



Relationship between sleep habits, anthropometric characteristics and lifestyle habits in adolescents with intellectual disabilities



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ABSTRACT

The aim was to explore the relationship between sleep habits and overweight/obesity, physical activity and sedentary behaviours in French adolescents with intellectual disabilities. This observational study was conducted on 535 French adolescents with intellectual deficiency. Sleep habits were analyzed and related to anthropometric measures, physical activity and sedentary behaviours. The study was conducted using a self-administered questionnaire. Adolescents completed the questionnaire during an interview with the principle investigator. Sleep timing behaviour was classified into 4 sleep patterns: Early-bed/Early-rise, Early-bed/Late-rise, Late-bed/Late-rise, and Late-bed/Early-rise. Of 573 eligible participants, 125 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, $N = 59$ (15.4%), Early-bed/Late-rise, $N = 164$ (43%), Late-bed/Early-rise, $N = 56$ (15%), Late-bed/Late-rise $N = 102$ (27%). Adolescents who woke up early were more active than those from the late rise group ($p < 0.001$). The number of adolescents who are sedentary was higher in late rise vs. early rise subjects ($p < 0.001$). Subjects in the late-bed group were more likely overweight and obese ($p < 0.05$). Results suggest that sleep behaviour was associated with overweight/obesity, physical activity and sedentary behaviour in adolescents with intellectual deficiency. Sleep behaviours should be considered in planning health promotion strategies.

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1. Introduction

Overweight and obesity is an international health problem (Wang & Lobstein, 2006). Since 1997, obesity has increased internationally at a rate of 5% per year with more than 1 billion now classified as overweight or obese (Puska, Nishida, & Porter, 2012). The number of obese persons in France reached 7 million in 2012, 15% of the total population (Obepi, 2012). Childhood and adult overweight and obesity in France are a significant public health problem because of the medical and

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economic consequences. Mikulovic et al. (2011) showed a higher prevalence of overweight and obesity in intellectually disabled adolescents compared to non-disabled adolescents. Similar findings have been reported in adults (Hove, 2004; Rimmer & Yamaki, 2006; Robertson et al., 2000; Stedman & Leland, 2010).

Studies have shown that chronic partial sleep loss may increase the risk of obesity and weight gain (Patel & Hu, 2008; Van Cauter, Spiegel, Tasali, & Leproult, 2008). Sleep deprivation enhances energy intake because of increased wake time, therefore increased opportunity to eat. Another possibility that may increase energy intake is the impact of sleep deprivation on peripheral regulators of hunger, leptin, and ghrelin. Elevations in serum ghrelin and reductions in serum leptin are significantly correlated with weight gain and increased appetite (Havel, 1999). Sleep deprivation is also associated with decreased energy expenditure as a consequence of tiredness, thus, less energy for physical activity. Studies of acute sleep deprivation in humans found a drop in core body temperature, suggesting that sleep loss may impact energy expenditure through thermoregulation. The relationship between short sleep duration and obesity in youth has been widely demonstrated (Cappuccio et al., 2008; Knutson, 2005; Patel & Hu, 2008). However, Fleig and Randler (2009) suggest that sleep-timing behaviour may also be a better predictor of overweight and obesity than sleep duration alone. Few studies have been performed on sleep-timing behaviour, i.e. time to bed and time to rise (Gaina et al., 2006; Olds, Maher, & Matricciani, 2011; Schubert & Randler, 2008). These three studies demonstrated that sleep habits were associated with an unfavourable activity and weight status profile, independent of age, sex, household income, geographical remoteness, and sleep duration. Early to rise children and adolescents have a lower body mass index compared with those who are late to bed (Gaina et al., 2006; Olds et al., 2011; Schubert & Randler, 2008). These conclusions demonstrate the importance of sleep duration and sleep timing behaviour.

The objective of this study was to explore whether sleep timing behaviour was related to overweight/obesity, physical activity and sedentary behaviour among French adolescents with intellectual disabilities.

2. Methods

2.1. Study design

The study was conducted in the North of France. Subjects were included from medico-educational institutes or from adapted sections of general and vocational schools. All schools or institutes in the area whose populations included children with intellectual deficiency were invited to participate. The decision to participate in the study was made by the principal at each of the schools. Twenty subjects were randomly chosen from each school. If the school had fewer than 20 intellectual deficiency subjects then all were included. All adolescents attending schools or institutes were eligible for the study, providing that they were classified as intellectually deficient by education committees assigned the responsibility of defining intellectual deficiency, whatever the aetiology or the degree of deficiency. Of the initial 535 subjects with intellectual deficiency, 125 were excluded because of missing data concerning age, weight or height. The remaining 410 were from 47 schools: 215 (52.4%) were from 32 medico-educational institutes and 195 (47.6%) were from 15 public schools with adapted sections according to the pathology. Two hundred twenty-three subjects were male (59.8%) and one hundred eighty seven were female (40.2%). Mean age was 15.1 years. Researchers were responsible for completing the questionnaire using the subject's file data and for interviewing subjects in the presence of either the school nurse or physical education teacher.

Aims and objectives of the study were explained carefully to each subject. Written, informed consent was obtained from the children and their parents. Authorization was also obtained from the principal of each school or institute.

2.2. Measurements

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

2.2.1. Subject 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). Weight was determined according to the definition of the International Obesity Task Force (IOTF) (Cole, Bellizzi, Flegal, & Dietz, 2000). For subjects more than 17 years of age, BMI ≤ 17 , ≥ 25 and ≥ 30 kg/m² defines underweight, overweight and obesity, respectively. Subjects 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, Conrand, Saubusse, Baine, & Maurice-Tison, 2010). In order to know if this questionnaire can be extrapolated to intellectual deficiency adolescents, two pretests were performed. Prior to data collection, an initial pretest questionnaire was completed by a sample of 10 adolescents with intellectual deficiency. This pretest was conducted to evaluate clarity and comprehensiveness of each question, as well as the amount of time necessary to complete the questionnaire. A second pretest was completed by a sample of 15 intellectual deficiency adolescents to assess the quality and response rate for each question. Questions were deleted if they were completed by less than 80% of participants.

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