Erasmus University Rotterdam
Erasmus School of Economics

Master Thesis (Economics and Business with specialisation in Health Economics)

"Exploring Health-Related Quality of Life: A Comparative Study of Peru and Argentina and the Role of Demographic Factors in Shaping Health Outcomes using the EQ-5D instrument."

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10/07/2024

The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

Abstract

This thesis explores the Health-Related Quality of Life (HRQoL) in Peru and Argentina, focusing on the role of demographic factors using the EQ-5D instrument. Data was collected from an online survey conducted by Dynata, with representative samples from Peru (N=526) and Argentina (N=718) in terms of age and gender between August 29 and October 21, 2023. This study aims to estimate the population norms for both countries. For Peru, the value set from the study by Augustovski et al. (2020) was used. For Argentina, the "crosswalk" method from EQ-5D-3L to EQ-5D-5L with the EQ-5D-5L EuroQoL index value calculator was applied. These benchmarks can facilitate the comparison of the health status of individuals within the general population. By conducting comparative analysis and estimating population norms, this study aims to identify significant determinants of HRQoL and examine how these factors affect health outcomes in both countries. The overall mean EQ-5D-5L index was 0.87 for Peru and 0.94 for Argentina, with corresponding mean Visual Analogue Scale (VAS) scores of 73.22 and 75.92, respectively. The dimension with more reported problems for both countries was anxiety/depression, particularly among females. Robust statistical analyses evaluated the EQ-5D-5L index values and VAS scores across various demographic and socioeconomic groups. In Argentina, lower HRQoL was observed among older individuals, females, retirees, unemployed individuals, singles, and those finding it really difficult to make ends meet. Similarly, in Peru, lower HRQoL was linked to older age, females, singles, and finding it really difficult to make ends meet. Additionally, in Peru, lower HRQoL was associated with a specific health insurance type (Health Facility). These results indicate differences in HRQoL between Peru and Argentina and highlight the importance of health policies and interventions to address specific health needs in each country, contributing to the field of health economics and quality of life research.

Acknowledgments

I would like to express my deepest gratitude to my supervisor, Karen Trujillo Jara, for the unwavering support, guidance and encouragement throughout this research journey. Her feedback, dedication and time have been instrumental in shaping this thesis.

I am also immensely grateful for my family, friends and my boyfriend, Luke, for their constant support.

A special mention goes to my parents, Roberto and Mónica, whose belief in me has kept my spirits and motivation high during this process. They have been significant reference figures for me.

I would also want to thank my grandmother, Tina. Thank you for being a fundamental pillar in my life, even from afar.

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1. Introduction

Health-related quality of life (HRQoL) is an outcome measure used to inform healthcare decisions based on self-reported physical, mental, and social functioning (Van Wilder et al., 2021). It plays a role in the economic evaluation of modern medicines, health practices, and other health interventions (Kharroubi & Elbarazi, 2023). HRQoL was defined as a multidimensional construct in the late 1980s (Endo et al., 2024). It quantifies the effects on health and reflects individuals' values and beliefs, including their cultural context (Tejada et al., 2021). Nowadays, HRQoL is considered a primary outcome in many clinical trials such as oncology or mental health disorders, and in the research context (Emrani et al., 2020). Using questionnaires, HRQoL outcomes are collected, and responses can be analysed to determine a single utility score, which can represent a person's desire for a particular health state at a particular time. This score is usually between 0, being the worst health state and 1, which is the best health state (Clarijs et al., 2022). Accordingly, these scores can offer valuable insights for health policy development and comparative effectiveness research. They are derived using specific instruments commonly employed in economic evaluations for cost-effectiveness analysis, which calculate quality-adjusted life years (QALYs) by considering both the quantity and quality of life (Ibid., 2022).

In this context, the EQ-5D and SF-6D are the most used instruments in health economics and outcomes research to measure HRQoL (Walters & Brazier, 2005). In the SF-6D, six domains are defined by 11 questions from the SF-36: physical functioning, role limitation, social functioning, pain, mental health, and vitality (Yousefi et al., 2016). On the other hand, the EQ-5D is a widely used general HRQoL instrument that was developed by EuroQoL (EuroQol, 2023). When using the EQ-5D, the health status is evaluated along five dimensions: mobility, self-care skills, ability to perform usual activities, pain/discomfort, and anxiety/depression. The EQ-5D has both a three-level version (EQ-5D-3L) and a five-level version (EQ-5D-5L). The EQ-5D-3L categorizes health status into three levels: no problems, some problems, and extreme problems. The new version (EQ-5D-5L) has been introduced recently with two new intermediate levels that are categorized as follows: 1 'no problems', 2 'slight problems', 3 'moderate problems', 4 'severe problems', and 5 'extreme problems' (Bailey et al., 2021). Overall, there are 3125 possible health states in the new version, and its main objective is to improve the measurement properties of the EQ-5D-3L, reducing the ceiling effect and

increasing discriminatory power. The EQ-5D-3L noticed persistent problems with these "ceiling effects" as some individuals will indicate having "no problems" in all domains, which suggests that there is a lack of capability to distinguish those with moderate illness from the ones with mild conditions (Thompson & Turner, 2020). Golicki, et al., (2015) and Pattanaphesaj, et al., (2015) confirmed the higher discriminatory power and smaller ceiling effect for the 5L version when compared to the 3L, respectively (Augustovski et al., 2015). Hence, the EQ-5D-5L may be more sensitive to changes in health status over time, as the concentration is reduced around full health and responses are more widely distributed. The EQ-5D instrument also allows the identification of differences among demographic groups (Ibid., 2015). For example, it can reveal whether younger adults report significantly higher levels of anxiety/depression issues compared to older adults, it can also highlight the need to address mental health initiatives according to these findings. In addition, the EQ-5D is a widely used generic preference-based HRQoL measure, validated across various populations and health conditions for its reliability. The SF-6D instrument does not appear to provide any distinct advantage over the EQ-5D in clinical studies. Therefore, the EQ-5D, particularly the five-level version, is preferred for its ability to produce comparable and consistent data across studies and populations. Consequently, this thesis will refer to the EQ-5D-5L as the primary instrument for HRQoL measurement (van Stel & Buskens, 2006).

Since every EQ-5D-5L health state has an associated societal value (utility values reflecting the preferences of society when rating the different health states), this questionnaire is often used to determine the health status of a population, which can allow the development of population norms and so-called reference values. Population norms are useful when comparing burdens of disease and as normative reference values. For instance, when evaluating clinical programs or assessing public health on a large scale, the values of a patient or sample can be compared to these benchmarks to assess how they align with the general population, considering age and gender (Jiang et al., 2020). In addition, the EQ-5D instrument has an additional measure which is the visual analogue scale (EQ VAS) to assess patients' valuation of their own health (EuroQol, 2024). Specifically, the individual needs to provide an assessment of their health on a scale from 0, the worst health imaginable, to 100 which is the best health imaginable (Bailey et al., 2021).

Over the past two and a half decades, research and development have advanced and the EQ-5D has been increasingly used in healthcare decision-making (Devlin & Brooks, 2017). There are several factors that contributed to the expansion of EQ-5D use post-1990. The use of EQ-5D data and its associated value sets, which assign numerical values to various health states for QALY calculations in cost-effectiveness analyses, has become increasingly popular as Health Technology Assessment (HTA) organizations have been established in healthcare systems worldwide (Brazilian Human Rights Platform, 2017). In addition, considerable resources were allocated to making EQ-5D available in a variety of languages, allowing it to be used globally (Devlin & Brooks, 2017). Another factor was the rapid increase in applications for licenses for the EQ-5D to be used in a wide range of medical and health sector settings, as well as pharmaceutical companies beginning to use the instrument in greater numbers, reflecting HTA bodies' requirements for QALY evidence. Nowadays, its main applications are in population surveys to assess patients´ HRQoL and in measuring patients' health conditions to demonstrate the cost-effectiveness of healthcare solutions (Ibid., 2017). Furthermore, the primary countries in which it has been developed and used include those in Europe (e.g. Belgium, Portugal, France) and North America (e.g. Canada and the United States). Additionally, its significant usage is also observed in various Asian countries such as Japan or China, as well as in Oceania in the case of Australia or New Zealand. Healthcare research and policymaking in these regions have adopted the EQ-5D-5L, demonstrating its global relevance and applicability (Gerlinger et al., 2019).

The presence of this type of instrument in developing countries has been gradual due to the timely implementation of expensive financial and human resources (Augustovski et al., 2009). Consequently, there has not been enough in-depth local research and validation and up to date, only two countries (Uruguay and Colombia) in Latin America (LATAM) have developed detailed discussions about the EQ-5D-5L value sets (Brazilian Human Rights Platform, 2017). LATAM data on population norms can provide benchmarks for clinicians, researchers, and policymakers to compare the health status of patients, groups, or treatments, as previously mentioned (Bailey et al., 2022). Therefore, estimating EQ-5D-5L population norms in Latin America holds significant importance as it can inform healthcare systems for resources allocation and planning of interventions, facilitating the prioritization of areas requiring improvement (Santos et al., 2021). Considering this gap, countries from Latin America could benefit from the use of this instrument. For instance,

the 2008 financial crisis in Argentina had an impact on the application of Health Economic Evaluations (HEE), as it resulted in reduced healthcare budgets and resource limitations, which limited the use of HEE to ensure cost-effectiveness and efficient allocation of resources (Rubinstein et al., 2007). Additionally, key factors such as resource availability, stakeholder and societal demands, and the evidence of treatment efficacy were identified as crucial requirements for implementation. Despite these challenges, Rubinstein et al., (2007) found that the crisis acted as a strong incentive to expand the use of HEE in Argentina. It made decision-makers aware of these limitations and encouraged their involvement in the generation of local studies (Ibid., 2007). Furthermore, the institutional fragmentation of the Argentinian healthcare system and a lack of trust in the transferability of research done in wealthy countries are considered two significant perceived issues for the implementation of HEE (Ibid., 2007). Therefore, providing insights derived on the use of the EQ-5D-5L instrument for this particular context can be informative for HEE in the Argentinian healthcare system (Ibid., 2007).

Another country in LATAM that experiences similar limitations in terms of HEE due to the lack of primary data and methodologies is Peru (Mezones-Holguín, 2011). For instance, its healthcare system still operates with a very low budget, which hinders optimal development (Vivar-Mendoza, 2020). Augustovski et al., (2020) paper emphasize the ongoing efforts aimed at highlighting the importance of HEE in healthcare decision-making and the use of tools like the EQ-5D-5L for establishing population norms, which are crucial for an informed allocation of healthcare resources (Augustovski et al., 2020).

Estimating the EQ-5D-5L population norms in the aforementioned countries Argentina and Peru can allow to implement a first effort to provide insights into practical methodologies for understanding these norms. This includes exploring how various demographic characteristics can affect the individual´s HRQoL, thereby facilitating a better understanding of potential healthcare interventions. These findings can inform different decision-making processes, such as healthcare resource allocation, policy formulation, and efforts to address health disparities in these countries. Using the EQ-5D-5L instrument to estimate population norms across the five dimensions and five levels will contribute to a better understanding of HRQoL in each country. For instance, regarding the healthcare disparities previously mentioned, large healthcare facilities and greater health literacy can be found in urban regions like Buenos Aires and Lima, which

might improve HRQoL outcomes. On the other hand, access to healthcare is restricted and healthcare providers are scarce in rural areas like Peru's Amazon and Argentina's Chaco, which can show significant health disparities and worse HRQoL scores (Pailaha, 2023).

