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Indonesian Journal of Health Research and Development Vol 4 No 3 (2026) https://doi.org/10.58723/ijhrd.v4i3.677

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Research Article

TEENFIT for Adolescents with Obesity: A Pilot Mixed-Methods Feasibility and Acceptability Study

Received: Month x, 2026	Revised: Month x, 2026	Accepted: June 30, 2026	Published: June 30, 2026

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Abstract:

Background: Effective intervention strategies are essential for adolescents with obesity; however, data on the feasibility of comprehensive programs remain limited.

Aims: This pilot mixed-methods study evaluated the feasibility and acceptability of TEENFIT, a 24-week interdisciplinary intervention for adolescents with obesity, to refine the programme and study procedures ahead of a future randomised trial.

Methods: Seven adolescents aged 12-14 years with a BMI above the 95th percentile participated in TEENFIT, delivered biweekly alongside monthly parental workshops at a private hospital in Lisbon. The intervention combined nutrition education, supervised physical activity, and behaviour modification workshops focused on goal-setting and self-monitoring, and was grounded in Self-Determination Theory, Self-Regulation, and the COM-B model. Feasibility metrics assessed recruitment, attendance, retention, fidelity, safety, and data capture. Acceptability was explored through focus groups with adolescents, parents, and providers using thematic analysis.

Results: All seven enrolled adolescents initiated the intervention. Over the first three months, mean attendance was 82%, retention was 100%, no serious adverse events occurred, and data completeness exceeded 90% for most variables. Qualitative findings indicated that peer support and parental involvement facilitated engagement, while transport, scheduling, and communication were key barriers. Overall, this small single-site pilot suggests preliminary feasibility and acceptability and highlights refinements for a future randomised trial.

Conclusion: TEENFIT met predefined feasibility and acceptability criteria at three months, supporting progression to a randomized controlled trial evaluating weight-related and psychosocial outcomes.

Keywords: Adolescent health; Childhood obesity; Health self-management; Interdisciplinary intervention; Pilot study.

1. INTRODUCTION

Childhood obesity poses a global crisis (Ogden et al., 2014). Rising rates of obesity in youth are linked to serious comorbidities across endocrine, cardiovascular, respiratory, and musculoskeletal systems (Dietz & Robinson, 2005; Skinner et al., 2015). Adolescents with obesity also frequently experience psychosocial distress and low self-esteem (Hemmingsson, 2014; Sawyer et al., 2011), and face elevated risk of bullying and discrimination (Griffiths, 2005). Recent frameworks and guidelines emphasise that adolescent obesity management should be comprehensive, family-engaged, and developmentally appropriate, incorporating psychosocial as well as behavioral outcomes (Jebeile et al., 2022; USPSTF, 2023; Nicholson et al., 2024; Lee et al., 2024). To prevent obesity and its sequelae, international guidelines recommend >=60 minutes of daily moderate-to-vigorous activity and at least thrice-weekly vigorous exercise for youth (Chaput et al., 2020). Theoretical models of behavior change emphasize that meeting psychological needs (autonomy, competence, relatedness) and addressing capability, opportunity, and motivation are essential for sustainable lifestyle change (Deci & Ryan, 2004; Michie et al., 2011). Interdisciplinary, self-management programs that engage families can leverage these theories to improve outcomes (Deci & Ryan, 2004; Michie et al., 2011). Accordingly, the present paper reports a pilot mixed-methods study evaluating the feasibility and acceptability of TEENFIT, a 24-week interdisciplinary programme for adolescents with obesity, with the aim of refining intervention delivery and study procedures prior to a future randomised trial.

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2. MATERIALS AND METHODS

The TeenFit intervention was conceptualized using an integrative theoretical framework illustrated in Figure 1, which synthesizes the principles of self-determination theory, self-regulation theory, and the COM-B model.

Eligible participants were adolescents aged 12–14 years with obesity, defined as BMI-for-age >+2 standard deviations according to the WHO growth reference for children and adolescents aged 5–19 years. Additional eligibility criteria included sufficient Portuguese language proficiency and cognitive capacity to understand study procedures and participate in group sessions, as well as medical clearance for moderate-to-vigorous physical activity.

