

QUALITY OF LIVING ASSESSMENT IN RURAL ROMANIA. AN ANALYSIS OF SETTLEMENTS WITH LOW ACCESSIBILITY TO MEDICAL SERVICES

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Abstract: Several factors contribute to the lower quality of living of post-communist countries like Romania, such as housing quality, access to basic infrastructure or services including healthcare, and low income and education levels. To evaluate to what extent the quality of living is related to social and economic factors, including access to medical services, a field questionnaire was applied to 703 respondents from 8 settlements located in the South-East of Romania. Using the Principal Component Analysis, four determinants were selected to compute a Quality of Living Index (QoLI): sewage, room surface per dweller, dwelling accessibility and fuel use for cooking. The QoLI computed for each respondent varied between 29.7 and 94.8 with a mean value of 58.5. It was directly related to the level of education and income and with several healthcare parameters. The mean value for each Local Administrative Unit was used to establish a ranking, with the commune of Mihail Kogălniceanu (Constanța county) having the highest average QoLI, and the commune of Brăești (Buzău county) having the lowest average QoLI. The QoLI of investigated settlements was in line with the results reported by other studies that assessed the socio-economic development of towns and it can be used as a tool to establish the level of living conditions and to prioritize the need of intervention.

Key Words: *quality of living, rural settlements, composite indicator, public healthcare, education and income.*

Introduction

Quality of life is considered to be one of the most difficult to define concepts of the post-modern society (Mărginean and Bălașa 2005). It is a very fluid concept, and it involves many different parameters, depending in large part on the society upon which the study is conducted. Consequently, there is no unanimity in defining the quality of life concept, as it encompasses notions such as well-being, access to better environment and better facilities, its assessment being different in each nation or local jurisdiction (Bukanya et al. 2003).

Many researchers all over the world became interested in defining and working with data on quality of life and its reflection in different areas of life (Precupețu 2019). At the European level, where countries are quite different in terms of development and perceived standards of living, especially in terms of urban-rural comparisons (Shucksmith et al. 2009), an overall agreed definition of the concept is even more difficult to achieve. Over the second half of the 20th century, different methods of measuring welfare, quality of life and quality of living conditions have been developed (Johansson 2002, Weber et al. 2002, Mărginean 2019). The concept of quality of life, as part of the more general concept of *welfare* arose for the first time at the end of the 1960s. It was the consequence of a largely dominant goal at that time, of increasing the material level of living (Noll 2002). Thus, the *quality of living* concept is a more elaborate version of the concept of welfare, encompassing both material and immaterial dimensions, both objective and subjective data (Argyle 1996). This is how the EUROMODULE was developed, in 1998, as a set of *basic questions which could be implemented in different types of ongoing*

surveys, designed to measure three kinds of welfare components: objective living conditions, subjective well-being and perceived quality of life (Delhey et al. 2002). Issues such as education, health status or employment possibilities thus become central in determining life satisfaction in different communities (Bukenya et al. 2003). With the concept of quality of life strongly linked to health (Testa and Simonson 1996), a closer analysis of the relation between health care access and quality of living issues (mainly objective living conditions) is crucial to support adequate policies in fragile territories.

In the case of rural living, economic indicators, dwelling characteristics, social and environmental factors are all considered to be important when defining well-being, both from an objective and a subjective viewpoint (Deller et al. 2001, Brereton et al. 2011). Socioeconomic status and health are considered to be strongly linked, while individuals with scarce economic resources are less likely to have access to health services (Williams 1990, Sells and Blum 1996, Adler and Ostrove 1999, Kawachi et al. 1999, Singh and Hiatt 2006, Sano and Richards 2011). Geographical location also plays an important role, especially when it comes to physical accessibility and access to different resources (Duncan et al. 2002, Bauer et al. 2011).

Geographic access to medical services is one of the main factors for reduced healthcare utilization in rural areas, especially because of spatial isolation from metropolitan areas or urban centers (Arcury et al. 2005). Research studies have shown that *rural residents have fewer overall visits and see fewer medical specialists and more generalists for their care than their urban counterparts* (Chan et al. 2006), an aspect which is explainable by the fact that many of the rural residents go to the doctor only when it is *absolutely necessary*, for acute care visits, often neglecting regular and chronic care visits (Arcury et al. 2005).

