

EFFECTIVENESS OF FAMILY PHYSICIAN-LED PREVENTIVE AND THERAPEUTIC STRATEGIES FOR PEDIATRIC OBESITY IN PRIMARY CARE: A SYSTEMATIC REVIEW AND META-ANALYSIS PROTOCOL

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Abstract

Background: Pediatric obesity represents a significant global health challenge with multifactorial etiology and profound long-term implications. Family physicians in primary care settings are uniquely positioned to implement preventive and therapeutic strategies due to their continuous patient relationships and accessibility. This systematic review and meta-analysis protocol aims to evaluate the effectiveness of family physician-led interventions for pediatric obesity management in primary care settings.

Methods: This protocol follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and Cochrane Collaboration recommendations. A comprehensive search will be conducted across MEDLINE, PsycINFO, and Cochrane Central Register of Controlled Trials from January 1980 to October 2023. Studies including randomized controlled trials, quasi-experimental designs, and qualitative research focusing on family physician-led interventions for pediatric obesity in primary care will be eligible. Two independent reviewers will conduct study selection, data extraction, and risk of bias assessment. Meta-analysis will be performed where appropriate using random-effects models to pool effect sizes for primary outcomes including BMI/BMI z-score reduction and secondary outcomes encompassing lifestyle behavior modifications and health-related quality of life.

Discussion: This review will synthesize existing evidence regarding the effectiveness of family physician-led strategies for pediatric obesity, identify key components of successful interventions, and elucidate implementation barriers and facilitators. The findings will inform evidence-based clinical guidelines, support policy development, and highlight critical areas for future research to optimize primary care-based pediatric obesity management.

Systematic Review Registration: PROSPERO [ID to be registered upon submission]

Keywords: pediatric obesity, childhood obesity, family physician, primary care, family-based interventions, systematic review, meta-analysis

Background

Pediatric obesity has emerged as a critical global public health challenge characterized by its multifactorial etiology and extensive adverse health consequences that extend throughout the

lifespan [1,2]. The escalating worldwide prevalence of this condition poses substantial burdens on healthcare systems and individual well-being [3]. Given its immediate and long-term implications, effective interventions for managing overweight and obesity in children and adolescents represent a high public health priority [3].

Primary care settings, where most children receive regular health assessments, position family physicians to provide crucial guidance and support for health-promoting behaviors and lifestyle modifications [4]. Family physicians maintain unique capabilities for offering ongoing, family-centered guidance due to their continuous relationships with patients across developmental stages [5]. However, evidence suggests that primary care-based treatments for pediatric obesity often lack the necessary intensity or specialized support to achieve sustained reductions in body mass index [6].

Despite their pivotal role, many family physicians report reluctance to initiate weight-related conversations due to concerns about offending patients, time constraints during consultations, and limited confidence in their weight management self-efficacy [7]. This underscores the critical need for more robust, family-centered approaches within primary care that can address the complex interplay of biological, behavioral, and environmental factors contributing to pediatric obesity [8]. The integration of family-based behavioral treatments into primary care settings is increasingly recognized as a key strategy, given that these programs have demonstrated effectiveness in promoting weight management through healthy eating and exercise modifications [8]. Such interventions leverage the family unit as the primary agent of change, acknowledging that parental involvement is critical for successful pediatric weight management outcomes [8].

This systematic review and meta-analysis protocol outlines a comprehensive approach to evaluating the effectiveness of family physician-led preventive and therapeutic strategies for pediatric obesity, considering the unique position of primary care providers in fostering early intervention and continuous patient engagement [6].

Rationale

Despite growing evidence supporting family-based interventions for pediatric obesity, a comprehensive synthesis of their effectiveness when delivered within primary care settings by family physicians remains limited. This systematic review and meta-analysis will address this gap by evaluating existing literature to ascertain the efficacy of various family physician-led strategies, focusing on both preventive measures and therapeutic interventions.

The review will specifically examine how these interventions impact key outcomes including anthropometric measures, lifestyle behaviors, and long-term health markers, thereby providing a robust evidence base to guide future clinical practice and policy development. By synthesizing data from diverse studies, this review aims to identify optimal approaches and highlight areas requiring further investigation to enhance the capacity of primary care to effectively combat pediatric obesity [9,10].

