

## ORIGINAL RESEARCH

# Quality of life of older adults in rural southern Brazil

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## ABSTRACT

**Introduction:** Ageing in rural communities poses unique challenges that can have an impact on older adults' quality of life (QoL). These limitations can be costly to the healthcare system but there is potential for them to be addressed with a better understanding of factors that affect QoL. The goal of this study was to assess the perceptions of QoL of older adults living in rural areas of southern Brazil and to identify factors associated with QoL in this population.

**Methods:** A cross-sectional study was conducted with 197 older adults (mean age  $69.7 \pm 7.5$  years). Instruments included the Katz and Lawton activities of daily living scales, QoL instruments and a questionnaire that addressed social, economic, demographic and health variables. Multiple regression analysis was performed, using various domains and overall QoL as dependent variables.

**Results:** Older adults who were more independent, living with a spouse, with higher income and educational levels, fewer morbidities, fewer years of tobacco use, and who did not report falls in the last year were significantly more likely to rate their QoL higher on one or more domains/measures.

**Conclusions:** Factors associated with QoL of older adults in rural areas are similar to those found in studies conducted in urban areas, but the rural context may influence these variables in unique ways.

**Key words:** ageing, Brazil, cross-sectional studies, primary health care, quality of life, rural population.

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## Introduction

The global increase in the ageing population has important implications for quality of life (QoL) of the population, given that an extended lifespan can be accompanied by functional limitations, the presence of one or more morbidities, and changes in social and family relationships<sup>1</sup>. These limitations can be addressed or adapted to enhance QoL of older adults.

QoL is a concept that has been defined and measured in different ways. WHO defines QoL as ‘... an individual’s perception of their position in life in the context of the culture and value system in which they live’<sup>2</sup>.

Studies on the living conditions and health of older adults living in rural areas in Brazil are scarce<sup>3-5</sup>. Further, in Brazil<sup>6</sup> and other countries, to date, there have been few surveys of QoL conducted in rural areas. Studies conducted in Vietnam, Tanzania, Indonesia and Thailand<sup>7-10</sup> have revealed that QoL ratings are significantly reduced at this stage of life and within rural settings. The challenges for these older adults also need to be explored.

In Brazil, ‘rural’ is defined as areas outside the urban limits (ie outside cities or towns). There are relatively low numbers of elderly people living in rural areas. However, in some regions in the south of the country, there is a disproportionately high rural population<sup>11</sup>.

The Brazilian National Health System (NHS) was established in 1988. Primary health care was reformed in 1994 through the Family Health Strategy (FHS)<sup>12</sup>. The FHS is guided by the NHS principles of universality, accessibility, continuity of care, comprehensive care, accountability, humanisation, equity and social participation<sup>13</sup>. Primary health care, through the FHS, focuses on the family, and understanding their physical and social environment. These services should be available where people live. Teams consist of family physicians, nurses, assistant nurses and community health

workers. In recent years, oral health teams have also been included<sup>14</sup>.

The NHS principles of universality, comprehensiveness and equity for Brazilian citizens have not yet been fully secured for rural populations<sup>15</sup>. In part, this gap can be explained by confusion between rural (spatial concept) and agricultural communities. Public policies for the rural population have been considered through the lens of urban realities and often simplistically extrapolated to the rural population<sup>16</sup>.

In some rural areas and small communities, FHS units are available and in areas with a growing elderly population, the FHS team tries to meet their needs, planning activities and programs for the growing number of partially or fully dependent elderly individuals, especially for the oldest. A better understanding of QoL of this population can guide the development of programs that enhance the wellbeing of older adults and support FHS implementation in other areas.

The aim of this study was to assess the perceptions of QoL of older adults living in rural areas of southern Brazil and to identify factors associated with QoL in this population.

