

DIFFERENCE OF HYDROSTATIC WEIGHTING AND SKINFOLD METHODS IN DETERMINATION OF BODY FAT IN CHINESE ADULTS

Wei Zhang, Dong-Qing Xu and Jia-Ji Chen

Tianjin Institute of Physical Education, Tianjin, People's Republic of China

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INTRODUCTION: Body fat content can be determined by Hydrostatic weighing method and skin fold measurement. The former is the most accurate and is thought as "golden Standard", while the later is an easy and simple way. Measurement of body fat content using skin fold method is by calculation based on the measured skin fold. But the formulas used to calculate body fat content were developed based on the studies in foreigners. We hypothesized that there was significant difference in the body fat content of Chinese determined by hydrostatic weighing and skin fold methods in which the formula was from the studies in foreigners. The formula developed based on the study in foreigners might not be suitable in the determination of body fat content in Chinese.

METHOD: A total of 435 males and 410 females participated in the study. The body fat content of each subject was determined using skin fold method and hydrostatic weighing method respectively. Weighing system used in this research includes trestle and an underwater seat. The body weight in water was weighted by a system with the tension detector and digital counter with sensitivity of 0.01kg (developed by Tianjin Institute of Physical Education and Electronic Department of University of Nankai.). This method was based on the report from McArdle (1981). The test was conducted in an indoor swimming center with 25°C - 27°C of water temperature and 26°C -28°C air temperature. The subject with swimming ware was weighted on the ground first. After then the lung capacity was measured 3 times. The subjects were asked to familiarize the test procedures of hydrostatic weighing. Hydrostatic weighing in each subject were repeated 6 trials at least. The biggest value read was used to calculate the body density, and calculate body fat content by the Siri equation (1956).

The body fat content of each subject was determined by skin fold method also. The skin fold in the triceps (P1), subscapular (P2), abdomen (P3), suprailiac (P4), thigh (P5), and chest (P6) (only for men) were measured three times. Equations of Susuki and Jackson were used to calculate the body fat content. American START program was used to detect statistical significant differences in the measurements from the two methods.

RESULTS: The average body fat content determined by hydrostatic weighing method was

10.38 +/- 4.71% for men and 23.12 +/- 3.97% for women. Comparing with the results determined by skin fold measurement and equation of Susuki and Jackson, there were significant difference in the body fat content ($P < 0.0001$). It indicated that the equation of Susuki and Jackson is not suitable to apply in the determination of body fat content in Chinese.

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