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DEPRESSION AND FRAILTY IN AN ELDERLY POPULATION LIVING IN A RURAL AREA

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ABSTRACT

Objectives: Determine the socio-demographical and health profile of the elderly population living in a county's rural area; Verify this population's frailty levels and depression symptoms' prevalence.
Method: A quantitative, descriptive-analytical approach was chosen. Data was collected through a questionnaire containing socio-demographical, health and life habits questions. Then the Edmonton Frail Scale and the Depressed Population Tracking Scale were used to measure the frailty and the depression symptoms' presence.
Results: 290 elderly subjects have filled out the survey, mostly female with ages from 60 to 70, although there were subjects with up to 100 years old. As for their marital situation, 64.1% were married, 25.6% were widowers. 57.6% of the subjects showed no frailty.
Conclusions: The results showed that 30.6% of the subjects showed depression symptoms. 14,2% showed both depression symptoms and frailty. It was also shown that 4.5% of the male subjects showed depression symptoms and severe frailty.

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INTRODUCTION

The populational aging, a XXI century phenomenon of immense social impact, is a global scale tendency leading to society's (re) organization, especially in developing countries. Aging is a complex life process, understood as the set of changes affecting human beings through time, causing functional decline and eventual death. It is a multidimensional process, involving all the distinct human life phases and encompassing physical, psychological and social aspects (Alvarado and Maya, 2014; OMS, 2002). According to the World Health Organization (WHO), a demographical revolution in under way, with estimates pointing to the doubling of the world's population with ages 60 and above, the figure going from 10% now to 21% in 2050 (OMS, 2002). In developing countries the change will be even more significant, with a four-fold population increase in the next 30 years. The question posed by the populational aging are also present in Brazil, as this is the country's fastest growing demographical group, with a 4% growth from 2012 to 2020. The Brazilian elderly population grew from 14.2 million people in 2000 to 19.6 million in 2010. The projections put this figures at 41.5 million in 2030 and 73.5 million in 2060. Projections also show a yearly average growth of 1.0 million new elderly citizens for the next 10 years. The populational aging is partly caused by the country's fast and continuous fertility rate

decrease associated with the mortality rate decrease in all age groups (Ervanti *et al*., 2015). The fast demographical aging period under way in Brazil has important consequences for individuals, families and for the society as a whole (Ervanti *et al*., 2015). While demographical changes are a great social achievement, they also pose new responsibilities for public officers and for society. Furthermore, the life expectancy increase in all age groups point to an overall longevity increase in Brazil, leading to a public policies orientation toward the elderly age group. Therefore, understanding the aging process and its repercussions throughout society becomes a tool for developing strategies geared toward raising people's life quality, leading to a healthy and active aging. This, on the other hand, implies investing in this age group's independence and autonomy and also focuses attention on its needs. It should be noted that the aging process varies according to the social context, so it is also important to highlight the specific characteristics of the rural population aging process. In this scenario, for instance, one of the factors that come into play is the younger generation tendency to migrate to urban areas while the elderly population stays in the rural areas (World Health Organization, 2002), leading to concerns relating to elderly people living alone, with little family support and away from the urban infrastructure. According again to the WHO (OMS, 2002), demographic projections indicate that in 2015, 82% of the developed countries population will be living in the urban area. In developing countries, on the other hand, there will be a high percentage of elderly citizens living in rural areas. This reinforces the need for research on the relation between aging and living in rural zones. Regardless of the living context being urban or rural, aging may also lead to a lonely way of life, even more so for very old people. In addition, the loss of close friends and relatives and the absence of a support network also contribute to social isolation. Accordingly, it is important that incentives toward more social participation and a healthier life style are in place for the elderly population. For those old people living alone, the natural loneliness of old age may be aggravated by the lack of social and family contacts.

