Teixeira de Paula, Josiane Aparecida; Costa Moreira, Osvaldo; Diniz da Silva, Cristiano;
Santos Silva, Diogo; dos Santos Amorim, Paulo Roberto
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the HIPERDIA in the city of Coimbra/MG, Brazil

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Josiane Aparecida Teixeira de Paula[1]
Osvaldo Costa Moreira[2]
Cristiano Diniz da Silva[3]
Diogo Santos Silva [4]
Paulo Roberto dos Santos Amorim[5]

1 Physical educator. Faculdade Ubaense Governador Ozanam Coelho –FAGOC-, Ubá/MG, Brazil.
email: josi_atp@yahoo.com.br
2 Physical educator, MCs. Professor, Universidade Federal de Viçosa, Florestal/MG, Brazil.
email: osvaldo.moreira@ufv.br
3 Physical educator, Ph.D. Candidate. Professor, FAGOC-, Ubá/MG, Brazil.
email: cristianodiniz.silva@gmail.com
4 Physical educator, Bachareal. Universidade Federal de Juiz de Fora, Ubá/MG – Brazil.
email: diogoefi@gmail.com
5 Physical educator, Ph.D. Professor, Universidade Federal de Viçosa, Viçosa/MG – Brazil. email: pramorin@ufv.br

Metabolic syndrome prevalence in elderly of urban and rural communities participants in the HIPERDIA in the city of Coimbra/MG, Brazil

Objective. To identify the prevalence of metabolic syndrome (MS), and the influence of gender and place of residence for elders served by the Family Health Strategy in the municipality of Coimbra (Minas Gerais state, Brazil). Methodology. The sample consisted of 435 individuals of both sexes, with mean of age 72 ± 8 years. Results. Women had higher prevalence rates of MS (urban= 40%, rural= 37%) with differences ($p<0.05$, $\phi= 0.168$ and 0.284) for men (urban= 13%, rural= 22%). Odds Ratio for SM was significant in age groups over 65 years in urban areas, with women having higher chances compared with men (OR=3.07 times), becoming 5.8 times aged 75 to 79 years. Women are more exposed to obesity (urban= 80.4 %, rural= 78.6%) than men, regardless of place of residence ($p<0.05$, $\phi=0.46$ and 0.47 respectively), and the urban women are still exposed to hypertension (65%, $p= 0.022$, $\phi= 0.12$). Conclusion. The prevalence of MS and exposure to risk factors such as obesity and hypertension was higher in women, mainly in urban areas. Health professionals, like nurses, should note that the elderly population in urban areas have greater exposure to risk factors for MS, which should strengthen educational programs that promote healthy lifestyles.

Key words: metabolic syndrome X; cross-sectional studies; rural health; urban health; aged; life style.

Prevalencia de síndrome metabólico em ancianos de comunidades urbanas y rurales participantes de HIPERDIA del município de Coimbra/MG, Brasil

Objetivo. Identificar la prevalencia de Síndrome Metabólico (SM), la influencia del sexo y zona de residencia en ancianos atendidos

Josiane Aparecida Teixeira de Paula • Osvaldo Costa Moreira • Cristiano Diniz da Silva •
Diogo Santos Silva • Paulo Roberto dos Santos Amorim

por la Estrategia de Salud Familiar en el municipio de Coimbra (Estado de Minas Gerais, Brasil). **Metodología**. La muestra estuvo compuesta por 435 individuos de ambos sexos, con un promedio de edad de 72 años. **Resultados.** Las mujeres tuvieron mayores tasas de prevalencia de SM en ambas zonas (urbana=40%; rural=37%) con relación a los hombres (urbana=13%; rural=22%). La razón de prevalencias para SM fue significativa en las personas mayores de 65 años de la zona urbana; las mujeres presentaron los mayores riesgos en relación con los hombres (Razón de prevalencias –RP-=3.1), llegando a ser la RP de 5.8 veces en el grupo de 75 a 79 años. En cuanto a los factores de riesgo, las mujeres, en ambas zonas, estuvieron más expuestas que los hombres a la obesidad (urbana=80.4%; rural=78.6%) y a la hipertensión arterial (urbana=78.6%; rural=65.1%). **Conclusión.** La prevalencia de SM y la exposición a factores de riesgo como la obesidad y la hipertensión fue mayor en las mujeres, principalmente en la zona urbana. Enfermería debe tener en cuenta que la población de adultos mayores de las zonas urbanas tiene una mayor exposición a factores de riesgo para SM, por lo que se deben fortalecer los programas educativos que promocionen estilos de vida saludables.

