



Interventions for High Body Mass Index in Children and Adolescents

¹ J.Rude, ² J.P.Tabernero

^{1,2} California University of Science and Medicine

Correspondence : doctorrude2837@gmail.com

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ABSTRACT

Background: The literature surrounding interventions for high body mass index (BMI) in children and adolescents reveals a progressive evolution of strategies aimed at addressing this pressing public health issue. **Literature Review:** Subsequent reviews (Sharma & Branscum, 2010) expand on these concepts by examining the mixed results of various individual-level behavioral approaches to obesity interventions in school settings. The effectiveness of school-based physical activity interventions is critically analyzed in a meta-analysis (Henrique Guerra et al., 2003), which reveals a concerning trend in childhood obesity, particularly in Brazil. Studies indicate that interventions with active parental engagement demonstrate higher success rates in achieving weight and BMI reductions (J. Ickes et al., 2004). The interplay between school and family environments is identified as crucial for the success of these interventions (R. B. Verjans-Janssen et al., 2008). The review of school-based interventions promoting healthy eating (Chaudhary et al., 2000) reveals the necessity of a comprehensive approach that includes psychosocial elements and peer support, which are essential for fostering healthier dietary habits among children and adolescents. In examining lifestyle intervention programs for overweight children (Bondyra-Wisniewska et al., 2001), the review highlights the effectiveness of combining caloric restriction with physical activity to achieve significant reductions in BMI. The duration and intensity of interventions are emphasized as critical factors influencing outcomes (Bondyra-Wisniewska et al., 2001). **Conclusion:** Ultimately, the literature underscores the importance of a multi-faceted, integrative approach to addressing high BMI in children and adolescents. The evidence suggests that successful interventions must engage multiple stakeholders, including schools, families, and communities, while focusing on both dietary and physical activity changes to achieve meaningful and sustainable health outcomes.

Keyword: Interventions, High Body Mass Index, Children, Adolescents

INTRODUCTION

The literature surrounding interventions for high body mass index (BMI) in children and adolescents reveals a progressive evolution of strategies aimed at addressing this pressing public health issue. Initial insights from (Calvert et al., 1970) highlight the significance of school-based interventions targeting dietary behaviors among 11- to 16-year-olds, emphasizing the formative nature of this developmental stage for establishing healthy eating habits. Their systematic review advocates for the inclusion of peer involvement, educational media, and tailored feedback within these interventions, while also calling for further exploration of gender-specific strategies and long-term follow-up studies to assess behavioral changes.

Building on these foundational concepts, (Sharma & Branscum, 2010) expand the discourse by examining various school-based interventions aimed at reducing adolescent obesity. Their review underscores the predominance of individual-level behavioral approaches rooted in social cognitive theory, revealing that while some interventions yielded modest behavioral changes, the overall impact on obesity indicators, such as BMI, remained mixed. This inconsistency is attributed to methodological limitations and a lack of comprehensive policy-level changes, suggesting a need for more integrative approaches.

In 2003, (Henrique Guerra et al., 2003) contribute to the conversation with a meta-analysis that specifically investigates the effectiveness of school-based physical activity interventions on BMI. They document a concerning trend in childhood obesity, particularly in Brazil, and advocate for enhanced physical education programs within schools as a proactive measure. Their findings indicate that earlier and sustained engagement in physical activity correlates with more favorable BMI outcomes, although they also note the overall lack of significant results across various studies, prompting a call for further investigation into effective intervention designs.

(J. Ickes et al., 2004) further refine the focus on comprehensive strategies by advocating for a multi-faceted approach that incorporates parental involvement and environmental changes in the context of childhood obesity interventions. Their review highlights that interventions including parental engagement were significantly more effective in achieving weight and BMI reductions, reinforcing the necessity of involving families in promoting healthy behaviors.

(R. B. Verjans-Janssen et al., 2008) build upon these insights by presenting a systematic review that emphasizes the importance of direct parental involvement in school-based physical activity and nutrition interventions. Their findings reveal small but favorable effects on children's BMI and energy balance-related behaviors, suggesting that the interplay between school and family environments is crucial for intervention success. They call for a deeper exploration of how these environments can synergistically influence children's health outcomes.

