

# Morbidity and quality of life of elderly individuals with diabetes mellitus living in urban and rural areas

MORBIDADES E QUALIDADE DE VIDA DE IDOSOS COM DIABETES MELLITUS  
RESIDENTES NAS ZONAS RURAL E URBANA

MORBILIDADES Y CALIDAD DE VIDA DE ANCIANOS CON DIABETES MELLITUS  
RESIDENTES EN ZONAS RURALES Y URBANAS

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## ABSTRACT

This study aimed to describe the socio-demographic variables and to compare the morbidities and the quality of life (QoL) of elderly individuals with diabetes mellitus (DM) residing in urban and rural areas. The sample consisted of 271 elderly individuals from urban areas and 104 from rural areas with self-reported DM. A descriptive analysis was used, and in the location comparison, an age adjustment was employed through linear and logistic multiple regression models ( $p < 0.05$ ). The elderly individuals from the rural area were younger, more educated, earned a higher income and were more often married in relation to the urban residents. Furthermore, the rural residents presented a higher QoL score in the physical and social relationships domains and in the autonomy, past, present and future activities, and intimacy facets compared to the urban residents. The elderly individuals residing in the urban area displayed a larger number of verified comorbidities. The elderly DM patients residing in the rural area generally presented better health conditions than those who lived in the urban area.

## DESCRIPTORS

Aged  
Diabetes mellitus  
Quality of life  
Geriatric nursing

## RESUMO

Este estudo objetivou descrever as variáveis sociodemográficas e comparar as morbidades e a qualidade de vida (QV) dos idosos com diabetes mellitus (DM) residentes nas zonas urbana e rural. A amostra foi composta de 271 idosos da zona urbana e 104 da rural que autorreferiram DM. Utilizou-se análise descritiva e, na comparação das localidades, realizou-se ajuste para a idade por meio de regressão logística e linear múltipla ( $p < 0,05$ ). Os idosos da zona rural eram mais jovens, casados e possuíam maior escolaridade e renda em relação àqueles da área urbana. Além disso, apresentaram maior escore de QV nos domínios físico e relações sociais e nas facetas autonomia, atividades passadas, presentes e futuras e intimidade, em relação aos do espaço urbano, nos quais se verificou maior número de comorbidades. Os idosos com DM da zona rural apresentaram, de forma geral, melhores condições de saúde em comparação aos que residiam na área urbana.

## DESCRIPTORIOS

Idoso  
Qualidade de vida  
Diabetes mellitus  
Enfermagem geriátrica

## RESUMEN

Se objetivó describir las variables sociodemográficas y comparar morbilidades y calidad de vida (QV) de ancianos con diabetes mellitus (DM) residentes en zonas urbanas y rurales. Muestra compuesta por 271 ancianos de zona urbana y 104 de zona rural que autorrefirieron padecer DM. Se utilizó análisis descriptivo y, en la comparación de localidades, se efectuó ajuste etario mediante regresión logística y lineal múltiple ( $p < 0,05$ ). Los ancianos de zonas rurales eran más jóvenes, casados y poseían mayor escolaridad y renta en relación a los de zonas urbanas. Además, presentaron mayor puntaje de QV en los dominios físico y relaciones sociales; y en las facetas autonomía, actividades actuales, presentes y futuras e intimidad, en relación a los de espacios urbanos; en los cuales se verificó mayor número de comorbilidades. Los ancianos con DM de zonas rurales expresaron, en rasgos generales, mejores condiciones de salud comparados a los residentes en zonas urbanas.

## DESCRIPTORIOS

Anciano  
Diabetes mellitus  
Calidad de vida  
Enfermería geriátrica

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## INTRODUCTION

Diabetes mellitus (DM) primarily affects sedentary, obese individuals aged more than 45 years<sup>(1)</sup>. In national and international studies, the prevalence of DM varies based on the individual's place of residence. According to data from the National Household Sample Survey (PNAD), the prevalence of diabetes in Brazil is higher among urban residents (3.99%) than in rural residents (2.97%)<sup>(2)</sup>. A Chinese study revealed that the lower prevalence of diabetes in rural areas was related to the underreporting of this disease<sup>(3)</sup>, revealing a lack knowledge regarding rural populations and their health conditions.

