



PHYSICAL ACTIVITY FOR GLOBAL HEALTH: A REVIEW OF TRENDS, DETERMINANTS AND POLICY RESPONSES

BY

Abdulsalam Abdullah: Department of Physical and Health Education, University of Maiduguri, Borno State, Nigeria

&

John Zodo Vurho: Department of Physical and Health Education, University of Maiduguri, Borno State, Nigeria

Abstract

Physical inactivity remains one of the most significant, and most persistently under-addressed, risk factors for premature mortality and non-communicable disease worldwide. This review synthesises literature published on global trends in physical activity, the health and economic burden of inactivity, the determinants of activity behaviour, and the policy responses developed to address them. Drawing on World Health Organization surveillance data, Lancet Physical Activity Series findings, and empirical research on mental health, the built environment and national policy, the review shows that global age-standardised prevalence of insufficient activity among adults has risen rather than fallen since 2000, that the health-care and productivity costs of inactivity run into hundreds of billions of dollars annually, and that the burden falls disproportionately, in absolute terms, on middle-income countries even though relative risk is highest in high-income settings. It further shows that physical activity yields substantial benefits for mental as well as physical health, that built environment and policy interventions can meaningfully increase population activity levels, and that implementation of the World Health Organization's Global Action Plan on Physical Activity 2018 to 2030 remains markedly uneven, with low-income countries the least likely to have a costed, monitored national policy in place. The review concludes that closing the gap between the evidence base and its translation into practice, particularly in low- and middle-income countries, is the central unresolved challenge for physical activity as a global health priority, and it sets out implications for surveillance, policy design and future research. Therefore, it recommended that Governments should strengthen and adequately fund national physical activity policies, with clear implementation strategies, measurable targets, dedicated resources and regular monitoring and evaluation.

Keywords: *Physical activity, Physical inactivity, Global health, Non-communicable disease, Sedentary behaviour, Health policy and Health equity*

Introduction

Regular physical activity is among the most consistently evidenced determinants of population health, associated with reduced risk of cardiovascular disease, type 2 diabetes, several cancers, dementia and premature mortality, as well as with improved mental health and quality of life (Bull et al., 2020). Despite this evidence, physical inactivity has been described as a global pandemic, and successive rounds of international surveillance have found that roughly one in three adults worldwide, and a substantially higher proportion of adolescents, fail to meet the minimum activity levels recommended for health (Guthold et al., 2018, 2020). The persistence of this gap between evidence and behaviour, across countries at every level of economic development, is the starting point for this review. Physical activity for global health is not solely a matter of individual choice. It is shaped by the built environment, transport systems, workplace and school design, cultural norms around movement and leisure, and, increasingly, by explicit national policy (Smith et al., 2017). Recognition of this structural dimension underpinned the World Health Organization's Global Action Plan on Physical Activity 2018 to 2030, which set a global target of a fifteen per cent relative reduction in insufficient physical activity by 2030 and called for coordinated action across active societies, active environments, active people and active systems (World Health Organization, 2018). Progress against that target has, however, been mixed, and recent surveillance suggests that global prevalence of insufficient activity among adults has risen rather than fallen since the plan's adoption (Strain et al., 2024).



This review addresses three related questions. First, what do the most recent global surveillance data show about trends in physical activity and inactivity across regions, age groups and country income levels? Second, what is the scale of the health and economic burden attributable to physical inactivity, and how is that burden distributed globally? Third, what does the evidence indicate about the determinants of physical activity and the effectiveness of policy and environmental interventions designed to increase it, and what does this imply for global health policy going forward? The review draws on World Health Organization guidance and surveillance publications, the Lancet Physical Activity Series, and peer-reviewed literature on the health, economic, environmental and policy dimensions of physical activity published predominantly between 2015 and 2025, a period spanning the launch of the current World Health Organization guidelines and Global Action Plan and the first post-pandemic reassessment of global trends.

Conceptual Clarifications

Definitions Physical Activity

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure, encompassing activity undertaken during work, transport, domestic tasks and leisure, and is distinguished conceptually from exercise, which refers to a subset of physical activity that is planned, structured and repetitive with the specific objective of improving fitness (Bull et al., 2020). Sedentary behaviour, by contrast, refers to waking behaviour characterised by low energy expenditure while sitting, reclining or lying, and is now recognised as a distinct risk factor rather than merely the absence of activity, since high sedentary time is associated with adverse health outcomes even among individuals who otherwise meet physical activity guidelines (Bull et al., 2020).