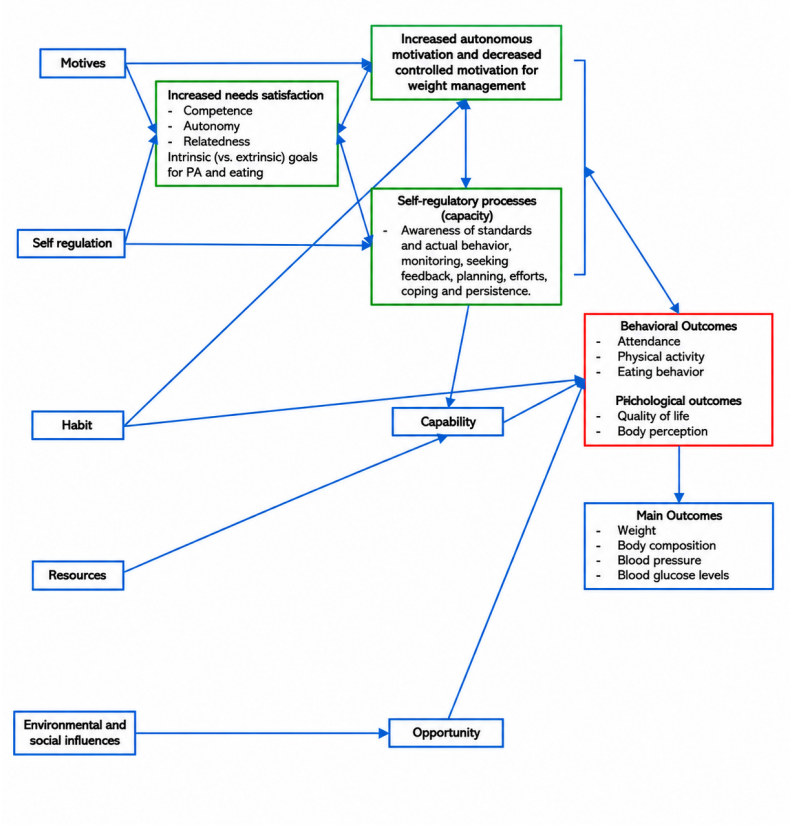


Figure 1. Program logic model

TEENFIT comprised 48 group sessions delivered biweekly over 24 weeks, complemented by monthly parent workshops. The sessions integrated supervised physical activity, nutrition education, and behaviour-change support, including goal setting, self-monitoring, and autonomy-supportive facilitation. The intervention was delivered by a multidisciplinary team comprising of doctors, psychologists, nutritionists and exercise physiologists, with each component led by the relevant professional.

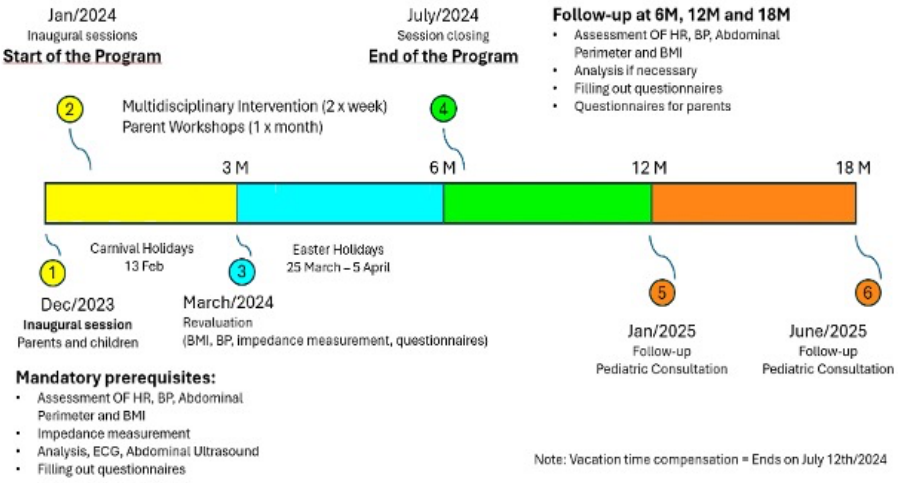


Figure 2. Timeline of the program (M, month; HR, heart rate; BP, blood pressure; BMI, body mass index; ECG, electrocardiogram)

