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Editorial

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Intervention for Severely Obese Children and Adolescents

Kyung Hee Park*

Department of Family Medicine, Hallym University Sacred Heart Hospital, Hallym University College of Medicine, Anyang, Korea

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*Corresponding author
Kyung Hee Park

https://orcid.org/0000-0001-9806-0076

Department of Family Medicine, Hallym University Sacred Heart Hospital, Hallym University College of Medicine, 22 Gwanpyeong-ro 170beon-gil, Dongan-gu, Anyang 14068, Korea
Tel: +82-31-380-3805
Fax: +82-31-380-1782
E-mail: beloved920@gmail.com

Obesity prevalence in children and adolescents is increasing worldwide, and severe obesity prevalence in children and adolescents is also increasing.[1] According to the student health checkup report, by the Ministry of Education in Korea, severe obesity prevalence increased from 0.8% in 2008 to 2.0% in 2017.[2]

Recently, severe obesity in children and adolescents has been commonly defined as body mass index (BMI) ≥120% of the sex- and age-specific 95th percentile BMI value (1.2×95th percentile).[1,3] BMI-for-age z-scores have been widely used as the primary outcome to determine intervention effectiveness. However, a recent study has emphasized the limitations of using BMI z-scores as a parameter for intervention effects among children and adolescents with very high BMIs. Instead, they suggested using a relative metric based on the BMI 95th percentile, such as %BMIp95 and ΔBMIp95.[4]

Severe obesity in adolescents is likely to persist into adulthood. A recent study of BMI trajectories from childhood to young adulthood by McGinty et al.[5] reported more rapid rates of increasing BMI among youth with severe obesity compared with their overweight or nonseverely obese peers. Studies from Korea have reported that the proportion of the population with three or more clustered cardiometabolic risk factors is higher among the severely obese, compared with the proportion among the overweight and the mild-to-moderately obese (30% vs. 10.9%).[6] Given the extent of previous reports that found an association between severe pediatric obesity and several medical and psychological complications in childhood and adolescence and adulthood[3], it is imperative to implement effective intervention programs for severely obese children and adolescents in Korea.

In consideration of its complex pathophysiology, multiple intervention components are needed to manage childhood and adolescent obesity. In particular, management of severe obesity requires multidisciplinary weight management services performed by a specialist alongside family- or community-based care. A recently published paper by Christison et al.[7] in *Childhood Obesity*, emphasized the value of a medical neighborhood framework with healthcare and community partners for effective coordinated care of children with severe obesity. They also argued that concept-of-care coordination for treating severely obese children will facilitate resource utilization, enhance care capacity, and improve outcomes. To enhance communication between care providers, community sectors, and families, they concluded that interoperable electronic health

records, a referral and tracking system, and payment for care coordination will play crucial facilitatory roles.

To date, relatively few intervention studies have been conducted for severe pediatric obesity. Moreover, the most common successful approaches for overweight and obese children and adolescents were not sufficiently effective for severe obesity cases. Most intervention programs usually incorporate nutritional education, encouragement of physical activity, and strategies for behavioral modification, including self-monitoring, goal-setting, relapse prevention, stimulus control, and problem solving. Family-based programs or parental involvement and support from peers and one's neighborhood are also important factors for successful weight management.[3,7,8]

Although relatively aggressive interventions, such as inpatient treatment during hospitalization and meal replacement therapy, yielded successful weight loss, patients frequently experienced weight regain after intervention termination.[3,9,10] Furthermore, inpatient treatment and modest caloric restriction via meal replacement therapy is difficult to maintain for long periods. This suggests a need to develop and implement long-term sustainable intervention programs in the real world, using the chronic care system as a model.

Recently, the results of a 16-week short-term pilot intervention study focusing mainly on severely obese children and adolescents in Korea were published.[11] In this paper, adding an exercise session to the standard care that included a multidisciplinary program consisting of education and consultation for diet and physical activity, parental education, and behavioral modification was associated with significant improvement in obesity status, body composition, liver function, diastolic blood pressure, and C-reactive protein, compared with baseline. After the intervention, the exercise group showed improvements in body composition, cardiometabolic markers, and lower leg muscle strength, compared with the standard care group. Based on the results of the studies conducted in consideration of the educational and social environment in Korea, establishment of a long-term care plan for severe pediatric obesity in a real-world setting will be needed.

Reviewing the results from intervention programs targeting severe pediatric obesity, severely obese children and adolescents usually remain severely obese or moderately obese, even after achieving a modest reduction in excess body weight through intensive treatment.[3] These disappointing results can encourage low adherence to intervention programs and high dropout rates. A high dropout rate makes it difficult to accurately evaluate the intervention effect.

However, many intervention studies have not only resulted in improved obesity status, but also in corresponding improvements to body composition, blood pressure, and cardiometabolic biomarkers. In fact, some studies have shown improvements in non-weight–related outcomes only, such as cardiometabolic risk factors, vascular structures or function, and cardiometabolic biomarkers.[12,13] For example, in the SickKids Team Obesity Management Program, a significant reduction in BMI was not observed, but patients did show improvements in cardiometabolic, psychological, and health-behavior outcomes.[14]

Among the factors related to intervention effects, some studies suggested that age may be an important factor. Knop et al.[15] observed that children under 10 years old have shown a larger decrease in BMI z-score compared with adolescents >10 years old after a 1-year intervention and a 1-year follow-up period. A 3-year multidisciplinary intervention program by Danielsson et al.[9] also concluded that young children (aged 6–9 years old) with severe obesity showed improvements in their obesity status, while adolescents (aged 14–16 years old) experienced relatively poor outcomes.

Educating parents or primary caregivers is important for managing childhood and adolescent obesity. Parental and caregiver education should not only focus on physical activity and nutrition, but also on parenting and communication skills, so that they can effectively communicate healthy messages to their child. In fact, given the dependency of the young children on their parents, parental education can be effective for lifestyle improvement, especially in younger children.

Overall, given that many patients maintained a similar degree of obesity after intensive interventions, but experienced improvements in their cardiovascular and metabolic complication profiles, non-weight parameters also need to be focal points. To maximize the effects of lifestyle modification interventions, further studies on physiological, psychological, and environmental factors for severe pediatric obesity and strategies for addressing related factors should be provided. Additionally, observed improvements in cardiometabolic

risk factors and body weight status need to be better evaluated.

For a feasible, effective, and sustainable long-term intervention program, it is necessary to develop and implement a community-based intervention model that incorporates the concept of a chronic-care model. To meet this goal, it is essential to utilize the available healthcare resources in the community and stabilize the communication systems between primary and tertiary care through networking within the community.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

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