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A STRUCTURAL EQUATION APPROACH FOR MODELING METABOLIC SYNDROME STATUS IN AN ADULT AND OLDER NORTH-EASTERN PORTUGUESE POPULATION

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INTRODUCTION

The metabolic syndrome (MetS) is characterized by an interrelated cardiometabolic risk factors, specifically central obesity, dysglycemia, dyslipidemia and arterial hypertension (Teixeira et al., 2021). Recently, a high prevalence has been described for MetS components in Portuguese population when analyzed separately such as: overweight (39.1%) and obesity (28.6%), hypertension (42.2%), high-risk lipid profile (73.0%) and high levels of insulin resistance (41.6%) (Raposo et al., 2017; Scuteri et al., 2015). Concretely, the MetS prevalence in adult and older North-Eastern Portuguese population was between 37.2% to 54.51% (Magalhães et al., 2023). Knowing which factors are more important in the development of MetS can lead to cardiovascular and metabolic illnesses prevention and treatment .

AIM

Aim – The aim of this study was to analyze the weighting factors for modeling metabolic syndrome status (3-, 4-, and 5-MetS components) in an adult and older North-Eastern Portuguese population

Research Hypothesis – It was hypothesized that:

- WC, SBP, and IFG had a larger proportional contribution to the prediction of the change in MetS status.
- The relative importance of each factor in the change in MetS status varies depending on the sex and age.

RESULTS

Weighting factors with the greatest effect were WC, FG, SBP and DBP, whereas there were no significant effects for HDL and TG.

Waist circumference (WC)
(β = 0.24, 95% CI: 0.19–0.29, p <0.001)

Fasting glucose (FG)
(β = 0.17, 95% CI: 0.12– 0.22; p <0.001)

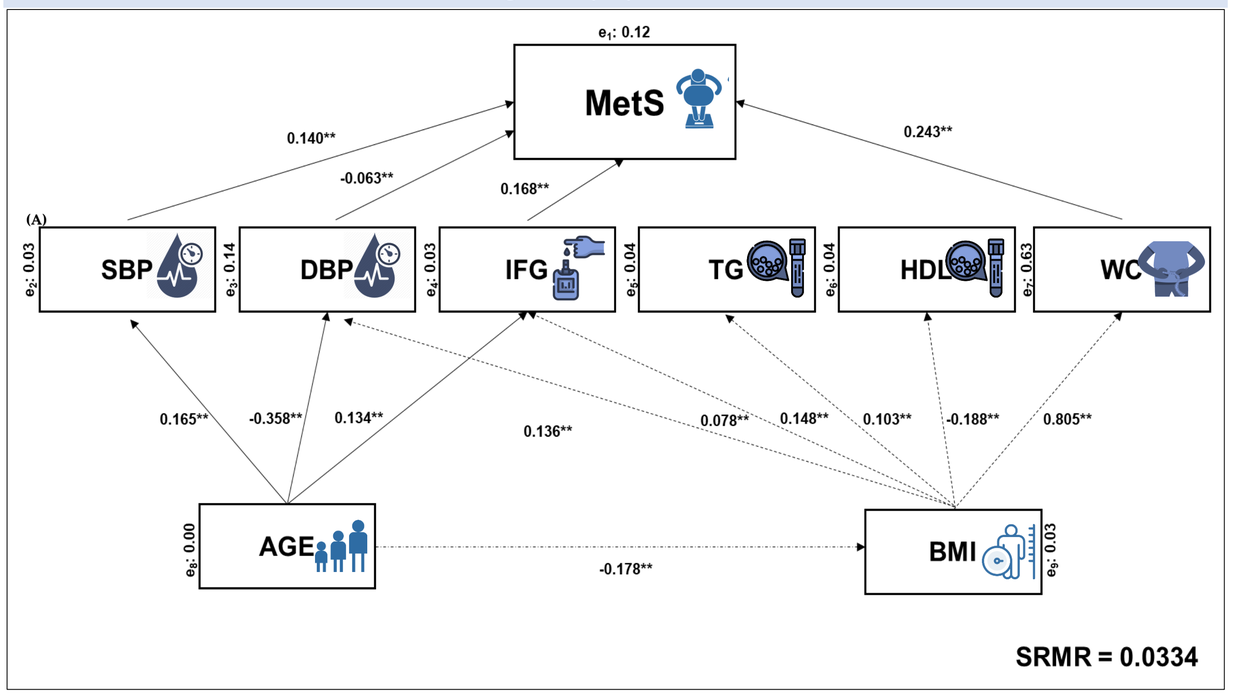
Systolic blood pressure (SBP)
(β = 0.14, 95% CI: 0.09–0.19; p < 0.001)

Dyastolic blood pressure (DBP)
(β = 0.06, 95% CI: 0.01–0.11; p < 0.001

High-density lipoprotein cholesterol (HDL-c)
(β = 0.18, 95% CI: 0.12–0.23; p ≥ 0.05)

Triglycerides (TG)
(β = 0.05, 95% CI: 0–0.10; p ≥0.05).

Table 1. *Adjusted goodness-of-fit model for the effects of the MetS components for this adult and older North-Eastern Portuguese population*



Subtitles: *BMI – body mass index; DBP – diastolic blood pressure; FG – fasting glucose; TG – triglycerides; HDL – low high-density lipoprotein cholesterol; SBP – systolic blood pressure; WC – waist circumference.*

METHOD

A cross-sectional, observational and retrospective analysis was conducted between January 2019 and December 2020 from patients' clinical records of 3,581 individuals with MetS condition (18–102 years) (Teixeira et al., 2021; Magalhães et al., 2023). A total of 18,890 individuals were analyzed, but 12,320 of them were disqualified from the data analysis based on the exclusion criteria listed below: (i) Participants under the age of 18; (ii) Missing data about the clinical MetS criteria, including height, weight, BMI, and demographic factors. Of them, 2989 people (i.e., those with less than or equal to two components) did not have a diagnosis of MetS. A structural equation modelling (SEM) analysis was applied using a standardized root mean square residuals (SRMR) with a path-flow method and a two-step maximum likelihood approach. MetS was diagnosed using Joint Interim Statement (JIS) criteria. Confirmatory model had a good adjustment (SRMR = 0.0334) (Teixeira et al., 2021).

CONCLUSIONS

- The action of low-density lipoproteins and triglyceride-rich lipoproteins cannot be discarded in the accumulation of atheroma plaques, as well as in the relationship amongst atherosclerosis and major adverse cardiovascular events (MACE).
- JIS definition has been widely debated to adding a better screening criterion for modelling the MetS diagnosis and progression using other criteria such as waist-to-height ratio (WhtR), waist-to-hip ratio (WHR), mean arterial pressure (MAP) and low-density lipoproteins (LDL) levels.
- Futures multivariate models should include exercise-related variables, i.e., frequency, intensity, time and type (FITT) principles, to measure the impact of the physical exercise on the MetS status change.

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