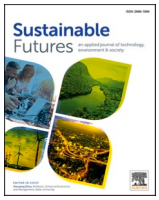
Sustainable Futures 10 (2025) 101214

Contents lists available at ScienceDirect

Sustainable Futures

journal homepage: www.sciencedirect.com/journal/sustainable-futures



Measuring the quality of life university students and its predictors as a basis for its applied research. Cross-country evidence

František Petrovič [a], František Murgaš [b], Anna Tirpáková [c,d], Marie Hubálovská [e], György Molnár [f,g], Roman Králik [h], Ján Zozuľak [i], Enikő Nagy [j], Marek Nocoń [k], Zoltán Balogh [l,f,*]

[a] Department of Ecology and Environmental Sciences, Constantine the Philosopher University in Nitra, 949 01 Nitra, Slovakia
[b] Department of Geography, Technical University of Liberec, 461 17 Liberec, Czechia
[c] Department of Mathematics, Constantine the Philosopher University in Nitra, 949 01 Nitra, Slovakia
[d] Department of School Education, Faculty of Humanities, Tomas Bata University in Zlín, 760 00 Zlín, Czechia
[e] Department of Technics, Faculty of Education, University of Hradec Kralove, 500 03 Hradec Králové, Czechia
[f] Kandó Kálmán Faculty of Electrical Engineering, Óbuda University, Budapest, Hungary
[g] Apáczai Csere János Faculty of Humanities, Education and Social Sciences, Széchenyi University Győr, 9021 Győr, Hungary
[h] Department of Social Works, Faculty of Theology, Catholic University in Ružomberok, 034 01 Ružomberok, Slovakia
[i] Department of Ethics and Aesthetics, Faculty of Arts, Constantine the Philosopher University in Nitra, 949 01 Nitra, Slovakia
[j] Kandó Kálmán Antal Bejczy Center for Intelligent Robotics, John von Neumann Faculty, Institute of Cyberphysical Systems, Óbuda University, Budapest, Hungary
[k] Faculty of Tourism and Recreation, Wyższa Szkoła Turystyki i Ekologii, Sucha Beskidzka 34-200, Poland
[l] Department of Informatics, Constantine the Philosopher University in Nitra, 949 01 Nitra, Slovakia

ARTICLE INFO

Keywords:
Quality of life (QoL)
University students
Predictors
Cross-country comparison
COVID-19 pandemic
Family relationships

ABSTRACT

The paper is focused on the quality of life of university students in Slovakia, the Czech Republic, Poland, Hungary and Spain and its indicators and predictors. University students represent a specific demographic group due to a combination of age, education, and health. Paper has several goals. The first goal is to determine the value of the quality of life of university students in the mentioned countries and to determine the degree of their similarity/difference. The second goal is to compare their quality of life with the quality of life in individual countries. The third goal is to investigate which of the indicators have an impact on the quality of life, and thus are its predictors. Two scientific questions are formulated. Firstly, we are interested in whether there will be a difference between quality of life in Central European countries and Western European Spain. Secondly, we aim to find which predictors there are in common in the studied countries. In other words, we examine what the Quality of Life of university students in five countries is and what determines it to be the way it is.

1. Introduction

Quality of life (hereinafter referred to as QoL) is a contemporary social concept, including all areas of life. It consists in the cognitive and emotional evaluation of one's own life by the individual, determined by the individual's values, expectations and perception of the physical and social environment that surrounds the individual [1].

QoL consists of variables. Their quantification creates indicators. Indicators with a significant impact on QoL are predictors. The Cambridge Dictionary (online a) defines a predictor as "something such as an event or fact that enables you to say what will happen in the future". According to Patrício et al. [1] the study of predictors of QoL of the general population is of great importance in creating a comparative standard for the appropriate treatment of sick people.

Several authors state that it is important to investigate QoL in comparative studies focused on different populations [1–3]. In the

Ethical approval: Ethical approval was obtained from the Ethic Committee of the Constantine the Philosopher University in Nitra (chairman Prof. dr. M. Bauerová). The Ethics Committee stated and confirmed that the research does not contradict any ethical rules and confirms that all respondents were informed about the use of their answers. The questionnaire was filled out anonymously. All respondents were initially informed about the objectives of the research and the use of the questionnaire. By filling out the questionnaire, they agreed to its evaluation.

* Corresponding author.
E-mail address: zbalogh@ukf.sk (Z. Balogh).

https://doi.org/10.1016/j.sftr.2025.101214
Received 29 January 2025; Received in revised form 6 July 2025; Accepted 23 August 2025
Available online 27 August 2025

paper, predictors of QoL are investigated in one demographic group, specific for its combination of age and education; this being a group of university students. By examining predictors in several Central European countries - Slovakia, the Czech Republic, Poland, Hungary and one Western European country - Spain, we want to arrive at valid data. We are interested in whether similarity or difference will prevail in the investigation of QoL and its predictors with respect to a relatively homogeneous group of students. Subsequently, whether, given the different socio-economic levels of development in Central European countries and Spain, the spatial structure of QoL will take the form of a cluster formed by neighbouring post-transitional countries such as Slovakia, the Czech Republic, Poland and Hungary on the one hand and Spain on the other, or whether the spatial structure will be different. The research was organised by a Slovak university, which created a network of partner universities. The measurement of predictors of quality of life was aimed at university students in these countries.

The focus of research on university students is not accidental. University students represent an age- and education-defined demographic group clearly distinguishable from other demographic groups. Their quality of life refers to the same group of subjective factors as the general population, or demographic group of young people. This can be referred to as the subjective dimension of QoL of university students. The objective dimension is represented by the complex of university influences on the life of its students, which in the past was considered the strongest predictor of university student quality [4]. This objective dimension, consisting of a focus on university studies and all the factors that influence its direction towards the successful completion of studies [5], makes the study of QoL of university students unique.

The impact of the COVID-19 pandemic, which transformed in-person education to remote education, had a significant impact on the physical and mental health of a large part of university students. It manifested itself in the form of frustration, anxiety and depression among students [6,7], accompanied by a significant reduction in social interactions. According to Shigemura [8] strong negative experiences can have long-lasting consequences. 81 % of university students had a negative opinion of remote learning as the only possible teaching method during the pandemic [9].

We reflected the stated findings in the creation of a questionnaire in which we ask about a wide range of variables that we believe influence QOUSL, starting with the type of residence - village, city - and in the case of cities, their size and the impact of the Covid-19 pandemic on the psyche and relationships with loved ones before and after the pandemic.

Quality Of Life

It has no generally accepted definition, and as a result, many scientists and institutions have proposed their own definitions. One of the most frequently cited is the World Health Organization's (WHO) definition of QOL [10]. In the paper we lean towards the definition: Quality of life is both objective and subjective. Each of these two dimensions comprises several domains which, together, define the total construct. Objective domains are measured through culturally relevant indices of objective wellbeing. Subjective domains are measured through questions of satisfaction [11].

An important feature of QoL is its dichotomy. It manifests itself in the fact that QoL has a subjective and an objective component, it concerns the individual and the entire society. On the one hand, it is a complex multidisciplinary concept, on the other hand, it is a simple answer to the question: How are you? Most people intuitively understand what QoL is, they consider it meaningful [12,13]. Individuals over the age of 18 generally report their quality of life as good to above average good [1]. Much of the research has an applied focus with the aim of improving QoL.

Psychologists and health professionals pay a lot of attention to interventions to improve individuals' QoL [14,15]. In applied non-psychologically and non-medically oriented QoL research, proposals for its improvement in the form of public policy measures concerning the whole of society take the form of interventions. A condition for their effectiveness is knowing which factors affecting the quality of life have a significant impact on it. These factors are denoted differently, e.g. 'key factors that determine the quality of life' [5]. In the paper, we generally call them variables. Indicators are created by measuring variables, indicators with medium and significant influence on QoL are 'predictors'.

