

Mapping Research Trends on Physical Fitness Determinants among Physical Education Teachers: A Bibliometric Review of Diet, Physical Activity, Motivation, and Sports Facilities

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ABSTRAK

Kebugaran jasmani merupakan komponen penting dalam kesehatan dan kinerja profesional, khususnya bagi guru Pendidikan Jasmani, Olahraga, dan Kesehatan (PJOK) yang dituntut menjadi teladan gaya hidup aktif. Namun, berbagai penelitian menunjukkan adanya ketidaksesuaian antara tuntutan profesional dan perilaku kebugaran pribadi guru. Penelitian ini bertujuan memetakan tren penelitian global terkait faktor-faktor penentu kebugaran jasmani melalui pendekatan *systematic literature review* yang dipadukan dengan analisis bibliometrik. Artikel ilmiah terindeks Scopus yang dipublikasikan pada periode 2010–2024 dikumpulkan dan dianalisis secara sistematis dengan mengikuti pedoman PRISMA. Analisis bibliometrik dilakukan menggunakan VOSviewer untuk mengkaji tren publikasi, kemunculan kata kunci, dan kluster tematik yang mencakup aktivitas fisik, pola makan, motivasi, dan fasilitas olahraga. Hasil penelitian menunjukkan peningkatan jumlah publikasi kebugaran jasmani dalam satu dekade terakhir, namun kajian yang secara khusus menyoroti guru PJOK masih sangat terbatas. Aktivitas fisik mendominasi tema penelitian, sementara faktor gizi, motivasi, dan lingkungan belum terintegrasi secara kuat dalam model analisis yang ada. Temuan ini menegaskan adanya celah konseptual dan populasi penelitian. Penelitian ini menyimpulkan bahwa studi selanjutnya perlu mengembangkan model analisis terpadu yang mengkaji secara simultan faktor perilaku, psikologis, dan lingkungan dalam memengaruhi kebugaran jasmani guru PJOK, khususnya di lingkungan pendidikan perkotaan.

Kata Kunci : Kebugaran Jasmani, Guru PJOK, *Systematic Literature Review*, Analisis Bibliometrik, Aktivitas Fisik

ABSTRACT

Physical fitness is a fundamental component of health and professional performance, particularly for Physical Education, Sports, and Health (PJOK) teachers who are expected to serve as role models for active lifestyles. Despite this expectation, existing studies indicate inconsistencies between professional roles and personal fitness behaviors. This study aims to map global research trends on the determinants of physical fitness using a *systematic literature review* combined with bibliometric analysis. Scientific articles indexed in the Scopus database and published between 2010 and 2024 were systematically identified and analyzed following the PRISMA guidelines. Bibliometric mapping was conducted using VOSviewer to examine publication trends, keyword co-occurrence, and thematic clusters related to physical activity, dietary patterns, motivation, and sports facilities. The results reveal a steady increase in physical fitness research over the past decade; however, studies focusing specifically on physical education teachers remain limited. Physical activity dominates as the central research theme, while dietary, motivational, and environmental factors appear weakly integrated within existing analytical models. These findings highlight significant conceptual and population-specific gaps in the literature. This study concludes that future research should adopt integrated analytical frameworks that simultaneously examine behavioral, psychological, and environmental determinants of physical fitness, particularly among physical education teachers in urban educational contexts.

Keywords:

Physical Fitness, Physical Education Teachers, Bibliometric Analysis, Dietary Patterns, Physical Activity, Motivation, Sports Facilities

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1. INTRODUCTION

Physical fitness is a fundamental indicator of health, work capacity, and long-term professional sustainability, particularly in occupations that demand continuous physical engagement such as physical education teaching. Physical Education, Sports, and Health (PJOK) teachers are not only responsible for delivering motor skill instruction but are also expected to function as role models of active and healthy lifestyles within school communities (Corbin et al., 2014; Kenney et al., 2020). Adequate physical fitness enables teachers to demonstrate movements effectively, manage active classrooms, and sustain teaching performance without excessive fatigue (Giriwijoyo & Sidik, 2013).

Despite these professional expectations, global evidence suggests that being professionally involved in physical education does not automatically translate into optimal personal fitness levels. Several studies report inconsistencies between occupational physical activity and personal lifestyle behaviors among physical education teachers, including irregular exercise habits, suboptimal dietary patterns, and increasing sedentary behavior due to administrative workloads (Sallis et al., 2015; Warburton & Bredin, 2017). These trends indicate that professional role alone is insufficient to maintain physical fitness without supportive behavioral, psychological, and environmental factors.

