THE IMPORTANCE OF ANTHROPOMETRIC RESEARCH TO THE MALAYSIAN POPULATION: A SYSTEMATIC REVIEW

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ABSTRACT

The importance of anthropometric research cannot be denied. Anthropometric research is defined as research related to human body measurements. This research is extensively conducted in many fields, such as product design, apparel manufacturing, health and medical care, and forensic research. This paper aims to review the existing articles on the importance of anthropometric research to the Malaysian population and determine how the related research can be further explored. This paper used PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) to retrieve the articles through its identification, screening and eligibility processes. The search for articles related to PRISMA resulted in 15 articles identified through Scopus and Web of Science databases. Articles were grouped based on themes using thematic analysis. The themes were created based on seven perceived benefits of anthropometric research: easy to use, fit, well-being, welfare, safety, work efficiency, and identity verification. Finally, at the end of this paper, several conclusions concerning the importance of anthropometric research for the reference of future scholars were presented.

Keywords: Anthropometric Research, Systematic Literature Review, Malaysia, Malaysian

RESEARCH HIGHLIGHTS

This paper has proved the importance of anthropometric research to the Malaysian population through its systematic literature review. Preferred Reporting Items for Systematic reviews and Meta-Analyses have been used to retrieve articles to avoid bias in the articles selection procedures.

Fifteen articles were retrieved and grouped into seven perceived benefits of anthropometric research: easy to use, fit, well-being, welfare, safety, work efficiency, and identity verification.

Many anthropometric research has been done to improve the suitability of product designs, such as furniture, workstations, apparels, car seats and safety equipment. Improper product design can cause many complications. In addition, anthropometric research is also useful in identifying the identities of individuals such as crime suspects.
**Graphical Abstract**

Fig. 1. Flow diagram for the review process using PRISMA (adapted from Moher et al., 2009)

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**Research Objectives**

This article review has proved that anthropometric research is essential to uplift the morale and provide an ideal living and working environment. The research significantly impacts human well-being, welfare, and safety by producing products which are easy to use and fit body dimensions perfectly. Nonetheless, Malaysia still lags behind in producing products based on the local body dimension measurement as it has yet to establish an anthropometric database due to a lack of investment in this area (Yusuff et al., 2016). Therefore, this paper hopes to provide some information and raise awareness about the importance of anthropometric research, so that continuous improvement of products such as apparel, footwear, and furniture tailored to the needs of the Malaysian population, can be realized. In order to achieve the aim, the objectives of this review are:

1. To identify existing articles related to the anthropometric research that revolves around Malaysian case studies;
2. To analyze the importance of anthropometric research to the Malaysian population from the existing articles; and
3. To determine how anthropometric related research can be further explored.
Methodology

Systematic Reviews and Meta-Analysis (PRISMA) has been used to retrieve articles. PRISMA practices a rigorous articles selection (Mohamed Shaffril et al., 2019; Moher et al., 2009). The processes were divided into three;

Articles Identification.

Scopus and Web of Science were used as primary databases for articles searching. Both of them are among the most extensive databases containing many publications on various subject areas. To identify the most relevant articles to be reviewed, the keywords chosen were ‘anthropometric’ or ‘body’, besides ‘data’, ‘measurement’, ‘database’, ‘survey’, ‘dimension’, ‘parameter’ or ‘ergonomic’ for ‘Malaysia’ or ‘Malaysian’.

Articles Screening.

At this stage, the inclusion and exclusion criteria have been set up. Only English articles with empirical studies from 2009 to 2019 were considered to be reviewed. The scope of the review was only articles of anthropometric research that revolves around Malaysian case studies. The others articles were excluded.

Eligible Articles Selection.

Each article was thoroughly read to ensure only articles related to anthropometric research (which not limited to height and weight but includes information about detailed body dimensions) in Malaysia were eligible to be reviewed

The selected articles were grouped using thematic analysis for reviewing process.

Results

The search for articles using the key references resulted in 109,842 and 53,072 publications found in Scopus and the Web of Science databases. There were 837 articles found after the keywords stated above were used. After the inclusion and exclusion criteria were taken into consideration, 113 articles found. Fifteen articles were extracted after deep reading of articles selected. The articles excluded were from medical journal studies that only used height and weight to support their analysis or clinical design process.

The themes analysis resulted in severn benefits of anthropometric research. There were easy to use, fit, well-being, welfare, safety, work efficiency and identity verification.

The research benefits mostly children, the elderly, and the disabled for their well-being and welfare. Besides, it was established that proper workstation design was important for working people to sustain their work efficiency. Safety product has also been researched, such as suitable car seat design and hard hats to reduce accidents impact. Other than that, anthropometric research was crucial in the forensic investigation to verify the individual identity.
Nonetheless, insufficient anthropometric database due to lack of financial support caused research to be inclined towards specific interest and only meant for academic journals, not for commercialization.

**Findings**

The mismatched design of products to the body can lead to health problems such as musculoskeletal disorders, severe injuries caused in accidents and the apparel 'misfit'. Ergonomics design is important for the elderly and disabled to live independently. Therefore, continuous anthropometric research is essential to produce products based on Malaysian body dimensions, which database is still lacking. The research related to individual morphological features also can be further explored. Besides, the advancement of research related to safety aspects will give added value to national cars to compete with foreign-made cars in the local market.

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**References**


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Nurashikin Saaludin is a Senior Lecturer and Researcher at Universiti Kuala Lumpur Malaysian Institute of Information Technology (UniKL MIIT). She received her Masters and Bachelor degree in Statistics from Universiti Kebangsaan Malaysia. Her research interests include Artificial Neural
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