In a Brazilian study, the geographic barriers of the rural areas were found to impair greater access to healthcare services for the population<sup>(4)</sup>. This factor hinders appropriate monitoring of DM and promotes the occurrence of complications, such as nephropathy, neuropathy, retinopathy and cardiovascular changes; these factors negatively impact the quality of life (QoL) of elderly individuals<sup>(5)</sup>. This present study adopted the QoL definition that was developed by scholars of the World Health Organization (WHO), which considers QoL as

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<sup>(6)</sup>.

Based on the assumption that infrastructure differences between rural and urban areas and the characteristics of each population may compromise the health and QoL conditions of elderly individuals when not cared for in their specificities territorial, it is necessary to conduct research to elucidate the peculiarities of these different spaces, urban and rural. The results of such research will facilitate the planning of healthcare options that are appropriate for the needs identified. The aims of this study were to describe the sociodemographic variables and to compare the morbidity and the QoL of elderly residents of urban and rural areas with DM in a municipality of Minas Gerais State.

## METHODS

This study stems from two observational and cross-sectional household survey studies that were conducted in urban and rural Uberaba-MG in 2008 and 2011, respectively. The population sample analyzed by the Center for Research in Community Health of the Triangulo Mineiro Federal University was used to define the urban population. The sample was calculated as containing 2892 elderly individuals with 95% confidence, 80% power of test, a 4.0% margin of error for the interval estimates and an estimated proportion of  $\pi = 0.5$  for the proportions of interest. A total of 2142 elderly people participated in the 2008 study.

The rural population study was populated based on the 1297 elderly individuals who enrolled in the Family Health Strategy in June 2010 (FHS). Of these individuals, 447 were excluded from the study; of the excluded individuals, 9% had changed their address, 8.1% displayed cognitive decline, 5.8% refused to participate, 4.4% were not located after three attempts by the interviewer, 3.8% had died, 0.2% were hospitalized and 6.1% were excluded due to other reasons. In total, 850 elderly individuals were interviewed. The inclusion criteria for this study were the following: aged 60 years or more, residing in an urban or rural area of the municipality of Uberaba-MG, achieving the minimum score in the cognitive evaluation, enrolling in the FHS, self-reporting DM, and agreeing to participate. Ultimately, 271 elderly individuals in the urban area and 104 in the rural area met the inclusion criteria.

Prior to data collection, a cognitive evaluation was performed by means of the Mini-Mental State Examination (MMSE). The reduced version, which was validated by researchers of the SABE Project<sup>(7)</sup>, was used in the urban area, and an instrument translated and validated in Brazil<sup>(8)</sup> was used in the rural area. Both instruments permitted the implementation of a screen for the presence of cognitive decline based on the evaluation of orientation, memory, calculation and language. Furthermore, the instruments considered the respondent's education level to establish a cutoff point. The change of instrument was justified because the collections occurred at different times, and it was determined that the instrument that had been translated and validated in Brazil<sup>(8)</sup> was more appropriate considering the target population of this study. The data collection interviewers were trained in the completion of the instrument and how to approach elderly individuals. Systematic meetings were held with the field supervisors and researchers to monitor the data collection.

To obtain the sociodemographic characteristics and morbidity, the Older Americans Resources and Services (OARS) questionnaire was used; this questionnaire was created by researchers at Duke University (1978) and was adapted for use in Brazil<sup>(9)</sup>. The following sociodemographic and health variables were studied: gender, age group, marital status, educational level (years of study), living arrangement, individual income (minimum wages) and self-reported morbidities. The World Health Organization Quality of Life - BREF (WHOQOL-BREF) and the World Health Organization Quality of Life Assessment for Older Adults (WHOQOL-OLD) were used to measure the QoL; both surveys were validated in Brazil<sup>(10-11)</sup>.

