

BAM – (data)base of anthropometric measurements

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Abstract

Anthropometry is a scientific discipline dealing with systematic measurements of the human body. As it has a long tradition in Slovenia, extensive anthropometric data has been collected over the years. The present manuscript presents the establishment of a machine-readable anonymised anthropometric database that includes anthropometric data from the Slovenian population since 1940. Currently, double-checking of the data is in progress; a preliminary insight into the available dataset is presented.

KEYWORDS: anthropometry, database, physical anthropology, Slovenia

Introduction

Anthropometry is a scientific discipline that aims to obtain systematic measurements of the human body; it is sometimes viewed as a sub-discipline of physical anthropology. Anthropometric measurements include the measurements of size (such as body height, body mass, body surface area, body volume), proportions (such as sitting and standing height, arm and leg length, shoulder and hip width, neck and limb circumferences), and body composition (such as body fat mass, lean body mass, body water content) of hu-

mans (Electronic source 1). According to the World Health Organisation (WHO), anthropometry provides the single most portable, universally applicable, inexpensive and non-invasive technique for assessing the size, proportions, and composition of the human body (World Health Organization, 1995). Although it is currently an underused technique (World Health Organization, 1995), because it reflects both health and nutritional status, it can, to a certain level, predict performance, health, and survival (WHO Expert Committee, 1995), and can be as such a valuable tool in various disciplines. According to Marfell-Jones, current president of the International Society for the Advancement of Kinanthropometry (ISAK), anthropometric skinfold measurements and quantities derived from them are used in physiology, structural anatomy, endocrinology, kinanthropometry, nutrition, health and fitness, growth, sport, and exercise science, and they are also specifically applied in occupational biomechanics, human hydrodynamics, drug quantification, diabetes, coronary heart disease, hypertension, anorexia nervosa, and many epidemiological and human biology studies (Clarys et al., 1987).

The Department of Biology of the Biotechnical Faculty, University of Ljubljana, Slovenia, has a long tradition of anthropometric measurements, which are performed yearly on the young adult (student) population. The beginnings of systematic anthropometric measurements in Slovenia were in 1930 when Božo Škerlj applied anthropometry in several of his studies. Škerlj's successors continued with anthropometric measurements in students and, whenever possible, also performed anthropometric measurements in children. Throughout their work, the best anthropometric practice was being followed by complying with established methodology and later with standardised anthropometrical procedures (Lohman et al., 1988; Marfell-Jones, 2006).

As a significant amount of anthropometric work had been performed prior to the era of computers, and as the same laboratory practice was followed for several years thereafter, a large database of anthropometric data had been collected in written (i.e. paper) form. Although the oldest anthropometric data collected by Škerlj have not been retrieved, we have nevertheless possessed a significant number of completed anthropometric paper forms. Consequently, we have been faced with a considerable challenge of organising these data into a machine-readable form. Our ongoing work has aimed to establish a machine-readable anonymised collection of anthropometric data that had been collected at our department throughout the 20th and into the 21st centuries.

Methods

We first collected all anthropometric paper forms from different studies in one place and then numbered them consecutively. As not all subjects' consent forms had been archived, we first applied for ethical clearance to use all of the collected anonymised anthropometric data from the National Ethics Committee of the Republic of Slovenia; we obtained it in 2011 (Approval No. KME 104/12/10). We then compiled a list of various anthropometric variables that had been measured through decades. If equivocal terminology was detected (for example, the term "suprailiac" (skinfold) can be interpreted as referring to both iliac crest or supraspinal location, so it is necessary to recognise the exact location of the measurement), the exact description of the measurement site (or the original reference of the measurement protocol) was looked for and appropriately considered. The compiled list of anthropometric variables served as a basis for database construction; Microsoft Access software was used for this purpose. Special care was taken to set up the database in a manner that restricted the input of largely erroneous data to avoid erroneous inputs due to, for example, the use of different units with the same variable. Finally, we classified the available data according to the type of obtained anthropometric measurements (i.e., into cross-sectional or longitudinal data).

Results

It has taken us quite some time to translate the available anthropometric data into a machine-readable format, but all anonymised anthropometric data from the paper forms have now been entered into the database.

