Factors associated with metabolic syndrome and quality of life of adults in a northeast brazilian municipality

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Factores asociados con síndrome metabólico y calidad de vida de adultos en un municipio noreste de brasileño

Fatores associados à síndrome metabólica e qualidade de vida de adultos em um município do nordeste brasileiro

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Abstract

Introduction: Metabolic Syndrome (MS) is currently considered a multi-factorial disease related to the asymptomatic, insidious, and deleterious inflammation that predisposes the individual to vulnerability by aggregating cardiovascular risk markers. **Objective:** to analyze the factors associated with Metabolic Syndrome and Quality of Life (QOL) in adult users of a health unit. **Material and Methods:** a cross-sectional study carried out with 108 adult users. Data collection was performed using a sociodemographic, clinical, and metabolic structured questionnaire and The Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) questionnaire. For the diagnosis of Metabolic Syndrome, the following criteria were used: increased abdominal circumference and arterial hypertension, diabetes, hypertriglyceridemia, and low HDL-cholesterol. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) 21.0 software. **Results:** Metabolic Syndrome was identified in 88.0% of the adults. Of this total of users evaluated with the syndrome, 87.4% of the individuals were female; 71.7% had diabetes; 87.0% had arterial hypertension; sedentary lifestyle was identified in 53.7%. In the assessment of the BMI, overweight and obesity predominated in 68.4% and 24.9%, respectively. The domains with the lowest quality of life scores were General Health and Vitality. **Conclusions:** The study made it possible to identify the Metabolic Syndrome in most of the adults evaluated. There was a low perception of quality of life among adults in all domains, except for physical aspects and vitality. Thus, there is a need for surveillance and health education for the studied population and improvement of their quality of life.

Keywords: Metabolic Syndrome; Quality of life; Diabetes; Hypertension; Obesity; Dyslipidemia.

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Factores asociados con síndrome metabólico y calidad de vida de adultos en un municipio noreste de brasileño

Resumen

Introducción: El Síndrome Metabólico (SM) se considera actualmente una enfermedad multifactorial relacionada con la inflamación asintomática, insidiosa y deletérea que predispone al individuo a la vulnerabilidad al agregar marcadores de riesgo cardiovascular. **Objetivo:** analizar los factores asociados al síndrome metabólico y calidad de vida en adultos usuarios de una unidad de salud. **Materiales y Métodos:** estudio transversal realizado con 108 usuarios adultos. La recogida de datos se realizó mediante un cuestionario sociodemográfico, clínico y metabólico, estructurado y mediante el cuestionario The Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). Para el diagnóstico de Síndrome Metabólico se utilizaron los siguientes criterios: aumento de la circunferencia abdominal e hipertensión arterial, diabetes, hipertrigliceridemia y colesterol HDL bajo. El análisis estadístico se realizó utilizando el software Statistical Package for Social Sciences (SPSS) 21.0. **Resultados:** Se identificó síndrome metabólico en el 88,0% de los adultos. De este total de usuarios evaluados con el síndrome, el 87,4% de los individuos eran mujeres; 71,7% con diabetes; 87,0% tenía hipertensión arterial; Se identificó sedentarismo en 53,7%. En la valoración del IMC, predominaron el sobrepeso y la obesidad en 68,4% y 24,9%, respectivamente. Los dominios con las puntuaciones más bajas de calidad de vida fueron Salud general y Vitalidad. **Conclusiones:** el estudio permitió identificar el Síndrome Metabólico en la mayoría de los adultos evaluados. Hubo una baja percepción de la calidad de vida entre los adultos en todos los dominios, excepto en los aspectos físicos y vitalidad. Por tanto, es necesaria la vigilancia y educación sanitaria de la población estudiada y la mejora de su calidad de vida.

Palabras clave: Síndrome Metabólico; Calidad de Vida; Diabetes; Hipertensión; Obesidad; Dislipidemia.