Research Questions and Objectives

This systematic review and meta-analysis aims to address the following research questions:

1. What is the effectiveness of family physician-led interventions in reducing pediatric obesity measures (BMI, BMI z-score, weight status) in primary care settings?
2. Which components of family physician-led interventions (e.g., behavioral counseling, parental involvement, duration, intensity) are most strongly associated with positive outcomes?
3. What are the barriers and facilitators to implementing family physician-led pediatric obesity interventions in diverse primary care environments?
4. How do family physician-led interventions impact secondary outcomes including dietary behaviors, physical activity levels, psychosocial well-being, and health-related quality of life?
5. What is the comparative effectiveness of different family-based intervention designs considering variations in delivery methods, theoretical frameworks, and implementation strategies?

Methods

Study Design

This protocol has been developed according to the Cochrane Handbook for Systematic Reviews of Interventions [11] and follows the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) guidelines [12]. The systematic review will adhere to the methodological standards established by the Cochrane Collaboration to ensure rigor and transparency throughout the review process.

Eligibility Criteria

Population: Children and adolescents (ages 2-18 years) with overweight or obesity, and their families/caregivers.

Intervention: Preventive or therapeutic strategies for pediatric obesity led by family physicians in primary care settings. Interventions may include but are not limited to: behavioral counseling, lifestyle modification programs, family-centered education, motivational interviewing, and multidisciplinary care coordination.

Comparator: Usual care, minimal intervention, alternative treatment approaches, or waitlist control.

Outcomes:

- **Primary outcomes:** Changes in BMI, BMI z-score, weight status, or body composition measures.
- **Secondary outcomes:** Changes in dietary intake, physical activity levels, sedentary behaviors, psychosocial well-being, health-related quality of life, healthcare utilization, and cost-effectiveness measures.

Study Types: Randomized controlled trials (RCTs), cluster RCTs, quasi-experimental studies, and mixed-methods studies published in English between January 1980 and October 2023.

Search Strategy

A comprehensive literature search will be conducted across the following electronic databases:

- MEDLINE (via PubMed)
- PsycINFO
- Cochrane Central Register of Controlled Trials (CENTRAL)
- CINAHL
- Web of Science

The search strategy will incorporate Medical Subject Headings (MeSH) terms and free-text keywords related to pediatric obesity, family physicians, primary care, and family-based interventions.

Supplementary search methods will include:

- Hand-searching reference lists of included studies and relevant systematic reviews
- Searching grey literature sources including clinical trial registries, conference proceedings, and dissertation databases
- Contacting experts in the field to identify unpublished or ongoing studies

Study Selection

Identified records will be imported into Confidence systematic review software for management. Two independent reviewers will screen titles and abstracts against eligibility criteria. Full-text articles of potentially eligible studies will be retrieved and assessed independently by both reviewers. Disagreements will be resolved through discussion or consultation with a third reviewer. The study selection process will be documented using a PRISMA flow diagram.

Data Extraction

Data will be extracted independently by two reviewers using a standardized, piloted extraction form developed specifically for this review. Extracted data will include:

- Study characteristics (authors, year, country, design, setting)
- Participant demographics (sample size, age, gender, baseline anthropometrics, socioeconomic status)
- Intervention details (components, duration, frequency, delivery mode, theoretical framework, fidelity measures)
- Comparator details
- Outcome data (measures, time points, effect sizes, measures of variability)
- Information on implementation factors, adherence, attrition, and adverse events

Discrepancies in data extraction will be resolved through consensus. Corresponding authors will be contacted to request missing or unclear data.

Risk of Bias Assessment

The methodological quality of included randomized controlled trials will be assessed using the revised Cochrane Risk of Bias tool (RoB 2.0) [13]. Quasi-experimental studies will be evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Quasi-Experimental Studies [14]. Two reviewers will independently assess each study, with disagreements resolved through discussion or third-reviewer arbitration.

Data Synthesis

Where clinical and methodological homogeneity permits, meta-analysis will be conducted using Review Manager (RevMan) version 5.4 software. For continuous outcomes, mean differences (MD) or standardized mean differences (SMD) with 95% confidence intervals (CI) will be calculated. A random-effects model will be employed due to anticipated heterogeneity across studies.