Gallup (2025) measures quality of life in three categories at the global level. In 2023, sixty percent of humanity rated their quality of life as "struggling," twenty-nine percent as "thriving," and twelve percent as "suffering." Between the years 2006 and 2023, the levels of struggling and suffering were relatively stable, while the level of thriving increased slightly.

2. Literature review

QoL research has experienced a boom in recent decades, which is related to a large number of published papers and books dedicated to this concept. This also applies to authors from the countries studied [5, 16–28], among others. It can be concluded that papers focused on application prevail over papers focused on conceptualisation, or development of QoL epistemology. Among individual age groups, QoL research around the world is also focused on university students [5,29, 30].

The term QoL consists of the words 'quality' and 'life', in the paper we are focused on the term 'quality'. From an etymological point of view, the term 'quality' is connected with the term 'evaluation'. Quality can be derived from the Latin 'qualis', coming from the root 'qui, who'? in the sense of 'who is it'?, 'what is it like'? Understanding QoL as something simple is close to defining quality as "how good or bad something is", (Cambridge Dictionary, online b). QoL is a concept, from which it follows that it is immeasurable. What can be measured are its characteristics called indicators. "For the purpose of measuring QoL, the term indicator is suitable, because it does not correspond to the effort to determine the causes, rather to express this phenomenon, or plausibly describe" [31].

Currently, the use of subjective indicators based on self-reported evaluation of one's own life, obtained from worldwide research such as the World Value Survey, containing valid data not only on the quality of life and happiness, but also on their indicators, is growing [28,32]. The second type of data is data obtained from internationally accepted questionnaires. Examples are the WHOQoL-100 with one hundred questions and the shorter version WHOQoL-BREF, and a 26-item instrument consisting of four domains: physical health, psychological health, social relationships, and environmental health; it also contains QoL and general health items (WHO, Programme on mental health (2012)). The third type are questionnaires compiled by individual researchers. An overview of the questionnaires is given by Sirgy et al. [33].

The paper is focused on the question of which of the proposed indicators characterising QoL have a significant impact on it and are therefore its predictors [1,5,34,35]. According to Villas-Boas, et al. [36] the predictors of QoL change with age. For young and old people, the strongest predictor is marital status.

Patricio et al. [1] investigated predictors of QoL in the Portuguese population also using the WHOQoL-BREF. The strongest predictor was the domain of physical health and the least strong predictor was social relationships. Age, education, socioeconomic status and emotional state were significantly correlated with QoL, which explained 25 % of the variance of QoL. QoL was significantly differentiated by age, education, marital status, location (mainland or islands), type of roommates, and health care. Residents of Portugal reported a high level of QoL. Individuals in the general population hypothesised that social relationships, social participation, physical health, environment, and mental health are strong predictors of QoL. However, a different finding emerged from the study. Predictors of QoL are, in descending order: physical health, mental health, and then social relationships.

Another study also focused on the QoL of Brazilian medical students.

Its data was obtained using VERAS-Q (a 45-item questionnaire with the domains of time management, mental health, physical health, and learning environment) created to assess the quality of life of students of health professions using a five-point Likert scale transformed to a scale of 0–100. The most important factor of students' QoL was found to be the physical domain, including, in addition to physical health, sleep, free time, physical activity and appearance [37]. Szegedi et al. [5] conducted extensive research on the QoL of university students studying business in Hungary. The result is the identification of physical condition, psychological state and family relationships as predictors of QoL.

There are papers focused on comparing QOUSL in several countries. Grabowski et al. [23] compared QOUSL in Kraków, Poland, and St. Petersburg, Russia, and explored that students rated their QoL at the same level. In another study focusing on QOUSL in Germany, Slovenia, the Czech Republic, Poland, Ukraine, Russia, Turkey, Israel and Colombia, different QOUSL values were found and countries also differed in predictors. The only common finding was a strong correlation between low self-reported health and low QoL. The authors explain the differences in the correlation values of the other indicators with cross-cultural differences [3].

In general, it can be stated that little attention had been paid to QOUSL so far [1], interest increased after the outbreak of the COVID-19 pandemic.

2.1. Aim of study

We have two goals in the paper. The first is to determine the QOUSL value in five European countries and their degree of similarity/difference. The second goal of QOUSL is to find out which of the investigated indicators are predictors of QOUSL in these countries. We ask ourselves two scientific questions. (i) We are interested in whether the differences among QOUSL in individual countries will be low, and thus confirm the results of Grabowski et al. [23] or will be significant. (ii) We are interested in how many predictors will be common to all the studied countries. In other words, what is the QoL of university students in five countries and what determines it.

3. Method

We collected data in all countries and at selected universities by having bachelors, masters and doctoral students fill out the same anonymous questionnaire on social networks. In Slovakia in Slovak, in the Czech Republic in Czech and in Poland, Hungary and Spain in their languages from English translation. The questionnaire questions were designed to cover the same research areas and through them we asked about the same opinions and attitudes, or we measured the same parameters. For this reason, we did not validate the questionnaire for each of its language localizations, only for Slovak. Language mutations were equivalent translations of the original (in Slovak) and subsequently checked by experts whose mother tongue was Czech or English. The data obtained are subjective self-reported data. In addition to demographic data characterising the student, we asked thirteen questions, which are listed in the appendix of the paper. Question no 1 was focused on QOUSL, the other questions formed two groups. The first group was represented by questions 2 (Residence), 3 (Marital status), 4 (Form of residence), 5 (Faith), 7 (Vaccination), 8 (Impact of the COVID-19 pandemic) and 11 (Finances). We were only interested in these questions as indicators of QOUSL. Questions 6 (Health), 9 (Trust), 10 Happiness, 12a-d (Relationships with loved ones before the pandemic) and 13a-d (Relationships with loved ones after the pandemic), forming the second group, interested us not only as QOUSL indicators, but we were also interested in their numerical value, expressed in the same way as in the case of question 1 (QoL) on a Cantril scale of 0 - 10. Subquestions 12e and 13e focused on the relationship with the wife/husband before and after the pandemic were originally in questions 12 and 13. Due to the low number of students who stated that they have a wife/husband, we did not process these answers. As we have already mentioned, the responses to question 1 (QoL) and the questions in the second group were determined on a numerical Cantril scale of 0–10, where 0 meant the lowest possible quality of life, life-threatening illness or injury, mistrust of anyone, etc., and 10 meant the highest possible quality of life, complete health, trust towards everyone, etc. Terminologically, we refer to all detected data as variables. Regarding the key element –QOUSL – variables with no or low influence are indicators, variables with medium or large influence are predictors.

Questions 6 - Health, 9 - Confidence and 10 - Happiness are often used to measure quality of life. We assigned question 12 – Relationships with loved ones before the pandemic and 13 – Relationships with loved ones after the pandemic to them. Questions 1, 6, 9 and 10 are tied to the person of the individual, questions 12 and 13 express the individual's relationships with others, in our case with the closest people. The reason for the inclusion of questions 12 and 13 is the researchers' repeatedly noted deterioration of the mental health of university students and young people in general, which was caused by the COVID-19 pandemic. It manifested itself in an increase in loneliness and the related absence of interpersonal contacts that spending time online cannot replace. We consider good to excellent relationships with loved ones to be significant in terms of supporting mental health and thus also QoL.

