ORIGINAL ARTICLE *DOI: 10.4025/cienccuidsaude.v17i1.36650*

RELATION BETWEEN SOCIODEMOGRAPHIC AND ANTHROPOMETRIC INDICATORS AND PHYSICAL ACTIVITY OF ELDERLY MEN AND WOMEN

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ABSTRACT

Quantitative, descriptive and transversal research that aimed to verify the relation between sociodemographic and anthropometric indicators and physical activity of elderly men and women. Data collection occurred from 2010 to 2011, through a structured interview. The data were analyzed in the statistical software SPSS 18.0 through Chi-square test, considering as significant p-value<0.05. The results showed that 424 elders participated, with 68.4% of women. The prevalent marital status was married for men and, for women, widow. The overweight predominated among women, while, among men, the eutrophy in the age group from 60 to 69 years, with low education, prevailed. The waist circumference related to excess weight in both sexes, predisposing for cardiovascular diseases. Thus, these results help planning rehabilitation assistance regarding combating preventable risk factors for chronic diseases, such as overweight, high waist circumference and, concomitantly, encouraging physical activity among elders in order to lessen the impact of these risk factors, thus reducing morbidities resulting from these as much as possible.

Keywords: Nutritional assessment. Aging. Obesity. Elder's nutrition.

INTRODUCTION

International demographic projections indicate an accelerated growth of the Brazilian population above 60 years for the next decades. In Brazil, between 1950 and 2000, the proportion of elderly people below 10.0% was similar to developing countries, but, from 2010, approached projections for developed countries. In this way, in 2070, the estimated elderly population ratio, forecasted as higher than 35.0%, will be even higher than the indicator for the group of developed countries[1].

The longevity is a humanity achievement, but the extra years of life should not be just more years of retirement, but planning for a life with quality, which invariably must base on goals and renewals of life plans. In this context, the fundamental factor to achieve this opportunity involves health condition, mainly maintenance of functional capacity and autonomy[2].

The progressive increase of elderly people in the global context shows the relevance of developing studies to deepen the understanding of the human aging process, as well as the increase in the training of professionals to work on attention to health of the elderly population. This condition is justified because, alongside the aging process, there is a consequent increased prevalence of chronic diseases among this population[3], which may negatively impact on their quality of life[3].

Sociodemographic variables, such as income, marital status, age group, in addition to general health conditions, influence the instrumental activities of daily living, thus affecting elders' quality of life[4].

Quality of life is the strongest predictor for active aging for both men and women. Among men, the behavioral factors, such as not being smoker, physical activity and absence of loss of appetite, were positive predictors for active aging, while, among women, behavioral factors, related to physical and social environment and economic factors, were positive predictors for active aging, a better quality of life score[5].

Knowing sociodemographic and anthropometric characteristics and physical activity is of extreme importance to develop a mapping study of the characteristics and needs of a population in order to improve the quality of life in years lived and reduce chronic diseases, since some factors resulting from the nutritional status and physical activity can be modified

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during aging process, contributing to other gerontological services[6].

This work aimed to verify the relation between sociodemographic and anthropometric factors and physical activity of elderly men and women.

METHODOLOGY

This was a descriptive, quantitative and cross-sectional research, population-based, using cluster sampling (urban and rural) in three-stage. The first stage relates to the division by census sectors according to the Brazilian Institute of Geography and Statistics – IBGE –, the second, to houses lottery by census sector, and the third, the choice of only one elder per residence.

The people involved in the study were elders living in Palmeira das Missões/RS, municipality with 33,846 inhabitants, being 4,037 elderly people. The calculated sample comprised 424 elderly, considering a 5% margin of error. They were grouped into age ranges, considering that the number of elders in the sample was proportional to the elderly population of each interval.

After identifying the domicile, the elders' availability and acceptance to participate in the research were verified, since, when there was no consent to the study, the criterion was to follow for the first home in the sequence. Students from the Nutrition Course of the Federal University of Santa Maria – UFSM – performed data collection at the elder's home, and took place from March 2010 to December 2011. Seniors of both sexes were contacted for the research, and the inclusion criteria were age of 60 years or more and acceptance to participate in the study, excluding bedridden seniors because of the difficulty measuring weight and height for subsequent calculation of the Body Mass Index-BMI.

