Sessione

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comunicazioni orali

Very similar or widely variable?

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A recurring theme in the literature on body composition and related diseases is the recommendation to compare each sample to a population-specific reference. This contribution discusses the drawbacks and the potential theoretical and methodological flaws associated with this approach.
A central issue concerns the very concept of 'population', which remains ill-defined in human biology and is often improperly used interchangeably with the terms terms 'ethnicity' or 'race'. Despite authoritative statements highlighting the lack of biological validity of such categories, expressions like 'Caucasians' are still widely employed in the biomedical literature.
When used appropriately - to identify groups sharing specific characteristics such as age, sex, or geographic ancestry - a population-specific reference can be useful, for example when comparing athletes to their peers.
However, in health-related contexts, as is typical for most studies on body composition, relying on population-specific references obscures intergroup variability that should instead be acknowledged and analysed. Notably, population-specific features of body composition may also signal widespread adverse health conditions.
From a diagnostic perspective, comparisons should be made against a standard defined as such because it represents a normative or desirable target. In addition, cut-off values should be chosen based on the underlying statistical distributions. Relying on simplistic thresholds (e.g. 2 SD) in the case of non-normal distributions may result in substantial misclassification.
In conclusion, with the exception of studies aimed at focused comparisons, health-related assessments should be based on standards that represent healthy body composition. In the absence of reliable standards, large international references - which include a wide range of variability and patterns of normality - may be a more appropriate alternative to strictly population-specific references. The distribution of variables should always be considered.

Specific bioelectrical vector reference values for Italian adults: a multicentre study

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Specific bioelectrical impedance vector analysis (*sp* BIVA) is a semi-quantitative approach for the analysis of body composition. *Specific* vectors can be evaluated using tolerance ellipses to compare individual or mean characteristics with those of the reference population or using confidence ellipses to make statistical comparisons between groups. Tolerance ellipses are currently available for Italo-Spanish young adults (up to 30 years), Italian older people (over 65 years), and US young adults. The aim of this multicentre study is to define *specific* bioelectrical reference values in Italian adults aged 30 to 65 years.

A sample of 1055 Italian adults (447 men and 608 women) was examined. The anthropometric variables considered were height, weight, mid-upper arm circumference, waist circumference and calf circumference. According to the *sp* BIVA procedure, the bioelectrical values (resistance and reactance, measured at 50 kHz) were standardised by a correction factor, that considers height and cross sections, in order to calculate: resistivity, Rsp, and reactivity, Xcsp (both expressed in ohm*cm). Impedivity (Zsp, ohm*cm) and phase angle (PhA, in degrees) were then derived. Differences between sexes and with previously published reference groups were evaluated by means of Hotelling T2 test.

Men and women had a similar mean age (men: 48.9 ± 10.9; women: 50.4 ± 10.2). The *specific* bioelectrical parameters were: Rsp (351.2 ± 56.2 cm), Xcsp (42.1 ± 9.4 cm), Zsp (353.8 ± 56.5 cm), PhA (6.9 ± 1.2°) for men; Rsp (384.9 ± 71.2 cm), Xcsp (40.7 ± 9.4 cm), Zsp (387.1 ± 71.6 cm), PhA (6.1 ± 1.0°) for women. The correlation between Rsp and Xcsp was 0.60 for men and 0.72 for women.

The difference between the mean vectors of the two sexes was significant (T2: 184, p¡0.001), with men showing higher phase angle and shorter vector. The differences with the younger Italo-Spanish (men, T2: 76.7, p¡0.001; women, T2: 32.0, p¡0.001) and older Italian (men, T2: 120.9, p¡0.001; women, T2: 215.1, p¡0.001) samples were significant, with lower phase angles and longer vectors in groups of increasing age. This trend mirrors the age-related changes of bioelectrical values and body composition.

The tolerance ellipses for the Italian adult population fill a gap in the existing literature and provide new tools for evaluating body composition in adults aged 30-65 years and for comparative analyses.

The effects of exercise training on body composition and quality of life in menopausal women

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Menopause is a natural phase in women's lives, characterized by physiological changes affecting physical and mental health. In this context, physical exercise has been proposed as a potential intervention to alleviate menopause symptoms and improve the quality of life of women in this phase.
This pilot study, part of a larger project, EFiM (physical exercise in menopause), which will last three years, examined the effects of a 12-week physical exercise program on a sample of 18 menopausal women on body composition and quality of life in menopausal women.
Anthropometric data (stature, weight, circumferences, diameters, skinfold thicknesses), bioelectrical impedance analysis, and body plethysmography (BOD POD) were carried out. An ultrasound bone densitometry instrument (OsteoSys – SONOST 3000) was used to assess bone density. Thompson & Gray's (1995) silhouettes were administered to examine the perception of body image. To assess the quality of life and well-being, the participants were administered the MENQOL (Menopause specific quality of life questionnaire), which explores 29 typical symptoms of menopause, to which they had to assign a score from 0 to 6 regarding the perception of the symptom. The handgrip strength test (HGS) and the treadmill stress test were performed to assess the subjects' functional parameters. The physical exercise protocol included two weekly sessions, divided into a part aerobic exercise and a part resistance exercise, for 12 weeks. Differences between pre-and post-intervention data of physical activity were assessed by the t-test for dependent samples.
A trend towards the amelioration of body composition parameters was detected. Significant improvements were recorded in strength, menopause symptoms, and psycho-physical well-being, indicating the positive effect of physical activity.
The menopause period is a critical time for interventions to promote physical activity and an active lifestyle, as women often become less active, aging processes become more apparent, and health threats and chronic diseases begin to emerge. Both initiating and maintaining active behaviours pose significant challenges, making it essential to propose targeting interventions and address the psychosocial factors determining short- and long-term adherence.