The WHOQOL-BREF, a generic instrument, is composed of four domains: physical, psychological, social rela-

In a Brazilian study, the geographic barriers of the rural areas were found to impair greater access to healthcare services for the population. This factor hinders appropriate monitoring of diabetes mellitus and promotes the occurrence of complications...

tionships and environmental<sup>(10)</sup>. The WHOQOL-OLD, which is specific for elderly individuals, has six facets: sensory abilities; autonomy; past, present and future activities; social participation; death and dying; and intimacy<sup>(11)</sup>. The QoL questions were answered based on the time that had elapsed two weeks prior to the data collection event. The instruments were applied to the urban area between August and December 2008 and were applied to the rural area from June 2010 to March 2011.

The interviews were revised and codified. Two Excel 2003<sup>®</sup> databases were constructed; one was used for the urban area and the other for the rural area. The collected data were double-entry processed by two people. If data inconsistencies were later observed between the two databases, a correction was performed after consulting the original interview. Upon completing these procedures, the elderly individuals who met the inclusion criteria established for this study were selected from the urban area database. The procedure was identical for the rural area database, and a single database was generated for use in this study. The statistical analysis was performed by using the simple frequency distribution, mean and standard deviation. When comparing the locations, the age was adjusted using logistic regression and multiple linear regression. The significance level was set at 5% ( $p < 0.05$ ). Each domain of the WHOQOL-BREF and facet of the WHOQOL-OLD was analyzed separately. The questionnaires were consolidated in the *Statistical Package for the Social Sciences* (SPSS) version 17.0 software program with their respective syntaxes. The scores ranged from 0 to 100, with the highest value corresponding to the highest QoL.

Both projects were approved by the Human Research Ethics Committee of the Triangulo Mineiro Federal University under protocols No. 897 and No. 1477, which were approved on 13/04/2007 and 12/02/2010, respectively. The elderly individuals signed the Terms of Free Prior Informed Consent following the relevant clarifications.

## RESULTS

Table 1 presents the sociodemographic characteristics of the study population according to the location of residence.

Females were more prevalent in both the urban (69%) and rural (65.4%) areas (Table 1). The age group representing the most individuals was 60-70 years for both locations. However, a higher percentage of elderly individuals aged 60-70 years was found to reside in the rural area, and the urban area contained a more even distribution of individuals aged 60-70 years and 70-80 years (Table 1). The majority of the elderly individuals was married or had a partner, and higher percentages were recorded for the rural residents (64.4%) than the urban residents (51.7%) (Table 1). It is noteworthy that the urban area presented a higher percentage of widowed, separated and divorced people when compared to the rural environment (Table 1).

**Table 1** - Frequency distribution of the sociodemographic variables of elderly individuals with DM according to the location of residence - Uberaba, 2011

Variable	Urban		Rural	
	N	(%)	N	(%)
<b>Gender</b>				
Female	187	69	68	65.4
Male	84	31	36	34.6
<b>Age group</b>				
60   70	128	47.2	64	61.5
70   80	112	41.3	30	28.8
≥ 80	31	11.4	10	9.6
<b>Marital status</b>				
Never married or lived with a partner	11	4.1	9	8.7
Lives with spouse or partner	140	51.7	67	64.4
Widowed	99	36.5	26	25
Separated or divorced	21	7.7	2	1.9
<b>Schooling (in years)</b>				
No schooling	59	21.9	24	23.1
1   4	111	41.1	29	27.9
4   8	66	24.4	46	44.2
9   11	12	4.4	4	3.8
11 or more	22	8.1	1	1
<b>Household arrangement</b>				
Alone	27	10	14	13.5
Alone with professional care	3	1.1	-	-
Alone with spouse	60	22.3	47	45.2
With another of the same generation (with or without spouse)	4	1.5	10	9.6
With children (with or without spouse)	93	34.6	26	25
With grandchildren (with or without spouse)	16	5.9	3	2.9
Other arrangements	66	24.5	4	3.8
<b>Individual income (in minimum wages)</b>				
0	27	10	14	13.5
< 1	5	1.9	4	3.8
1	163	60.6	43	41.3
1   3	67	24.9	33	31.7
3   5	6	2.2	8	7.7
> 5	1	0.4	2	1.9

The rural area contained a higher percentage of elderly individuals with four to eight years of education (44.2%), while those in the urban area had one to four years of education (41.1%) (Table 1). A higher percentage of elderly people in the rural area lived only with their spouse (45.2%), while those of the urban area lived with their children with or without their spouse (34.6%) (Table 1). In both groups, the highest percentage of elderly individuals reported an individual monthly income of one minimum wage. However, individuals in the rural area reported a higher percentage of incomes above one minimum wage when compared to those in the urban area (Table 1).