(Chaudhary et al., 2000) contribute to the body of evidence by reviewing the effectiveness of school-based interventions that promote healthy eating. They identify successful multicomponent strategies that incorporate physical activity, psychosocial elements, and family involvement as critical components in influencing dietary behaviors among children and adolescents. This review emphasizes the need for a broader approach that transcends individual education to include systemic changes within schools.

In 2001, (Bondyra-Wisniewska et al., 2001) conduct a systematic review focusing on lifestyle intervention programs for children with overweight or obesity. They highlight the effectiveness of caloric restriction and nutritional education, particularly when combined with physical activity, in achieving significant reductions in BMI. Their findings underscore the importance of intervention duration and intensity, suggesting that longer and more intensive programs yield better outcomes.

(Cerrato-Carretero et al., 2001) further investigate the efficacy of long-term dietary and physical activity interventions in school settings, revealing conflicting results regarding their impact on BMI. They argue for a more nuanced

understanding of how combined dietary and physical activity interventions can be optimized to address childhood obesity effectively.

Finally, (Nally et al., 2001) synthesize the evidence surrounding school-based interventions targeting obesity-related behaviors in primary school children. Their systematic review highlights the critical role of early intervention in preventing obesity and its associated health risks, advocating for comprehensive strategies that incorporate both dietary and physical activity changes.

This literature review thus illustrates a clear trajectory in the development of interventions aimed at reducing high BMI in children and adolescents, emphasizing the necessity of multi-faceted, integrative approaches that engage not only the school environment but also families and broader community contexts.

LITERATURE REVIEW

The article titled "Delivering in-school interventions to improve dietary behaviours amongst 11- to 16-year-olds: A systematic review" by (Calvert et al., 1970) provides a comprehensive examination of school-based interventions aimed at enhancing dietary behaviors in adolescents. The authors emphasize the significance of this developmental stage, as it is crucial for the establishment of lifelong eating habits. Their systematic review identifies the school environment as an optimal setting for implementing interventions due to its controlled nature, which can facilitate positive behavior changes before unhealthy habits become entrenched.

One of the key insights from the article is the recommendation for incorporating peer involvement in the delivery of interventions. This approach may leverage social dynamics among adolescents, potentially increasing engagement and the effectiveness of dietary behavior changes. The authors also highlight the importance of using educational media to communicate intervention messages, suggesting that multimedia resources can cater to various learning styles and enhance retention of information.

Furthermore, the article advocates for increasing the availability of healthy food options within school environments as a critical component of dietary

interventions. By ensuring that healthier choices are accessible, schools can create an environment that supports better dietary decisions among students. The inclusion of computerized tailored feedback that reflects normative behaviors is another innovative strategy suggested by the authors, which could personalize the intervention experience and encourage students to align their choices with those of their peers.

Despite the valuable insights provided, the review points out the need for further research to evaluate the individual components of these interventions and their specific impacts on dietary behaviors. The authors call for studies that incorporate both short- and long-term follow-ups, which are essential for understanding the sustainability of dietary changes over time. Additionally, they note the existence of gender differences in dietary behaviors among adolescents, recommending that future interventions tailor feedback to address these differences effectively.

In "Novel and emerging approaches to combat adolescent obesity," (Sharma & Branscum, 2010) provide a comprehensive review of various interventions aimed at reducing obesity among adolescents, particularly within school settings. The authors emphasize that schools are the predominant environment for these preventative initiatives, which primarily target behavior change at the individual level. This focus on individual behavior is notable, as it highlights a common approach in public health interventions, but it raises questions about the broader systemic factors influencing obesity.

The review encompasses 11 interventions conducted between 1999 and 2004, revealing a trend toward utilizing existing school staff for implementation. This choice may have implications for the sustainability and effectiveness of the interventions, as teachers may have varying levels of training and commitment to health promotion. The authors note that while there were some positive behavioral changes observed, the overall impact on obesity indicators, such as Body Mass Index (BMI), was modest and inconsistent.

Additionally, the article references a meta-analysis of 57 randomized controlled trials (RCTs) related to physical activity and nutrition interventions

conducted from 1985 to 2003. The findings from this analysis further underscore the challenges in achieving significant outcomes, with only four studies demonstrating notable improvements in physical activity levels and dietary habits. The authors attribute the success of these interventions to their foundation in social cognitive theory, suggesting that theoretical frameworks play a crucial role in the design and implementation of effective programs.