Palabras clave: síndrome X metabólico, estudios transversales; salud rural; salud urbana; anciano; estilo de vida.

Prevalência de Síndrome metabólica em idosos de comunidades urbana e rural participantes do HIPERDIA do município de Coimbra/MG, Brasil

Objetivo. Identificar a prevalência de Síndrome Metabólica (SM), influência do gênero e do local de moradia em idosos atendidos pela Estratégia de Saúde da Família (ESF) do município de Coimbra-MG. **Metodologia.** A amostra foi composta por 435 indivíduos de ambos os sexos (72 ± 8 anos) das áreas urbana e rural. **Resultados.** As mulheres obtiveram maiores taxas de prevalência de SM (urbana=40%; rural=37%) com diferenças (p<0.05; φ=0.168 e 0.284) para os homens (urbana=13%; rural=22%). Odds Ratio para SM mostrou-se significativa em faixas etárias superiores a 65 anos na zona urbana, com as mulheres apresentando maiores chances em relação aos homens (OR=3.07 vezes), chegando a ser de 5,8 vezes na faixa etária 75 a 79 anos. As mulheres estão mais expostas à OA (urbana=80.4%; rural=78.6%) que os homens, independente do local de moradia (p<0.05; φ=0.46 e 0.47 respectivamente). As mulheres do meio urbano estão ainda expostas a HA (65%; p=0.022; φ=0.12). **Conclusão.** A prevalência de SM mostrou-se maior para as mulheres, principalmente da zona urbana. Fatores como OA e HA acometem esse público de maneira significativa. Tais resultados denotam a necessidade de maior atenção em relação à área urbana no que diz respeito a hábitos de vida mais saudáveis, como alimentação equilibrada e prática regular de atividade física.

Palavras chave: síndrome metabólica; estudos transversais; saúde da população rural; saúde da população urbana; idoso; estilo de vida.

Introduction

The technologic development, before the urban life character, is reaching the rural man and the rising of the rural labor mechanization is impacting his lifestyle, promoting reductions in the level of habitual physical activities.[1] In addition, it is considered that the aging of the population and the process of epidemiological transition has led to changes in the morbidity and mortality profile of the population, presenting a reduction of the infectious and contagious diseases and a raise of the chronic and degenerative diseases, included in these are cardiovascular diseases and the neoplasms.[2-4] Accompanying this process of demographic and epidemiologic transitions, also occurred a process of nutritional transition, in which the availability of high-calorie foods led a

raise of the prevalence of obesity and overweight, and consequently a reduction of the malnutrition prevalence.[2]

Obesity and overweight currently are proving to be a public health problem at local and international levels, lying associated with dyslipidemia, insulin resistance, hyperinsulinemia, glucose intolerance and high blood pressure, factors related to the leading causes of morbimortality in the adult population.[3-5] Furthermore, these risk factors trigger the metabolic syndrome (MS), which is a complex disorder characterized by the concomitant presence of at least three of the above risk factors.[6] Is important to highlight the association of MS with cardiovascular disease, increasing overall mortality rate of approximately 1.5 times and cardiovascular mortality at 2.5 times.[6]