Research on physical fitness has expanded substantially over the last decade, addressing determinants such as physical activity, nutrition, motivation, and environmental support. Physical activity is consistently identified as the primary determinant of cardiorespiratory endurance, muscular strength, and overall fitness (Caspersen et al., 1985; ACSM, 2021). In parallel, dietary patterns play a critical role in energy balance, body composition, and recovery capacity, thereby influencing physical fitness directly and indirectly through activity engagement (Thomas et al., 2016; Jeukendrup & Gleeson, 2019).

Beyond behavioral factors, psychological determinants—particularly motivation—have been recognized as essential in sustaining long-term physical activity participation. Self-Determination Theory emphasizes that intrinsic and autonomous motivation enhances adherence to physical activity behaviors, which in turn supports fitness maintenance (Deci & Ryan, 2000; Ryan & Deci, 2017). Motivation is especially relevant for early-career teachers who face competing demands between professional responsibilities and personal health management.

Environmental factors, such as the availability and quality of sports facilities, further shape opportunities for physical activity. Access to supportive physical environments has been shown to significantly influence exercise frequency and intensity among adults, including educators (Bauman et al., 2012; Sallis et al., 2015). However, facilities are often examined as contextual background variables rather than as integral components of fitness-related models.

Although these determinants have been widely studied, existing research predominantly focuses on students, adolescents, athletes, or general adult populations. Studies specifically addressing physical education teachers remain limited and fragmented, often examining single variables in isolation rather than adopting an integrated analytical framework (Corbin et al., 2014). Furthermore, the interaction between behavioral (physical activity, diet), psychological (motivation), and environmental (sports facilities) factors within one comprehensive model is rarely explored, particularly in urban educational contexts.

Bibliometric analysis provides a systematic approach to mapping research development, identifying dominant themes, and detecting underexplored areas within a scientific field (Donthu et al., 2021). By analyzing publication trends, keyword co-occurrence, and thematic clusters, bibliometric methods allow researchers to objectively assess how knowledge has evolved and where significant gaps remain. Applying this approach to physical fitness research can clarify the positioning of physical education teachers within the broader literature and justify the need for targeted empirical studies.

Therefore, this study aims to conduct a bibliometric review of international research on physical fitness determinants, focusing on dietary patterns, physical activity, motivation, and sports facilities. By identifying research trends and gaps, this study provides a theoretical foundation for developing integrated empirical models examining physical fitness among physical education teachers, particularly those in early adulthood and urban school settings

2. METHOD

This study employed a Systematic Literature Review (SLR) combined with bibliometric analysis to comprehensively map international research trends related to determinants of physical fitness. The SLR approach was adopted to ensure a transparent, structured, and replicable process in identifying and synthesizing relevant scientific literature. To strengthen methodological rigor, the review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, which provide a standardized framework for literature identification, screening, eligibility assessment, and inclusion.

The literature data were collected from the Scopus database, selected due to its broad coverage of high-quality peer-reviewed journals and its suitability for bibliometric mapping. The search was conducted across titles, abstracts, and keywords using a Boolean combination of terms related to physical fitness, physical education teachers, dietary patterns, physical activity, motivation, and sports facilities. The search was limited to publications from 2010 to 2024 to capture recent and relevant developments in the field. Only journal articles published in English were considered to ensure academic consistency and accessibility.

Following the identification stage, duplicate records were removed, and an initial screening was performed based on titles and abstracts to exclude studies that were not aligned with the research focus. Articles that met the preliminary criteria were then subjected to a full-text assessment to determine their eligibility. Studies were included if they examined physical fitness or its determinants within educational, sport science, or health-related contexts. Publications such as editorials, book reviews, conference abstracts without full texts, and studies focusing exclusively on elite athletes or clinical populations were excluded. The entire screening and selection process is summarized in the PRISMA flow diagram (Figure 1), illustrating the systematic progression from initial identification to the final inclusion of studies.