The chances of employment in rural settlements or rural towns (Sirodov et al. 2015) are lower than those in the urban areas (Neagu 2012). As a result, most of the inhabitants in these specific areas struggle to support their family and to cover basic survival needs (Dolan et al. 2011). The poor access of services and facilities in rural areas is also influenced by limited transport options (Tay et al. 2004, Shucksmith et al. 2006, Brereton et al. 2011). Consequently, people living in rural areas tend to have less access and to receive less formal support services in terms of healthcare and other social services (Dolan et al. 2011), which leads not only to a lower quality of life, but to increased mortality rates (Knudson et al. 2015). Poor access to healthcare services is closely linked to the low supply of professionals (Wilson et al. 2009) and hospitals in rural areas – a fact which becomes even more problematic considering the threats (e.g. pesticides used in agriculture) posed by the rural environments to human health (Ricketts 2000). Hence, access to medical care is often the most important problem of rural and remote populations (McGrail and Humphreys 2009). The inequitable access to medical services derives both from spatial factors (uneven distribution of healthcare providers) and non-spatial factors (Wang and Luo 2005), occurring when social structure or income determine who gets medical care (Andersen 1995). Although the shortage of doctors in rural areas has tried to be resolved by the implementation of incentive schemes or programs designed to encourage doctors to relocate, it remains the most important barrier in accessing health services at times of need (Li et al. 2014).

Rural Romania covers 87.1% of the country's surface and it includes approximately 45% of its total population (Ignat et al. 2014). Most of the population in these areas is confronted with severe poverty and poor living conditions (Mărginean 2006, Precupețu et al. 2018). Besides the rural areas, some of Romania's towns are also considered to be "rural" (Sirodov et al. 2015), struggling with the same quality of living problems as the rural villages (Naldi et al. 2015). Furthermore, between 2002 and 2012, following the 2008 economic crisis, 35 public hospitals have been closed in small towns in Romania because of the under-financing from the central government (Mitrea and Cochechi 2015).

Official statistical data (National Institute of Statistics 2011) highlight that the most affected regions in Romania regarding the lack of medical personnel are the Eastern and Southern regions. Most of the eight rural villages and rural towns analysed in this paper belong to these three regions of Romania.

According to EUROSTAT data, in 2016, 38.8% of the Romanian population was exposed to poverty risk and social exclusion: *"In fact, in 2016 Romania is in the unenviable position of being the EU member state with the highest level of income inequality, ranked last in relative poverty and second to last, after Bulgaria, in the poverty or social exclusion indicator"* (Stănescu 2018). Romanians were considered, in 2012, the poorest people in Europe (Bădescu 2012), with Romania holding the first place in the European Union regarding the relative poverty rate. Rural development thus becomes strongly dependent on infrastructure provision and the possibility to diversify the rural economy (Turnock 2005). This is especially difficult in isolated rural areas in Romania that are considered to be disadvantaged areas, where the population does not have the same opportunities as the population of other rural areas, not to mention the population of some urban centers (Ianoș et al. 2010). Recent studies on marginalization in rural Romania showcase a strong association of these marginalized areas with the low levels of human development (Teșliuc et al. 2016).

