

Impact of a Nurse-Led Multicomponent Intervention on Obesity Prevention and Weight Management among School children**Shahida Parveen, Research Scholar, Malwanchal University, Indore****Dr Jisha George, Research Supervisor, Malwanchal University, Indore****Abstract**

Childhood obesity requires coordinated interventions addressing individual behaviours, family routines, and school environments. This narrative review examines the rationale, evidence, and practical application of nurse-led multicomponent interventions for obesity prevention and weight management among schoolchildren. Published clinical trials, professional recommendations, and international guidelines inform the discussion. Essential components include growth assessment, nutrition education, enjoyable physical activity, behavioural counselling, sleep promotion, parental participation, and supportive school policies. Direct school-nurse trials demonstrate feasibility and improvements in selected health behaviours, although significant reductions in BMI have not been consistently established. Evidence from broader school and family interventions supports combining education with sustained behavioural support and environmental modifications. Universal obesity prevention should be distinguished from individualized treatment for children already living with obesity. Evaluation should include age- and sex-adjusted anthropometric measures, dietary practices, physical activity, psychosocial well-being, implementation fidelity, and equity. Nurses can coordinate early identification, education, family engagement, and referral when supported by adequate training, protected time, and multidisciplinary collaboration. Nurse-led interventions offer a practical approach to promoting healthy growth, but their effectiveness depends on programme intensity, participation, context, and continuity. Further rigorous research is required to establish their long-term effects on weight-related outcomes.

Keywords: childhood obesity, schoolchildren, nurse-led intervention, weight management, school health, family participation.

Introduction

Childhood obesity is a major public health concern affecting physical health, emotional well-being, and future disease risk. The World Health Organization (WHO, 2025) estimated that more than 390 million children and adolescents aged 5–19 years had overweight in 2022, including approximately 160 million living with obesity. Its development reflects interactions among biological susceptibility, dietary patterns, physical activity, family circumstances, and environmental influences. Consequently, prevention and management require approaches extending beyond instructions to eat less or exercise more.

Schools offer repeated opportunities to support healthy development because children spend substantial time learning, eating, and interacting within them. However, education has limited practical value when nutritious food, safe recreational spaces, and supportive adult guidance are unavailable. WHO and the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2021) recommend a whole-school approach connecting policies, learning environments, health services, families, and communities. Within this approach, nurses can coordinate interventions that combine universal prevention with confidential assessment and individualized support.

Scope and Rationale

This narrative review integrates selected trials and authoritative guidance to examine nurse-led multicomponent interventions. It discusses published evidence and proposes practical applications rather than reporting original study findings. Universal prevention promotes healthy behaviours throughout the school population, whereas weight-management interventions provide additional support for children with established overweight or obesity. These objectives require different eligibility criteria, intervention intensity, and outcome measures. Evidence supporting intensive clinical treatment should therefore not be automatically transferred to brief classroom education.

A multicomponent approach recognizes that children's behaviours develop within interconnected settings. Nutritional knowledge may improve without dietary change if healthier food remains unaffordable. Similarly, motivation to exercise may not translate into

participation when children experience bullying or lack accessible activities. Nursing coordination can help identify these barriers and connect education with practical support. WHO (2021) positions school health services within broader systems of care, supporting continuity between schools, families, and health facilities.

Assessment and Nursing Coordination

Assessment begins with accurate height and weight measurement, growth history, and an understanding of the child's circumstances. Adult BMI thresholds should not be applied to schoolchildren. Under the WHO growth reference for ages 5–19 years, overweight is defined as BMI-for-age above +1 SD and obesity above +2 SD (WHO, n.d.). Programmes should specify their growth reference and apply it consistently. Measurements must be conducted privately, with appropriate consent, assent, and confidential communication.

Nursing assessment should explore dietary routines, food access, activity opportunities, sleep, family concerns, and experiences of bullying. A high BMI requires contextual assessment rather than assumptions about motivation or behaviour. Hampl et al. (2023) emphasize comprehensive evaluation and family-centred treatment. Children with suspected complications or psychological distress require appropriate clinical referral. Nurses coordinate this process while dietitians, physical education teachers, counsellors, and paediatric clinicians contribute specialist expertise. Their responsibilities should be clearly defined to support safe and consistent care.

