

Lower body weight and less skeletal muscle mass in children with disabilities

Won Jin Sung^{1*}, Woo Jin Kim², Joon Sung Kim¹, Seong Hoon Lim¹, Bo Mi Sul¹, Bo Young Hong^{1†}

St. Vincent's Hospital, College of Medicine, The Catholic University of Korea, Department of Rehabilitation Medicine¹, College of Medicine, The Catholic University of Korea, College of Medicine²

Introduction

Identifying the nutritional status of children with disabilities and correcting malnutrition is very important issue, and some researches have been conducted on body composition index for understanding this issue. However, there are few studies about the nutritional and growth status in children with disabilities in Korea. The purpose of this study is to measure and compare body composition indexes between typically developing children and those with disabilities in Korea for understanding the nutritional and growth status.

Method

Typically developing 355 children(183 boys and 172 girls) in the 5th and the 6th grades from two schools (A and B), and 73 children with disabilities(50 boys and 23 girls) from one special school which includes from elementary school students to high school students were participated. The clinical characteristics of all subjects are listed in Table 1.

Inbody 770 and Inbody S10, body composition analyzers, were used to measure the body composition index of the subjects. They have an Asian population-based standard range of body composition index that fit the subject's height through several studies. Body weight(BW), Fat Mass(FM), Fat-Free Mass(FFM), Skeletal Muscle Mass(SMM), Body Mass Index(BMI), and Percentage Body Fat(PBF) were measured.

We calculated mean and standard deviation(SD) of measured body composition index. And we calculated the rate of "under range", "within range" and "over range" which depends upon each index belonging to the standard range as mentioned above.

Data from 5th and 6th grades of the special school were used to compare the mean difference with typically developing children. And data from all students of the special school were used to compare the rate of "under range", "within range" and "over range" with typically developing children.

Result

The results of comparing the mean difference of body composition index were shown in Table 2. The SMM was significantly higher in typically developing children compared to children with disabilities in 5th and 6th grades.

The results of comparing the rate of "under range", "within range" and "over range" shown in figure 1. As shown in Figure 1, BW showed the significant difference in the rate of "under range", "within range" and "over range" between typically developing children and children with disabilities.

Conclusion

In this study, we measured and analyzed the body composition index of typically developing children and children with disabilities in Korea. We found that the rate of "under range" in BW was significantly higher in children with neurodevelopmental disabilities than typically developing children. And SMM was significantly lower in children with disabilities. The results of this study suggest that children with disabilities have lower body weight with less skeletal muscle mass. This highlights that the importance of physical activity in children with disabilities.

Acknowledgment

NRF-2017R1C1B5017423

Typically developing children	Clinical Characteristics	No. of patients(%)
	Male/Female	183(51.5) / 172(48.5)
	School A/School B	195(54.9) / 160(45.1)
	5th grade/6th grade	180(50.7) / 175(49.3)
Children with disabilities	Clinical Characteristics	No. of patients(%)
	Male/Female	50(68.5) / 23(31.5)
	Ambulation/Non-Ambulation	64(87.7) / 9(12.3)
	5th grade/6th grade	9(12.3) / 7(9.6)
	Type of disability	No. of patients(%)
	Intellectual disability	55(75.3)
	Cerebral palsy	16(21.9)
	Autism spectrum disorder	14(19.2)
	Epilepsy	2(2.7)
	Language disorder	1(1.4)
Hearing impairment	3(4.1)	

Table 1. The clinical characteristics of typically developing children and children with disabilities.

	Typically developing children	Children with disabilities (5th and 6th Grade)	P value
Height(cm)	148.54 ± 7.54	145.32 ± 7.81	0.097
BW(kg)	45.49 ± 12.06	39.59 ± 8.54	0.054
FM(kg)	13.35 ± 7.48	10.34 ± 5.12	0.113
FFM(kg)	32.14 ± 5.82	29.24 ± 5.18	0.051
SMM(kg)	16.92 ± 3.48	15.13 ± 3.09	0.043*
BMI(kg/m²)	20.39 ± 4.12	18.74 ± 3.79	0.114
PBF(%)	27.63 ± 8.83	25.41 ± 8.64	0.325

* Mean value was significantly different between compared group(P<0.05)

BW : Body weight, FM : Fat mass, FFM : Fat Free Mass, SMM : Skeletal Muscle Mass

BMI : Body Mass Index, PBF : Percentage Body Fat

Table 2. The mean difference of body composition indexes between typically developing children and children with disabilities(5th and 6th grade).

