Sociodemographic factors related to low quality of life scores in adolescents in a Northeastern city in Brazil: an analysis using the Whoqol-Bref

Factores sociodemográficos relacionados com a baixa qualidade de vida dos adolescentes de uma cidade do Nordeste do Brasil: uma análise utilizando o Whoqol-Bref

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ABSTRACT
Objective: To investigate the quality of life, as well as to analyze the main sociodemographic factors associated with low quality of life scores in Brazilian adolescents. **Methods:** This was a cross-sectional study performed with 13,850 adolescents aged 14 to 18 years of both sexes, enrolled in public high schools. Quality of life was assessed by Whoqol-bref. Sociodemographic factors were investigated using a specific questionnaire. **Results**: The average frequency of global QOL was 58%, being lower in domain IV (49%), compared to domain I (51.78%), domain II (61.57%) and domain III (68.71%). Lower QOL scores were observed among female adolescents (OR=1.23, CI95%: 1.15-1.32), night shift students (OR=1.24, CI95%: 1.03-1.44) and full-time (OR=1.35, CI95%: 1.23-1.48). **Conclusion:** Low quality of life is very common among Brazilian high school adolescents. Domain I and IV have the lowest frequency. Lower QOL scores were associated with female gender, night shift, and full-time school

shift. Our results seek to collaborate with the development of public policies aimed towards progress in the QOL of this population group.

Keywords: adolescents, quality of life, cross-sectional studies.

RESUMO
Objectivo: Investigar a qualidade de vida, bem como analisar os principais factores sociodemográficos associados aos baixos índices de qualidade de vida dos adolescentes brasileiros. **Métodos**: Este foi um estudo transversal realizado com 13.850 adolescentes dos 14 aos 18 anos de ambos os sexos, matriculados em escolas secundárias públicas. A qualidade de vida foi avaliada por Whoqol-bref. Os factores sociodemográficos foram investigados utilizando um questionário específico. **Resultados**: A frequência média de QOL global foi de 58%, sendo inferior no domínio IV (49%), em comparação com o domínio I (51,78%), domínio II (61,57%) e domínio III (68,71%). Foram observadas pontuações de QOL mais baixas entre as adolescentes do sexo feminino (OR=1,23, CI95%: 1,15-1,32), estudantes do turno da noite (OR=1,24, CI95%: 1,03-1,44) e a tempo inteiro (OR=1,35, CI95%: 1,23-1,48). **Conclusão**: A baixa qualidade de vida é muito comum entre os adolescentes brasileiros do ensino secundário. Os domínios I e IV têm a frequência mais baixa. As notas mais baixas de QOL foram associadas ao sexo feminino, ao turno nocturno e ao turno escolar a tempo inteiro. Os nossos resultados procuram colaborar com o desenvolvimento de políticas públicas que visam o progresso no QOL deste grupo populacional.

Palavras-chave: adolescentes, qualidade de vida, estudos transversais.

1 INTRODUCTION

Adolescence is an important period of human development, a transitional stage between childhood and adulthood that involves several psychosocial and physiological changes [1, 2]. Therefore, investigating this age group is relevant to the analysis of behaviors that may reflect on adult life, as well as on the quality of life (QOL).

As a multidimensional concept influenced by psychological, physical health, and social relationships the QOL is defined by the World Health Organization (WHO) as being an "individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" [3]. The analysis of QOL is an important social issue in helping to develop public policies, promotional health actions, protection, and resource allocation.

A review study aiming to map the characteristics and trends of scientific production on health care for adolescents in Brazil identified a context of programmatic fragility and care gaps focused on health care for this population that discourages initiatives, resources, and investments in the field of research and innovation. Furthermore, in Brazil, the precarious living and health conditions of adolescents and

young people reveal their vulnerability, which requires a broader look toward the horizon of informed policies that effectively care for and protect them [4].

However, few studies assess QOL in school-age adolescents, with the majority of studies being carried out in adolescents with different pathologies [5–8]. Even after finding some writings carried out with school adolescents, publications are still scarce and suggest more research with this group, mainly, investigating the factors associated with QOL [9, 10].

Therefore, this study aimed to analyze the QOL of adolescents from public schools in a northeastern city of Brazil, as well as the sociodemographic factors associated with low QOL scores.