Nutrition Education and Supportive Food Environments

Nutrition education should develop practical skills that children can use independently. Activities may include identifying added sugars in beverages, comparing food labels, planning balanced snacks, and recognizing hunger and fullness. In Indian schools, examples can incorporate affordable seasonal fruits, vegetables, pulses, and familiar home-prepared meals. The ICMR–National Institute of Nutrition (2024) recommends dietary variety and limiting foods high in fat, sugar, and salt. Educational messages should accommodate cultural preferences, household resources, and nutritional requirements during growth.

Supportive environments make these lessons achievable. Schools can improve drinking-water access, review canteen offerings, and involve families in planning balanced lunchboxes. Ebbeling et al. (2012) reported a smaller BMI increase following a one-year intervention reducing sugar-sweetened beverage consumption, although the difference was not significant at the prespecified two-year endpoint. This finding highlights the importance of continued support. It does not establish that beverage education alone prevents obesity. Uniform restrictive diets, skipped meals, and food-related punishment are inappropriate strategies for growing children.

Physical Activity and Sedentary Behaviour

Physical activity should emphasize enjoyment, participation, and progressive skill development. WHO (2020) recommends an average of at least 60 minutes of moderate-to-vigorous physical activity daily across the week for children and adolescents aged 5–17 years. Vigorous activity and muscle- and bone-strengthening activities should be incorporated on at least three days weekly. School programmes can contribute through active classroom breaks, physical education, outdoor games, dance, and accessible recreation. Activity accumulated outside school also contributes to this recommendation.

Nurses can help identify barriers and coordinate adaptations for children with disabilities, low fitness, or medical conditions. Activities should avoid public comparisons of body size or athletic performance. Family discussions can address prolonged recreational screen use and identify achievable alternatives. After-school programmes require attention to transport, supervision, and competing responsibilities. Integrating activities into the school day may improve accessibility, but this proposed adaptation should be evaluated within the local context rather than assumed to be effective.

Behavioural Counselling, Sleep, and Family Participation

Behavioural counselling translates general recommendations into manageable routines. Nurses can help children select achievable goals, anticipate obstacles, practise solutions, and review progress. Examples include carrying drinking water, participating in a preferred game, or establishing regular meal routines. Reinforcement should recognize effort, confidence, and

participation rather than kilograms lost. Hampl et al. (2023) support motivational interviewing and intensive health behaviour and lifestyle treatment within comprehensive obesity care. Counselling should remain collaborative and appropriate to the child's developmental stage.

Sleep assessment provides another opportunity for health promotion. Paruthi et al. (2016) recommend 9–12 hours of sleep for children aged 6–12 years and 8–10 hours for adolescents aged 13–18 years. Nurses can discuss bedtime routines and screen habits with families. These recommendations support overall health but do not demonstrate that sleep education alone treats obesity. Persistent snoring, disturbed sleep, or daytime sleepiness should prompt clinical assessment rather than reliance on general lifestyle advice.

Family involvement is important because caregivers influence food purchasing, meal timing, transport, and recreational opportunities. Educational meetings should offer practical support without blaming parents. Epstein et al. (2023) demonstrated improved weight outcomes with family-based behavioural treatment compared with usual care in paediatric primary care. Although this supports family participation, it does not directly establish the effectiveness of a school-nurse intervention. Flexible meeting times, local-language materials, and affordable suggestions can improve access for families with different resources.

Evidence of Intervention Impact

Direct evidence for school-nurse interventions requires cautious interpretation. Pbert et al. (2013) evaluated a six-session counselling intervention delivered by school nurses in six high schools. The programme was feasible and acceptable and improved selected dietary behaviours, but it did not significantly improve BMI. In a subsequent trial involving eight high schools, nurse-delivered counselling was combined with an after-school exercise programme. This intervention did not significantly reduce BMI or key obesity-related behaviours, and exercise participation presented implementation difficulties (Pbert et al., 2016).