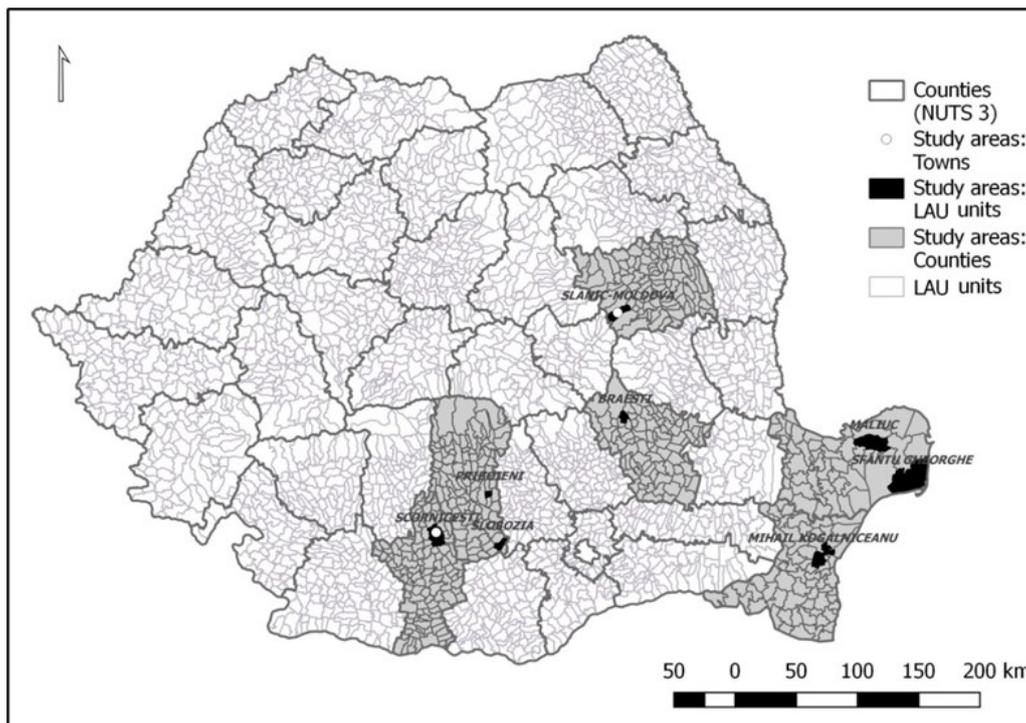


Fig. 1 – Location of study areas in Romania

Accordingly, this study focuses on the specific case of quality of living assessment in rural Romania and how it relates to healthcare. The objective of our study was to gather information from eight Local Administrative Units (LAUs) and to create a composite quality of living index (QoLI) that reflects the socio-economic status and the living conditions in the studied areas.

Afterwards, we evaluated the links between the quality of living and the education level, income and access to medical services.

Methodology

The study was conducted in eight LAUs located in the South and East of Romania (Fig. 1).

Between October 2015 and September 2016, a social questionnaire was applied during the "Medical Doctor's Caravan" campaigns to people waiting for medical consult. The questionnaire was applied to 703 people. Twenty subjects were removed from the analysis because of inadequate responses regarding the surface and number of rooms in their dwellings, leaving 678 final entries for the statistical analysis. The questionnaire had five main sections:

- a) General questions aiming to profile the respondents (age, gender, marital status);
- b) Quality of living indicators designed to obtain information about the respondents' home and surroundings, their access to facilities and the general living conditions. Two other housing indicators were computed from the responses: average room surface per dweller and average number of dwellers per room. The questions in this section were based on the form used by the National Institute of Statistics in the 2011 census (National Institute of Statistics 2011).
- c) The education level was assessed by asking the respondents which was the highest school level they had graduated, e.g. primary school, middle school, high school, college/University.
- d) The economic indicators were: (1) the current employment of the respondents (employed, pensioner, unemployed looking for work, unemployed looking for first employment, stay-at-home, social pension, pupil/student); (2) the monthly income divided into four categories: under 400 RON (~90 EUR); between 400-750 RON (90-170 EUR); between 750-1200 RON (170-270 EUR); over 1200 RON (270 EUR) – between 2015-2016, the average value of one EURO was of 4.47 RON (the European Central Bank); in the same period, the minimum wage in Romania was of 750 RON (170 €) and the minimum pension was of 400 RON (90 €).
- e) The used healthcare indicators were: (1) the distance (in km) to the nearest medical facility/dispensary and the number of months passed since their (2) last medical examination, and (3) last blood test. Depending on the amount of time passed since the respondents' last visit to the doctor and the last blood test, the answers were divided into three categories: less than one year, over one year and never.

Statistical analysis

A principal component analysis (PCA) was used to identify the main components defining the *Quality of Living Index*. Ten variables related to quality of living aspects were included in the PCA: (1) average room surface per dweller, (2) average number of dwellers per room, (3) bathroom, (4) kitchen, (5) water supply, (6) hot water supply, (7) sewage system, (8) fuel used for cooking, (9) heating system and (10) accessibility of the housing unit. To ensure that all statistical analyses could be run on all variables, the nominal variables were transformed into ordinal variables.

Descriptive statistics, exploratory analyses and paired correlations were computed for the ten variables, to exclude the outliers, as well as the variables significantly correlated with each other (correlation coefficient >0.7).

After running the PCA, four components were identified with an Eigenvalue above 1, which explained a cumulative variance of 66.96% of the total variance in the dataset. The appropriateness of the data for the factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) test which returned a value of 0.607, revealing an acceptable mediocre sample

adequacy, and the Bartlett's Test of Sphericity (BTS), which was statistically significant: $\text{Chi}^2=1054.118$, $p<0.001$ (Chan and Idris 2017).

In the end, the variable with the highest correlation coefficient for each identified component was selected for the computation of a quality of living index for each questionnaire respondent. The selected variables were normalized (maximum value = 100), and the index was computed by weighing each normalized indicator. The assigned weights for each indicator were established based on the cumulative variance explained in the PCA, normalized to 100% (Table 1).