This research aims at assessing: "*What is the health-related quality of life among the populations of Peru and Argentina, and how do demographic factors in these countries contribute to variations in health outcomes?".*

This is divided into four sub-questions:

1. What is the HRQoL in Peru and Argentina?
2. What are the main factors determining HRQoL in Peru and Argentina?
3. What are the key variations in features between individuals with low HRQoL and the rest of the population in these countries?
4. How do these findings differ between the two countries?

This thesis is organized as follows. In Chapter 2 the theoretical framework will be discussed, which will include insights about Health Economic Evaluations, detailed information about the EQ-5D and population norms, and determinants of the HRQoL in Argentina and Peru. Following this, Chapter 3 will present the data and methods section, which describes the methodologies used, description of the dataset and empirical strategy. Then, Chapter 4 will present the analysis results. Finally, Chapter 5 will include a discussion of the findings, the study´s limitations, and conclusion. The thesis concludes with the bibliography and appendix.

2. Theoretical framework

The theoretical framework for this research is based on an understanding of the determinants that influence the HRQoL outcomes and the tool used to measure it (EQ-5D-5L instrument). Firstly, it will be shown the importance of Health Economic Evaluations for informed decision-making and resource allocation, particularly in Latin America, where diverse health challenges and economic constraints present significant issues to effective healthcare delivery. Then, the EQ-5D instrument and population norms will be discussed more in-depth and finally the specific socioeconomic factors affecting HRQoL in Peru and Argentina will be mentioned. By integrating these areas, this framework will provide the context for understanding and comparing HRQoL between these two countries.

2.1. Health Economic Evaluations in Healthcare Latin America

Health Economic Evaluations (HEE) are currently being more recognized in LATAM, nevertheless, this is still limited in comparison with developed countries (Augustovski et al., 2009). The application of HEE in healthcare is crucial for informed decision-making and resource allocation in LATAM, which is characterized by diverse health challenges and economic limitations. Health authorities face a significant challenge in their decision-making process. For instance, they must consider who should be covered, which services to cover, and what percentage of costs to cover (Rojas-Roque & Palacios, 2023). In low- and middle-income countries (LMIC), where the resources are scarcer, HEE, sometimes part of the health technology assessment (HTA) process, are increasingly used to make evidence-based decisions. In addition to developed countries, these countries arguably have a higher need to prioritize how their scarce resources are used (Ibid., 2023).

In LATAM, there are limited examples regarding HEE. For instance, Brazil is one of the pioneer countries in the development of methodological guidelines for the economic evaluation of health technologies. More specifically, in 2009, the Ministry of Health of Brazil published a manual that provided detailed guidelines for conducting HEE that can facilitate the adoption of new technologies and the regulation of reimbursement policies (Augustovski et al., 2009). Another example is the one in Mexico, which has recently shown a keen interest in formalizing its processes for HEE to inform health policy

decisions and resource allocation, although it is still in the process of developing a formal and comprehensive structure for the implementation of HEE (Ibid., 2009). Lastly, Uruguay is another country that by the end of 2007 started a healthcare reform by establishing an Integrated National Health System to improve access, quality and efficiency of healthcare services. Since then, Health Technology Assessments (HTA) and HEEs have been regularly used by the Ministry of Health since the reform to make decisions related to financial coverage and the provision of high-cost technologies (Augustovski et al., 2015).

Nevertheless, according to Singer (2008), it is quite disconcerting that advancements in HEEs have almost entirely been concentrated in developed countries, without any similar advances in developing countries that account for over 80% of the world's population and where scarce healthcare resources are spent without any analysis (Augustovski et al., 2009). Another challenge is increasing the resources (primarily funding and committed personnel) to build and maintain the technical ability to provide health economic analyses (Rojas-Roque & Palacios, 2023). The demographic change and the epidemiological transition from acute to chronic illnesses, along with the present trend of growing costs for healthcare innovation, place pressure on healthcare systems and budgets in Latin American areas. Therefore, there is a need for HEE research and the use of available instruments like the EQ-5D to determine healthcare priorities and policy (Ibid., 2023).

2.2. EQ-5D Instrument and Population Norms

The EuroQol Group created the EQ-5D, a standardized health status measure, to provide a simple, comprehensive measure of health for clinical and financial appraisal (Oemar, 2013). This instrument is available for multiple scenarios including different health conditions and treatments with a descriptive profile and a single value index for health status, used for population health surveys, for example. It is simple, and easy to understand, only taking a few minutes to complete it with instructions included in the questionnaire (Ibid., 2013). Furthermore, as mentioned in the introduction, the EQ-5D holds different questions to evaluate its five dimensions: mobility, self-care skills, ability to perform usual activities, pain/discomfort, and anxiety/depression. Additionally, this instrument originally started with three levels: no problems, some problems, and extreme

problems. And has been later developed with 5 levels: no problems, slight problems, moderate problems, severe problems, and extreme problems (Ibid., 2013). For example, an individual holding health state 13524 would have no problems walking, moderate problems performing self-care such as bathing or dressing, extreme problems with usual activities, slight pain/discomfort, and severe problems regarding anxiety/depression (Bailey et al., 2021). Currently, one of the instruments most frequently used worldwide to assess HRQoL is the EQ-5D questionnaire (EuroQol, 2023). Therefore, the fast increase in the adoption of HRQoL measurements in health evaluation and policymaking can be attributed to this expanding recognition (McCaffrey et al., 2016).

In relation to the EQ-5D questionnaire, population norms play a crucial role in its application. These are used to provide benchmark or reference scores based on representative samples of that region or country. In addition to being used to benchmark individual or group outcomes (e.g. patients) against the health of the general population, EQ-5D population norms can also be used to measure and identify the burden of disease among patients or patient groups (EuroQol, 2024). Moreover, population norms are useful for calculating quality-adjusted life years (QALYs) and for evaluating the economic impact of medical interventions and health technologies. There have been published population norms by age and gender for the EQ-5D-5L, including reported problems by the five EQ-5D dimensions, self-reported EQ VAS ratings, and EQ-5D values (Ibid., 2024). Some examples are mentioned below:

In the case of Belgium, a study by Van Wilder et al., (2018) represented the first nationally representative population norms using the EQ-5D. EQ-5D-5L questionnaires were administered in four languages (Dutch, French, German and English) to assess self-perceived health status. This research found that more than half of respondents were experiencing pain/discomfort issues and over a quarter were experiencing anxiety/depression problems. A score of 0.84 was averaged across all dimensions. The index values for women were significantly lower on all dimensions, particularly anxiety/depression and pain/discomfort. Following the age of 80, mobility problems, self-care issues, and everyday tasks became increasingly difficult (Ibid., 2018). On the other hand, Grochtdreis et al., (2019) developed a study to estimate population norms for Germany based on a representative sample through a cross-sectional phone survey. In this case, they found an EQ-5D-5L index score of 0.88 and an EQ-VAS score of 71.59. They

discovered that a lower EQ-5D-5L index was associated with female gender and older age ($p<0.001$). Additionally, there was an association between a higher EQ-5D-5L index score and full-time employment, higher education and private health insurance ($p<0.001$) (Ibid., 2019).

In the study by Ferreira et al., (2023), a mean EQ-5D-5L index score of 0.887 and 76.0 for the EQ-VAS in Portugal's general population was found. This index score is similar to those in other countries like Belgium which reported an index of 0.84 (Van Wilder et al., 2021), Germany with 0.88 (Grochtdreis et al., 2019), and Quebec with an index of 0.824 (Poder et al., 2020). Furthermore, 33.3% of the sample reported 'no problems' across all dimensions, highlighting variations in self-reported health status influenced by cultural inclinations. Additionally, demographic factors such as gender, age, education level, and chronic conditions were found to significantly impact EQ-5D-5L index scores. Even though the sample was large which was a strength to represent the Portuguese population, the sample was overrepresented by highly educated individuals, posing a limitation (Ferreira et al., 2023). Furthermore, another study on population norms using the EQ-5D-5L indexes was carried out in France, which highlighted the importance of population norms regarding QALY studies for the assessment of utility reductions associated with a particular disease-treatment connection. Overall, the mean value index in this study was 0.905, which specifically was 0.915 for males and 0.895 for females (Gautier et al., 2023).

Outside Europe, there was a study in Quebec by Poder et al., (2020). In this research, only the province of Alberta's population standards for the EQ-5D-5L were published in Canada. Within their results, they found a mean index score of 0.824 and an EQ-VAS of 75.9. Various of the reasons why some individuals indicated a lower score were due to being divorced or widowed, having no children or being unemployed, among others. Beyond Europe as well, there is a study available by Yang et al., (2018) that generated urban Chinese population norms using the EQ-5D-5L dimensions, EQ-VAS scores and EQ-5D-5L index scores by age and gender. Regarding the mean EQ-5D-5L index values, they varied from 0.912 for females over 70 to 0.971 for females aged 30-39 and for the EQ-VAS scores it ranged from 88.3 for males under 19 to 82.9 for females aged 60-69. Overall, respondents experienced more issues with pain/discomfort and anxiety/depression compared to mobility, self-care, and usual activities across all age

groups (Ibid., 2018). Lastly, a study in Tehran by Emrani et al., (2020) provided EQ-5D-5L utility scores and EQ-VAS values among the adult population. A crosswalk method was used to determine the HRQoL mean score, which was 0.79. Meanwhile, the VAS mean score was 71.7. For the first time in Tehran, the EQ-5D-5 L was applied to a large sample. A highly populated city (with 11% of Iran's population), Tehran includes different ethnicities, making it a good representative of Iran as a whole (Emrani et al., 2020).

In LATAM, the study by Bayley et al., (2021) aimed to provide Colombian population norms for EQ-5D-5L trying to show health inequalities and sociodemographic determinants of HRQoL. The paper indicated that the place of residency (urban/rural), household size and health insurance of the individual did not emerge as significant drivers of self-reported health as disparities based on ethnicity, income and education did (aside from sex and age). The study highlighted the need for further research regarding the lower health status of Indigenous populations and the impact of marital status on health outcomes (Bailey et al., 2021). Uruguay is the other country with EQ-5D-5L value sets available to date. Due to the lack of recommended EQ-5D-5L value set in the literature and no study regarding the EQ-5D-3L value set for Uruguay, this study compared their findings with the EQ-5D-5L crosswalk value set derived from the original 3L value set for Argentina since both countries have similar socio-economic background. Uruguay exhibited slightly elevated value sets across the different health states (Augustovski et al., 2015). This study, similar to previous research, was overrepresented by highly educated individuals. However, it made significant development in LATAM by being the first country to implement the EQ-5D-5L value set, providing insights for researchers to conduct cost-utility analyses in more countries in LATAM to guide decision-makers in allocating resources (Ibid., 2015).

As mentioned through numerous research examples, many countries are conducting research that directly elicits preferences from broad population samples to produce value sets for the EQ-5D-5L (Ferreira et al., 2023). While these values can be similar between countries, this is not always the case. It has been demonstrated that value sets vary among countries/regions in several ways, such as their relative importance to the five dimensions, the different levels, the length of the value scale, and how values are distributed across all 3125 health states, in the case of the EQ-5D-5L (Roudijk et al., 2022). There are

several reasons for the observed variations in values between countries. Two possible explanations for the disparities in population preferences for health states can be attributed to the methodological and population health state preferences (Ibid., 2022). Differences in population health state preferences are thought to be influenced by a variety of institutional and other country-specific variables that affect people's health possibilities and problems, as well as health expectations and norms. Countries have different healthcare systems, social insurance policies, systems of government, and cultures with different values and beliefs, and can even be different by geographical location (Ibid., 2022). However, it usually takes time for these studies to be finished and for the results to be shared (Oemar, 2013). Additionally, with the EQ-5D's standardized format, there is the possibility to allow for an accurate measurement across different populations. This facilitates comparisons of HRQoL between different demographic groups, countries, or patient populations. Researchers can analyze variations in health status and identify disparities in health outcomes across various subgroups. In this context, HRQoL is a critical variable in clinical practice and the medical literature with significant consequences for patients and society. Assessment of medical treatments using patient-reported outcome measures, including self-assessed HRQoL, as critical variables have gained popularity as the general population ages and treatments become more advanced, prevalent, and costly (Ibid., 2013).