Primary feasibility endpoints were prospectively defined and included attendance and engagement, retention, recruitment and consent, implementation fidelity, safety, data capture completeness, and acceptability. Attendance success was defined as a mean session attendance of at least 70%; retention success was defined as at least 80% completion at three and six months; fidelity required delivery of at least 80% of core components; safety required no serious adverse events attributable to the intervention; and data capture targeted at least 85% completeness for key measures. Acceptability required at least 80% of adolescents and parents to rate sessions as useful, supported by qualitative evidence of appropriateness, manageable burden, and willingness to continue.

Participants completed medical and nutritional assessments before and during the program, including anthropometry, body composition using InBody570, blood pressure measurement with OMRON devices, and laboratory assessment of fasting glucose, insulin, and HbA1c. Demographic characteristics were extracted from hospital records. Secondary outcomes included psychological need satisfaction, behavioural regulation, self-regulatory behaviours, quality of life, body image perception, objectively monitored physical activity, and eating behaviours. Quality, suitability, acceptability, adherence, barriers, and facilitators were explored through semi-structured interviews and focus groups with staff, adolescents, and parents.

Three focus groups were conducted at the three-month follow-up with adolescents, parents, and professionals using semi-structured interview guides. Sessions were audio-recorded, transcribed verbatim, and analysed thematically by two researchers using NVivo, with disagreements resolved through consensus with a third researcher. An audit trail and reflexive memos were used to strengthen credibility and dependability.

This study was designed as a pilot mixed-methods evaluation of the feasibility and acceptability of the TEENFIT intervention. Although the intervention spans 24 weeks, the present report focuses on the prespecified 3-month feasibility and acceptability assessment from the initial pilot cohort. A definitive randomised controlled trial is planned; however, protocol-level details for that trial are beyond the scope of this report. Although approved by the University Ethics Committee (D0924; institution name redacted in source manuscript), the study procedures are currently under review by the Ethics Committee of Hospital. At manuscript submission, Hospital approval and prospective registration were still pending, as the TEENFIT intervention and study procedures were being refined. Registration will be completed after ethical approval and before recruitment for the definitive trial/evaluation phase. Written parental/legal guardian consent and adolescent assent will be obtained before participation.

3. RESULTS AND DISCUSSION

3.1 Results

Among the feasibility indicators currently available, all seven enrolled adolescents initiated the TEENFIT intervention. During the first three months, mean session attendance was 82%, exceeding the predefined feasibility threshold of 70%, and retention at the three-month assessment was 100%. No serious adverse events or intervention-related safety concerns were reported. Data collection was also feasible, with baseline and follow-up data obtained for more than 90% of measured variables.

Acceptability findings were favorable across adolescents, parents, and professionals. Adolescents valued the group-based and interactive format, parents emphasised the usefulness of the nutrition and psychology workshops, and staff identified the interdisciplinary structure as a key strength. Qualitative feedback indicated that peer support, family involvement, and a supportive group environment facilitated engagement, whereas transport difficulties, scheduling conflicts, communication issues, and smartphone distraction were identified as practical barriers requiring refinement before the next phase.

Overall, the predefined feasibility thresholds were met or exceeded, and the pattern of quantitative and qualitative findings indicates that TEENFIT was feasible and highly acceptable in this pilot sample.

The preliminary findings indicate that TEENFIT achieved strong feasibility and acceptability. The observed attendance, retention, safety profile, and participant satisfaction are consistent with or stronger than recent adolescent obesity intervention studies. The multidisciplinary design and explicit parental involvement are aligned with current best-practice recommendations, which emphasize family-based, multicomponent care for pediatric obesity. TEENFIT also draws on Self-Determination Theory, self-regulation, and COM-B, supporting an autonomy-supportive and capability-focused approach that may help sustain engagement. The positive role of peer support described by participants further reinforces the value of group-based delivery. At the same time, the pilot identified practical barriers - especially transport, scheduling, communication, and smartphone distraction - that should be directly addressed in the definitive trial.

