REME • Rev Min Enferm. 2017;21:e-1069
DOI: 10.5935/1415-2762.20170079

RESEARCH

VALIDATION OF METABOLIC SYNDROME AND ITS SELF REPORTED COMPONENTS IN THE CUME STUDY

VALIDAÇÃO DA SÍNDROME METABÓLICA E DE SEUS COMPONENTES AUTODECLARADOS NO ESTUDO CUME

VALIDACIÓN DEL SÍNDROME METABÓLICO Y DE SUS COMPONENTES AUTODECLARADOS EN EL ESTUDIO CUME

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Submitted on: 2017/09/15 Approved on: 2017/10/23

ABSTRACT

The aim of this study was to analyze the validity of self-reported diagnoses of metabolic syndrome (MetS) and its components through participants of the Cohort of Universities of Minas Gerais (CUME). A subsample of 172 cohort participants (33 males and 139 females, age 38 ± 11 years) was randomly selected for this study. The presence of MetS was defined according to the criteria of the International Diabetes Federation (IDF). Data on weight, height, blood pressure, and serum concentration of glucose, triglycerides and HDL-c were self reported in an online cohort questionnaire, and the same variables were measured using a standardized protocol in laboratories of higher education institutions involved in the project. Self-reported and measured data were compared by means of intraclass correlation coefficient (ICC), Kappa coefficient (k) and differences between self-reported and measured data, according to the Bland and Altman method. The prevalence of MetS was 4.7% and 5.2% according to self-reported and measured data, respectively. The Kappa coefficient between diagnoses of self-reported and measured MetS was 0.814, indicating almost perfect agreement, a situation similar to that observed for obesity (k = 0.882). The other components of MetS had moderate agreement (k = 0.41 to 0.60). The ICC also indicated excellent agreement for weight, height, BMI and HDL-c, respectively, 0.989, 0.995, 0.983 and 0.761. Glucose presented low agreement (ICC: 0.366). The study concludes that the CUME project participants provided valid information for the self-reported diagnoses of MetS and its components.

Keywords: Chronic Disease; Metabolic Syndrome X; Validation Studies; Self Report.

RESUMO

O objetivo deste estudo foi analisar a validade dos diagnósticos autodeclarados de síndrome metabólica (SM) e de seus componentes pelos participantes da Coorte de Universidades Mineiras (CUME). Uma subamostra de 172 participantes da coorte (33 homens e 139 mulheres, idade 38 ± 11 anos) foi aleatoriamente selecionada para este estudo. A presença de SM foi definida segundo os critérios da International Diabetes Federation (IDF). Dados de peso, altura, pressão arterial, concentração sérica de glicose, triglicerídeos e HDL-c foram autodeclarados em questionário online da coorte e as mesmas variáveis foram aferidas presencialmente mediante protocolo padronizado em laboratórios das instituições de ensino superior envolvidas no projeto. Os dados autodeclarados e aferidos foram comparados por meio de coeficiente de correlação intraclasse (CCI), coeficiente Kappa (k) e diferenças entre medidas autodeclaradas e aferidas segundo a metodologia de Bland e Altman. As prevalências da SM foram de 4,7%e 5,2%, de acordo com os dados autodeclarados e aferidos, respectivamente. O coeficiente Kappa entre diagnósticos de SM autodeclarado e aferido foi 0,814, indicando concordância quase perfeita, situação similar à observada para a obesidade (k=0,882). Os demais componentes da SM apresentaram concordâncias moderadas (k=0,41 a 0,60). Os CCIs também indicaram excelente concordância para peso, estatura, IMC e HDL-c, respectivamente, 0,989, 0,995, 0,983 e 0,761. A glicose apresentou baixa concordância (CCI: 0,336). Concluiu-se que participantes do projeto CUME forneceram informações válidas para os diagnósticos autodeclarados de SM e de seus componentes.

