HEALTH-RELATED QUALITY OF LIFE AND FACTORS ASSOCIATED AMONG THE ELDERLY LIVING IN URBAN VIETNAM

Duong Anh Thy[1*], Cao Nguyen Hoai Thuong[1], Tran Minh Thai[2], Phung Khanh Lam[3]

*[1]Faculty of Public Health, Pham Ngoc Thach University of Medicine -
02 Duong Quang Trung, Hoa Hung Ward, Ho Chi Minh City, Vietnam*

[2]Ho Chi Minh City Department of Health - No. 59-59B, Nguyen Thi Minh Khai, Ben Thanh Ward, Ho Chi Minh City, Vietnam
*[3]Domain Biostatistics & Modelling, Saw Swee Hock School of Public Health, National University of Singapore -
12 Science Drive 2, #10-01, Singapore*

ABSTRACT

Introduction: Population aging is a significant challenge for Vietnam, particularly in urban areas, where the proportion of elderly individuals is increasing. Describing health-related quality of life (HRQoL) and associated factors in the context of this aging process plays a crucial role in shaping future elderly care services and policies. The aim of this study is to measure HRQoL and identify related factors among elderly individuals (aged ≥60) living in urban areas of Vietnam.

Methods: This cross-sectional study was conducted in Ward 16, District 8, one of the most populous wards in Ho Chi Minh City. HRQoL was measured using the EuroQol-5 dimensions-5 levels (EQ-5D-5L) instrument. A convenience sampling technique was employed with a sample frame of 2,447 elderly individuals. A total of 387 elderly individuals were selected from this sample frame between March and April 2021. Inclusion criteria: individuals aged ≥60 years living in Ward 16 at the time of the study and who agreed to participate. Exclusion criteria: elderly individuals with mental health issues, those unable to answer independently, or those with missing information for any of the five domains (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression).

Results: The EQ-5D-5L index of older people had a median of 0.931 (IQR 0.847-1.000); the EQ VAS score had a median of 70 (IQR 60-80). The mean EQ-5D-5L index was 0.884 (SD = 0.18); the mean EQ VAS score was 72.14 (SD = 15.51). The study found a correlation between age group, sex, education, income-generating work, self-rated economic status, and most health issues with HRQoL.

Conclusion: The results of this study serve as a reference for public health programs supporting the elderly population, particularly in urban areas. Furthermore, elderly individuals will have a clearer understanding of their HRQoL and be able to implement appropriate personal solutions to improve their HRQoL.

Keywords: EQ-5D-5L, elderly, Health-Related Quality of Life.

1. INTRODUCTION

Population aging is one of the most significant public health issues in Vietnam. According to the United Nations Population Fund (UNFPA), the percentage of elderly individuals aged 60 and above in Vietnam has rapidly increased from 8.6% in 2009 to 11.9% in 2019 [1],[2]. This proportion is expected to continue rising, reaching nearly 20% of the total population by 2035 [3]. According to the Central Census Steering Committee, the average life expectancy of Vietnamese people was 73.6 years in 2019 [2]. The aging population has put financial pressure on systems supporting older people [4]. Many studies indicate that health-related quality of life (HRQoL) declines with age and is influenced

by factors such as sex, education level, work in old age, and economic status [5-9]. HRQoL is also related to both self-reported chronic diseases and their risk factors. Measuring HRQoL can help identify the burden of preventable diseases, injuries, and disabilities and uncover new insights into the relationship between HRQoL and risk factors [10].