Table 1

The selected indicators for computing the Quality of Living Index

Component	Indicator (variable)	Variance explained	Assigned weight
1	Sewage system	24.29 %	36.28 %
2	Average room surface/dweller	17.54 %	26.20 %
3	Dwelling accessibility	15.05 %	22.48 %
4	Fuel used for cooking	10.07 %	15.04 %

For each of the LAUs, an average Quality of Living Index was computed. Frequency analyses were performed for the variables which were not included in the computation of the quality of living index, but which were considered indicative for the profile of the respondents (age, sex, marital status) and the general housing characteristics (property type, type of housing, building materials), as well as for the education, economic and healthcare indicators.

The numerical variables that had a normal distribution were reported as mean and standard deviation, while the variables with non-normal distribution were reported as median and first and third quartiles (Q1, Q3).

Correlations were computed to explore the eventual relations between the QoLI and the healthcare indicators, the monthly revenue, and the level of education. The analysis of variance was used to assess the differences between the group means. The Chi Square statistic was used for testing the relationships between the categorical variables. The Pearson bivariate correlation was used to describe the linear relationship between the continuous variables, while the Spearman correlation was used in the case of non-normally distributed continuous variables. A $p<0.05$ was considered significant.

Results

The average age of the respondents was 53 years, and over two thirds (67%) were females. Three quarters declared to be married (75%) and 9% were widowed.

Almost 98% people declared to live on a private property – only 3% stated that they lived in social houses, the majority living in single-family houses (86%). 25% of the respondents claimed to live in adobe houses. The average surface of the housing units was 58.5 ± 27.0 square meters with a mean number of dwellers/housing unit of 3.5 ± 1.5 (Table 2).

Two thirds had attended only primary (17%) and middle school (47%), 30% had finished high school. A staggering 94% of the respondents did not have a higher level of education.

Regarding the medical questionnaire, about 10% of the respondents (n=618) had never been examined by a physician. The median time between the visits to the doctor was 6 months (Q₁ 1, Q₃ 17; max 360). Also, 17% had never done a blood test and the median time from their last blood test was 12 months (Q₁ 3, Q₃ 36, max 360).

Indicators	N	Percent
Type of housing unit		
- House	588	87.0
- Block of flats	88	13.0
Property type		
- Private	580	85.5
- Social housing	17	2.5
- Group property	81	11.9
*Accessibility of the housing unit by road		
- Access by dirt road	108	16.2
- Access by paved road	275	41.3
- Access by asphalt road	283	42.5
Building materials of the residence		
- Adobe	168	24.9
- Concrete, brick, stone	508	75.1
*Bathroom		
- Does not have	72	10.6
- Outside of the residence	219	32.3
- Inside the residence – just toilet	74	10.9
- Inside the residence – with shower or hot tub	313	46.2
*Kitchen		
- No cooking facilities	3	0.4
- Kitchen outside of the residence	157	23.2
- Kitchen inside the residence	518	76.4
*Water supply		
- Doesn't have	29	4.4
- From own system (well)	305	45.9
- From the public network	330	49.7
*Hot water supply		
- Doesn't have	145	21.5
- From own system (central heating, boiler)	428	63.6
- From the public network	100	14.9
*Sewage		
- Doesn't have	158	23.3
- Own system (septic tank)	347	51.3
- From the public network	172	25.4
Electricity		
- Not available	669	98.7
- Available	8	1.2
*Type of fuel used for cooking		
- Electric energy	2	0.3
- Solid fuel (wood, coal)	66	9.7
- Liquefied gases (gas tank)	600	88.5
- From the public gas system	10	1.5
*Heating		
- Other	1	0.1
- Electric Energy	15	2.2
- Stove	598	88.2
- Gas cooker	6	0.9
- Personal central heating	45	6.6
- Public heating system	13	1.9
*Variables retained in the Quality of Living Index		

Table 2

The observed indicators of the Quality of Living

The QoLI computed for each respondent varied between 29.7 and 94.8 (as compared to a maximum value of 100). The mean value was 58.5, with 26% of the respondents having a staggering score below 50.

An average QoLI was calculated for the studied LAUs. The mean QoLI of the investigated LAUs was 60, Brăești village having the lowest value (47.5) (Table 3).

Table 3

The observed Quality of Life Index in the investigated LAUs

LAUs	Mean Quality of Living Index
Brăești (Buzău county)	47.55
Slănic Moldova (Bacău county)	52.69
Slobozia (Argeș county)	56.23
Scornicești (Olt county)	58.90
Maliuc (Tulcea county)	61.99
Sfântu Gheorghe (Tulcea county)	64.48
Priboieni (Argeș county)	66.43
Mihail Kogălniceanu (Constanța county)	75.37

The Quality of Living significantly varied according to the level of education. The mean QoLI increased by 6 points in those with middle school level, high school and college, as compared to those with primary school level ($F_{3,487}=32.67$; $p<0.001$). However, the increase was not significant in the case of high school versus college/University, probably because of the low number of higher education graduates (Table 4, Fig. 2).