Palavras-chave: *Doença Crônica; Síndrome X Metabólica; Estudos de Validação; Autorrelato.*

How to cite this article:
Miranda AES, Ferreira AVM, Oliveira FLP, Hermsdorff HHM, Bressan J, Pimenta AM. Validation of metabolic syndrome and its self-reported components in the CUME study. REME – Rev Min Enferm. 2017[cited _____ ___ ___];21:e-1069. Available from: _____ DOI: 10.5935/1415-2762.20170079

RESUMEN

El objetivo de este estudio fue analizar la validez de los diagnósticos autodeclarados de síndrome metabólico (SM) y de sus componentes por los participantes de la Cohorte de Universidades Mineras (CUME). Para este estudio fue aleatoriamente seleccionada una submuestra de 172 participantes de la cohorte (33 hombres y 139 mujeres, edad 38 ± 11 años). La presencia de SM fue definida según los criterios de la International Diabetes Federation (IDF). Los datos de peso, altura, presión arterial, concentración sérica de glucosa, triglicéridos y HDL-c fueron autodeclarados en un cuestionario en línea de la cohorte y las mismas variables fueron evaluadas presencialmente mediante un protocolo estandarizado en laboratorios de las instituciones de enseñanza superior involucradas en el proyecto. Los datos autodeclarados y evaluados se compararon mediante el coeficiente de correlación intraclase (CCI), el coeficiente Kappa (k) y las diferencias entre medidas autodeclaradas y evaluadas según la metodología de Bland y Altman. Las prevalencias de la SM fueron del 4,7% y del 5,2% de acuerdo con los datos autodeclarados y evaluados, respectivamente. El coeficiente Kappa entre diagnósticos de SM autodeclarado y constatado fue 0,814, indicando concordancia casi perfecta, situación similar a la observada para la obesidad (k = 0,882). Los demás componentes de SM presentaron concordancias moderadas (k = 0,41 a 0,60). Los CCI también indicaron una excelente concordancia para peso, estatura, IMC y HDL-c, respectivamente, 0,989, 0,995, 0,983 y 0,761. La glucosa presentó baja concordancia (CCI: 0,336). Se concluye que los participantes del proyecto CUME proporcionaron información válida para los diagnósticos autodeclarados de SM y sus componentes.

***Palabras clave**: Enfermedad Crónica; Síndrome X Metabólico; Estudios de Validación; Autoinforme.*

INTRODUCTION

The Metabolic Syndrome (MetS) is a combination of metabolic and cardiovascular risk factors, associated to an increased risk of cardiovascular diseases (CVD), type 2 diabetes mellitus (DM2) and general mortality.[1]

The prevalence of MetS is increasing in epidemic proportions both in developed and developing countries, affecting from 20% to 45% of their populations.[2] In the United States, the prevalence of Mets increased from 21.8%[3] to 33.0%[4] in the last 15 years. A systematic review indicated that the prevalence of MetS in Brazil is 29.6%.[5]

On the other hand, Internet access has been increasing in the world and in Brazil,[6] allowing for advances in the methodology of researches and making data collection through online self-completed questionnaires a promising alternative when it comes to health.[7] Indeed, populational studies can use self-reported information as proxies of the measures being analyzed, since it is low cost, highly practical and logistically better.[8]

However, validation studies are important to guarantee the validity of the self-reported data[9], since the differences between self-reported information and that found in other types of research may be influenced by specific characteristics of the participants, such as gender, age, education and socioeconomic conditions.[10]

Considering that, this study aimed to analyze the validity of the self-reported MetS diagnoses and its components in a sub-sample of participants from the Cohort of Universities of Minas Gerais (CUME project).

METHODS

Design and sample of the study.

This study discusses the validation of MetS diagnoses and their components, which were self-reported through the online questionnaire of the CUME project, which aims at studying the impact of the Brazilian dietary habits and of the nutritional transition about the non-communicablediseases in alumni from two federal higher teaching institutions in the state of Minas Gerais, Brazil.