The World Health Organization's 2020 Guidelines on Physical Activity and Sedentary Behaviour, developed by an expert Guideline Development Group reviewing evidence across children, adolescents, adults, older adults, and specific populations including pregnant and postpartum women and people living with chronic conditions or disability, recommend that adults undertake at least 150 to 300 minutes of moderate-intensity, or 75 to 150 minutes of vigorous-intensity, aerobic physical activity per week, together with muscle-strengthening activity on two or more days, and that sedentary time be limited and replaced with activity of any intensity where possible (Bull et al., 2020). These guidelines superseded the World Health Organization's 2010 recommendations and, for the first time, incorporated sedentary behaviour and issued guidance for population groups previously addressed only partially or not at all.

For surveillance purposes, an adult is classified as insufficiently active if they undertake less than 150 minutes of moderate-intensity equivalent activity per week, a threshold used consistently across the successive rounds of World Health Organization-coordinated global surveillance discussed below (Guthold et al., 2018; Strain et al., 2024). This binary threshold, while necessary for international comparability, is a simplification of a continuous exposure, and several of the sources reviewed here note that health risk rises with each increment of inactivity below the threshold rather than only once the threshold is crossed, an important nuance when interpreting prevalence statistics as a policy target.

Global Trends in Physical Activity and Inactivity Trends among Adults

The most comprehensive assessment of global adult physical activity levels to date is provided by Strain et al. (2024), whose pooled analysis of 507 population-based surveys covering 5.7 million participants across 163 countries found that global age-standardised prevalence of insufficient physical activity rose from approximately 23.4% in 2000 to 31.3% in 2022, with the steepest increases in high-income Asia-Pacific countries and parts of South Asia. This update superseded the earlier estimate by Guthold et al. (2018), based on 358 surveys and 1.9 million participants, which had found a comparatively stable global prevalence of 27.5% between 2001 and 2016, masking considerable divergence between countries and regions even at that stage. Strain et al. (2024) further



reported a persistent and, in some regions, widening sex disparity, with women globally less active than men, a pattern also identified in earlier surveillance rounds and attributed in the literature to unequal domestic and caregiving burdens, safety concerns affecting outdoor and active transport, and cultural norms restricting women's participation in sport and recreation in some settings. On current trajectories, the authors concluded, the World Health Organization's global target of a fifteen per cent relative reduction in insufficient activity by 2030 is very unlikely to be met.

Adolescent activity levels are substantially lower than those of adults relative to the guidelines applicable to each age group. Guthold et al. (2020), in the first global trend analysis of adolescent activity, pooled 298 surveys covering 1.6 million participants aged eleven to seventeen years across 146 countries and found that 81% did not meet the recommended sixty minutes of daily moderate-to-vigorous activity, with prevalence essentially unchanged between 2001 and 2016 despite two decades of policy attention. As with the adult data, a marked sex gap was evident, with girls less active than boys in the great majority of countries studied, a disparity the authors describe as showing no sign of narrowing. Taken together, the adult and adolescent trend literature indicates that physical inactivity is not merely a stubborn residual problem but, on the most recent adult data, an intensifying one, and that the adolescent population has shown no measurable improvement over an extended period despite the existence of global guidelines and a dedicated World Health Organization action plan (Guthold et al., 2020; Strain et al., 2024), raising questions, addressed later, about the adequacy of current policy implementation relative to the scale of behavioural shift required.

The Health and Economic Burden of Physical Inactivity

Disease and Mortality Burden

Physical inactivity is causally associated with a substantial share of the global non-communicable disease burden. Katzmarzyk et al. (2022), calculating population-attributable risk across 168 countries, estimated that 7.2% of all-cause deaths and 7.6% of cardiovascular disease deaths globally are attributable to physical inactivity, with attributable proportions ranging from 1.6% for hypertension to 8.1% for dementia. Critically, relative burden, as population-attributable risk, was more than double in high-income countries compared with low-income countries, yet 69% of total deaths and 74% of cardiovascular deaths attributable to inactivity occurred in middle-income countries, given their far larger populations, a distinction between relative and absolute burden with significant implications for how global resources should be prioritised.