Fatores associados à síndrome metabólica e qualidade de vida de adultos em um município do nordeste brasileiro

Resumo

Introdução: A Síndrome Metabólica (SM) é atualmente considerada uma doença multifatorial relacionada à inflamação assintomática, insidiosa e deletéria que predispõe o indivíduo à vulnerabilidade por agregar marcadores de risco cardiovascular. **Objetivo:** analisar os fatores associados à Síndrome Metabólica e a Qualidade de Vida (QV) em adultos, usuários de uma unidade de saúde. **Materiales e M**étodos: estudo transversal realizado com 108 usuários, adultos. A coleta de dados foi realizada por meio de um questionário sociodemográfico, clínico e metabólico, estruturado e pelo questionário *The Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36)*. Para diagnóstico da Síndrome Metabólica utilizou-se como critérios: a circunferência abdominal aumentada e hipertensão arterial, Diabetes, hipertrigliceridemia e baixo HDL-colesterol. A análise estatística foi realizada com auxílio do *software Statistical Package for Social Sciences (SPSS)* 21.0. **Resultados:** a Síndrome Metabólica foi identificada em 88,0% dos adultos. Desse total de usuários avaliados com a síndrome, 87,4% dos indivíduos eram do sexo feminino; 71,7% com Diabetes; 87,0% apresentaram hipertensão arterial; o sedentarismo foi identificado em 53,7%. Na avaliação do IMC preponderou o excesso de peso e a obesidade em 68,4% e 24,9%, respectivamente. Os domínios com menores escores da qualidade de vida foram Estado Geral de Saúde e Vitalidade. **Conclusões:** o estudo possibilitou a identificação da Síndrome Metabólica na maioria dos adultos avaliados. Observou-se, em todos os domínios, uma baixa percepção da qualidade de vida entre os adultos, exceto nos aspectos físicos e vitalidade. Assim, faz-se necessária vigilância e educação em saúde para a população estudada e melhoria de sua qualidade de vida.

Palavras chave: Síndrome Metabólica; Qualidade de Vida; Diabetes; Hipertensão; Obesidade; Dislipidemia.

Introduction

Metabolic Syndrome (MS) is currently considered a multi-factorial disease related to the asymptomatic, insidious, and deleterious inflammation that predisposes the individual to vulnerability by aggregating cardiovascular risk markers. It involves the identification of at least three diagnostic criteria, among which increased waist circumference, elevated fasting blood glucose, blood pressure, triglycerides and/or reduced high-density cholesterol stand out[1]. The estimated prevalence is 23.7%, in line with the criteria of the III Adult Treatment Panel[2].

Metabolic Syndrome (MS) is currently considered a multi-factorial disease related to the asymptomatic, insidious, and deleterious inflammation that predisposes the individual to vulnerability by aggregating cardiovascular risk markers.

Chronic non-communicable diseases have multiple impacts in terms of limiting quality of life. Metabolic Syndrome represents a public health problem due to the increase in its incidence, prevalence, and considerable economic burden for individuals, families, and society. This context was considered to establish the object of this study: associated factors that promote Metabolic Syndrome, which are added to it and reflect on the quality of life of adults as users of a health unit.

Thus, the confirmation of the metabolic syndrome in people doubles the risk of Cardiovascular Disease (CVD). However, its components are considered to be reversible and are closely associated with the Western lifestyle, which is attributed to physical inactivity and the consumption of high-fat foods[3]. A number of studies show the effects that MS can have on people's quality of life, which makes it necessary to increase studies of interventions capable of promoting new prevention and control strategies in relation to MS, since this pathology has its importance for public health today and that studies of interventions have shown improvements not only in MS but also in QoL scores[4].

It is worth highlighting that childhood obesity is considered a risk factor for the development of MS in adults and other components for MS have been postulated with a higher prevalence in needy populations[3]. The associated factors with MS are progressive, insidious and silent, they often start during childhood and are perpetuated throughout the adult's life course, but their deleterious impacts are noticeable in the older adult's life cycle. This stage is where barriers to health rehabilitation are found, which requires health professionals to develop clinical health care capable of restoring people's health and quality of life in all the phases of the life cycle.

Many studies have been developed with regard to MS and the harms it causes to the quality of life of the patients. However, there is little evidence of its impact on patients' quality of life[4]. On the other hand, not all individuals are affected by the Metabolic Syndrome, although there are genetic factors that are already well established for the components of the syndrome, such as type 2 diabetes and dyslipidemia as well as body composition (proportion between fat and muscle mass)[3].

Thus, contemplating the practical bases for the prevention of the MS clinic condition, in line with the recommendations of the Primary Health Care Notebooks of the Ministry of Health and the lines of care aimed at people with arterial hypertension and diabetes, effectively contributes to the increase in knowledge and to improving the living and health conditions of the population, who is unaware of the clinical signs and symptoms of MS[5].

Thus, this study aims to analyze the factors associated with Metabolic Syndrome in adult users of a health unit.

