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The subjects were 328 men and 1,531 women aged 60 years and over, who participated in the physical fitness checkups (hereinafter: the checkups) organized by a cooperation project among local municipalities in Hokkaido, northern Japan, a nonprofit organization for social business promotion and Hokusho University in 2019. The checkups have been carried out annually since 2010. Measurements included grip strength, functional reach, sit-and-reach, one-leg standing with open eyes, chair stand and maximum walking speed. Individual attributes, health conditions and lifestyle were also checked using a questionnaire. Weakness was defined by grip strength <26kg for men and <18kg for women, which is a part of the criteria for frailty and sarcopenia by the Asian Working Group for Sarcopenia. The subjects were divided into 3 groups using frequency of participation in the checkups in 2010-2019; only once, 2-3 times and 4 times and more. Multiple logistic regression models having weakness in 2019 as an outcome were used to estimate the association of participation levels in the checkups controlling for age, year and municipalities.

RESULTS:

The prevalence of weakness in 2019 was 107 (32.6%) for men and 427 (27.9%) for women. The number of subjects in the 3 participation levels; once, 2-3 times and 4 times and more were 93 (28.3%), 138 (42.1%) and 97 (29.6%) in men, and 324 (21.2%), 605 (39.5%) and 602 (39.3%) in women, respectively. In the results of the logistic regression analyses (Odds Ratio; OR and 95% Confidence Interval; CI), women who participated in the checkups more than once were significantly less likely to have weakness (2-3 times: OR 0.65, 95%CI 0.46-0.90, 4 times<: OR 0.57, 95%CI 0.39-0.85). Men showed a similar trend; however, it was not statistically significant (2-3 times: OR 0.83, 95%CI 0.40-1.69, 4 times<: OR 0.55, 95%CI 0.24-1.29).

CONCLUSION:

Regular checkups may be associated with preserving muscle strength due to awareness of physical fitness condition, and lead to the prevention of frailty and sarcopenia, especially for women. Our results suggest that regular participation in physical fitness checkups may have a beneficial effect on preventing weakness among community-dwelling older people.

ASSOCIATION BETWEEN PHYSICAL ACTIVITY PATTERNS AND SARCOPENIA IN ARAB MEN

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INTRODUCTION:

The intensity and duration of daily physical activity may play a significant role in reducing the occurrence of sarcopenia. This study examined the association between physical activity patterns and sarcopenia in Arab men.

METHODS:

This cross-sectional study included 363 men (47.7 ± 15.4 years), and appendicular lean mass (ALM), handgrip strength test, and physical activity levels were analyzed. ALM divided by the square of height in meters was calculated (ALM/H²), and participants with -1 and -2 standard deviations below the sex-specific means for Saudi young adults were considered sarcopenic class I and class II, respectively. Independent t-test, ANOVA, Mann-Whitney U test were performed to determine mean and median differences.

RESULTS:

The difference between sarcopenic and non-sarcopenic participants in moderate-to-vigorous physical activity (MVPA) was significant (P = 0.04), while correlation between ALM/H² and MVPA was borderline significant (P = 0.07). At a one-hour/week in MVPA, the ALM/H² increased by 0.30 kg/m². Total and appendicular muscle mass, handgrip strength, and MVPA were significantly lower in participants >60 years (P < 0.001), whereas fat mass and waist circumference did not change as compared to middle-aged participants (P > 0.05).

CONCLUSION:

MVPA, muscle mass, and strength were lower in older men than that of middle-aged and young men, whereas low physical activity and fat mass did not differ. Future studies should examine the role of MVPA training programs on muscle mass and strength in older men.

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ANTHROPOMETRIC AND BODY COMPOSITION EQUATIONS TO PREDICT RESTING ENERGY EXPENDITURE IN OVERWEIGHT AND OBESE MEN AND WOMEN LIVING IN A TEMPERATE CLIMATE

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INTRODUCTION:

The resting energy expenditure (REE) is commonly determined by indirect calorimetry. However, in clinical and nutrition settings, it is usually unfeasible and thus prediction equations are employed using anthropometric (ANT) and/or body composition (BC) data. Epidemiological evidence has shown an association between ambient temperature and body weight in humans, and particularly high prevalence of obesity when living in temperate climates. The aim was to develop equations to predict REE of overweight and obese living in a temperate climate all-year round and to determine the accuracy of traditional equations in this population.

METHODS:

Overweight and obese men and women (n=174) living permanently in Gran Canaria agreed to participate (age: 18-70 yr; BMI>27 kg.m²). REE was measured in fasting conditions by indirect calorimetry (Vmax N29). For anthropometric assessment, body weight and height were measured with a balance scale while body composition by DXA. Stepwise multiple regression analysis was used to determine the best predictors of REE in our population by two models (ANT and BC-based). The agreement of our measured REE was compared to the estimation by 20 widely employed ANT-based equations by calculating: bias (absolute values and %), the limit of agreement (LA) (upper LA=bias+1.96xSD; lower LA=bias-1.96xSD), concordance correlation coefficient (CCC). The % of subjects whose predicted REE fell within 10% of the measured REE was taken as a measure of accuracy. Statistical significance was set at p<0.05.