Economic Burden

Ding et al. (2016), in the first global quantification of the economic cost of physical inactivity, estimated direct health-care costs and productivity losses across 142 countries, representing 93.2% of the world's population, at approximately International \$53.8 billion in 2013, alongside substantial disability-adjusted life-year losses attributable to coronary heart disease, stroke, type 2 diabetes, and breast and colon cancer. Building on this baseline, Santos et al. (2023) modelled the cost of continued inaction, projecting that if global inactivity prevalence remained unchanged, almost 500 million new preventable cases of non-communicable disease and mental ill-health, and International \$520 billion in associated health-care costs, would accrue between 2020 and 2030 alone. The same analysis found that although more absolute new cases would occur in low- and middle-income countries, high-income countries would bear a disproportionately larger share of the economic cost, reflecting their higher per-case health-care expenditure. Santos et al. (2023) further highlighted the substantial and rising contribution of depression and anxiety, conditions whose prevalence increased markedly during the COVID-19 pandemic and which, unlike many physical non-communicable diseases, can be meaningfully reduced through increased physical activity, implying that the economic case for investment in physical activity promotion may be understated by analyses focused primarily on cardiovascular and metabolic disease.

Distribution of the Burden by Country Income

The recurring finding that relative risk is concentrated in high-income countries while absolute case numbers are concentrated in middle-income countries, evident across both Katzmarzyk et al. (2022) and Santos et al. (2023), has direct implications for how the burden of physical inactivity should be framed in global health policy. A



framing focused solely on relative risk directs attention toward high-income settings already the subject of considerable public health investment, whereas a framing attentive to absolute case numbers would direct greater attention toward middle-income countries, where preventable disease is largest but where physical activity promotion infrastructure and policy capacity are frequently less developed.

Physical Activity and Mental Health

Alongside its established role in preventing physical non-communicable disease, physical activity has increasingly strong evidential support as a determinant of mental health. Singh et al. (2023), in an umbrella review of ninety-seven systematic reviews encompassing 1,039 trials and over 128,000 participants, found that physical activity interventions produced medium-sized reductions in symptoms of depression, anxiety and general psychological distress compared with usual care, with effects observed consistently across the general population, people with diagnosed mental health disorders, and people managing chronic physical disease. The review's authors concluded that physical activity should be regarded as a mainstay approach in the management of depression, anxiety and psychological distress, alongside, rather than only as an adjunct to, established pharmacological and psychological treatments. This evidence carries particular weight for global health policy in light of the substantial rise in the global prevalence of depressive and anxiety disorders associated with the COVID-19 pandemic, a rise that has itself been linked to the concurrent decline in population activity levels during pandemic restrictions (Santos et al., 2023; Singh et al., 2023). The convergence of strong mental health evidence with the pre-existing physical health case strengthens the argument, developed further in the concluding sections of this review, for treating physical activity promotion as a core, rather than peripheral, element of global mental as well as physical health strategy.

Determinants of Physical Activity

The Built Environment

A substantial body of research links the design of the physical environment to population physical activity levels, particularly through its effect on active transport. Smith et al. (2017), updating an earlier systematic review of built environment effects on physical activity and active transport, found consistent evidence that neighbourhood walkability, land use mix, connectivity and population density are positively associated with walking and cycling for transport, and extended this evidence base by examining differential effects by socioeconomic status and ethnicity, finding that the benefits of built environment improvements are not always equitably distributed across population subgroups, with lower-income and minority communities sometimes seeing smaller activity gains from environmental investment than more affluent communities in the same city. Complementing this environmental evidence, natural experiment and intervention studies have found that targeted infrastructure changes, including improved crossings and pavements, traffic calming, new greenways and cycle infrastructure, and renovated parks, are associated with measurable increases in active transport and leisure-time activity, although the overall strength of evidence remains constrained by the observational design of most available studies and by limited representation of low- and middle-income country settings in the built environment literature to date.

Social, Cultural and Economic Determinants

Beyond the physical environment, physical activity behaviour is shaped by social and economic determinants including gender norms, caregiving responsibilities, occupational structure, and the relative safety and social acceptability of activity in public space, factors repeatedly identified as contributing to the persistent sex disparity in both adult and adolescent activity levels documented by global surveillance (Guthold et al., 2018, 2020; Strain et al., 2024). Economic development itself appears to have a complex, non-linear relationship with activity: as economies industrialise and urbanise, occupational and transport-related activity typically declines even as leisure-time activity may rise, a transition whose net effect on total population activity varies considerably by context and is not adequately captured by aggregate national income alone.



Policy Responses: From Global Targets to National Implementation

The WHO Global Action Plan on Physical Activity

The World Health Organization's Global Action Plan on Physical Activity 2018 to 2030 sets out twenty policy actions organised around four strategic objectives, namely creating active societies through social norms change and public awareness, active environments through infrastructure and urban design, active people through programmes reaching specific population groups, and active systems through governance, workforce and information systems, with a headline target of a fifteen per cent relative reduction in global insufficient physical activity by 2030 (World Health Organization, 2018). The plan frames physical activity promotion as requiring cross-sectoral action spanning health, transport, urban planning, education and sport, rather than as the responsibility of health ministries alone.