Individual questions always had several sub-questions, from two (5 – Faith: Believers, Non-believers, 7 – Vaccination: Vaccinated, Unvaccinated) to six (2 – Residence: Village, City up to 20 thousand inhabitants, 20,001 – 50,000, 50,001 – 100,000, 100,001 – 500,000, >500,000, 8 – Pandemic impact: Fear, Anxiety, Depression, Suicidal ideation, Suicide attempt and No impact). So we did not measure the quality of life in the e.g. "Faith" question, but in the quality of life for Believers and Non-Believers; not in the question of Residence, but for students living in a village or city with up to 20,000 residents etc. Research at universities in individual countries took place in the second half of 2023.

We wanted to find out which of the mentioned indicators are also predictors of the quality of life through the research described in the presented paper. The calculation of the correlation coefficients between the quality of life and other indicators was used in the search for an answer to the above question. Before we conducted the research, we determined the reliability and validity of the research instrument - the questionnaire. Reliability, or rather accuracy or reliability, describes the influence of random errors on the results obtained by the questionnaire method. If we want our questionnaire to best describe the researched issue, it is necessary to eliminate the influence of chance as much as possible - in our case, determine reliability as a measure of dependence between individual items of the questionnaire using Cronbach's alpha. Cronbach's alpha determines reliability (as the internal consistency of the test questionnaire) and is given by the relationship:

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum_{j=1}^{k} \mathrm{var}(Y_j)}{\mathrm{var}(Y)}\right)$$

where k is the number of observed variables (questions) in the questionnaire, v var (Y_j) is the variance of the points of the j-th variable, and var(Y) is the variance of the raw scores of all questions of the questionnaire. The calculated coefficient values, which are close to the value 1, confirm a strong linear dependence - this means that the influence of random errors on the results obtained by the questionnaire is minimal.

In our case, we calculated Cronbach's alpha in the STATISTICA program [38]. First, we calculated the value of Cronbach's alpha for the entire set, which is 0.917348. We can see that the calculated Cronbach's alpha value is close to 1, which indicates a very high reliability of the data obtained by the questionnaire used. This means that the impact of random errors on the results obtained by the questionnaire QOUSL is minimal in our case. We also proceeded analogously when verifying the reliability of the QOUSL questionnaire data for each country: Slovakia, the Czech Republic, Poland, Hungary and Spain. Using the STATISTICA program, we calculated the following Cronbach's alpha values: Slovakia

(0.907241), the Czech Republic (0.9128561), Poland (0.906624), Hungary (0.921364) and Spain (0.920335). Based on the calculated Cronbach's alpha values in all the countries studied, we conclude that the impact of random errors on the results obtained by the QOUSL questionnaire is minimal in all the countries studied. To test the validity, we used the method of construct validation of the research instrument (QOUSL questionnaire) using factor analysis. Using method of the factor analysis, we determined what basic factors the research instrument consists of and whether the individual items of the questionnaire sufficiently saturate the given factors (or correlate) - we found that they do and the calculation also confirmed that the factors together explained >52 % of the total variance, which confirmed the construct property of the questionnaire. It turned out that the measurements are in line with the theoretical meaning and conceptualization of the investigated construct. In order not to exceed the permitted scope of the article, we have provided only basic information on the methods used to verify the reliability and validity of our research instrument and also a brief evaluation of the obtained results. Based on the obtained results, we conclude that the required conditions for both the reliability and validity of the obtained data in all tested countries were met.

3.1. Participants

As we have already stated, the respondents, respectively the participants of our research were bachelors, masters and doctoral students of public universities in Slovakia, the Czech Republic, Poland, Hungary and Spain ($N = 747$). The research was conducted in the second half of 2023.

3.2. Measures

Quality of life, like other social concepts, cannot be measured. What can be measured are its variables. Indicators are created by measuring variables, indicators with medium and significant influence on QOL are 'predictors'.

In the paper, we start from the approach according to which QoL should be investigated and measured by a wide range of variables. We are guided by an applied approach, according to which, in addition to QoL, indicators that influence QoL should also be examined and measured [39]. We relied on this approach when creating the questionnaire. In the measurement, we first calculated the basic statistical characteristics for all questions (1 to 13d): arithmetic mean and standard deviation. The average values and standard deviations of the answers from all five countries are shown in the following table (Table 1) and shown graphically (Fig. 1) in the following section "Results and discussion".

The calculation of correlation coefficients followed next. In the next part of the analysis, we were interested in whether there are connections between the quality of life and other observed characteristics (selected questions in the questionnaire), or bonds. When looking for a connection between the answers to the questions, we used a statistical method - Spearman's rank correlation coefficient, which expresses the degree of dependence between the characteristics X and Y.

The rank correlation coefficient R takes values from the interval $\langle -1, 1\rangle$.

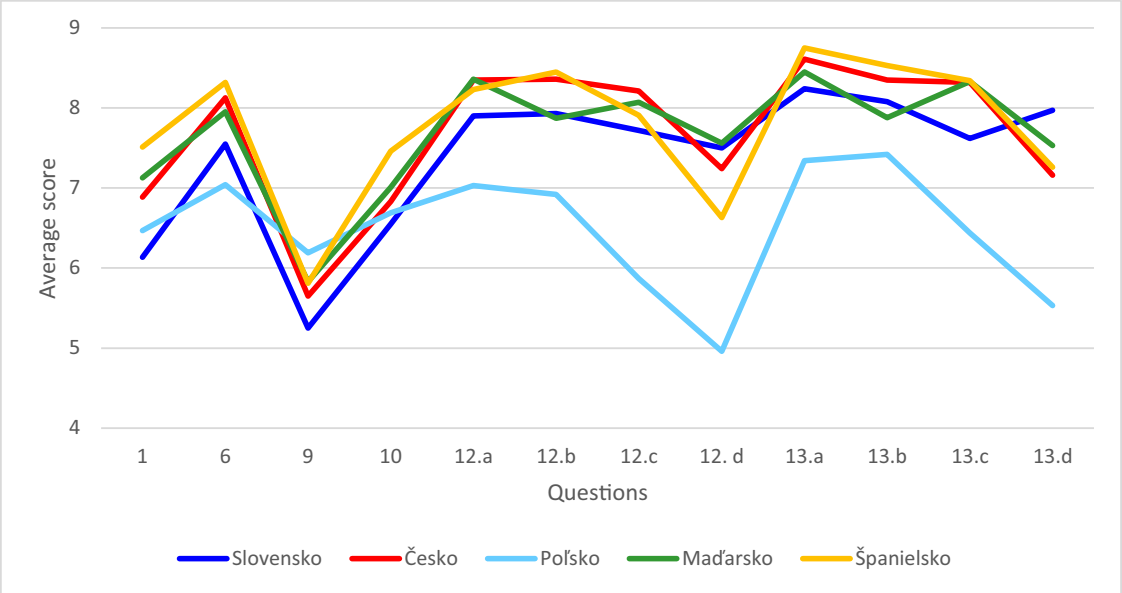
4. Results and discussion

The calculated values of basic statistical characteristics - arithmetic mean and standard deviation are shown in Table 1. It contains students'

Table 1
Arithmetic mean and standard deviation of questions of measured variables.