Material and Methods

This is a cross-sectional study with a quantitative approach carried out with adults at risk of Metabolic Syndrome, followed-up on an outpatient basis in a municipality in the Northeast of Brazil. Data collection took place in a Basic Health Unit in the urban area, between September 2018 and March 2019. Adults aged 18 years old and older and younger than 60 years old, overweight/obese and/or with hypertension and/or diabetes, regardless of gender, followed-up in consultations with nurses and/or nutritionist in the morning and evening shifts were included. Pregnant women with type 1 diabetes were excluded. In this sense, all individuals who agreed to participate in the research and met the pre-established criteria were interviewed individually, with prior appointment, and in a private room.

Structured instruments elaborated for the study were used for sociodemographic, clinical, and metabolic characterization: the SF-36 questionnaire to assess quality of life, and the IPAQ to assess physical activity. After the initial interview, blood pressure was measured with a validated semiautomatic sphygmomanometer (Onrom -742 INT) with the validation standards required by international entities such as that of the British Hypertension Society[6], with the interviewee seated, feet on the floor, left arm at height of the heart and palm facing upwards, empty bladder and after 30 or more minutes of the last caffeine intake and cigarette use, after 10 minutes of rest[7].

The anthropometric data (weight and height) were measured only once, considering some precautions. Weight was obtained with the participants barefoot and wearing light clothing, using a digital scale with a capacity of 150 kg and an accuracy of 100 g. The height was verified in a portable metallic stadiometer with 0.1 mm resolution. For the calculation of the Body Mass Index (BMI), defined as the ratio between weight (kg) and the square of height (m), participants with values between 18.5 kg/m^2 and 24.9 kg/m^2 were considered eutrophic; between 25.0 kg/m^2 and 29.9 kg/m^2, overweight; and those with a BMI ≥ 30 kg/m^2 were considered obese[8,9].

Finally, blood collection was scheduled to obtain information from laboratory tests, High Density Lipoproteins (HDL) cholesterol, triglycerides, and blood glucose after 12 hours of fasting. Blood samples of 4 ml were collected by median antecubital venipuncture, using a vacuum system (*VACUETTE*), identified, stored in a thermal box, and transported to the accredited laboratory, where they were centrifuged and analyzed by dry chemistry in an *Ortho Clinical Vitros*® equipment.

For the assessment of MS, the criteria of the National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATPIII) and of the International Diabetes Federation (IDF) were used; following the NCEP-ATPIII criteria, the presence of at least three metabolic changes is necessary: blood glucose fasting increased when ≥ 100 mg/dl or drug treatment for diabetes; increased triglycerides ≥ 150 mg/dl or drug treatment for hypertriglyceridemia; HDL cholesterol decreased when < 40 mg/dl (male), < 50 mg/dl (female) or drug treatment for low HDL; high abdominal circumference when ≥ 102 cm (male) and ≥ 88 cm (female); increased systolic blood pressure ≥ 130 mmHg and/or diastolic blood pressure ≥ 85 mmHg or drug treatment

for hypertension[8,10-13]. The use of medication was assessed in the interview by asking for a prescription and/or card for the outpatient follow-up at the Basic Health Unit (BHU). The information on smoking and drinking habits was self-reported.

For the calculation of physical activity, the IPAQ (International Physical Activity Questionnaire), short and weekly version, was used, which classifies the person as very active, active, insufficiently active, and sedentary, validated for Brazil[14].

The SF-36 Questionnaire constructed and validated for the Brazilian context by[15] was used to assess quality of life. The *SF-36* (*Medical Outcomes Study 36 – Item Short – Form Health Survey*) is a generic instrument for assessing quality of life, easy to administer and understand, consisting of a multidimensional questionnaire made up of 36 items encompassed in eight domains: functional capacity, physical aspects, pain, general health, vitality, social aspects, emotional aspects, and mental health, whose score ranges from 0 to 100 (obtained by calculating the *Raw Scale),* where *zero* (0) corresponds to the worst general health status and one hundred (100), to the best health status.[15]

The study complied with Resolution No. 466/2012 of the National Health Council (*Conselho Nacional de Saúde*, CNS), which deals with the ethical aspects of research involving human beings. Thus, data collection was carried out only after the project was released by the Research Ethics Committee of the Southwest Bahia State University (*Comitê de Ética em Pesquisa/ Universidade Estadual do Sudoeste da Bahia*, CEP/UESB), under CAAE No. 92352818.9.0000.0055, and the consent of the individuals was obtained by their signing the Free and Informed Consent Form (FICF) and other ethical aspects provided in the Resolution.