National Policy Adoption and Content

Assessment of national policy adoption against this global framework reveals substantial and uneven progress. Minatto et al. (2023), in a thematic analysis of national physical activity policy documents from sixty-four countries with differing economic profiles, found that while most countries had adopted some form of written policy, the comprehensiveness of that policy, in particular the inclusion of concrete indicators, funding commitments and implementation mechanisms rather than aspirational goals alone, varied markedly by country income level, with lower-income countries systematically less likely to have moved beyond high-level policy statements to costed, monitored action plans. A related earlier scoping review by Klepac Pogrmilovic et al. (2018), mapping the global evidence on national policy indicators and content, similarly found that formal evaluation of policy implementation and effectiveness remained rare worldwide, meaning that even where policies exist, evidence on whether they are being implemented as intended is frequently unavailable to policymakers. This pattern, of policy adoption running ahead of policy evaluation, and of implementation depth varying systematically with country income, helps explain the persistence of the global trends documented earlier in this review: a global action plan can shape the rhetoric and formal structure of national policy relatively quickly, but translating that structure into resourced, monitored, on-the-ground action, particularly in resource-constrained settings, has evidently proceeded far more slowly (Minatto et al., 2023; Strain et al., 2024).

Reassessing the Research and Policy Agenda

Reflecting on this gap between global ambition and national implementation, Ding et al. (2024) argue for a realignment of the physical activity research agenda toward population health, equity and wellbeing, contending that the field has historically over-invested in establishing the association between activity and disease outcomes, now well established, relative to research on how to implement effective, equitable interventions at scale in the diverse contexts in which physical inactivity actually occurs. The authors call for greater attention to implementation science, to equity-focused evaluation examining whether interventions reach the population subgroups with greatest need, and to research conducted in, and led from, low- and middle-income countries, which remain markedly under-represented in the evidence base relative to their share of the global disease burden.

Equity Considerations and the Low- and Middle-Income Country Context

The evidence reviewed above points consistently to a structural mismatch between where the burden of physical inactivity is largest and where the research, policy and implementation capacity to address it is most developed. Middle-income countries bear the largest absolute share of deaths and disease attributable to physical inactivity (Katzmarzyk et al., 2022), yet are less likely than high-income countries to have progressed beyond aspirational national policy statements to funded, monitored implementation (Minatto et al., 2023), and are markedly under-represented in the built environment and intervention literature that informs global guidance (Smith et al., 2017). This mismatch is compounded by the sex disparities documented in both adult and adolescent surveillance, which appear to interact with, rather than operate independently of, income-level and cultural context, since the safety, infrastructure and social norm barriers to women's and girls' physical activity participation are frequently most acute in precisely the lower-resource settings where policy implementation is weakest (Guthold et al., 2018, 2020). For sub-Saharan Africa specifically, the combination of rapid urbanisation, a nutrition transition toward more sedentary occupational and transport patterns, and comparatively nascent national physical activity policy



infrastructure suggests a trajectory of rising inactivity-related disease burden that current global monitoring, dominated by high- and upper-middle-income country data, may be slow to detect and slower still to prompt a policy response to.

Addressing this mismatch, as Ding et al. (2024) argue, requires not simply extending existing high-income country intervention models to lower-resource settings, but developing and evaluating interventions designed from the outset for the infrastructural, economic and cultural conditions of those settings, together with the surveillance capacity to track whether such interventions are reaching the population groups, defined by income, sex, age and geography, who stand to benefit most.

Challenges and Gaps in the Evidence Base

Surveillance Coverage and Data Quality

Global surveillance of physical activity depends on self-reported survey instruments that vary in design and validation across countries, and on the availability of at least two comparable surveys over time to estimate trends, a requirement met by a minority of the countries included in even the most comprehensive pooled analyses (Guthold et al., 2018; Strain et al., 2024). Low-income countries are systematically under-represented in this surveillance base, meaning that global and regional estimates for the lowest-income settings rest on sparser data and wider uncertainty intervals than estimates for high-income regions, a limitation that persists despite successive rounds of methodological refinement.

