International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Operating Publisher
SciFormat Publishing Inc.
ISNI: 0000 0005 1449 8214

2734 17 Avenue SW,
Calgary, Alberta, T3E0A7,
Canada
+15878858911
editorial-office@sciformat.ca

ARTICLE TITLE	IMPLICATION OF ACTIVE VIDEO GAMES IN THE TREATMENT AND PREVENTION OF OVERWEIGHT AND OBESITY IN THE PAEDIATRIC POPULATION
DOI	https://doi.org/10.31435/ijitss.1(49).2026.4570
RECEIVED	13 November 2025
ACCEPTED	12 January 2026
PUBLISHED	25 January 2026
LICENSE	The article is licensed under a **Creative Commons Attribution 4.0 International License.**

IMPLICATION OF ACTIVE VIDEO GAMES IN THE TREATMENT AND PREVENTION OF OVERWEIGHT AND OBESITY IN THE PAEDIATRIC POPULATION

Benedykt Baljon *(Corresponding Author, Email: benedyktbaljon@gmail.com)*
CM Łańcut Sp. z o.o., St. Michael the Archangel Hospital, Łańcut, Poland
ORCID ID: 0009-0008-0843-4627

Justyna Bogdan
CM Łańcut Sp. z o.o., St. Michael the Archangel Hospital, Łańcut, Poland
ORCID ID: 0009-0002-8599-3656

Radosław Ramotowski
Clinical Provincial Hospital No. 2 in Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0007-2880-7788

Izabela Harpula
Clinical Provincial Hospital No. 2 in Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0005-3167-159X

Patryk Brzezicki
Infant Jesus Clinical Hospital UCC MUW, Medical University of Warsaw, Warsaw, Poland
ORCID ID: 0000-0003-1788-807X

Paulina Frączkiewicz
5 Military Clinical Hospital SPZOZ in Cracow, Cracow, Poland
ORCID ID: 0000-0002-4163-2843

Natalia Bębenek
Faculty of Medical Sciences, Collegium Medicum, University of Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0006-6976-6698

Gabriela Barszcz
Faculty of Medical Sciences, Collegium Medicum, University of Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0004-0127-6225

Monika Błądek
Faculty of Medical Sciences, Collegium Medicum, University of Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0005-1939-0891

Karolina Drygała
Faculty of Medical Sciences, Collegium Medicum, University of Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0002-0049-3856

Sylwia Wit
Faculty of Medical Sciences, Collegium Medicum, University of Rzeszów, Rzeszów, Poland
ORCID ID: 0009-0004-9866-2092

ABSTRACT

Background: Active video games (AVG) are increasingly recommended as an attractive way to motivate overweight and obese children to include physical activity in their daily routines. However, the consistency and impact on weight, BMI, body composition, fitness, and health improvement remain uncertain and require further trials to examine their effects on children's bodies.
Objectives: To systematically review and collect evidence from systematic reviews, meta-analyses, and randomised controlled trials (RCTs) on how AVGs affect overweight and obese children.
Methods: A comprehensive search was performed on PubMed, Scopus, and Web of Science for English-language articles published between 2020 and 2025. Selected studies included systematic reviews, meta-analyses, and RCTs evaluating AVG interventions in overweight or obese children aged 2–18, focusing on at least one weight or fitness-related outcome. Seven studies met the inclusion criteria.
Results: Across included studies, AVGs were found to influence BMI-related and body composition outcomes. Evidence of improvements in cardiovascular and respiratory function was noticeable, especially when exergaming was combined with multicomponent exercise training. One of the RTCs reported an increase in muscle mass and motor skills.
Conclusions: AVGs appear to be a safe and engaging method for improving BMI and body composition and providing additional benefits in cardiorespiratory fitness, muscular strength, and motor competence. The most consistent and clinically significant effects occur when exergaming is incorporated into structured, multicomponent exercise programs that last long enough. Further high-quality, adequately powered RCTs are needed to better understand the long-term effects on weight and optimise intervention strategies.

KEYWORDS

Active Video Games, Childhood Obesity, Overweight Children, Weight Reduction

CITATION

Benedykt Baljon, Justyna Bogdan, Radosław Ramotowski, Izabela Harpula, Patryk Brzezicki, Paulina Frączkiewicz, Natalia Bębenek, Gabriela Barszcz, Monika Błądek, Karolina Drygała, Sylwia Wit (2026) Implication of Active Video Games in the Treatment and Prevention of Overweight and Obesity in the Paediatric Population. *International Journal of Innovative Technologies in Social Science*. 1(49). doi: 10.31435/ijitss.1(49).2026.4570