The collection of data from the cohort baseline took place from March to August 2016. Participants were invited to participate through e-mail, and those who agreed with the Free and Informed Consent Form received an online questionnaire divided in two stages: in the first one, they answered questions regarding their sociodemographic characteristics, lifestyle, individual and family morbidity, and anthropometric data. In addition, they reported the last two-year results of the following exams: total cholesterol, HDL cholesterol (HDL-c) and LDL cholesterol (LDL-c), triglycerides, glycemia, systolic and diastolic bloodpressure and their current use of medication. In the second stage, participants completed the food frequency questionnaire (FFQ) and additional questions related to dietary practices and consumption of specialty products.

For the MetS validation stage, a random sample of 200 people, weighted on the variables gender, skin color, age, marital status, education, professional situation, city, body mass index (BMI), smoking, alcohol consumption, practice of physical activity, regular work in the last 12 months, information on biochemical and clinical exams, health state classification, number of meals per day, and quantity of salt and sugar in the meals. The selection was made among the 731 participants of the basely of the project CUME, who answered the following information on the variables that make up the MetS diagnoses in the online questionnaire. Due to logistic convenience issues, we restricted our populational universe and only considered eligible the participants who lived in the two cities where the universities are. The sizing of the sample followed the same standard of other validation studies conducted about the same theme.[9,11]

Participants were invited through e-mails, which asked them to respond communicating at what day and time they would be available for on-site data collection. If after three attempts the

participant did not answer, he or she was considered to be a sample loss. Pregnant women, women in the puerperium, and participants that reported loss or gain of weight above 10% after filling the online questionnaire, were excluded from the research. The final sample, thus, was composed by 172 participants.

Face-to-face data collection

Before the beginning of data collection, which took place from September 2016 to March 2017, the interviewers — postgraduation students of Nursing and Nutrition from the institutions involved — were trained by a field supervisor during a week, to standardize the anthropometric evaluation and the checking of blood pressure in both institutions. On the other hand, blood collections were carried out by nurses with professional experience in the practice.

The individuals that agreed to participate in the on-site data collection were asked to show up after a 12 hour fast, between 07:30 and 09:30 A.M., in the labs of both superior teaching federal institutions. In addition, they had not been through any vigorous physical activities nor had they ingested alcohol in the last 24 and 48 hours, respectively, before the collection, as per previous instructions.

The measurements of weight and height followed the procedures described by Lohman et al.[12], using, respectively, a portable digital scale (from the brand Marte, Model LC200-PP), capable of supporting 200 kg and 50 g precision. The stadiometer used was by Alturaexata® (Belo Horizonte, Brazil), with a maximum height of 213 cm and precision of 0.1 cm. After height and weight were assessed, the BMI was calculated.

The blood pressure of participants was checkedaccording to the recommendations of the Brazilian Cardiology Society, using a validated automatic device (Omron HEM 7200, China). The interval between the three verifications was two minutes.[14] The height and blood pressure of the patients were measured three times and the results were registered in a form. The mean of three measurements used as a result.

In order to conduct the biochemical evaluation, blood samples were collected through a venipuncture, after a 12-hour fast. Later, the material was taken to the labs for centrifugation and serum samplealiquoting. The samples were then stored at -80ºC for later analysis. The serum dosages of glucose, HDL-c and triglycerides were determined by the enzymatic method, using commercial kits of the Labtest® brand.

The participants had access to the results of the physical and laboratory exams. In the event of an abnormality being found, the project coordinator contacted the participant and told him to seek the adequate health care treatment.

The CUME project is in accordance to the ethical principles of non-maleficence, beneficence, justice and autonomy in the Resolution nº 466/12 of the National Health Council. The project was also approved by the Ethic Committees for Human Being research of both the Federal University of Minas Gerais and the Federal University of Viçosa (protocol nº 596.741-0/2013). The same is true for the validation study (protocol nº1,588,799/2016). All participants signed the Free and Informed Consent Form.

