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A STUDY ABOUT THE STANDARD SIZE CHARTS FOR ETHIOPIAN MEN AND ANTHROPOMETRY IN ADOLSCENT

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ABSTRACTS

An anthropometric survey of Ethiopian males aged 18-26 years was used in this study. Sixty three variables were measured using a sample size of 440 males in Bahir Dar University based on the nine regions of Ethiopia (Tigray, Afar, Amhara, Oromia, Benishangul gumuz, Gambella, Harari, Somale, South Nation of Ethiopia). The data was analysed using inferential statics to compare the mean of the 63 variables to evaluate for significance, setting the p value to 0.05. In order to see if the variations warrant the development of the size chart for the whole Ethiopia or individual sizing chart for different groups, the grand mean of the sample was compared to the nine group mean. Of group's body dimensions are different, which means that the body proportion is incredibly different within the region or ethnic group, so it is preferable to make the size charts for each region since the mean of the land is different from the mean of each region. Due to the various fit issues faced by the ready-to-wear industry, studies on anthropometric body measurements are very relevant. The goal of this paper was to develop an anthropometric sizing system specifically for males from 18-26 years of age in Ethiopia to develop precise systems for the production of fitted and comfortable clothing. Correlations have also been used to determine the relationship between the proportions of the body and the size chart's set of main dimensions. In order to produce size limits, size codes and different size maps, a step by step process is used. Five key sizing systems have been developed in this pilot study to provide a guide for the design and development of various apparels, including Ethiopian males aged 18-26 years. It became clear that body shape has a direct impact on the choice of clothing as its acceptance may rely on its suitability and suitability for a particular body shape.

Key Words: anthropometric survey, males, measurement

INTRODUCTION

The human body has been a topic of research in Ethiopia for many years, and it was not until recent years that more precise information through anthropometry became available. The quest for the right clothing fit has a long history of numerous attempts to evaluate body anthropometry in the clothing industry for the creation of patterns and clothing. Owing to sedentary lifestyles, eating behaviours, migration patterns and the influence of growing factors that impact body shape values, the shapes of human figure forms continue to shift. Anthropometry is the study of the human body in both static and dynamic positions that collects data from body measurement, which is very useful in various fields, such as anthropology, practical clothing design, ergonomics, etc. Anthropometric data is an important component of clothing construction for high-quality clothing design and development. And one of the key factors in the customer's decision-making is garment fit.

The most notable body size and shape variations are attributed to ethnic diversity, age and gender. There is no comparable body proportion, in theory. Many adults grow shorter and many become heavier as age increases. The body shape of Ethiopians means that their hand is short and their upper torso is long; again, China's buttock is much larger than that of Ethiopians, which results uncomfortably. Consequently, the clothing imported to Ethiopia is not suitable for the customer and is sufficient and not comfortable. The goal is to create an acceptable system of sizing for general use in that sector of the market. With regard to sizing, surveying the bodies of Ethiopian males between the ages of 18 and 26, which leads to the need to provide multiple sizes during the growth of the human body, with the increase in age, various changes in width, height and weight are evident. During the lifecycle, it is important to remember that the human body develops, grows and changes through increased size, structure differentiation and shape alteration. In order to make clothing that fits comfortably and is appropriate for its intended function, these improvements need to be understood. However such data needs to be revised over time to take into account the evolving pace of growth from one generation to another In view of this before designing and producing garments, apparel manufacturers and retailers should be responsible enough to research their customers' body sizes and figure styles. This should be done to ensure that the garment suits the defined consumer's intended form, silhouette and height. In all of its variations, body size and shape are very significant in ergonomic design and in enhancing comfort and fit in clothing. Based on their demographic

anthropometric data, sizing systems are used to match various classes of the population. Various researches aimed at establishing sizing criteria for the body shapes of customers in the fashion industry have been studied. For the intent of understanding physical variation, anthropology refers to measuring living human persons. The most prominent variations with regard to ethnic diversity, age and gender in body size and shapes for customers, retailers and manufacturers, sizing data is essential; poor sizing could lead to customer dissatisfaction. Designers and manufacturers use anthropometric data in the development of the required fit measurements. Clothing manufacturers and retailers then formulate and provide customers with size code information on fit on the basis of the measurement of the average population. In theory, no proportions are natural, since they get shorter and heavier as people get older. Small appendages and excessively long torsos define Ethiopian body proportions.

Today, for the purposes of understanding physical variation, the word 'anthropometry,' as used in the field of physical anthropology, refers to the measurement of living human individuals. In general, contemporary research in the field can be divided into two categories: static and dynamic anthropometry. The two are also often referred to as "structural anthropometry" and "functional anthropometry", to make it clear that one is chiefly concerned with body size, and the other with behaviour performed by the body. Static anthropometry is the topic of this survey. In general, the estimation of body measurements in a set of normal fixed postures, such as standing or sitting upright, is recorded by static anthropometry.