RESULTS:

In our population, REE can be predicted with the following equations (1=ANT; 2=BD):

$$\text{REE(kcal/d)} = 15.78 \times \text{Weight(kg)} + 169.07 \times \text{sex} + 143.87 \quad (1)$$

$$(R=0.76, R^2=0.58, \text{SEE}=252.7, p<0.001)$$

$$\text{REE(kcal/d)} = 24.91 \times \text{FFM(kg)} + 7.88 \times \text{FM(kg)} + 87.35 \quad (2)$$

FFM=Fat Free Mass; FM= Fat Mass
(R=0.79, R²=0.62, SEE=241.4, p<0.001)

The equations of Mifflin et al. and Livingston et al. gave the best scores of accurate predictions (51% of patients) with non-significant bias of 0.7 and 0.6% and CCC of 0.72 and 0.68, respectively. Out of the 17 additional equations, the Huang et al. and Bernstein et al. equations underestimated (4.8% and 13.0%, respectively), while the other equations overestimated (3.4–15.9%) REE. The equations that did not include obese subjects overestimated REE, except the Henry and Rees equation developed for tropical inhabitants with a non-significant bias (+1.1%).

CONCLUSION:

Most equations overpredicted REE in overweight and obese humans living in a temperate climate all year-round and thus we have developed specific equations to predict REE in this population. From the previously existing equations, Mifflin et al. equations gave the most accurate predictions. Reduced thermogenesis in overweight and obese humans living in a temperate climate may contribute to obesity. In agreement, our research gives support to a sustained attenuation of REE in people living in the Canary Islands.

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RUNNING TRAINING HABITS AND BODY WEIGHT – EPIDEMIOLOGIC SURVEY OF SPORT NEWCOMERS AGED 30 TO 60 YEARS

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INTRODUCTION:

Regular running training has many beneficial health effects including the potential to control body weight (1). Furthermore, weight-loss is a frequently stated reason for starting regular physical activities and sports. Especially running is frequently taken up to achieve this goal because it is easy to take up (2). In this context, it is the aim of the current study to analyze training habits and their relationship to body weight in an epidemiologically relevant subsample of newcomers to running.

METHODS:

We extracted data from our nationwide survey (www.dshs-koeln.de/med-pace) which collects data from runners registering for running events organized in the German-Road-Races e.V. Survey data is obtained by a scaled questionnaire covering anthropometric parameters (e.g. body weight, body mass index (BMI)), training specifics (e.g. volume, frequency). Cross-sectional data of a subsample from more than 160,000 complete datasets was extracted and analysed. Sample selection criteria were (a) runners aged 30 to 60 years, (b) starting regular running training within the last one to five years and (c) prior to that sporting und running inactivity. ANOVA was used for independent groups.

RESULTS:

A total of 11,770 data sets were extracted and data of 7,314 male (m) (41.9±7.3 years; 82.4±11.5 kg; BMI 25.2±3.0) and 4,456 female (f) runners (40.2±7.2 years; 66.3±11.5 kg; BMI 23.5±3.7) were analyzed (mean±s; each p<0.001) in groups by training experience (TE, 1-5 years). Mean TE in years was 3.1±1.2 (m) and 2.9±1.2 (f). Training volume (km/week) increased in an approximately e-functional shape in relation to TE from 14.1±12.7 to 30.2±16.8 km (m) and 11.7±11.1 to 23.1±13.5 km (f) respectively from one to five years TE (p<0.001). In parallel, mean body weight decreases (-5.2 kg (m) and -4.7 kg (f)) with increasing training experience in the TE groups with one through five years from 86.4±13.4 to 81.2±10.5 kg (m) and from 69.2±13.8 to 64.5±9.5 kg (f) (p<0.001). Corresponding mean BMI values vary between 26.4±3.9 to 24.9±3.7 kg (m) and 24.6±4.6 to 22.9±2.9 kg (f) respectively (p<0.001).

CONCLUSION:

Of course, the interpretation of these results and all drawn conclusions are subject to the well-known constraints of cross sectional approaches concerning causality. Moreover, analyzed survey data may differ from data obtained by anthropometric measurements. Nevertheless, these results from an extensive sample size suggest systematic long-term effects of regular running training on body weight. Additionally, results imply that formerly inactive, middle-aged subjects are motivated and able to realize progressive training regimes. Together, these results reinforce the view about the enormous protective potential of regular training for ambitious sport beginners and returners to sport activity even later in life.

References

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DOSE-EFFECT ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND BODY COMPOSITION OF THE ELDERLY IN CHINESE URBAN-RURAL JUNCTION

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INTRODUCTION:

The World Health Organization (WHO) recommends the elderly should have at least 75 vigorous or 150 moderate intensity minutes per week (600 MET min/week) of physical activity. This research is to quantify the accurate dose-response association between leisure time physical activity (LTPA) and body composition of the elderly in Chinese rural-urban junction area and find the threshold that will improve different body composition index.

METHODS:

We conducted a sample survey of old people in a rural-urban junction in East China. We designed "Questionnaire of PA of the Elderly in Chinese Rural-Urban Junction" (with reliability and validity test), and acquired LTPA and divide subjects into 7 LTPA level groups.

We measured subjects' bone density Z value, bone mass, muscle mass and fat content respectively by ultrasonic bone densitometer and Tsinghua BCA-2A Body Composition Analyzer.

RESULTS:

Compared with males reporting no LTPA, we observed a 0.43 unit higher Z value among males who performing less than the minimum recommendation (0-1 REC), a 0.52 unit higher at 1-2 REC, a 0.63 unit higher at 2-4 REC, A highest threshold for bone density benefit occurred at 4-6 REC. More than 6 REC, the benefit slows down, but Z value is also higher than baseline. The similar trend occurred in females. There is a similar dose-effect relationship in bone mass index.