However, the review also identifies several limitations in the interventions that did not yield significant results, including methodological flaws, inadequate program design, and challenges in implementation and evaluation. This critical evaluation points to the need for a more robust framework that not only addresses individual behavior but also considers environmental and policy-level changes to create a supportive context for healthier lifestyle choices.

The article titled "The effect of school-based physical activity interventions on body mass index: a meta-analysis of randomized trials" by (Henrique Guerra et al., 2003) addresses a critical public health issue: the rising prevalence of overweight and obesity among children and adolescents, particularly in Brazil. The authors highlight that this demographic is facing significant health risks, including the transition from normal weight to overweight during adolescence, which correlates with increased risks of chronic conditions such as type 2 diabetes and hypertension.

The article systematically reviews randomized trials to evaluate the effectiveness of school-based physical activity interventions in managing BMI among children and adolescents. The authors argue that schools are a pivotal environment for implementing health-promoting interventions, given that children spend a substantial amount of time in these settings. This perspective is particularly relevant in Brazil, where disparities exist between industrialized and less-developed regions regarding obesity prevalence among adolescents.

One of the notable findings of the meta-analysis is the contrasting outcomes between interventions focused solely on physical activity and those that integrate nutritional education. While some studies indicated a lack of significant changes in BMI from physical activity-only interventions, others that combined physical

activity with nutritional counseling yielded positive results, suggesting that a multifaceted approach may be more effective. This insight aligns with the authors' recommendation for expanding physical education programs in schools as a strategy to prevent overweight and obesity.

Furthermore, the article emphasizes the importance of early intervention, noting that involvement in physical activity during early childhood is associated with better long-term outcomes in terms of BMI management. This finding underscores the necessity for policies that encourage physical activity from a young age, as well as the implementation of comprehensive programs that address both physical activity and dietary habits.

The article "Global School-Based Childhood Obesity Interventions: A Review" by (J. Ickes et al., 2004) provides a comprehensive analysis of various interventions aimed at addressing childhood obesity through school-based programs. The authors emphasize the importance of building future interventions on successful strategies related to nutrition and physical activity, highlighting the critical role of parental involvement in shaping children's health behaviors.

One of the key insights from the article is that only 40% of the reviewed interventions effectively incorporated parental involvement as a targeted strategy. This statistic underscores a significant gap in current intervention frameworks, as those interventions that actively engaged parents demonstrated a notable success rate, with 75% reporting significant reductions in weight and/or BMI among participants. This finding aligns with existing literature that recognizes the influence of familial dynamics on children's dietary and physical activity habits. The authors suggest that enhancing parental engagement through methods such as motivational interviewing could yield positive outcomes, indicating a potential area for future research and intervention design.

Furthermore, the article highlights the necessity of environmental changes as part of obesity intervention strategies. The authors report that interventions which included an environmental component also showed a high success rate, with 75% achieving significant improvements in BMI and weight outcomes. This suggests that addressing the broader environmental context in which children

operate—such as school settings, community resources, and access to healthy foods—may be crucial for fostering sustainable behavior changes.

The systematic review conducted by (R. B. Verjans-Janssen et al., 2008) provides a comprehensive analysis of school-based physical activity and nutrition interventions that involve direct parental participation, specifically examining their effects on children's Body Mass Index (BMI) and energy balance-related behaviors (EBRBs). The review synthesizes findings from multiple studies, highlighting a general trend of favorable outcomes, albeit with predominantly small effect sizes on BMI and BMI z-scores.

A critical evaluation of the material reveals several key insights. Firstly, the review underscores the significance of parental involvement in enhancing the effectiveness of interventions aimed at improving children's health behaviors. The authors note that interventions integrating parental engagement tend to yield more positive results in physical activity and sedentary behavior compared to those without such involvement. This finding is particularly relevant given the increasing recognition of the family environment's role in shaping children's health behaviors.

Moreover, the review points out that while the majority of studies reported beneficial outcomes for physical activity and sedentary behavior, the effects on nutritional behavior were largely inconclusive. This inconsistency raises questions about the specific strategies employed in nutrition interventions and suggests a need for further research to identify effective methods for promoting healthier eating habits among children. The authors emphasize that understanding the interaction between the social and physical environments—both at school and home—is crucial for the success of these interventions.