2 METHODS

The present study was part of a school-based epidemiological survey carried out in the city of Fortaleza, State of Ceará, located in the Northeast region of Brazil, with an estimated population of 2,686.612 in the year 2020 and with a human development index (HDI) of 0.754. The study population consisted of students of both sexes, enrolled in the 1st to the 3rd year of high school in the public school system. According to data from the State Department of Education, in 2016, 73,569 students were enrolled in this educational segment, distributed among 174 schools. The city where this study was performed has a territorial extension of 312,353km^2. Due to its size, the Municipal Department of Education divided the territory into six educational centers (regionals) that encompass the entire area of the city. Below is the map of the city of Fortaleza and the distribution of schools by district (Figure 1).

Figure 1 Distribution of the number of state schools by regionals of the city of Fortaleza
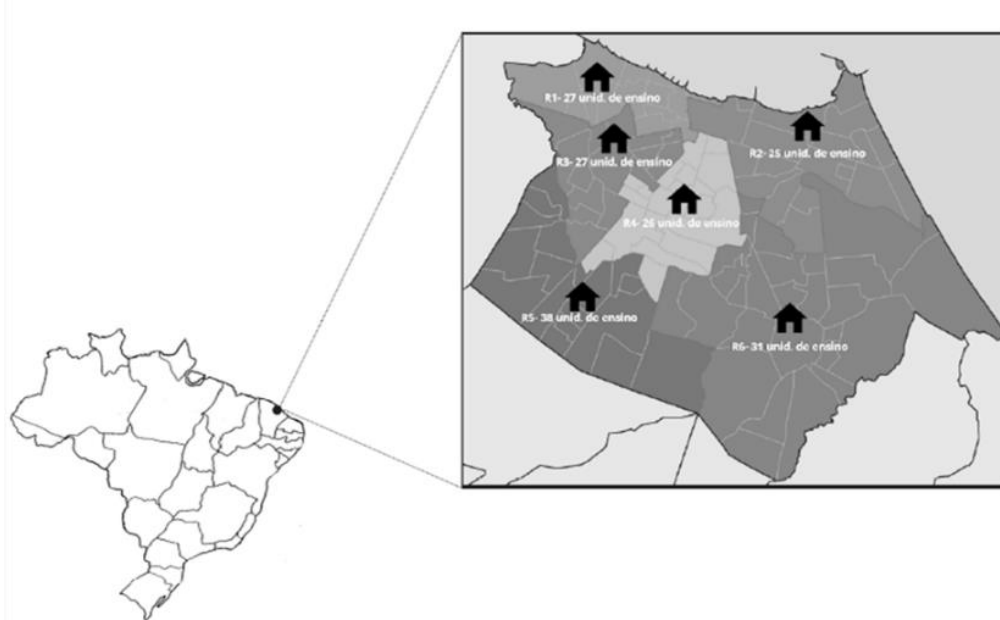
R1 - Regional I; R2 - Regional 2; R3 - Regional 3; R4 - Regional 4; R5 - Regional 5; R6 - Regional 6

To calculate the size of the representative sample of the population, an estimated prevalence of 50%, a 95% confidence level, and precision of three percentage points were used, resulting in a sample size of 3,979 students. An increase of 20% was used for possible cases of losses or refusals, totaling 5,571 students. However, due to the availability of researchers and school directors, a larger quantity than necessary was collected.

The sample selection procedure was carried out considering the "school" as the primary sampling unit and the secondary "schooler". Initially, a proportional number of educational institutions were drawn for each region. After the draw, the referred institution was contacted and the administration was informed of the day and time for the application of the questionnaires. Questionnaires were applied to all students who were present on the day of collection. Data collection was carried out from July to December 2015, with 14,411 students, 561 being excluded for not having signed the Informed Consent Form (ICF), for not having correctly filled out the questionnaires, and/or being absent the day of collection.

The study was carried out following the Declaration of Helsinki, and it was approved by the Research Ethics Committee of the State University of Ceará (opinion no. 1.430.345) and all individuals gave their informed consent for inclusion before participating in the study.

3 INSTRUMENTS

QOL was measured using the WHOQOL-Bref questionnaire, developed by the study group of WHO on QOL. This instrument contains 26 questions and considers the last fifteen days lived by the respondents. The WHOQOL-Bref is composed of four domains: physical (domain I), psychological (domain II), social relationships (domain III), and environmental (domain IV), and is analyzed based on the criteria proposed by the Australian WHOQOL team [11], with results ranging on a scale from 0 to 100, noting that the closer to 100, the better the QOL of the individual. The classification was performed using a quartile range, where people were classified as follows: low score (3rd and 4th quartiles) and high score (1st and 2nd quartiles).