As previously described, there are different studies that have reported differences in the variability of population norms considering the different demographic factors like age and ethnicity but also socioeconomic factors. Therefore, this thesis intends to contribute to the existing literature by deriving population norms and gaining insights into the HRQoL of Peru and Argentina. Moreover, it aims to enrich the literature by including additional demographic factors in the analysis such as a broader age range compared to the study from Colombia by Bayley et al., (2021) or marital status, and employment status, which was not considered in the Uruguay study by Augustivski et al., (2015), for instance.

2.3. Determinants of HRQoL in Peru and Argentina

Peru has been experiencing serious challenges in terms of inclusion, inequality, and vulnerabilities in the last two decades (Rubiano-Matulevich, 2023). There are still

significant economic vulnerabilities present in Peru which are related to *"development traps",* which are the country´s vicious cycles of poor service quality, unhappiness, and low desire to pay taxes, which decreases the state's economic legitimacy (OECD, 2019). This country currently faces the challenge of low productivity growth, which has already led the economy to slow down significantly (Olmo et al., 2021). Furthermore, Peru has a weak institutional development, since socioeconomic benefits are still not distributed fairly. For a significant proportion of the population, vulnerabilities remain serious, and inequality is still severe (OECD, 2019). According to the World Health Organization (WHO), Peru´s health system is fragmented, and approximately one-third of the population remains uninsured (WHO, 2017). One-third of the country's population is covered by Comprehensive Health Insurance (SIS), which includes the homeless and the poor, while 24.8% are covered by social security (ESSalud), which includes the formal sector population. Aside from social security, there are also private insurance and healthcare providers that offer low-complexity benefits (Giedion et al., 2014). Peru is divided both socioeconomically but also culturally between the rural and urban regions. Peru has two distinct cultural and social regions: rural and urban. According to a recent census, around 75.9% of the people live in urban centres with the remaining 24.1% living in rural regions. Peru suffers from significant economic inequality, with 20% of the population holding more than 54% of the national GDP (Hart, 2023). Approximately 50% of the population lives in poverty, with a daily income of USD $3.10, while 20% live far below the poverty line, with a daily income of around USD $1.90 (Ibid., 2023). Although urban Peruvians have more access to excellent healthcare than rural Peruvians, both percentages remain low: 16% of urban Peruvians have access to high-complexity medical centres, while just 5% of rural Peruvians have access to similar facilities. Both rural and urban areas suffer from a lack of high-quality healthcare, with the most extreme differences occurring in the country's poorest regions (Ibid., 2023). In a study by Elera-Fitzcarrald et al., (2018) regarding Peru, it was stated that HRQoL was positively correlated with Socio-Economic Status (SES) in four domains: planning, emotional health, intimate relationships, and fatigue. Also, low social support may reduce HRQoL scores for patients with low SES as a result of factors such as poor access to healthcare, poor education, and low income (Elera-Fitzcarrald et al., 2018). Therefore, there are still major challenges in the way of the country's goal of becoming more than a developing country into one that can be sustainable and able to improve individual´s HRQoL (OECD, 2019).

Argentina has historically been more advanced than Peru, but Argentina´s economic stability has been threatened by excessive public debt and inflation, affecting the general well-being of its residents (Brazilian Human Rights Platform, 2017). Argentina was wealthier than other Latin American countries in the early twentieth century. However, the country steadily lost influence in the global economy over the course of the century, notably during the 1970s (Carrere et al., 2022). As pointed out by the literature, some of the considerable causes and symptoms of repeated periods of short-term growth and contraction were the result of both severe inflation crises and economic recessions, which also included poor macroeconomic governance and high political instability (Brazilian Human Rights Platform, 2017). Consequently, compared to other countries, Argentine income per capita developed more slowly. Therefore, the political and financial instability that followed many economic recessions in the latter part of the 20th century led to significant shifts in social and economic stratification. (Ibid., 2017). These economic and political factors have had a direct impact on HRQoL outcomes. There have been numerous studies that have examined how recessions affect health and how they are impacted by different economic policies. Some health outcomes, such as road-traffic fatalities and alcohol-related mortality, seem to decline after recessions, whereas suicides and cardiovascular disease worsen. Furthermore, there is sufficient evidence that suggests that people who lose their jobs suffer from lower HRQoL, which makes it important to understand the differences in the impacts and how they are affected by economic and social policy. It has been found that austerity policies in the face of recession, as well as recessions in countries with minimal welfare state support, worsen negative health impacts (McCartney et al., 2019).

Not only during recessions but overall, there is an effect between specific factors like economic stability and HRQoL. In Pezzuchi´s (2018) paper, he states from a psychosocial perspective that economic stability inequality affects individuals´ HRQoL by causing stress and anxiety. Additionally, the neo-materialistic perspective argues that economic stability inequality leads to lower investment in the social and environmental conditions necessary to promote health with lower incomes (Ibid., 2018). The study found that being male or younger is statistically significant and increases the probability of an individual having a better HRQoL. Specifically, men have a 32.2% higher probability of having a

better HRQoL compared to women. Furthermore, each passing year decreases the probability of having a better HRQoL by approximately 10% (Ibid., 2018).

Given the gap in health assessment tools in developing countries, particularly in LATAM, there is a significant opportunity to use the EQ-5D instrument in these contexts. This potential is highlighted by examining the estimation of population norms in various countries and reviewing the background of HEE in LATAM, where disparities persist. Additionally, considering the various factors influencing HRQoL and the specific challenges faced by Argentina and Peru provides the necessary context for understanding and comparing HRQoL in these two countries.

3. Data and Methods

This section will discuss the data and methodologies employed in this thesis to investigate the HRQoL in Argentina and Peru. The analysis aims to provide an understanding of the estimation methodologies for population norms in both countries and to provide a comparative comprehension of HRQoL by examining various demographic and socioeconomic variables and their association with the variations in health outcomes.

3.1. Data source

This research adopts a cross-sectional study design in which the dataset used comes from an online survey conducted by the company "Dynata" across four regions: Peru (N=526), Argentina (N=718), Chile (N=557), and Ecuador (N=500). These samples are representative of each country by age and gender. The survey, administered between August 29 and October 21, 2023, targeted men and women aged 18 to 75. This study focuses on Peru and Argentina, as previously mentioned. Moreover, participants gave their consent for the use of their data for scientific studies, publications, and presentations, ensuring their preferences regarding data usage are respected.

3.1.2. Summary statistics

The HRQoL for each country, measured by the EQ-5D-5L Index and EQ-VAS, serves as the dependent variable in this study. The EQ-5D-5L ranges from 0 to 1 and it is stratified by age and gender, while the EQ-VAS ranges from 0 to 100 and complements the EQ-5D-5L index as an additional dependent variable. Age is categorized into six groups 18-24, 25-34, 35-44, 45-54, 55-64, and 65-75, and gender is classified as either male or female.

In terms of data adjustment, out of the total samples from Peru and Argentina, two respondents indicated "other" or "prefer not to say" regarding gender. For the purposes of this analysis, 716 observations were considered for Argentina, while the number of observations for Peru remained unchanged. This decision was based on the rationale that these two responses were unlikely to affect the results significantly. Including them could introduce ambiguity, as they represent a very small fraction of the sample and do not align with the binary gender categories commonly used in HRQoL studies. Additionally,

another change is related to the “Ability to ends meet” variable. The variable was chosen over direct income to facilitate an appropriate comparison between Argentina and Peru, considering the different currencies they use (the Argentine Peso and the Peruvian Sol).

Furthermore, some covariates can be listed. “Education” was categorized into three levels: low, middle and high. “Health insurance” is categorized differently for Argentina and Peru. For Argentina, the categories are “Social Security or prepaid insurance (PAMI included), “State Health Programmes”, those who do not have either of those or “other”. For Peru, the categories are “ESSALUD”, “Private Health Insurance”, “Health Care Facility (EPS)”, “FF Insurance. AA. / Police”, “SIS”, “No insurance” or “Other”. Moreover, the categorical variable of “Current Status” represents an individual´s marital status, with categories such as married, lives like married, divorced, separated, widowed or single. Furthermore, the variable “Employment” includes eight categories: full-time, part-time (work less than 30 hours), self-employed, retired, homemaker, student, unemployed and other. The size of the household is observed holding five categories, ranging from one person to more than six people. The variable “Caregiving” includes six categories: caregiving for one or more of my children, parents/parents-in-law, grandparents, other family members, non-family members and none. Additionally, the variable “Ability to ends meet” (proxy of income) includes four categories: really difficult, slightly difficult, slightly easy and really easy. “Religion” was included as a binary variable, which takes value 1 if religious or 2 if not religious. Lastly, the region variable is categorical with 24 categories for Argentina which was then grouped into six regions for easier interpretation and readability: Norte Grande Argentino, Nuevo Cuyo, La Patagonia, CABA and Buenos Aires (694 from the total of 716 respondents reported their region of residence). In Peru, there were no missing observations for this variable. The 25 regions of residence were categorized into three groups: the coast, the Amazon, and the highlands. All these variables previously mentioned were included to ensure that the sample reflects the populations of interest in Argentina and Peru, to support meaningful analysis and conclusions.

Tables 1 and **2** present descriptive statistics for Argentina and Peru, respectively, to provide a general understanding of the two samples. In Argentina, most respondents fall within the 25-54 age range (21.73%), while in Peru, the predominant age range is 45-54 (22.62%). In terms of education, 2.76% of the sample in Argentina have a low education

level and 1.52% were identified in Peru, which shows an underrepresentation of low-educated individuals in both samples. Furthermore, in 37.33% of the sample in Argentina, the household size is between 4 to 6 people, while in Peru 52.48% has this composition. Conversely, 13.51% of Argentinians live alone, compared to only 5.70% of Peruvians.

Lastly, a factor to highlight is the ability to make ends meet in both countries. Most of the individuals in Argentina (43.99%) found it slightly difficult to be able to cover basic monthly expenses, in Peru it was about 40.87%. Additionally, a slightly higher percentage of Peruvians (9.70%) report finding it really difficult to cover these expenses, compared to Argentinians (7.68%).

Table 1. Socio- demographic characteristics in Argentina

Gender		
Male	363	50.56%
Female	353	49.16%
Other	1	0.14%
Prefer not to say	1	0.14%
Total	718	
Age Group		
18-24	151	21.03%
25-34	156	21.73%
35-44	147	20.47%
45-54	117	16.30%
55-64	85	11.84%
65-75	62	8.64%
Total	718	
Education[1]		
Low	18	2.76%
Middle	407	62.52%
High	226	34.72%

[1] **Low education** includes individuals that have no education or only primary education; **Middle education** counts with individuals that that have EGB, secondary school, post-compulsory secondary education or terciary (non-university); **High education** includes individuals that have a university degree or a post-graduate degree.