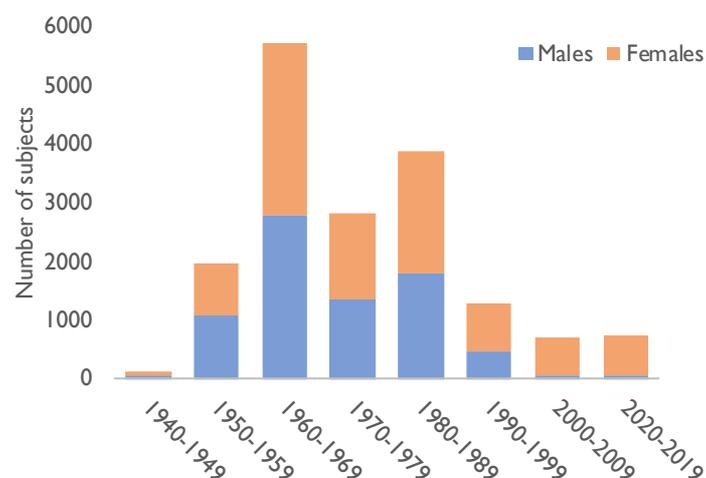


Figure 1: Number of subjects (females and males presented separately) for whom anthropometric data were obtained in the presented periods.

Although the process of data double-checking will still need some time to be completed, we have now been able to obtain the first insights into a rather extensive anthropometric data collection. In summary, anthropometric data from more than 17,000 people have been gathered over the years, including data from more than 7,800 males and 9,500 females (Figure 1).

Although the majority of anthropometric data were obtained in young adults (student population) ($n \approx 8,600$), anthropometric data from more than 4,700 children aged up to 10 and from more than 3,800 aged 10 to 17 were also gathered (Figure 2).

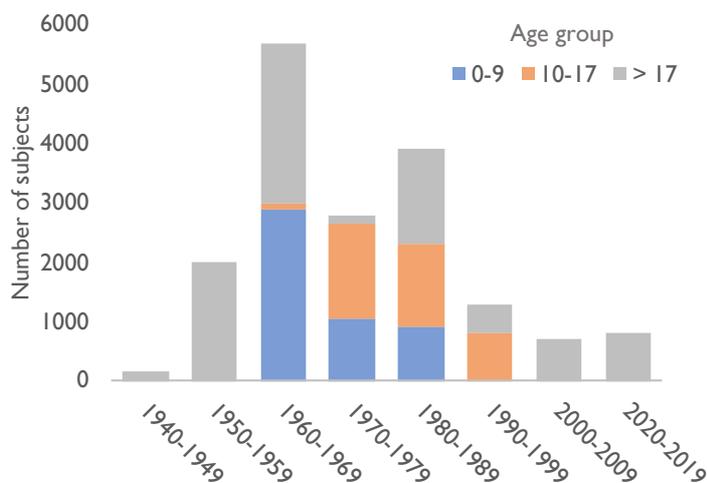


Figure 2: Number of subjects from different age groups (corresponding to age classification according to European Food Safety Authority (EFSA, 2014) for whom anthropometric data were obtained in the presented periods

The majority of the available anthropometric data are cross-sectional, although longitudinal (growth) data were also collected for more than 1,500 subjects between the ages of 7 and 15 years.

Detailed analysis according to different variables (such as body composition calculated from skinfolds, waist to hip ratio, leg and trunk ratio, age at menarche, etc.) will become possible once the double-checking of all data is performed.

Conclusion

The establishment of a machine-readable anthropometric database is a considerable advancement in the field of anthropometry in Slovenia. For the first time, it will enable a detailed analysis of anthropomorphic secular trends in Slovenia. Combined with other physical development-related data collections—such as the SLOfit database (SLOfit,

2017)—it can provide clear insight into current body composition-related challenges. We believe that the machine-readable collection of anonymised anthropometric data will provide new collaboration opportunities to which we are very much looking forward.

References

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Povzetek

Antropometrija je znanstvena disciplina, ki se ukvarja s sistematičnimi meritvami človeškega telesa. Ker ima v Sloveniji dolgo tradicijo, se je tekom let oblikoval obširen nabor antropometričnih podatkov. Pričujoči članek predstavlja vzpostavitev strojno-berljive anonimizirane podatkovne baze, ki vključuje antropometrične podatke slovenske populacije od 1940' let dalje. Preverjanje podatkov je še v teku, vendar članek predstavlja preliminarni vpogled v razpoložljiv podatkovni nabor.

KLJUČNE BESEDE: prantropometrija, podatkovna zbirka, fizična antropologija, Slovenija

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