## Methods

An epidemiological study using a cross-sectional design was conducted from November 2012 to January 2013. Data were collected in the municipality of Taquaruçu do Sul, state of Rio Grande do Sul, Brazil, a region where there was Italian and German colonisation. The economy is focused on agriculture with an emphasis on pork, milk and tobacco production. Health care is provided in two healthcare facilities: one located in the urban area and another in the largest rural community area. Health groups meet in rural areas. They provide opportunities to enhance adherence to regimens and to support interactions between healthcare professionals and patients. Also available is a municipal program called ‘health community’ in which a multidisciplinary and intersectoral team moves to rural



communities in order to develop preventive activities, monitoring and tracking diseases.

According to the 2010 Brazilian Census, this municipality had 2966 inhabitants. Of this total, 17.8% of the population was over 60 years of age and 64% of these older individuals lived in rural areas, a higher proportion than many other rural communities in Brazil<sup>11</sup>. The study population comprised individuals who were 60 or more years of age and users of the primary health care (PHC) centre. In 2012, the centre located in the rural community area provided care for 341 residents aged 60 or more. All residents of this area were registered for this service. Using probability sampling, 197 elderly individuals stratified by sex, age group and five districts were randomly selected. A total of 27 elderly individuals were excluded because they did not obtain the required score on the Mini Mental State Examination ( $>13$  for illiterate people;  $>18$  for people with elementary/high school education and  $>26$  for people with post-secondary education)<sup>17</sup>. Three individuals refused to participate in the study.

Data were collected in 2012 by a trained team of interviewers using a questionnaire developed for this study that addressed social, economic, demographic and health variables (age group, sex, schooling, individual monthly income, family income, marital status, falls and morbidities). Individuals were asked to self-report whether they had common morbidities such as heart disease, diabetes, high pressure, depression, osteoarthritis, stroke, lung diseases and cancer; these were coded as dichotomous variables (yes or no). An open-ended question was included so participants could list other morbidities. In addition, a question about whether participants experienced one or more falls in the last year (yes or no) was used. Additional instruments included the Katz scale to measure basic activities of daily living (ADL) and the Lawton scale to measure instrumental activities of daily living (IADL)<sup>18</sup>. The Brazilian versions of WHOQOL-BREF and WHOQOL-OLD modules were used to assess QoL.

The Katz Index of Independence in ADL is used to assess independence in the performance of six functions and classifies them into seven categories from A to G, where A characterises independence in all activities and G represents dependence in all activities. Using the Lawton scale, nine functions are scored on a three-point scale, with ratings from one to three for each function. The total score could range from 9 to 27 points with higher scores representing greater independence. These scales are used in many Brazilian studies but limited psychometric data are available for the Brazilian translations. In the first Brazilian study of both scales, the overall Cronbach's alpha coefficient was 0.88<sup>19</sup>.

The Brazilian version of WHOQOL-BREF is an instrument abbreviated from the WHOQOL-100, and consists of 26 questions pertaining to four domains: physical, psychological, social relationships and environment as well as two questions about general QoL and health<sup>20</sup>. The WHOQOL-OLD module was designed to augment the WHOQOL-100 or WHOQOL-BREF with items designed for older adults. It has 24 items and six facets: sensory functions; autonomy; past, present and future activities; social participation; death and dying; and intimacy. Each of these facets has four items that, when combined, produce an overall score of QoL for elderly people<sup>21</sup>.

Results of the WHOQOL-BREF and WHOQOL-OLD were transformed into values ranging from 0 to 100, with 100 reflecting the highest possible score. The WHOQOL-BREF showed satisfactory psychometric performance and was considered a useful tool for the measurement of QoL in older adults in Brazil<sup>22</sup>. In this study, the Cronbach's alpha coefficient was 0.829 for the physical domain, 0.752 for the psychological domain, 0.612 for social relationships and 0.784 on the environmental domain. This lower internal consistency for the social relationships domain can be explained by the limited number of items in this domain and the lack of response (17.7%) on the item relating to sexual activity. In addition, the WHOQOL-BREF domains significantly discriminated between well and ill groups. The WHOQOL-OLD also showed satisfactory psychometric performance<sup>22</sup>. The Cronbach's alpha coefficients ranged



from 0.710 (autonomy) to 0.885 (overall), discriminant validity ( $p < 0.01$ ), and test–retest reliability over 2–8-week intervals yielded correlation coefficients from 0.584 (autonomy and intimacy facets) to 0.820 (overall).

