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Anthropometry of Indonesian Sundanese children and the development of clothing size system for Indonesian Sundanese children aged 6–10 year

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Abstract

The design of clothing that consider anthropometry approach is important. The purpose of this study is to describe anthropometry of school children aged 6–10 year in Indonesia related to clothing size and determine clothing size system for Indonesian children for this age range. Six hundred and fifty-four Sundanese children were involved in this study (mean age = 7.86 year, SD = 1.22 year, 339 females and 215 males). Forty-nine anthropometry dimensions were measured consisting of 28 upper body dimensions and 21 lower body dimensions. Descriptive statistic of the anthropometry data is presented. Standardized clothing size system for Indonesian Sundanese children is proposed based on principal component analysis and implications of the result are discussed. © 2017 Elsevier B.V.

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Anthropometry of Indonesian Sundanese children and the development of clothing size system for Indonesian Sundanese children aged 6–10 year



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ABSTRACT

The design of clothing that consider anthropometry approach is important. The purpose of this study is to describe anthropometry of school children aged 6–10 year in Indonesia related to clothing size and determine clothing size system for Indonesian children for this age range. Six hundred and fifty-four Sundanese children were involved in this study (mean age = 7.86 year, SD = 1.22 year, 339 female). Forty-nine anthropometry dimensions were measured consisting of 28 upper body dimensions and 21 of lower body dimensions. Descriptive statistic of the anthropometry data is presented. Standard clothing size system for Indonesian Sundanese children is proposed based on principal component analysis and implications of the result are discussed.

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1. Introduction

The importance of anthropometry data in the design of product and workplace has been recognized for years (see Porter et al., 2004 for an example). The absence of anthropometric data may lead to negative consequences on the suitability of human and products or workplaces. For example, Sitalaksana and Widyanti (2016) reviewed the man-work mismatch in the design of workplace in small industries in Indonesia with safety and health consequences. Poirson and Parkinson (2014) underlined the importance of anthropometry consideration in the design of commercial pilot seats in relation to safety. Other studies related to the design of domestic and daily goods were done by Al-Ansari and Mokdad (2009) describing the role of anthropometry in the design of school furniture, and Boyles et al. (2003) describing anthropometry consideration in the design of scissors for hairdressing.

Clothes are a daily product that crucially needs suitability between the user and their anthropometric data. As a primary need of mankind, clothes play a critical role in every individual's activities. Clothes are also crucial in one's social and cultural interaction, as

well as an expression of the individual's style. However, finding clothes that fit exactly for everybody's need is not easy, except for clothes that are tailor made for a certain individual (e.g., in a boutique, a tailor, etc) and for a particular need (e.g., certain sports).

Problems in garment industries arise in line with standardized clothing size due to the wide variation of the body size. Customers may find difficulties in obtaining clothes for their specific needs. The unstandardized clothing size system can lead to mistakes during purchases. The unfitted garment's size can cause a condition in which the garment will never be used by the customer along with customer's dissatisfaction or the clothes may be used once or twice only and lead to the worst situation, that is the disposal of the clothes which eventually create unwanted environmental impacts (Laitala and Klepp, 2010). The main issue for the industry is of economic matters and sizing systems practicality. Without size standards, mass production can be less accurate, less efficient, less marketable, and therefore less profitable.

A clothing sizing system classifies a specific population into several different relatively homogeneous subgroups based on some key body dimensions. Persons of the same subgroup are assumed to have the same particular body shape characteristics and therefore share the same clothing size. In other words, the goal of clothing sizing system is to select a group of sizes so that a limited number of sizes ensure a ready-made garment that best fits the individuals of

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The moderating role of end-tidal CO₂ on upper trapezius muscle activity in response to sustained attention



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ABSTRACT

With higher levels of automation in modern manufacturing, there is increased monitoring of the process by the human operator. Prolonged monitoring or sustained attention has been found to be stressful for human operators. Plant and process operators have also been found to have one of the highest level of work demands (work speed, pace) in a recent European survey (Eurofound, 2015). Along with this, the incidence of Work Related Musculoskeletal Disorders (WRMSDs) remains at a high level in the manufacturing sector. This research endeavoured to determine if end-tidal CO₂ levels decreased and upper trapezius muscle activity increased concurrently with increased levels of attention. We then developed a model to investigate if end-tidal CO₂ moderated the relationship between mental workload due to sustained attention and upper trapezius muscle activity. The resulting interactional model found that end-tidal CO₂ moderated the relationship ($p = 0.004$) when end-tidal CO₂ reached the hypocapnic range (>35 mm Hg). This model indicates the possibility that a high level of sustained attention is a risk factor in the development of WRMSDs and should therefore be included in workplace risk assessments.