"The World Health Organization (WHO) defines quality of life (QoL) as 'individuals' perceptions of their position in life in the context of the culture and value systems in which they live and about their goals, expectations, standards, and concerns" [11]. This definition indicates that QoL is a subjective evaluation based on an individual's perception in a broad and complex way. The concept of health-related quality of life and its determinants has evolved since the 1980s, including aspects of overall quality of life that can clearly be shown to affect physical or mental health [12]. The U.S. Centers for Disease Control and Prevention (CDC) defines HRQoL as "the perceived physical and mental health of an individual or group over time" [10]. The EQ-5D tool for measuring HRQoL, developed by The EuroQol Group, is widely used around the world. A systematic review of 99 publications representing 32 countries from 2011 to 2019 shows that EQ-5D-5L is a reliable and valuable tool across various populations and contexts [13]. In Vietnam, there have been studies evaluating HRQoL in older people using the EQ-5D-5L tool [6],[14]. These studies did not report any difficulties in their use. However, previously, due to the lack of a Vietnamese value set for this tool, earlier studies had to use value sets from other countries, such as Thailand [15] and South Korea [16]. This approach in those studies carried the risk of not accurately reflecting the actual health status of older adults in Vietnam. Currently, the Vietnamese value set for the EQ-5D-5L tool [17] has been developed by the research team of author Mai VQ and has been approved by The EuroQol Group."

HRQoL assessment is a critical public health practice for the elderly in the context of increasing life expectancy, to improve the quality of life in later years, despite the cumulative health impacts associated with natural aging and disease [10]. As the proportion of older adults in urban areas of Vietnam is increasing (11.3% in 2019) [18], the availability of the Vietnamese EQ-5D-5L value set [17], and the lack of HRQoL data for elderly individuals living in urban areas, our study aims to describe HRQoL and the relationship between sociodemographic characteristics and health issues with HRQoL in the elderly. This description will serve as a reference for plans, policies, and regulations in developing solutions for the elderly support system.

2. MATERIALS AND METHODS

2.1. Study design and participants

A cross-sectional study was conducted in Ward 16, District 8. Ward 16 is a large area and one of the most populous wards in Ho Chi Minh City, with a population of 50,116 people in 2020 (according to the report of the People's Committee of Ward 16). The selection criteria included elderly individuals aged 60 and above, living in the area from March to April 2021, and who agreed to participate in the study. Elderly individuals were excluded from the study if they had mental health issues, were unable to answer independently, or had missing information for any of the five domains: mobility (MO), self-care (SC), usual activities (UA), pain/discomfort (PD), and anxiety/depression (AD).

2.2. Sample size and data collection

The sample size was determined using the population estimation formula. The study used an estimated standard deviation of σ = 0.22 based on a cross-sectional study conducted from February to April 2017 with 523 elderly individuals in Soc Son, Hanoi [14], and a margin of error of d = 0.022.

$$n = Z^2_{1-\alpha/2} \ \frac{\sigma^2}{d^2}$$

The minimum sample size calculated using the formula is 385. A total of 387 elderly individuals were conveniently selected from a list of 2,447 individuals aged 60 and above, organized by neighborhood groups at the time of the survey, provided by the local health station. The sample interval was calculated by dividing the total number of elderly individuals in the list by 387. The result gives a sample interval of 6.32. A random starting number of 4 was chosen. The individuals selected for the study sample will have consecutive serial numbers (taking only the integer part) based on the formula 4 + a × 6.32, where 'a is a constant with values from 0 to 386. According to this formula, the person with serial number 4 in the list is selected first, the second person chosen will have the serial number 4 + 1 × 6.32 = 10, and so on, until the last person selected, who will have the serial number 4 + 386 × 6.32 = 2443.

The researchers contacted the neighborhood group leaders, who then introduced the interviewers to the selected elderly individuals. The interviewers were final-year medical students from Pham Ngoc Thach University of Medicine. The interviewers received training before conducting the survey. They explained the study objectives clearly, and after obtaining written consent from the elderly participants, the interviewers used a structured questionnaire to collect data on sociodemographic

characteristics and health issues. The data on sociodemographic characteristics and health issues were self-reported. Subsequently, the elderly individuals completed the information regarding health-related quality of life (HRQoL) using the EQ-5D-5L tool. The total data collection time was 20 minutes per individual.