Study data were entered into a spreadsheet and analysed using Statistical Package for Social Sciences (SPSS) software, v18.0 (SPSS Inc; [www.spss.com](http://www.spss.com)). Continuous variables were described as means and standard deviations or medians and interquartile ranges. Categorical variables were described using absolute and relative frequencies. To compare means between the groups, the student's *t*-test or one-way analysis of variance (ANOVA) with Tukey post-hoc analysis was used. Associations between continuous and ordinal variables were assessed using the Pearson or Spearman correlation coefficient. Variables with  $p < 0.20$  in bivariate analysis were included in a multivariate linear regression model, using a stepwise method to control confounding factors. The level of significance was set at  $p \leq 0.05$ .

Missing values were handled according to the WHOQOL protocol<sup>23</sup>: if one value in the domain was missing, the median score from the other items was used to replace the value. If there were more than one missing value in the same domain, it was excluded from the analysis.

The four domain scores of the WHOQOL-BREF, the overall QoL score and the WHOQOL-OLD score were used as dependent variables in different regression equations. The overall QoL score was the mean of the two general questions about health and QoL. Social, economic, demographic and health variables were used as independent variables for each domain or total scores.

### **Ethics approval**

The research project was approved by the Federal University of Rio Grande do Sul Research Ethics Committee (No. 04843012.0.0000.5347). The older adults signed an informed consent form after they indicated a willingness to participate in the study.

## Results

The mean age of the participants was  $69.7 \pm 7.5$  years, with 55.8% in the 60–69 age group; half were men (50.8%). In relation to schooling, 53.3% had between 4 and 7 years of formal education. Most participants had a monthly income of less than the Brazilian minimum wage (71.6%) and 36.5% of participants had a family income that was 3–5 times the minimum wage. They had an average of  $3.11 \pm 1.48$  dependents. It was also observed that 86.3% of the individuals lived with a spouse or companion. In relation to morbidities, 46.7% of the participants reported having one or two morbidities; depression was self-reported by 11.2% and falls within the last year were reported by 20.8% of participants. Tobacco smoking (present and past) averaged 43.4 years ( $\pm 12.3$  years). Most of the elderly individuals (85.3%) were classified as independent for ADL and had high scores on the IADL ( $25.5 \pm 2.1$ ). QoL scores and results of the multivariate linear regression model using a stepwise method are shown in Tables 1–3.

## Discussion

In this study, most participants were younger older adults and most had a partner. Given that demographic ageing is a more recent phenomenon in Brazil, these participants were most available. This is also the case in other studies from the central region of Brazil<sup>6,24</sup>.

Education and income were higher in the area than in other areas in the very south of the state and from the south-west of Brazil, the most developed region of the country<sup>3,4,25,26</sup>. Education can influence older adults' understanding of the ageing process as well as their understanding of the disease processes common at this stage of life.

It was noted that family members did not significantly add to family income in the home. It seems that the older adults benefited from the government provision of homes for people who had retired from agricultural activity. Their family members continued to reside with them.



**Table 1: Mean WHOQOL-BREF domain scores of rural area older adults in southern Brazil (n=197) (transformed to a scale of 0–100)**

WHOQOL-BREF	Mean	SD	Median	Minimum	Maximum
Physical	63.5	12.2	64.3	25.0	89.3
Psychological	67.3	9.2	66.7	41.7	95.8
Social relationship	74.5	11.4	75.0	50.0	100
Environment	64.7	8.3	65.6	37.5	93.8
Overall QoL	67.3	12.1	62.5	37.5	100

SD, standard deviation. WHOQOL-BREF, World Health Organization Quality of Life BREF instrument.