In this context, the presence of depressive traits and symptoms is a very frequent disorder among the elderly population. The emergence of depression is associated to multiple factors. Among the psychological triggers are the loneliness, the inactivity, the sense of uselessness, the lack of a life project and the tendency to relive the past. There are also familiar factors like the loss of close relatives, the loss of life partners, forced home moving, abandonment and destitution[5]. Among the elderly persons, depression is more prevalent than dementia and has a diverse form of manifestation, showing up as a reduction in self-esteem, a lack of energy, a sense of emptiness, a guilty feeling and a general pessimism, resulting in a poorer quality of life. The frailty also affects the elderly population quality of life. According to the Brazilian Health Ministry, a frail elder or an elder in situation of frailty is a 75 or more years-old person who is interned in an institution, bedridden, hospitalized and suffering from incapacitating diseases like demential syndromes and neurodegenerative diseases[6]. According to some authors, frailty is associated to a continuous and dynamic process, being a consequence of a series of risk factors related to health problems, loses, difficulties in overcoming acute physical and psychological episodes, all affecting the person's capacity to carry out his/her daily life activities (Ministério da Saúde, 2006; Díaz *et al*., 2014). The elderly frailty prevention, taking all this factors into account, will then imply offering an active aging, focusing on health promotion and on preventive measures to delay disease manifestation and dependency, thus enhancing life quality (Almeida *et al*., 2012). Frailty prevention demands a multidisciplinary approach, encompassing biological, social, political, economical and health aspects. Also, it is important to identify the relationship between the different morbidity conditions arising when a person ages. The association between depression and frailty syndrome has been identified as a determinant cause for morbidity and mortality in urban elderly populations (Mezuk *et al*., 2012; Tavares *et al*., 2014). Although the frailty in elderly populations may have distinct definitions, but it is commonly related to the loss of autonomy and the lack of control over one's own life, reflecting in the person's well-being and interfering in aging's natural course. However, few studies have been carried out about the association between depression symptoms and frailty in elderly persons. The populational aging is also associated to an accelerated increase for health services. Here the nursing services play an important role in elderly care. In the nursing professional interaction with elderly persons the communication is understood as a fundamental element of care, the hearing and the dialogue being the tools allowing for the exchange of experience and the understanding of the elderly person's needs[11]. In the light of the previous discussion regarding frailty and depression symptoms in the rural elderly population, and considering the lack of research on this area, our objectives were to identify the socio-demographical and health profiles in a county's rural area elderly population and verify the frailty levels and the presence of depression symptoms in that population.

METHODS

The study used quantitative, analytical-descriptive approach. The rural elderly residents of Arroio do Tigre city, in the Brazilian state of Rio Grande do Sul were submitted to a home inquiry. The city has 12,648 inhabitants, 6,686 in the rural area and 5,962 in the urban area. From the total population, 1,692 are 60 years old or older, being thus classified as elderly. Of the elderly population, 1,051 or 64, 52% live in the rural area. 290 elderly subjects from both sexes living, in the rural area, were able to answer the interview verbally, agreed to participate in the survey and signed a Free and Informed Term of Consent. The sample was determined taking into account the total number of elderly rural residents (1051) registered in the Family Health Strategies Program through the Basic Attention Information System. These residents were distributed throughout the city rural area 17 micro-areas. From this initial number, the sample calculation for simple aleatory probabilistic sample for analytical studies was carried out using the following formulas (Barbetta, 2007): $n0 = 1/(E0)^2$ e $n = (N \times n0)/(N + n0)$, where N is the sample size (1051), E0 is the maximum sample error (5%), n0 is the sample first estimation (400) and n is the sample size (290). The subjects names and addresses were obtained from the Community Health Agents operating in the city's rural area. The actual subjects were then randomly drawn from the total population listing. After the draw, a researcher visited the potential subjects to invite them to voluntarily participate in the survey. If the selected person did not agree to participate or had died since the last registry updated, another resident from the same micro-area was drawn. The data collection was carried out using an instrument containing socio-demographical, living habits, health and community involvement questions.

Table 1. Sample socio-demographical and health atributes, Arroio do Tigre, Rio Grande do Sul, Brasil, 2015

Atributes	Variables	Females (%)	Males (%)	Total (%)
Sex		78(61,4%)	112(38,6%)	290(100%)
Children	Yes	168(57,9%)	106(36,6%)	274(94,5%)
	No	10(3,4%)	6(2,1%)	16(5,5%)
Number of children	1 – 2	36(12,4%)	18(6,2%)	54(18,6%)
	3 – 4	69(23,8%)	56(19,3%)	125(43,1%)
	5 – 6	32(11,0%)	16(5,5%)	48(16,6%)
	7 or more	31(10,7%)	16(5,5%)	47(16,2%)
Reads and writes	Yes	158(52,8%)	90(31,0%)	243(83,8%)
	No	25(8,6%)	22(7,6%)	47(16,2%)
Years in School	0 -1years	18(6,2%)	15(5,2%)	33(11,4%)
	2 - 4years	126(23,4%)	60(20,7%)	186(64,1%)
	5 or more years	34(11,7%)	37(12,8%)	71(24,5%)
Timespan residing in the rural area	< 20 years	1(0,3%)	2(0,7%)	3(1%)
	20|---49 years	1(0,3%)	1(0,3%)	2(0,7%)
	50 or more years	176(60,7%)	109(37,6%)	285(98,3%)
Marital situation	Married	95(32,7%)	91(31,4%)	186(64,1%)
	Stable Union	4(1,4%)	5(1,7%)	9(3,1%)
	Single	13(4,5%)	5(1,7%)	18(6,2%)
	Widower	66(22,8%)	11(3,8%)	77(26,6%)