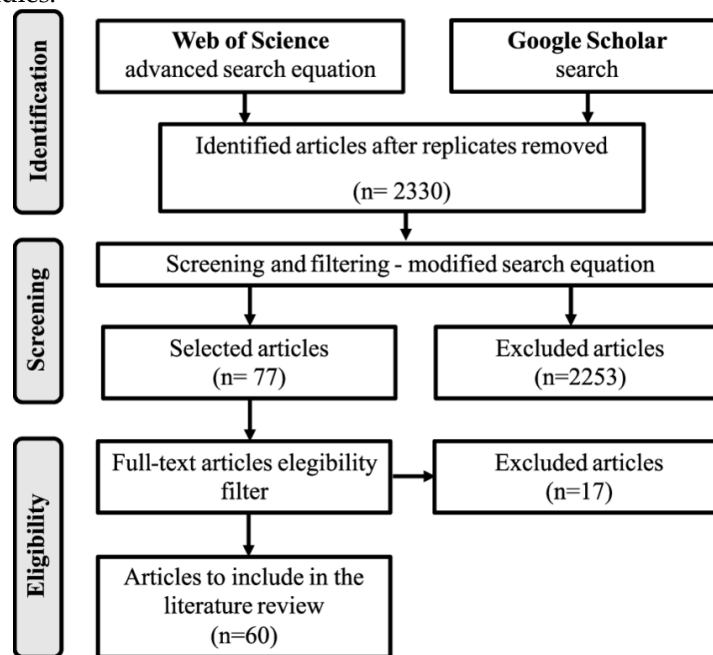


Figure 1. Prisma Flow Diagram

Bibliometric analysis was conducted using VOSviewer (version 1.6.x) to quantitatively explore the structure and evolution of the research field. The analysis focused on publication trends, keyword co-occurrence, and thematic clustering to identify dominant research themes and relationships among variables. Author keywords and index keywords were analyzed using a minimum occurrence threshold to ensure robustness and reduce noise in the visualization. Network and overlay visualizations were generated to examine the interconnections among key concepts and to identify emerging research topics based on temporal distribution.

The results of the bibliometric analysis were interpreted through a thematic synthesis approach, enabling the identification of core research domains, peripheral themes, and underexplored areas related to physical fitness determinants. This integrative analysis provided a comprehensive overview of existing knowledge while highlighting research gaps, particularly regarding the interaction of

behavioral, psychological, and environmental factors in physical fitness research. The findings from this methodological approach serve as a theoretical foundation for the development of integrated empirical models and future studies focusing on physical education teachers in urban educational settings.

3. RESULT AND DISCUSSION

Result

The bibliometric analysis reveals a clear and consistent growth in scientific publications related to physical fitness and its determinants over the last decade. Analysis of Scopus-indexed articles published between 2010 and 2024 indicates a gradual increase in research output from 2010 to 2015, followed by a more pronounced acceleration after 2018. This upward trend reflects growing global attention to physical fitness as a multidimensional construct linked to health, education, and professional performance. However, despite the overall growth, studies explicitly focusing on physical education teachers remain relatively limited compared to those examining students, adolescents, or the general adult population.

Keyword co-occurrence analysis identified several dominant thematic clusters that structure the existing body of literature. The largest and most central cluster is centered on physical activity and cardiorespiratory fitness, highlighting variables such as exercise frequency, intensity, aerobic capacity, and health-related fitness outcomes. This cluster is strongly connected to broader health-related keywords, indicating that physical activity continues to be positioned as the primary driver of physical fitness across populations. The prominence of this cluster confirms the central role of behavioral activity in fitness research.

A second major cluster relates to dietary patterns and body composition, encompassing keywords such as nutrition, energy balance, obesity, body mass index, and metabolic health. Although this cluster shows strong internal coherence, its linkage to studies involving teachers is comparatively weak. This suggests that while nutrition is widely acknowledged as an important determinant of fitness, it is more frequently investigated in clinical, athletic, or student populations rather than among educators, including physical education teachers.

The third cluster focuses on motivation and psychological factors, incorporating terms such as self-determination, motivation, adherence, and lifestyle behavior. This cluster appears moderately connected to physical activity but is positioned more peripherally in the overall network. The visualization indicates that motivational constructs are often examined as supporting or explanatory variables rather than as central components of integrated fitness models. Moreover, studies explicitly addressing motivation among physical education teachers remain sparse, highlighting a gap in population-specific psychological research.

A fourth, smaller cluster represents environmental and contextual factors, particularly sports facilities, infrastructure, and access to physical environments. This cluster shows weaker connectivity to the core fitness outcomes, indicating that environmental determinants are less frequently integrated into comprehensive analytical models. The limited density of this cluster suggests that facilities are often treated as contextual background variables rather than as active enablers of physical activity and fitness, especially in school-based professional settings.

Overlay visualization based on publication year reveals a temporal shift in research focus. Earlier studies (2010–2015) predominantly emphasized physical activity and physiological outcomes, whereas more recent publications (post-2020) increasingly incorporate psychological and lifestyle-related variables, such as motivation and behavioral adherence. However, environmental factors, including sports facilities, remain underrepresented even in the most recent literature, indicating a persistent research gap. This trend suggests an emerging recognition of multidimensional fitness determinants, although integration across behavioral, psychological, and environmental domains is still limited.