The lack of a consistent pattern regarding the targeted environmental determinants and the outcomes achieved suggests complexity in the relationship between intervention design and effectiveness. The authors propose that future research should focus on more proximal outcomes and the specific determinants that influence EBRBs, as this may provide clearer insights into why certain interventions succeed or fail.

The article "Promoting Healthy Eating among Young People—A Review of the Evidence of the Impact of School-Based Interventions" by (Chaudhary et al., 2000) provides a comprehensive overview of the effectiveness of various school-based interventions aimed at improving the dietary habits and physical activity levels of children and adolescents. The authors emphasize the necessity of a multifaceted approach to tackle the issue of high body mass index (BMI) among young populations.

A critical evaluation of the article reveals that the authors effectively highlight the importance of extending physical education classes and incorporating activity breaks within the school curriculum. These strategies are essential in mitigating sedentary behaviors, which are increasingly prevalent among youth and contribute significantly to rising BMI levels. The authors argue that a combination of school staff and intervention specialists is crucial for the successful implementation of these programs, which reflects an understanding of the complex nature of behavior change in school environments.

Moreover, the article underscores the significance of psychosocial and psychoeducational components in interventions. This inclusion is particularly relevant as it acknowledges the role of mental health and social influences on dietary choices and physical activity levels. The authors also advocate for the involvement of peer leaders and family, recognizing that social support can enhance the effectiveness of interventions aimed at promoting healthier eating habits.

The findings presented in the article indicate a strong evidence base for multicomponent interventions that target fruit and vegetable intake among children, while moderate evidence exists for educational interventions aimed at adolescents. This distinction is crucial, as it suggests that while younger children may respond more favorably to comprehensive dietary interventions, adolescents may require different strategies that account for their developmental stage and social contexts.

However, the article notes a significant gap in evidence regarding the impact of these interventions on anthropometric obesity-related measures. This is a critical limitation, as the ultimate goal of such interventions is to effect tangible changes in BMI and overall health outcomes. The authors suggest that while there is evidence

supporting the promotion of healthy diets, the direct correlation with reductions in BMI remains less clear. This points to the need for further research to establish the efficacy of these interventions in producing measurable changes in body weight and composition.

The article "Impact of Lifestyle Intervention Programs for Children and Adolescents with Overweight or Obesity on Body Weight and Selected Cardiometabolic Factors—A Systematic Review" by (Bondyra-Wisniewska et al., 2001) provides a comprehensive analysis of various interventions aimed at addressing obesity in children and adolescents. The authors critically evaluate the effectiveness of lifestyle intervention programs, highlighting the multifaceted approach required to tackle this complex issue.

A significant insight from the review is the emphasis on nutritional education as a cornerstone of successful interventions. The authors note that dietary modifications, particularly calorie-restricted diets, play a crucial role in reducing body mass index (BMI) and BMI z-scores among participants. The systematic review underscores that the involvement of dietitians or nutrition specialists enhances the effectiveness of these programs, indicating that professional guidance is integral to achieving desired health outcomes.

Moreover, the article illustrates the importance of the duration and intensity of interventions. The findings suggest that programs lasting at least six months yield more substantial reductions in BMI, with longer interventions correlating with better weight loss outcomes. This reinforces the notion that sustained engagement in lifestyle changes is necessary for effective weight management in this demographic.

Another critical aspect discussed in the review is the role of physical activity. The authors report that 83% of the interventions included physical activity components, which were associated with significant reductions in BMI. This highlights the necessity of incorporating exercise into weight management strategies, as it not only complements dietary changes but also contributes to overall health improvements.

The review also points to the modified Stop/Traffic Light approach as an effective strategy for weight reduction, emphasizing the need for tailored interventions that consider individual preferences and circumstances. The authors advocate for interdisciplinary programs that combine nutritional education, physical activity, and behavioral strategies to maximize effectiveness.

