	Sig.
Overall Perceived Quality	None	0,881	5	0,314
	3rd class	0,881	5	0,314
	4th class	0,786	11	0,006
	9th class	0,866	6	0,212
	12th class	0,630	4	0,001
	Superior education	0,849	4	0,224
Tangibility	None	0,873	5	0,278
	3rd class	0,701	5	0,010
	4th class	0,923	11	0,344
	9th class	0,869	6	0,223
	12th class	0,851	4	0,230
	Superior education	0,907	4	0,467
Reliability	None	0,943	5	0,690
	3rd class	0,809	5	0,096
	4th class	0,852	11	0,046
	9th class	0,940	6	0,659
	12th class	0,899	4	0,426
	Superior education	0,937	4	0,637
Responsiveness	None	0,927	5	0,575
	3rd class	0,921	5	0,537
	4th class	0,860	11	0,057
	9th class	0,930	6	0,582
	12th class	0,825	4	0,155
	Superior education	0,909	4	0,478
Assurance	None	0,828	5	0,135
	3rd class	0,782	5	0,057
	4th class	0,881	11	0,107
	9th class	0,833	6	0,113
	12th class	0,928	4	0,584
	Superior education	0,763	4	0,051
Empathy	None	0,889	5	0,350
	3rd class	0,859	5	0,223
	4th class	0,924	11	0,354
	9th class	0,892	6	0,327
	12th class	0,763	4	0,051
	Superior education	0,819	4	0,140
Food	None	0,991	5	0,984
	3rd class	0,989	5	0,978
	4th class	0,924	11	0,355
	9th class	0,967	6	0,873
	12th class	0,801	4	0,103
	Superior education	0,951	4	0,724
Global Health Improvement	None	0,956	5	0,777
	3rd class	0,979	5	0,928
	4th class	0,926	11	0,376
	9th class	0,955	6	0,783
	12th class	0,912	4	0,492
	Superior education	0,630	4	0,001
HRQoL Improvement	None	0,774	5	0,049
	3rd class	0,552	5	0,000
	4th class	0,526	11	0,000
	9th class	0,675	6	0,003
	12th class	0,889	4	0,379
	Superior education	0,630	4	0,001

Table A8.4 – Shapiro-Wilk test for Education Level

		Shapiro-Wilk		
MARITAL STATUS		Statistic	df	Sig.
Overall Perceived Quality	Single	0,685	9	0,001
	Married	0,828	5	0,135
	Divorced	0,833	5	0,146
	Widowed	0,871	16	0,028
Tangibility	Single	0,944	9	0,622
	Married	0,908	5	0,455
	Divorced	0,784	5	0,060
	Widowed	0,890	16	0,055
Reliability	Single	0,886	9	0,182
	Married	0,932	5	0,608
	Divorced	0,702	5	0,010
	Widowed	0,890	16	0,055
Responsiveness	Single	0,905	9	0,280
	Married	0,902	5	0,421
	Divorced	0,779	5	0,054
	Widowed	0,840	16	0,010
Assurance	Single	0,866	9	0,112
	Married	0,902	5	0,421
	Divorced	0,719	5	0,015
	Widowed	0,757	16	0,001
Empathy	Single	0,913	9	0,335
	Married	0,870	5	0,265
	Divorced	0,745	5	0,027
	Widowed	0,743	16	0,001
Food	Single	0,915	9	0,352
	Married	0,967	5	0,852
	Divorced	0,698	5	0,009
	Widowed	0,952	16	0,527
Self-Rated Health Improvement	Single	0,953	9	0,721
	Married	0,883	5	0,325
	Divorced	0,771	5	0,046
	Widowed	0,907	16	0,103
HRQoL Improvement	Single	0,810	9	0,027
	Married	0,552	5	0,000
	Divorced	.	5	.
	Widowed	0,641	16	0,000