The *Statistical Package for Social Science (SPSS)*, version 21.0 for Windows, was used for data analysis. The data were presented in the format of tables of relative (%) and absolute (n) frequency for the qualitative variables in order to establish the profile of the studied population. Pearson's chi-square and Fisher's exact tests were used to analyze the association between the sociodemographic and clinical variables and the presence of MS.

The analyzed data were presented in relative (%) and absolute (n) frequency. In order to compare the frequencies of the variables according to the presence of the metabolic syndrome, the chi-square test and the prevalence ratio (PR) and its respective 95% confidence interval were used with a significance of 0.05.

Results

The prevalence of Metabolic Syndrome was 88.0% (n=95), with a mean age of 48 years old. Among those affected by MS, these prevailed: female individuals (87.4%), with a partner (68.4%), non-white (84.2%), with eight or less years of study (62.1%), and with an income equal to or higher than a minimum wage (69.5%), as shown in Table 1 below.

Table 1. Characterization of the factors associated with Metabolic Syndrome. Jequié, Bahia, 2020.

	Metabolic Syndrome		PR [95%CI]
	Absent n (%)	Present n (%)	
Gender			
Male	3 (23.1)	12 (12.6)	1
Female	10 (76.9)	83 (87.4)	1.12 [0.86-1.45]
Marital status			
Has a partner	9 (69.2)	65 (68.4)	1
No partner	4 (30.8)	30 (31.6)	1.01 [0.86-1.16]
Ethnicity			
White	3 (23.1)	15 (15.8)	1
Non-white	10 (76.9)	80 (84.2)	1.07 [0.86-1.32]
Schooling years			
> 8 years	7 (25.0)	36 (45.0)	1
≤ 8 years	21 (75.0)	44 (55.0)	0.81 [0.65-1.00]
Income			
One MW or more	32 (76.2)	45 (68.2)	1
Less than one MW	10 (23.8)	21 (31.8)	1.16 [0.85-1.57]

Source: Prepared by the authors, 2020.

Table 2. Associated factors of the sample studied according to Metabolic Syndrome involvement. Jequié, Bahia, 2020

	Metabolic Syndrome		PR [95%CI]
	Absent n (%)	Present n (%)	
Diabetes Diagnosis			
No	9 (69.2)	26 (28.3)	1
Yes	4 (30.8)	66 (71.7)	3.67 [2.08-6.45]
Hypertension Diagnosis			
No	9 (75.0)	12 (13.0)	1
Yes	3 (25.0)	80 (87.0)	1.69 [1.16-2.45]
Smoking habit			
No	13 (100.0)	70 (73.7)	1
Smoke/Smoked	0	25 (26.3)	1.14 [1.01-1.28]
Drinking habit			
No	8 (61.5)	49 (51.6)	1
Drink/Drank	5 (38.5)	46 (48.4)	1.05 [0.91-1.20]
Physical Activity			
Yes	8 (61.5)	44 (46.3)	1
No	5 (38.5)	51 (53.7)	1.07 [0.94-1.24]
BMI			
Eutrophic	3 (23.1)	7 (7.4)	1
Overweight	7 (53.8)	65 (68.4)	1.29 [0.85-1.94]
Obesity	3 (23.1)	23 (24.2)	1.26 [0.82-1.94]

Source: Prepared by the authors, 2020.

As for the exposure to the risk factors, of the 108 adults with metabolic syndrome, it was verified that the prevalence of diabetes was 66.7% (n=70) and that of hypertension, 76.9% (n=83). Among the individuals affected by MS, those diagnosed with diabetes (77.3%), without hypertension (66.7%), non-smokers (69.7%), without drinking habits (53.0%), not practicing physical activity (69.6%), and obesity (69.7%) prevailed, as shown in Table 2 below.

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Regarding the assessment of quality of life, Figure 1 shows that, except for the physical aspects and vitality domains, the totality of the others was reduced in individuals affected by MS.

