

## Importance of Standardization of Anthropometric Protocols

Syed Arif Kamal<sup>1</sup>, Urooj A. Razzaq and Samira Sahar Jamil  
SF-Growth-and-Imaging Laboratory, Department of Mathematics  
University of Karachi, Karachi, Pakistan; <sup>1</sup>sakamal@uok.edu.pk

Anthropometry is an offshoot of anthropology, which provides understanding of variation of human-body physiques. The word *anthropometry* means measurement of man. It is concerned with relative measurements of body dimensions, such as height, weight, skin-fold thickness, circumferences of waist, chest and mid-upper-arm as well as their correlates over time. The most primitive measurements of the humans are linked to the ancient Greek and Roman civilizations. Anthropometric data of certain populations are available since early 1700s. However, large-scale-organized anthropometric measurements are, regularly, being carried out for modern military organizations. Height, mass, body composition and fat distribution of vary from individual to individual, within nations and in a population with time because of biological, economic, environmental, genetic and nutritional factors. These data, also, provide information about the changes in living standards, lifestyles, nutritional and economic statuses of individuals among geographical regions and ethnic groups. Anthropometry plays an important role in design of equipment, clothing, ergonomics and architecture. Anthropometric measurements are important ingredient of all medical practices because the procedures are simple, easy, low cost, reproducible and reliable in detecting illnesses, *e. g.*, diabetes, obesity and hypertension. Nutritionists take anthropometric measurements as guidelines to decide the best diet and exercise programs for their patients. Adult stature is an indicator of net nutritional status. It mirrors the food facility and access to healthful atmospheres. One of the areas in which anthropometry plays a vital role is monitoring and evaluation of growth disorders. Pediatricians use these data to determine, if the child is growing within established boundaries for the population. If not, the physician may look for any potential health issues causing the abnormal growth. For a child-growth model to be able for use in clinical-decision making, it becomes imperative to devise a standard protocol for measurement — the equipments should be easy-to-use and the procedures should be easy-to-implement, reliable and reproducible. In order for the researchers in different parts of the world to compare their findings, it is necessary to establish standards. There is a need to write down SOPs (standard operating procedures), so that child anthropometry becomes smooth, efficient and effective. In order to avoid variations introduced due to different types of clothing worn and the child assuming an artificial posture, it is now, universally, accepted that measurements of children should be performed with the child barefoot and completely undressed except short underpants. Pre-collection planning, collection monitoring and post-collection analysis are keys to a successful anthropometric-data-collection campaign (Fig. 1 shows common errors in measurement of mass). Regular update of growth charts, based on standardized measurements, is an essential community-health activity of every civilized nation. Pakistani pediatricians and community-health physicians need to take a pro-active role in this direction.

**Keywords:** Anthropometry, standardization, reproducibility, accuracy, precision, children

**Conflict of Interest Statement:** No potential conflict of interest is identified for this work

**Grant Sponsor:** Dean's (Science) Research Grant, University of Karachi, number DFSR/2009

**Research Ethics:** Project initiated after Institutional Review Process and conducted in compliance with ethical and human-right standards in our region.



**Fig. 1.** From left to right, (a) measurement of mass; common errors in measurement process (b) hair-band not removed; (c) feet not positioned correctly and (d) student holding on to beam scale

**Web address of this document:** <http://www.ngds-ku.org/Presentations/Anthropometry.pdf>

**HTML version:** <http://www.ngds-ku.org/pub/confabstA.htm#C103>:

**Reprinted from:** [www.ngds-ku.org/Anthromathematics/2013/Abstracts2013.pdf](http://www.ngds-ku.org/Anthromathematics/2013/Abstracts2013.pdf)

<sup>1</sup>Prof. Dr. Syed Arif Kamal (<http://ngds-ku.org/kamal>), PhD (Mathematical Neuroscience), MA, Johns Hopkins, Baltimore, MD, United States; Visiting Faculty, the Albert Einstein College of Medicine, New York, United States; Associated Professor, Malmö General Hospital, Sweden; Sessional Faculty, the Aga Khan University Medical College, Karachi, Master Trainer for Anthropometry, Tawana Pakistan and Department of Special Education, University of Karachi and Member, Subject Committee for Physical Education, Health and Sport Sciences, National Testing Service (<http://nts.org.pk>), Islamabad, Pakistan; **Paper Mail:** Professor and Chairman, Department of Mathematics (<http://math.uok.edu.pk>), and Project Director, the NGDS Pilot Project (<http://ngds.uok.edu.pk>), University of Karachi (<http://www.uok.edu.pk>), Karachi 75270, Pakistan; **Telephones:** +92 21 9926 1300-6 ext. 2380, 2293