**Table 2: Mean WHOQOL-OLD module scores of rural area older adults in southern Brazil (n=197) (transformed to a scale of 0–100)**

WHOQOL-OLD	Mean	SD	Median	Minimum	Maximum
Sensory abilities	68.2	16.3	68.8	25.0	100
Autonomy	62.3	10.9	62.5	31.3	93.8
Past–present–future	69.1	11.8	68.8	37.5	100
Social participation	67.4	12.3	68.8	37.5	100
Death and dying	80.2	16.2	81.3	25.0	100
Intimacy	70.7	14.2	75.0	18.8	100
Total score	69.7	8.5	68.8	51.0	93.8

SD, standard deviation. WHOQOL-BREF, World Health Organization Quality of Life Old Module

Some important factors to consider when comparing findings of different studies are the morbidities and functional capacities of the older adult participants. In rural populations, health and illness have implications for ability to work, both in the home and in agricultural production. Regarding the number of comorbidities, similar findings have been noted in Thailand where 10% of the rural elderly had no comorbidities, 42% had one or two, 29% reported three or four and 19% had five or more<sup>10</sup>. However, in another study in Taiwan, all the elderly presented comorbidities – 70% had one or two and 30% had more than three<sup>27</sup>. In a study of older adults with diabetes mellitus conducted in Brazil, the average number of comorbidities in the urban area ( $\mu=8.57$ ) was significantly higher than in rural areas ( $\mu=7.2$ ), even when it was controlled for age<sup>6</sup>. It is likely that the living

conditions of each country influenced these results as well as the rural/urban environment.

Most of the elderly were classified as independent for all activities of daily living and none of the participants was totally caregiver dependent. This result is probably associated with the fact that the group was mostly made up of younger old.

Average QoL scores for the elderly in this rural environment were similar to those of other studies conducted in urban settings in Brazil<sup>6,25</sup>. As in other investigations that target older adults in Brazil, it was also found that a higher number of morbidities and younger age are related to poorer QoL<sup>28,29</sup>.



**Table 3: Results of multivariate linear regression for the domains of quality of life, overall quality of life, the total score of the WHOQOL-OLD and variables of interest (n=197)**

Independent variable	B	CI 95%	B	P	R <sup>2</sup>
Physical domain of WHOQOL-BREF					
ADL	5.16	1.02±9.31	0.151	0.015	34.5%
IADL	1.92	1.20±2.63	0.332	<0.001	
Individual family income	1.56	0.16±2.97	0.131	0.029	
Number of morbidities	-1.84	-2.68±0.99	-0.277	<0.001	
Length of time of tobacco use (in years)	-0.36	-0.69±-0.03	-0.353	0.035	
Psychological domain of WHOQOL-BREF					
Schooling	2.91	1.30±4.52	0.243	<0.001	11.6%
Number of morbidities	-0.78	-1.46±-0.11	-0.156	0.024	
Number of falls	-3.09	-6.13±-0.05	-0.137	0.047	
Social relationship domain of WHOQOL-BREF					
Schooling	3.15	1.01±5.29	0.213	0.004	32.4%
Married	4.91	0.14±9.67	0.149	0.044	
Length of time of tobacco use (in years)	-0.29	-0.57±-0.01	-0.344	0.043	
Environment domain of WHOQOL-BREF					
IADL	0.64	0.10±1.19	0.164	0.021	18.8%
Schooling	2.51	0.99±4.04	0.231	0.001	
Family income	1.84	0.77±2.90	0.227	0.001	
Length of time of tobacco use (in years)	-0.32	-0.59±-0.05	-0.433	0.021	
Overall QoL					
Individual monthly income	3.89	0.61±7.18	0.201	0.020	11.4%
Number of morbidities	-1.65	-2.82±-0.47	-0.237	0.006	
Total score WHOQOL-OLD					
IADL	1.19	0.65±1.72	0.291	<0.001	14.7%
Family income	1.39	0.30±2.48	0.168	0.013	
Depression	-4.39	-7.93±-0.85	-0.164	0.015	

ADL, basic activities of daily living; IADL, instrumental activities of daily living.