Implementation and Evaluation Gaps

As discussed above, the scoping review evidence indicates that formal evaluation of national physical activity policy implementation and effectiveness remains rare globally, and rarer still in lower-income settings (Klepac Pogrmilovic et al., 2018; Minatto et al., 2023). This creates a structural gap in the evidence base: the field has considerably stronger evidence on what physical activity does for health than on what works, in a given context, to increase population physical activity levels, a gap that limits the practical value of existing guidance for policymakers operating under resource constraints.

Equity of Intervention Effects

Even where interventions, particularly built environment interventions, have demonstrated aggregate population-level benefit, evidence on whether those benefits are equitably distributed across income, ethnic and gender groups remains limited, and what evidence exists suggests that benefits may accrue disproportionately to already-advantaged groups within a given city or country (Smith et al., 2017). This finding cautions against treating aggregate improvements in population activity levels as evidence of equitable progress, and supports the call for equity-disaggregated evaluation advanced by Ding et al. (2024).

Discussion: Towards More Effective Global Physical Activity Promotion

The evidence reviewed here supports several implications for global health policy and practice. First, the finding that global insufficient activity prevalence has risen rather than fallen since 2000, and shows no sign of reversing on current trajectories, indicates that the World Health Organization's 2030 target is unlikely to be met without a substantial change in the scale or nature of current efforts, and that surveillance and target-setting exercises should be paired more explicitly with accountability mechanisms that track not only prevalence but policy implementation depth (Minatto et al., 2023; Strain et al., 2024).

Second, the divergence between where relative risk is concentrated, in high-income countries, and where absolute disease burden is concentrated, in middle-income countries, suggests that global resource allocation and research investment should be explicitly reweighted toward the settings bearing the largest absolute burden, rather than allocated in proportion to existing research and policy infrastructure, which remains concentrated in high-income countries (Katzmarzyk et al., 2022; Santos et al., 2023).



Third, the strength of the mental health evidence reviewed here supports integrating physical activity promotion more fully into mental health policy and service delivery, rather than treating it as a physical health intervention with incidental mental health benefits (Singh et al., 2023). Given the substantial pandemic-era rise in depression and anxiety prevalence globally, this integration may represent one of the more immediately actionable findings from the literature reviewed, since it requires primarily a reorientation of existing mental health service pathways rather than new infrastructure investment.

Fourth, the equity gaps identified in both the built environment and policy implementation literature indicate that aggregate national or global progress indicators are insufficient on their own; equity-disaggregated monitoring, tracking activity levels and intervention reach by sex, income and geography within as well as between countries, should become a standard component of national and global physical activity surveillance rather than a supplementary analysis (Ding et al., 2024; Smith et al., 2017).

Conclusion

This review has synthesised literature published largely between 2015 and 2025 on global trends, burden, determinants and policy responses relating to physical activity and inactivity. The evidence indicates that physical inactivity remains a substantial and, on the most recent adult surveillance data, worsening global health problem, that its health and economic costs run into hundreds of billions of dollars annually and fall disproportionately, in absolute terms, on middle-income countries, and that its benefits extend to mental as well as physical health. Effective responses exist, spanning built environment design and national policy frameworks, but their implementation, and the evaluation of their effectiveness and equity, lags well behind the strength of the underlying case for action, particularly in low- and middle-income countries. Closing this implementation gap will likely require reweighting global research and policy attention toward the settings bearing the largest absolute disease burden, integrating physical activity promotion explicitly into mental as well as physical health strategy, and establishing equity-disaggregated monitoring as a standard feature of national and global surveillance rather than an occasional supplementary analysis. Future research would benefit from a substantially expanded evidence base on intervention effectiveness and implementation specifically within low- and middle-income country contexts, including within Africa, so that the global physical activity agenda can be informed by evidence genuinely representative of the populations and settings in which the burden of inactivity is now most acutely concentrated.

Recommendations

Based on the findings of the review, the following recommendations are made:

1. Governments should strengthen and adequately fund national physical activity policies, with clear implementation strategies, measurable targets, dedicated resources and regular monitoring and evaluation.
2. Governments and local authorities should develop safe, accessible and affordable environments, including pedestrian walkways, cycling facilities, parks and recreational spaces, to make physical activity easier to incorporate into everyday life.
3. Physical activity programmes should prioritise vulnerable and underserved groups, particularly women and girls, adolescents, older adults, persons with disabilities and low-income populations, while taking account of their social, cultural and environmental circumstances.
4. Governments and research institutions should strengthen physical activity surveillance and implementation research by collecting reliable, regularly updated and disaggregated data and evaluating the effectiveness, equity and cost-effectiveness of physical activity policies and interventions.



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