MetS Diagnostic

In order to avoid underestimating the self-reported MetS prevalence in the online questionnaire and obtain more information, the participants answered about each component separately[9], and the MetS was defined, later, according to the criteria of the International Diabetes Federation (IDF)[1], which classifies a BMI ≥ 30 kg/m^2 as central obesity. According to the IDF, in addition to central obesity, two or other criteria are needed to classify MetS, which are: hypertriglyceridemia – triglycerides ≥ 150 mg/dL and/or hypertriglyceridemia treatment; low HDL-c– HDL-c< 40 mg/dL for men and < 50 mg/dL for women or treatment for low HDL-c levels; hypertension – systolic bloodpressure (SBP) ≥ 130 mmHg and/or diastolic bloodpressure (DBP) ≥ 85 mmHg and/or treatment for arterial hypertension; hyperglycemia –fasting glycemia ≥ 100 mg/dL and/or previous diagnoses of DM2. In addition to the use of medication, the medical diagnostic was also used to classify hypertension and hypertriglyceridemia.

The IDF criteria was used, since the pilot-study of the CUME study detected that most participants did not have, in their residence, a metrical tape for the assessment of their waist, which would make it difficult for them to check this measurement.

For this validation study, each component was also individually assessed for a posterior MetS diagnostic.

Data analysis

Data is here presented through frequencies, averages, standard deviation, and 95% confidence intervals (95% CI). The normality of continual variables was verified through the Shapiro-Wilk test. The Mann-Whitney U test was used to compare the self-reported numbers declared by the potential participants and those from the sub-sample verified.

According to the recommendations of Bland and Altman[15], the differences between the self-reported measured values and those checked later were estimated. The relative meanerror was also calculated, expressed in percentage, considering the quotient of the difference between the self-reported number and the one checked later, and taking into account their mean. Therefore, the negative results represent an underestimation of the averages self-reported by the participants, while positive results indicate overestimated values.

Intraclass Correlation Coefficients (ICC) and their respective 95% confidence intervals (95% CI) were determined to evaluate to what extent the self-reported results agree to the verified ones for each variable that composes the MetS diagnoses. According to the criteria of Kramer and Feinstein, agreements of ICC ≥ 0.75, 0.40 ≤ ICC < 0.75, andICC< 0.40, were respectively considered "excellent", "moderate" and "low".

Finally, Kappa coefficient were calculated to analyze the agreement between the prevalence of MetS diagnoses and their self-reported and assessed measurements, according to the criteria of Landis and Koch[17], which are: almost perfect (0.81 a 1.00); substantial (0.61 a 0.80); moderate (0.41 a 0.60); regular (0.21 a 0.40); discrete (0 a 0.20); and poor (< 0).

The statistical analysis was conducted with the software Stata® (version 13), with a level of statistical significance of 5%.

RESULTS

A total of 172 alumni from the two higher teaching institutions participated in the study, 139 of whom were women (80.8%). About one third of them were between 30 and 39 years of age. Comparing the sub-sample of the validation study with the potential participants regarding their demographic, anthropometric and metabolic variables, no statistically significant differences were found, except for weight (Table 1).

Table 1 - Comparison between the demographic, anthropometric and metabolic variables self-reported by the potential participants and sub-sample of the validation study, CUME project, Minas Gerais, 2017

Variables	Potential participants	Sub-sample	P-value*
Age (years)	37.9 (37.0-38.8)	38.2 (36.5-39.9)	0.687
Weight(kg)	68.8 (67.6-70.0)	66.4 (64.2-68.7)	**0.040**
Height (m)	1.66 (1.65-1.67)	1.66 (1.64-1.67)	0.216
BMI (kg/m²)	24.8 (24.4-25.1)	24.1 (23.4-24.8)	0.064
SBP(mmHg)	114.6 (113.6-115.5)	113.7 (112.0-115.4)	0.239
DBP (mmHg)	74.7 (74.0-75.5)	73.6 (72.3-74.8)	0.162
Glucose (mg/dL)	83.3 (82.2-84.4)	84.3 (81.9-86.6)	0.926
HDL-c(mg/dL)	58.9 (57.3-60.5)	58.8 (56.0-61.6)	0.978
Triglycerides (mg/dL)	120.0 (114.9-125.1)	120.9 (111.2-130.5)	0.942

Data from meannumbers (95%confidence interval); BMI: body mass index; SBP: SBP: systolic bloodpressure; DBP: diastolic bloodpressure; HDL: High-density lipoprotein * P-values according to the Mann-Whitney U test.
Source: elaborated by the authors based on the data of the research.

