Contribution ID: **290** Type: **Poster**

The double burden of malnutrition and its agreement with body composition indicators in Latin American children and adolescents. The SAYCARE Study.

Background: Undernutrition in childhood has traditionally been a major concern for public health in low and middle-income countries. However, rapid changes in lifestyles contributed to the increase in the prevalence of obesity and other chronic diseases. Coexistence of excess body weight with growth deficit is known as the "double burden of malnutrition". Anthropometry is a simple and recognized method to assess body composition, although it has limitations. Body mass index (BMI) provides information about total body mass but doesn´t discriminate between fat mass and fat free mass.
Objectives: (I) to assess body composition indicators in Latin American children and adolescents belonging to the South American Youth/Child cARdiovascular and Environmental (SAYCARE) study and (II) to assess the agreement between the double burden of malnutrition classification and the excess of body fat in children and adolescents.
Methods: Subjects were selected from seven participating cities (Buenos Aires, Medellin, Lima, Montevideo, Santiago, Sao Paulo y Teresina) stratified by age and sex. Anthropometric standard procedures included weight, height, circumferences and skinfolds. According to nutritional status, the population was classified in: low height/overweight (LH/OW, double burden of malnutrition), low height/normal weight (LH/NW), normal height/overweight (NH/OW) and normal height/normal weight (NH/NW). Fat mass index (FMI) and Fat free mass index (FFMI) were used as body composition indicators, and Z-scores were computed using linear regression analyses and then entered as residuals into further analyses. Comparisons between categories according to the nutritional status were performed by analysis of variance. Agreement between the double burden classification and excess body fat classification (FMI>1SD) was performed using the Kappa test. ROC curves were designed to assess the ability of the double burden of malnutrition, using ZBMI and a composite index using the sum of ZBMI and Zheight (ZBMI+(Zheight X -1)), to identify subjects with excess of body fat.
Results: In children, FMI z-scores were: 0.37 ±0.73 (Mean ±SD) in the group of the double burden, and -0.55 ±0.36, 0.74 ±0.90 and -0.46 ±0.49 in the LH/NW, NH/OW and NH/NW groups, respectively. In adolescents, the values were: 1.46 ±1.21, -0.61 ±0.72, 1.07 ±0.98 and -0.61±0.70 in the same groups, respectively. The Kappa coefficient showed a low agreement between the double burden of malnutrition classification and the excess of FMI (k=0.02 and 0.14 in children and adolescents, respectively). However, the ROC curves showed a good ability of the double burden of malnutrition classification to identify subjects with excess FMI. The areas under the ROC curves were 0.972 for ZBMI (CI: 0.957, 0.988) and 0.783 for composite ZBMI and Zheight (CI: 0.726, 0.840) in children; and 0.956 for ZBMI (CI: 0.937, 0.975) and 0.862 for composite ZBMI and Zheight (CI: 0.825, 0.898) adolescents.

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Session Classification: Poster Session 7

Track Classification: Epidemiology