Question number. A variable	Slovakia			Czechia			Poland			Hungary			Spain		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Males	6,05	0,31	43	6,88	0,25	69	6,09	0,21	104	7,05	0,19	133	7,38	0,29	56
Females	6,17	0,20	106	6,89	0,21	99	7,18	0,28	56	7,80	0,56	15	7,63	0,28	63
Bachelor student	6,09	0,19	115	6,95	0,20	103	6,60	0,20	120	7,11	0,18	147	7,50	0,22	103
Master's student	6,17	0,38	29	6,78	0,26	64	6,05	0,35	38	10,00	2,18	1	7,56	0,55	16
PhD student	7,00	0,92	5	7,00	2,07	1	6,50	1,53	2	0,00	0,00	0	0,00	0,00	0
Village (up to 5000 inhabitants)	6,11	0,23	80	7,11	0,23	76	6,49	0,32	47	6,97	0,37	34	6,85	0,60	13
City 5 001 - 20,000 inhabitants	5,78	0,48	27	6,22	0,30	46	6,84	0,44	25	6,77	0,36	35	7,65	0,45	23
City 20 001 - 50 000 inhabitants	5,78	0,40	18	7,28	0,48	18	6,52	0,44	25	8,11	0,50	19	8,46	0,44	24
City 50 001 - 100 000 inhabitants	6,85	1,03	20	6,86	0,44	21	6,40	0,69	10	7,60	0,97	5	6,80	0,97	5
City 100 001 – 500 000 inhabitants	7,00	0,46	4	7,80	0,91	5	6,24	0,32	46	8,67	0,88	6	7,14	0,41	28
City over 500 001 inhabitants	0,00	0,00	0	9,00	1,44	2	6,43	0,83	7	6,92	0,31	49	7,38	0,42	26
Single living with parents	6,16	0,20	104	6,67	0,19	112	6,44	0,23	86	7,00	0,28	62	7,84	0,25	74
Single living alone	6,21	0,48	19	8,20	0,52	15	6,16	0,43	25	6,61	0,51	18	7,10	0,47	21
Single living with a girlfriend	6,04	0,42	24	6,87	0,32	39	6,10	0,40	29	6,90	0,40	30	6,36	0,58	14
Married	5,00	1,47	2	9,50	1,42	2	7,59	0,52	17	7,57	0,40	30	7,63	0,76	8
Divorced	0,00	0,00	0	0,00	0,00	0	7,00	1,24	3	8,50	0,77	8	7,50	1,53	2
Housing-With parents	5,95	0,26	61	6,72	0,21	96	6,36	0,23	91	6,88	0,30	51	7,79	0,25	76
Housing-Dormitory	6,16	0,29	50	6,92	0,42	24	6,14	0,58	14	6,68	0,49	19	6,80	0,97	5
Housing-Sublease	6,26	0,37	31	7,15	0,32	41	6,74	0,35	39	6,88	0,33	42	6,84	0,39	31
Housing-Own flat	7,00	0,78	7	7,57	0,78	7	6,69	0,54	16	8,00	0,36	36	8,00	0,82	7
Believer	6,40	0,21	92	7,22	0,32	41	6,61	0,22	95	7,23	0,28	60	7,45	0,28	62
Unbelievers	5,70	0,27	57	6,78	0,18	127	6,26	0,27	65	7,06	0,23	88	7,58	0,29	57
Vaccinated	5,95	0,21	97	6,85	0,18	130	6,48	0,21	105	7,07	0,19	127	7,44	0,21	112
Unvaccinated	6,48	0,28	52	7,03	0,34	38	6,45	0,29	55	7,48	0,48	21	8,71	0,82	7
The impact of the pandemic - fear	6,16	0,40	25	7,03	0,34	34	6,59	0,46	22	7,20	0,68	10	7,00	0,55	15
Anxiety	6,00	0,35	33	6,13	0,35	31	6,45	0,38	33	7,21	0,49	19	7,22	0,44	23
Depression	5,86	0,38	28	6,11	0,45	19	6,03	0,37	34	6,09	0,65	11	7,50	0,67	10
Suicidal thoughts	5,50	0,82	6	4,00	1,14	3	6,50	0,77	8	6,67	1,25	3	5,40	0,95	5
Suicide attempt	0,00	2,01	1	0,00	0,00	0	5,60	0,97	5	3,50	1,53	2	4,00	2,13	1
No impact	6,52	0,27	56	7,41	0,22	81	6,76	0,28	58	7,30	0,21	103	7,95	0,26	65
Finances - Lack of money	5,17	0,40	24	6,09	0,62	11	6,45	0,48	20	6,15	0,60	13	6,64	0,65	11
Occasional lack of money	5,78	0,26	59	6,60	0,25	67	6,30	0,27	63	6,73	0,36	37	6,97	0,37	33
Enough money	6,80	0,24	66	7,20	0,22	90	6,61	0,25	77	7,41	0,22	98	7,88	0,25	75

Source: own research.



. 1. Average values of answers to questions 1, 6, 9, 10, 12a, 12b, 12c, 12d, 13a, 13b, 13c and 13d.
Source: Own research.

answers to two demographic variables - gender and type of study and thirteen questions, while questions 12 and 13 each have the same four sub-questions.

In Table 1 there are no answers for some questions. It is in cases where e.g. no doctoral students participated in the research (Hungary and Spain), there is no city in the country with >500,000 inhabitants (Slovakia), the number of married students is minimal, therefore none of them are divorced, etc. We did not deal with questions that had a low number of answers (<10 per country).

It can be concluded based on the analysis of the answers to all questions (1–13d) that the average value of all variables in Slovakia, the Czech Republic, Poland, Hungary and Spain is 6.17 on a scale of 0–10, it means that it is above average. If a question did not have a sufficient number of answers in three or more countries, the question was not evaluated. For this reason, six measurements were not evaluated. We measured responses to thirty-nine questions and for five countries. One hundred and eighty-seven out of one hundred and ninety-five measurements had an above-average value (we consider a value of 6.0 and above on the 0–10 Cantril scale), seven measurements had an average value (we consider a value of 5.0–5.99 on the 0–10 Cantril scale) and one measurement had a below-average value (we consider the value 0–4.99 on the Cantril scale of 0–10).

Eurostat (2024) reports the measurement of the quality of life of the EU member states, Switzerland, Norway and Turkey for 2023 on a scale of 0–10 (Table 2). The highest quality of life value is in Finland (7.8) and the lowest in Bulgaria (5.9). The age category of 16–24 years is not identical to university students, but due to the high representation of university students in this age category, it can be included.

Several important insights emerge from Table 1 and its graphic representation in Fig. 1:

Table 2
Overall quality of life and quality of life in the age category of 16–24 years on a scale of 0–10 in all the countries studied.

Country	Slovakia	Czechia	Poland	Hungary	Spain
Overall quality of life	7.3	7.4	7.6	7.1	7.2
Quality of life age group 16–24	7.8	8.1	7.8	7.1	7.7

Source: Eurostat (2024).

- The average QOUSL in Slovakia, the Czech Republic, Poland, Hungary and Spain is 6.83 and ranges from 6.13 in Slovakia to 7.51 in Spain. It means that QOUSL is above average in these countries. Okulicz -Kozaryn, Valente [40] divide Europe in terms of life satisfaction, which we consider synonymous with quality of life, into two macro-regions – West and East. The West consists of the fifteen countries that made up the European Union before its enlargement in 2004, and the East consists of the countries of Central and Eastern Europe. Slovakia, the Czech Republic, Poland and Hungary together with Slovenia are the most successful post-transition countries. Our finding falls into this statement, but the difference between Spain on the one hand and Slovakia, the Czech Republic, Poland and Hungary on the other is not significant. QOUSL is 7.13 in Hungary, which is only 0.38 less than in Spain.
- The measured QOUSL values are in the range from 4.96 (value of relations with girlfriend/boyfriend of Polish students) to 8.75 (value of relations with grandparents of Spanish students. Very high values over 8 on a scale of 0–10 - of the individual variables, were achieved by relationships after the pandemic, specifically relationships with parents (8.28) and grandparents (8.05). Very high relationship values above 8 on a scale of 0–10 were reported by Czech students (six times out of eight measurements), Spanish (five times), Hungarian (four times) and Slovak (twice). The lower values of relationships reported by Polish students differ significantly from the others.
- As we have already stated, in the second group of questions (questions 6, 9, 10, 12 and 13) we were interested in absolute values reported as well as QOUSL on a scale of 0–10. The obtained results can be interpreted so that for questions 1, 6, 9 and 10, health has the highest values, as expected (given the young age of the respondents), and trust has the lowest. The biggest difference between the lowest (Slovakia, 6.13) and the highest (Spain, 7.51) value compared to the average value (6.83) is for QoL.