Health Insurance[2]		
Social security or prepaid insurance (PAMI included)	475	66.34%
State Health Programmes	57	7.96%
Do not have social security, prepaid insurance or state health programmes	180	25.14%
Other	13	1.82%
Current Status		
Married	242	33.70%
Lives like married	133	18.52%
Divorced	31	4.32%
Separated	37	5.15%
Widowed	12	1.67%
Single	263	36.63%
Size of the Household		
1	97	13.51%
2	155	21.59%
3	182	25.35%
Between 4 and 6 people	268	37.33%
More than six people	16	2.23%
Caregiving		
One or more of my children	264	36.77%
One or more of my parents/parents-in-law	35	4.87%
One or more of my grandparents	7	0.97%
One or more of other members of my family	42	5.85%
One or more that are not members of my family	6	0.85%
None	383	54.34%
Employment Category		
Full-time	279	38.86%
Less than 30 hours	72	10.03%
Self-employed	172	23.96%
Retired	50	6.96%
Homemaker	25	3.48%
Student	63	8.77%

[2] **PAMI:** public health insurance targeted to retired people.

Unemployed	48	6.69%
Other	9	1.25%
Ability to make ends meet		
Really difficult	135	18.85%
Slightly difficult	315	43.99%
Slightly easy	211	29.47%
Really easy	55	7.68%
Religion		
Yes	314	43.73%
No	404	56.27%
Region [3]		
Patagonia	38	5.48%
Centre	133	19.16%
CABA	107	15.42%
Buenos Aires	304	43.80%
Norte Grande Argentino	73	10.52%
Nuevo Cuyo	39	5.62%

Table 2. Socio-demographic characteristics in Peru

Gender		
Male	269	51.14%
Female	257	48.86%
Total	526	
Age Group		
18-24	82	15.59%
25-34	118	22.43%
35-44	101	19.20%
45-54	119	22.62%

[3] **Regions in Argentina:**

Patagonia: Chubut, La Pampa, Neuquén, Santa Cruz and Tierra del Fuego

Centre: Córdoba, Entre Ríos and Santa Fe

CABA: CABA

Buenos Aires: Buenos Aires

Norte Grande Argentino: Catamarca, Chaco C, Corrientes, Fomosa, Jujuy, Misiones, Tucumán, Salta and Santiago del Estero

Nuevo Cuyo: La Rioja, Mendoza, San Juan and San Luis

55-64	65	12.36%
65-75	41	7.79%
Total	526	
Education[4]		
Low	8	1.52%
Middle	341	64.83%
High	177	33.65%
Health Insurance[5]		
ESSALUD	239	45.44%
Private Health Insurance	35	6.65%
Health Care Facility	12	2.28%
FF Insurance. AA. / Police	13	2.47%
SIS	180	34.22%
None	59	11.22%
Other	13	2.47%
Current Status		
Married	182	34.60%
Lives like married	119	22.62%
Divorced	21	3.99%
Separated	38	7.22%
Widowed	8	1.52%
Single	158	30.04%
Size of the Household		
1	30	5.70%
2	61	11.60%
3	125	23.76%
Between 4 and 6 people	275	52.28%
More than six people	35	6.65%
Caregiving		
One or more of my children	200	38.02%

[4] **Low education** includes individuals that have no education or only primary education; **Middle education** counts with individuals that that have secondary school or superior (non-university); **High education** includes individuals with university studies, university degree, a post-graduate degree or a PhD.

[5] **ESSALUD:** Public health insurance financed through contributions from workers and employees
Health Care Facility: complementary services to ESSALUD
SIS: public and free health insurance
FF Insurance. AA. /Police: specific health insurance system designed for members of the Armed Forces and the Peruvian National Police

One or more of my parents/parents-in-law	46	8.75%
One or more of my grandparents	6	1.14%
One or more of other members of my family	34	6.46%
One or more that are not members of my family	9	1.71%
None	253	48.10%
Employment Category		
Full-time	173	32.89%
Less than 30 hours	48	9.13%
Self-employed	149	28.33%
Retired	16	3.04%
Homemaker	50	9.51%
Student	34	6.46%
Unemployed	48	9.13%
Other	8	1.52%
Ability to Cover Basic Monthly Expenses		
Really difficult	103	19.58%
Slightly difficult	215	40.87%
Slightly easy	157	29.85%
Really easy	51	9.70%
Religion		
Yes	269	51.14%
No	257	48.86%
Region [6]		
Coast	431	81.94%
Highlands	69	13.12%
Amazon	26	4.94%

[6] **Regions in Peru:**

Coast: Tumbes, Piura, Lambayeque, La Libertad, Prov. Const. del Callao, Lima, Ica, Moquegua and Tacna

Highlands: Áncash, Apurímac, Arequipa, Ayacucho, Cajamarca, Cusco, Huancavelica, Huánuco, Junín, Pasco and Puno

Amazon: Amazonas. Loreto, Madre de Dios, San Martín and Ucayali

3.2. Methodology

3.2.1. EQ-5D-5L Questionnaire

Respondents self-completed the EQ-5D-5L questionnaire, rating each dimension from 1 (no problems) to 5 (extreme problems). The analysis was conducted using STATA/MP 18.0. Based on the research question and subquestions of this thesis, utility scores to determine the health-related quality of life among the populations of Peru and Argentina were calculated using two different techniques. On the one hand, the value set of Peru was already available from a paper by Augustovski et al., (2020), which produced EQ-5D-5L value sets for the Peruvian general population. The paper by Augustovski et al.,(2020) sampled 1000 adults from Lima, Iquitos, and Arequipa, who were interviewed by local medical students. Data collection included completing 11 composite time trade-offs (cTTO) and a discrete choice experiment (DCE), with quality control measures to monitor task completion time and identity inconsistent response patterns. This allowed to compute the EQ-5D index of Peru (Augustovski et al., 2020).

On the other hand, for Argentina, since there are no value sets available for the EQ-5D-5L, the EQ-5D-3L value sets were used (van Hout et al., 2012). Then, a mapping ("crosswalk") technique was conducted to derive the 5L value sets from the available 3L data. This was computed by using the EQ-5D-5L EuroQoL index value calculator, which converted the 3L health states to their 5L equivalents (Ibid., 2012).

After computing these indexes, which could go from 0 to 1, for Peru and Argentina, it was possible to observe the different values to establish what is the HRQoL among participants depending on how they answered the EQ-5D questionnaire, as previously mentioned.

3.2.2 Empirical Strategy

Using a non-causal approach, the study investigates Health-Related Quality of Life (HRQoL) in Peru and Argentina and how demographic factors influence health outcomes. Using cross-sectional survey data, this study examines associations between demographic and socioeconomic characteristics. Cross-sectional data limits the ability to observe individuals' behavior over time, making causality difficult to establish (Wooldridge, 2018). Despite this limitation, a non-causal approach still provides an

understanding of how demographic factors in Peru and Argentina influence variations in health outcomes (Ibid., 2018).

This analysis was conducted using an Ordinary Least Squares (OLS) regression model. This method is appropriate for estimating associations between the dependent variable (HRQoL) and independent variables (demographic and socioeconomic factors), facilitating a clear understanding of these associations. OLS has been similarly used in other studies, such as McCaffrey et al. (2016) in their work on "HRQoL measured using the EQ-5D-5L: measured using the EQ-5D-5L: South Australian population norms" and Emrani et al. (2020) in "HRQoL measured using the EQ-5D-5L: population norms for the capital of Iran". Several assumptions were checked to validate the use of this model: linearity, no multicollinearity, independence, assumption of normality and homoscedasticity. Except for heteroskedasticity, none of these assumptions were violated. The Breusch-Pagan/Cook-Weisberg test (shown in **Appendix 5**) indicated heteroskedasticity across all regression models, in the EQ-5D-5L index and EQ-VAS score in Peru and Argentina ($p<0.01$). To ensure the validity of the results, robust OLS regressions to correct for heteroskedasticity were used. Using robust OLS regressions ensures reliable and accurate results despite heteroscedasticity and mitigates the influence of outliers, resulting in more reliable estimates. Additionally, HRQoL is measured using the EQ-5D, a validated instrument known for its reliability in assessing HRQoL across different populations (Hernandez et al., 2019).

To address the research questions and identify the main factors determining HRQoL in Peru and Argentina, the demographic characteristics of both countries were included. This approach also aimed to understand how these factors differ between the two countries. Including relevant covariates regarding demographic characteristics and socio-economic indicators enhanced internal validity (Augustovski et al., 2015). The following equations address the research questions by quantifying the association between the HRQoL and various demographic and socioeconomic factors in Argentina and Peru**. Equations (1)** and **(3)** model the EQ-5D-5L index as a function of these factors in these target countries, highlighting which characteristics significantly impact the HRQoL in each country. Similarly, **equations (2)** and **(4)** model the EQ-VAS score, providing another perspective on the influence of these variables. By comparing the coefficients across these models, the determinant factors shaping HRQoL in Peru and Argentina will

be identified. Additionally, key differences between individuals with low HRQoL and the rest of the population will be highlighted, and the differences in findings between these two countries will be shown.

Argentina´s EQ-5D-5L index and EQ-VAS score:

$$(1)\boldsymbol{EQ5D5L\ index\ Argentina} =$$
$$= \beta_0 + \beta_1 Ag_i + \beta_2 G_i + \beta_3 Ed_i + \beta_4 Emp_i + \beta_5 Rel_i + \beta_6 CS_i + \beta_7 H_i + \beta_8 Reg_i + \beta_9 Ends_i + \beta_{10} Care_i + \beta_{11} Ins1_i + \beta_{12} Ins2_i + \beta_{13} Ins3_i + \epsilon$$

$$(2)\boldsymbol{EQVAS\ Argentina}$$
$$= \alpha_0 + \alpha_1 A_i + \alpha_2 G_i + \alpha_3 Ed_i + \alpha_4 Emp_i + \alpha_5 Rel_i + \alpha_6 CS_i + \alpha_7 H_i + \alpha_8 Reg_i + \alpha_9 Ends_i + \alpha_{10} Care_i + \alpha_{11} Ins1_i + \alpha_{12} Ins2_i + \alpha_{13} Ins3_i + \epsilon$$

Peru´s EQ-5D-5L index and EQ-VAS score:

$$(3)\boldsymbol{EQ5D5L\ index\ Peru}$$
$$= \gamma_{\gamma 0} + \gamma_1 A_i + \gamma_2 G_i + \gamma_3 Ed_i + \gamma_4 Emp_i + \gamma_5 Rel_i + \gamma_6 CS_i + \gamma_7 H_i + \gamma_8 Reg_i + \gamma_9 Ends_i + \gamma_{10} Care_i + \gamma_{11} Ins1_i + \gamma_{12} Ins2_i + \gamma_{13} Ins3_i + \gamma_{14} Ins4_i + \gamma_{15} Ins5_i + \gamma_{16} Ins6_i + \epsilon$$

$$(4)\boldsymbol{EQVAS\ Peru} =$$
$$= \delta_{\gamma 0} + \delta_1 A_i + \delta_2 G_i + \delta_3 Ed_i + \delta_4 Emp_i + \delta_5 Rel_i + \delta_6 CS_i + \delta_7 H_i + \delta_8 Reg_i + \delta_9 Ends_i + \delta_{10} Care_i + \delta_{11} Ins1_i + \delta_{12} Ins2_i + \delta_{13} Ins3_i + \delta_{14} Ins4_i + \delta_{15} Ins5_i + \delta_{16} Ins6_i + \epsilon$$

Where:

- $\boldsymbol{Ag_i}$: Age
- $\boldsymbol{G_i}$: Gender
- $\boldsymbol{Ed_i}$: Education
- $\boldsymbol{Emp_i}$: Employment Category
- $\boldsymbol{Rel_i}$**:** Religion
- $\boldsymbol{CS_i}$: Current Status
- $\boldsymbol{H_i}$: Household Size
- $\boldsymbol{Liv_i}$: Region
- $\boldsymbol{Ends_i}$: Ability to ends meet
- $\boldsymbol{Care_i}$: Caregiving
- $\boldsymbol{Ins_i}$: Insurance Type
- $\boldsymbol{\epsilon}$**:** Error term

4. Results

This section presents the results from the EQ-5D-5L questionnaire, focusing on an analysis of the five EQ-5D instruments´ dimensions by age and gender as well as the most commonly reported health states in Argentina and Peru. Furthermore, the mean EQ-VAS and index values by age group and gender and finally, the robust OLS regressions mentioned will be presented. These results contribute to reaching conclusions about the research questions stated in the introduction of this thesis. Overall, it will be presented a comprehensive understanding of how demographic factors in these countries impact differences in health outcomes.