Table 2 presents the prevalent comorbidities.

**Table 2** -Frequency distribution of the comorbidities prevalent in the elderly individuals with DM according to location of residence - Uberaba, 2011

Morbidity	Urban		Rural		OR (CI 95%)	p*
	N	(%)	N	(%)		
Arterial hypertension	229	84.8	84	80.8	0.8 (0.44; 1.46)	0.473
Vision problems	217	81.6	73	70.2	1.88 (1.11; 3.17)	0.019
Back problems	186	68.6	70	67.3	0.94 (0.58; 1.53)	0.811
Poor circulation	183	67.8	40	39.2	3.19 (1.98; 5.13)	<0.001
Heart problems	156	58.6	38	38	2.27 (1.41; 3.65)	0.001
Trouble sleeping	127	46.9	52	50	1.08 (0.69; 1.71)	0.729

\*Adjusted for age.

The mean number of morbidities within the elderly urban population ( $\mu = 8.57$ ) was significantly higher than that of the rural population ( $\mu = 7.2$ ). After controlling for the age variable, the number of morbidities continued to be related to the place of residence ( $\beta = -0.186$ ;  $p < 0.001$ ). The prevalent morbidities were coincident in both locations, with the percentages presenting divergences. The age-adjusted comparison between the groups revealed that the elderly urban population reported more vision

problems ( $\beta = 1.875$ ;  $p = 0.019$ ), instances of poor circulation ( $\beta = 3.189$ ;  $p < 0.001$ ) and heart problems ( $\beta = 2.271$ ;  $p = 0.001$ ) compared to the rural population (Table 2). The majority of the elderly individuals in the urban area (68.3%) and rural area (60.6%) reported a good QoL. Many elderly individuals in the urban (59.6%) and rural (59%) areas reported a satisfactory health self-assessment.

Table 3 presents the QoL scores of the study population.

**Table 3** - QoL, WHOQOL-BREF and WHOQOL-OLD scores for elderly individuals with diabetes according to place of residence - Uberaba, 2011

QoL score	Urban		Rural		OR	p*
	Mean	SD	Mean	SD		
<b>WHOQOL-BREF</b>						
Physical	54.16	15.24	60.34	16.09	0.18	0.001
Psychological	64.74	12.06	66.86	13.96	0.08	0.11
Social relationships	67.56	12.7	71.88	12.99	0.15	0.004
Environment	62.07	11.94	59.71	12.53	-0.07	0.16
<b>WHOQOL-OLD</b>						
Sensory abilities	78.18	20.94	66.23	23.23	-0.24	<0.001
Autonomy	58.53	13.52	63.04	16.78	0.14	0.01
Past, present and future activities	63.82	12.78	68.93	12.96	0.18	<0.001
Social participation	62.66	15.52	64.48	13.91	0.05	0.32
Death and dying	74.75	24.67	66.65	26.12	-0.14	0.01
Intimacy	69.07	15.83	73.5	16.35	0.13	0.01

\*Adjusted for age.

According to the WHOQOL-BREF, the highest QoL score occurred in the social relationships domain for both the urban (67.56; SD = 12.7) and rural (71.88; SD = 12.99) areas (Table 3).

In the urban area, the lowest QoL score was related to the physical domain (54.16; SD = 15.24) (Table 3). In the rural area, the lowest QoL score was found in the environmental domain (59.71; SD = 12.53) (Table 3).

The elderly people of the urban area presented age-adjusted QoL scores in the physical ( $\beta = 0.177$ ;  $p = 0.001$ ) and social relationship ( $\beta = 0.151$ ;  $p = 0.004$ ) domains that were lower than those of the rural area (Table 3).