Broader school-based findings are also mixed. The HEALTHY Study Group (2010) evaluated a multicomponent programme incorporating nutrition, physical education, behavioural activities, and communication. Intervention schools did not achieve a significantly greater reduction in the primary outcome of combined overweight and obesity prevalence. However,

several secondary adiposity-related outcomes improved. These findings indicate that school interventions can influence some health outcomes without necessarily producing the anticipated change in overall weight-status prevalence. Programme effectiveness should therefore be assessed across clearly specified outcomes.

The US Preventive Services Task Force (2024) recommends providing or referring children aged six years or older with BMI at or above the 95th percentile under US growth standards to comprehensive, intensive behavioural interventions. Beneficial programmes generally involve at least 26 contact hours. This recommendation concerns treatment rather than a teaching requirement for every schoolchild. It illustrates the importance of sufficient intervention intensity and supports referral when schools cannot provide the level of care required.

Implementation in Indian Schools

Implementation should begin with consultation involving children, caregivers, school leaders, nurses, and community health professionals. A needs assessment can examine food availability, activity facilities, staff capacity, and referral arrangements. Where undernutrition and excess weight coexist, universal messages should promote adequate, balanced nutrition rather than weight loss for all. The ICMR–National Institute of Nutrition (2024) provides a relevant foundation for culturally appropriate content. Materials should be understandable, affordable to implement, and responsive to local food practices.

A proposed programme can combine curriculum-linked group activities with confidential individual follow-up. An academic-year schedule might introduce core skills initially, reinforce them through regular contacts, and assess progress at six and twelve months. This is an implementation suggestion rather than a validated treatment dose. Effective delivery requires protected nursing time, training, clear responsibilities, and a realistic budget. Institutional integration, emphasized by WHO and UNESCO (2021), can support continuity beyond the involvement of individual enthusiastic staff members.

Evaluation and Future Research

Evaluation must distinguish improved knowledge from sustained behavioural change and clinical benefit. A study may prespecify change in BMI-for-age z-score as its primary outcome while considering appropriate alternative measures for severe obesity. Secondary outcomes can include dietary quality, physical activity, fitness, sleep, and health-related quality of life. Attendance, contact hours, caregiver participation, referral completion, and intervention fidelity should also be recorded. These measures help explain whether disappointing outcomes reflect an ineffective intervention, insufficient participation, or difficulties in delivery.

Cluster randomization by school can reduce contamination between intervention and comparison groups. Sample-size calculations must account for clustering and anticipated attrition. Analysis should consider baseline outcomes and the clustered design, reporting effect sizes and confidence intervals alongside p-values. Qualitative interviews can explore children's and caregivers' experiences. Longer follow-up and economic evaluation are needed to examine sustainability. Research should also assess whether benefits reach children across socioeconomic groups and identify the specific contribution of nursing leadership.

Ethical and Psychosocial Considerations

Protecting dignity is a central component of programme quality. Pont et al. (2017) describe the adverse consequences of weight stigma and recommend respectful communication. Nurses should use person-first language, seek permission before discussing weight, and avoid public disclosure of measurements. Weight-loss competitions, punitive exercise, teasing, and visible categorization by BMI are inappropriate. Evaluation should include body dissatisfaction, bullying, and possible disordered eating. Children and families should understand that participation supports health, development, and well-being rather than conformity to a preferred body shape.

Nursing Implications and Conclusion

Nursing education should strengthen competencies in growth assessment, counselling, safeguarding, family communication, and programme evaluation. Service leaders must provide supervision, manageable workloads, and reliable referral access. Partnerships with nursing colleges can support community health activities, but students require oversight and should not

independently manage complex childhood obesity. Programme teams should plan continuity during holidays, examinations, and school transitions. Flexible follow-up, printed materials, and accessible communication can help families maintain feasible routines when regular school activities pause.

A nurse-led multicomponent intervention can connect health education, supportive environments, family participation, and clinical care. Published evidence supports its feasibility and potential behavioural benefits, but consistent BMI reduction from school-nurse counselling alone has not been established. Implementation should therefore combine realistic expectations with sustained support and rigorous evaluation. The central objective is healthier growth and improved well-being, achieved through collaborative care that respects each child's needs, circumstances, and dignity.