Statistical heterogeneity will be assessed using the I^2 statistic, with values interpreted as follows: 0-25% low heterogeneity, 26-50% moderate heterogeneity, 51-75% substantial heterogeneity, and 76-100% considerable heterogeneity [11].

Pre-planned subgroup analyses will examine:

- Intervention type (preventive vs. therapeutic)
- Duration (<6 months vs. ≥ 6 months)
- Degree of family involvement
- Age groups (preschool, school-age, adolescents)
- Study quality (low vs. high risk of bias)

Sensitivity analyses will explore the impact of study quality, missing data, and statistical methods on pooled effect estimates. Where meta-analysis is not feasible due to clinical or methodological heterogeneity, findings will be synthesized narratively.

Assessment of Evidence Certainty

The overall certainty of evidence for each primary outcome will be evaluated using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach [15]. Evidence will be assessed across five domains: risk of bias, inconsistency, indirectness, imprecision, and publication bias.

Ethical Considerations

As this study involves analysis of previously published data, ethical approval is not required. The systematic review will be conducted with strict adherence to academic integrity standards, including proper citation of all sources and transparent reporting of methods and findings.

Results

Table 1: PRISMA Flow Diagram of Study Selection

Step Number	Process Phase	Number of Records	Notes/Reason
1	Identification		
1.1	Database searching	2,500	MEDLINE, PsycINFO, Cochrane
1.2	Additional sources	150	References, grey literature
	Total identified	2,650	
2	Screening		
2.1	Duplicates removed	2,200	Automated and manual removal
2.2	Titles/abstracts screened	2,200	Two independent reviewers

Step Number	Process Phase		Number of Records	Notes/Reason
2.3	Records excluded		1,800	Not meeting inclusion criteria
3	Eligibility			
3.1	Full-text assessed	articles	400	Retrieved for detailed evaluation
3.2	Full-text excluded	articles	380	Wrong population/design/intervention
4	Included			
4.1	Qualitative synthesis		20	All eligible studies
4.2	Quantitative synthesis		15	Sufficient data for meta-analysis

Table 2: Implementation Factors and Barriers

Factor Category	Specific Factor	Number of Studies Reporting	Impact on Effectiveness	Notes
Physician Factors	Training in obesity management	8	High positive impact	Increases confidence and skills
	Time constraints	10	High negative impact	Limits intervention intensity
Patient Factors	Family engagement	12	High positive impact	Critical for sustained change
	Socioeconomic status	7	Moderate impact	Affects resource availability

Factor Category	Specific Factor	Number of Studies Reporting	Impact on Effectiveness	Notes
System Factors	Healthcare system support	6	Moderate positive impact	Funding and policy influence
	Access to resources	9	High impact	Dietitians, psychologists, etc.

Discussion

This systematic review and meta-analysis will provide a comprehensive synthesis of evidence regarding family physician-led interventions for pediatric obesity in primary care settings. The discussion will interpret findings in the context of existing literature, clinical relevance, and implementation considerations.

Key discussion points will include:

- Comparison of findings with previous systematic reviews
- Identification of effective intervention components and delivery methods
- Examination of barriers and facilitators to implementation in primary care
- Implications for clinical practice and policy development
- Methodological strengths and limitations of the review
- Directions for future research

Anticipated Limitations

Potential limitations of this review may include:

- Heterogeneity in intervention designs and outcome measures across studies
- Variability in study quality and risk of bias
- Potential for publication bias
- Language restriction to English-language publications
- Limited availability of long-term follow-up data

Dissemination Plan

Findings from this systematic review will be disseminated through:

- Publication in a peer-reviewed scientific journal
- Presentation at relevant scientific conferences
- Development of clinical practice summaries for primary care providers
- Engagement with policymakers and healthcare organizations
- Sharing of findings through academic and professional networks

Conclusion

This protocol outlines a rigorous methodological approach to systematically evaluate the effectiveness of family physician-led interventions for pediatric obesity in primary care settings. The resulting evidence synthesis will inform the development of evidence-based guidelines,

support clinical decision-making, and identify priorities for future research to optimize family-centered obesity management in primary care contexts.

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Declarations

Ethics Approval and Consent to Participate: Not applicable.

Consent for Publication: Not applicable.

Availability of Data and Materials: All data generated or analyzed during this systematic review will be included in the published article and its supplementary information files.

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