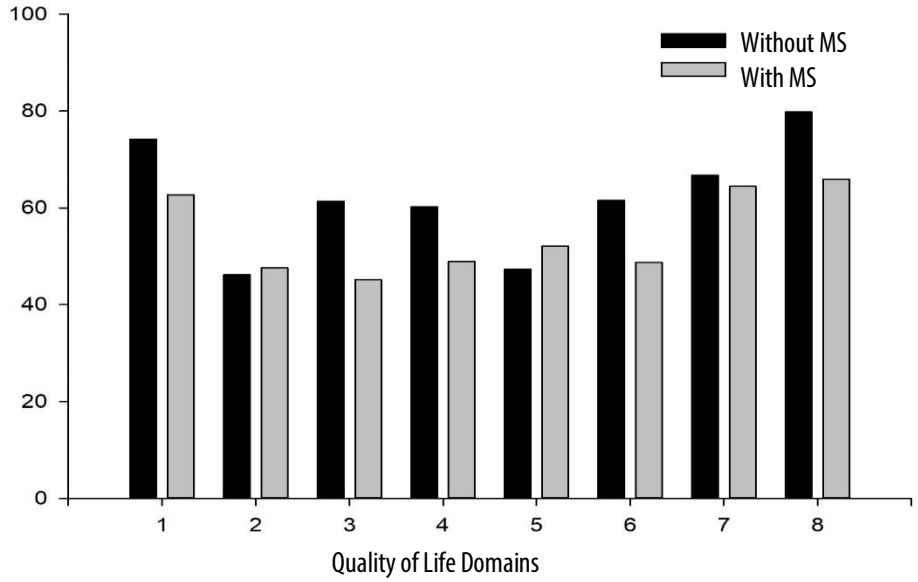

Figure 1. Quality of life domains according to involvement by Metabolic Syndrome. Jequié, 2020.

Note: 1. Functional capacity; 2. Physical aspects; 3. Pain; 4. General health status; 5. Vitality; 6. Emotional aspects; 7. Mental health; 8. Social aspects

Discussion

In this study, a high prevalence (87.4%) of MS was noticed in females, corroborating the results of other studies[16-19], statistically exceeding the value observed in the male population. This fact is due to the difficult therapeutic itinerary present in primary health care services, since consultations of specific programs such as HiperDia operate at inconvenient times, hindering men from seeking basic health units, due to labor issues that prevent them from attending routine appointments, leading to absenteeism.

A high prevalence of MS (68.4%) was observed in people with partners. These data are similar to what was found in the study[20], which showed that, among those diagnosed with MS, men were often married or living in a stable relationship and women were less likely to be married or living in a stable relationship compared to men.

In this follow-up, there was a high prevalence (84.2%) in non-white people, with an MS diagnosis. The aforementioned corroborating the data from a study with quilombolas from Bahia, where 86.5% of the participants reported being black-skinned[21].The highest prevalence of MS is among those with lower schooling and those with the lowest incomes[16,22]. In this group, homogeneous socioeconomic characteristics, urban area origin, users of the Unified Health System, non-white ethnicity, low schooling, and low family income were observed, highlighting the condition of social inequality that are potentiating characteristics of MS[23].

The analyses of the study signal the diagnosis of diabetes, the diagnosis of hypertension, and smoking as factors associated with MS. Statistically considerable results were found between the analyses of the prevalence of MS and diabetes, highlighting a significant increase in the studied sample[24]. MS exposes disastrous conditions, since it has a high prevalence and is associated with an increase in cardiovascular diseases and diabetes[25].

A cross-sectional study carried out in a BHU, located in the North of the state of São Paulo, verified that MS was present in 119 patients (45.6%), 102 (60.7%) of whom were hypertensive and 17 (18.3%) normotensive.[26] The hypothesis of the presence of MS among hypertensive individuals is much more expressive and can be confirmed with results from other studies[16,27,28].

The meta-analysis study highlights that smoking increases the risk of having MS, since the effects of smoking on the cardiovascular system can be caused by the increase in nicotinic receptors[29]. Smokers are 2.24 times more likely to have MS, compared to non-smokers, due to insulin resistance[30]. The results of diverse research that study the association between alcohol consumption and MS are not so consistent and can vary according to the size of the population, age, gender, ethnicity, cultural traditions, and lifestyles of the people who constitute that population[20].

In a cohort conducted in the community where 10,037 participants were analyzed, of which 3,076 had MS and 6,961 did not have MS, it was verified that the prevalence of MS in both genders was associated with the habit of drinking alcohol. The results also show that the amount of alcohol consumption (0.1-5.0 g/day) was significantly associated with a lower prevalence of MS in both genders compared to those who did not have the habit of drinking[31].