Categorizing by Age

It is therefore an important topic to consider the relationship between age and clothing size. The size and fit of South American men are classified according to their ages. Since their body proportions change as individuals mature, resulting in a need for clothing fitting that can accommodate these changes.

Definitions and Meanings of Anthropometry

Anthropometry includes the study of measurements of the human body and has been described by different authors in various ways.

Roebuck (1995) describes anthropometry as a measurement science and the art of application that determines the human body's physical geometry, mass properties and strength capacity, which require a range of techniques to assess the number of dimension limitations. Anthropometry is the study of body proportions, according to Oborne (1982), and is an integral feature of any ergonomic analysis.

Anthropometrics is described by Pheasant and Haslegrave (2006) as the human science branch that deals with body measurements, especially with body size, weight, mobility and flexibility and working ability. Anthropometry is the systematic analysis of human physical stature, which dates back to the eighteenth century, according to Cameron (1984). Anthropometry is described by the Oxford English Dictionary (2007) as the measurement of the human body in order to determine its average proportions and the proportion of its parts, at various ages and in different races or groups.

Anthropometry is defined by the Sci-Tech Encyclopaedia (2009) as the systematic quantitative representation of the human body and the techniques used to calculate the absolute and relative variability of the human body's size and shape. Cooklin (1990) notes that anthropometry requires the systematic collection and correlation of the human body's accurate measurements for various purposes, such as anthropological study, clothing fitting, and the construction of complex environments that provide protection and effectiveness.

Anthropometric data collection needs to be revised because changes arise in the distribution of body measurements due to changes in lifestyles, diet and ethnic population composition (Oborne, 1982; Roebuck, 1995). The authors point out that there is often a shift in the relationship between clothing sizes and body measurements. Croney (1980) suggests that when manufacturers equate creative and industrial efforts in their designs by comparing them perfectly to the customer, greater satisfaction can be achieved. Oborne (1982) agrees with Croney(1980) that the most basic consideration is an anthropometric dimension of the topic to ensure that they are as well adapted as the situation would allow. This means that manufacturers of clothing should be up to date with details on various styles of sizes and shapes of the human body. Oborne (1982) points out that anthropometric studies are unconsciously assumed to include subjective decisions, such as clothing manufacturers can create better fitting clothing when anthropometric clothing data is used as it deals with a person's specific physical measurements.

Historical Perspective of Anthropometry

George Cuvier (1769-1832), a French naturalist, invented the term anthropometry from the Greek roots man'anthro 'and measurement' metreen 'which means the measurement of man' (Oborne, 1982; Cooklin, 1991; Roebuck, 1995; Fan,2000; Bridger, 2003). Other scholars (Cameron, 1982; Pheasant 1996) suggest that Johann Sigismund Elsholtz, a German physician, coined the term 'anthropometria' in Paduain 1654 as his graduation thesis title, which focused on human proportion for medical or scientific purposes in order to evolve human shape. Anthropometry, according to Tanner (1981), is art imbued with the spirit of Pythagorean philosophy, and not science. Tanner reveals that when there was a need for guidance on the relative proportions of the body components to assist painters and sculptors in their work, the study of anthropometry came about when they found the mundane occupation of creating life-like pictures. Pheasant and Has Legrave (2006) state that Leonardo Da Vinci, a renowned painter, demonstrated the principle of human proportion by drawing the body of a man circumscribed within a square and a circle through his famous drawing of a 'Vitruvian Man'

The growth of anthropometry was affected by the growth of physicalanthropometry and the quest for proof of 'ethnic' variations (Pheasant, 1986;Roebuck, 1995). It was mainly used in an effort to discriminate between racial and ethnic groups of people, to distinguish offenders and to help with medical diagnosis.

Manual Anthropometric Method

Using simple instruments that are inexpensive, easy to handle and use, manual methods for obtaining body measurements are used. Although the procedure takes time and requires difficult procedures, when taking measurements of the human body, it is reasonably straightforward (Roebuck, 1995). This methodology has been used to perform many national surveys in the United States, the United Kingdom, Germany, France and South Africa, for example. It is still being used in surveys where the necessary measurements can not be obtained by scanners. Roebuck (1995) points out that various forms of measurements are given by manual anthropometrics, which can be from those based on the feeling resistance of the underlying bone to those with minor pressures. In addition, he notes that the manual method has been well defined to assist anthropologists and ergonomists in recognising both what the measurement represents and the data summary

and interpretation method. Using manual procedures, good coordination between measurer, recorder and subject is called for. Croney (1980) advises that recording sheets should be prepared, orderly listed and designed in a manner appropriate for recording in the field before the measurement is taken. Roebuck (1995) notes that by using the manual process, arrangements should be made to prevent the transmission of skin diseases. When measuring subjects, Cameron (1984) and Beazley (1997) recommend that the following procedures should be taken.