The structure of the answers is different in the second group of questions (questions 12a-13d). Poland differs significantly from the other countries with the lowest values. Numerical differences of 2.60, 2.44 or 2.24 on a scale of 0–10 when evaluating five countries are surprisingly large. It is a paradox that in Poland students declared the highest level of trust (which, together with relationships, forms social

capital) as in the only country above the value of 6 (6.19). It is true for all countries, including Poland, that relations with the closest ones are better after the pandemic than before it.

- Slovak students reported the lowest QoL values for questions 1, 6, 9 and 10 from a regional point of view. This also applies to the other variables in three of the four questions. Spanish students achieved the highest QoL values. This also applies to the other variables in two of the four questions.
- The results are different for questions 12 and 13, that is, questions focused on students' relationships with their closest relatives. The achieved values are significantly higher than for questions 6, 9 and 10. Post-pandemic relationships (question 13) are rated higher than pre-pandemic relationships (question 12). The average value of relations with parents and grandparents is higher than 8 on a scale of 0–10.
- The answers to questions 12 and 13 differ from the answers to questions 1, 6, 9 and 10 also from a regional point of view. The lowest values eight times out of eight questions were achieved by Polish students, including the only below-average value from all examined questions: 4.96. We consider a value from 0 to 4.99 to be below average on a scale of 0–10. The highest values for relationship questions were achieved by Czech students - six times out of eight questions, a value of >8 was achieved.

The second goal of our paper is to find out which indicators, determined using questions 2–13d, are significant indicators of QOUSL, called predictors. Table 3 was used for the verbal interpretation of the calculated indicator values. It is based on the arbitrary decision that the predictor is an indicator, which in our case correlates with the quality of life with a value of 0.30 and higher.

Furthermore, we do not present the traditional correlation matrix, because we are focused only on the relationship between QOUSL and other variables. For this reason, we present tables of the correlation of QOUSL and variables in Slovakia, the Czech Republic, Poland, Hungary and Spain. They show which of the variables are indicators with no or low impact on QoL and which are predictors with medium or large impact on QoL.

4.1. Slovakia

Research on predictors of QOUSL in Slovakia involved ($N = 152$) students, out of which 29 % were men and 71 % were women. Values of correlations with QOUSL indicators and predictors are in Table 4.

Eighteen measurements showed that nine indicators are predictors of QOUSL, all at the medium correlation level. As many as seven indicators correlate with the quality of life at the level of no correlation and very small correlation.

As expected, the predictors of the quality of life in Slovakia are Happiness, as well as Trust and Satisfaction with the financial situation. Relationships with parents, grandparents and siblings are predictors of the quality of life before the pandemic and now. Relationships with a partner are not among them, probably because of their less permanent nature.

Table 3
Verbal interpretation of predictors in correlation matrices.

Correlation value	Verbal Indication of Correlation	Verbal Indication of the Predictor
$0 \leq \|r\| < 0{,}09$	No correlation	None
$0.10 \leq \|r\| < 019$	Very small correlation	None
$0.20 \leq \|r\| < 0.29$	Small correlation	None
$0.30 \leq \|r\| < 0.49$	Medium correlation	Predictor
$0.50 \leq \|r\| < 0.69$	Large correlation	Strong predictor
$0.70 \leq \|r\| < 0.89$	Very large correlation	Very strong predictor
$0.90 \leq \|r\| < 1$	Near perfect correlation	Near perfect predictor

Source: Own research according to [38,41].

Table 4
Correlations of QOUSL and variables in Slovakia.

SK Correlations of variables		Value	Verbal Indication of correlation
Quality of life	Residence	0.10	very small correlation
	Marital status	−0.04	no correlation
	Form of housing	0.10	very small correlation
	Faith	0.17	very small correlation
	Health	0.15	very small correlation
	COVID-19 vaccination	0.12	very small correlation
	Impact of the pandemic on the psyche	0.08	no correlation
	Trust	**0.38**	**medium correlation**
	Happiness	**0.43**	**medium correlation**
	Finance	**0.30**	**medium correlation**
	Relationships before the pandemic		
	a) with parents	**0.38**	**medium correlation**
	b) with grandparents	**0.31**	**medium correlation**
	c) with siblings	**0.34**	**medium correlation**
	d) with partner	0.20	small correlation
	Relationships after the pandemic		
	a) with parents	**0.38**	**medium correlation**
	b) with grandparents	**0.34**	**medium correlation**
	c) with siblings	**0.35**	**medium correlation**
	d) with partner	0.22	small correlation

Note: QOUSL predictors are marked in bold.

4.2. Czechia

Research on predictors of QOUSL in Czechia involved ($N = 168$) students, out of which 41 % were men and 59 % were women. Values of correlations with QOUSL indicators and predictors are in Table 5.

There are five QOUSL predictors in the Czech Republic. In this country as well as in Slovakia, QoL correlates with up to nine indicators at the level of no correlation and very small correlation. Predictor of QOUSL is also, as expected, Happiness. Its correlation value is high. Before the pandemic, only the relationships with parents were a predictor. Currently, the predictors are relationships with parents,

Table 5
Correlations of QOUSL and variables in Czechia.

CZ Correlations of variables		Value	Verbal Indication of correlation
Quality of life	Residence	0.04	no correlation
	Marital status	0.11	very small correlation
	Form of housing	0.11	medium correlation
	Faith	´−0.17	very small correlation
	Health	0.12	medium correlation
	COVID-19 vaccination	0.04	no correlation
	Impact of the pandemic on the psyche	0.18	very small correlation
	Trust	0.24	small correlation
	Happiness	**0.72**	**very large correlation**
	Finance	0.17	very small correlation
	Relationships before the pandemic		
	a) with parents	**0.33**	**medium correlation**
	b) with grandparents	0.29	small correlation
	c) with siblings	0.29	small correlation
	d) with partner	0.01	no correlation
	Relationships after the pandemic		
	a) with parents	**0.36**	**medium correlation**
	b) with grandparents	**0.30**	**medium correlation**
	c) with siblings	**0.35**	**medium correlation**
	d) with partner	0.12	very small correlation

Note: QOUSL predictors are marked in bold.

grandparents and siblings. As in Slovakia, relations with a partner are not predictor, probably due to their unstable nature.

4.3. Poland

Research on predictors of QOUSL in Poland involved ($N = 160$) students, out of which 65 % were men and 35 % were women. Values of correlations with QOUSL indicators and predictors are in Table 6.

In Poland, there are six QOUSL predictors, up to a third of QOUSL correlations and indicators are at the level of no correlation. The correlation with Happiness is as expected high, the other correlations are different from the previous ones. Health is a predictor and Trust is a strong predictor. Unlike Slovak and Czech students, relationships with siblings are not a predictor for Polish students.

4.4. Hungary

Research on predictors of QOUSL in Hungary involved ($N = 148$) students, out of which 89 % were men and 11 % were women. Values of correlations with QOUSL indicators and predictors are in Table 7.

In Hungary, the number of QOUSL predictors is the lowest - five. Correlations of QOUSL in Hungary with indicators from non-relationship-oriented questions are similar to those in Poland, Happiness is a strong predictor, Health and Trust are predictors. However, unlike Slovak, Czech and Polish students, current relationships with loved ones are not important for Hungarian university students, and therefore these relationships are not predictors of QOUSL.

4.5. Spain

Research on predictors of QOUSL in Spain involved ($N = 119$) students, out of which 47 % were men and 53 % were women. Values of correlations with QOUSL indicators and predictors are in Table 8.