Elderly individuals who are selected but absent during the study period will be replaced by individuals whose address is closest to that of the absentee.

2.3. Measures and Instruments

The HRQoL of older people in the study was measured using the official Vietnamese version of the EQ-5D-5L tool, with permission from the EuroQoL organization. Rosalind Rabin, the representative of the Version Management Committee, ensured the translation process of the Vietnamese version of the EQ-5D-5L Self-Complete – Paper, as well as its reliability and validity, were equivalent to the original version 19].

The EQ-5D-5L Self-Complete – Paper tool includes the EQ-5D descriptive system and the EQ visual analogue scale (EQ VAS).

The EQ-5D descriptive system consists of five domains: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each domain has five levels: no problems, slight problems, moderate problems, severe problems, and extreme problems. The elderly individuals will indicate their health status by marking the box next to the most appropriate answer in each domain. The corresponding EQ-5D-5L index represents each health condition. In this study, information about the EQ-5D-5L index, calculated based on the available Vietnamese value set, is determined using the following formula: 1—(disutility MO)— (disutility SC)—(disutility UA)—(disutility PD)—(disutility AD) [16].

The EQ VAS records the elderly individual's self-rated health on a vertical visual analogue scale, with the two endpoints labeled as 'The best health you can imagine' and 'The worst health you can imagine'.

2.4. Statistical methods

The data were entered using Epidata 3.1 software and analyzed with Stata 14.2 software. Qualitative variables were described using frequency and percentage. Since the EQ-5D-5L index and EQ VAS score had non-normal distributions, they were reported using median values and interquartile ranges (IQR). The study also noted the mean values and standard deviations for the EQ-5D-5L index and EQ VAS score for easier comparison with the results of other studies. The study used the Mann-Whit-ney and Kruskal-Wallis tests to determine the relationships between skewed quantitative variables and qualitative variables.

Potential confounding variables (age group, sex, education, self-rated economic status, income-generating work) were included in the multivariable linear regression model to adjust for the associations between health issues and the EQ-5D-5L index.

2.5. Ethical considerations

The study received ethical approval from the Ethics Committee for Biomedical Research of the University of Medicine and Pharmacy at Ho Chi Minh City, No. 131/HĐĐĐ-ĐHYD, signed on February 22, 2021.

EuroQol granted permission to use the Vietnamese version of the EQ-5D instrument for this study with registration code ID 36689.

3. RESULTS

In the study, older women accounted for approximately 65%. The rate of elderly individuals aged 80 and above was 12.4%. The group of elderly individuals who completed primary school had the highest percentage at 30.6%. In comparison, the group of elderly individuals who never attended school had the lowest rate at 7.6%. Additionally, the percentage of elderly individuals living with others was 97.4%.

Table 1 describes the health-related quality of life and the percentage of participants experiencing any issues in the domains of the EQ-5D-5L. The EQ-5D index had a median of 0.931 (IQR 0.847-1), and the EQ VAS score had a median of 70 (IQR 60-80). We also calculated the mean EQ-5D index as 0.884 (SD = 0.18) and the mean EQ VAS score as 72.14 (SD = 15.51). The percentage of participants experiencing problems with pain/discomfort was the highest at 41.6%, followed by mobility (31.8%), usual activities (18.9%), anxiety/depression (18.1%), and self-care (16%).

Table 1. Current health status and HRQoL of older people

Characteristics	n	%
Having problems in		
Mobility	123	31.8
Seft-care	62	16.0
Usual activities	73	18.9
Pain/Discomfort	161	41.6
Anxiety/Depression	70	18.1

	n	Mean	Std	Median	Interquartile Range	Min	Max
EQ-5D-5L Index	387	0.884	0.18	0.931	0.847-1	-0.176	1
EQ VAS Score	384	72.14	15.51	70	60-80	20	100

Table 2 describes the distribution of the EQ-5D index according to different socio-demographic factors. The study found a statistically significant relationship between the EQ-5D index and the following characteristics: age group, sex, education, income-generating work, and self-rated economic status ($p < 0.05$). However, no statistically significant relationship was found between the EQ-5D index and marital status, living conditions, satisfaction with family care, or the use of health insurance.