The impact of urban and rural environment on young adults anthropometric characteristics: a study on a Northwest Italy University students sample

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In developed countries, the influence of the living environment on physical development remains a debated topic with studies suggesting the benefits of urban settings while others point out the rural as the more optimal. The aim of this study was to investigate differences in anthropometric characteristics among students of the University of Torino (Wellness4Students project) according to the area in which they grew up (urban/rural) and their changes after years spent in an urban setting. A sample of 847 students (18-25 years old) was divided into 8 groups based on gender, area and year of study course: 1st year sample consisted of 123 urban and 123 rural females, 76 urban and 97 rural males; 3rd and 4th years sample consisted of 100 urban and 157 rural females, 80 urban and 91 rural males. Height, weight and waist circumference were collected (ISO 7250.1/2017); Body Mass Index (BMI) and waist to height ratio (WHtR) were calculated; percentages of Fat Mass (FM%), Fat Free Mass (FFM%) and Muscle Mass (MM%) were estimated through Classic Bioelectrical Impedance Vector Analysis (BIVA, BIA 101 Pro-Akern). Statistical analyses (normality tests, independent samples t test) were conducted (IBM SPSS Statistics.29) with significance set at p ¡ 0.05. Results highlighted no differences between urban and rural 1st year females in all the variables, while rural 1st year males showed a significantly lower FM% (-2.2 % ± 0.91, p¡0.05) and a higher MM% (2.1 % ± 0.7, p¡0.01) than the urban counterpart. On the contrary, in the 3rd and 4th years sample no differences were found between urban and rural males, while rural females presented significantly lower values of WHtR (-0.02 ± 0.01 p¡0.05). Even though no significant differences were found among the groups regarding BMI, higher frequencies of overweight/obesity conditions emerged in urban samples compared to the rural counterparts specifically in males (+7% in the 1st years sample and +8% in the 3rd and 4th years sample). In conclusion, this study found more MM%, lower FM% and lower prevalence of overweight/ obesity in rural males of the 1st year compared to urban, although these differences seem to attenuate after a few years spent in an urban context. Rural females instead presented lower values of WHtR in the 3rd and 4th years. These findings suggest that the urban environment can have a significant influence on students' physical condition, and this should be further explored and monitored for primary prevention.

Body composition as a tool for tailoring therapeutic interventions in epilepsy

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Body composition (BC) plays an important role in the distribution and dynamics of drugs, influencing treatment efficacy and the risk of adverse effects. This is particularly relevant in epilepsy, one of the most common neurological disorders, which is treated with drugs characterised by a narrow therapeutic index.
Despite its relevance, BC is generally overlooked in clinical practice, mainly due to the high cost, technological complexity, and invasiveness of reference methods. Bioelectrical impedance analysis (BIA) is a suitable alternative, as it is minimally invasive, inexpensive, and quick to use.
The aim of this interdisciplinary project is to analyse the role of BC in drug distribution in patients with epilepsy, using a longitudinal design and taking into account possible influencing or confounding factors (sex, age, cortisol levels, physical activity, multimorbidity, and the presence of SNPs).
In this contribution, we present the structure and first results of the project.
The sample consisted of 75 adults with epilepsy (30 men and 45 women). Baseline BC was assessed by anthropometry, conventional BIA, and bioelectrical impedance vector analysis (BIVA).
Three antiepileptic drugs were most commonly prescribed: levetiracetam (16 men, 21 women), lamotrigine (5 men, 15 women), and valproate (6 men, 3 women), sometimes in combination with each other or with additional treatments (33.3% of the sample). Plasma levels were categorised as subtherapeutic (49.1%), therapeutic (43.6%), or supratherapeutic (7.3%), according to treatment-specific reference ranges.
The average fat mass percentage (FM%) indicated obesity in both sexes. BC did not differ between treatment groups, regardless of the analytical method used. In men, FM% was significantly lower in the levetiracetam subtherapeutic group, while R/H, indicative of dehydration, was lower in the lamotrigine subtherapeutic group. Specific BIVA also showed lower FM% and PhA values, indicative of low muscle mass, in the Lamotrigine subtherapeutic groups (in both sexes).
In conclusion, this study represents a translational application of human biology to pharmacokinetics. The association between BC and plasma drug levels varied depending on treatment, but FM% and hydration levels suggested their relevance as influencing factors. Longitudinal analysis will help to reduce interindividual variability and clarify the impact of BC on drug distribution.