Diverse scientific evidence suggests that several levels of alcohol consumption have a positive association with MS. In turn, there is a need for the results of these analyses to be carefully interpreted by the scientific community. And they reinforce that people must not adopt alcohol consumption or be advised to consume alcohol to improve their risk profile for CVD or prevent MS, but they should be advised to adopt changes in a healthy lifestyle as a benefit to reduce the risk of MS[32].

The probability of having or not having MS has a direct relation with the modifiable factors associated with lifestyle, which include lack of physical exercise, overweight, and obesity[33]. Although the scientific evidence highlights studies with a positive association between physical exercise and MS, there is little evidence to prove the necessary amount of physical exercise to avoid MS[34].

A study that assessed the level of physical activity and the prevalence of MS highlighted a significant prevalence of MS in people with low levels of physical activity compared to those

who practice moderate or high physical exercise. The same study also showed that moderate and high physical exercise proved to have statistically significant protective effects for MS[33].

Obesity increases the risk of MS with advancing age, and the role of abdominal obesity over the components of the metabolic syndrome in both genders can be observed[35]. Abdominal obesity was the most prevalent factor in the secondary study of the National Health Survey, with 53.8% being overweight[18].

The final multivariate regression model from another study that assessed the prevalence of MS and associated factors in adults from the Brazilian Amazon verified that overweight and middle-aged obese individuals remained statistically significant, showing that, in general, obesity was the risk factor most related to MS, with nine times the approximate risk of occurrence of MS (OR = 8.82, 95% CI = 5.56 ± 13.98, p<0.001)[17].

This study showed that, in the standard deviation analysis of the quality of life domains measured using *SF-36*, they are slightly reduced in adults with MS, corroborating with the analyses of the National Health and Nutrition Survey (*Inquérito de Saúde e Nutrição Exame Nacional*, NHANES) with adult participants older than 20 years old, which showed that people with MS have had their quality of life reduced when compared to those who do not have MS[36]. It is evident that, through graphic analyses, the quality of life domains translate results of disastrous impacts on the health and quality of life of adults affected by MS. Although the majority of the adults with MS have compromised QoL domains, it is possible to continue living with quality of life as long as care, health promotion, and rehabilitation practices are adopted in the population.

It is evident that, through graphic analyses, the quality of life domains translate results of disastrous impacts on the health and quality of life of adults affected by MS. Although the majority of the adults with MS have compromised QoL domains, it is possible to continue living with quality of life as long as care, health promotion, and rehabilitation practices are adopted in the population.

In this context, studies that identify the relation between the MS and Quality of life variables are of great interest for the professionals working in public health since, by understanding these variables, it is possible to establish strategies for health promotion and to deliver the clinical health care needed to achieve improvements in the quality of life and health of this population. The aforementioned considering that MS can negatively impact the Unified Health System and the Social Security System, mainly due to the deleterious effects caused by the pathology in question, which can bring onerous expenses related to treatment, such as the supply of medications and hospitalizations, as well as the maintenance of pensions caused by cardiovascular disease.

Conclusion

The survey data show how young and middle-aged adults are exposed to cardiometabolic risks and that the prevalence remains high for the components of the MS, negatively interfering in the quality of life of these adults. This reinforces the need to adopt a healthy lifestyle, considered the most viable and accessible cardioprotective factor.

The results of the research point to the need for public health policies aimed at adult patients with MS, since the chronic illness due to the syndromic complex has repercussions on the living

conditions and shows chaotic conditions in people's health, being possible to observe a deterioration of quality of life in its domains of functional capacity, pain, general health, emotional and social aspects, and mental health.

It is expected that this study will be used as a subsidy for the evaluation, tracking, and monitoring of adults attended in Basic Health Units (BHUs) present in Primary Health Care, distributed throughout the Brazilian territory and serve as a model for the production of clinical health care aimed at patients with MS in order to ensure health promotion and comprehensive care in Primary Health Care services, through primary health surveillance actions and educational interventions, which positively impact the health situation of the communities.

The possible limitations of the study are due to the methodological design of the cross-sectional approach and to the sample size of research participants, which makes it difficult to establish a cause and effect relation, since they are analyzed in a single moment in a health unit, making it impossible to make generalizations. It is necessary to clarify that the 108 individuals in the study have basic conditions such as obesity, diabetes and hypertension, therefore being a limiting factor of the study that cannot be generalized to the general population. Furthermore, it reinforces the need for new longitudinal research studies to understand the factors associated with MS in adults living in other social, cultural, and economic contexts.

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