4.1. Health States in Argentina and Peru

Tables 3 and **4** show the results of the EQ-5D-5L by age and gender in Argentina and Peru, respectively, which reveal notable trends in HRQoL, as well as distinct patterns between these two countries. In Argentina, both males and females showed a higher rate of mobility and self-care issues with advancing age. For instance, among Argentine females, 61.90% of those aged 65-75 reported no mobility problems, whereas this figure was 94.37% for those aged 18-24. In Peru, a similar trend was observed, since 57.14% of females aged 65-75 reported no mobility problems. For males, Argentine data shows 63.41% of those aged 65-75 report no mobility issues, compared to 94.94% in the 18-24 age group, while Peruvian males report 76.47% and 94.12% respectively. Both countries illustrate an increased rate of mobility problems among older populations, though Argentine data suggests more variation across age groups.

Table 3. EQ-5D-5L male respondents by age for Argentina in %

Male	18-24	25-34	35-44	45-54	55-64	65-75
Mobility						
1	94.94%	92.96%	87.18%	96.23%	75.61%	63.41%
2	5.06%	4.23%	8.97%	1.89%	12.20%	21.95%
3	0%	1.41%	3.85%	1.89%	9.76%	9.76%
4	0%	1.41%	0%	0%	2.44%	2.44%
5	0%	0%	0%	0%	0%	2.44%
Self-care						
1	96.20%	98.59%	97.44%	98.11%	95.12%	95.12%
2	2.53%	1.41%	2.56%	1.89%	2.44%	0%
3	1.27%	0%	0%	0%	2.44%	2.44%
4	0%	0%	0%	0%	0%	0%

5	0%	0%	0%	0%	0%	2,44%
Usual activities						
1	87.34%	91.55%	84.62%	88.68%	80.49%	85.37%
2	10.13%	4.23%	12.82%	9.43%	12.20%	9.76%
3	2.53%	2.82%	1.28%	1.89%	4.88%	2.44%
4	0%	1.41%	1.28%	0%	2.44%	2.44%
5	0%	0%	0%	0%	0%	0%
Pain/Discomfort						
1	65.82%	63.38%	46.15%	56.60%	36.59%	46.34%
2	30.38%	29.58%	46.15%	35.85%	48.78%	41.46%
3	2.53%	7.04%	6.41%	5.66%	12.20%	12.20%
4	1.27%	0%	1.28%	1,89%	2,44%	0%
5	0%	0%	0%	0%	0%	0%
Anxiety/depression						
1	51.90%	54.93%	46.15%	69.81%	63.41%	58.54%
2	30.38%	28.17%	38.46%	18.87%	21.95%	31.71%
3	12.66%	15.49%	10.26%	7.55%	12.20%	7.32%
4	5.06%	1.41%	1.28%	0%	2.44%	2.44%
5	0%	0%	3,85%	3.77%	0%	0%

Table 4. EQ-5D-5L female respondents by age for Argentina in %

Female	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65-75**
Mobility						
1	94.37%	95.24%	94.20%	84.38%	77.27%	61.90%
2	2.82%	1.19%	4.35%	9.38%	13.64%	33.33%
3	1.41%	2.38%	1.45%	6.25%	9.09%	4.76%
4	1.41%	0%	0%	0%	0%	0%
5	0%	1%	0%	0%	0%	0%
Self-care						
1	100.00%	97.62%	97.10%	98.44%	100%	90.48%
2	0%	2.38%	1.45%	1.56%	0%	9.52%
3	0%	0%	0%	0%	0%	0%
4	0%	0%	1.45%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%
Usual activities						
1	87.32%	84.52%	86.96%	85.94%	86.36%	85.71%
2	11.27%	8.33%	13.04%	10.94%	9.09%	9.52%
3	1.41%	7.14%	0%	3.12%	4.55%	4.76%
4	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%
Pain/Discomfort						
1	47.89%	55.95%	53.62%	29.69%	38.64%	33.33%
2	46.48%	30.95%	43.48%	46.88%	33.36%	47.62%
3	5.63%	9.52%	2.90%	21.88%	22.73%	14.29%
4	0%	1.19%	0%	1.56%	2.27%	4.76%
5	0%	2,38%	0%	0%	0%	0%
Anxiety/depression						
1	23.94%	28.57%	53.62%	46.88%	54.55%	57.14%
2	40.85%	48.81%	23.19%	34.38%	34.09%	33.33%
3	29.58%	10.71%	15.94%	7.81%	6.82%	9.52%
4	4.23%	4.76%	5,80%	10.94%	4.55%	0%
5	1.41%	7.14%	1.45%	0%	0%	0%

In Peru, males generally rated their health state regarding usual activities higher than females across most age groups. For example, among the 18-24 age group, 94.12% of males reported no problems with usual activities, compared to 76.92% of females. This is similar for the 25-34 age group, with 92.86% of males versus 78.95% of females. In Argentina, when looking at usual activities, 87.32% of females aged 18-24 reported no problems, which is similar across age groups. The same trend is observed among males as well. Pain and discomfort trends also show similarities and differences between the two countries. In Argentina, the rate of severe pain is notable in the 55-64 age group, with 22.73% of females and 12.20% of males reporting significant pain. Peruvian data indicates a consistent rate of pain across age groups, with a significant portion of females (57.89%) aged 55-64 reporting moderate pain, and males aged 55-64 reporting 56.52% at a similar level.

As shown in both tables, a minority of individuals reported severe (4) and extreme (5) problems across the different dimensions. Nevertheless, there is still a significant concern in Peru and Argentina regarding anxiety/depression, particularly among females reporting the worst health state in this dimension. For example, in Peru, 9.23% of the females aged 18-24 reported the worst health state in this dimension, whereas the highest percentage of females reporting the worst health state in Argentina is within the cohort of 25-34 with a 7.14% (Proportions that represent the % for Tables **3,4, 5 and 6** are shown in **Appendix 1 and 2**).

Table 5. EQ-5D-5L results for males by age for Peru in %

Male	18-24	25-34	35-44	45-54	55-64	65-75
Mobility						
1	94.12%	85.71%	80.36%	85.14%	78.26%	76.47%
2	5.88%	9.52%	14.29%	12,16%	1.22%	14.71%
3	0%	4.76%	5.36%	2.70%	4.35%	5.88%
4	0%	0%	0%	0%	2.17%	2.94%
5	0%	0%	0%	0%	0%	0%
Self-care						
1	94.12%	92.86%	89.29%	95.95%	95.65%	91.18%
2	0%	2.38%	10.71%	4.05%	0.00%	5.88%
3	5.88%	4.76%	0%	0%	0%	2.94%
4	0%	0%	0%	0%	4.35%	0%
5	0%	0%	0%	0%	0%	0%
Usual activities						
1	94.12%	92.86%	82.14%	87.84%	80.43%	73.53%
2	5,88%	7.14%	16.07%	12.16%	13.04%	20.59%
3	0%	0%	1.79%	0%	6.52%	5.88%
4	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%
Pain/Discomfort						
1	82.35%	59.52%	46.43%	54.05%	36.96%	50%
2	17.65%	35.71%	41.07%	43,24%	56,52%	32.35%
3	0%	4.76%	10.71%	2,70%	4,35%	14.71%
4	0%	0%	1.79%	0%	2.17%	2.94%
5	0%	0%	0%	0%	0%	0%
Anxiety/depression						
1	70.59%	66.67%	55.36%	63.51%	56.52%	61.76%
2	17.65%	23.81%	30.36%	27.03%	41.30%	17,65%
3	5.88%	9.52%	8.93%	8.11%	0%	20.59%
4	0%	0%	3.57%	1.35%	2.17%	0%
5	5.88%	0%	1.79%	0%	0%	0%

Table 6. EQ-5D-5L results for females by age for Peru in %

Female	18-24	25-34	35-44	45-54	55-64	65-75
Mobility						
1	90.77%	92.11%	84.44%	77.78%	78.95%	57.14%
2	7.69%	6.58%	11.11%	15.56%	15.79%	28.57%
3	1.54%	1.32%	4.44%	6.67%	5.26%	14.29%
4	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%
Self-care						
1	93.85%	92.11%	95.56%	97.78%	100%	85.71%
2	4.62%	6.58%	2.22%	2.22%	0%	14.29%
3	1.54%	1.32%	2.22%	0%	0%	0%
4	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%
Usual activities						
1	76.92%	78.95%	86.67%	88.89%	94.74%	71.43%
2	13.85%	13.16%	8.89%	11.11%	5.26%	28.57%

3	9.23%	7.89%	4.44%	0%	0%	0%
4	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%
Pain/Discomfort						
1	41.54%	43.42%	46.47%	35.56%	31.58%	42.86%
2	38.46%	36.84%	40%	48.89%	57.89%	42.86%
3	15.38%	15.79%	13.33%	11.11%	10.53%	14.29%
4	3.08%	2.63%	0%	4.44%	0%	0%
5	1.54%	1.32%	0%	0%	0%	0%
Anxiety/depression						
1	29.23%	55.26%	53.33%	48.99%	73.68%	57.14%
2	32.31%	31.58%	33.33%	35.56%	26.32%	14.29%
3	18.46%	10.53%	6.67%	8.89%	0%	28.57%
4	10.77%	1.32%	4.44%	2.22%	0%	0%
5	9.23%	1.32%	2.22%	4.44%	0%	0%

Table 7 summarizes the most commonly reported EQ-5D-5L health states in Argentina. The table includes the frequency (Freq.), percentage (%), and cumulative percentage (Cum.) for each health state. The most frequently reported health state was "11111" which reflects those individuals that had no problems across all five dimensions, this accounted for 15.86% of Argentinians. Overall, the top three health states account for a significant proportion of the sample in Argentina. On the other hand, **Table 8** shows a similar pattern to Argentina, with most respondents in Peru reporting no problems (13.37% of the sample in Peru). Nevertheless, there are some differences in the specific frequencies and cumulative percentages, as seen below.

Even though most of the health states were reported with the "11111" state, still there are some variations across other states. Therefore, these tables show that a significant proportion of these samples reported no problems across all dimensions of health but also, they are giving some insights into the specific health issues faced by these population samples in these countries. For example, 95 individuals in Argentina and 73 individuals in Peru reported slight problems in the dimension of pain/discomfort, holding the rest of the dimensions as "best health state". Following this, the anxiety/depression dimension also shows "slight problems" within individuals (A full table with all health states calculated with the EQ-5D-5L index calculator is shown in **Appendix 3 and 4**).