Table 1 (cont.). Sample socio-demographical and health atributes, Arroio do Tigre, Rio Grande do Sul, Brasil, 2015

Atributes	Variables	Females (%)	Males (%)	Total (%)
Lives with how many other persons	Lives Alone	8(2,7%)	4(1,4%)	12(4,1%)
	1 to 3	129(44,8%)	87(30,2%)	216(75%)
	4 or more	41(14,2%)	20(6,9%)	61(21,2%)
Work situation	Working	1(0,3%)	4(1,4%)	5(1,7%)
	Retired	110(37,9%)	44(15,2%)	154(53,1%)
	Retired and Works	67(23,1%)	64(22,1%)	131(45,2%)
Community activities involvement				
	Always	80(27,6%)	49(16,9%)	129(44,5%)
	Sometimes	39(13,4%)	22(7,6%)	61(21%)
	Rarely	30(10,3%)	24(8,3%)	54(19,9%)
	Never	29(10%)	17(5,9%)	46(15,9%)
Health self-assessment	Excellent	1(0,3%)	4(1,4%)	5(1,7%)
	Very Good	6(2,1%)	7(2,4%)	13(4,5%)
	Good	111(38,3%)	64(22,1%)	175(60,3%)
	Average	34(11,7%)	24(8,3%)	58(20%)
	Bad	26(9%)	13(4,5%)	39(13,4%)
Health Care monthly cost	No Cost	27(9,3%)	21(7,2%)	48(16,6%)
	Up to 1/4 MW*	70(24,1%)	49(16,9%)	119(41%)
	¼ to ½ MW	55(19%)	22(7,6%)	77(26,6%)
	1/2 MW or more	26(9%)	20(6,9%)	46(15,8%)

*MW: The Brazilian mandatory Minimum Monthly Wage, equivalent to U$ 255.00 in 2015.

Table 2. Relation between EFS and CES-D, Arroio do Tigre, Rio Grande do Sul, Brasil, 2015

CES-D	EFS			
	No frailty n(%)	Vulnerable n(%)	Frailty n(%)	Total n(%)
≤ 15	139(48,3)	38(13,2)	23(8)	200(69,4)
> 15	27(9,4)	20(6,9)	41(14,2)	88(30,6)
Total	166(57,6)	58(20,1)	64(22,2)	288(100)*

Chi-squared test ($p < 0.001$). * Edmonton Frail Scale.
Teste qui-quadrado ($p< 0,001$). *Edmonton Frail Scale. **Center for Epidemiologic Studies Depression Scale ***Two subjects from the total sample did not answered this instruments.

Table 3. EFS Frailty scores and its relation to CES-D, by sex. Arroio do Tigre, RS, Brasil, 2015

		EFS					
Sex	CES-D	AF n(%)	Vulnerable n(%)	FL n(%)	FM n(%)	FS n(%)	Total n(%)
Male	<15	62(55,9)	10(9)	5(4,5)	2(1,8)	1(0,9)	80(72,1)
	> 15	14(12,6)	2(1,8)	6(5,4)	4(3,6)	5(4,5)	31(27,9)
	Total	76(68,5)	12(10,8)	11(9,9)	6(5,4)	6(5,4)	111(100)
Female	< 15	77(43,5)	28(15,8)	10(5,6)	3(1,7)	2(1,1)	120(67,8)
	> 15	13(7,3)	18(10,2)	11(6,2)	10(5,6)	5(2,8)	57(32,2)
	Total	90(50,8)	46(26)	21(11,9)	13(7,3)	7(4)	177(100)
Total	< 15	139(48,3)	38(13,2)	15(5,2)	5(1,7)	3(1)	200(69,4)
	> 15	27(9,4)	20(6,9)	17(5,9)	14(4,9)	10(3,5)	88(30,6)
	Total	166(57,6)	58(20,1)	32(11,1)	19(6,6)	13(4,5)	288(100)*

*Edmonton Frail Scale. **Center for Epidemiologic Studies Depression Scale. Two subjects from the total sample did not answer these instruments.
***Absence of frailty. ***Light Frailty. *****Moderate Frailty. ******Severe Frailty

The frailty was measured using the Edmonton Frail Scale (EFS) translated to Portuguese and validated in Brazil. This scale is composed by nine domains distributed in eleven scored items, each ranging from 0 to 17 points. Points were attributed in the following pattern: cognition, general health condition, health description, functional independence, social support, medicine use, and functional performance (up to two point for each item); nutrition, mood, continence (up to one point for each item). For score analysis, the following categories were used: 0-4 points – no frailty, 5-6 points – apparently vulnerable, 7-8 points – light frailty, 9-10 points – moderate frailty, 11 or more points – severe frailty[13].