Many studies[2,7-9] highlight that aging predisposes the increase of conditions to the development of certain risk factors including central obesity, dyslipidemia, insulin resistance and hypertension. Nevertheless, the impact between the place of residence, characterized as urban and rural areas, also appear to influence the incidence of risk factors and quality of life of the resident population in these two locations.[2,7-9] The literature brings a wide variation when it comes to prevalence of MS in the elderly, probably because of the profile of the studied population and the used criteria. The use of the National Cholesterol Education Program - Adult Treatment Panel III[10] (NCEP-ATP III), NCEPATPIII reviewed[11] or the International Diabetes Federation[12] (IDF) has values ranging from 11.3% to 39% in women and 12.5 % to 35% in men.[13-15] In Brazil, there is a lack of studies on prevalence of MS with representative data of Brazilian population.[6] Therefore, it takes studies in small cities to develop strategies for behavior changes and fighting the MS components, so that way may contribute to mitigate the risk of developing this syndrome.

In addition, when considering the increase in life expectancy of our population and the large number of elderly people living in rural areas in inner cities, conducting such studies enables health professionals such as nurse practitioners, to diagnose and troubleshoot, and to intervene in the health-disease process, in order to protect and rehabilitate health, aiming comprehensive care and multiprofessional action. These actions are in line with the nursing professional performance in primary health care, allowing these professionals to combine their clinical performance to the practice of collective health and, at the same time, drive the actions of the Family Health Strategy units (FHS) taking into account the real health needs of the served population. This study aims to identify the prevalence of MS in elderly patients attended by the FHS in the city of Coimbra, Minas Gerais, as well as the influence of gender and home region and its association with risk factors. Knowing the epidemiological characteristics of this syndrome will allow the establishment of preventive treatment more effectively.

Methodology

This study is a quantitative research, not experimental, of the cross observational type, held through consultation of hospital records of patients from the HIPERDIA database of the city of Coimbra/MG. According to the Brazilian Institute of Geography and Estatística[2] (IBGE) the city of Coimbra-MG has 7054 inhabitants, which is located in the Zona da Mata region of Minas Gerais.

The study sample population consists of non-probability sampling, for convenience, served by the FHS, consisting of 435 individuals of both genders registered, aged more than sixty years. The inclusion criteria were, age of 60 years or more, permanent residence for more than 10 years and have attended at least one clinic visit in the last six months in a unit of municipal FHS. Failure to follow these criteria constitutes an exclusion criterion. Data collection was performed in the FHS of Coimbra that has a 100% population coverage. The researchers were trained and data were collected between 3 and 14 August 2013.

Josiane Aparecida Teixeira de Paula • Osvaldo Costa Moreira • Cristiano Diniz da Silva •
Diogo Santos Silva • Paulo Roberto dos Santos Amorim

Started out with a clinical evaluation that included the following anthropometric measurements: body weight (kg), height (cm) and waist circumference (WC; cm). Then a measurement of systolic and diastolic blood pressure (SBP, DBP, mmHg) and measurements of the glycemic levels (mg/dl). Finally, was used additional information on the use of medications and history of the patients, taken from the accompanying charts from HIPERDIA which is a registration and monitoring system of Hypertensive Diabetics raised in the National Care Reorganization Plan to hypertension (HA) and Diabetes Mellitus in all ambulatory units of the National Health System. Data accesses were previously authorized by the Municipal Health. All study procedures were approved by the ethics committee on research with beings of the Federal University of Viçosa, Viçosa/MG, Brazil, under protocol 026/2013.

First were measured body mass and height by a Filizola® scale with coupled stadiometer. Then the abdominal circumference measurement was taken at half the distance between the iliac crest and the lower costal margin. Blood pressure was determined by the indirect method, with the auscultatory technique and the use of a mercury sphygmomanometer from the Premium® brand according to the recommendations of the SBC.[6] Finally, measures of the glycemic levels were performed on fasting for 8 hours, the blood glucose test using the Accu-Chek Advantage® system and the classification standards were those recommended by the Brazilian Society of Diabetes Mellitus. It should be highlighted that although the blood glucose is not a standard for the diagnosis of diabetes mellitus, the choice of using it was because of the ease of application, low cost of this technique and its previous use in some epidemiological studies as an indicator of suggestive glucose diabetes.[3,4] For definition of the metabolic syndrome consult the recommendations of the NCEP III,[11] as shown in Table 1.