There are six QOUSL predictors in Spain. As expected, the correlation with Happiness has the highest value. For Spanish students, the most – up to nine indicators – are of negligible importance in terms of their QOUSL. As in the case of Polish students, relationships with siblings are not predictors of their QOUSL. Students in this country value relationships with their grandparents the most.

The previous Tables 3–7 show the correlations of QOUSL and variables in each of the investigated countries, which are based on the verbal indication of the measured values. If we add up the numerical values of all the measured correlations of the variables with QOUSL, we get the sum of the values, i.e. the 'weight of the correlations' for each country (Table 9).

Table 8 shows that QOUSL in individual countries is unrelated to the sum of correlations within them. The correlation of these two variables is negative −0.27.

The paper is focused on the QOUSL predictors and their differentiation in the individual investigated countries. In Table 10 we present their overview in verbal indication.

Table 8 shows that individual countries have a different number of predictors – from 5 (Hungary) to 11 (Slovakia). We solved the problem

Table 6
Correlations of QOUSL and variables in Poland.

PL Correlations of variables		Value	Verbal Indication of correlation
Quality of life	Residence	´−0.06	no correlation
	Marital status	0.09	no correlation
	Form of housing	0.07	no correlation
	Faith	´−0.08	no correlation
	Health	**0.31**	**medium correlation**
	COVID-19 vaccination	0.00	no correlation
	Impact of the pandemic on the psyche	0.04	no correlation
	Trust	**0.58**	**large correlation**
	Happiness	**0.67**	**very large correlation**
	Finance	0.05	very small correlation
	Relationships before the pandemic		
	a) with parents	**0.36**	**medium correlation**
	b) with grandparents	**0.39**	**medium correlation**
	c) with siblings	0.26	small correlation
	d) with partner	0.23	small correlation
	Relationships after the pandemic		
	a) with parents	**0.32**	**medium correlation**
	b) with grandparents	**0.35**	**medium correlation**
	c) with siblings	0.28	small correlation
	d) with partner	0.26	small correlation

Note: QOUSL predictors are marked in bold.

Table 7
Correlations of QOUSL and variables in Hungary.

HU Correlations of variables		Value	Verbal Indication of correlation
Quality of life	Residence	0.02	no correlation
	Marital status	0.14	very small correlation
	Form of housing	0.17	very small correlation
	Faith	´−0.04	no correlation
	Health	**0.44**	**medium correlation**
	COVID-19 vaccination	0.10	very small correlation
	Impact of the pandemic on the psyche	0.06	no correlation
	Trust	**0.31**	**medium correlation**
	Happiness	**0.78**	**very large correlation**
	Finance	0.16	very small correlation
	Relationships before the pandemic		
	a) with parents	0.28	small correlation
	b) with grandparents	**0.31**	**medium correlation**
	c) with siblings	**0.32**	**medium correlation**
	d) with partner	0.24	small correlation
	Relationships after the pandemic		
	a) with parents	0.28	small correlation
	b) with grandparents	0.29	small correlation
	c) with siblings	0.27	small correlation
	d) with partner	0.23	small correlation

Note: QOUSL predictors are marked in bold.

Table 8
Correlations of QOUSL and variables in Spain.

ES Correlations of variables		Value	Verbal Indication of correlation
Quality of life	Residence	´−0.04	no correlation
	Marital status	´−0.14	very small correlation
	Form of housing	´−0.13	very small correlation
	Faith	0.03	no correlation
	Health	0.17	very small correlation
	COVID-19 vaccination	0.10	very small correlation
	Impact of the pandemic on the psyche	0.17	very small correlation
	Trust	**0.33**	**medium correlation**
	Happiness	**0.58**	**large correlation**
	Finance	0.22	small correlation
	Relationships before the pandemic		
	a) with parents	**0.34**	**medium correlation**
	b) with grandparents	**0.40**	**medium correlation**
	c) with siblings	0.26	small correlation
	d) with partner	0.10	very small correlation
	Relationships after the pandemic		
	a) with parents	**0.39**	**medium correlation**
	b) with grandparents	**0.41**	**medium correlation**
	c) with siblings	0.28	small correlation
	d) with partner	0.15	very small correlation

Note: QOUSL predictors are marked in bold.

Table 9
Values of correlations and their sum for the studied countries.

Values of QOUSL correlations with variables	Question number	Slovakia	Czechia	Poland	Hungary	Spain
	2	.10	.04	´−06	.02	.04
	3	.−4	.11	.09	.14	´−.14
	4	.10	.11	.07	.17	´−.13
	5	17	.12	´.08	´.03	.03
	6	.15	.13	.31	.44	.17
	7	.12	.04	.00	.10	.11
	8	.08	.18	.04	.06	.17
	9	.38	.24	.58	.31	.33
	10	.43	.72	.67	.78	.58
	11	.30	.17	.05	.16	.22
	12a	.38	.33	.36	.28	.34
	12b	.31	.29	.39	.31	.40
	12c	.34	.29	.26	.32	.26
	12d	.20	.10	.23	.34	.10
	13a	.38	.36	.32	.28	.39
	13b	.34	.30	.35	.29	.41
	13c	.35	.35	.28	.27	.28
	13d	.22	.12	.26	.23	.15
Total		4.31	3.60	3.98	4.46	3.83
QOUSL		6.13	6.89	6.47	7.13	7.51

Note: Question numbers: 1 Quality of life, 2 Residence, 3 Marital status, 4 Form of housing, 5 Faith, 6 Health, 7 COVID-19 vaccination, 8 Impact of the pandemic on the psyche, 9 Trust, 10 Happiness, 11 Finance, 12 Relationships before the pandemic, 12a with parents, 12b with grandparents, 12c with siblings, 12d with partner, 13 Relationships after the pandemic, 13a with parents, 13b with grandparents, 13c with siblings, 13d with partner. The full text of the questions is in the appendix.

Table 10
Verbal indication of predictors in individual countries.

Questions	Slovakia	Czechia	Poland	Hungary	Spain
2	none	none	None	none	none
3	none	none	None	none	none
4	none	predictor	None	none	none
5	none	none	None	none	none
6	none	predictor	Predictor	predictor	none
7	none	none	None	none	none
8	none	none	None	none	none
9	predictor	none	strong predictor	predictor	predictor
10	predictor	very strong pred.	strong predictor	very strong pred.	strong predictor
11	predictor	none	None	none	none
12a	predictor	predictor	Predictor	none	predictor
12b	predictor	none	Predictor	predictor	predictor
12c	predictor	none	None	predictor	none
12d	predictor	none	None	none	none
13a	predictor	predictor	Predictor	none	predictor
13b	predictor	predictor	Predictor	none	predictor
13c	predictor	predictor	None	none	none
13d	predictor	none	None	none	none

of qualitative evaluation of this fact by assigning weight to the predictors.

The predictor was given a weight of 1

Strong predictor was given a weight of 2

Very strong predictor was given a weight of 3.

The result is Table 11 with weights of predictors affecting QOUSL in individual countries. Slovakia has the highest weight with a distance from the Czech Republic, Poland, Spain and Hungary.

Table 9,10 and 11 can be interpreted so that Spain has the highest QOUSL and at the same time the fourth highest sum of correlation values and the weight of predictors. Hungary has the second highest QOUSL, the highest sum of correlation values and the lowest predictor weights. On the other hand, Slovakia with the lowest QOUSL has the second highest sum of correlation values and the highest weight of predictors.

Table 11
Weights of QOUSL predictors in the studied countries.