1. Introduction:

Public health is confronting a lot of problems nowadays, one of the most alarming is overweight and obesity among children. In 2024, worldwide, 35 million children younger than 5 years old are overweight, and 390 million between 5 and 18 years old. When the weight exceeds the healthy limit based on height, we talk about being overweight or obese. In adults, we use Body Mass Index (BMI) to measure the relationship between height and weight using a special formula: weight (kg) divided by height² (m^2). When BMI is between 25,0 and 29,9, we diagnose overweight; when it hits 30,0 and more, we are talking about obesity and its stages I, II, and III [1]. Children, especially those under the age of 5, have different body proportions, so we cannot classify them solely based on BMI and pure results. We have to refer to the result of the formula to the percentile charts showing norms in the paediatric population. We define overweight when the child's BMI is above the 85th percentile (i.e., equal to or higher than 85% of the population), and the 95th percentile is the diagnosis of obesity [2]. Recent years show that an excess amount of body mass is a serious problem for public health, as overweight leads to the development of so-called “lifestyle diseases” like type 2 diabetes, hypercholesterolemia, or hypertension. This situation is caused by several factors, including genes, eating patterns, physical activity levels, access to health care, and sleep routines. Genetic information cannot be changed, healthier eating or being more concerned about sleep duration can be easily changed, but the time spent on exercise requires a lot of motivation [3]. Children, especially, are easily distracted and show little interest in physical activity. A solution to both of these problems can be Active Video Games (AVG), such as Just Dance or Wii Sports. AVG is making a controller out of the human body using cameras or remote holding in your hand. To move a character, you have to do some movement in front of the screen. This can interest children, boosting their motivation and substituting some physical exercises that they were not interested in performing.

2. Methodology

A systematic search of the PubMed, Scopus, and Web of Science databases for records published between 2020 and 2025 was conducted using the search terms "active video games children overweight", "active video games children obesity", and "active video games children weight reduction".

Inclusion criteria:

- Study design: Randomized Controlled Trials, Controlled Clinical Trials, Systematic Reviews, or Meta-Analyses.
- Population: overweight/obese children under the age of 18
- Intervention: use of AVG as primary or co-intervention
- Outcomes: at least one weight-related outcome or fitness-related outcome
- Language of publication: English

Seven studies met all inclusion criteria and were included in this review, which was conducted according to PRISMA guidelines.

3. Results

3.1 Study characteristics:

Papers from 2020 to 2025 were searched in PubMed, Scopus, and Web of Science for the use of AVGs in overweight/obese children. After screening, seven were included in this review: 3 randomised controlled trials, two systematic reviews, and two meta-analyses. The most frequent reasons for exclusion were the wrong population, interventions not based on active video games, and the absence of weight- or fitness-related outcomes. The population analysed in this paper consists of overweight/obese children aged between 2 and 18 years old. Sample sizes in randomised controlled trials range from 29 to 135 participants, and meta-analyses/systematic reviews include 10 to 17 individual study analyses. Research teams conducted trials using home-based or supervised sessions of AVG on Xbox Kinect, Nintendo Wii, dance mats, or cycling simulations. Usually, intervention consists of 3 sessions per week for 3 to 6 months. Control groups (CG) consist of standard activity levels, a waitlist for intervention, or standardised physical activity programmes. The Randomised Controlled Trials show a moderate risk of bias, with acceptable randomisation and no possibility of fully blinding the intervention. Measured outcomes are objectively gathered (i.e., BMI, spirometry). Systematic reviews and meta-analyses use methods accepted in the scientific community, such as Cochrane-based assessments or adherence to PRISMA guidelines, to reduce bias, especially when evaluating trials with risk levels ranging from low to moderate.

3.2 Effects on Weight and BMI

Weight reduction and BMI are the most common outcomes reported in the included studies. In a 2021 meta-analysis, Comeras-Chueca et al. reported consistent reductions in BMI across the included studies [4]. However, Valeriani et al., publishing their systematic review in the same year, showed that 7 of 10 included clinical trials showed weight reduction in the AVG group, with only 4 showing a statistically significant reduction. It is important to note that three studies indicate better outcomes in CG [5]. Spring et al., in a 2025 systematic review, suggest that BMI can be reduced with the use of AVG. However, they show that longer training duration (over 12 weeks) compared to short interventions correlates with better outcomes [6]. In the same year, a meta-analysis by França et al., which focuses more on fitness-related outcomes, shows that secondary weight-related outcomes indicate that BMI reduction is noticeable; however, the effect varies depending on the intervention's characteristics and study design [7]. In a randomised trial combining multicomponent exercise training with and without AVG, they indicate an increase in lean mass (body mass without fat) in both intervention and control groups [8]. In another 6-month home-based trial comparing the AVG-only intervention, AVG Narrative (adding story and characters to the existing AVG), and a control group without any intervention, a weight reduction was observed, but it was not statistically significant. The authors note that this situation may be related to the COVID-19 pandemic and the study's moderate statistical power [9]. The third trial compared AVGs, aquatic aerobic, and maintaining usual daily activity. In both interventional groups, the science team observed weight reduction and maintained the results at 1-month follow-up, suggesting that AVG can be a substitute for traditional methods to reduce BMI [10].