Table 4

QoLI according to the level of education

Level of education	N	Mean	95% Confidence Interval	
			Lower bound	Upper bound
Primary school	88	51.34	49.14	53.54
Middle school	243	57.04	55.68	58.40
High school	140	63.78	61.84	65.72
College/University	20	69.69	66.64	72.74

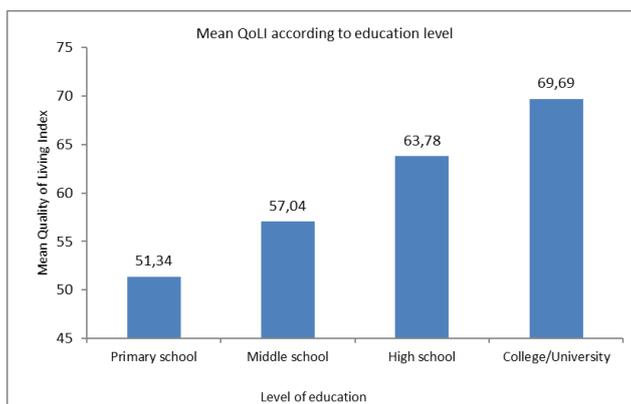


Fig. 2 – Mean QoLI according to the level of education

The same statement can be made when examining the relationship between QoLI and the income: the QoL increased in line with the income ($F_{3,456}=21.38$, $p<0.001$) (Table 5, Fig. 3).

Table 5

QoLI according to income

Monthly Income	N	Mean	95% Confidence Interval	
			Lower bound	Upper bound
Under 400 RON (90 EUR) – <i>minimum pension</i>	103	51.35	49.076	53.6242
Between 400-750 RON (90-170 EUR) – <i>minimum pension/minimum wage</i>	175	57.82	56.2265	59.4264
Between 750-1200 RON (170-270 EUR)	131	59.95	58.1286	61.7879
Over 1200 RON (270 EUR)	51	65.07	62.1014	68.0481

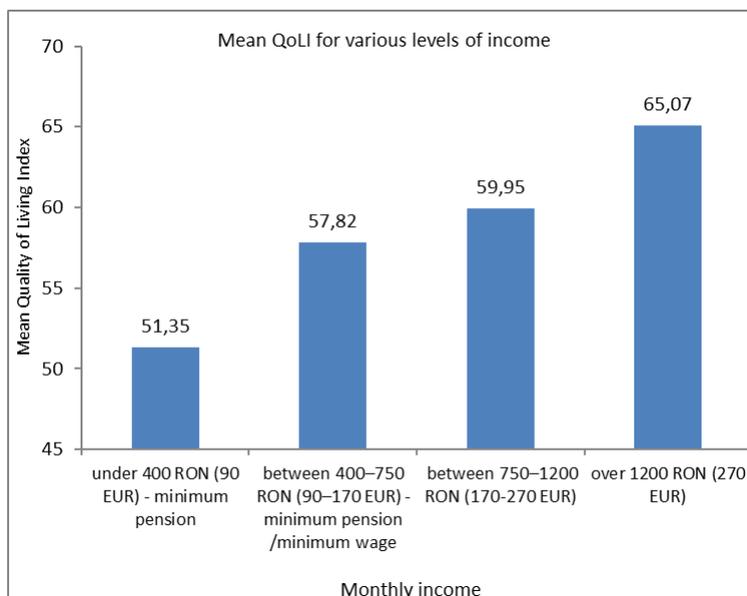


Fig. 3 – Mean QoLI for various levels of income

The respondents' level of education was strongly directly related with their income ($X^2(9) = 135.038$, $p<0.001$) (Fig. 4).

When examining the relationship between the Quality of Living and the health care indicators, the mean QoLI was higher in those who had visited the doctor in the past year than in those who hadn't been to the doctor for more than a year. Surprisingly, those who never visited the doctor had higher QoLI than those who went to the doctor at least once ($F_{2,435}=9.15$, $p<0.001$) (Table 6, Fig. 5). There was a negative correlation between the time passed since the respondents' last visit to the doctor and their QoLI ($r_s=-0.13$, $p<0.01$).