	Slovakia	Czechia	Poland	Hungary	Spain
Weight of predictors	11	7	7	5	6

5. Conclusion

The goal of the paper was to investigate QOUSL in Slovakia, the Czech Republic, Poland, Hungary and Spain and the degree of their similarity/difference. The second goal was to compare the QOUSL and quality of life in individual countries. The third goal was to investigate which of the indicators have an impact on the quality of life, and thus are its predictors. Two scientific questions were formulated. Firstly, we were interested in what the quality of life would be in a group of neighbouring Central European countries compared to Western European Spain. Secondly, we aimed to find which predictors there are in common in the studied countries. In other words, we examine what the QOL of university students in five countries is and what determines it to be the way it is.

First goal. Based on the analysis of the results of our research, we can state that the average QOUSL is 6.83. It ranges from 6.13 in Slovakia to 7.51 in Spain, so it is above average. In response to the first scientific question, it can be stated that the division of countries into a relatively homogeneous group of Central European countries on the one hand and Western European Spain on the other has not been confirmed, because Central European countries are not homogeneous in QOUSL. QOUSL is lower in Slovakia and Poland, the difference between them and Spain is >1 on a scale of 0–10. QOUSL is higher in the Czech Republic and Hungary, and therefore the difference between them and Spain is lower.

Second goal. Comparison of the determined QOUSL values in the studied countries and the values of the general QOL in these countries brought ambiguous results. In Slovakia, QOUSL is lower than the general QOL, in other countries it is higher. In the Czech Republic and Poland it is slightly higher, in Hungary and Spain it is significantly higher

Third goal. Much attention has been paid to examining which indicators are predictors of quality of life. As expected, Happiness is a predictor in all the countries studied. Trust (not in the Czech Republic), Relations with parents before the pandemic (not in Hungary), Relations with grandparents before the pandemic (not in the Czech Republic), Relations with parents after the pandemic and Relations with grandparents after the pandemic (both not in Hungary) in four countries. On the other hand, Residence, Marital status, Faith, Vaccination and Impact of the COVID-19 pandemic on the psyche are not predictors in any of the

five countries.

The second scientific question was aimed to find which predictors there are in common to all the countries studied. As expected, Happiness is a predictor in all the countries studied. Trust (not in the Czech Republic), Relations with parents before the pandemic (not in Hungary), Relations with grandparents before the pandemic (not in the Czech Republic), Relations with parents after the pandemic and Relations with grandparents after the pandemic (both not in Hungary) in four countries. The claim of Villas-Boas, et al. [36], that the strongest predictor of QOUSL is income was not confirmed. Satisfaction with financial situation is a predictor of QOUSL only in Slovakia with a borderline correlation of 0.30. In other countries it is not a predictor. In line with the findings of Szegedi et al. [5], family relationships, specifically relationships with parents and grandparents, are also predictors in our research both before the COVID-19 pandemic and after the pandemic.

Based on the obtained results of the presented research, we also believe that it would be appropriate to improve the indicators: Vaccination, Health (except Slovakia), Satisfaction with the financial situation (only in Slovakia) by using public policy tools. It means that the possibilities of decision-making authorities in public policy to influence QOUSL are limitedAt the same time, we see the significant importance of university students' relationships with parents and grandparents. We are currently observing an increase in anxiety [42], stress [43], and other mental disorders, which started during the COVID-19 pandemic. Support for psychological interventions, for which decision-making bodies should create material and non-material conditions, has an irreplaceable place in reducing the aforementioned health and social disorders. Therefore, we consider the knowledge of the importance of relationships with those closest to us to be a significant finding.

Ethical approval

The Ethics Committee stated and confirmed that the research does not contradict any ethical rules and confirms that all respondents were informed about the use of their answers. The questionnaire was filled out anonymously. All respondents were initially informed about the objectives of the research and the use of the questionnaire. By filling out the questionnaire, they agreed to its evaluation.

Consent for publication

Not applicable

Research funding

This work was supported by the Ministry of Education of the Slovak Republic and the Slovak Academy of Science [grant number VEGA 1/0578/24].

CRediT authorship contribution statement

František Petrovič: Supervision, Funding acquisition, Conceptualization. **František Murgaš:** Methodology, Investigation, Formal analysis. **Anna Tirpáková:** Resources, Methodology, Investigation. **Marie Hubálovská:** Validation, Software, Resources. **György Molnár:** Visualization, Validation, Software. **Roman Králik:** Visualization, Validation. **Ján Zozuľak:** Writing – original draft, Visualization, Validation. **Enikő Nagy:** Writing – original draft, Visualization, Software. **Marek Nocoń:** Writing – review & editing, Resources, Project administration. **Zoltán Balogh:** Writing – review & editing, Visualization, Software, Resources.

Declaration of competing interest

The authors declare that they have **no** known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

All authors have participated in the conceptualization, data collection, analysis, writing, and revision of the manuscript and have approved the final version. The authors take full responsibility for all aspects of the work and affirm that questions related to the accuracy or integrity of any part of the work have been appropriately investigated and resolved.

The study was conducted as part of academic research activities at the authors' respective institutions.

The data collected for this study involved human participants who provided informed consent. The research was approved by the Ethics Committee of Constantine the Philosopher University in Nitra, which confirmed that the research does not contradict any ethical rules. All respondents were informed about the objectives of the research and the use of their data. By completing the questionnaire, they provided their consent for participation. The questionnaire was administered anonymously, ensuring participant confidentiality.

The authors confirm that the manuscript is original, has not been published elsewhere, and is not under consideration by another journal.

Appendix

Questionnaire questions

1. Quality of life

Please rate your quality of life on a scale from 0 (the worst possible) to 10 (the best possible).

2. Size of permanent residence

Indicate one of the six options for the size of the residence in which you live permanently.

3. Marital status

Indicate one of the five options expressing your marital status

4. Form of housing

Indicate one of the four options, expressing the form of your housing during your studies

5. Trust

State one of the two options, expressing whether you are a believer or not

6. Health

Indicate on a scale from 0 to 10 how you subjectively feel about your health. 0 means you suffer from a life-threatening illness or injury, 10 means you feel quite healthy.

7. COVID-19 vaccination

Please indicate one of the two options, indicating whether you have received or not received Covid-19 vaccine.

8. Impact of the Covid-19 pandemic on the psyche

State one of the six options expressing the impact of the pandemic on your psyche.

9. Trust

Indicate on a scale from 0 to 10 how much you trust other people. 0 means you trust no one, 10 means you trust everyone.

10.Happiness

Indicate how happy you are on a scale from 0 to 10. 0 means you are completely unhappy, 10 means you are completely happy.

11. Financial situation

Please indicate one of the three options expressing your financial situation

12. Evaluation of relationships with loved ones before the Covid-19 pandemic

12a. Please indicate on a scale from 0 to 10 what kind of relationship you had with your parents before the pandemic. 0 means that the relations were the worst possible, 10 means that the relations were the best possible.

12b Please indicate on a scale from 0 to 10 what kind of relationship you had with your grandparents before the pandemic. 0 means that the relations were the worst possible, 10 means that the relations were the best possible.

12c. Indicate on a scale from 0 to 10 how you had relationships with your siblings before the pandemic. 0 means that the relations were the worst possible, 10 means that the relations were the best possible.

12d Indicate on a scale from 0 to 10 what kind of relationship you had with your partner before the pandemic. 0 means that the relations were the worst possible, 10 means that the relations were the best possible.

13. Evaluation of relationships with loved ones after the Covid-19 pandemic

13a. Indicate on a scale from 0 to 10 what kind of relationship you had with your parents after the pandemic. 0 means that the relations were the worst possible, 10 means that the relations were the best possible.

13b Please indicate on a scale from 0 to 10 what kind of relationship you had with your grandparents after the pandemic. 0 means that the relations were the worst possible, 10 means that the relations were the best possible.