The Center for Epidemiologic Studies Depression Scale (CES-D) was used to access the presence of depression symptoms. This scale is composed by 20 items that evaluate the depression symptoms experienced by the subject in the 7 days prior to the interview. Each question allows for an answer in a four points crescent scale, scored accordingly: never or rarely (0 points), sometimes (1 point), often (3 points) and always (4 points). Questions 3, 6,14 and 18 are related to depressive feelings (humor sub-scale). Questions 4, 8, 12 and 16 survey the positive feelings (well-being sub-scale). Questions 5, 7, 11 and 20 are related to the somatic activity (psychomotor sub-scale). Finally, questions 15 and 19 survey the interpersonal relationships. The items 4, 8, 12 and 16 are positive, so they are inverted for scoring purposes. The final score varies between 0 and 60 points, corresponding to the sum of all answers. A score greater than 15 points was considered the threshold, above which there were indications of significant depression symptoms[14]. The data was collected between November 2014 and February 2015 and processed using the *Statistical Package for the Social Sciences* (SPSS) software, version 17.0. For analysis, the descriptive statistics, the Chi-squared test ($p < 0.05$) and the Spearman correlation coefficient were used, considering $p < 0.05$ as significant.

As for the ethical issues, all participants were informed about the survey objectives and confidentiality, according to the Brazilian National Health Council Resolution Nº 466/12. The research project was also approved by the parent University's Research Ethics Committee (nº 869.372/2014).

RESULTS

The data regarding the health and socio-demographical profile may be found in Tables 1 and 2. 290 elderly persons took the survey, mostly females between 60 and 70 years-old. The ages varied between 60 and 100 years-old. Most of the subjects has 3 to 4 children, lives with one to three other persons, can read and write and went to school for two to four years. As for the martial status, 64.1% were married and little more than half of those (32.7%) are women. Most of the widowers were women (22.8% out of 26.6% in the total sample). 53.1% of the subjects were retired and 45.2% were legally retires but still worked, the numbers being very similar for both men and women. Most of the subjects (98.3%) have been living in the rural area for more than 50 years. Asked about their health, most men and women (60.3% of the sample) considered themselves healthy. 63, 76% of the subjects expend R$ 1 to 400 monthly in health care. 15% declared they do not participate in community activities. Table 2 depicts the relation between EFS and CES-D, showing that while 57.6% of the sample showed no frailty (p←.001 in Chi-squared test), 30.6% of the subjects showed depressive symptoms and 14.2% showed both depressive symptoms and frailty.

Table 3 presents the relation between EFS frailty categories and the CES-D depression symptomatology, divided by sex. 4.5% of the sample's male subjects showed depressive symptoms and severe frailty. The same conditions affect 2.8% of the female subjects. As for the whole sample, among those

who show depressive symptoms, 5.9% present light frailty, 4.9% moderate frailty and 3.5% severe frailty. The data on EFS and CES-D results shows a significant correlation between age and school years. It is possible to propose that these two variables are co-dependent. There is also a significant correlation between the two scales.

DISCUSSION

Identifying the factor associated to frailty and depression in rural areas elderly population is of great importance, as it can help caring for these individuals and increase the quality of life. The social-demographic data shows a prevalence of elderly females (61.4%) of the 60-70 years-old age group (r2.8%) that went to school for two to four years (64.1%). This data regarding age, sex and schooling is consistent with other Brazilian surveys regarding the elderly population, both in urban and rural areas (Madeira, 2013). The prevalence of females among the elderly populations is a global phenomenon, however it is happening even faster in Brazil (Instituto Brasileiro de Geografia e Estatística, 2015). As for the age, most of the subjects are "new" elders, who still maintain an economically active life, contributing to the home income. Even after retirement, most of them still work, helping raise their families income and quality of life. A Chinese research about elderly residents of rural areas showed that they tend to take charge of domestic activities in their sons and daughters homes, helping take care of children and undertaking small agricultural tasks.