1. If appropriate, the subject should be in minimum clothing (inner clothing) in announced condition (ISO, 8559:1989)
2. Measurers should also make sure the subjects are comfortable with the equipment.
3. To minimise movement and speed up the job, organise the lab.
4. Place the recorder in a position that is appropriate.
5. Measure from the right side of the body, unless otherwise indicated. Measurers are standing to the left to prevent obstruction.
6. Using coloured adhesive indicators, identify the surface landmarks prior to starting measurements.
7. Gently yet firmly apply the resources.
8. Call out the full numbers of the results (If possible measure the subjects twice for all dimensions).
9. In any one session, avoid weighing too many subjects.
10. Appearance should be monitored

Body Scanning Method

Considerable advances in the study of anthropometry have been seen in the last decade of the twentieth century. The 3D body scanner is a new technology that has been developed which can currently collect from the human body an infinite number of anthropometric data types and measurements as well as acquire very large volumes of information (Mckinnon and Istook, 2002; Simmons and Istook,2003). Simmons and Istook (2003) note that the apparel industry has continuously relied on linear measurement data that can be instantly extracted for use while 3D scanning technologies provide information on others such as body shape, angles and relational data points. This technology has given the

fashion industry the ability to adapt patterns to a person, according to Mckinnon and Stook (2002), revolutionising the process of cutting, stitching, and delivering finished custom clothing to the customer. Mckinnon and Istook (2002) clarify that the image captured may be used at any time to retrieve information that recognises that without well-developed data tools, such as Shape Analysis, Integrity and Tecmath-Vitrus, the image might be useless. Taking readings from the 3D scanner is fast and discreet as compared to manual measurement methods. Technology has tried to remove the biggest barriers to anthropometric surveys: the reproducibility of time and data

Instrumentation and Body Measurement Techniques

Throughout the years, researchers have used different types of instruments to perform anthropometric surveys of clothing. The conventional method used simple, fast non-invasive instruments such as tape measurement, weightscale, camera, tape measurement, anthropometer, calliper spreading, compass sliding and head spanner (O'Brien and Shelton, 1941; Simmon and Istook, 2003). For the conventional Roebuck approach, physical anthropologists developed methods of using anthropometers for linear dimensions from height to foot length and callipers to measure skin fold thickness (1995). Cameron (1984) states that the suitability of tape measurement depends on the fulfilment of five criteria: flat cross-section, millimetre graduations, blank leading strip, metal or fibre glass construction and a minimum length of one metre. Weighing scales with a precision of 0.1 kg are used to measure the weight of the subject. Beazley(1997) measured body areas with a number of instruments; hip level metre law, plastic adjustable three-sided sliding angle square for the width and rise of the neck, adjustable elastic tapes for girth measurements, and specially made brace with two tape measurements fastened at the zero measurement at right angles.

Development of Size Charts

The development of a size chart requires the use of current anthropometric data created by conventional methods of body scanning. Bougourd et al. (2000) suggest that the manual techniques can be slow, costly, complex and subject to variations, and the 3D body scanner and 2D data capture systems offer higher speed, precision and replication, but are very expensive to use. Tamburino (1992) states that the dimensional distribution of the population by geographical area should be expressed in the data and that precise details

should be collected according to standardised and standard standards in order to meet the technical requirements of clothing manufacturers.

CONCLUSIONS

By presenting comprehensive procedures involved in creating a research-based anthropometric data and size table, this study contributes to information. It became clear from the interviews conducted for clothing manufacturers and customers that there were differences in sizes, coding and marking of ready-to-wear clothing manufactured by male Ethopian clothing manufacturers. The use of sizing systems from various nations, the differing allowances used for clothing and the complexity of reading size charts were the key causes of the difference in sizes. Despite comparability in codes, the resulting clothes were of various sizes. The clothes created using these size charts resulted among Ethopian males in dissatisfaction. It became evident that the absence of an Ethopian male size chart contributed to the adoption and alteration of size charts from elsewhere by producers. It became clear during the extensive search for literature that data on the processes involved in size chart creation was scarce, although a few researchers contributed to this field of study (Roebuck, 1995; Pheasant, 1996; Beazley, 1997, 1998, 1999, Otieno, 2009). This may be due to the ownership of companies not willing to provide sizing data for fear of making known trade secrets, which has resulted in non-analytical and inaccurate assessments. Therefore by offering an insight into the techniques used in the creation of size maps, the current research has added to awareness. And part of the processes involved in this study was provided with a thorough description. Determination and selection of main measurements, size codes, clothing measurement (CAD and grading) development and procedures involved in fitting tests were included.

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