3.3 Effects on Body Composition

Beyond weight and BMI, examining body composition can give us much more information about an individual's health. BMI has its limitations, as the same BMI can indicate a person with a lot of adipose tissue and a waist circumference over 120 cm, or a person who exercises regularly at the gym with a waist circumference less than 80 cm. Body composition can provide detailed information about the proportions of adipocytes (fat cells) and myocytes (muscle cells). Comeras-Chueca et al. and Valeriani et al. in their works indicated that the composition of the body during AVG implementation is improving [4, 5]. In a study by the same team, lean body mass (body mass minus adipose tissue mass) increased in both intervention groups [8]. However, Lu et al. showed that only the AVG intervention is not enough to gain lean mass. They suggested that a multimodal approach with additional resistance training is necessary to meet the requirements of body development in childhood [9]. As mentioned previously, waist circumference not only helps us differentiate between people with the same BMI, but is also used to diagnose abdominal obesity, in which adipocytes are mainly localised in the abdominal area, increasing the risk of cardiovascular and metabolic diseases. 12-week randomized trial; one of their methods for collecting results used the waist-to-hip ratio. In both interventional groups, this index decreased, indicating a change in adipocyte localisation [10].

3.4 Effects on cardiac and respiratory efficiency

Cardiorespiratory fitness is the ability of the cardiovascular and respiratory systems to deliver oxygen-rich blood to muscles during physical activity. It is a long-term predictor of cardiovascular health and correct metabolic function. Across the analyzed studies, Comeras-Chueca et al. and França et al. reported, in their meta-analyses, that AGS has a positive influence on health and on respiratory and cardiovascular system parameters [4, 7].

3.5 Effects on fitness-oriented outcomes

Clinical trial performed by Comeras-Chueca et al., with muscular and fitness improvement as the primary outcome. However, the presenter's results compare an AVG + resistance training group with a control group, so we cannot connect these results to the use of AVGs. They reported increases in maximal isometric knee extension strength, handgrip strength, and countermovement jump height [8]. Although the meta-analysis found unclear results, it found a correlation between active video games and muscle strength [7].

3.6 Effects on Motor Competences and Movement Skills

One of the included randomized controlled trials uses the Test of Gross Motor Development, 3rd edition, to assess locomotor and object-control skills. TGMD-3 contains tests for: run, gallop, hop, skip, slide, leap, striking a stationary ball, stationary dribble, kicking, catching, overhand throw, and underhand roll. AVG connected with a multicomponent intervention showed a considerable, statistically significant improvement in both skills categories, as graded by TGMD-3, among all contestants. The motor component shows an increase from the 5th percentile to the 22nd percentile, enhancing self-averageness, independence, and closeness to peers. This can reduce the risk of being outcast or bullied by others [8].

4. Discussion

AVG can be a promising approach to increasing physical activity among paediatric patients. Across all included studies, evidence for weight loss and improvement in Body Mass Index is moderate and heterogeneous. Mentioned meta-analyses show that approximately 70% of trials demonstrate weight improvement and a significant reduction in BMI. However, the included studies show mixed results: 2 of 3 report considerable weight reduction, and one reports mixed results. Differences in the interventions used by researchers can be one of the explanations for this situation. While the effect generally favors the use of AVG, the heterogeneous results and the lack of well-designed multicenter RCTs suggest that active games can reduce weight, but they are not a first-choice option. A few studies also tested body composition, showing promising results in increasing lean body mass, reducing adipocyte numbers, and improving the distribution of fat tissue. This situation is more important from a clinical point of view as it can reduce the risk of the development of diseases like type 2 diabetes, hypercholesterolemia, or hypertension. The improvement in cardiovascular and respiratory systems is significant, as demonstrated in multiple meta-analyses and tested using objective methods such as spirometry. By converting exercises into an engaging, game-like experience with rewards and an achievements system, an achievements system can encourage children to engage in intentional training. However, the size of the improvements made with AVG compared to traditional high-intensity training is

smaller, suggesting that AVG can be a good option for improving health, but cannot be the only physical activity children engage in. Muscular fitness can be enhanced using AVG; however, a statistically significant increase was reported when adding multicomponent, strength-oriented training to the intervention. The same applies to motor competencies, which can be improved through active games, but these results were reported in only one RCT included in this review. This indicates that the use of AVG is promising, although the results need to be confirmed by other trials.