The analyzed variables were sociodemographic (age, sex, education and income), anthropometrical (weight, height, BMI, waist and calf circumference and triceps skinfold) and physical activity (frequency, type, and duration). The weight was checked by using a portable digital scale, calibrated according to the rules of the National Institute of Metrology (Inmetro), with a maximum capacity of 180 kg. The scale was placed on a plan floor and individuals had their weight measured with light jackets, without shoes and objects in the pockets. The measure was recorded in kilograms; the height was measured in centimeters, with the aid of a portable stadiometer, with the individual in upright position with arms extended down and feet together; the BMI was calculated by dividing weight in kilograms by the square of height in meters, and the result expressed in kg/m2 for sorting[7].

The waist circumference was measured with an inelastic tape, in centimeters, at the midpoint between the iliac crest and the last rib. The values were classified as at risk or without cardiovascular risk[6]. The triceps skinfold (TSF) was measured with a scientific adipometer at the midpoint between the acromion and the olecranon; the calf circumference (CC) was measured with the elderly's relaxed leg forming a 90° angle with the knee. The measure was performed with an inelastic tape, in centimeters, in the largest part of the calf circumference[9].

The practice of physical activity (PA) (yes or no), its frequency (up to twice/week and three or more times/week), PA Type (walk or another PA), Practice time (< six months or ≥ six months) and PA duration (< 45 minutes or ≥ 45 minutes) considered the self-reported information.

Data were processed in an Excel spreadsheet and analyzed in the statistical software SPSS 18.0. The analysis methodology was the descriptive statistics and Chi-square test, considering $p<0.05$ statistically significant.

The Research Ethics Committee of the Federal University of Santa Maria approved the research, under the opinion 23081.009908/2010-10.

RESULTS

The study had the participation of 424 elderly people, being 68.4% women. According to Table 1, the sociodemographic characteristics indicated that widows, aged 60 to 69 years, with low education and income, composed most part of the study sample, differing only from men's marital status, which was married. A larger percentage of women self-reported a habit of physical activity, while the higher frequency for

the same week was among men, being walk the choice for both sexes, with more than six months of practice.

Table 1. Sociodemographic and physical activity charcateristics of seniors from Palmeira das Missões, RS, according to sex. 2010-2011

Variables	Sex		Total
	Female n (%)	Male n (%)	n (%)
Age			
60 – 69	144 (34.0)	69 (16.3)	213 (50.2)
70 – 79	99 (23.3)	46 (10.8)	145 (34.2)
≥ 80	47 (11.1)	19 (4.5)	66 (15.6)
Marital status*			
Single	24 (5.7)	5 (1.2)	29 (6.8)
Married	119 (28.1)	109 (25.7)	228 (53.8)
Widow(er)	122 (28.8)	14 (3.3)	136 (32.1)
Separated	25 (5.9)	6 (1.4)	31 (7.3)
Education*			
< 5 years	163 (38.4)	92 (21.7)	255 (60.1)
≥ 5 years	127 (30.0)	42 (9.9)	169 (39.9)
Income			
< 1 MW	32 (7.5)	16 (3.8)	48 (11.3)
1 - 2 MW	203 (47.9)	87 (20.5)	290 (68.4)
2.1 - 3 MW	32 (7.5)	19 (4.5)	51 (12.0)
≥ 3.1 MW	23 (5.4)	12 (2.8)	35 (8.3)
Physical activity			
Yes	138 (34.8)	54 (14.7)	192 (48.4)
No	137 (34.5)	68 (17.1)	205 (51.6)
Not answered	15 (3.5)	12 (2.8)	27 (6.4)
Frequency*			
Once/week	48 (11.3)	10 (2.4)	58 (13.7)
Twice/week	40 (9.4)	9 (2.1)	49 (11.6)
Three times/week	24 (5.7)	10 (2.4)	34 (8.0)
More than three times/week	26 (6.1)	25 (5.9)	51 (12.0)
No	137 (34.5)	68 (17.1)	205 (51.6)
Not answered	15 (3.5)	12 (2.8)	27 (6.4)
Type*			
Walk	87 (20.5)	50 (11.8)	137 (32.3)
Cycling	3 (7.0)	4 (9.0)	7 (1.7)
Swimming	1 (2.0)	-	1 (2.0)
Gymnastics	26 (6.1)	-	26 (6.1)
Other	21 (5.0)	1 (2.0)	22 (5.2)
Not applicable	151 (35.6)	79 (18.6)	230 (54.2)
Not answered	1 (2.0)	-	1 (2.0)
Practice time			
≥6 months	111 (57.5)	42 (21.8)	153 (79.3)
≤ 6 months	27 (14.0)	12 (6.7)	40 (20.7)
Duration			
≥45 minutes	96 (49.7)	37 (19.2)	133 (68.9)
≤45 minutes	42 (21.8)	18 (9.3)	60 (31.1)