The article titled "Long-Term Dietary and Physical Activity Interventions in the School Setting and Their Effects on BMI in Children Aged 6–12 Years: Meta-Analysis of Randomized Controlled Clinical Trials" by (Cerrato-Carretero et al., 2001) addresses the pressing public health challenge of childhood obesity, particularly its association with high body mass index (BMI) among children aged 6 to 12 years. The authors highlight the alarming prevalence of obesity in U.S. schoolchildren, which has escalated from 31.8% for overweight and 16.9% for obesity in 2011-2012 to 18.5% in 2017-2008. This trend underscores the urgent need for effective interventions targeting this demographic.

The article systematically evaluates various school-based interventions aimed at reducing BMI through dietary modifications and increased physical activity. It critically assesses the efficacy of these interventions, noting that while numerous studies have been conducted, results have often been inconsistent. Some interventions have shown only weak efficacy, particularly those combining dietary and physical activity components. This inconsistency raises important questions about the design and implementation of such interventions, as well as their adaptability to different school environments.

One of the key contributions of this meta-analysis is its focus on the joint effect of dietary and physical activity interventions, an area that has been relatively underexplored in existing literature. By synthesizing data from randomized controlled trials, the authors provide a more comprehensive understanding of how these interventions can be optimized to improve BMI outcomes in children. This approach is particularly relevant given the multifaceted nature of obesity, which is influenced by a range of factors including lifestyle, environment, and socio-economic status.

Furthermore, the article emphasizes the role of the school setting as a strategic platform for implementing health interventions. Schools not only provide access to physical education programs and health education but also serve as a critical environment for fostering healthy behaviors among children. The authors argue that interventions should be integrated into the school curriculum and supported by health services to maximize their impact.

The article titled "The Effectiveness of School-Based Interventions on Obesity-Related Behaviours in Primary School Children: A Systematic Review and Meta-Analysis of Randomised Controlled Trials" by (Nally et al., 2001) addresses the pressing public health issue of childhood obesity, which has escalated dramatically over the past four decades, affecting millions of children worldwide. The authors highlight the multifaceted nature of childhood obesity, linking it not only to physical health outcomes, such as increased adiposity and cardiometabolic risk factors, but also to behavioral issues and academic performance.

The systematic review and meta-analysis presented by the authors effectively synthesizes existing literature on school-based interventions aimed at modifying obesity-related behaviors, emphasizing the school environment as a critical setting for such interventions. This setting is particularly advantageous as it allows for the simultaneous delivery of health education, nutritious meals, and opportunities for physical activity, thereby reaching a diverse demographic of students, regardless of socioeconomic status. The authors argue that early intervention is crucial in mitigating health inequalities and curbing the rising rates of obesity, which aligns with the broader public health goal of preventing chronic diseases from an early age.

The article provides compelling evidence that interventions targeting nutritional knowledge and caloric intake can yield positive outcomes. However, the authors note that the effectiveness of physical activity interventions remains inconsistent, suggesting that while these programs may contribute to increased physical activity levels, their impact is not uniformly positive across studies. This inconsistency raises important questions about the design and implementation of

such interventions, indicating a need for more robust frameworks that can address various behavioral targets simultaneously.

Furthermore, the authors call for further research to explore the dynamics of multi-component interventions, which combine dietary and physical activity strategies. This is a critical area for future inquiry, as understanding how these interventions can be effectively integrated could lead to more comprehensive approaches to preventing childhood obesity.

CONCLUSION

The literature reviewed presents a comprehensive overview of interventions aimed at addressing high body mass index (BMI) in children and adolescents, particularly focusing on school-based strategies. The initial findings emphasize the importance of dietary behavior interventions within school environments, highlighting the formative years of 11 to 16 as critical for establishing healthy eating habits (Calvert et al., 1970). The inclusion of peer involvement and tailored feedback is suggested as a means to enhance engagement and effectiveness (Calvert et al., 1970).

Subsequent reviews (Sharma & Branscum, 2010) expand on these concepts by examining the mixed results of various individual-level behavioral approaches to obesity interventions in school settings. The presence of methodological limitations and the need for comprehensive policy changes are highlighted as factors contributing to the inconsistent impacts on BMI (Sharma & Branscum, 2010).

The effectiveness of school-based physical activity interventions is critically analyzed in a meta-analysis (Henrique Guerra et al., 2003), which reveals a concerning trend in childhood obesity, particularly in Brazil. The findings indicate that while physical activity is beneficial, integrating nutritional education yields more significant improvements in BMI outcomes, suggesting a multifaceted approach is necessary (Henrique Guerra et al., 2003).