Table 2. Bivariate analyses of associations between study participants' sociodemographic factors and HRQoL scores

Characteritics	n	EQ-5D-5L Index Median (IQR)	p -value
Age group	387		
≥ 80	48	0.885 (0.700-0.936)	<0.001*
< 80	339	0.931 (0.848-1)	
Sex	387		
Male	136	1 (0.877-1)	<0.001*
Female	251	0.916 (0.804-1)	
Education	382		
No education	29	0.879 (0.732-0.931)	<0.001**
Below the primary school	88	0.926 (0.847-1)	
Primary school	117	0.916 (0.804-1)	
Middle school	73	0.922 (0.852-1)	
High school or above	75	1 (0.916-1)	

Characteritics	n	EQ-5D-5L Index Median (IQR)	p -value
Marital status	386		
Single	36	0.919 (0.823-1)	0.076**
Married	249	0.936 (0.848-1)	
Divorced/separated/widowed	101	0.916 (0.842-1)	
Living situation	385		
Living with others	375	0.922 (0.847-1)	0.409*
Living alone	10	1 (0.852-1)	
Income-generating work	385		
Yes	75	1 (0.884-1)	0.019*
No	310	0.916 (0.842-1)	
Self-rated economic status	387		
Poor	81	0.852 (0.775-1)	<0.001**
Middle	282	0.931 (0.852-1)	
Rich	15	1 (0.916-1)	
Level of satisfaction with family care	382		
Unsatisfied	7	0.852 (0.725-0.936)	0.106**
Neutral	90	0.916 (0.804-1)	
Satisfied	229	0.931 (0.848-1)	
Very satisfied	56	0.9261 (0.796-1)	

Characteritics	n	EQ-5D-5L Index Median (IQR)	p -value
Having health insurance	**384**		
Yes	351	0.916 (0.847-1)	0.076*
No	33	1 (0.916-1)	

*Mann Whitney Test, **Krukal Wallis Test

Table 3 describes the distribution of the EQ-5D index according to different health issues. The study found a statistically significant relationship between the EQ-5D index and most health issues, including cardiovascular disease, diabetes, musculoskeletal diseases, chronic respiratory diseases, depression, visual impairment, and the number of chronic diseases, except for hearing impairment (p > 0.05).

Table 3. Bivariate analyses of associations between study participants' health issues and HRQoL scores

Characteritics	Frequency	EQ-5D-5L Index Median (IQR)	p-value
Cardiovascular diseases	**387**		
Yes	243	0.916 (0.804-1)	< 0.001*
No	144	1 (0.916-1)	
Diabetes	**387**		
Yes	101	0.916 (0.801-1)	0.001*
No	286	0.936 (0.848-1)	
Musculoskeletal diseases	**387**		
Yes	184	0.916 (0.779-1)	< 0.001*
No	203	1 (0.916-1)	
Chronic respiratory diseases	**387**		
Yes	31	0.916 (0.688-1)	0.026*
No	356	0.931 (0.847-1)	

Characteritics	Frequency	EQ-5D-5L Index Median (IQR)	p-value
Depression	**383**		
Yes	12	0.791 (0.409-0.860)	< 0.001*
No	371	0.931 (0.847-1)	
Visual impairment	**385**		
Yes	226	0.916 (0.838-1)	0.004*
No	159	0.954 (0.870-1)	
Hearing impairment	**387**		
Yes	103	0.916 (0.842-1)	0.089*
No	284	0.931 (0.847-1)	
Number of chronic diseases	**387**		
≥ 2	211	0.916 (0.783-1)	< 0.001**
1	105	0.916 (0.870-1)	
0	71	1 (0.936-1)	

* Mann Whitney Test, ** Krukal Wallis Test

In the univariate analysis, most health conditions (cardiovascular disease, diabetes, musculoskeletal diseases, chronic respiratory diseases, depression, and visual impairment), except for hearing impairment, were found to be associated with the EQ-5D index. However, after adjusting for factors such as age group, sex, education, self-rated economic status, and income-generating work in the multivariate linear regression model, only musculoskeletal diseases, chronic respiratory diseases, depression, and visual impairment had a significant impact on the reduction of the EQ-5D index (Table 4).