5. Conclusions

The evidence summary demonstrates that BMI, body fat percentage reduction, and cardiorespiratory fitness improvement are outcomes for which research can be highly specific, as supported by results from included meta-analyses, systematic reviews, and RCTs. In contrast, motor competences are more important from a clinical perspective. Still, they are not well supported in the included studies due to a lack of papers measuring them, which provides direction for future study designs. This review demonstrates that active video game intervention can produce measurable benefits across many health concerns in overweight and obese children. Evidence supports the use of AVG as a potentially practical approach to reducing body mass and improving health. However, active games need to be combined with other forms of training for a more extended period to achieve better results. Future research should focus more on understanding the underlying mechanisms, as heterogeneous responses were observed. Optimizing session duration and intensity is needed to consider AVG a reliable approach to reducing body mass and improving health in paediatric populations.

Author's contribution:
Conceptualization and methodology – Benedykt Baljon
Check – Justyna Bogdan, Benedykt Baljon
Form analysis – Izabela Harpula, Benedykt Baljon
Investigation – Radosław Ramotowski, Benedykt Baljon
Resources – Paulina Frączkiewicz, Benedykt Baljon
Data curation – Patryk Brzezicki, Benedykt Baljon
Writing - rough preparation – Natalia Bębenek, Benedykt Baljon
Writing - review and editing – Gabriela Barszcz, Benedykt Baljon
Visualization - Monika Błądek, Benedykt Baljon
Supervision – Karolina Drygała, Benedykt Baljon
Project administration – Sylwia Wit, Benedykt Baljon

All authors have read and agreed with the published version of the manuscript.
Funding statement: The study did not receive special funding.
Conflict of interest statement: The authors declare that they have no conflict of interest.

REFERENCES

1. World Health Organization. (2023). Obesity and overweight. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
2. A.D.A.M. Medical Encyclopedia. (2024, July 31). Defining overweight and obesity in children. MedlinePlus. https://medlineplus.gov/ency/patientinstructions/000384.htm
3. Centers for Disease Control and Prevention. (n.d.). *Preventing childhood obesity: 6 things families can do.* https://www.cdc.gov/obesity/family-action/index.html
4. Comeras-Chueca, C., Marin-Puyalto, J., Matute-Llorente, A., Vicente-Rodriguez, G., Casajus, J. A., & Gonzalez-Aguero, A. (2021). Effects of Active Video Games on Health-Related Physical Fitness and Motor Competence in Children and Adolescents With Overweight or Obesity: Systematic Review and Meta-Analysis. *JMIR serious games*, *9*(4), e29981. https://doi.org/10.2196/29981
5. Valeriani, F., Protano, C., Marotta, D., Liguori, G., Romano Spica, V., Valerio, G., Vitali, M., & Gallè, F. (2021). Exergames in Childhood Obesity Treatment: A Systematic Review. *International journal of environmental research and public health*, *18*(9), 4938. https://doi.org/10.3390/ijerph18094938
6. Spring, F. D. H., Lærkholm, G., Jensen, R. B., & Kloppenborg, J. T. (2025). The Effect of Exergaming on BMI and Fitness in Children and Adolescents With Obesity: A Systematic Review. *Acta paediatrica (Oslo, Norway : 1992)*, *114*(7), 1522–1537. https://doi.org/10.1111/apa.70048
7. França, C., Ashraf, S., Marques, A., Ihle, A., Lopes, H., Campos, P., & Gouveia, É. R. (2025). Effects of Exergaming on Physical Fitness of Youth with Overweight and Obesity: A Systematic Review with Meta-Analysis. *Games for health journal*, *14*(4), 251–264. https://doi.org/10.1089/g4h.2024.0192
8. Comeras-Chueca, C., Villalba-Heredia, L., Perez-Lasierra, J. L., Marín-Puyalto, J., Lozano-Berges, G., Matute-Llorente, Á., Vicente-Rodríguez, G., Gonzalez-Aguero, A., & Casajús, J. A. (2022). Active Video Games Improve Muscular Fitness and Motor Skills in Children with Overweight or Obesity. *International journal of environmental research and public health*, *19*(5), 2642. https://doi.org/10.3390/ijerph19052642
9. Lu, A. S., Baranowski, T., Barreira, T. V., Fleischman, A., Green, M. C., Huang, S. Y., Lee, I. M., Levitsky, L. L., Noubary, F., & Thompson, D. (2025). The impact of narratives and active video games among black and hispanic children with overweight and obesity: a randomized controlled trial. *The international journal of behavioral nutrition and physical activity*, *22*(1), 60. https://doi.org/10.1186/s12966-025-01756-1
10. Irandoust, K., Taheri, M., H'mida, C., Neto, G. R., Trabelsi, K., Ammar, A., Souissi, N., Chtourou, H., Nikolaidis, P. T., Rosemann, T., & Knechtle, B. (2021). Exergaming and Aquatic Exercises Affect Lung Function and Weight Loss in Obese Children. *International journal of sports medicine*, *42*(6), 566–572. https://doi.org/10.1055/a-1289-9307