Table 7. Most commonly reported states in Argentina

EQ-5D-5L	Freq.	%	Cum.
11111	197	15.86	58.21
11121	95	7.65	75.93
11112	94	7.57	65.78
11122	75	6.04	81.96
11123	37	2.98	84.94
11113	24	1.93	67.71
11132	17	1.37	87.68
11124	9	0.72	85.67
11223	8	0.64	90.98
11114	6	0.48	68.20

Table 8. Most commonly reported states in Peru

EQ-5D-5L	Freq.	%	Cum.
11111	166	13.37	71.01
11121	73	5.88	81.56
11122	57	4.59	86.15
11112	40	3.22	74.24
11113	12	0.97	75.20
11222	11	0.89	90.74
11131	10	0.81	88.00
21121	9	0.72	94.69
21111	7	0.56	93.88
11133	6	0.48	89.05

4.2. Mean index values and mean EQ-VAS

Mean EQ-VAS and index values levels, presented by age group and sex in **Table 9** for Argentina and **Table 10** for Peru, show that these scores tend to be higher for men than for women in both countries. In terms of age, younger age groups in Argentina reported higher scores compared to older groups, with clearly lower scores in both EQ-VAS and EQ-5D-5L index values as age increases. Conversely, in Peru, the youngest age group (18-24) reported similar scores to the oldest age group (65-75) among males and females. For instance, the mean EQ-5D-5L index value for females aged 18-24 was 0.849 whereas for females aged 65-75, it was 0.838. In general, when considering the EQ-5D-5L index between age groups it was observed that the trend in Peru was more gradual in comparison with Argentina. As observed in **Figure 1**, the scores of Argentina belong to a range between 0.97 to around 0.88, whereas in Peru the scores were between 0.887 and 0.867. Argentina´s younger population reported better scores than Peru´s, but Peru´s older population reported better scores than Argentina´s older population as seen in the table below

Overall, the mean EQ-5D-5L index for the entire sample in Argentina was 0.94 with a mean EQ-VAS score of 75.92. In Peru, the mean EQ-5D-5L index for the sample was 0.87, with a mean EQ-VAS score of 73.22.

Table 9. Mean EQ-5D-5L index values and mean EQ-VAS by age group and gender (Argentina)

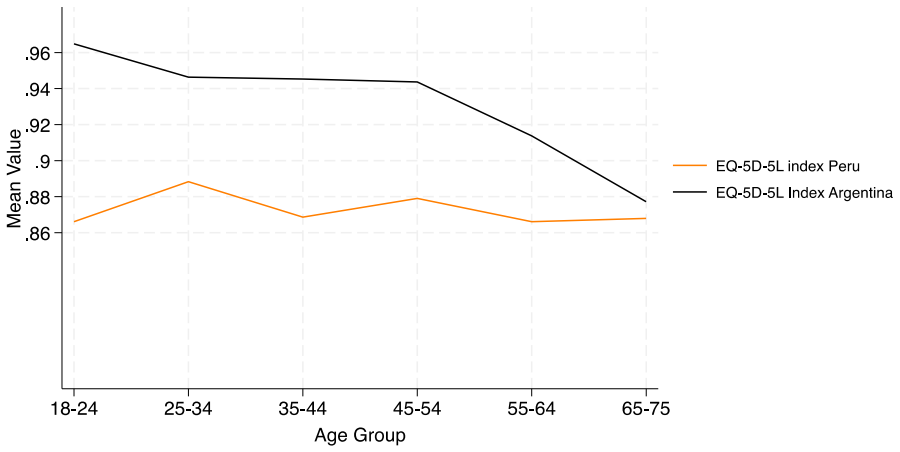
EQ VAS Values						
Age Group	**Mean EQ VAS (male)**	**Standard Error**	**95% CI**	**Mean EQ-VAS (female)**	**Standard Error.**	**95% CI.**
18-24	81.569	1.674	78.237-84.902	68.775	2.185	64.416-73.133
25-34	79.859	1.606	76.656-83.062	72.595	2.141	68.338-78.853
35-44	76.641	1.629	73.398-79.884	76.449	2.201	72.057-80.841
45-54	77.396	2.235	72.891-81.902	75.063	2.204	70.658-79.468
55-64	75.171	2.109	70.907-79.435	77.205	2.568	72.026-82.383
65-75	75.317	2.687	69.886-80.748	73.381	4.496	64.003-82.759
EQ-5-5L index values						
Age Group	**Mean index (male)**	**Standard Error**	**95% CI**	**Mean index (female)**	**Standard Error.**	**95% CI.**

18-24	0.97	0.008	0.953-0.988	0.959	0.013	0.932-0.985
25-34	0.972	0.009	0.953-0.992	0.924	0.02	0.883-0.965
35-44	0.937	0.015	0.907-0.967	0.955	0.014	0.926-0.983
45-54	0.961	0.014	0.932-0.989	0.929	0.017	0.895-0.964
55-64	0.912	0.022	0.867-0.957	0.915	0.021	0.874-0.957
65-75	0.876	0.028	0.817-0.934	0.88	0.031	0.816-0.944

Table 10. Index values and mean EQ-VAS mean by age group and sex (Peru)

EQ VAS Values						
Age Group	**Mean EQ-VAS (male)**	**Standard Error.**	**95% CI.**	**Mean EQ-VAS (female)**	**Standard Error.**	**95% CI.**
18-24	75.882	4.389	66.578-85.187	65.015	2.694	59.634-70.397
25-34	79.048	2.797	73.398-84.697	71.039	2.305	66.448-75.631
35-44	74.357	2.726	68.893-79.821	71.089	2.707	65.633-76.545
45-54	77.041	1.698	73.656-80.425	70.6	2.876	64.805-76.395
55-64	77.239	1.977	73.258-81.2209	71.737	4.116	63.724-80.384
65-75	75.029	2.838	69.255-80.804	81.286	5.951	66.724-95.874
EQ-5-5L index values						
Age Group	**Mean index (male)**	**Standard Error.**	**95% CI.**	**Mean index (female)**	**Standard Error.**	**95% CI.4**
18-24	0.931	0.029	0.869-0.993	0.849	0.015	0.818-0.879
25-34	0.909	0.018	0.870-0.947	0.877	0.015	0.847-0.907
35-44	0.86	0.022	0.817-0.903	0.879	0.018	0.843-0.915
45-54	0.895	0.015	0.865-0.925	0.853	0.019	0.813-0.893
55-64	0.857	0.017	0.823-0.890	0.889	0.024	0.839-0.939
65-75	0.8754	0.027	0.819-0.929	0.838	0.08	0.642-1.00

Figure 1. EQ-5D-5L indexes per age group in Argentina and Peru



4.4. Regression results

In Argentina, regression analysis for both the EQ-5D-5L index and the EQ-VAS showed several factors influencing the HRQoL. Age is a statistically significant factor, with older groups (55-64 and 65-75) showing negative scores when comparing it to the reference group of individuals aged 18-24 years old, regarding the EQ-5D-5L index. Gender has a smaller, non-significant negative impact for females in the EQ-5D-5L index (coefficient= -.008), but a significant negative impact in the EQ-VAS regression model (-3.449, $p<0.05$). Employment status is also a statistically significant variable, as being retired is associated, on average, with a 0.056 unit decrease in the EQ-5D-5L index, statistically significant at a 10% significance level, ceteris paribus. In the EQ-VAS model a coefficient of -7.067 significant at a 5% significance level was found. Additionally, being unemployed is associated, on average with a 0.045 unit decrease in the EQ-5D-5L index, statistically significant at a 5% significance level, ceteris paribus. Additionally, being single showed lower scores in both the EQ-5D-5L index (coefficient= -0.038, $p<0.05$) and EQ-VAS (coefficient= -5.396, $p<0.01$). Furthermore, the region did not show any significant effect in either of the models in the case of Argentina. Finally, the ability to ends meet showed a significant effect in both models. Finding it really easy to ends meet improved the scores of individuals in both the EQ-5D-5L index and EQ-VAS models. Specifically, in the case of the EQ-5D-5L index, finding it really difficult to ends meet compared to finding it really easy is associated, on average, with a .0447 unit increase in the EQ-5D-5L index, statistically significant at a 5% significance level, ceteris paribus.

In Peru, some differences can be seen in comparison to Argentina. Age is not a significant factor in the EQ-5D-5L index, but the 25-34 age group shows a positive significant influence on EQ-VAS scores (coefficient= 8.304, $p<0.05$). Gender shows a significant effect on the scores, with females experiencing lower scores in the EQ-VAS (coefficient= -4.821, $p<0.01$). Education, specifically being highly educated, showed a negative value score in the EQ-5D-5L index (coefficient= -.0582, $p<0.10$) and a positive EQ-VAS score (coefficient=-7.899), being not significant. As well as in Argentina, being single shows a lower score. Specifically, in the EQ-VAS, being single compared to being married is associated, on average with a 5.359 unit decrease in the EQ-VAS score, statistically significant at a 5% significance level, ceteris paribus. Regional differences showed some significance in the case of Peru, in this analysis, it was found that residing in the Amazon

region compared to the coast region is associated, on average, with a .055 unit increase in the EQ-5D-5L index, statistically significant at a 5% significance level, ceteris paribus. Finally, within the ability to ends meet, finding it really easy significantly showed higher scores for both the EQ-5D-5L index and EQ-VAS, as was also shown in Argentina. Peru, in comparison with Argentina, showed a significant coefficient regarding health insurance. For instance, in the EQ-5D-5L regression model in Peru, it was found that, on average, individuals with healthcare facility insurance had an EQ-5D-5L index score of 0.078 units lower compared to individuals without this service, ceteris paribus. This negative association suggests that having this type of insurance is associated with a slight decrease in the perceived HRQoL as measured by the EQ-5D-5L index.

Table 11. Summary of the regression results for the EQ-5D-5L Index and EQ-VAS scores in Argentina

Variables	EQ-5D-5L Index	EQ-VAS Score
Age group		
25-34	-.034* (.0195)	-2.679 (2.309)
35-44	-.044** (.020504)	-4.221* (2.516)
45-54	-.049** (.0199)	-5.315** (2.600)
55-64	-.075*** (.0224)	-3.777 (2.903)
65-75	-.080*** (.0302)	-2.390 (3.335)
Gender		
Female	-.008 (.0097)	-3.449** (1.393)
Education		
Middle	-.027 (.0272)	-4.477 (3.743)
High	-.0108 (.0285)	-1.336 (3.821)
Employment Category		
Less than 30 hours	.018 (.0166)	.067 (2.301)
Self-employed	.009 (.01213)	1.774 (1.662)
Retired	-.056* (.0333)	-7.067** (3.230)
Homemaker	-.079 (.05187)	-7.099 (4.923)
Student	-.007 (.0227)	-3.904 (2.877)
Unemployed	-.045**	-1.474

	(.0193)	(2.546)
Other	.002 (.0601)	-2.814 (5.788)
Religion		
Not religious	.003 (.0105)	.382 (1.326)
Current Status		
Lives like married	-.005 (.0152)	-3.837** (1.839)
Divorced	-.042 (.0300)	-8.753** (3.712)
Separated	-.016 (.0216)	-2.837 (3.013)
Widowed	-.026 (.0387)	-6.218 (4.376)
Single	-.038** (.01723)	-5.396*** (2.116)
Size of the household		
2	-.041** (.0178)	-3.692 (2.135)
3	-.0196 (.0171)	-1.268 (2.201)
Between 4 and 6 people	-.011 (.0161)	-.492 (2.216)
More than six people	-.076 (.0588)	-1.963 (5.466)
Region		
Nuevo Cuyo	.0189 (0.0227)	1.589 (3.591)
Patagonia	-.018 (0.0263)	-2.499 (3.668)
Centre	-.011 (.0201)	.785 (2.521)
CABA	.003 (.0196)	-3.145 (2.686)
Buenos Aires	-.004 (.0163)	-2.806 (2.362)
Ability to ends meet		
Slightly difficult	.017 (.0172)	4.407*** (2.005)
Slightly easy	.031* (.0173)	6.518*** (2.094)
Really easy	.045** (.0211)	9.655*** (2.637)
Care Giving		
No care giving	.005 (.01275)	-1.004 (1.589)
Social security or prepaid insurance (PAMI included)	.007 (.0322)	1.640 (3.456)
State Health Programmes	-.018 (.0348)	2.022 (3.545)