This way they remain active and more involved in the family activities and life (Hong *et al*., 2013). Moreover, a Brazilian systematic review pointed that for the elderly population, working is a protective factor against depression, incapacity and frailty, helping on keeping the well-being, preserving the cognitive functions and the independence in the daily activities (Amorim *et al*., 2014). Besides, a person's self-identity is a foundation of mental health, and the recognition achieved through work, by helping on the development and maintenance of one's identity, also plays a role on mental health. This way, the work is seemed as one of the main building blocks of identity, both culturally and socially (Moreira, 2012). Regarding the family structure, most elderly subjects has sons and/or daughters and lives in homes with up to three other people. However, the data about offspring and who lives with other people shows that 24.5% of the elderly who have offspring do live with them. This may raise some concern, since the family is the main source of support and resources for the elders, as the social and health services are practically nonexistent in these areas (Serrani, 2014).As for schooling, the data shows that even with the known difficulties in rural areas, such as school distance and lack of public transports, a significant number of elders (64.1%) had two to four school years. This is compatible to other countries data about rural elderly population. In Sweden, for instance, a developed country, research shows a significant number of rural-side resident elders with less than eight school years (Sjo *et al*., 2010). Another survey, in China, shows similar results, with 93.3% of the subjects with less than eight school years (Xie *et al*., 2014). In our sample, 16.2% of the subjects claimed they could not read or write, being considered illiterate. Other surveys on other rural areas found even higher rates of illiteracy, such as 23% (Tavares *et al*., 2014; Hong *et al*., 2013). Access to education is still difficult in Brazil, raising elderly illiteracy, specially in rural areas. Also, sex and home location differences are still present, with women showing lower rates of school years than men and rural areas populations also presenting less school years on average than urban areas ones[22]. Elderly frailty is considered a predictor for other factors that influence on the elders health and quality of life. Our data showed that 22.2% of the sample was suffering from frailty conditions and other 20.1% was vulnerable to it. Another survey, focused on urban area elderly population, showed a lower rate of frailty, 12.8% (Ferreira and Tavares, 2013). The early identification of elders vulnerable to frailty allows for preventive measures that mays delay the emergence or the progression of a frailty syndrome. When examining the relation between frailty and depression with the subject's sex, the survey showed a prevalence of this condition among the female population, confirming other research on depression. However, there was no difference related to sex on the frailty status (Tavares *et al*., 2014). Nevertheless, there is a male prevalence (4.5%) in cases of severe frailty combined with depression symptoms. This may indicate the need for further research on the relation between severe frailty and depression, as most previous studies on depression symptoms point to a female prevalence (Bravo *et al*., 2013). As for the occurrence of depression symptoms among elderly populations, our results showed a higher rate than that encountered in one previous research (22% (Ansoleaga *et al*., 2014)), but agreed with another Brazilian study that showed a 30.0% rate of depression symptoms among elders (Madeira *et al*., 2013). A Spanish survey also showed that 30% of the elderly population in that country showed depression signs (Bravo *et al*., 2013). Depression is considered a risk factor for frailty. Also, social isolation and loneliness area also health risks, specially for elders, who have already suffered changes and losses related to the aging process. Social isolation and loneliness area also related to higher mortality rates.

However, it is not clear if these conditions are independent or if the loneliness is a result of social isolation, which in turn upsets the health (Steptoe *et al*., 2013). Another significant correlation, this time between depression and age and school years, was also observed in previous research, where a higher rate of depressive symptoms was found in illiterate patients and in patients with fewer years of formal education. So, the intellectual level seems to be an important depression predictor, showing also the dependency between the two variables (Madeira *et al*., 2013). In yet another survey, the larger number of elders without depression signs had 4 to 8 years of formal education (Tavares *et al*., 2014). The knowledge about a risk situation for the elderly population health allows for the planning of actions capable of preventing or mitigating the damage. So, the elderly person needs must be met with the efforts of all health team members, regardless of each person's intervention complexity. The health care professionals must then make good use of communication skills, verbal and non-verbal, in order to straighten the bond with the elderly patients, harbor their needs and tend to their demands (Araújo *et al*., 2017). The elderly patient health should be understood and acted upon from all its dimensions, biological, psychological and social, since aging marks a life period when the physical and emotional frailties, the diseases and the social isolation become more frequent than before. This is clearly also true for the rural elderly population.

Conclusion

This survey brings forth new information about the aging process in rural areas, raising questions and concerns about the

rural elderly population profile and health. The prevalence of elderly people with frailty and depression indicators is an important issue, and identifying the predictors for these conditions may help building strategies to prevent or minimize its effects. Also, by relating age to the frailty level score, we showed that the score raises with age, presenting a significant relation. The two variables may be said to be dependent on each other. Even within its natural limitation and considering the reduced number of surveys about frailty and depression in rural context, this survey identified the need for more research on the present subject, in order to enhance health attention and care for the rural elderly population. We also believe that the results shown herein may have important implications for public policy and social programs development towards this particular population.

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