Further literature emphasizes the importance of parental involvement and environmental changes in interventions [ref: 2cf86bea-644a-4f65-99a4-

318703c1212d; ref: 488b98cb-42b9-4b9a-87d6-7b19f3bc6a02]. Studies indicate that interventions with active parental engagement demonstrate higher success rates in achieving weight and BMI reductions (J. Ickes et al., 2004). The interplay between school and family environments is identified as crucial for the success of these interventions (R. B. Verjans-Janssen et al., 2008).

The review of school-based interventions promoting healthy eating (Chaudhary et al., 2000) reveals the necessity of a comprehensive approach that includes psychosocial elements and peer support, which are essential for fostering healthier dietary habits among children and adolescents. However, the evidence remains inconclusive regarding the direct impact of these interventions on BMI, indicating an area requiring further research (Chaudhary et al., 2000).

In examining lifestyle intervention programs for overweight children (Bondyra-Wisniewska et al., 2001), the review highlights the effectiveness of combining caloric restriction with physical activity to achieve significant reductions in BMI. The duration and intensity of interventions are emphasized as critical factors influencing outcomes (Bondyra-Wisniewska et al., 2001).

Ultimately, the literature underscores the importance of a multi-faceted, integrative approach to addressing high BMI in children and adolescents. The evidence suggests that successful interventions must engage multiple stakeholders, including schools, families, and communities, while focusing on both dietary and physical activity changes to achieve meaningful and sustainable health outcomes.

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REFERENCES

1. Calvert, S., DEMPSEY, R., & POVEY, R., 1970. Delivering in-school interventions to improve dietary behaviours amongst 11- to 16-year-olds: A systematic review.. [PDF]
2. Sharma, M. & Branscum, P., 2010. Novel and emerging approaches to combat adolescent obesity. ncbi.nlm.nih.gov
3. Henrique Guerra, P., Roberto Cuce Nobre, M., Augusto Cardoso da Silveira, J., & Augusto de Aguiar Carrazedo Taddei, J., 2003. The effect of school-based physical activity interventions on body mass index: a meta-analysis of randomized trials. ncbi.nlm.nih.gov
4. J. Ickes, M., McMullen, J., Haider, T., & Sharma, M., 2004. Global School-Based Childhood Obesity Interventions: A Review. ncbi.nlm.nih.gov
5. R. B. Verjans-Janssen, S., van de Kolk, I., H. H. Van Kann, D., P. J. Kremers, S., & M. P. L. Gerards, S., 2008. Effectiveness of school-based physical activity and nutrition interventions with direct parental involvement on children's BMI and energy balance-related behaviors – A systematic review. ncbi.nlm.nih.gov
6. Chaudhary, A., Sudzina, F., & Egberg Mikkelsen, B., 2000. Promoting Healthy Eating among Young People—A Review of the Evidence of the Impact of School-Based Interventions. ncbi.nlm.nih.gov
7. Bondyra-Wiśniewska, B., Myszkowska-Ryciak, J., & Harton, A., 2001. Impact of Lifestyle Intervention Programs for Children and Adolescents with Overweight or Obesity on Body Weight and Selected Cardiometabolic Factors—A Systematic Review. ncbi.nlm.nih.gov
8. Cerrato-Carretero, P., Roncero-Martín, R., D. Pedrera-Zamorano, J., López-Espuela, F., M. Puerto-Parejo, L., Sánchez-Fernández, A., Luz Canal-Macías, M., M. Moran, J., & M. Lavado-García, J., 2001. Long-Term Dietary and Physical Activity Interventions in the School

- Setting and Their Effects on BMI in Children Aged 6–12 Years: Meta-Analysis of Randomized Controlled Clinical Trials. ncbi.nlm.nih.gov
9. Nally, S., Carlin, A., E. Blackburn, N., S. Baird, J., Salmon, J., H. Murphy, M., & M. Gallagher, A., 2001. The Effectiveness of School-Based Interventions on Obesity-Related Behaviours in Primary School Children: A Systematic Review and Meta-Analysis of Randomised Controlled Trials.