Comparing the found data with that declared by the participants, there was a significant difference for the SBP, DBP, glucose, and HDL-c results. However, these differences can be considered irrelevant from a clinical perspective. The agreementof the self-reported and measured weight (ICC: 0.989; IC 95% 0.985-0.992), height (ICC: 0.995; IC 95% 0.993-0.996), BMI (ICC: 0.983; IC 95% 0.976-0.987) and HDL-c were found to be excellent. The other variables presented moderate agreement, from the DBP, with 0.486 (IC 95% 0.294-0.624) to the triglycerides, with 0.690 (IC 95% 0.579-0.770). Glucose levels, however, presented a low agreement (ICC: 0.336; IC 95% 0.098-0.511) (Table 2).

Table 2 - Averagesand Interclass Correlation Coefficient (ICC) for self--reported and measured anthropometric and metabolic data of the sub-sample of participants of the validation study of the CUME project, Minas Gerais, 2017

Variables	Self-reported Mean (95%IC)	Measured Mean (95%IC)	ICC (95%IC)	P-value**
Weight (kg)	66.4 (64.2-68.7)	67.0 (64.7-69.3)	0.989 (0.985-0.992)	<0.001
Height (m)	1.66 (1.64-1.67)	1.66 (1.64-1.67)	0.995 (0.993-0.996)	<0.001
BMI (kg/m²)	24.1 (23.4-24.8)	24.3 (23.7-25.0)	0.983 (0.976-0.987)	<0.001
SBP (mmHg)	113.7 (112.0-115.4)*	116.2 (114.3-118.1)*	0.667 (0.547-0.755)	<0.001
DBP (mmHg)	73.6 (72.3-74.8)*	76.4 (75.1-77.8)*	0.486 (0.294-0.624)	<0.001
Glucose (mg/dL)	84.3 (81.9-86.6)*	77.8 (75.4-80.2)*	0.336 (0.098-0.511)	0.002
HDL-c (mg/dL)	58.8 (56.0-61.6)*	55.3 (52.8-57.8)*	0.761 (0.673-0.825)	<0.001
Triglycerides (mg/dL)	120.85 (111.2-130.5)	123.1 (114.0-132.2)	0.689 (0.579-0.770)	<0.001

95% CI: 95% confidence interval; BMI: body mass index; SBP: systolic bloodpressure; DBP: diastolic bloodpressure; HDL: high-density lipoprotein; *Significant statistical difference; **P-value of the ICC.
Source: elaborated by the authors based on the data of the research.

Considering the absolute mean differences between the self-declared and measured values (Table 3), it can be found that participants have underestimated their weight in 569g; their BMI in 0.215 kg/m²; their SBP in 2.511 mmHg; their DBP in 2.881 mmHg; and their triglyceride levels in 2.247 mg/dL. They also overestimated their glucose levels in 6.453 mg/dL and their HDL-c in 3.490 mg/dL. There was no difference between the self-reported height measurements and those taken on this study. Glucose presented the highest mean error (about 8%).

The prevalence of MetSwas 4.7% and 5.2%, respectively, according to the self-reported and measured data. The agreement between self-declared and measured MetS diagnoses was almost perfect (Kappa=0.814); a similar result was found for obesity. For the diagnoses of the other MetS components, the agreements were moderate (k=0.41 to 0.60) (Table 4).

