



## Physical Activity Status and Body Composition of Adolescents with Borderline Intellectual Functioning in South Korea

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### Dear Editor-in-Chief

Borderline Intellectual Functioning (BIF), defined by an IQ range of 71 to 84 (1), encompasses approximately 12%–14% of the worldwide school-age population, and approximately 13% of South Korean adolescents fall within this classification (2). Despite its prevalence, there is limited research on the physical activity levels and body composition of adolescents with BIF, with existing studies primarily focusing on mild intellectual disability and neglecting the BIF population. For instance, Mohammadi et al. (3) highlighted gender disparities and IQ correlations in mild intellectual disability (IQ: 50–75), emphasizing the link between lower IQ and reduced physical fitness. Similarly, Wouters et al. (4) reported elevated overweight (23–25%) and obesity rates (10–15%) in mild intellectual disability, with the majority (71–91%) scoring below fitness reference values.

Recognizing the potential positive influence of physical activity on obesity and overall health risks (5), it is imperative to investigate the factors influencing physical activity status in adolescents with BIF. Given the limited research in this area, this study examines the physical activity status, body composition, and potential contributing factors influencing physical activity and body composition levels in adolescents with BIF.

From September to October 2023, we enrolled 128 adolescents diagnosed with BIF by a pediatrician, excluding those with Rett syndrome, Asperger syndrome, or other autism spectrum disorders. During the visit to our research laboratory, we obtained written consent from both the adolescents and their parents. A general information interview with one parent gathered data on adolescents' gender, age, IQ score, parent's education level, and monthly family income. Height and weight were assessed to derive the body mass index (BMI) based on these measurements. BMI percentiles were determined using age-appropriate reference values from the 2000 CDC growth charts for the United States (6), with cut-off points at P<sub>5</sub>, P<sub>85</sub> (risk-for-overweight), and P<sub>95</sub> (overweight) for BMI. Additionally, adolescents with BIF, assisted by a parent, completed a brief Korean version of the International Physical Activity Questionnaire (7), comprising nine items. The data categorized total weekly physical activity levels, distinguishing between low (<600 MET-min/week), moderate (≥600–≤3000 MET-min/week), and high-intensity (>3000 MET-min/week) activities.

SPSS 23.0 statistical software was used to compute means and standard deviations for quantitative variables and percentages for categorical variables.



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ables. Binary logistic regression with an enter method was employed to identify predictors of BMI percentiles and participants' physical activity levels. The statistical significance level was set at  $P < 0.05$ .

Participants included 93 males and 35 females, with an average age of  $16.09 \pm 1.90$  years ( $15.82 \pm 1.79$  years for males,  $16.80 \pm 2.02$  years for females). The overall average IQ was  $73.71 \pm 5.99$ , with males scoring  $74.14 \pm 5.97$  and females scoring  $72.57 \pm 5.99$ . Heights averaged  $160.37 \pm 12.17$  cm for all, with males at  $161.92 \pm 13.4$  cm and females at  $156.23 \pm 6.53$  cm. Weight averaged  $57.91 \pm 12.69$  kg, with males at  $59.35 \pm 13.38$  kg and females at  $54.08 \pm 9.80$  kg. BMI averaged  $22.46 \pm 3.73$  overall, with males at  $22.59 \pm 3.96$  and females at  $22.13 \pm 3.07$ . Regarding parental education, 60.2% of mothers had college degrees, 24.2% had graduate or higher education, and 15.6% had a high school diploma or lower. For fathers, 68.8% were college graduates, 21.9% had graduate or advanced degrees, and 9.4% had a high school diploma or lower. Regarding monthly income, 0.8% reported less than \$2,000, 30.5% fell within \$2,000-\$3,999, 19.5% reported \$4,000-\$5,999, and 49.2% indicated \$6,000 or above.

The study found that 5.5% of adolescents with BIF had BMI  $\leq 5$ th percentile, 27.3% had BMI  $\geq 85$ th percentile, and 7.0% had BMI  $\geq 95$ th percentile. No significant predictors were identified for BMI  $\leq 5$ th percentile or  $\geq 95$ th percentile. However, for BMI  $\geq 85$ th percentile, age ( $\beta = -0.282$ ,  $P = 0.042$ , OR = 0.745), mother's education level ( $\beta = -1.102$ ,  $P = 0.012$ , OR = 0.332), and IQ score ( $\beta = -0.101$ ,  $P = 0.015$ , OR = 0.904) were significant predictors. In addition, 29.7% engaged in low-intensity physical activity, 57.0% in moderate-intensity, and 13.3% in high-intensity. Gender was a significant predictor of low-intensity activity ( $\beta = 1.386$ ,  $P = 0.013$ , OR = 3.999). For moderate intensity, age ( $\beta = -0.260$ ,  $P = 0.033$ , OR = 0.771), mother's education level ( $\beta = 0.936$ ,  $P = 0.026$ , OR = 0.392), and IQ score ( $\beta = 0.117$ ,  $P = 0.002$ , OR = 0.889) were significant predictors. Similarly, age ( $\beta = 0.628$ ,  $P = 0.006$ , OR = 1.875) and mother's

education level ( $\beta = 2.569$ ,  $P = 0.001$ , OR = 13.053) were significant predictors of high-intensity activity.

Thus, the study reveals a notable prevalence of overweight risk among adolescents with BIF. Predictors of overweight risk include age, mother's education level, and IQ score. In addition, gender significantly impacts low-intensity physical activity, whereas age and mother's education levels are key factors in predicting moderate and high-intensity physical activity in this population.

### Conflict of interest

The authors declare that there are no conflicts of interest.

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