4 SOCIODEMOGRAPHIC VARIABLES

Sociodemographic variables included: gender (male and female), ages (14 to 17 years), grade (1st year, 2nd year, and 3rd year), and study shift (morning, afternoon, evening, and full-time)

5 STATISTICAL ANALYSIS

Initially, the Kolmogorov Smirnov test was used to verify the normality of the data. Subsequently, descriptive statistics in mean and standard deviation were adopted to describe the values related to the domains and global QOL. To analyze the mean scores of global QOL and the domains according to gender, the independent t-test and ANOVA one-way with post-hoc tukey for age, grade, and school shift were used.

Crude and adjusted logistic regression models were used to identify factors associated with low QOL scores. In this way, it was possible to estimate the crude and adjusted odds ratio values, as well as their respective 95% CI. All investigated variables (gender, age group, grade, school shift) were introduced in the multivariate regression model and variables with $p < 0.20$ in the crude analysis. The level of significance was set at 5% ($p < 0.05$) for the final analyses. All data were analyzed using IBM SPSS Statistics 21.0 software.

6 RESULTS

In the final sample of the present study, there was a total of 13,850 adolescents, 47.1% female, 70% aged between 16 and 18 years, 42.3% students in the 1st year, and 44.2% students in the afternoon shift (Table 1)

Table 1 Description of the sample according to sociodemographic characteristics and perception of quality of life among adolescents. Fortaleza (CE), Brazil, 2015 (n = 13850)

Variables	n	%
Sex		
Male	6524	47,1
Female	7326	52,9
Years of age		
14-15	3318	24.0
16-18	9684	70.0
> 18	826	6,0
Grades		
1st year	5681	42.3
2nd year	4957	35.8
3rd year	3024	21.9
Study shift		
Morning	3284	23.7
Afternoon	6115	44.2
Night	550	4.0
Full time	3901	28.2
Percepction of QOL		
Positive	10337	74,9
Negative	3459	25,0

QOL – Quality of life

The findings regarding the QOL of adolescents can be seen in Graph 1. Taking into account that the results of the WHOQOL-Bref are presented on a percentage scale, with a range of 0-100, it can be inferred that the adolescents presented a value average global QOL of 58%. Furthermore, it was identified that the average value of domains I, II, III, and IV was 51.78%, 61.57%, 68.71%, and 49%, respectively.

Graphic 1 Means of quality of life of adolescents according to domains. Fortaleza (CE), Brazil, 2015 (n = 13850).
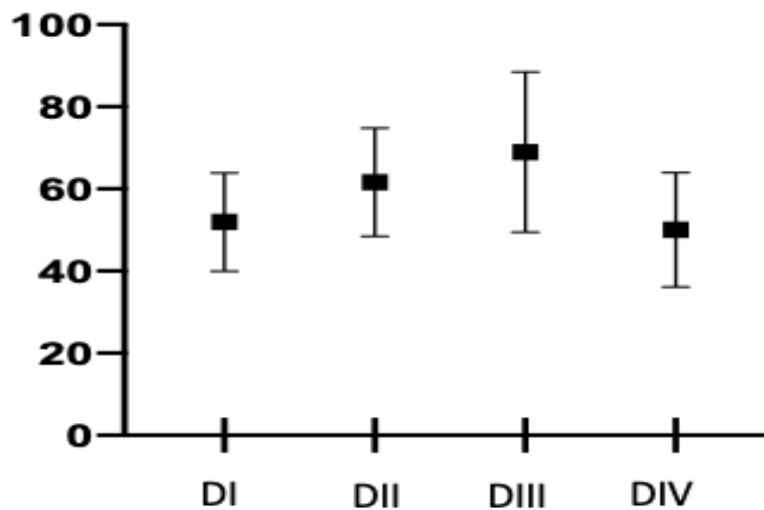
Regarding the domains and global QOL, it can be observed that females had higher values than males in the domain of social relationships (69.5 ± 19.4; p<0.001), as well as third-year adolescents had a better mean of global QOL (58.7 ± 10.5; p<0.001), physical domain (51.7 ± 11.9; p< 0.001) and psychological (61.3 ± 13.2; p< 0.001) than males. In addition, adolescents who study during the night shift had a better mean in the physical domain (52.5 ± 11.6; p< 0.001), while those in the morning presented (50.5 ± 14.0; p< 0.001) for the environmental domain (Table2).