Table 3 - Absolute and relative deviations of self-reported and measured anthropometric and metabolic data. CUME project. Minas Gerais. 2017

Variables	Mean* (SD)	Absolute deviation (SD)	Relative mean error
Weight (kg)	66.7 (14.9)	-0.569 (3.1)	-0.853
Height (m)	1.66 (0.1)	0.000 (0.0)	0.000
BMI (kg/m2)	24.2 (4.5)	-0.215 (1.2)	-0.888
SBP (mmHg)	114.9 (10.5)	-2.511 (11.9)	-2.185
DBP (mmHg)	75.0 (7.1)	-2.881 (10.0)	-3.841
Glucose (mg/dL)	81.0 (12.2)	6.453 (19.6)	7.967
HDL-c (mg/dL)	57.0 (16.2)	3.490 (15.6)	6.123
Triglycerides (mg/dL)	122.0 (54.3)	-2.247 (60.8)	-1.842

BMI: body mass index; SBP: systolic bloodpressure; DBP: diastolic bloodpressure; HDL: High-density lipoprotein; *(self-reported value + measured value/2); SD: standard deviation; absolute difference: informed value - measured value; relative mean error: difference/mean value * 100.
Source: elaborated by the authors based on the data of the research.

Table 4 - Agreementof the diagnostic of metabolic syndrome and its components, CUME project, Minas Gerais, 2017

Variables	Self-reported n (%)	Measured n (%)	Kappa Coefficient	P-value*
Obesity	19 (11.0)	19 (11.0)	0.882	<0.001
Hypertension	29 (16.9)	42 (24.4)	0.560	<0.001
Hyperglicemia	21 (12.2)	13 (7.6)	0.546	<0.001
Low HDL-c	68 (39.5)	76 (44.2)	0.499	<0.001
Hyper triglyceridemia	30 (17.4)	49 (28.5)	0.499	<0.001
Metabolic syndrome	8 (4.7)	9 (5.2)	0.814	<0.001

*P-value of the Kappa coefficient; HDL: High-density lipoprotein.
Source: elaborated by the authors based on the data of the research.

DISCUSSION

The results of this study showed high agreement between online and on-site answers, indicating a high validity of the self-declared MetS diagnoses and its components, when compared to the measures taken by the participants of the CUME project.

Previous national studies evaluated the validity of self-reported weight, height, and BMI measures[10], as well as diabetes mellitus[18] and hypertension[19]. Therefore, this study was a pioneering effort to evaluate the validity of self-reported diagnoses of MetS and its components.

The Kappa coefficient between the self-reported MetS diagnoses and the results measured was of 0.814, indicating an almost perfect agreement. A study conducted by Barrio-Lopez et al.[9], with a sub-sample of the Spanish cohort SUN, used medical records as a golden-standard and showed a Kappa coefficient of 0.97 between the self-reported MetS diagnoses and the confirmed diagnoses, according to criteria from the IDF.

Many participants of the CUME project are health professionals who, possibly, have more knowledge about general health, which translates into more precise self-reports, and consequently, in higher ICC results.[20] Therefore, the validity of self-reported data depends on the understanding the individual has about the disease, their ability to remember and their willingness to report.[21]

The fact that the participants were not told that their self-declared data could later be validated through direct measurements increases the potentialities of the study[11,20] and excludes one of the possible causes of error: the knowledge of the research objectives by a part of the population.[10]

Considering the anthropometric MetS components, the agreements were excellent for weight, height, and BMI, as demonstrated by high ICC results (≥ 0.75). Similar results were found by Fonseca et al.[10] for weight (ICC: 0.977) and height (ICC: 0.943), in a study with 3.713 public employees of a university in Rio de Janeiro. On the other hand, a study conducted with adults from a countryside population in the Brazilian Northeast has shown moderate ICC results for height and BMI – respectively, 0.60 and 0.53.[22] The lowest ICCs found in the study of Martins et al.[22] can be related to the low educational and income level of the population, when compared to the sub-sample of the CUME project.

The differences between self-reported anthropometric measurements and the measures taken later can be considered of low magnitude in our study. Regarding weight, the mean difference was near -0.6kg, inferior to the -1.1kg difference found by Fonseca et al.[10] This group of investigators also found differences between the self-reported and measured heights, while, in this study, there was no such difference, highlighting the high level of agreement. This lower difference might be due to the elevated educational level of the participants of the CUME project, since they are all alumni from undergraduate and postgraduate courses, while the participants of the study by Fonseca et al.[10] are active administrative and technical workers.