As in other studies from the central and southern regions in Brazil<sup>6,28-30</sup>, the social relationship domain of the WHOQOL-BREF showed higher scores than other domains and higher scores than are common in other countries. These findings are probably related to cultural differences<sup>31</sup>. Despite the similarities to other Brazilian findings, the activities in this environment are different from those in an urban environment. In the rural environment, social interactions involve mostly visits to neighbours and offspring who live nearby, and possible participation in religious or community activities such as card games, bocce (an Italian ball game) and other cultural/community activities (eg rural associations and unions).

The physical domain of QoL was the most compromised. This result is similar to that found in Thailand<sup>10</sup>. This finding may have been influenced by chronic disorders in old age that, in a rural environment, can hinder the ability to do agricultural work (which often continues after retirement), and by difficulties in gaining access to health services. Access to health services has previously been found to be an important factor related to QoL when assessing individuals with chronic disorders who live in rural and remote areas<sup>32</sup>.

On the WHOQOL-OLD, the highest scores were found on the death and dying facet. A similar result was identified in a study in which QoL of older adults from 39 leisure centres in



Colombia was examined<sup>33</sup>. According to the authors of this study, a high score on this facet can be related to perceptions that death is natural and a normal part of ageing. In a study conducted in Thailand<sup>10</sup>, the facet with the highest score was intimacy. Although gender comparisons were not conducted in the present study, it is interesting that in a study of rural older adults in central Brazil, the highest score on the intimacy facet occurred among women. Among men, the highest score was on death and dying facet<sup>5</sup>.

It was surprising to find that the participants of this study scored autonomy lower than other indicators of QoL. Considering that most of the participants lived in uni-generational homes and were independent, higher scores were expected. However, in other studies in a Brazilian rural context, similar findings were noted<sup>6,25</sup>. Perhaps the distance from banks, cooperatives, services and businesses made participants feel more dependent on family members. To better understand these findings, it is suggested that further study, perhaps of a qualitative nature, of the barriers to autonomy in the daily lives of older adults in rural settings be carried out.

The participants who reported full independence in relation to ADL had higher physical domain QoL scores than those who were more dependent. Greater independence on the IADL was also positively related to physical and environmental QoL domains and total score on the WHOQOL-OLD. Similar results were found in a study with older adults in rural Turkey, where functional dependence was related to lower QoL scores on all domains and overall QoL, especially among women with chronic diseases<sup>34</sup>. These findings may be related to low social and economic conditions of the target population, which would affect their functional capacity, especially relating to instrumental activities<sup>19</sup>. A comparative study from 22 countries showed that in some developing countries, elderly people with functional dependence had lower QoL scores in the physical domain<sup>31</sup>.

On the other hand, in a study conducted with older users of PHC services in an urban area in the interior of north-eastern Brazil, researchers did not find a statistically significant

relationship between ADL and QoL<sup>35</sup>. However, the authors only used the WHOQOL-OLD module and did not indicate whether this was a probabilistic sample. In other investigations, it has been found that older adults in rural environments are less dependent than those in urban environments. This may be related to the migration of persons who become dependent to urban areas looking for more formal support<sup>36</sup>.

The number of morbidities had a negative relationship with scores on the physical and psychological domains, and overall QoL. Similar results were identified in all QoL domains, and overall QoL of the WHOQOL-BREF with elderly people in rural areas in Turkey<sup>34</sup>. In a study of rural elderly in an urban area in southern Brazil, the authors found a consistent and inverse association between health problems and the QoL of older adults<sup>37</sup>.

Individual monthly income of the participants was positively associated with overall QoL, while family income was associated with the physical and environmental domains and total score on the WHOQOL-OLD. Studies conducted with older adults in urban areas in Brazil, Mexico and the USA also showed that elderly people with higher income had a better perception of their QoL<sup>28,38,39</sup>.

Smoking was negatively related to physical, social relationships and environmental domains of QoL. The average number of years of smoking in the studied population was considerable at  $43.4 \pm 12.3$ , and this may have resulted in chronic diseases leading to impairments in physical status and social relationships. Other studies have also shown an association between being a smoker and having a lower perception of QoL<sup>24,40</sup>.

