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Brief Report

# The physical activity patterns of adolescents with intellectual disabilities: A descriptive study

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## Abstract

**Background:** Emerging data suggest that adolescents with intellectual disabilities (IDs) have lower physical activity (PA) levels and have a higher incidence of obesity than their peers without IDs.

**Objective:** To examine daily PA patterns (weekdays vs. weekend days) of adolescents with IDs among boys and girls. The contributions of PA at school, including school recesses and physical education time, and PA outside of school were also analyzed.

**Methods:** Participants included forty-nine adolescents with mild to moderate IDs (mean 15.3 years) from the Valencia region (Spain). Adolescents wore a pedometer for seven consecutive days to measure PA objectively and filled in a daily activity log. Mean steps for weekdays, weekend days, and for the different day segments were calculated and compared.

**Results:** This study indicates significant differences in daily PA levels between boys and girls (12,630 and 9599 steps respectively; $p < 0.05$). Girls were less active than boys on weekdays (13,872 vs. 9868 steps; $p = 0.016$), during school time (7097 vs. 4802 steps; $p = 0.005$), and during school recesses (1953 vs. 1147 steps; $p = 0.033$). Boys showed higher levels of PA on weekdays compared to weekend days (13,872 vs. 10,188 steps; $p = 0.015$) and PA at school represented 50% of the participants' daily PA in both genders. There were no differences comparing weight status groups (normal vs. overweight/obese) in PA levels either on weekdays or weekend days.

**Conclusions:** These findings provide an empirical basis for interventions to increase PA levels among adolescents with IDs. 

*Keywords:* Adolescent; Gender; Intellectual disability; Special school; Physical activity

Regular physical activity (PA) has been linked to many health benefits in adolescents[1] therefore it is recommended that youth of both genders accumulate at least 60 min per day of moderate intensity PA which corresponds to 11,500 steps.[1,2] However, there is little evidence about PA levels among adolescents with intellectual disabilities (IDs).[3] Emerging data suggest that adolescents with IDs are insufficiently active and have a higher incidence of obesity than their peers without IDs.[3,4]

Although most of the available data for youth with IDs are based on objective instruments such as pedometers and accelerometers[3] the results usually show daily/weekly total PA levels and do not analyze the contribution of the time spent at school and out of school to PA behavior. The few scientific studies examining gender differences in adolescents with IDs have indicated that girls have lower levels of PA than boys.[5,6] Apart from demographic differences, the literature indicates that PA levels can differ between weekdays and weekend days,[7] although the evidence is limited. Therefore, the aim of this study was to examine daily PA patterns (weekdays and weekend days) of adolescents with IDs among boys and girls. In addition, the contributions of PA at school, including school recesses and physical education (PE) time, and PA outside of school were considered in our analysis.

## Methods

### *Participants*

The final sample was composed of 35 adolescents (mean age 15.3 ± 2.7 years; 62.9% boys). Nine of the participants had Down syndrome. The average body mass index (BMI) was 24.4 ± 5.0 kg/m$^2$ (54.3% normoweight). Participants were recruited from a special education school for people with IDs in the Valencian region, Spain. This public school is specific for youth with intellectual disabilities who have special education needs. Inclusion criteria were: an age of 12–20 years, with mild (Intelligence Quotient [IQ] of

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70–50) to moderate (IQ 50–35) IDs,[8] and an ability to walk at least 10 m without assistance. Students meeting the age criteria were selected and screened by the school nurse; 83 students met the inclusion criteria and their parents or legal representatives were contacted by the school nurse via an information letter in order to obtain informed consent for their child's participation in this study. Forty-nine signed consents were obtained. The study protocol was approved by the Human Research Ethics Committee of the University of Valencia.

### *Measurements and procedure*

Yamax Digiwalker SW-200 pedometers (Yamax, Tokyo, Japan) were used to measure PA. Pedometers are one of the objective instruments which can be used to accurately assess PA patterns for youth with disabilities.[9] Before data collection, both parents and adolescents were trained in the use of the pedometers. Participants were instructed to wear the pedometer for 7 consecutive days (Spring 2012), during waking hours except during water-based activities.