13c. Indicate on a scale from 0 to 10 how you had relationships with your siblings after the pandemic. 0 means that the relations were the worst possible, 10 means that the relations were the best possible.

13d Indicate on a scale from 0 to 10 what kind of relationship you had with your partner after the pandemic. 0 means that the relations were the worst possible, 10 means that the relations were the best possible.

Data availability

Data will be made available on request.

References

[1] B. Patrício, et al., Quality of life predictors and normative data, Soc. Indic. Res. 119 (3) (2014) 1557–1570.
[2] F. Koohi, et al., Quality of life among general populations of different countries in the past 10 years, with a focus on human development index: a systematic review and meta-analysis, Iran. J. Public Health 46 (1) (2017) 12–22.
[3] A.M. Rogowska, et al., Satisfaction with life among university students from nine countries: cross-national study during the first wave of COVID-19 pandemic, BMC Public Health 21 (1) (2021).
[4] A.C. Michalos, J.A. Orlando, A note on student quality of life, Soc. Indic. Res. 79 (1) (2006) 51–59.
[5] K. Szegedi, Z. Gyori, T. Juhász, Factors affecting quality of life and learning-life balance of university students in business higher education, Humanit. Soc. Sci. Commun. 11 (1) (2024).
[6] A. Vantarakis, et al., Impact of COVID-19 on university students' quality of life and mental health in Greece, Eur. J. Public Health (2022) 32.
[7] C.M. Cunha, N. Dens, G.D. Granic, University students' well-being and engagement in activities in the early days of Covid-19, Appl. Res. Qual. Life 18 (1) (2023) 279–303.
[8] J. Shigemura, et al., Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: mental health consequences and target populations, Psychiatry Clin. Neurosci. 74 (4) (2020) 281–282.
[9] V. Duong, et al., The ivory tower lost: how college students respond differently than the general public to the COVID-19 pandemic, in: 2020 Ieee/Acm International Conference on Advances in Social Networks Analysis and Mining (Asonam), 2020, pp. 126–130.
[10] Organization, W.H., WHOQOL: measuring quality of life. 1997.
[11] OECD, OECD guidelines on measuring subjective well-being. 2013.
[12] D.A. Revicki, et al., Recommendations on health-related quality of life research to support labeling and promotional claims in the United States, Qual. Life Res. 9 (8) (2000) 887–900.
[13] P.M. Fayers, D. Machin, Quality of Life: the Assessment, Analysis and Reporting of Patient-Reported Outcomes, John Wiley & Sons, 2015.
[14] L. Bolier, et al., Positive psychology interventions: a meta-analysis of randomized controlled studies, BMC Public Health (2013) 13.
[15] K.E. Hansen, et al., Psychological interventions improve quality of life despite persistent pain in endometriosis: results of a 3-armed randomized controlled trial, Qual. Life Res. 32 (6) (2023) 1727–1744.
[16] G. Molnar, et al., The role and impact of visualization during the processing of educational materials, presentation options in education and in the virtual space, in: 10th IEEE International Conference on Cognitive Infocommunications (CogInfoCom), Ieee, Naples, ITALY, 2019.
[17] P. Kladivo, M. Halás, Quality of life in an urban environment: a typology of urban units of Olomouc, Quaest. Geogr. 31 (2) (2012) 49–60.
[18] F. Murgas, M. Klobucník, Municipalities and regions as good places to live: index of quality of life in the Czech Republic, Appl. Res. Qual. Life 11 (2) (2016) 553–570.
[19] E. Bendyk, J. Hausner, M. Kudłacz, in: A. Brdulak, H. Brdulak (Eds.), *The Analysis of Quality of Life—The Case of Warsaw*, in *Happy City - How to Plan and Create the Best Livable Area for the People*, Springer International Publishing: Cham, 2017, pp. 135–149. Editors.
[20] B. Németh, et al., Quality-adjusted life year difference in patients with predominant negative symptoms of schizophrenia treated with cariprazine and risperidone, J. Comp. Eff. Res. 6 (8) (2017) 639–648.
[21] P. Nowak, Regional variety in quality of life in Poland, Oecon. Copernic. 9 (3) (2018) 381–401.
[22] J.M.F. Garrido, et al., Evolution of quality of life and health-related behaviors among Spanish university students, Int. J. Health Plan. Manag. 34 (1) (2019) p. E789-E801.
[23] M. Grabowski, et al., Comparative analysis of students' quality of life in Poland and Russia, Int. J. Qual. Res. 13 (1) (2019) 145–156.
[24] F. Petrovic, F. Murgas, Holistic and sustainable quality of life conceptualization and application, Folia Geogr. 62 (1) (2020) 77–94.
[25] F.J. Goerlich, E. Reig, Quality of life ranking of Spanish cities: a non-compensatory approach, Cities (2021) 109.
[26] O. Rypl, K. Macku, V. Pászto, The quality of life in Czech rural and urban spaces, Humanit. Soc. Sci. Commun. 11 (1) (2024).
[27] A. Ayuso-Alvarez, et al., Rural-Urban Gradients and all-Cause, Cardiovascular and Cancer Mortality in Spain Using Individual Data, Ssm-Population Health, 2022, p. 19.
[28] F. Murgas, et al., The impact of religiosity on quality of life, Acta Missiol. 17 (2) (2023) 169–187.
[29] N. Nur, et al., Health-related quality of life and associated factors among undergraduate university students, Oman Med. J. 32 (4) (2017) 329–334.
[30] H.M. Li, B.L. Zhong, Quality of life among college students and its associated factors: a narrative review, Ame Med. J. (2022) 7.
[31] P. Babinčák, Subjective happiness in Slovakia, Eur. J. Ment. Health 13 (02) (2018) 111–132.
[32] A. Oliver, et al., Quality of life in European older adults of SHARE wave 7: comparing the old and the oldest-old, J. Clin. Med. 10 (13) (2021).
[33] M.J. Sirgy, S. Grzeskowiak, D. Rahtz, Quality of college life (QCL) of students: developing and validating a measure of well-being, Soc. Indic. Res. 80 (2) (2007) 343–360.
[34] P. Spagnoli, A. Caetano, A. Silva, Psychometric properties of a Portuguese version of the subjective happiness scale, Soc. Indic. Res. 105 (1) (2012) 137–143.
[35] A.C. Solis, F. Lotufo-Neto, Predictors of quality of life in Brazilian medical students: a systematic review and meta-analysis, Braz. J. Psychiatry 41 (6) (2019) 556–567.
[36] S. Villas-Boas, et al., Predictors of quality of life in different age groups across adulthood, J. Intergenerational Relatsh. 17 (1) (2019) 42–57.
[37] A.D.C. Miguel, et al., Predictive factors of quality of life among medical students: results from a multicentric study, BMC Psychol. 9 (1) (2021).
[38] Markechová, D., B. Stehlikova, and A. Tirpáková, Statistical methods and their applications. 2011.
[39] M.A. Bujang, et al., Measuring population health and quality of life: developing and testing of the significant quality of life measure (SigQOLM), Heliyon 9 (12) (2023).
[40] A. Okulicz-Kozaryn, R.R. Valente, Livability and subjective well-being across European cities, Appl. Res. Qual. Life 14 (1) (2019) 197–220.
[41] F. Petrovic, P. Maturkanic, Urban-rural dichotomy of quality of life, Sustainability 14 (14) (2022).
[42] F.M. Delpino, et al., Prevalence of anxiety during the COVID-19 pandemic: a systematic review and meta-analysis of over 2 million people, J. Affect. Disord. 318 (2022) 272–282.
[43] M. Mróz, et al., Stress and coping strategies among women in late motherhood, J. Clin. Med. 13 (7) (2024).