Table A8.5 – Shapiro-Wilk test for Marital Status

		Shapiro-Wilk		
PREVIOUS LOCATION		Statistic	df	Sig.
Overall Perceived Quality	Home	0,888	16	0,051
	Hospital	0,628	13	0,000
	Other long-term care institution	0,912	6	0,452
Tangibility	Home	0,803	16	0,003
	Hospital	0,857	13	0,035
	Other long-term care institution	0,829	6	0,106
Reliability	Home	0,918	16	0,156
	Hospital	0,854	13	0,032
	Other long-term care institution	0,958	6	0,805
Responsiveness	Home	0,859	16	0,019
	Hospital	0,955	13	0,679
	Other long-term care institution	0,913	6	0,458
Assurance	Home	0,810	16	0,004
	Hospital	0,762	13	0,002
	Other long-term care institution	0,787	6	0,045
Empathy	Home	0,797	16	0,003
	Hospital	0,946	13	0,540
	Other long-term care institution	0,740	6	0,016
Food	Home	0,960	16	0,655
	Hospital	0,890	13	0,098
	Other long-term care institution	0,911	6	0,445
Self-Rated Health Improvement	Home	0,932	16	0,260
	Hospital	0,916	13	0,219
	Other long-term care institution	1,000	6	1,000
HRQoL Improvement	Home	0,552	16	0,000
	Hospital	0,677	13	0,000
	Other long-term care institution	0,615	6	0,001

Table A8.6 – Shapiro-Wilk test for Previous Location

		Shapiro-Wilk		
LIVING HOME		Statistic	df	Sig.
Overall Perceived Quality	Alone	0,862	20	0,009
	Accompanied	0,771	15	0,002
Tangibility	Alone	0,778	20	0,000
	Accompanied	0,857	15	0,022
Reliability	Alone	0,916	20	0,083
	Accompanied	0,879	15	0,045
Responsiveness	Alone	0,861	20	0,008
	Accompanied	0,926	15	0,237
Assurance	Alone	0,677	20	0,000
	Accompanied	0,851	15	0,018
Empathy	Alone	0,669	20	0,000
	Accompanied	0,932	15	0,288
Food	Alone	0,815	20	0,001
	Accompanied	0,931	15	0,287
Self-Rated Health Improvement	Alone	0,927	20	0,132
	Accompanied	0,951	15	0,535
HRQoL Improvement	Alone	0,625	20	0,000
	Accompanied	0,661	15	0,000

Table A8.7 – Shapiro-Wilk test for Living Home

UNIT		Shapiro-Wilk Statistic	df	Sig.
Overall Perceived Quality	Private	0,796	14	0,005
	Public	0,806	21	0,001
Tangibility	Private	0,828	14	0,011
	Public	0,840	21	0,003
Reliability	Private	0,967	14	0,837
	Public	0,915	21	0,068
Responsiveness	Private	0,929	14	0,296
	Public	0,873	21	0,011
Assurance	Private	0,807	14	0,006
	Public	0,707	21	0,000
Empathy	Private	0,945	14	0,491
	Public	0,731	21	0,000
Food	Private	0,947	14	0,510
	Public	0,851	21	0,004
Self-Rated Health Improvement	Private	0,897	14	0,104
	Public	0,956	21	0,447
HRQoL Improvement	Private	0,569	14	0,000
	Public	0,691	21	0,000

Table A8.8 – Shapiro-Wilk test for unit

TYPOLOGY		Shapiro-Wilk Statistic	df	Sig.
Overall Perceived Quality	Temporary care	0,862	17	0,017
	Long-lasting care	0,824	18	0,003
Tangibility	Temporary care	0,802	17	0,002
	Long-lasting care	0,941	18	0,305
Reliability	Temporary care	0,902	17	0,074
	Long-lasting care	0,893	18	0,043
Responsiveness	Temporary care	0,893	17	0,052
	Long-lasting care	0,857	18	0,011
Assurance	Temporary care	0,648	17	0,000
	Long-lasting care	0,787	18	0,001
Empathy	Temporary care	0,700	17	0,000
	Long-lasting care	0,719	18	0,000
Food	Temporary care	0,879	17	0,030
	Long-lasting care	0,950	18	0,432
Self-Rated Health Improvement	Temporary care	0,940	17	0,314
	Long-lasting care	0,924	18	0,155
HRQoL Improvement	Temporary care	0,834	17	0,006
	Long-lasting care	0,435	18	0,000

Table A8.9 – Shapiro-Wilk test for typology

Appendix 9 – Hypotheses testing Levene's Test

		Levene Statistic	Sig.
Age	Self-Rated Health Improvement	1,002	0,422
Gender	Self-Rated Health Improvement	0,886	0,353
Education level	Responsiveness	1,171	0,347
	Assurance	4,614	0,003
	Empathy	4,620	0,003
	Food	2,808	0,035
Marital Status	Tangibility	2,846	0,054
Place of residence	Reliability	7,473	0,010
	Responsiveness	17,802	0,000
	Empathy	67,926	0,000
Previous location	Food	9,382	0,001
	Self-Rated Health Improvement	0,045	0,956
Living home	Self-Rated Health Improvement	0,349	0,559
Unit	Reliability	7,684	0,009
	Self-Rated Health Improvement	0,139	0,712
Typology	Self-Rated Health Improvement	1,044	0,314