Table 4. Correlations between EQ-5D-5L index and health issues

Characteritics	Coef (95% CI)a	p-value
Cardiovascular diseases (Yes)	-0.02 (-0.06; 0.01)	0.198
Diabetes (Yes)	-0.03 (-0.07; 0.00)	0.070
Musculoskeletal diseases (Yes)	-0.06 (-0.10; -0.03)*	0.000
Chronic respiratory diseases (Yes)	-0.07 (-0.13; -0.01)*	0.020
Depression (Yes)	-0.19 (-0.30; -0.09)*	0.000
Visual impairment (Yes)	-0.04 (-0.07; -0.01)*	0.016
Hearing impairment (Yes)	-0.03 (-0.07; 0.01)	0.126

*a: Adjusted to age group, sex, education, self-rated economic status, and income-generating work, *p<0,05.*

4. DISCUSSION

The percentage of elderly individuals aged 80 and above in the study sample was 12.4%, which is nearly equivalent to the proportion in Ho Chi Minh City in 2019 at 12.7% [18], but lower than the national proportion in Vietnam in 2019, which was 16.8% [18]. This difference may be due to the distribution of individuals aged 80 and above being more prevalent in rural areas than in urban areas in Vietnam. The percentage of females in the study sample was 65%, lower than the proportion found in rural regions of Sóc Sơn, Hanoi (70%) [14]. This result is reasonable, as the proportion of females in rural areas is typically higher than in urban areas [20].

4.1. Current health status and HRQoL of the elderly

The average EQ-5D-5L index in our study sample was 0.884 (SD = 0.18), which is similar to the index of the Ba Vì population (0.876) [6], but higher than that of Sóc Sơn (0.66) [14]. This difference may be explained by the variation in the value sets used. Specifically, the use of the Vietnamese value set is a significant strength of this study, whereas the Ba Vì study used the value set from South Korea and the Sóc Sơn study used the value set from Thailand.

In terms of HRQoL domains, pain/discomfort was the most common issue faced by older people in this study, while self-care was the least common problem. This finding is consistent with studies on elderly individuals in rural areas of Vietnam [6],[14] and elderly patients in hospitals in Vietnam [21],[22]. This may indicate that pain/discomfort is a prevalent issue that older adults in Vietnam face.

4.2. Sociodemographic factors associated with HRQoL

The study indicates that there is an association between age group and sex with HRQoL. A survey conducted in the general population of Vietnam found a correlation between age and the EQ-5D-5L index, with older individuals having lower scores [5]. The study in Sóc Sơn showed that older men had significantly higher EQ-5D-5L scores than older women (0.7 vs. 0.64) [14]. This may be because Vietnamese women primarily take on the role of homemakers and caregivers, continuing household chores and looking after grandchildren as they age. In contrast, Vietnamese men, upon retirement, often have more time for social activities and better opportunities for a higher quality of life.

In this study, there is an association between education and HRQoL. This result is consistent with studies in Ba Vì and Thailand [6],[9]. A study in the general population of Vietnam found that lower quality of life was associated with higher education levels [5]. Another study did not find a link between education and HRQoL [22]. As we know, achieving a higher education level can improve health both directly and indirectly in various ways [23]. However, HRQoL is a subjective health outcome, and therefore, elderly individuals with different education levels may perceive its domains differently.

