

ORIGINAL ARTICLE**Meta-analysis of Facilitators and Barriers to Participation of Adults with Physical-Motor Disabilities in Sports and Physical Activity****Leila Ebadi¹, Reza Nikbakhsh^{2*}, Tayebh Sadat Zargar³**

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EXTENDED ABSTRACT**Introduction**

Physical activity and organized sports are universally recognized as integral components of a healthy lifestyle, playing a vital role in the holistic well-being of individuals across the lifespan. For the global population of approximately 650 million people living with disabilities, engagement in regular physical activity is not merely a leisure pursuit but a critical health intervention. Scientific literature consistently highlights that physical activity helps prevent and manage non-communicable diseases such as cardiovascular disorders, type 2 diabetes, and musculoskeletal conditions, which are prevalent in this demographic. Beyond physical health, sports participation offers profound psychological benefits, including significant reductions in stress, anxiety, and depression, while simultaneously enhancing sleep quality and cognitive function. Furthermore, sports serve as a powerful social platform, fostering community belonging, reducing isolation, and developing essential interpersonal skills.

Despite these well-documented benefits and clear guidelines from the World Health Organization (WHO) regarding inclusive physical activity, participation rates among individuals with physical-motor disabilities remain alarmingly low. Global statistics suggest that nearly 16% to 62% of this population do not meet recommended activity levels, and only about 29% achieve the benchmark of 60 minutes of daily activity. This disparity necessitates a deep understanding of the determinants—categorized as facilitators and barriers—that influence the decision to participate. Facilitators, such as intrinsic motivation, social support, and accessible infrastructure, increase the likelihood of engagement. Conversely, barriers, ranging from physical pain and fatigue to environmental inaccessibility and societal stigma, restrict participation.

While numerous studies have investigated these factors, the existing research landscape is fragmented. Studies conducted in different cultural and economic contexts often yield contradictory results regarding the relative weight of these determinants. For instance, some research identifies economic constraints as the primary hurdle, while others prioritize environmental or psychological factors. These inconsistencies make it difficult for policymakers and health professionals to design effective, evidence-based interventions. To date, there is a lack of comprehensive quantitative synthesis that aggregates these disparate findings to determine the true effect size of each factor.

Therefore, the primary objective of this research is to conduct a systematic review and comprehensive meta-analysis of existing quantitative literature. By statistically pooling data from eligible studies, this research aims to identify, classify, and prioritize the most significant facilitators and barriers to sports participation among adults with physical-motor disabilities. The ultimate goal is to provide a robust, data-driven foundation for developing strategic interventions that can effectively bridge the participation gap and promote health equity.

Methodology

This study was designed as a systematic review and meta-analysis, strictly adhering to the

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PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency and reproducibility. The protocol for including and excluding studies was developed based on the PICOS framework, focusing exclusively on adults (aged 18 and older) with diagnosed physical-motor disabilities, such as spinal cord injuries, amputations, or multiple sclerosis; studies focusing solely on sensory or intellectual disabilities without separate data were excluded. The independent variables investigated were determinants of participation, categorized into facilitators and barriers across individual, social, environmental, organizational, and policy domains. As is typical in correlational meta-analyses, comparisons were made between varying levels of determinants or different factor types. The primary outcome was the quantitative measurement of sports or physical activity participation (frequency, duration, intensity), while studies measuring only the "intention" to participate were excluded. Inclusion was limited to quantitative descriptive studies including correlational, cross-sectional, and survey-based designs that reported sufficient statistical data (e.g., correlation coefficients, t-statistics, p-values) to calculate an effect size.

A comprehensive systematic search was executed across 14 national and international databases to identify relevant literature. Persian databases included IranDoc, SID, Magiran, Noormags, and the National Library of Iran, while international sources comprised Google Scholar, Web of Science, Scopus, PubMed, Taylor & Francis, Elsevier, Emerald, EBSCOhost, and SPORTDiscus. The search window covered articles published between 2020 and 2024, utilizing a combination of keywords related to the population (e.g., "physical disability," "mobility impairment"), the outcome (e.g., "sport participation," "exercise"), and determinants (e.g., "barriers," "facilitators") combined with Boolean operators. The selection process involved a two-stage screening by two independent researchers, starting with a review of titles and abstracts to remove duplicates and irrelevant studies, followed by a full-text examination against inclusion criteria. The methodological quality of the selected studies was rigorously assessed using the AXIS tool for cross-sectional studies and JBI critical appraisal tools.

Data were extracted using a standardized checklist covering bibliographic details, methodological characteristics, and statistical values, with all statistical analyses performed using Comprehensive Meta-Analysis (CMA) software (version 2). Given the anticipated clinical and methodological diversity among the primary studies, a random-effects model was chosen to synthesize the data, using the correlation coefficient (r) reported with 95% confidence intervals as the primary effect size metric. Heterogeneity was quantified using Cochran's Q statistic and the I^2 index, with values of 25%, 50%, and 75% representing low, moderate, and high heterogeneity, respectively; to identify sources of heterogeneity, subgroup analyses were conducted based on specific determinant categories (e.g., individual vs. social factors). Finally, publication bias was assessed using funnel plots, Egger's regression test, and Duval and Tweedie's trim and fill method.

