Malaysian Journal of Nutrition
Vol. 18 No. 2, 2012

Contents

Printed by

Aslita Sdn Bhd
20, Jalan 4/10B
Spring Crest Industrial Park
68100 Kuala Lumpur

Mal J Nutr 18(2): iii - iv, 2012

GUEST EDITORIAL

Recumbent Height Measurement among Older Adults

Stature or height is an important anthropometric parameter required for assessment of nutritional and clinical status such as computation of body mass index and determination of creatinine height index, and also in calculation of nutrient needs. However, the accuracy of standing height among older adults is questionable, as aging would result in physiological changes including reduction in height due to the thinning of the vertebrae disc. It is also impossible to determine an accurate standing height measurement in older adults with spinal curvature or kyphosis, tremors and have difficulty in standing. Thus, since early 1980s efforts have been carried out to explore the possibility of using long bone measurements (arm length and knee height) as an alternative to standing height. These recumbent height measurements are less affected by the aging process as compared to standing height.

Determination of the most suitable long bone measurements as an alternative to height depends on the subject or patient's condition. Arm span is the length from the tip of the middle finger of one hand to the other, while the person is standing with both arms outstretched laterally; thus this measurement could not be accurately measured if an individual is affected by lung disease and osteoporosis. This measurement also requires the presence of two additional people. Further, it is impossible to be taken of bedridden or wheelchair bound subjects. Thus, a single arm or half arm span, which is the length of the tip of the middle finger to the sterna notch, is more preferable than the arm span and recommended by the World Health Organization (WHO). However, caution should be taken if an elderly individual has a condition that does not allow maximum stretching of the arm and fingers during the breath out position. Demispan, which is the length between the sterna notch to the web of the middle finger could be used among subjects with disability of the fingers. Knee height has also been increasingly used as a recumbent measurement to predict stature, and is also recognised by the World Health Organization. It is the distance between the sole of the foot and the apex of the knee with each joint flexed at a 90^0 angle as measured using a sliding caliper. Knee height could be measured either in a sitting or lying position among bedridden subjects. However, there is a need for a suitable equipment, ie. a sliding caliper, and mobilisation to bend the knee. Thus, some effort has been made to evaluate the validity and reliability of a few devices for recumbent height measurement including knee height caliper and anthropometer or supine height ruler. Recently, an anthropometer or a supine ruler measurement has been reported to be the best measurement for bed ridden subjects.

All these recumbent height measurements should be validated against a standing height measurement among younger adults or elderly individuals without kyphotic or other conditions that cause inaccuracy of the measurement. Regression analysis is usually performed to develop a simple predictive equation to predict stature according to gender, with the long bone measurement and age as predictor variables. Cross-validation involving other groups from which the equations have been developed is essential to be conducted in order to demonstrate the accuracy of the models. It should be noted that there would be ethnic differences in body composition and stature, thus several equations have also been developed according to ethnicity. In Malaysia, predictive equations to estimate height from arm span, demi span and knee height have been developed for the major ethnic groups. However, these equations do not include age as a predictor variable and there is a need to develop a nationally representative predictive equation.

Predictive equations to estimate stature among elderly individuals are not only used for a population based study but also invaluable for application in a clinical setting among non- ambulatory or bedridden subjects. The principles and methods of measurement and development have also been applied among mobility-impaired or handicapped persons. However, a few studies have demonstrated that the reliability of recumbent height measurements such as half arm span and knee height are less than standing height. In conclusion, standing height is the preferred anthropometric measurement in older adults who are able to stand straight for an accurate measurement to be taken. However, conditions such as kyphosis, tremors and others could affect the validity of a standing height measurement There is a need to develop a nationally representative prediction equation for estimation of stature from recumbent measurements in order to reduce the inherent problem of sample specificity and enhance accuracy and confidence in the estimation.

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