Table A9.1 – Levene's test

Appendix 10 – Hypotheses testing Parametric Tests

Independent variables	Dependent variables	Test Statistic	Sig.
Age	Global Health Improvement	0,458	0,766
Gender	Global Health Improvement	0,000	1,000
Education level	Responsiveness	1,717	0,162
Marital Status	Tangibility	0,802	0,502
Previous location	Global Health Improvement	0,377	0,689
Living home	Global Health Improvement	-0.961	0,344
Unit	Global Health Improvement	-1,408	0,168
Typology	Global Health Improvement	0,268	0,790

Table A10.1 – Parametric tests outputs

Appendix 11 – Hypotheses testing Nonparametric Tests

	Independent variables	Dependent variables	Test Statistic	Sig.
Personal characteristics	**Age**	Overall Perceived Quality	4,197	0,380
		Tangibility	5,949	0,203
		Reliability	4,250	0,373
		Responsiveness	2,816	0,589
		Assurance	3,984	0,408
		Empathy	3,940	0,414
		Food	2,672	0,614
		HRQOL improvement	2,274	0,686
	Gender	Overall Perceived Quality	150,000	0,915
		Tangibility	132,000	0,483
		Reliability	135,000	0,551
		Responsiveness	136,500	0,584
		Assurance	150,000	0,919
		Empathy	145,500	0,803
		Food	93,500	0,048
		HRQOL improvement	146,500	0,805
	Education level	Overall Perceived Quality	2,680	0,749
		Tangibility	11,294	0,046
		Reliability	4,504	0,479
		Assurance	3,439	0,633
		Empathy	3,183	0,672
		Food	5,365	0,373
		HRQOL improvement	4,796	0,441
		Global Health improvement	4,406	0,493
	Marital Status	Overall Perceived Quality	2,967	0,397
		Reliability	3,692	0,297
		Responsiveness	0,478	0,924
		Assurance	3,183	0,364
		Empathy	4,598	0,204
		Food	3,031	0,387
		HRQOL improvement	0,908	0,823
		Global Health improvement	6,476	0,091
	Place of residence	Overall Perceived Quality	34,500	0,039
		Tangibility	43,500	0,133
		Reliability	45,500	0,163
		Responsiveness	56,000	0,368
		Assurance	42,500	0,115
		Empathy	51,000	0,253
		Food	73,000	0,925
		HRQOL improvement	59,000	0,384
		Global Health improvement	15,000	0,004
	Previous location	Overall Perceived Quality	,386	0,824
		Tangibility	2,712	0,258
		Reliability	1,513	0,469
		Responsiveness	0,871	0,647
		Assurance	0,975	0,614
		Empathy	0,284	0,868
		Food	2,592	0,274
		HRQOL improvement	14,109	0,001
	Living home	Overall Perceived Quality	112,500	0,176
		Tangibility	142,000	0,787
		Reliability	93,000	0,056
		Responsiveness	121,500	0,339
		Assurance	101,000	0,093
		Empathy	108,500	0,163
		Food	123,000	0,366
		HRQOL improvement	138,000	0,644

Table A11.1 – Nonparametric tests outputs regarding personal characteristics

	Independent variables	Dependent variables	Test Statistic	Sig.
Service characteristics	**Unit**	Overall Perceived Quality	127,000	0,466
		Tangibility	137,500	0,746
		Reliability	123,000	0,417
		Responsiveness	136,500	0,722
		Assurance	145,500	0,959
		Empathy	142,500	0,878
		Food	139,500	0,800
		HRQOL improvement	113,500	0,193
	Typology	Overall Perceived Quality	139,500	0,630
		Tangibility	146,500	0,828
		Reliability	142,000	0,716
		Responsiveness	123,500	0,327
		Assurance	135,000	0,541
		Empathy	145,000	0,790
		Food	81,500	0,018
		HRQOL improvement	137,000	0,542

Table A11.2 – Nonparametric tests outputs regarding service characteristics