Education is often used as an indicator of socioeconomic status, and may lead to greater understanding of the ageing process and better adaptation to changing circumstances. In this study, amount of schooling was positively associated with QoL in the psychological, social relationships and environmental domains. Similarly, in India, among the rural elderly population, education was associated with physical



and psychological domains<sup>41</sup>. In a study with older adults in an area with low economic indicators in southern Brazil, an association was found between higher education and all domains of the WHOQOL-BREF and general score of WHOQOL-OLD<sup>37</sup>.

Falls in the past year were negatively associated with the psychological domain of QoL. Falling can cause feelings of insecurity. Further, depression can lead to the use of medication that contributes to falls. In a study of older adults in a metropolitan Brazilian city, researchers also found lower QoL scores in the psychological domain among those participants who had fallen<sup>42</sup>.

Living with a spouse or companion was positively associated with the social relationship domain score. In another study of older adults in a Brazilian urban area, not being married was also associated with lower scores on the social domain<sup>28</sup>. In countries such as Turkey, Vietnam and Indonesia, older adults in rural environments who lived without a companion, especially women, had lower QoL scores<sup>7,9,34</sup>. In the rural environment, living with a spouse or companion may be more important than in urban areas, considering the distance between homes and challenges imposed by heavy daily living duties related to production or home activities.

As might be expected, depression had a negative impact on WHOQOL-OLD scores. In several studies<sup>28,43</sup>, it has been found that older people with depression present significantly lower QoL scores than others, both in rural and urban environments. People with depression may have less social support and may perceive life in general and QoL more negatively than others<sup>43</sup>. There are strong correlations between the constructs of depression and aspects of QoL assessed in WHOQOL-OLD, such as affect, lack of companionship, living alone, feeling lonely and negative expectations in relation to the future<sup>28</sup>. Furthermore, in the rural environment, access to services for diagnosis, treatment and follow-up of older adults with depression can be challenging.

PHC professionals have many opportunities to facilitate enhancement of QoL of older adults in rural communities. Assessing the capacity of the elderly to conduct daily activities

and planning strategies to maintain functional capacity are some of the key activities of PHC. PHC professionals also must work on preventing smoking, falls and on chronic disease management in older adults. In relation to smoking and chronic diseases, health professionals could develop health education programs targeted earlier in life. When considering falls in rural communities, specific evaluation criteria must be developed that consider the environment outside the house. In researchers' experience the external physical environment such as gardens is a common location for falls of older adults in Brazil.

Policy makers need to consider social and cultural factors that can contribute to QoL of older adults in rural environments. Specifically, access to services, mobility to access adequate health and social care, and opportunities for family and community integration need to be provided. In developing countries, policy makers have the challenge of unmet socioeconomic needs and lack of adequate infrastructure to facilitate independent living. Community-based initiatives that focus on social participation and integration may provide support for needs of older adults.

There are a number of limitations to this study. Given the cross-sectional design of this study, it was not possible to draw causal relationships between variables. It was also not possible to generalise to other communities in Brazil or other countries. Further research using mixed methods and longitudinal studies could provide data that help to better understand the nature of factors that contribute to QoL.

## Conclusions

In this study, higher overall QoL ratings of older adults in a rural environment were associated with income and lower number of morbidities. Higher scores on the WHOQOL-OLD were associated with functional independence, higher family income and no self-reported depression. In relation to the WHOQOL-BREF domains, functional independence was related to higher scores in the environment and physical domains; more years of schooling was related to higher scores





in the environment, social relationship and psychological domains; a lower number of morbidities was associated with the psychological and physical domains; no falls within the past year was associated with the psychological domain; fewer years of tobacco smoking was associated with social relationship and physical domains; living with a spouse or companion was associated with the social relationship domain; and better individual and/or family income was associated with environmental and physical domains. Factors associated with QoL in this study are similar to those identified in studies conducted in urban environments. However, it seems that these factors may influence QoL differently because of characteristics of the rural environment.

Further research is needed to assess how QoL of older adults in the rural environment changes over time and to identify other variables not explored in this study that may be associated with QoL of older adults.

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