The QoL was measured through the WHOQOL-OLD, the highest score in the urban area was for sensory abilities (78.18; SD = 20.94), and the highest score in the rural area was for the intimacy facet (73.5; SD = 16.35) (Table 3).

Regarding the lower QoL scores, the autonomy facet represented the lowest mean in both the urban (58.53; SD = 13.52) and rural areas (63.04; SD = 16.78) (Table 3).

The age-adjusted comparison between the groups revealed that the elderly individuals who lived in the rural area had significantly lower QoL scores than those of the urban area in the sensory abilities ( $\beta = -0.243$ ;  $p < 0.001$ ) and death and dying ( $\beta = -0.138$ ;  $p = 0.008$ ) facets (Table 3).

The elderly individuals of the urban area had lower age-adjusted QoL scores compared to those in the rural area in the following categories: autonomy ( $\beta = 0.135$ ;  $p = 0.009$ ); past, present and future activities ( $\beta = 0.184$ ;  $p < 0.001$ ); and intimacy ( $\beta = 0.13$ ;  $p = 0.012$ ) (Table 3).

## DISCUSSION

The predominance of females was similar in studies conducted in urban areas of the state of Minas Gerais (60.8%)<sup>(12)</sup> and in the rural areas of southern Brazil (56.1%)<sup>(13)</sup>. Considering that the prevalence of females is high in both urban and rural areas and that men seek healthcare services less than women, nurses and the FHS teams should encourage their presence in this care space. Studies conducted among elderly individuals in rural and urban areas corroborate the predominance of the 60-70 year-old age group<sup>(12-13)</sup>. Importantly, the higher concentration of younger elderly individuals residing in rural areas may be related to the physical effort required to perform daily activities. Based on this perspective, nursing professionals need to act to control and prevent complications of DM even among younger elderly individuals. Over time, these individuals may suffer additional physiological losses and acquire new diseases that may be potentiated by DM.

With respect to marital status, the prevalence of marriage is consistent with that observed in urban regions of southern Brazil<sup>(14)</sup>. Nurses caring for elderly DM patients should encourage co-responsibility from family members, autonomous actions and self-care. Therefore, it is worth investigating whether elderly individuals who lack companions are supported by other family members. Regarding schooling, previous studies have shown that elderly residents of rural areas had one to four years of education (63.9%), while residents of urban areas had four years of schooling or more (35.5%)<sup>(12-13)</sup>. Concerning the housing arrangement, a study conducted in the urban areas of Santa Catarina showed that the majority of elderly DM patients lived only with their spouse (42%)<sup>(14)</sup>. Nurses must consider the family members of the elderly individual in the home-care plan and seek their cooperation for glyce-mic control and support in coping with the disease.

A study conducted in the state of Paraíba found that 48% of the elderly rural residents received up to three minimum wages, and 48% received from three to ten minimum wages; however, the majority urban residents (39%) received from three to ten minimum wages individually<sup>(15)</sup>. These data are similar to the current study, with showed a higher income in the rural population. One possible explanation for this finding may be related to the fact that the rural elderly individuals were still performing farm activities even after retirement, which consequently increased the income of this population.

Concerning the morbidities, an international study demonstrated that the elderly people in urban areas (16.7%) who presented chronic diseases reported more vision problems than those in rural areas (6.8%)<sup>(3)</sup>. During the nursing consultation, the visual acuity of elderly DM patients should be evaluated because retinopathy constitutes one of the chronic complications of this disease. Thus, when visual changes are reported, the patient can be referred to a physician to promote early diagnosis. Re-

garding circulation problems, unlike the results obtained in the present study, a study performed in the Sergipe State found that 71% of the people with DM and lower limb ulcers were from the interior regions, especially the rural areas. Circulatory problems (absence of pulse) constitute a predisposing factor for the development of ulcers in the lower limbs<sup>(16)</sup>. Thus, nurses must evaluate peripheral circulatory conditions to prevent possible injuries that compromise the QoL of the elderly individuals, especially in environments where the physical space is irregular and with higher risks of injuries, which is true in rural areas. In relation to the higher proportion of heart problems in the urban area, a similar finding was obtained in a study conducted in China among elderly individuals with chronic diseases, such as ischemic heart diseases<sup>(3)</sup>. Because there is a high prevalence of arterial hypertension and other cardiac affections among diabetic individuals, nursing professionals must pay more attention to elderly patients' life habits, correct use of medication, attendance of consultations and evaluations of cardiovascular conditions.