*p<0.05 statistically significant.

Table 2 presents the elders' anthropometric data, indicating that, considering the BMI, most women are overweight, while men, in eutrophy, but this difference was not statistically significant. Regarding waist circumference, seniors of both sexes showed high values, indicating statistically significant cardiovascular risk. Most seniors had calf circumference measurements and triceps skinfold within the parameters considered appropriate.

Table 2. Elders' anthropometric data, according to sex. Palmeira das Missões, RS. 2010-2011

Anthropometric data	Sex		Total
	Female n (%)	Male n (%)	n (%)
BMI* (p=0.019)			
Thinness	37 (8.7)	11 (2.6)	48 (11.3)
Eutrophy	96 (22.6)	63 (14.9)	159 (37.5)
Overweight	157 (37.0)	60 (14.2)	217 (51.2)
Waist circumference*			
Without cardiometabolic risk	79 (18.6)	63 (14.9)	142 (33.5)
With cardiometabolic risk	211 (49.8)	71 (16.7)	282 (66.5)
Calf circumference* (p=0.000)			
With muscular depletion	60 (14.2)	16 (3.8)	76 (17.9)
Without muscular depletion	230 (54.2)	118 (27.8)	348 (82.1)
Triceps skinfold (TSF)* (p=0.003)			
Nutritional risk	108 (25.5)	64 (15.1)	172 (40.6)
Eutrophy	126 (26.4)	56 (13.2)	168 (39.6)
Overweight/obesity	70 (16.5)	14 (3.3)	84 (19.8)

*p<0.05 statistically significant.

When analyzing the relation of BMI with sex and sociodemographic variables (Table 3), there was prevalence of overweight among men and women. Regarding education, most elderly women with less than five years of study were overweight, while in elderly men, the same educaiton group was classified as eutrophic. In relation to income, both sexes received from one through two minimum wages, receving the overweight classification.

Table 3. Relation between BMI and sociodemographic variables, according to sex. Palmeira das Missões, RS. 2010-2011