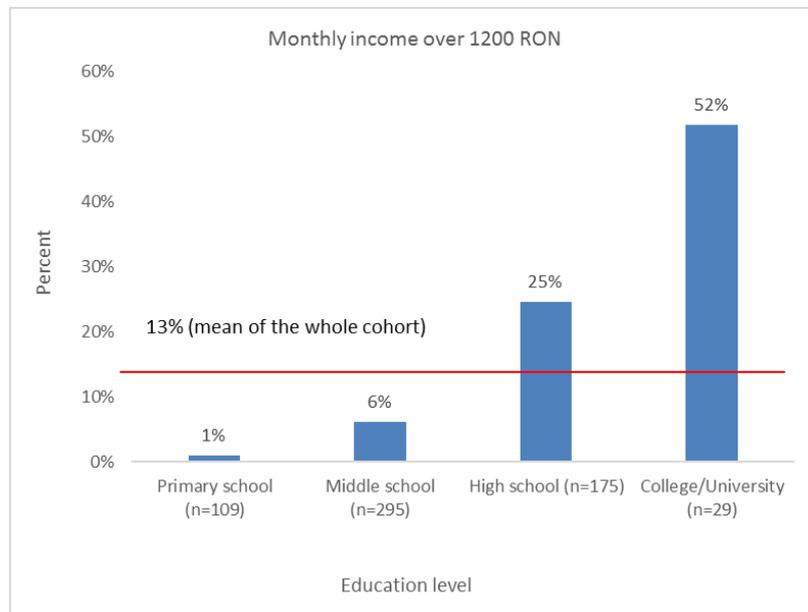


Fig. 4 – Percent of the inhabitants with income over 1200 RON according to the level of education

Table 6

QoLI according to the time passed since the last visit to the doctor

Time since the last visit to the doctor	N	Mean	95% Confidence Interval for Mean	
			Lower Bound	Upper Bound
< one year	302	59.12	57.74	60.48
> one year	104	54.71	52.43	56.97
Never	32	64.16	59.95	68.36
$F_{2,435}=9.15, p<0.001$				

A similar trend was observed in the relationship between the QoLI and the time since the respondents' last blood test ($F_{2,434}=2.21, p=0.11$), but the difference was not significant.

A key factor in public health is the addressability of the healthcare facility. The respondents' mean distance to the nearest medical unit/hospital was 2.6 km, with a median of 1 km (Q_1 1, Q_3 2, max 45), the distribution being non-normal. The distance to the nearest medical unit/hospital was weakly directly correlated with the time of the last visit to the doctor ($r_s=0.156, p<0.01$), and the time since the last blood test ($r_s=0.087, p=0.035$).

The level of income was also significantly correlated with the time since the last visit to the doctor ($\chi^2(6) = 17.439, p=0.008$). There was no relationship with the time passed since the last blood tests or when comparing the level of education with the frequency of doctor visits and blood tests performed.

Discussion

This is the first study that creates a composite indicator for the quality of living in rural Romania by using on-site information collected from a directly applied questionnaire to the inhabitants of the studied areas. The proposed Quality of Living Indicator was correlated with education, economic and healthcare indicators, and it seemed to properly depict the situation of Romanian rural areas.

The respondents' profile highlights the specific characteristics of Romanian rural areas and small towns: old age, higher proportion of females, high ratio of married people, single-family and privately-owned houses, poor access to facilities and medical services.

The proposed QoLI is based on the four indicators extracted after running the Principal Component Analysis; each of them could significantly influence the quality of living in rural areas. Firstly, areas with a high ratio of houses connected to public sewage networks are less likely to suffer from soil and water pollution caused by poorly built septic tanks or, worse, by the total lack of sewage systems (Corcoran et al. 2010). Secondly, a high average room surface per dweller implies a higher level of in-door comfort but it could indicate a slight depopulation of the analysed study areas, with houses now sheltering less people than initially planned. Thirdly, the accessibility by road (whether the road is paved, cobbled or just a dirt road) can be related, indirectly, with the people's accessibility to other basic services (shops, schools, medical services). Most often, these services are located along the main roads of the settlements – national or county roads, and less along the secondary roads. Finally, the fuel used for cooking indicates if a house is connected to a public gas network, while houses in rural areas are often dependent on gas tanks to ensure this fuel.