The agreement between self-reported and measured obesity diagnoses (BMI ≥30 kg/m^2) was almost perfect (k > 0.81). The prevalence of obesity estimated from the measured data (11%) was inferior to that found in the Brazilian population, possibly due to the inverse association between obesity and education.[23]

There was a statistical differencebetween self-reported and measured results for SBP and DBP, indicating a moderate agreement between the two measurements (SBP: ICC 0.667; PBD: ICC 0.486). In spite of that, the ICC values were better than those found by Fernández-Montero et al.[11] in a validation study of MetS components (SBP: ICC 0.47; DBP: ICC 0.46), in a research conducted with participants of the Spanish cohort SUN. A cross-sectional study with a populational base con-

ducted by Selem et al.[19], with 535 participants of the Health Questionnaire in the City of São Paulo (ISA-Capital 2008) had a Kappa coefficient of 0.52, when comparing self-reported and measured hypertension diagnoses, indicating a moderate agreement, a similar result to that found in this study. Contradictory results might be explained by the cut-off points used in the diagnostic. In our study, the classification of hypertension was defined according to the blood pressure levels (SBP ≥ 130 mmHg and/or DBP ≥ 85 mmHg), and/or the use of antihypertensive medication, according to the proposed standard for the definition of MetS.[1]

On the other hand, the prevalence of hypertension according to the measured data was superior to that of the self-reported data (24.4% versus 16.9%). The differences in self-reported and measured blood pressure levels, and the consequent difference in the self-reported and measured hypertension values, can be explained by fluctuations caused by the intraindividual biological variability of bloodpressure, as well as by the influence of the white coat effect.[9]

When it comes to the biochemical variables, glucose, triglycerides and HDL-c, they presented, respectively, low, moderate, and excellent agreement between the self-reported and measured data. Additionally, the glucose has shown a significant absolute difference and relative meanerror. The ICC of this variable was inferior, and its relative error was superior to that found in the validation study conducted in the Spanish cohort SUN.[11]

Although the glucose presents a low ICC, it can be verified that the clinical aspect was not really impacted, since the agreement between self-reported and measured hyperglycemia diagnoses (which is an MetS component) was moderate (Kappa of 0.546). Also, differences found between self-declared and measured values can probably be attributed to biological variability[24] and to the fact that the self-reported data had been based on exams conducted in the last two years.

Regarding triglycerides and HDL-c, the ICC of the first was slightly lower than that of the Spanish cohort SUN, while the latter was slightly higher.[21] The most prevalent components of the sample were the low serum concentration of HDL-c and the hypertriglyceridemia, respectively, 44.2 and 28.5%. These two components also present low magnitude Kappa coefficients (k = 0.499), which could be explained by intraindividual variations in the plasmatic lipids caused by the analytic variation and the influence of environmental factors (diet, physical activity, and seasonal changes).[25]

As a limitation of this study, one can consider the interval of nearly six months between the completion of the online questionnaire and the presentialcollection. Despite that, the validity between the self-reported and measured data yielded good results. For that matter, a study conducted with a similar population found acceptable validity between two measurements of data, even after a five-year period had passed, in some cases, between the two measurements.[11]

CONCLUSION

The results of the present study evidenced the almost perfect agreement between the self-reported and measured MetS diagnostic. When it comes to the MetS components,obesity has also presented an almost perfect agreement, while the others (hypertension, hyperglicemia, low HDL-c, and hypertriglyceridemia) have shown moderate agreement.

ACKNOWLEDGEMENTS

The authors would like to thank all participants of the study, without whom it would not have been possible. They would also like to thank the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), for the PhD scholarship conceded to AES Miranda, and the Fundação de Amparo à Pesquisa de Minas Gerais(FAPEMIG), for the financing of the CUME project. HHM Hermsdorff, J Bressan, and FLP de Oliveira are are research productivity fellows offered by the ConselhoNacional de DesenvolvimentoCientífico eTecnológico(CNPq).

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