This study also shows an association between income-generating work and economic status with HRQoL. Employment, financial conditions, social-psychological resources, and a healthy lifestyle can indirectly improve health [23]. Society and families should create conditions to encourage and motivate elderly individuals to participate in additional income-generating activities, as this helps reduce their economic and psychological dependence in old age. By doing so, elderly individuals can improve both their physical and mental health, thereby contributing to the enhancement of their HRQoL.

4.3. Health issues associated with HRQoL

A study on the general population of Vietnam found an association between hypertension and musculoskeletal diseases with HRQoL [5]. A survey of patients with cardiovascular disease (CVD)

in Vietnam showed that the HRQoL of CVD patients was lower than the average level of the general Vietnamese population [22]. The study in Sóc Sơn indicated that the EQ-5D-5L index was lower in patients with respiratory conditions who also had cardiovascular or musculoskeletal diseases compared to those without these conditions [14]. HRQoL in Vietnamese patients with diabetes complications was also lower than the average level [24]. Similarly, the results of this study show an association between cardiovascular disease, diabetes, musculoskeletal diseases, and chronic respiratory diseases with HRQoL. The study also found a relationship between depression and HRQoL. This result is consistent with a study in Turkey, which showed a negative relationship between depression and HRQoL [25].

In the multivariate linear regression model, we found that most health issues, such as musculoskeletal diseases, chronic respiratory diseases, depression, and visual impairment, were significantly associated with a reduction in HRQoL. Specifically, the most significant decrease was observed in participants with depression (Coefficient = -0.19; 95% CI = -0.30; -0.09).

In summary, chronic diseases, particularly depression, are common and significant factors contributing to the reduction of HRQoL in elderly individuals. Non-communicable diseases related to lifestyle are preventable or can be improved by maintaining a healthy lifestyle. Specifically, depression is a factor that can be prevented if elderly individuals have a comfortable and mentally fulfilling life.

4.4. Methodological issues

The advantage of this study is that we used the EQ-5D-5L instrument, which now has a value set based on the health preferences of the Vietnamese population. In contrast, many previous studies had to rely on value sets from other countries. However, one limitation of this study is that 3/4 of the elderly individuals initially planned to participate were replaced by elderly individuals living nearby. This limits the representativeness of the sample for the target population. However, selecting elderly individuals who lived near those who could not be reached helped minimize the differences in social characteristics due to the geographic location of the elderly participants. In cases where elderly individuals were absent due to work commitments, these individuals may have better health, higher independence, and potentially a higher EQ-5D-5L score than those we replaced. This suggests that the study's sample may have a lower median EQ-5D-5L index than the actual population.

5. CONCLUSION

In conclusion, the findings of the study emphasize that most participants self-rated their quality of life as excellent, with the two main dimensions faced by older people being pain/discomfort and mobility. Lower HRQoL was associated with older age, female sex, lower education levels, poor economic status, lack of income-generating work, health issues, and multiple chronic diseases. Local authorities need to pay more attention to the lives of the elderly, particularly those over 80, women, those with low education, people with low incomes, and those facing significant health issues, especially depression. Additionally, families should also focus on the well-being of elderly individuals, particularly addressing issues of pain/discomfort and mobility, to improve their HRQoL.

COMPETING INTERESTS

No potential conflict of interest relevant to this article was reported.

REFERENCES

[1] Ministry of Planning and Investment, General Statistics Office of Viet Nam. Results - the Viet Nam Population and Housing Census of 2009 Fertility and Mortality in Viet Nam: Status, Trends and Differences. Ha Noi city; 2011.

[2] Central Population And Housing Census Steering Committee. Results - the Viet Nam Population and Housing Census of 00:00 hours on 1 April 2019. Ha Noi city; 2020.

[3] Viet Nam National Committee on Ageing. Towards a comprehensive national policy for an ageing Viet Nam. Hanoi, 2019.

[4] United Nations, Department of Economic and Social Affairs, Population Division. World Population Ageing 2019: Highlights. (ST/ESA/SER.A/430)2019.