There are only a handful of other studies that have created instruments to measure the level of development of towns and villages in Romania, all using information derived from the data of the National Institute of Statistics and the National 2011 census (National Institute of Statistics 2011). Sandu (2011) used seven indicators, e.g. life expectancy at birth, average age of the population, education level, income (estimated through the number of cars/person), housing surface, gas consumption and size of town/village, to create a Settlement Social Development Index (Sandu 2011). Another study was conducted by the Academy of Economic Studies and it used 25 indicators, e.g. number of inhabitants, population density, agricultural and forestry surface, sewage and heating availability, economic indicators (number of companies/1000 inhabitants and number of reported tourists), to create a complex Socio-economic Development Potential of villages in Romania (Boboc and Ileanu 2015). Teșliuc et al. (2016) created a map with the most "marginalized" rural settlements in Romania (LAUs that have disproportionately low inhabitants, workplaces, and living conditions as compared to the average level of the same type of rural settlement) (Table 7). Vâlceanu and Zulaica (2012) proposed to create a housing quality index by using over 20 indicators (such as the surface and building materials of the dwelling, access to public water, gas sewage, number of people per dwelling, percent of green spaces per inhabitant, employment rate etc.) and by attributing an assigned weight to each indicator, the final index being the sum of all the indicators according to their weights.

The hierarchization of the eight LAUs according to the average QoLI illustrates some interesting results, especially when compared with the other studies. The highest average QoLI is registered in the village of Mihail Kogălniceanu (Constanța county), located in the metropolitan area of Constanța, the fifth largest city in Romania and the biggest port-city in the country. This is consistent with the results of previous studies: the village of Mihail Kogălniceanu ranked high (10th place) in the socio-economic development potential of villages in Romania, while the village is considered to be a developed one according to the Settlement Social Development Index.

Table 7

The observed Quality of Living Index in investigated LAUs and other reported indicators of social development

LAU (towns/villages)	Mean QoLI	Socio-economic potential of villages – normalized (Boboc and Ileanu 2015)	Settlement Social Development Index (Sandu 2011)	Marginalization rate (Teşliuc et al. 2016)
Brăeşti (Buzău county)	47.55	38	32	Severe
Slănic Moldova (Bacău county)	52.69	N/A	68	N/A
Slobozia (Argeş county)	56.23	46.26	47	Moderate
Scorniceşti (Olt county)	58.90	N/A	71	N/A
Maliuc (Tulcea county)	61.99	52.73	41	None
Sfântu Gheorghe (Tulcea county)	64.48	51.71	38	None
Priboieni (Argeş county)	66.43	44.64	55	None
Mihail Kogălniceanu (Constanţa county)	75.37	60.9	66	None
N/A=not available				

The two small towns in the study (Scorniceşti, Olt county, and Slănic-Moldova, Bacău county) have registered rather low values of the QoLI, below villages like Priboieni (Argeş county), Maliuc or Sfântu Gheorghe (Tulcea county). In the case of Scorniceşti, the low values could be explained by the fact that the questionnaire was applied in the village of Negreni, located in the administrative territory of Scorniceşti, but having rural characteristics. This discussion could be detailed in future studies, as the situation of urban villages (villages located within the administrative territory of cities, but which often have rural characteristics) is special in Romania. Both small towns are also considered to be poor according to the other social development indexes.

The village of Priboieni, in Argeş county, registers the second highest mean value of the QoLI. Priboieni is also ranked second according to the Settlement Social Development Index, however it ranks less in the Socio-economic Development Potential ranking. It is interesting to note, comparing the two villages of Argeş county (Priboieni and Slobozia) with the villages of Tulcea county (Maliuc and Sfântu Gheorghe), that the latter have a better score in the socio-economic development potential index, but a worse one in both the Quality of Living Index and the Settlement Social Development Index. This could be explained by the fact that the two villages in Tulcea county are located in the Danube Delta, where technical the infrastructure provision and road accessibility are low, but the development potential of tourism is high.

The village of Brăeşti (Buzău county) registered the lowest mean value of the Quality of Living Index, in line with the results of both Sandu (2011) and Boboc and Ileanu (2015) data. Furthermore, the World Bank's study (Teşliuc et al. 2016) regarding the rural marginalized areas in Romania also classified Brăeşti as a village with a severe rate of marginalization (over

24% of the population living in marginalized areas), representing the highest rate of marginalization within the analyzed LAUs.

Thus, the proposed QoLI seems to be useful in classifying rural areas in Romania using “field” questionnaires, but it needs to be further refined by its application in more LAUs, with more varied characteristics and in more geographical regions. Alternatively, the questionnaire can be validated using data collected with the occasion of the National Census (2011).

The relationship between the computed QoLI and the other investigated parameters was evaluated. There was a direct correlation between QoLI and the level of education and the monthly income, which suggests that a higher level of education is linked with higher standards demanded by the people in relation to the quality of living. Also, the economic component should not be ignored, as the development of public infrastructure (including quality of roads) is often difficult in LAUs where the population registers lower levels of income (and tax returns are lower). Even when the technical infrastructure is provided, poorer families often do not have the financial possibilities to connect to the existing water or sewage networks and to support the monthly utility costs.