Do not have social security, prepaid insurance or state health programmes	-.016 (.0337)	-2.045 (3.770)
Constant	1.00*** (.0583)	8.936 (6.789)

Robust SE in parentheses
*****p<0.01 **p<0.05 *p<0.1**

Table 12. Summary of regression results for the EQ-5D-5L Index and EQ-VAS Score in Peru

Variable	EQ-5D-5L Index	EQ-VAS Score
Age group		
25-34	.018 (.0224)	8.304** (3.448)
35-44	-.005 (.02497)	4.951 (3.562)
45-54	.007 (.0267)	5.382 (3.850)
55-64	.003 (.0296)	5.970 (3.903)
65-75	.013 (.0413)	4.280 (4.913)
Gender		
Female	-.018 (.0138)	-4.821** (1.813)
Education		
Middle	-.039 (.0295)	-7.898 (5.598)
High	-.058* (.0328)	-7.898 (5.877)
Employment Category		
Less than 30 hours	-.032 (.0226)	2.529 (2.583)
Self-employed	-.005 (.0488)	.649 (2.209)
Retired	-.053 (.0161)	-1.926 (6.971)
Homemaker	.009 (.0226)	-.351 (3.914)
Student	-.028 (.02845)	7.100 (4.405)
Unemployed	-.038 (.0258)	-2.845 (3.668)
Other	-.047 (.0429)	-5.472 (4.308)
Religion		
Not religious	.009	.643

	(.0118)	(1.613)
Current Status		
Lives like married	-.013 (.00172))	-2.641 (2.288)
Divorced	.023 (.0300)	.4075 (4.232)
Separated	-.036 (.0272)	-1.812 (3.426)
Widowed	.009 (.0501)	1.721 (7.934)
Single	.012 (.01901)	-5.358** (2.298)
Region		
Highlands	-.006 (.0180)	-2.771 (2.513)
Amazon	.055** (.0218)	3.949 (3.259)
Size of the household		
2	.005 (.0329)	-5.443 (4.592)
3	-.012 (.0327)	-3.194 (4.243)
Between 4 and 6 people	-.018 (.0317)	-4.299 (4.197)
More than six people	-.015 (.0363)	-7.649 (5.218)
Ability to ends meet		
Slightly difficult	.041** (.0179)	7.283** (2.577)
Slightly easy	.086*** (.0189)	1.262*** (2.726)
Really easy	.109*** (.0229)	1.950*** (3.250)
Care giving		
No care giving	-.029** (.0127)	.546 (1.716)
ESSALUD	-.023 (.0266)	.982
Private Health Insurance	-.014 (.0287)	-.045 (3.446)
Health Care Facility	-.077 (.0354)	1.668 (3.453)
FF Insurance. AA. / Police	-.023 (.0277)	4.384 (5.147)
SIS	-.038 (.0277)	-.509 (3.539)
None	-.031 (.0314)	.187 (4.368)
Constant	.950*** (.0639)	79.592*** (9.148)

Robust SE in parentheses
*****p<0.01 **p<0.05 *p<0.1**

5. Discussion

The implications of the findings are discussed in this chapter, as well as their link to the research question and sub-questions. The analysis of the EQ-5D-5L data by age and gender for Argentina and Peru, and their respective EQ-VAS scores reveals some trends in HRQoL and different patterns between these two countries. This will provide a comprehensive understanding of how various demographic factors influence the health outcomes of both samples.

In Argentina, both males and females showed a higher rate of mobility and self-care issues with older groups reporting lower levels of HRQoL. These low scores are even more pronounced in Argentina compared to Peru. A dimension that is important to remark on is the one related to anxiety/depression for both countries, as it was the only dimension in which various respondents chose level 5 (extreme problems). After analysing the data, mental health challenges (i.e.Anxiety/depression) significantly impacted young adults´ HRQoL in Peru and Argentina, especially among younger females in Peru. These finding aligns with those in the paper of Colombia (Bailey et al., 2021), where they found that pain and discomfort as well as anxiety and depression were the dimensions with the highest rates of worst health states (Ibid., 2021). There has been an increase in studies on adults and youth with mental disorders, who are already participating in care, reflecting the global burden of mental health disorders (i.e. anxiety/depression), with an obvious impact in LATAM as seen in this thesis (Leijdesdorff et al., 2020). Hence, there is no health without mental health (Prince et al., 2007). Health state (11111) was the most reported among participants. These findings indicate that, in general, Peruvians and Argentinians reported this specific health state with 15.86% in Argentina and 13.37% in Peru. These numbers are considerably lower compared to similar studies in other regions, such as South Australia (42.8%), Portugal (33.3%) and Colombia with 52% (McCaffrey et al., 2016; Ferreira et al., 2023; Bailey et al., 2021).

Overall, the estimated mean EQ-5D-5L index for Peru´s sample was 0.87 and an EQ-VAS mean of 73.22. This EQ-5D-5L index is really close to the one of Uruguay which is stated as 0.895 (Augustovski et al., 2015). In the case of Argentina, its EQ-5D-5L index was 0.94 and a mean EQ-VAS score of 75.92, which in this case EQ-5D-5L index aligns with the one of Colombia that stated an index of 0.953 (Bailey et al., 2021).

After analysing the regression results, this thesis could find the main factors of HRQoL in each country, the key variations between individuals with low HRQoL and the rest of the population and how these differ between the two countries. Therefore, older individuals as well as retired, unemployed and with difficulties in the ability to ends meet, were more likely to have a lower HRQoL. These characteristics align with the findings from the study in Quebec (Poder et al., 2020). A demographic factor that is important to highlight is the ability to ends meet for both countries. The ability to make ends meet is a crucial factor for both economic and psychological well-being, it sets a boundary on a household's ability to meet its needs and pursue its aspirations (Sconti, 2022). For instance, recently in Peru, the rising cost of living driven by economic and political crises has heavily impacted consumers' finances and therefore their HRQoL (CEPES, 2023).

In Argentina, single individuals had lower HRQoL. Additionally, Argentina´s lower HRQoL was also influenced by being unemployed. Specifically, Argentina's unemployment rate has shown volatility and an upward trend in this situation, reflecting worrying economic instability (FocusEconomics, 2024). This can have a negative effect on the individuals under these circumstances and their respective families in the economic, social and psychological aspects. Hence, reduced household income results in a limited ability to meet both individual and collective needs, significantly affecting the HRQoL and perceived health of the unemployed (Puciato et al., 2020). In the case of Peru, the results showed that individuals living in the Amazonas had slightly better HRQoL. This is questionable, considering the known situation based on existing studies regarding this region, as they are considered less developed than the coastal region. For instance, in the Amazonas region, individuals find it difficult to access education and have scarce resources for health insurance and living conditions, such as basic services of water, drainage, electricity and in some cases no access to the internet (ComexPerú, 2021). Given this situation, it would be expected that government responses at various levels would aim to meet these needs; however, the statistics by the Ministry of Economy and Finance indicate otherwise (Ibid., 2021). This issue has influenced individuals trying to progress, often without the necessary conditions to ensure equal opportunities. To address the significant inequality gaps, Light Up the World (LUTW) and other organizations are aiming to increase the quality of life and promote sustainable development. They have implemented projects in the communities of 'Dos de Mayo,' 'Soledad,' 'Villa Gonzalo,' 'San Antonio,' 'Democracia,' and 'Cucuhuasa' in the Amazonas

region (LUTW, 2022). Among these initiatives, education and supporting the local economy are included, with efforts like improving school facilities. Efforts like these should be duplicated to achieve significant short-term progress (Ibid., 2022). Educational disparities were also more evident in Peru, where surprisingly, lower HRQoL is associated with higher education, compared to Argentina where education levels did not show a significant impact. Nevertheless, the sign of these two specific values could be due to the underrepresentation of individuals from the Amazonas region and those with lower education levels, which may distort the results.

Furthermore, an interesting significant factor found was health insurance, specifically having a Health care facility (EPS). Individuals reported a lower HRQoL in comparison with not having this service. It could be explained by the issues identified by the health facility directors, which are the shortage of human resources, the lack of supplies and medications, deficient infrastructure and budget deficits. These findings provide useful knowledge for health managers and decision-makers who have the responsibility to make appropriate and timely decisions to improve the quality of services and individual satisfaction (Espinoza-Portilla et al., 2021).

Several limitations should be acknowledged. Primarily, as previously mentioned, the "crosswalk" technique used to convert data from the EQ-5D-3L to the EQ-5D-5L might overrepresent the "11111" health state. For instance, the health state 11133 in the 3L version is still considered as 1 in the 5L version (van Hout et al., 2012), which could affect the accuracy of the health state classification. Furthermore, the study relies on self-reported data, which can be subject to biases. The online survey methodology also introduces its own set of limitations, such as the potential underrepresentation of individuals without internet access, as seen with the Amazonas region and low-educated individuals in Peru. Despite these limitations, the use of the EQ-5D instrument, widely used in health economics, provides a standardized measure of HRQoL and has been validated in diverse populations globally. Therefore, it supports the reliability and validity across different cultural contexts, making it appropriate for this study (Herdman et al., 2011). Furthermore, another of the strengths of this study was the inclusion of specific regional data and the use of the ability to "ends meet" as a proxy for income. Additionally, the wide range of participants, going from 18 to 75 years old, enhances the study´s comprehensiveness.

Overall, based on the findings of this thesis, some recommendations can be made. Firstly, considering the impact of anxiety and depression on HRQoL, particularly among young females in Peru, mental health programs and support systems could help (Singh et al., 2022). This can include accessible mental health services and community-based interventions. Furthermore, after analysing the regression results health policies addressing socioeconomic factors influencing HRQoL should be addressed (Alegría et al., 2018). Likewise, support systems for unemployed and retired individuals, who reported lower HRQoL but also encouraged economic stability through job creation, and educational opportunities could improve overall well-being. Future studies should incorporate more diverse data collection methods, such as face-to-face interviews and paper surveys, to mitigate potential biases from online studies and to have access to underrepresented groups.

In conclusion, this study provides insights into HRQoL in Argentina and Peru, highlighting key factors across various demographic groups, which are crucial when considering the health outcomes of the individuals. Additionally, a significant contribution of this research is the estimation of population norms, which serves as a crucial reference point for understanding health states within the individuals of these two countries. Overall, this research not only enhances the understanding of HRQoL disparities in Peru and Argentina but also provides a reference for policy interventions aimed at improving HRQoL.