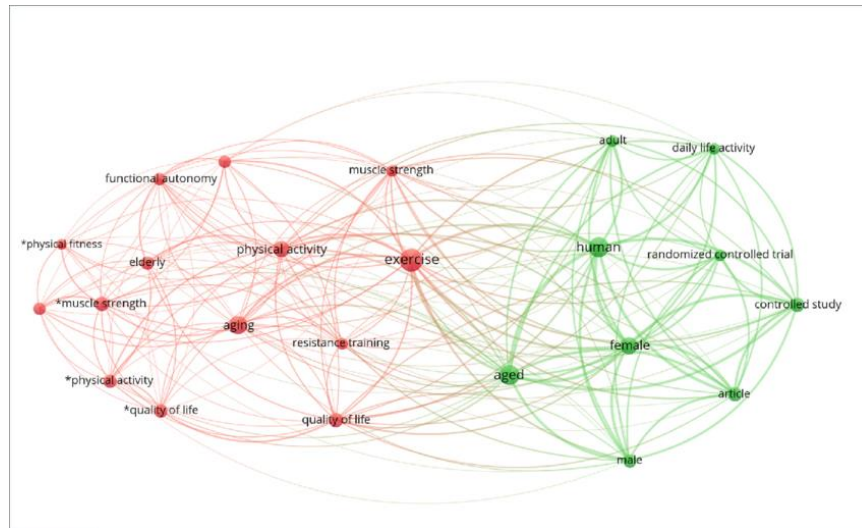


Figure 2. Bibliometric Analysis

Overall, the bibliometric findings demonstrate that existing research on physical fitness is heavily weighted toward behavioral and physiological perspectives, with less emphasis on psychological and environmental determinants, particularly within the context of physical education teachers. The limited intersection among diet, motivation, facilities, and teacher-specific populations underscores the lack of comprehensive, integrated research models. These findings provide strong empirical justification for future studies that simultaneously examine behavioral, psychological, and environmental factors influencing physical fitness among physical education teachers, especially those in early adulthood and urban educational settings.

Discussion

The bibliometric findings indicate that research on physical fitness has expanded significantly over the past decade; however, its conceptual integration remains limited. The dominance of the physical activity cluster strongly aligns with classical and contemporary theories that position physical activity as the primary determinant of physical fitness (Caspersen et al., 1985; ACSM, 2021). Physiological theories of fitness emphasize that regular physical activity drives adaptations in cardiorespiratory endurance, muscular strength, and flexibility, which form the core components of health-related fitness (Kenney et al., 2020). The central position of physical activity in the bibliometric network therefore reflects a consistent theoretical foundation within the literature. Nevertheless, this dominance also suggests a tendency toward reductionist approaches that prioritize activity behavior while underrepresenting complementary determinants.

The dietary pattern cluster, although conceptually relevant, appears weakly connected to fitness outcomes in the bibliometric visualization. From the perspective of energy balance theory and sport nutrition frameworks, dietary intake provides the metabolic foundation that enables sustained physical activity and physiological adaptation (Thomas et al., 2016; Jeukendrup & Gleeson, 2019). The limited integration of dietary variables within fitness models suggests a disconnect between nutritional theory and empirical research practices. Many studies continue to examine nutrition as an isolated factor, rather than as a variable interacting dynamically with physical activity to influence physical fitness. This finding highlights a theoretical–empirical gap that warrants further investigation.

Motivational constructs emerge as a peripheral but increasingly visible cluster within the bibliometric results. This pattern partially reflects the growing influence of psychological theories, particularly Self-Determination Theory, which emphasizes motivation as a key mechanism sustaining long-term physical activity engagement (Deci & Ryan, 2000; Ryan & Deci, 2017). Motivation determines whether individuals initiate, maintain, or abandon physically active lifestyles, thereby indirectly shaping physical fitness outcomes (Hagger et al., 2020). The marginal position of motivation in the network indicates that, despite its strong theoretical relevance, motivation is often treated as a secondary or explanatory variable rather than as a mediating construct within comprehensive fitness models.

Environmental determinants, especially sports facilities, constitute the smallest and least connected cluster in the bibliometric analysis. Ecological models of health behavior argue that individual behavior is shaped by multilevel influences, including physical environments and institutional infrastructure (Sallis et al., 2015). Access to sports facilities has been shown to significantly influence physical activity participation among adults, including educators (Bauman et al., 2012). The weak representation of facilities-related research suggests that environmental enablers of physical fitness remain under-theorized and underexamined. This limitation is particularly relevant in school settings, where the availability and quality of facilities can either facilitate or constrain teachers' opportunities for regular physical activity.