Table 2 Distribution of the mean quality of life scores (global QOL and in each domain) according to sex, age, grade and study shift of adolescents. Fortaleza (CE), Brazil, 2015 (n = 13850).

Variables	Quality of life and domains				
	Global QOL	Physical	Psychological	Social relationships	Environmental
Sex					
Male	57.9 ± 10.8	51.9 ± 12.0	61.3 ± 13.2	68.4 ± 19.4	50.1 ± 14.0
Female	58.2 ± 10.7	51.8 ± 11.7	61.8 ± 13.0	69.5 ± 19.4	49.9 ± 13.8
p-value *	0.126	0.097	0.788	**0.001**	1.683
Age (years)					
14-15	58.0 ± 10.6	51.5 ± 11.9	61.6 ± 13.0	68.6 ± 19.2	50.4 ± 13.8
16-18	58.1 ± 10.8	52.0 ± 11.8	61.6 ± 13.1	69.2 ± 19.5	49.8 ± 13.9
> 18	57.6 ± 11.0	52.0 ± 12.7	61.2 ± 13.6	67.6 ± 20.2	49.8 ± 13.8
p-value	0.413	0.109	0.755	0.045	0.080
Grade (%)					
1st year	58.0 ± 10.8	51.7 ± 11.9	61.3 ± 13.2	68.8 ± 19.7	50.1 ± 13.9
2nd year	57.8 ± 10.8	51.6 ± 11.9	61.3 ± 13.2	68.5 ± 19.4	49.8 ± 14.0
3rd year	58.7 ± 10.5	52.6 ± 11.7	62.4 ± 13.0	68.9 ± 19.5	50.1 ± 13.6
p-value **	**0.001**	**0.001**	**0.001**	0.015	0.422
Study shift (%)					
Morning	58.3 ± 10.9	52.4 ± 12.0	61.4 ± 13.3	69.0 ± 19.5	50.5 ± 14.0
Afternoon	58.1 ± 10.8	52.3 ± 12.0	61.6 ± 13.1	69.0 ± 19.7	49.7 ± 13.9
Night	57.4 ± 10.9	52.5 ± 11.6	60.8 ± 13.3	68.8 ± 20.2	47.4 ± 13.7
Full time	57.9 ± 10.5	50.7 ± 11.6	61.7 ± 13.0	68.8 ± 18.9	50.4 ± 13.7
p-value **	0.131	**0.001**	0.441	0.976	**0.001**

* Independente t-test; ** ANOVA One way

As can be seen from the information contained in Graph 2, there is a higher risk of having a low QOL score among female adolescents (OR = 1.23, 95% CI: 1.15 - 1.32), studying at night (OR = 1.24, 95% CI: 1.03 - 1.44) or full time (OR = 1.35, 95% CI: 1.23 - 1.48).

Graphic 2 Factors associated to low quality of life of adolescents. Fortaleza (CE), Brazil, 2015 (n = 13850).
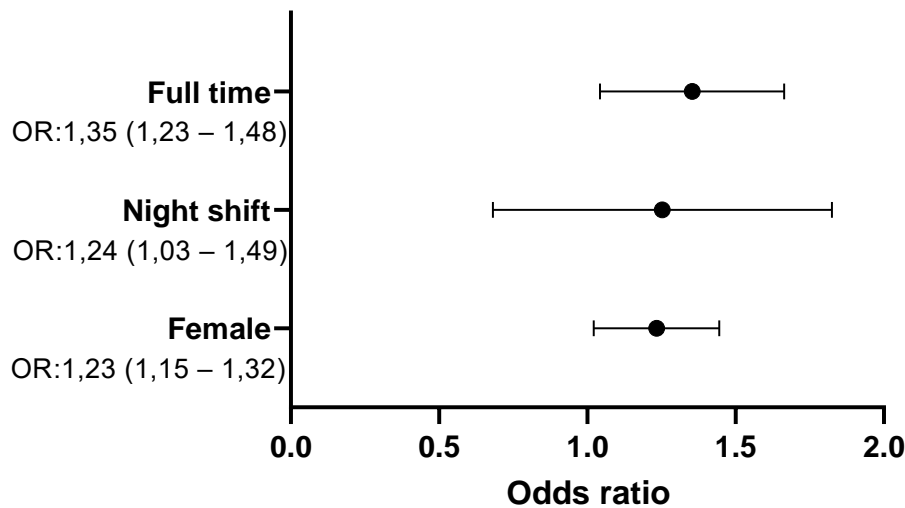
7 DISCUSSION

