INPLASY

Relationship Between Physical Literacy and body composition in Children and Adolescents: A Systematic Review and Meta-analysis

Corresponding author:
José Francisco López-Gil

josefranciscolopezgil@gmail.com

Author Affiliation:
School of Medicine, Universidad Espíritu Santo, Samborondón, Ecuador. Vicerrectoría de Investigación y Postgrado, Universidad de Los Lagos, Osorno, Chile.

Valle-Muñoz, VM; Ávila-García, M; López-Gil, JF; Villa-González, E.

ADMINISTRATIVE INFORMATION

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 September 2025 and was last updated on 11 September 2025.

INTRODUCTION

Review question / Objective Physical inactivity and obesity in children and adolescents have become two of the most critical threats to global public health. A large portion of the youth population, particularly those aged 11 to 17, fails to meet the minimum recommended levels of physical activity, which negatively affects their BC and overall well-being. Unhealthy BC during these key developmental stages is associated with an increased risk of metabolic, cardiovascular, and musculoskeletal diseases, as well as psychological and social disorders. Childhood obesity, in particular, has been identified as one of the most pressing health challenges of the 21st century, with alarming projections indicating continued growth in the years ahead.

In this context, PL has emerged as a comprehensive and promising approach for fostering active, sustainable, and healthy lifestyles from an early age. PL is defined as a multidimensional construct that encompasses motivation, confidence, physical competence, and the knowledge and understanding necessary to participate regularly and autonomously in physical activities throughout life. This concept extends beyond motor skills, incorporating cognitive and affective dimensions that directly influence health-related behavior. Therefore, PL is structured around four fundamental domains: physical competence, knowledge and understanding, and motivation and confidence. Each of these domains is closely linked to factors that influence BC, suggesting that PL may serve both as an early warning indicator and as a promising target for intervention in this area.

Numerous studies have linked higher levels of PL with increased participation in physical activity, better physical fitness, reduced sedentary behavior, and improved mental and social well-being. Among adolescents, PL has also shown positive associations with muscular strength, academic achievement, and lower prevalence rates of overweight and obesity. In recent years,

interest in the relationship between PL and BC in children and adolescents has grown. However, to date, no systematic review or meta-analysis has been conducted to gather, analyze, and synthesize the available evidence on this topic. Only one recent systematic review and meta-analysis by Jiang et al. (2025) has specifically examined the association between PL and CRF in children and adolescents. This review, which included 18 studies with a total of 16,316 participants aged 6 to 17 years, found a moderate to strong positive association between physical literacy and CRF ($r = 0.45$; 95% CI: 0.36–0.53). These findings underscore the relevance of PL in promoting cardiovascular health and highlight the need to expand the research focus to include other key health markers such as BC.

Given the growing recognition of PL as both an educational and public health tool, it is essential to deepen our understanding of its relationship with BC in children and adolescents. Accordingly, this systematic review and meta-analysis aims to compile, evaluate, and critically synthesize studies that have examined the PL–BC relationship in this population. The findings will inform the design of more effective educational strategies, preventive programs, and health interventions, with a focus on promoting PL as a key determinant of healthy and sustainable development from early childhood. However, most eligible studies are likely to be observational, and substantial heterogeneity is expected due to differences in study designs, measurement methods, and instruments used.

Condition being studied This review focuses on observational and longitudinal studies that examine the relationship between PL and BC in children and adolescents aged 5 to 17. Low PL is characterized by deficits in motivation, confidence, physical competence, knowledge, or understanding, which can limit regular and autonomous participation in physical activity and negatively affect health outcomes, including BC and overall well-being. Given that PL encompasses multidimensional components, physical competence, knowledge and understanding, and motivation and confidence, studying its association with BC provides insight into how these factors may influence physical health during critical developmental stages. Understanding this relationship is essential to inform interventions and public health strategies aimed at fostering healthier, more active lifestyles and preventing obesity and related health issues in youth.

METHODS

Search strategy Keywords and synonyms were entered in various combinations in the title, abstract or keywords: ("physical literacy" OR "physical competence" OR "motivation and confidence" OR "knowledge and understanding") AND ("body composition" OR "body weight" OR "lean mass" OR "fat mass" OR "body fat percentage" OR "BMI" OR "bone mineral density" OR "bone mineral content" OR "waist circumference" OR "skeletal muscle mass") AND ("child" OR "adolescent" OR "youth" OR "teen").

Participant or population Children and adolescents between the ages of 5 to 17 who are seemingly healthy.

Intervention N/A.

Comparator N/A.

Study designs to be included Study designs eligible for inclusion comprised cross-sectional, cohort, and experimental studies. Intervention studies were considered only when baseline data had been reported.