Table 1. Component of the metabolic syndrome according to the NCEP-ATP III *

Components	Levels
Abdominal obesity by Abdominal Circumference	
Men	>102 cm
Women	> 88 cm
Triglycerides	≥ 50 mg/dl
HDL Colesterol	
Men	< 40 mg/dl
Women	< 50 mg/dl
Arterial Pressure	SBP ≥ 140 mmHg e ou DBP ≥ 90 mmHg
Fasting glycemia	≥ 110 mg/dl

*The presence of Diabetes mellitus does not exclude the diagnosis of MS

In order characterize the sample, data regarding age (continuous) were presented as mean ± standard deviation and median, since there was no service to normal distribution occurred after the Kolmogorov-Smirnov test. To analyze the prevalence's found it was used the Z test for proportions and for the comparison between the MS prevalence among men and women, as well as between rural and urban regions, the chi-square test. Effect sizes (phi coefficient [φ]) were calculated to estimate the magnitude of the differences and values of 0.10, 0.30 and larger than 0.50 were considered small, medium and large, respectively.[16] All statistical analyzes were performed using Statistical Package for Social Sciences software (SPSS® 17 for Windows,

Chicago, IL, USA). In all other cases the level of statistical significance was set at p <0.05.

Results

In total, were evaluated 435 elderly patients, with mean age 72 ± 8 years (median=71). Of these, 342 lived in the urban area, with 132 being males and 210 females; and 93 lived in the rural areas, and 37 were male and 56 were female. The analysis of prevalence of MS revealed that women had higher rates (40% and 37% respectively for urban and rural areas) with differences (p <0.05)

of average magnitude (ϕ=0.168 and 0.284) for men (SM=22% and 13%, respectively for urban and rural areas) (Table 1).

When the age range is stratified into intervals of five in five years it was observed that women in urban areas had higher rates MS statistically (p <0.05) than men of the same region, no significant differences were observed between men and women rates in the countryside. (Table 2). The Odds Ratio was significant in age groups of five in five years from 65-79 years in the urban area, with women were more likely to MS compared to men (OR = 3.07 times), becoming up to 5.8 times in the age group 75-79 years.

Table 2. Prevalence of Metabolic Syndrome using criteria of the Adult Treatment Panel III as age, location and gender

Age Range	Women (n=56)		men (n=37)		X^2	P	Phi	OR (IC95%)
Rural Area								
	Yes	No	Yes	No				
60-64	5 (33)	10 (67)	1 (20)	4 (80)	0.317	1.000	0.126	1.667 (0.251-11.071)
65-69	6 (40)	9 (60)	1 (14)	6 (86)	1.455	0.350	0.257	2.800 (0.412-19.051)
70-74	2 (17)	10 (83)	2 (14)	12 (86)	0.028	1.000	0.033	1.167 (0.192-7.072)
75-79	5 (56)	4 (44)	2 (40)	3 (60)	0.311	1.000	0.149	1.389 (0.409-4.715)
≥80	3 (60)	2 (40)	2 (33)	4 (67)	0.782	0.567	0.267	1.800 (0.472-6.867)
Total	21 (37)	35 (62)	8 (22)	29 (78)	2.618	0.000	0.168	1.734 (0.861-3.494)
Urban Area								
	Women (n=209)		Men (n=133)		X^2	P	Phi	OR (IC95%)
	Yes	No	Yes	No				
60-64	15 (29)	37 (71)	5 (18)	23 (82)	1.172	0.279	0.121	1.615 (0.656-3.981)
65-69	22 (51)	21 (49)	4 (17)	20 (83)	7.719	0.005	0.339	3.070 (1.198-7.867)
70-74	18 (47)	20 (53)	4 (15)	22 (87)	7.000	0.008	0.331	3.079 (1.177-8.055)
75-79	16 (47)	18 (53)	2 (8)	23 (92)	10.367	0.001	0.419	5.882 (1.485-23.295)
≥80	13 (31)	29 (69)	3 (10)	27 (90)	4.445	0.035	0.248	3.095 (0.966-9.920)
Total	84 (40)	125 (60)	18 (13)	115 (87)	27.596	0.000	0.284	2.970 (1.874-4.706)