The QoL self-assessment results differed from a previous study conducted in an urban area in the state of Bahia, which reported a higher percentage of elderly DM patients who considered their QoL to be neither good nor bad (40%)<sup>(17)</sup>. The health self-assessment findings of the current study are consistent with those of the urban area of Bahia State, in which the highest percentage of elderly DM patients (40%) reported neither satisfaction nor dissatisfaction<sup>(17)</sup>. It is noteworthy that the QoL and health self-assessment data obtained in this study are considered a positive factor for coping with diabetes and its comorbidities because it may reflect greater concern for the patient's own health, self-care and DM control.

The higher QoL score for social relationships corroborates the results of a Brazilian study that was conducted in the south of the country among elderly residents of urban areas with DM (68.3; SD = 21.1)<sup>(18)</sup>. The lower QoL scores for the physical domain that were reported in the urban area compared to the rural area differs from the results of a study that was conducted among elderly residents of southern Brazil with DM; in the latter study, the lowest QoL score was in the environment domain (58.8; SD = 15.9)<sup>(18)</sup>. The findings in the physical domain can be related to the higher proportion of comorbidities among the elderly urban residents because it evaluates, among other factors, dependence on medication and health treatments. Monthly health monitoring of elderly individuals by the FHS nurse contributes to the identification of the factors related with health resulting from the possible morbidities and complications that negatively impact the patients' daily lives.

Elderly rural residents reported a lower score in the environment domain. This result was similar to that observed in the rural area of Paraíba State<sup>(15)</sup>. This result indicates that nurses should pursue strategies that improve the health conditions of elderly individuals residing in

remote areas with limited access at health's services, restricted information and few recreational opportunities. A home visit promotes improved knowledge about the space in which the elderly individual resides and may subsidize intersectorial actions to minimize the environmental impact on the QoL of the elderly person. The lower QoL scores in the physical domain reported by the elderly urban residents can be related to the greater number of self-reported comorbidities by this group. It is noteworthy that the elderly respondents in this study reside in a catchment area with FHS coverage. Therefore, a strengthened bond between the team and the elderly individuals and their family members may facilitate access to healthcare services and contribute to treatment adherence. Regarding the comparison of the social relationships domain, the elderly individuals of the rural area may have reported a better situation than those in the urban area due to the higher proportion of married individuals and fewer widowed individuals in the rural location.

The higher score observed in the urban area for the sensory abilities facet differs from the results of a study conducted with elderly residents of southern Brazil with DM; in the latter study, the highest score was reported in the death and dying facet (81.6; SD = 25.9)<sup>(14)</sup>. In the rural environment, the higher scores in the intimacy facet differ from the findings of an international study in which the highest score among elderly residents of rural areas was in social participation (70.29; SD = 17.92)<sup>(19)</sup>. The intimacy facet evaluates the ability of an elderly individual to relate to other people<sup>(11)</sup>. The predominance of elderly individuals living with family that was observed in this study may have contributed to the higher score in this facet. While nurses monitor elderly patients, they must observe the patient's relationship network because living with loved ones can contribute to coping with the disease. Moreover, the family and nurse can work together to promote DM care; together, they can encourage self-care and adherence to the guidance provided during consultations and in groups.

In the current study, the lowest mean score in the WHOQOL-BREF was reported in the autonomy facet; however, an Asian study reported that rural elderly residents displayed the lowest score in the death and dying facet (48.03; SD = 35.73)<sup>(19)</sup>. The lowest mean score in the autonomy facet in both regions indicates losses with respect to the independence of the elderly individuals and an impaired ability of these individuals to make their own decisions<sup>(11)</sup>. When providing improved comprehension of the DM to the elderly person, the nurse stimulates both the development of autonomy regarding self-care and coping with this disease.