The school day was segmented into two categories based on Brusseau et al[10]: *at school* (8:00–17:00) and *outside of school* (from 17:00 until the start of school in the morning). Moreover, PA was assessed during PE classes and recesses. There were two active PE classes a week with a length of 60 min, and two school recesses per day. The first recess was 30 min in length during the mid-morning and the second recess was for lunch (60 min).

Weight and height were measured to calculate BMI (kg/m$^2$) using a standard scale (Añó-Sayol SL, Barcelona, Spain). BMI percentiles were calculated and this data was used to divide the adolescents into two groups: normal-weight and overweight/obese.

A daily activity log was used to record the number of steps each participant took, and the school nurse and school teachers helped the students to record their pedometer step counts at different times of the school day: when they arrived at/left school, school recesses, and PE lessons. Outside of school and during weekend days, the activity log was completed by the adolescents with assistance from their parents before bedtime. Unusual step values were checked with the participants and their parents for clarification. Means for the total number of steps per day were calculated, registering counts of more than 20,000 as 20,000 in order to limit unrealistic data.[11] Following current recommendations,[12] 150 steps were added to the daily number of steps for every minute of reported cycling or swimming. A minimum of 4 entire days of pedometer data were required; fourteen participants were excluded because they did not meet this criteria.

### *Data analysis*

The mean number of steps for weekdays, weekend days, and for the different segments of the day (at school, outside of school, recesses, and PE) were calculated. Gender differences were also analyzed. Differences between the means were evaluated by unpaired and paired *t*-tests. Effect sizes were estimated using Cohen's *d*. Statistical analyses were conducted using SPSS 19.0 software (SPSS, Chicago, Illinois, USA).

## Results

The descriptive characteristics of the study sample are shown in Table 1. Overall, there were significant differences in daily PA levels ($t = 2.02$, $p < 0.05$, $d = 3.03$; $\Delta = 3031$ steps) between boys and girls. Furthermore, as shown in Fig. 1, girls were less active than boys on weekdays ($t = 2.57$, $p = 0.016$, $d = 1.09$; $\Delta = 4004$ steps), during school time ($t = 3.07$, $p = 0.005$, $d = 1.13$; $\Delta = 2295$ steps), and school recesses ($t = 2.25$, $p = 0.033$, $d = 0.89$; $\Delta = 806$ steps).

The *t*-test results indicated that boys showed higher levels of PA on weekdays compared to weekend days ($t = 2.66$, $p = 0.015$, $d = 0.60$; $\Delta = 3684$ steps), whereas there were no significant differences in PA levels between weekdays and weekend days for girls. There was no difference between the number of steps counted at school and out of school for either boys or girls.

Fig. 2 presents the step counts for each PA segment by weight status. Overall, there were no differences in PA levels when comparing BMI groups, either on weekdays or weekend days. Normal-weight adolescents took an overall higher number of steps than overweight/obese adolescents during the recess periods ($t = 2.55$, $p = 0.017$, $d = 1.01$; $\Delta = 842$ steps). Although no differences were observed in PA levels between weekdays and weekend days, either in normal-weight or overweight groups, a

Table 1
Sample characteristics

| | All | Boys | Girls | *p*-value |
|---|---|---|---|---|
| *N* | 35 | 22 | 13 | – |
| Age (years) | 15.26 ± 2.70 | 14.68 ± 2.61 | 16.23 ± 2.68 | 0.102 |
| Weight (kg) | 60.02 ± 14.14 | 59.04 ± 15.02 | 61.67 ± 12.94 | 0.603 |
| Height (m) | 1.57 ± 0.13 | 1.57 ± 0.14 | 1.55 ± 0.12 | 0.671 |
| Body mass index (kg/m$^2$) | 24.44 ± 4.98 | 23.80 ± 5.30 | 25.53 ± 4.36 | 0.327 |
| Physical activity (steps/day) | 11,689.13 ± 3934.99 | 12,629.77 ± 3888.27 | 9598.81 ± 3340.69 | 0.046 |

Values are mean ± SD.