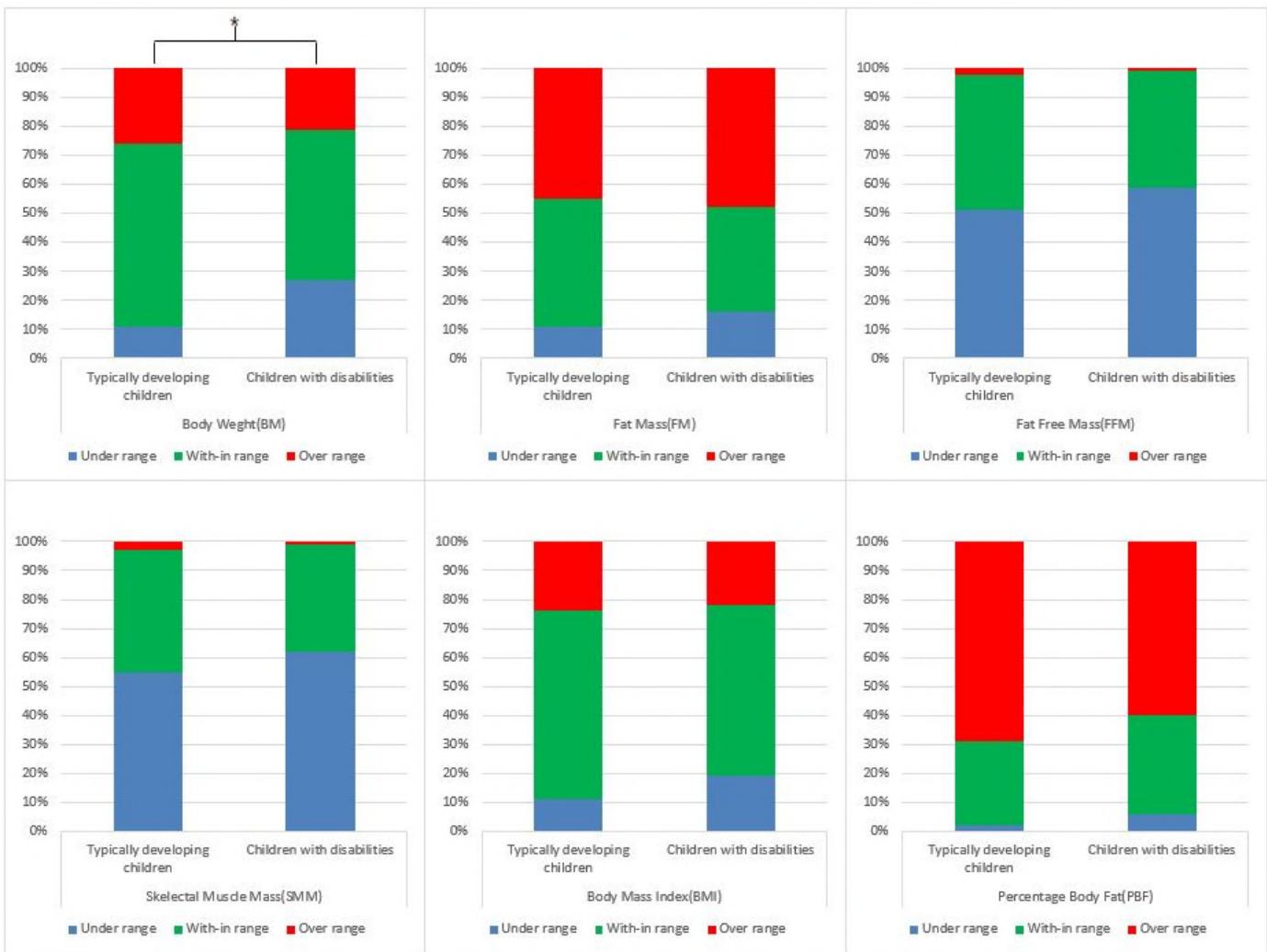


Figure 1. Comparison in the rate of “under range”, “within range” and “over range” between typically developing children and children with disabilities.