To date, this is the first epidemiological study that analyzed QOL and its associated factors in adolescents in the city of Fortaleza, where the relationship between school grade and global QOL, physical and psychological domains; study shift associated with the physical and environmental domain and factors related to low QOL scores were identified. For a better discussion of the results, the following topics are presented.

Analysis of global quality of life and domains

According to the WHOQOL-bref, a mean value of the adolescents' global QOL was lower than that found in the international [12] and national literature [13, 14]. This may be due to socioeconomic differences in the sample and regional characteristics. In Brazil, most children and adolescents who study in public schools are of low socioeconomic status, live in peripheral regions, with precarious conditions of basic sanitation, greater vulnerability, and insecurity due to high crime rates [15]. It is important to emphasize that the Northeast region of Brazil, where this study was carried out where 47.9% of the country's poverty is concentrated [16].

A study carried out with adolescents from a state in the Southeast region of Brazil, aimed to analyze the living conditions of families in social vulnerability and its potential relationship with well-being and mental health. The results obtained concerning sociodemographic information allowed the identification of situations of social vulnerability associated with social inequities in which those surveyed found themselves. The lack of access to work and income deserves to be highlighted, factors that can directly

interfere in many other spheres of life, hindering or preventing access to health services, transportation, housing, culture, leisure, among other determinants necessary for material and symbolic reproduction of human life [17].

Adolescents had a higher score for the social relationships domain and a lower score for the environment. Social relationships include personal bonds, social support, and sexual activity [11]. The highest score may be related to a good level of friendship, family, and the community. A study carried out with 633 adolescents from public education, aimed to assess the self-perception of adolescents about their QOL and the results showed the highest mean related to the social domain. This result is justified by the authors because the social domain is strengthened in adolescents since they are inserted in social groups with whom they can relate and seek approval. In addition, the school environment is very conducive to social interactions, as it facilitates adolescents' communication with people other than their family members and with whom they can identify because they are sharing the same stage of life [18]. Therefore, it is important that, within the school environment, monitoring should be carried out through lectures and conversations with adolescents, so that they can feel accepted at school and within the family environment, as well as in different social environments.

On the other hand, the lowest values found in the environmental domain [11] concern the perception of the environment where one lives (security, home, and financial capital, for example), which may be related to the situation of greater social vulnerability. In the same sense, studies carried out in the past point to this last domain as being the most affected by QOL in adolescents [19–21]. An analysis carried out with 202 adolescents from technical schools aimed to verify the relationship of sociodemographic and behavioral variables with the environmental domain of the WHOQOL-Bref. The authors considered that the social conditions in which the subjects live have a direct impact on the health and QOL of citizens. Several Brazilian municipalities have implemented interventional actions in the areas of education, basic sanitation, medical assistance, and work environments. However, the allusive commitment of government officials concerning policies aimed at better living conditions for the population is still very low [22]. Given this finding, it can be inferred that greater government investments are needed to improve environmental living conditions, not only for adolescents but for Brazilian families, especially after the Coronavirus pandemic.

Mean scores of QOL domains according to sociodemographic factors

When analyzing the domains according to sociodemographic information, it can be seen that females had better scores than males in the social relationships domain. These results corroborate a study carried out with 2,434 adolescents enrolled in high school (public and private) where females also had better scores in the social domain of QOL. The present findings can be justified by a greater network of female relationships, with greater interpersonal and family involvement, and time devoted to friendships. Also, according to what was observed, it can be inferred that social relationships do not seem to be influenced by the socio-economic situation of the sample, since the study by Custódio & Benicasa [23] was carried out in São Paulo, one of the most developed cities in the country, with more privileged individuals, belonging to the highest social class, in comparison to Fortaleza.