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1. Introduction

The globalisation of financial and product markets are increasing international competition, resulting in rapid technological change and expectations for higher performance at both the corporate and individual levels (Narula, 2014). This has contributed to an emerging trend of work intensification with an increase in workload and work pressure (European Agency for Health and Safety at Work, 2007; Eurofound, 2015). Industry is meeting this challenge through increasing levels of automation and robotics technology (Probst et al., 2013). Between 2015 and 2018, it is estimated that about 1.3 million new industrial robots will be installed in factories around the world (IFR, 2015). One motivator for advancements in automation technology has been the reduction in human mental workload, albeit that increased monitoring creates mental workload in itself (Lee, 2006; Parasuraman et al., 2000). Increased cognitive demand for operators acting as system supervisors is likely to arise from the requirement for additional

monitoring of automation (Kaber and Endsley, 2004; Warm et al., 1996). Sustained attention is a dominant component of job content in modern manufacturing and it is likely that the duration of monitoring required has increased in line with work intensification. Hancock (2013) ascertains that while sustained attention has always been part of human life, operators' lack of control of the focus of their attention within modern automated environments is a source of stress.

1.1. Sustained attention

Sustained attention or vigilance refers to the ability to maintain focus of attention and to remain alert to stimuli over prolonged periods of time (Molloy and Parasuraman, 1996). There are two main theoretical approaches which explain vigilance. The mindlessness model is based on the premise that repetitive and monotonous tasks reduce the level of stimulation required by the central nervous system resulting in a lowered sensitivity to signal detection (Heilman, 1995; Manly et al., 1999; Robertson et al., 1997; Thomson et al., 2015). It is proposed that as the mind disengages from the task, it is preoccupied with task unrelated thoughts (Giambra, 1995; Smallwood et al., 2004; Allen et al., 2013). The attentional resource theory is an alternate view has also been used to understand the concept of vigilance (Fisk and Scerbo, 1987; Fisk

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Work-related musculoskeletal disorders in home care nurses: Study of the main risk factors



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ABSTRACT

Background: Nurses are a risk group for work-related musculoskeletal disorders (WMSDs). Several studies reveal that nurses have high prevalence rates of injuries and symptoms related to WMSDs. However, many of these studies focus mostly on hospital nurses. Worldwide, few studies include home care nurses.

Objective: This work aimed to identify the body region most affected by musculoskeletal complaints in home care nursing, and subsequently develop a statistical model, that includes the main risk factors, to predict the risk of having musculoskeletal complaints in the identified region.

Methods: The research method was based on the Standardised Nordic Questionnaire applied to home care nurses working at Health Centres of northern Portugal. Univariate and multivariate models of logistic regression were used to meet the goals of this work.

Results: Home care nurses have a three times greater chance of having lumbar complaints than their counterparts working only at Health Centres (OR = 3.19 ($p < 0.05$), with a 95% confidence interval [1.256; 8.076]). A statistical model with seven variables (forearm posture; static postures; arm posture; arm supported; bed height; job satisfaction; assistive devices) was obtained to predict lumbar complaints.

Conclusions: The lumbar region was identified as the most affected by musculoskeletal complaints. These complaints were associated with seven factors.

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1. Introduction

Work-related musculoskeletal disorders (WMSDs) have been described as the most important occupational health problem affecting nurses (Barroso et al., 2007; Smith et al., 2006). The high prevalence rates of musculoskeletal symptoms and injuries in nurses confirm this claim (Barroso et al., 2007; Alexopoulos et al., 2006, 2011; Barroso and Martins, 2008; Daraiseh et al., 2010; Smith and Leggat, 2003; Smith et al., 2004; Trinkoff et al., 2003b; Yip, 2001). In fact, caring for people is considered a risky activity by some authors, as it is associated with high prevalence of musculoskeletal complaints, mainly in the back (Barroso et al., 2007; Alexopoulos et al., 2006, 2011; Daraiseh et al., 2010; Menzel, 2004). It is very important to reduce back complaints in nurses as those may lead to physical suffering, greater absenteeism, and also to an early retirement. Also, symptoms in the lumbar

region can lead to symptoms in other body regions (Daraiseh et al., 2010).

Most studies about this topic have been carried out in hospitals, nursing homes and other institutions. Information regarding WMSDs in home care nurses worldwide is scarce (Davis and Kotowski, 2015). Still, there are few studies dedicated to WMSDs in nurses, especially comparing nurses in home care with nurses in hospitals and nursing homes.

Some studies indicate that injuries and musculoskeletal disorders in the back and other body sites constitute a serious problem for professionals who provide home care, namely nurses and nursing assistants (Brulin et al., 1998; Cheung et al., 2006; Knibbe and Friele, 1996; Meyer and Muntaner, 1999; Ono et al., 1995; Pohjonen et al., 1998). A study involving a comparative analysis of musculoskeletal disorders between Greek and Dutch nursing personnel in hospitals and nursing homes suggested that work in both situations entailed similar risks. However, the nursing home environment may entail more risks, as is less controlled and standardised (Alexopoulos et al., 2006). Following that reasoning, one can suppose that home care provision may lead to an even

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