Variables	Sex		BMI			Total
			Thinness n (%)	Eutrophy n (%)	Overweight n (%)	n (%)
Age (years)	Fem	60-69	15 (5.2)	45 (15.5)	84 (29.0)	144 (49.7)
		70-79	15 (5.2)	31 (10.7)	53 (18.3)	99 (34.1)
		≥ 80	7 (2.4)	20 (6.9)	20 (6.9)	47 (16.2)
		Total	37 (12.8)	96 (33.1)	157 (54.1)	290 (100)
	Male	60-69	3 (2.2)	29 (21.6)	37 (27.6)	69 (51.5)
		70-79	4 (3.0)	28 (20.9)	14 (10.4)	46 (34.3)
		≥ 80	4 (3.0)	6 (4.5)	9 (6.7)	19 (14.2)
		Total	11 (8.2)	63 (47)	60 (44.8)	134 (100)
Education	Fem	< 5 years	23 (7.9)	62 (21.4)	78 (26.9)	153 (56.2)
		≥ 5 years	14 (4.8)	34 (11.7)	79 (27.2)	127 (43.8)
		Total	37 (12.8)	96 (33.1)	157 (54.1)	290 (100)
	Male	< 5 years	8 (6.0)	45 (33.6)	39 (29.1)	92 (68.7)
		≥ 5 years	3 (2.2)	18 (13.4)	21 (15.7)	42 (31.3)
		Total	11 (8.2)	63 (47.0)	60 (44.8)	134 (100)
Income	Fem	<1 MW	2 (7.0)	12 (4.1)	18 (6.2)	32 (11.0)
		1 - 2 MW	32 (11.0)	67 (23.1)	104 (35.9)	203 (70.0)
		2.1 - 3 MW	3 (1.0)	10 (3.4)	19 (6.6)	32 (11.0)
		≥ 3.1 MW	-	7 (2.4)	16 (5.5)	23 (7.9)
		Total	37 (12.8)	96 (33.1)	157 (54.1)	290 (100)
	Male	<1 MW	0 (0.0)	10 (7.5)	6 (4.5)	16 (11.9)
		1 - 2 MW	11 (8.2)	37 (27.6)	39 (29.1)	87 (64.9)
		2.1 - 3 MW	-	11 (8.2)	8 (6.0)	19 (14.2)
		≥ 3.1 MW	-	5 (3.7)	7 (5.2)	12 (9.0)
		Total	11 (8.2)	63 (47.0)	60 (44.8)	134 (100)

*p<0.05 statistically significant. Fem = Female. MW = Minimum Wages

Table 4 shows that relationship between waist circumference, of men and women, presented indicative values for cardiovascular risk, and the seniors with these values altered had BMI showing statistically significant excess weight. In both sexes, although the TSF percentage concentrated in the normal parameters for subcutaneous fat, it was statistically associated with excess weight. As for the calf circumference assessment, there was a statistically significant relationship between normal and overweight in elderly women, while, among men, there was a relationship, although not significant, between normal calf circumference parameters and eutrophy.

Table 4. Relation between BMI and anthropometric variables, according to sex. Palmeira das Missões, RS. 2010-2011

Variables	**Sex**		**BMI** Thinnes n (%)	Eutrophy n (%)	Excess weight n (%)	**Total** n (%)
WC		No risk	32 (11.0)	36 (12.4)	11 (3.8)	79 (27.3)
	Fem*	With risk	5 (1.7)	60 (20.8)	146 (50.3)	211 (72.8)
	(p=0.000)	Total	37 (12.8)	96 (33.1)	157 (54.1)	290 (100)
		No risk	6 (10.7)	48 (35.8)	9 (6.7)	63 (47.0)
	Male	With risk	5 (3.7)	15 (11.2)	51 (38.1)	71 (53.0)
		Total	11 (8.2)	63 (47.0)	60 (44.8)	134 (100)
TSF		Risk	36 (12.4)	41 (14.1)	31 (10.7)	108 (37.8)
	Fem	Eutrophy	1 (3.0)	38 (13.1)	73 (25.2)	112 (38.6)
		Overweight	-	17 (5.9)	53 (18.3)	70 (24.1)
		Total	37 (12.8)	96 (33.1)	157 (54.1)	290 (100)
		Risk	11 (8.2)	30 (22.4)	23 (17.2)	64 (47.8)
	Male	Eutrophy	-	24 (17.9)	32 (23.9)	56 (41.8)
		Overweight	-	9 (6.7)	5 (3.7)	14 (10.4)
		Total	11 (8.2)	63 (47.0)	60 (44.8)	134 (100)
CC		Depletion	27 (9.3)	25 (8.6)	8 (2.8)	60 (20.7)
	Fem*	Adequate	10 (3.4)	71 (24.5)	149 (51.4)	230 (79.3)
	(p=0.000)	Total	37 (12.8)	96 (33.1)	157 (54.1)	290 (100)
		Depletion	4 (3.0)	7 (5.2)	5 (3.7)	16 (11.9)
	Male	Adequate	7 (5.2)	56 (41.8)	55 (41.0)	118 (88.1)
		Total	11 (8.2)	63 (47.0)	60 (44.8)	134 (100)