Separate analysis of the prevalence of all components of the NCEP ATP III criteria (Table 3) revealed that women are more exposed to abdominal obesity (78.6% and 80.4%, rural and urban, respectively) than men, regardless of

place of residence and with significant magnitude difference (ϕ=0.46 and 0.47 respectively). The urban women are still exposed (65%; p=0.022) to another worrying risk factor, the HA.
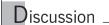
Josiane Aparecida Teixeira de Paula • Osvaldo Costa Moreira • Cristiano Diniz da Silva •
Diogo Santos Silva • Paulo Roberto dos Santos Amorim

Table 3. Prevalence of metabolic syndrome components as location and gender

Metabolic Syndrome Risk Factor	Rural Area						
	Women (n=56)		Men(n=37)		X^2	P	Phi
	Yes	No	Yes	No			
Waist	78.6%	21.4%	32.4%	67.6	19.798	0.001	0.46
Arterial Pressure	78.6%	21.4%	83.8%	16.2	0.388	0.533	-0.06
Glycemia	60.7%	39.3%	67.6%	32.4	0.451	0.502	-0.07

	Urban Area						
	Women (n=209)		Men (n=133)		X^2	P	Phi
	Yes	No	Yes	No			
Waist	80.4%	19.6%	33.1%	66.9%	77.174	0.001	0.47
Arterial Pressure	65.1%	34.9%	52.6%	47.4%	5.251	0.022	0.12
Glycemia	67.0%	33.0%	71.0%	28%	0.746	0.388	-0.04

In Table 4, the data is stratified between gender and place of residence. In this analysis, men from rural areas compared to the urban areas, showed a significant exposure to the risk factor HA (83%; p=0.001).

Table 4. Stratified prevalence among sex and place of residence

Metabolic Syndrome Risk Factor	Men						
	Rural (n=37)		Urban (n=133)		X^2	P	Phi
	Yes	No	Yes	No			
Waist	32.4	67.6	33.1	66.9	0.006	0.941	-0.00
Arterial Pressure	83.8	16.2	52.6	47.4	11.650	0.001	0.26
Glycemia	67.6	32.4	71.4	28.6	0.208	0.648	-0.03

	Women						
	Rural (n=56)		Urban (n=209)		X^2	P	Phi
	Yes	No	Yes	No			
Waist	78.6	21.4	80.4	19.6	0.091	0.793	-0.01
Arterial Pressure	78.6	21.4	65.1	34.9	3.694	0.055	0.11
Glycemia	60.7	39.3	67.0	33.0	0.770	0.380	-0.05

Discussion

The prevalence of MS in the sample of elderly in a rural and urban community of a provincial town of Minas Gerais can be considered very high for women, regardless of region. In literature, we found wide variation in the prevalence of MS in the elderly, probably because of the profile of the

studied population and the used criteria. Franco et al.,[10] in a study conducted in Cuiabá-MT with 120 hypertensive (60 women and 60 men), aged 58.3±12.6 years, found a prevalence of MS of 70.8%, much higher than the present study. In Cuiabá the predominance was among females (81.7% vs. 60.0%; p=0.009), in agreement with the results of this research, women (40% and 37% respectively for urban and rural areas) for men (SM=22% and 13% respectively for urban and rural areas). Another study reports similar data in a rural population of the Jequitinhonha Valley - MG (33.6% women vs. 7.7% men).[8]

By analyzing the prevalence of MS, we found 3.07 times more likely to have the MS among the female public, as compared to men. In the age group 75-79 years comes to 5.8 times more likely to have the syndrome. This results alert us to the female population of the city of Coimbra, MG, is recommended for this population to accompany their physical activity and feeding habits. Another risk factor revealed by the survey was to abdominal obesity, as concern for the population of a provincial region of Minas Gerais. These results were significant in females, in both regions, rural and urban. Franco et al.[10] in Cuiabá/MT, found the WC increased, especially in women. Tinoco et al.[17] in a study conducted in the city of Viçosa, with a group of elderly Municipal Program of the Third Age, also found high values of WC, which is higher among women, all results reported in the literature corroborate this study.