Findings

The systematic search and rigorous screening process resulted in the final inclusion of 11 studies, providing 60 distinct effect sizes for the meta-analysis. The overall synthesis revealed a statistically significant distinction between the roles of facilitators and barriers. Facilitators demonstrated a medium, positive, and significant relationship with sports participation ($r = 0.384$; 95% CI: 0.284 to 0.483; $p < 0.001$), indicating that enabling factors are strong predictors of increased activity. Conversely, barriers showed a small but significant negative association with participation ($r = -0.165$; 95% CI: -0.213 to -0.117; $p < 0.001$). High heterogeneity was observed in both groups ($I^2 > 90\%$), necessitating further subgroup analyses to explore the sources of variation and specific determinants.

Subgroup analysis of facilitators highlighted the dominance of psychological and social drivers. Individual factors, such as intrinsic motivation, self-efficacy, and psychological skills, emerged as significant positive predictors ($r = 0.217$, $p < 0.001$). Similarly, social factors, including societal attitudes, media representation, and general social support, were identified as significant facilitators ($r = 0.191$, $p < 0.001$). While interpersonal, organizational, and environmental factors displayed positive effect sizes, they did not reach statistical significance in this specific meta-analysis, suggesting that personal empowerment and a supportive social climate may be more critical drivers of participation than physical infrastructure alone within the studied context.

Regarding obstacles to participation, health-related barriers—such as pain, fatigue, and fear of injury—were identified as the strongest deterrents ($r = -0.206$, $p < 0.001$). This was followed by socio-cultural barriers ($r = -0.122$) and systemic issues related to staff, programs, and policies ($r = -0.084$). Attitudinal barriers, including

discrimination or stigma ($r = -0.074$), environmental inaccessibility ($r = -0.067$), and safety concerns ($r = -0.030$) were also confirmed as statistically significant hindrances. Notably, barriers stemming from immediate social circles, such as family and friends, did not show a statistically significant negative impact, indicating that systemic and health challenges pose greater hurdles than opposition from close relationships.

Finally, the robustness of these findings was verified through publication bias assessments. Visual inspection of the funnel plot displayed a relatively symmetrical distribution of studies around the mean effect size, despite minor asymmetry. This was objectively confirmed by Egger's regression test, which yielded a p-value greater than 0.05 ($p=0.337$), indicating no evidence of significant publication bias. Furthermore, Duval and Tweedie's trim and fill method did not result in the imputation of any missing studies. These diagnostic tests collectively suggest that the calculated effect sizes are reliable and not significantly skewed by the non-publication of studies with null or negative results.

Discussion and Conclusion

The findings of this meta-analysis underscore that sports participation among adults with physical-motor disabilities is a multidimensional phenomenon governed by a complex interplay of internal and external forces. The prominence of individual and social factors as the primary facilitators highlights the critical role of psychological empowerment and a supportive ecosystem. Specifically, the strong influence of intrinsic motivation, self-efficacy, and psychological coping skills suggests that when individuals possess a robust belief in their capabilities, they are significantly more likely to overcome physical limitations. Simultaneously, the significance of social factors such as positive media representation and inclusive societal attitudes aligns with the Social-Ecological Model, confirming that a welcoming environment is just as crucial as personal drive in fostering active lifestyles.

Conversely, the analysis reveals that the most significant hurdles are not merely physical but deeply rooted in health experiences and systemic inadequacies. Health-related barriers, including chronic pain, fatigue, and fear of injury, emerged as the most potent deterrents, suggesting that the internal management of the disability is often a greater challenge than external architecture. Furthermore, the significance of socio-cultural, attitudinal, and policy-related barriers indicates that the "medical model" of disability and persistent social stigma continue to exclude individuals from sports, even when facilities might be technically accessible. Interestingly, barriers stemming from immediate family and friends were not found to be statistically significant, implying that opposition usually arises from broader societal structures and personal health challenges rather than one's closest social circle.

In conclusion, effective strategies to enhance participation must move beyond a singular focus on physical infrastructure to adopt a holistic, multi-level approach. Interventions should prioritize psychological interventions to boost self-efficacy and resilience, alongside medical support for pain and fatigue management. At the systemic level, there is an urgent need for policy reforms, specialized training for sports staff, and comprehensive awareness campaigns to dismantle the invisible socio-cultural walls of stigma. By addressing these psychological, health, and systemic dimensions simultaneously, stakeholders can create a truly inclusive sports environment that ensures equitable access and health benefits for adults with physical-motor disabilities.

KEY WORDS

Meta-analysis, Sports Participation, Physical-Motor Disability, Facilitators, Barriers, Physical Activity, Systematic Review, Social-Ecological Model.