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Appendix

Appendix 1. EQ-5D-5L by age and sex in proportion (Argentina)

Male	18-24	25-34	35-44	45-54	55-64	65-75
Mobility						
1	75	66	68	51	31	26
2	4	3	7	1	5	9
3	0	1	3	1	4	4
4	0	1	0	0	1	1
5	0	0	0	0	0	1
Self-care						
1	76	70	76	52	39	39
2	2	1	2	1	1	0
3	1	0	0	0	1	1
4	0	0	0	0	0	0
5	0	0	0	0	0	1
Usual activities						
1	69	65	66	47	33	35
2	8	3	10	5	5	4
3	2	2	1	1	2	1
4	0	1	1	0	1	1
5	0	0	0	0	0	0
Pain/Discomfort						
1	52	45	36	30	15	19
2	24	21	36	19	20	17
3	2	5	5	3	5	5
4	1	0	1	1	1	0
5	0	0	0	0	0	0
Anxiety/depression						
1	41	39	36	37	26	24
2	24	20	30	10	9	13
3	10	11	8	4	5	3
4	4	1	1	0	1	1
5	0	0	3	2	0	0
Female	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65-75**
Mobility						
1	67	80	65	54	34	39
2	2	1	3	5	6	16

3	1	2	1	4	4	5
4	0	0	0	0	0	1
5	1	1	0	0	0	0

Self-care

1	71	82	67	63	44	19
2	0	2	1	1	0	2
3	0	0	0	0	0	0
4	0	0	1	0	0	0
5	0	0	0	0	0	0

Usual activities

1	62	71	60	55	38	18
2	8	7	9	7	4	2
3	1	6	0	2	2	1
4	0	0	0	0	0	0
5	0	0	0	0	0	0

Pain/Discomfort

1	34	47	37	19	17	7
2	33	26	30	30	16	10
3	4	8	2	14	10	3
4	0	1	0	1	1	1
5	0	2	0	0	0	0

Anxiety/depression

1	17	24	37	30	24	12
2	29	41	16	22	15	7
3	21	9	11	5	3	2
4	3	4	4	7	2	0
5	1	6	1	0	0	0

Appendix 2. EQ-5D-5L by age and sex in proportion (Peru)

Male	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65-75**
Mobility						
1	16	36	45	63	36	26
2	1	4	8	9	7	5
3	0	2	3	2	2	2
4	0	0	0	0	1	0
5	0	0	0	0	0	1
Self-care						
1	16	39	50	71	44	31
2	0	1	6	3	0	2

3	1	2	0	0	0	0
4	0	0	0	0	2	0
5	0	0	0	0	0	1
Usual activities						
1	16	39	46	65	37	25
2	1	3	9	9	6	7
3	0	0	1	0	3	2
4	0	0	0	0	0	0
5	0	0	0	0	0	0
Pain/Discomfort						
1	14	25	26	40	17	17
2	3	15	23	32	26	11
3	0	2	6	2	2	5
4	0	0	1	0	1	4
5	0	0	0	0	0	0
Anxiety/depression						
1	12	28	31	47	26	21
2	3	10	17	20	19	6
3	1	4	5	6	0	7
4	0	0	2	1	1	0
5	1	0	1	0	0	0
Female	**18-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65-75**
Mobility						
1	59	70	38	35	15	4
2	5	5	5	7	3	2
3	1	1	2	3	1	1
4	0	0	0	0	0	0
5	0	0	0	0	0	0
Self-care						
1	61	70	43	44	19	6
2	2	5	1	1	0	1
3	1	1	1	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
Usual activities						
1	50	60	39	40	18	5
2	9	10	4	5	1	2
3	6	6	2	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0

Pain/Discomfort

1	27	33	21	16	6	3
2	25	28	18	22	11	3
3	10	12	6	5	2	1
4	2	2	0	2	0	0
5	1	1	0	0	0	0

Anxiety/depression

1	19	42	24	22	14	4
2	21	24	15	16	5	1
3	12	8	3	4	0	2
4	7	1	2	1	0	0
5	6	1	1	2	0	0

Appendix 3. EQ-5D-5L Argentina's Health State

EQ-5D-5L	Freq.	%	Cum.
..... |	526[7]	42.35	42.35
11111 |	197	15.86	58.21
11112 |	94	7.57	65.78
11113 |	24	1.93	67.71
11114 |	6	0.48	68.20
11115 |	1	0.08	68.28
11121 |	95	7.65	75.93
11122 |	75	6.04	81.96
11123 |	37	2.98	84.94
11124 |	9	0.72	85.67
11125 |	2	0.16	85.83
11131 |	6	0.48	86.31
11132 |	17	1.37	87.68
11133 |	5	0.40	88.08
11134 |	2	0.16	88.24
11135 |	2	0.16	88.41
11141 |	1	0.08	88.49
11142 |	2	0.16	88.65
11211 |	3	0.24	88.89
11212 |	6	0.48	89.37
11213 |	5	0.40	89.77

[7] These 526 missing values correspond to the individuals in Peru

11215 |	1	0.08	89.86
11221 |	4	0.32	90.18
11222 |	2	0.16	90.34
11223 |	8	0.64	90.98
11225 |	1	0.08	91.06
11232 |	2	0.16	91.22
11234 |	1	0.08	91.30
11235 |	1	0.08	91.38
11242 |	1	0.08	91.47
11313 |	1	0.08	91.55
11314 |	2	0.16	91.71
11321 |	1	0.08	91.79
11322 |	1	0.08	91.87
11332 |	2	0.16	92.03
11333 |	1	0.08	92.11
11344 |	1	0.08	92.19
11355 |	2	0.16	92.35
11415 |	1	0.08	92.43
11433 |	1	0.08	92.51
12211 |	1	0.08	92.59
12212 |	1	0.08	92.67
12214 |	1	0.08	92.75
12222 |	1	0.08	92.83
12231 |	1	0.08	92.91
12242 |	1	0.08	93.00
12313 |	1	0.08	93.08
21111 |	4	0.32	93.40
21112 |	1	0.08	93.48
21113 |	1	0.08	93.56
21121 |	17	1.37	94.93
21122 |	8	0.64	95.57
21123 |	1	0.08	95.65
21132 |	2	0.16	95.81
21134 |	1	0.08	95.89
21211 |	1	0.08	95.97
21221 |	3	0.24	96.22
21222 |	3	0.24	96.46
21223 |	1	0.08	96.54
21224 |	1	0.08	96.62
21231 |	1	0.08	96.70
21232 |	2	0.16	96.86
21233 |	1	0.08	96.94

21235 |	1	0.08	97.02
21331 |	1	0.08	97.10
22212 |	1	0.08	97.18
22224 |	1	0.08	97.26
22333 |	1	0.08	97.34
23242 |	1	0.08	97.42
31121 |	1	0.08	97.50
31122 |	1	0.08	97.58
31132 |	1	0.08	97.67
31221 |	2	0.16	97.83
31222 |	3	0.24	98.07
31224 |	1	0.08	98.15
31231 |	1	0.08	98.23
31232 |	2	0.16	98.39
31234 |	2	0.16	98.55
31235 |	1	0.08	98.63
31323 |	1	0.08	98.71
31331 |	2	0.16	98.87
31332 |	2	0.16	99.03
32123 |	1	0.08	99.11
32233 |	1	0.08	99.19
32333 |	1	0.08	99.28
33411 |	1	0.08	99.36
33442 |	1	0.08	99.44
34211 |	1	0.08	99.52
41111 |	1	0.08	99.60
41131 |	2	0.16	99.76
51112 |	1	0.08	99.84
51322 |	1	0.08	99.92
55112 |	1	0.08	100.00
Total |	1,242	100.00	

Appedix 4. EQ-5D-5L Peru´s Health State

EQ-5D-5L	Freq.	%	Cum.
..... |	716[8]	57.65	57.65
11111 |	166	13.37	71.01
11112 |	40	3.22	74.24
11113 |	12	0.97	75.20
11114 |	4	0.32	75.52

[8] These 716 missing values correspond to the individuals in Argentina

11115	2	0.16	75.68
11121	73	5.88	81.56
11122	57	4.59	86.15
11123	9	0.72	86.88
11124	3	0.24	87.12
11125	1	0.08	87.20
11131	10	0.81	88.00
11132	7	0.56	88.57
11133	6	0.48	89.05
11135	2	0.16	89.21
11145	1	0.08	89.29
11155	1	0.08	89.37
11211	2	0.16	89.53
11214	1	0.08	89.61
11221	3	0.24	89.86
11222	11	0.89	90.74
11223	3	0.24	90.98
11224	1	0.08	91.06
11225	1	0.08	91.14
11232	4	0.32	91.47
11233	2	0.16	91.63
11234	1	0.08	91.71
11244	1	0.08	91.79
11312	1	0.08	91.87
11332	2	0.16	92.03
11333	1	0.08	92.11
11334	1	0.08	92.19
11335	1	0.08	92.27
12111	1	0.08	92.35
12112	1	0.08	92.43
12123	1	0.08	92.51
12213	1	0.08	92.59
12222	1	0.08	92.67
12223	1	0.08	92.75
12234	1	0.08	92.83
12244	1	0.08	92.91
12313	1	0.08	93.00
12323	1	0.08	93.08
12335	1	0.08	93.16
13222	1	0.08	93.24
13313	1	0.08	93.32
21111	7	0.56	93.88

21113 |	1	0.08	93.96
21121 |	9	0.72	94.69
21122 |	10	0.81	95.49
21123 |	1	0.08	95.57
21132 |	2	0.16	95.73
21141 |	1	0.08	95.81
21221 |	4	0.32	96.14
21222 |	6	0.48	96.62
21223 |	3	0.24	96.86
21231 |	1	0.08	96.94
21232 |	1	0.08	97.02
21233 |	1	0.08	97.10
21242 |	1	0.08	97.18
21311 |	1	0.08	97.26
21314 |	1	0.08	97.34
21322 |	1	0.08	97.42
21323 |	1	0.08	97.50
22121 |	2	0.16	97.67
22222 |	4	0.32	97.99
22231 |	1	0.08	98.07
23121 |	1	0.08	98.15
23345 |	1	0.08	98.23
31112 |	1	0.08	98.31
31121 |	3	0.24	98.55
31122 |	1	0.08	98.63
31132 |	2	0.16	98.79
31133 |	1	0.08	98.87
31145 |	1	0.08	98.95
31221 |	1	0.08	99.03
31231 |	1	0.08	99.11
31233 |	1	0.08	99.19
32222 |	1	0.08	99.28
32223 |	1	0.08	99.36
32231 |	1	0.08	99.44
32333 |	1	0.08	99.52
32353 |	1	0.08	99.60
33223 |	1	0.08	99.68
33331 |	1	0.08	99.76
34212 |	1	0.08	99.84
44342 |	1	0.08	99.92
55341 |	1	0.08	100.00
Total |	1,242	100.00	

Appendix 5. Heteroskedasticity test

Test	Assumption	Variable	Null Hypothesis	Chi-Square (chi2)	Prob > chi2
Breusch–Pagan/Cook–Weisberg	Normal Error terms	Fitted values of EQ-5D-5L index Argentina	Constant variance	199.79	0.0000

Test	Assumption	Variable	Null Hypothesis	Chi-Square (chi2)	Prob > chi2
Breusch–Pagan/Cook–Weisberg	Normal Error terms	Fitted values of EQ-5D-5L index Peru	Constant variance	26.00	0.0000

Test	Assumption	Variable	Null Hypothesis	Chi-Square (chi2)	Prob > chi2
Breusch–Pagan/Cook–Weisberg	Normal Error terms	Fitted values of EQ-VAS Argentina	Constant variance	62.83	0.0000

Test	Assumption	Variable	Null Hypothesis	Chi-Square (chi2)	Prob > chi2
Breusch–Pagan/Cook–Weisberg	Normal Error terms	Fitted values of EQ-VAS index Peru	Constant variance	32.21	0.0000