References

Ebbeling, C. B., Feldman, H. A., Chomitz, V. R., Antonelli, T. A., Gortmaker, S. L., Osganian, S. K., & Ludwig, D. S. (2012). A randomized trial of sugar-sweetened beverages and adolescent body weight. *New England Journal of Medicine*, 367(15), 1407–1416. <https://doi.org/10.1056/NEJMoa1203388>

Epstein, L. H., Wilfley, D. E., Kilanowski, C., Quattrin, T., Cook, S. R., Eneli, I. U., Geller, N., Lew, D., Wallendorf, M., Dore, P., Paluch, R. A., & Schechtman, K. B. (2023). Family-based behavioral treatment for childhood obesity implemented in pediatric primary care: A randomized clinical trial. *JAMA*, 329(22), 1947–1956. <https://doi.org/10.1001/jama.2023.8061>

Hampl, S. E., Hassink, S. G., Skinner, A. C., Armstrong, S. C., Barlow, S. E., Bolling, C. F., Avila Edwards, K. C., Eneli, I., Hamre, R., Joseph, M. M., Lunsford, D., Mendonca, E., Michalsky, M. P., Mirza, N., Ochoa, E. R., Sharifi, M., Staiano, A. E., Weedn, A. E., Flinn, S. K., . . . Okechukwu, K. (2023). Clinical practice guideline for the evaluation and treatment of children and adolescents with obesity. *Pediatrics*, 151(2), Article e2022060640. <https://doi.org/10.1542/peds.2022-060640>

HEALTHY Study Group. (2010). A school-based intervention for diabetes risk reduction. *New England Journal of Medicine*, 363(5), 443–453. <https://doi.org/10.1056/NEJMoa1001933>

ICMR–National Institute of Nutrition. (2024). *Dietary guidelines for Indians*. <https://www.nin.res.in/dietaryguidelines/pdfjs/locale/DGI07052024P.pdf>

Paruthi, S., Brooks, L. J., D'Ambrosio, C., Hall, W. A., Kotagal, S., Lloyd, R. M., Malow, B. A., Maski, K., Nichols, C., Quan, S. F., Rosen, C. L., Troester, M. M., & Wise, M. S. (2016). Recommended amount of sleep for pediatric populations: A consensus statement of the American Academy of Sleep Medicine. *Journal of Clinical Sleep Medicine*, 12(6), 785–786. <https://doi.org/10.5664/jcsm.5866>

Pbert, L., Druker, S., Barton, B., Schneider, K. L., Olendzki, B., Gapinski, M. A., Kurtz, S., & Osganian, S. (2016). A school-based program for overweight and obese adolescents: A randomized controlled trial. *Journal of School Health*, 86(10), 699–708. <https://doi.org/10.1111/josh.12428>

Pbert, L., Druker, S., Gapinski, M. A., Gellar, L., Magner, R., Reed, G., Schneider, K., & Osganian, S. (2013). A school nurse-delivered intervention for overweight and obese adolescents. *Journal of School Health*, 83(3), 182–193. <https://doi.org/10.1111/josh.12014>

Pont, S. J., Puhl, R., Cook, S. R., Slusser, W., Section on Obesity, & The Obesity Society. (2017). Stigma experienced by children and adolescents with obesity. *Pediatrics*, 140(6), Article e20173034. <https://doi.org/10.1542/peds.2017-3034>

US Preventive Services Task Force. (2024, June 18). *High body mass index in children and adolescents: Interventions*. <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/obesity-in-children-and-adolescents-screening>

World Health Organization. (n.d.). *BMI-for-age (5–19 years)*. <https://www.who.int/toolkits/growth-reference-data-for-5to19-years/indicators/bmi-for-age>

World Health Organization. (2020). *WHO guidelines on physical activity and sedentary behaviour*. <https://www.who.int/publications/i/item/9789240015128>

World Health Organization. (2021). *WHO guideline on school health services*. <https://www.who.int/publications/i/item/9789240029392>

World Health Organization. (2025, December 8). *Obesity and overweight*. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>

World Health Organization, & United Nations Educational, Scientific and Cultural Organization. (2021). *Making every school a health-promoting school: Global standards and indicators*. World Health Organization. <https://www.who.int/publications/i/item/9789240025059>