Adolescents who were in the third year had better mean levels of global QOL, physical and psychological domain. Regarding the global QOL, these results are partially in agreement with the study by Biswas, Bhattacherjee & Mukherjee [24], who evaluated the QOL of school adolescents from an Indian city and observed that older individuals, during the last years of high school, had better scores. This can be explained by the greater behavioral autonomy that the person acquires over the years, unlike individuals from lower grades, from a lower age group, in which parents/relatives tend to influence the behavior more strongly, resulting in impacts on the perception of QOL. It is believed that when adolescents enter the third year of high school, they become more preoccupied and stressed [25] about entering college, and, to reduce this stress, many schools encourage the practice of physical activity regularly. In this sense, a meta-analysis study showed that the practice of physical exercise has a positive effect on the perception of the physical domain [26]. Regarding the psychological domain, a likely explanation is that the transition from elementary to high school may reflect changes experienced by students in lower grades (first and second year), in which changes in the social group, teachers, and even changing schools can influence psychological aspects, something that is probably more mature in third-year students, as reflected by their higher scores [27, 28].

Regarding the study shift, it was identified that morning students have the highest mean in the environment domain, differing from their peers who study at night and achieved higher scores in the physical domain. Considering the limited evidence, due to the few studies that relate QOL to the study shift, further research is suggested and encouraged to seek clarification of these findings, as some studies show that adolescents

who study in the morning tend to have excessive sleepiness [29] and poor academic performance [30] factors that influence QOL.

Sociodemographic factors associated with low quality of life scores

In the present study, it was identified that studying during the night shift or full time is associated with low QOL scores. Data from the Brazilian school census [31] reports that there is a strong relationship between studying during the night shift and lower socioeconomic status, as well as a predominance of older students: half of those enrolled in this period are between 18 and 21 years old, with a high rate of age-grade gap and a higher percentage of school dropouts, indicating that they have already dropped out of school at least once. On the other hand, some adolescents study in full-time schools (7:00 am to 4:30 pm), where institutions often do not offer adequate conditions for students to stay, such as a space for rest, changing rooms, and leisure areas [32].

It is believed that the sum of these factors can contribute to a low QOL in this population, thus strengthening the need for strategies in the school environment to improve QOL in this period of life. A study conducted with teenagers in Texas, United States of America - USA, aimed to carry out an intervention in the school environment with Hatha Yoga classes, twice a week, for three months, and found positive results in the behavior of students during classes and stress reduction [33], reinforcing the importance of the school environment for taking action that contributes to a better QOL of children and adolescents, especially for those who study at night.

In the present study, females were more likely to have low QOL scores. The Brazilian Institute of Geography and Statistics – IBGE showed that the main reason for females to abandon school is the lack of interest in studying, followed by unplanned pregnancy [34]. In addition, the need to take care of other people or household chores is alleged as the third reason for females to quit studying [19]. These data can contribute to the female audience being more likely to obtain low QOL scores when compared to males. A study carried out with Chilean schoolchildren aimed to discuss gender issues and the relationship with health-related QOL. This paper found lower scores focused on the perception of QOL in females compared to males, even after stratifying the sample by age, type of school, and region of the country. Thus, it was concluded that educational and health policies should be created to improve the QOL of these young people, especially females [35]. Through these factors, it becomes noticeable that there is still a gender difference in domestic occupations that influence a low QOL among females and

it would also be interesting for schools to carry out awareness campaigns regarding sex education during adolescence, as a form of prevention of unplanned pregnancies and other consequences arising from irresponsible sexual practices.

The present study had some limitations: absence of students from private institutions, preventing comparative discussions about socioeconomic conditions on QOL. However, the magnitude of the sample (n) stands out, which can represent the population of the studied location. In the same sense, another positive point of the present study was the use of the WHOQOL-bref, a practical instrument with satisfactory psychometric properties, in addition to being the most widespread tool for assessing QOL worldwide and recommended by the WHO.

8 CONCLUSION

It is concluded that high school students from the state public education system in Fortaleza had a low mean value of global QOL, with the Social Relations Domain better estimated and the Environmental Domain more vulnerable. The findings of this study allow us to collaborate with the development of public policies aimed at progressing the QOL of this population group.

Compliance with Ethical Standards
Conflict of Interest
The authors declare that they have no conflict of interest.

Ethical Approval
The study was conducted ac-cording to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee (Opinion Number: 1.430.345)

Informed Consent
Informed consent was obtained from all individual participants

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