* p<0.05 statistically significant Fem = Female WC = Waist circumference TSF = Triceps skinfold CC = Calf circumference

DISCUSSION

The anthropometric condition was characterized by excess weight, especially in the age groups between 60 and 69 years in elderly women, and waist circumference with cardiovascular risk in both sexes. The feminization of aging found in this study resembles the Brazilian demographic census in 2014(10), which indicated 50.6% of women in the elderly population. As for education, according to the National Sample Survey of Households – PNAD (*Pesquisa Nacional por Amostra de Domicílios*)[11] – there is a large number of illiterates, which is more prevalent in women (16.1%) when compared to men (15.3%). In this study, there was no reversal in the relationship among those with less years of education. This fact can be attributed to the process of feminization of young women, who have higher educational degrees than men do.

The situation of low income among seniors points to the importance of the Benefit of Continuing Provision – BCP – in an attempt of reducing poverty and improving living conditions of this population segment. Specifically among women, BCP is even more crucial, since many of them, now elderly, have always lived without access to income and financially financial depended on their spouses. Although this benefit contributes to the financial independence of the elderly woman, she still has a submissive behavior to the spouse, being a home caregiver because of intergenerational

cultural values[12].

In relation to physical activity, elderly women were more active, probably because they are more concerned about health, well-being and aesthetics than the elderly men are. These studies, however, differ from a research in which women performed less physical activity than men did. A possible justification for this is that women's triple working day limits time for leisure, since about half of the interviewees added to their weekly work hours more than 20 hours of domestic activities and care to their children. The most mentioned physical activities was walk, since it is the simplest exercise to perform and that causes few pain due to minor impact on muscles. These factors provide greater satisfaction coupled with coexistence with society (the environments where these activities take place, such as squares, parks, etc.)[13].

In relation to the waist circumference, high parameters prevailed, regardless of gender, indicating cardiovascular risk. Changes in the spine or osteoporosis can also increase the waist circumference with the advancement of age, because of the stem growth and stature shortening[15]. The calf circumference was normal in both sexes, being statistically significant. The triceps skinfold, although within the normal range in most elders, presented a slight trend below the recommendation in elderly men, probably because men have higher proportion of muscle mass than women, thus accumulating more fat at the ends(16). The relationship between BMI and education had results different from a study in which high levels of education relate to good health in seniors, since education may stave off health problems, probably because they accumulate advantages, that is, people with more access to education have higher chances to know more about prevention of certain diseases and how to have healthy habits throughout life(17). Regarding income, the results were similar to a study that showed that increased income allows greater access to processed foods, leading to a nutritional transition, when the chance of increasing overweight is proportional to the household income growth, with a ratio of 2.55 (2-5 minimum wages), 2.77 (2-10 minimum wages) and 3.57 (> 10 minimum wages)(18). As much as the results resemble the literature findings, in this study, they were not significant according to the analyzed sample.

The results confirm that the elderly population of Palmeira das Missões presents nutritional problems, especially overweight. The association between BMI and waist circumference indicated that both men and women, mostly overweight, were also with the waist circumference above recommended values. High waist circumference does not necessarily mean that an elderly person is overweight, only enhances the occurrence of cardiovascular events, particularly coronary[15], but also raises triglycerides (TG) and reduces high density lipoproteins (HDL), impacting high blood pressure[19]. The association between calf circumference and BMI showed that those women who were underweight, the calf circumference was below the recommendation. In men, however, even though the CC was below or normal, the BMI was in the normal range, opposite to expected results.

This variable is normally used to assess muscle mass in seniors, since it indicates changes in lean mass arising from aging and decline in physical activity. The CC, compared with muscle mass measured by Dexa, is considered a suitable surrogate marker of muscle mass, including to diagnose sarcopenia[20].

CONCLUSION

Conclui-se que o IMC teve relação com a circunferência da cintura e com a circunferência da panturrilha entre as mulheres, enquanto entre os homens idosos o IMC relacionou-se com a circunferência da cintura. Assim, estes resultados auxiliam no planejamento da assistência gerontológica quanto ao enfrentamento de fatores de risco evitáveis para doenças crônicas, como o excesso de peso e circunferência da cintura acima do recomendado, estimulando concomitantemente a atividade física entre os idosos, visando a diminuir o impacto destes fatores de risco e, assim, comprimindo as morbidades decorrentes destes o mais tardiamente possível.

