



Influence of sleep timing behavior on weight status and activity patterns in adults with intellectual disabilities



Jacques Mikulovic^a, Olivier Dieu^b, Paul S. Fardy^c, Gilles Bui-Xuan^d,
Jérémy Vanhelst^{e,f,*}

^a LACES, EA 4140, Université de Bordeaux, France

^b ER3S, Université Lille Nord de France, Calais, France

^c Queens College, City University of New York, Flushing, NY, United States of America

^d ER3S, Université d'Artois, 59658 Villeneuve d'Ascq, France

^e Unité Inserm U995 & Université Lille Nord de France, Lille, France

^f Centre d'Investigation Clinique, CIC-1403-Inserm-CH&U, Lille, France

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ABSTRACT

The aim was to explore the relationship between sleep habits and overweight/obesity, physical activity and sedentary behaviors in French adults with intellectual disabilities. This observational study was conducted on 570 French adults with intellectual deficiency. Sleep habits were analyzed and related to anthropometric measures, physical activity and sedentary behaviors. The study was conducted using a self-administered questionnaire. Participants completed the questionnaire during an interview with the principal investigator. Sleep timing behavior was classified into 4 sleep patterns: Early-bed/Early-rise, Early-bed/Late-rise, Late-bed/Late-rise, and Late-bed/Early-rise. Of 570 eligible participants, 61 were excluded because of missing data on age, weight or height. The number of participants identified in each of the four sleep patterns was as follows: Early-bed/Early-rise, $N = 119$ (23%), Early-bed/Late-rise, $N = 171$ (34%), Late-bed/Early-rise, $N = 100$ (20%), Late-bed/Late-rise $N = 119$ (23%). Participants who wake up earlier are more active than those who rise late ($p < 0.02$). Participants who slept later spent more time in sedentary activities than those in the Early rise groups ($p < 0.01$). The number of obese/overweight participants was also higher in Late-bed/Late rise group. Sleep behavior was associated with overweight/obesity, physical activity and sedentary behavior in adults with intellectual deficiency, independently the sleep duration. Implementing intervention or promotion programs on sleep behaviors should be considered in order to meet the objectives of promoting health on anthropometric characteristics and increased physical activity among these disabled adults.

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1. Introduction

Overweight and obesity continue to attract worldwide concern in developing public health policy. The prevalence of obesity has tripled since thirty years in European countries, and continues to rise at an alarming rate (WHO, 2009). Equally

* Corresponding author at: Centre d'Investigation Clinique, CIC-PT-1403-Inserm-CH&U, CHRU de Lille, 59037 Lille Cedex, France. Tel.: +33 03 20 44 60 58; fax: +33 03 20 44 66 87.

E-mail addresses: jeremy.vanhelst@chru-lille.fr, jeremy.vanhelst@hotmail.fr (J. Vanhelst).

alarming is the high percentage of overweight and obese in population with intellectual disabilities. Many studies showed a higher prevalence of overweight and obesity in intellectually disabled adults compared to non-disabled adults (Hove, 2004; Mikulovic et al., 2014; Rimmer & Yamaki, 2006; Robertson et al., 2000; Stedman & Leland, 2010). Regarding the consequences of obesity (diabetes, cardiovascular diseases, cancer, and increased early mortality) and its high cost associated, estimated in Europe at roughly €33 billion a year (Berenson et al., 1998; Fair & Montgomery, 2009; Fry & Finley, 2005), it is necessary to develop a better understanding on the health problems in disabled adults and policies to develop in a near future.

Overweight and obesity are pathologies marked by an increase of body fat as a consequence of a positive energy balance, when energy intake exceeds energy expenditure, over a prolonged period of time. By this definition, intervention to treat obesity should include nutrition and physical activity. However, other factors have to be taken into consideration, particularly the societal changes. Increasing in television viewing and Internet use has an important impact on sleep patterns, leading to chronic sleep deprivation. Indeed, patterns of reduced sleep duration have been reported simultaneously with patterns of increased obesity (Van Cauter & Knutson, 2008). The relationship between short sleep duration and obesity has been widely demonstrated (Cappuccio et al., 2008; Knutson, 2005; Patel & Hu, 2008). However, sleep-timing behavior may also be a better predictor of overweight and obesity than sleep duration alone (Fleig & Randler, 2009; Gaina et al., 2006; Olds, Maher, & Matricciani, 2011; Schubert & Randler, 2008). These studies demonstrated that sleep habits were associated with an unfavorable activity and weight status profile, independent of age, sex, household income, geographical remoteness, and sleep duration in people with no intellectual disabilities. Recently, a study in French adolescents with intellectual disabilities showed the higher number of adolescents who were sedentary was those in Late rise vs. Early rise participants and participants in the Late-bed group were more likely overweight and obese, independently the sleep duration (Vanhelst, Bui-Xuan, Fardy, & Mikulovic, 2013). Today, there is no study on this topic in adults with intellectual disabilities.

Therefore, the objective of this study was to explore whether sleep timing behavior was related to overweight/obesity, physical activity and sedentary behavior among French adults with intellectual disabilities.

2. Methods

2.1. Study design

The participants included in the study were institutionalized intellectual deficiency adults, hosted in working centers, occupational institutes, foster homes or medical foster homes. The study was conducted in cooperation with five French Universities (Lyon, Strasbourg, Montpellier, Nice and Dunkirk). Students doing the degree course in Adapted Physical Exercise participated in data collection as interviewers. All institutions for intellectual deficiency adults near these five cities that hosted students for a training period were asked to participate in the study. All responded positively. Ten intellectual deficiency people were randomly selected per institution, to balance the relative statistical weight of each institution and prevent any “institution” effect. Participants younger than 18 and older than 60 years were excluded. Before the study began, the purpose and objectives were carefully explained to each participant and legal tutors. Written informed consent was obtained. Participation in the study was voluntary. All procedures were performed in accordance with the ethical standards of the Helsinki Declaration of 1975 as revised in 2008 and with European Good Clinical Practices (Béghin et al., 2008).

Each participant participated in a face-to-face interview with a student who completed the questionnaire, in the presence of a professional working in the institution (physician, educator or nurse). Factual data (such as the time spent doing sporting activities) were reported by the professionals accompanying the intellectual deficiency participants. The intellectual deficiency participants themselves answered personal questions (body representation, self-esteem, eating habits, etc.). All participants attending the institutions were capable of answering the questionnaire. No exclusion criteria were applied before randomization.

2.2. Measurements

Measurements included physical characteristics and lifestyle habits. Data were collected anonymously.

2.2.1. Participant characteristics

Body mass was measured without shoes and heavy outer garments to the nearest 0.1 kg using an electronic scale (Seca, Hamburg, Germany). Height was measured without shoes to the nearest 0.1 cm using a standard physician's scale. Body Mass Index (BMI) was calculated by weight (kg)/height (m²). BMI ≤ 18.5 , ≥ 25 and ≥ 30 kg/m² defines underweight, overweight and obesity, respectively (de Onis & Habicht, 1996). Participants were assigned to respective weight categories according to BMI scores.

2.2.2. Lifestyle habits

A questionnaire was used that had been developed previously for non-intellectual deficiency adolescents (Thibault, Contrand, Saubusse, Baine, & Maurice-Tison, 2010). In order to know if this questionnaire can be extrapolated to intellectual

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