The lower score in the sensory abilities facet in the rural area is evidence of the greater impact the sensory ability in QoL in this location even though the highest percentage of elderly individuals with vision problems was found by this study to reside in the urban area. It is noteworthy

that this facet also evaluates other senses<sup>(11)</sup>. Thus, these findings indicate the need to reflect on the possibility of a higher risk of accidents related to sensory alterations due to the characteristics of the physical environment. Elderly individuals may experience secondary trauma, such as falls. Home visits are essential for the evaluation of the elderly individuals' residences because risk factors for falls must be identified. A joint discussion with the elderly individual and associated family members may facilitate the implementation of strategies that can be used to improve the environment to minimize risks by considering the local realities. The lower score in the autonomy facet, which was reported by the elderly urban residents, may be related to the housing arrangement because these individuals generally live with their children. This situation may decrease the decision-making power if the family members tend to maintain care excesses regarding the sick elderly individual. In this context, health education is an ideal forum for addressing this issue. Furthermore, the greater number of younger elderly rural residents continuing to exercise their functions may have influenced the greater autonomy of this population. This result can be observed in a qualitative study that was performed in rural Ceará, in which elderly individuals associated the fact that they were active in their daily work with independence and autonomy<sup>(20)</sup>.

In the present study, the lower score obtained in the urban area for the past, present and future activities facet may reflect the better education, better financial conditions and fewer morbidities reported by the elderly rural residents. Achievements throughout life and the possibilities of future achievements more may be related to the physical motivation of the elderly individuals combined with the socioeconomic conditions that are required to realize these achievements. A study conducted in São Paulo showed that younger elderly individuals presented a lower score (14.17; SD = 4.12) in the death and dying facet than older elderly individuals (15.21; SD = 3.72)<sup>(21)</sup>. By relating these data to the present study, it was observed that a greater proportion of older elderly individuals (70 to 80 years of age) lived in the urban area, which may have influenced the greater acceptance of death among the participants compared to the younger rural participants. Consistent with the findings of this investigation regarding the intimacy facet, a study performed in Portugal found that the elderly individuals in rural areas presented higher social support as a result of increased contact between individuals in the rural space<sup>(22)</sup>. This facet evaluates the personal and intimate coexistence between elderly individuals<sup>(11)</sup>.

The higher number of widowed individuals and elderly individuals living with their children in the urban area may have affected these findings. Therefore, it is hypothesized that the loss of a spouse and the family rearrangement can influence whether that individual lives with other people and may limit intimate relationships. Nurses working across disciplines with other professions can develop

coexistence groups to help elderly people cope with physical illness and the aging process in general, including their losses and family restructuring processes.

## CONCLUSIONS

Higher percentages of elderly females were observed in both study sites. When comparing the two groups, the elderly rural residents were proportionately younger, more often married, more educated, earned a higher income and more frequently lived with their spouses. The elderly urban residents reported a higher number of comorbidities and more vision problems, poor circulation and heart problems compared to the elderly rural residents.

Significant differences in QoL were observed; the elderly individuals of the rural area presented a higher score in the physical and social relationships domains and in the autonomy, past, present and future activities, and intimacy facets. Among the elderly residents of the urban area, the highest QoL scores were the sensory abilities and

death and dying facets. Given these results, after adjusting for age, it can be noted that the elderly DM patients in the rural area generally presented better sociodemographic conditions, a lower incidence of morbidity and better QoL scores than the residents of the urban area.

Although nursing care is needed in both locations, the results of this study indicate the need to strengthen health care actions among elderly DM patients residing in urban areas. Among these actions, greater access to healthcare services, an improved bond between the FHS and the elderly patients and the development of preventive activities aimed to delay the complications of this disease are highlighted. This study's limitations, including self-reported DM and the cross-sectional design, prevent the establishment of causality between the variables. However, the results of the study contribute to the expansion of knowledge regarding the sociodemographic factors and the health and QoL conditions of elderly DM patients in both rural and urban areas. Knowledge of differences between these two groups enables the development of effective healthcare action based on local specificities.

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