Regarding the healthcare parameters, the study shows a direct relationship between an individual's quality of living and the care for personal health. An increased QoLI was observed for those who went more frequently to the doctor as opposed to those who had not seen any physician in over a 1-year period. Interestingly, those who had never been to a doctor had the highest QoLI. Although this category was represented by a small number of respondents, an assumption can be made that people with high quality of life, being healthier, are not motivated to visit a doctor. Although other factors need to be accounted for, such as the availability of the general practitioner or the distance from the resident's house to the nearest medical facility, the elements included in the QoLI influence the people's decision when it comes to their personal health. Thus, as expected, the proposed QoLI seems also to be related to some healthcare indicators. Accordingly, presumably, as the quality of living improves, so it does the interest time allocated for healthcare by the residents.

The limitations of the study are represented by the profile of the respondents: the questionnaire was applied during a campaign that offered free medical services and an argument can be made that the people who wanted to benefit from such services may not accurately depict the status of all the inhabitants in the LAUs where the study was conducted. Moreover, the campaign aimed to provide medical care in locations with a low level of development. However, the study depicts a situation which could be rather frequent in rural areas of Romania, as sustained by EUROSTAT data, where the risk of poverty or social exclusion is the second highest in Romania (38.8% of population), and it points to an urgent need of intervention.

The applied questionnaires belong to an opportunity sample, where the main criteria were the access to the services offered by the “Medical Doctor's Caravan”. However, given the large number of respondents, the statistical data obtained illustrate a hierarchy of the localities which is very similar to the one presented in a strictly statistical analysis (Sandu 2013). The opportunity sample on which the results of this paper are based represents one of the limits of our research. It is however balanced by the high number of the respondents which allows us to invoke, in this particular case, the “law of big numbers” (Vulpe and Chirilov 2005).

Conclusions

The results of this study are based on the statistical analysis of data collected directly from the respondents, through a questionnaire which was applied in 8 LAUs located in 6 different Romanian counties. While a more thorough analysis, comprising more LAUs, would be

necessary, we consider that the results of this study highlight the existing quality of living problems in Romanian rural areas and small towns and their links with educational and economic issues. The healthcare parameters that we analysed also offered us an insight into the more profound socio-economic issues in some of the LAUs.

The proposed Quality of Living Index based on field questionnaires is in line with other socio-economic indices of the Romanian rural areas computed from census data, and it allows the ranking of the settlements. Moreover, the QoLI correlated with educational and economic factors and it showed a direct relationship with some healthcare parameters. Although more research is needed to validate the proposed QoLI, it can be used as a tool to establish the level of living conditions and to prioritize the need for intervention.

An advantage of the proposed method is the fact that it is based on the questionnaire structure from Romania's national census. The method could be extended for computing a Quality of Living Index for the entire country, and the micro-data from the next National Census in 2021 should be available for such analyses. Such an index should be the first step in identifying the areas with significant living issues, both in urban and in rural areas in Romania. The index could also be adapted for analyses at county or municipal level and it could become a method used in baseline studies for County Territorial Plans, General Urban Plans or development strategies at regional, county or local levels.

Consequently, our research highlights the potential role of such composite indices in identifying areas with major quality of living issues, as a pre-requisite step in the development of targeted policies and programmes for rural areas and rural towns in Romania. These policies could target areas such as the provision of technical infrastructure (water, sewage, gas), the development of social infrastructure (education, health, social services) and transport infrastructure (improving road quality, public transport provision) or the improvement of living conditions (housing refurbishment). Furthermore, the QoLI could be compared to demographic forecasts in order to define the priority areas for intervention and to adapt other policies and development programmes to the specific situation of shrinking towns and rural areas.

The limits of this study, already discussed in previous chapters, relate to the application of questionnaires and the statistical validation of the index. While this research was based on an opportunity sample, it would be interesting to compare the results obtained through a representative sampling of the population in each Local Administrative Unit. Furthermore, while we elected to compare the rankings for the 8 LAUs with other similar studies realized at national level, the methodology could be further developed through other statistical validations of the proposed index.

All in all, the computation of the QoLI produced a similar ranking to the previous research regarding the socio-economical characteristics of rural areas in Romania, however we intend to further develop our research in order to better explain the relationship between quality of living and different health care issues observed in the analysed LAUs (the health status of the population, as well as the accessibility to medical services). Moreover, at a broader level, the research can be a stepping stone in the development of specific health policies in rural areas, in conjunction with other integrated policies.

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