Eligibility criteria Inclusion of criteria following PICOs framework. Publications will be included if they meet the following criteria: (i) observational studies (cross-sectional or cohort) or experimental studies; (ii) studies investigating the relationship between PL and any parameter of BC; (iii) studies involving typically developing children (ages 5 to 12) and/or adolescents (ages 13 to 17); (iv) the use of validated instruments, self-reports, or indirect measures to assess PL; and (v) the publication is written in English or Spanish and is peer-reviewed. Publications will be excluded if they meet any of the following: (i) case studies or qualitative studies; (ii) participants belong to populations with chronic diseases or medical conditions; (iii) studies do not explicitly address the relationship between PL and BC; or (iv) the publication is a review, commentary, conference abstract, case report, or is not original research.

Information sources The electronic search will be conducted in six databases: PubMed, Scopus, Medline (via ProQuest), PsycINFO, Cochrane Library, and Web of Science. A search for grey literature will be performed in Google Scholar to minimize publication bias.

Main outcome(s) Determine the relationship between PL and BC.

Data management The data extraction process will involve organizing the data in a Microsoft Excel spreadsheet using the Cochrane Consumers and Communication Review Group's data extraction template. This spreadsheet will be used to assess the inclusion criteria for all selected studies. In addition, the bibliographic manager Ednote version X9 will be utilized to extract articles and make decisions about their inclusion or exclusion from the review.

Quality assessment / Risk of bias analysis The Joanna Briggs Institute (JBI) Critical Appraisal Checklist was selected as the tool to assess the methodological quality of the included studies, as it is widely recommended for observational research. For cross-sectional studies, the corresponding 8-item checklist will be applied. This version evaluates whether inclusion criteria were clearly defined, whether participants and study settings were adequately described, whether the exposure and outcomes were measured in a valid and reliable way, whether standard criteria were used, whether confounding factors were identified and appropriately managed, and whether appropriate statistical analysis was conducted. For longitudinal (cohort) studies, the 11-item JBI checklist will be used. In addition to the aforementioned aspects, it includes evaluation of whether exposures were measured similarly across groups, whether participants were free of the outcome at the study's start, whether follow-up time was reported and sufficient, whether follow-up was complete or adequately addressed, and whether missing data were handled appropriately. Any disagreement between reviewers will be resolved through discussion with a third author (SC). Finally, risk of bias for each study will be classified as low, moderate, or high based on the percentage of items rated as "yes": greater than 70% indicates low risk, 50–69% moderate risk, and less than 50% high risk.

Strategy of data synthesis The information extracted from the selected articles will be reported based on the following: (1) author and year; (2) country; (3) study design; (4) participants (sample size, age, % female); (5) PL (type and method); (6) BC (type and method); and (7) outcomes.

Subgroup analysis Meta-analyses were conducted when at least three studies reported on PL, BC outcomes (body mass index, fat mass, body fat percentage, muscle mass, and bone density), and used the same study design (observational or experimental). Effect sizes were calculated using correlation coefficients (r), and adjusted effects were prioritized over unadjusted ones whenever available. To ensure comparability, standardized regression coefficients (β), odds ratios (OR), and Cohen's d were converted to r values using established formulas. The r values were transformed into Fisher's z scores for the meta-analysis and subsequently back-transformed to facilitate interpretation. Pooled effect sizes were estimated with 95% probability-based confidence intervals and classified as small (0.10–0.20), moderate (0.21–0.35), or large (>0.35). Heterogeneity across studies was assessed using the I^2 statistic and categorized as low (0.05 indicating no evidence of bias. In addition, exploratory meta-regressions may be performed—when the number of studies allows—based on moderators such as age, percentage of girls, region, or the instrument used, while making clear that adjusted effects will always be prioritized. The meta-analysis was performed using the metaSEM package in R version 4.2.2.

Sensitivity analysis N/A.

Language restriction English.

Country(ies) involved Spain and Ecuador.

Other relevant information N/A.

Keywords health; physical literacy; body composition; children; adolescents.

Contributions of each author
Author 1 - Víctor Manuel Valle-Muñoz - Víctor Manuel Valle Muñoz. Performed the search and methodological search and made the synthesis of results. Wrote and revised the manuscript.
Email: victor_96@ugr.es
Author 2 - Manuel Ávila-García - Manuel Ávila-García. Performed the search and methodological search. Wrote and revised the manuscript.
Email: mavila@cmli.es
Author 3 - José Francisco López-Gil - José Francisco López-Gil. Performed the search and methodological search and made the synthesis of results. Wrote and revised the manuscript.
Email: josefranciscolopezgil@gmail.com
Author 4 - Emilio Villa-González - Emilio Villa González. Wrote and revised the manuscript.
Email: evilla@ugr.es