[5] Nguyen LH, Tran BX, Hoang Le QN, al e. Quality of life profile of the general Vietnamese population using EQ-5D-5L. Health and Qual-

ity of Life Outcomes. 2017;15(1):199.

[6]   Hoi LV, Chuc NTK, Lindholm L. Health-related quality of life, and its determinants, among older people in rural Vietnam. BMC Public Health. 2010;10(1):549.

[7]   Dasgupta A, Pan T, Paul B, al e. Quality of life of older adults in a rural area of West Bengal: A community-based study. Medical Journal of Dr DY Patil Vidyapeeth. 2018;11(6):527-31.

[8]   Tajvar M, Arab M, Montazeri A. Determinants of health-related quality of life in older people in Tehran, Iran. BMC Public Health. 2008;8(1):323.

[9]   Donnapa H, Ratana S. Factors influencing the Quality of Life (Qol) among Thai older people in a rural area of Thailand. Iranian journal of public health. 2015;44(4):479.

[10] Centers for Disease Control and Prevention. Measuring Healthy Days. Atlanta, Georgia: November 2000.

[11] Whoqol Group. The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. Social science & medicine. 1995;41(10):1403-9.

[12] McHorney CA. Health status assessment methods for adults: past accomplishments and future challenges. Annual review of public health. 1999;20(1):309-35.

[13] Feng Y-S, Kohlmann T, Janssen MF, Buchholz I. Psychometric properties of the EQ-5D-5L: a systematic review of the literature. Quality of Life Research. 2021;30:647-73.

[14] Pham T, Nguyen NTT, ChieuTo SB, et al. Gender Differences in Quality of Life and Health Services Utilization among Elderly People in Rural Vietnam. International Journal of Environmental Research and Public Health. 2019;16(1):69.

[15] Keebler D, Revill P, Braithwaite S, Phillips A, Blaser N, Borquez A, et al. Cost-effectiveness of different strategies to monitor adults on antiretroviral treatment: a combined analysis of three mathematical models. The Lancet Global Health. 2014;2(1):e35-e43.

[16] Lee Y-K, Nam H-S, Chuang L-H, Kim K-Y, Yang H-K, Kwon I-S, et al. South Korean time trade-off values for EQ-5D health states: modeling with observed values for 101 health states. Value in health. 2009;12(8):1187-93.

[17] Mai VQ, Sun S, Minh HV, et al. An EQ-5D-5L Value Set for Vietnam. Quality of Life Research. 2020;29(7):1923-33.

[18] General Statistics Office of Viet Nam. Completed Results of the 2019 Viet Nam Population and Housing Census. Hanoi: Statistical Publishing House; 2020. 842 p.

[19] The EuroQoL Group. Certified Translation: EQ-5D-5L Vietnamese version for Vietnam. 2013.

[20] General Statistics Office of Viet Nam. Older Persons in Viet Nam: An analysis of the Population Change and Family Planning Survey 2021. Hanoi, 2021.

[21] Ngo CQ, Phan PT, Vu GV, al e. Effects of different comorbidities on health-related quality of life among respiratory patients in Vietnam. Journal of Clinical Medicine. 2019;8(2):214.

[22] Tran BX, Moir MPI, Thai TPT, al e. Socioeconomic Inequalities in Health-Related Quality of Life among Patients with Cardiovascular Diseases in Vietnam. BioMed Research International. 2018;2018:2643814.

[23] Ross CE, Wu C-l. The links between education and health. American Sociological Review. 1995:719-45.

[24] Pham TB, Nguyen TT, Truong HT, al e. Effects of Diabetic Complications on Health-Related Quality of Life Impairment in Vietnamese Patients with Type 2 Diabetes. Journal of Diabetes Research. 2020;2020:4360804.

[25] Bakar N, Aşılar R. Factors affecting depression and quality of life in older people. J Gerontol Geriatr Res. 2015;4(249):2.