3.2 Discussion

In this small, single-site pilot, TEENFIT appeared feasible and acceptable over the first three months, while also identifying practical barriers that warrant refinement before a future trial. Attendance and retention in this pilot were encouraging; however, comparisons with other adolescent obesity interventions should be interpreted with caution, given differences in intervention intensity, delivery setting, and participant characteristics. A definitive randomised controlled trial is planned. The present pilot primarily informs intervention refinement, recruitment procedures, data

collection processes, and acceptability assessment in preparation for this next stage.

3.2.1 Implications

The findings suggest that TEENFIT's interdisciplinary, family-based, and autonomy-supportive structure should be maintained in the next phase. Practical improvements are also needed, particularly clearer scheduling, reminder systems, and communication pathways, to address transport, timetable, and organisational barriers reported by participants. These refinements may improve implementation without compromising the supportive and motivational features valued by adolescents and parents.

3.2.2 Research contribution

This study contributes a theory-driven, hospital-based intervention protocol for adolescents with obesity, accompanied by an embedded mixed-methods assessment of feasibility and acceptability. TEENFIT integrates physical activity, nutrition education, behaviour modification, and parental involvement, drawing on Self-Determination Theory, self-regulation theory, and the COM-B model. The preliminary implementation findings provide practical evidence to inform the design of a future definitive randomized controlled trial.

3.2.3 Limitations

The pilot involved only seven adolescents and was conducted at a single site, which limits the generalisability of the findings. In addition, the study was designed to assess feasibility and acceptability rather than intervention efficacy. Therefore, the preliminary results should not be interpreted as evidence that TEENFIT produces improvements in weight-related or psychosocial outcomes.

3.2.4 Suggestions

Future work should refine programme logistics, including transport-related arrangements, session scheduling, reminders, and communication with families. The next step is to conduct a definitive randomized controlled trial comparing TEENFIT with standard care and assessing standardized BMI at six months, alongside secondary outcomes such as physical activity, quality of life, and self-regulation over a longer follow-up period.

4. CONCLUSION

In this small, single-site pilot, TEENFIT appeared feasible and acceptable during the first three months of delivery. These findings primarily inform refinements to intervention logistics, communication processes, and study procedures ahead of a future randomised trial, and should not be interpreted as evidence of effectiveness.

5. ACKNOWLEDGEMENT

The authors acknowledge the adolescents, parents, and healthcare professionals who participated in the TEENFIT pilot activities and contributed feedback on the program.

AUTHOR CONTRIBUTION STATEMENT

Detailed author contribution roles were not provided in the source manuscript and should be confirmed by the author group before submission.

STATEMENT

Conflict of Interest

The authors have no relevant conflicts of interest to disclose.

Funding

The authors formally declared in the source manuscript that no financial support, grants, or other assistance were received during the development and preparation of this manuscript.

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REFERENCES

Chaput, J.-P., Willumsen, J., Bull, F., Chou, R., Ekelund, U., Firth, J., Jago, R., Ortega, F. B., & Katzmarzyk, P. T. (2020). 2020 WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5-17 years: Summary of the evidence. International Journal of Behavioral Nutrition and Physical Activity, 17(1), 141. https://doi.org/10.1186/s12966-020-01037-z

Deci, E. L., & Ryan, R. M. (Eds.). (2004). Handbook of self-determination research (Softcover edition). University of Rochester Press.