However, Martins and Marinho,[18] in a survey conducted in São Paulo-SP, with 1042 people, add that the high association between gender and WC, revealed that women have seven times the risk of developing abdominal obesity, than men. Zamboni et al.[19] analyzed the distribution of fat in women of different age groups by CT scans, which shows that the aging process leads to redistribution of body fat and greater accumulation of visceral fat, especially among elderly women. Santos and Sichieri[20] in their study found a reduction of arm muscle area and increased fat centralization. Elderly women of the village had one more aggravating risk

factor, high blood pressure, because when they were compared with men of the same region the women had high levels of hypertension. Pimenta et al.[21] found a higher prevalence of hypertension in women over 60 years old. The authors justify that the high prevalence of hypertension in elderly women, coincides with the onset of menopause. Before this stage, the hemodynamic point of view women are less likely than men of the same age. So after menopause this situation is reversed.[22] In this study, the prevalence of hypertension in women who were already in the menopausal phase was 69.2%, while the prevalence among women who had not yet reached that stage was 32.5%, a significant difference.

Still on hypertension, we found that 84% of men the rural region are hypertensive, since the urban region 53%. This result shows that men the rural region are being most affected by the hypertension risk factor, when compared to men of the urban region. Further studies are required with these populations, as these results were not seen in the literature. Despite the low cutoff point, we know that the risk for developing cardiovascular complications varies with the blood pressure values, rising from values above 110x75 mmHg[23] and which is exacerbated by the aging process.[24] The isolated impact of this MS component in cardiovascular risk on elderly still must be better defined.

Almost all variables analyzed in this study have modifiable characteristic, this implies that reducing the prevalence of these variables with the adoption of simple strategies is plausible. This type of intervention is feasible to be carried out by the health professional such as a nurse, through the promotion of health education, since this is a fundamental tool for the prevention, promoting awareness of individuals about the importance of adopting healthy lifestyle habits. Moreover, it is necessary that these professionals understand these actuations to the family assembly, to add positive results for the individual who had high cardiovascular risk. This study had some limitations because it does not take into account social and socioeconomic information of patients. This may imply the existence of a large number

Josiane Aparecida Teixeira de Paula • Osvaldo Costa Moreira • Cristiano Diniz da Silva •
Diogo Santos Silva • Paulo Roberto dos Santos Amorim

of elderly patients who are unaware of their status in glycaemia, weight, waist circumference and their blood pressure levels in the municipality. We point out that even when the population sample of the elderly was distributed by age and sex, there was a loss of power due to the small size of the groups, especially in the age group higher than 80 years and resident of rural area, which consequently leads to a loss in the ability of generalization of the data.

Conclusion

The prevalence of metabolic syndrome among the elderly was higher for women, and increased the odds ratio when they are living in the urban area. Factors such as abdominal obesity and hypertension affect this audience significantly. These results show the need for greater attention to the urban area with regard to healthier lifestyle habits, such as balanced diet and regular practice of physical activity, which interfere directly and positively, not only in reducing fat percentage, as also the autonomy of the elderly population. Added to this the role of a nurse as an educator conducting health campaigns, which are a way to awareness individuals and their families about risks and the importance of adopting more positive measures to promote health and quality of life. In addition, the city's health professionals involved in primary health care such as nurses and physical educators should participate in the development and implementation of public policies for prevention targeting the elderly, especially for women, in which they verified high values of waist circumference. Thus, these professionals take the specific assistance role to this population and can provide effective care, treating diseases already installed in the patients, as to prevent the worsening of problems as a result of one or more constituent factors of MS.

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