A critical finding of this study is the pronounced population gap revealed through bibliometric mapping. The majority of existing research focuses on students, adolescents, athletes, or general adult populations, while studies explicitly addressing physical education teachers are scarce. This gap is theoretically significant, as physical education teachers occupy a unique professional role that combines physical demands, pedagogical responsibilities, and expectations to model healthy behaviors (Corbin et al., 2014). Early adulthood, typically spanning ages 26–35, represents a life stage characterized by peak physiological capacity alongside increasing professional and administrative demands (Santrock, 2019). The lack of targeted research on this population limits the applicability of existing fitness models to educational professionals.

Taken together, the bibliometric results demonstrate that current research on physical fitness remains fragmented, with behavioral, nutritional, psychological, and environmental determinants examined largely in isolation. This fragmentation contrasts with integrative frameworks such as the Human Performance Model and ecological health theories, which conceptualize physical fitness as the outcome of interacting biological, behavioral, psychological, and environmental systems (Sallis et al., 2015; Kenney et al., 2020). The absence of integrated structural or mediational models in the literature represents a substantial research gap.

Therefore, this study provides strong justification for future empirical research adopting comprehensive analytical models that simultaneously examine dietary patterns, physical activity, motivation, and sports facilities. Such approaches are particularly needed in studies focusing on physical education teachers in urban educational contexts, where professional demands, environmental constraints, and lifestyle behaviors intersect. Addressing these gaps will contribute to a more holistic understanding of physical fitness and support the development of evidence-based interventions aimed at enhancing teacher health, professional performance, and long-term sustainability.

4. CONCLUSION

This study provides a comprehensive bibliometric overview of international research on physical fitness and its key determinants, namely physical activity, dietary patterns, motivation, and sports facilities. The findings demonstrate that although research output on physical fitness has increased substantially over the last decade, the literature remains conceptually fragmented. Physical activity dominates as the central determinant of physical fitness, reflecting long-established physiological theories that emphasize movement behavior as the primary driver of fitness adaptation (Caspersen et al., 1985; ACSM, 2021). However, the prominence of this single determinant also reveals a prevailing tendency toward partial or reductionist analytical approaches.

The bibliometric results further indicate that dietary patterns, motivational factors, and environmental determinants such as sports facilities are present but weakly integrated within existing research models. This pattern contrasts with theoretical frameworks in sport nutrition, psychology, and ecological health behavior, which emphasize the interactive nature of biological, behavioral, psychological, and environmental influences on physical fitness (Thomas et al., 2016; Ryan & Deci, 2017; Sallis et al., 2015). The limited connectivity among these determinants suggests that empirical research has not fully operationalized integrative theoretical propositions into comprehensive analytical models.

A critical contribution of this study lies in identifying a clear population-level research gap. Bibliometric mapping reveals that most studies focus on students, athletes, or general adult populations, while physical education teachers remain underrepresented. This gap is particularly significant given the dual role of physical education teachers as educators and role models of active lifestyles (Corbin et al., 2014). Moreover, early adulthood represents a crucial life stage characterized by peak physical

capacity alongside increasing professional and administrative demands (Santrock, 2019). The absence of focused research on this population limits the applicability of existing fitness models to educational and professional contexts.

From a theoretical perspective, the findings underscore the need to move beyond single-variable explanations toward integrated frameworks that capture the complexity of physical fitness determinants. Models such as the Human Performance Model and ecological approaches to health behavior provide a strong conceptual basis for examining how dietary patterns, motivation, and environmental supports interact with physical activity to influence physical fitness outcomes (Kenney et al., 2020; Sallis et al., 2015). The bibliometric gaps identified in this study highlight opportunities to empirically test such integrative models, particularly using structural or mediational analyses.

Practically, the findings have important implications for educational institutions and policymakers. Schools and education authorities should recognize that maintaining physical fitness among physical education teachers requires more than professional knowledge or instructional duties. Supportive environments, including adequate sports facilities, organizational policies that reduce excessive administrative burdens, and programs that enhance motivation and healthy dietary behaviors, are essential to sustaining teacher fitness and professional performance (Bauman et al., 2012). Interventions that address these factors holistically are more likely to produce sustainable outcomes than those focusing solely on increasing physical activity.

In conclusion, this bibliometric study highlights both the strengths and limitations of current physical fitness research and provides a strong theoretical justification for future empirical investigations. By identifying conceptual fragmentation and population-specific gaps, this study contributes to the advancement of fitness research and supports the development of integrated, evidence-based models focusing on physical education teachers in urban educational settings. Future research grounded in these insights can play a critical role in enhancing teacher health, instructional quality, and long-term professional sustainability.

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