The BMI had relationship with waist and calf circumferences among women, while, among elderly men, it related to waist circumference. These results help planning rehabilitation

assistance regarding combating preventable risk factors for chronic diseases, such as excess weight and waist circumference above the recommendation, stimulating, at the same time, physical activity among seniors in order to lessen the impact of these risk factors, thus reducing morbidities resulting from these as much as possible.

A limitation of the study was its cross-sectional design, in addition to its development in only one city in the interior of southern Brazil.

RELAÇÃO ENTRE INDICADORES SOCIODEMOGRÁFICOS E ANTROPOMÉTRICOS E ATIVIDADE FÍSICA DE HOMENS E MULHERES IDOSOS

RESUMO

A pesquisa, do tipo quantitativa, descritiva e transversal, teve como objetivo verificar a relação entre os indicadores sociodemográficos e antropométricos e atividade física de homens e mulheres idosos. A coleta de dados foi realizada no período de 2010 a 2011, por meio de uma entrevista estruturada. Os dados foram analisados no software estatístico SPSS 18.0 por intermédio do teste Qui-quadrado, considerando significativo o valor de p<0,05. Os resultados apontaram para a participação de 424 idosos, sendo 68,4% composto por mulheres. O estado civil prevalente foi casado para os homens e viúvo para as mulheres. O excesso de peso predominou entre as mulheres, enquanto entre os homens foi a eutrofia na faixa etária de 60 a 69 anos com baixa escolaridade. A circunferência da cintura teve relação com o excesso de peso em ambos os sexos, predispondo risco para doenças cardiovasculares. Assim, estes resultados auxiliam no planejamento da assistência gerontológica quanto ao enfrentamento de fatores de risco evitáveis para as doenças crônicas, como excesso de peso, circunferência da cintura acima do recomendado e, concomitantemente, estimulando a atividade física entre os idosos, visando a diminuir o impacto destes fatores de risco e, assim, comprimindo as morbidades decorrentes destes o mais tardiamente possível.

Palavras-chave: Avaliação Nutricional. Envelhecimento. Obesidade. Nutrição do idoso.

RELACIÓN ENTRE INDICADORES SOCIODEMOGRÁFICOS Y ANTROPOMÉTRICOS Y ACTIVIDAD FÍSICA DE HOMBRES Y MUJERES ANCIANOS

RESUMEN

La investigación, del tipo cuantitativa, descriptiva y transversal, tuvo como objetivo verificar la relación entre los indicadores sociodemográficos y antropométricos y la actividad física de hombres y mujeres ancianos. La recolección de datos fue realizada en el período de 2010 a 2011, por medio de una entrevista estructurada. Los datos fueron analizados en el software estadístico SPSS 18.0 por intermedio de la prueba Ji-cuadrado, considerando significativo el valor de p<0,05. Los resultados señalaron la participación de 424 ancianos, siendo el 68,4% compuesto por mujeres. El estado civil prevalente fue casado para los hombres y viudo para las mujeres. El exceso de peso predominó entre las mujeres, mientras que entre los hombres fue la eutrofia en la franja de edad de 60 a 69 años con baja escolaridad. La circunferencia de cintura tuvo relación con el exceso de peso en ambos los sexos, predisponiendo riesgo para enfermedades cardiovasculares. Así, estos resultados ayudan en la planificación de la atención gerontológica en cuanto al enfrentamiento de factores de riesgo evitables para las enfermedades crónicas, como exceso de peso, circunferencia de cintura arriba de lo recomendado y, al mismo tiempo, fomentando la actividad física entre los ancianos, teniendo como objetivo disminuir el impacto de estos factores de riesgo y, reducir así las morbilidades resultantes de estos lo más tarde posible.

Palabras clave: Evaluación nutricional. Envejecimiento. Obesidad. Nutrición del Anciano.

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Submitted: 10/04/2017
Accepted: 10/02/2018