Dietz, W. H., & Robinson, T. N. (2005). Overweight children and adolescents. New England Journal of Medicine, 352(20), 2100-2109. https://doi.org/10.1056/NEJMcp043052

El-Behadli, A. F., Sharp, C., Hughes, S. O., Obasi, E. M., & Nicklas, T. A. (2015). Maternal depression, stress and feeding styles: Towards a framework for theory and research in child obesity. British Journal of Nutrition, 113(S1), S55-S71. https://doi.org/10.1017/S000711451400333X

Griffiths, L. J. (2005). Obesity and bullying: Different effects for boys and girls. Archives of Disease in Childhood, 91(2), 121-125. https://doi.org/10.1136/adc.2005.072314

Hemmingsson, E. (2014). A new model of the role of psychological and emotional distress in promoting obesity: Conceptual review with implications for treatment and prevention. Obesity Reviews, 15(9), 769-779. https://doi.org/10.1111/obr.12197

Hoare, E., Thorp, A., Griffiths, M., & Fuller-Tyszkiewicz, M. (2015). Adolescent obesity and weight management: Barriers and facilitators. Obesity Reviews, 16(12), 1050-1060. https://doi.org/10.1111/obr.12301

Jebeile, H., Gow, M. L., Baur, L. A., Garnett, S. P., Paxton, S. J., & Lister, N. B. (2022). Treatment of obesity, with a focus on eating disorders: A systematic review of guidelines. Pediatric Obesity, 17(5), e12893. https://doi.org/10.1111/ijpo.12893

Jiang, F., Zhu, S., Yan, C., Jin, X., Bandla, H., & Shen, X. (2009). Sleep and obesity in preschool children. The Journal of Pediatrics, 154(6), 814-818. https://doi.org/10.1016/j.jpeds.2008.12.043

Kelleher, E., Davoren, M. P., Harrington, J. M., Shiely, F., Perry, I. J., & McHugh, S. M. (2017). Barriers and facilitators to initial and continued attendance at community-based lifestyle programmes among families of overweight and obese children: A systematic review. Obesity Reviews, 18(2), 183-194. https://doi.org/10.1111/obr.12478

Lee, R. E., Mama, S. K., Medina, A. V., & Reese-Smith, J. (2024). Scaling up community-based obesity interventions for youth: Evidence and equity considerations. International Journal of Behavioral Nutrition and Physical Activity, 21(1), 5. https://doi.org/10.1186/s12966-024-01506-7

Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. Implementation Science, 6(1), 42. https://doi.org/10.1186/1748-5908-6-42

Nicholson, J. M., Stewart, C., Lister, N. B., & Goldfeld, S. (2024). Addressing childhood obesity: An evidence-based framework for action. The Lancet Child & Adolescent Health, 8(2), 69-82. https://doi.org/10.1016/S2352-4642(23)00300-6

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. JAMA, 311(8), 806. https://doi.org/10.1001/jama.2014.732

Ryan, R. M., Deci, E. L., Vansteenkiste, M., & Soenens, B. (2021). Building a science of motivated persons: Self-determination theory's empirical approach to human experience and the regulation of behavior. Motivation Science, 7(2), 97-110. https://doi.org/10.1037/mot0000194

Sawyer, M. G., Harchak, T., Wake, M., & Lynch, J. (2011). Four-year prospective study of BMI and mental health problems in young children. Pediatrics, 128(4), 677-684. https://doi.org/10.1542/peds.2010-3132

Skinner, A. C., Perrin, E. M., Moss, L. A., & Skelton, J. A. (2015). Cardiometabolic risks and severity of obesity in children and young adults. New England

Journal of Medicine, 373(14), 1307-1317. https://doi.org/10.1056/NEJMoa1502821

Teixeira, P. J., Carraca, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. International Journal of Behavioral Nutrition and Physical Activity, 9(1), 78. https://doi.org/10.1186/1479-5868-9-78

U.S. Preventive Services Task Force (USPSTF). (2023). Screening and treatment of obesity in children and adolescents: Recommendation statement. JAMA, 330(6), 541-549. https://doi.org/10.1001/jama.2023.12893

Ufholz, K., & Bhargava, A. (2020). Peer support groups for weight management in adolescents: A review. Pediatric Obesity, 15(4), e12574. https://doi.org/10.1111/ijpo.12574

World Health Organization (WHO). (2022). Guidelines on physical activity and sedentary behavior for children and adolescents. https://www.who.int/publications/i/item/9789240015128

World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. JAMA, 310(20), 2191. https://doi.org/10.1001/jama.2013.281053