

# Insufficient Physical Activity : a Global Public Health Concern

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Physical activity is one of the essential prerequisites to enjoy sound health and quality of life. Insufficient physical activity is a well-documented risk factor of the leading non-communicable diseases (NCDs) like coronary heart disease, stroke, diabetes and cancers of breast and colon, depression and risk of falling in adults.<sup>[1,2,3]</sup> Newer evidences indicate that participation in regular physical activities can reduce risk of cancer of bladder, endometrium, esophagus, kidney, lung, and stomach also<sup>[4]</sup>. These NCDs are the leading causes of premature death and disability, prevalence of which are rising very fast globally. World Health Organization estimates that in 2016 NCDs accounted for 71% of global mortality equivalent to as high as 41 million deaths of which three quarters occurred in low and middle-income countries<sup>[5]</sup>. Deaths due to NCD have now surpassed the total mortality due to combined causes of the communicable, maternal and perinatal nutrition-related deaths.<sup>[6]</sup> Apart from being a modifiable risk factor of the major NCDs, regular physical activity also reduces the risk factors associated with NCDs such as overweight, obesity, hypertension, and high blood cholesterol and is also found to be associated with improved mental health, delayed age-related cognitive decline and improved quality of life and well-being<sup>[1, 2, 3, 4]</sup>. Observations from recent studies suggest significant association between regular exercise and increased volume of the area of cerebral cortex associated with memory and thinking (prefrontal cortex and medial temporal cortex).<sup>[7]</sup> Further, studies also indicate that physical exercise alone or with cognitive interventions might improve cognitive functions in elderly patients with Alzheimer's disease.<sup>[8,9]</sup>

## **Physical activity – types and recommendations:<sup>[10,4]</sup>**

'Physical activity' is defined as any bodily movement produced by skeletal muscles that result in energy expenditure. Walking, cycling, running, dancing, swimming, exercise, outdoor games, housework, gardening etc. are all examples of

different types of physical activities. All forms of physical activities are beneficial to health when undertaken regularly with sufficient duration and intensity. Exercise is a form of physical activity that is planned, structured, repetitive, and performed with the goal of improving health or fitness. Intensities of Physical activities are commonly classified as light, moderate or vigorous depending upon the absolute rates of energy expenditure. Energy expenditure of activities are expressed by multiples of the metabolic equivalent of task (MET), where 1 MET is the rate of energy expenditure while sitting at rest.<sup>[10,4]</sup>

WHO Global recommendations on physical activity for health:<sup>[11]</sup>

Adults should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate and vigorous-intensity activity. The weekly minimum recommended time of 150 minutes can be spread out as 30 minutes per day, 5 days a week.<sup>[12]</sup>

- Moderate-intensity physical activities have MET values between 3 to 5.9 (approx) and any vigorous intensity physical activity has a MET value of 6 or more.<sup>[13]</sup>

- Examples of moderate-intensity aerobic physical activities are brisk walking (at least 4 km or 2.5 miles per hour), swimming, jogging, cycling, dancing, gardening or classes like step aerobics.<sup>[14]</sup>

- Any vigorous intensity physical activity requires higher amount of effort so that the performer will not be able to talk much without getting out of breath. Examples of vigorous-intensity aerobic activities: hiking uphill or with a heavy backpack, jogging, running, fast swimming laps, aerobic dancing, heavy yard work like continuous digging

or hoeing, tennis (singles), fast cycling 10 miles per hour or faster, jumping rope, competitive outdoor sports etc.<sup>[14]</sup>

Children should accumulate at least 60 minutes of moderate to vigorous intensity physical activity daily.

Older adults, with poor mobility, should perform physical activity to enhance balance and prevent falls three or more days per week.

People of all ages should do strengthening activities involving major muscle groups on two or more days a week.

Newer recommendations as per Physical Activity Guidelines for Americans 2018 are<sup>[14]</sup>:

Preschool-aged children (ages 3 through 5 years) should be physically active throughout the day to enhance growth and development

Some physical activity is better than none. Adults should move more and sit less throughout the day.

Adults who sit less and do any amount of moderate-to-vigorous physical activity gain some health benefit.

Interestingly, 'insufficient physical activity' as per WHO guideline, is different from 'sedentary behaviour' which means sitting or lying down for long periods and has been defined as any waking behaviour characterized by an energy expenditure  $\leq 1.5$  METs while in a sitting, reclining or lying posture.<sup>[15]</sup> Someone spending a large amount of the day by sitting or lying down at work, at home, for study, for travel or during leisure time would still be considered as 'sedentary' even if he or she is performing enough physical activities to meet the physical activity guidelines.

Studies were conducted to assess whether sedentary behaviour itself is an independent risk factor of NCDs. Prolonged sitting might have adverse health consequences and a recent systematic review published in *Annals of Internal Medicine*<sup>[16]</sup> indicates that prolonged sedentary time may be an independent risk factor for hospitalizations, all-cause mortality, cardiovascular disease, type 2 diabetes and cancer in adults, irrespective of the level of physical activity. Another meta-analysis (Ekelund et al, *Lancet*, 2016)<sup>[17]</sup> shows that high levels of moderate intensity physical activity seem to eliminate the increased risk of death associated with high sitting time. However, this high activity level attenuates, but does not eliminate the increased risk associated with high TV-viewing time. Watching TV for 3 hours or more per day was associated with increased mortality regardless of physical activity, except in the most active quartile, where mortality

was significantly increased only in people who watched TV for 5 hours/day or more.

Nature of job is getting more sedentary nowadays and a review of current status of the nature and types of jobs in USA observed that sedentary jobs have increased by 83 percent since 1950 and very few (< 20%) of the U.S. workforce is currently employed in physically active jobs now, down from roughly half of the jobs of similar nature in 1960.<sup>[18]</sup> Findings of all these studies conclude that people with insufficient daily physical activity associated with high sedentary behaviour, especially in adolescents and young adults are at the highest risk and deserve prioritisation for suitable health interventions.

#### **Current status and trend of physical activity:**

Current global estimates (WHO, 2016)<sup>[19]</sup> show that 27.5% of adults aged 18+ years (23% of men and 32% of women) perform insufficient physical activity. Region-wise, WHO Americans are least active (39.3%) while prevalence of insufficient physical activity in South East Asia is 30.5%. Across all regions, with the exception of East and Southeast Asia, women were less active than men in 2016. Level of insufficient physical activity among adults has not shown any improvement in last 15 years (28.5% in 2001). In fact in high-income countries, the prevalence has increased from 31.6% in 2001, to 36.8% in 2016.<sup>[20]</sup>

Of immense concern, is the finding that as high as 81% of school going adolescents of 11-17 years (77.6% male and 84.7% female) are not meeting the global recommendations for physical activity (WHO, 2016). Globally, the trend of insufficient physical activity among school going adolescents, which was 82.5% (80.1% in male and 85.1% in female) in 2001, has not shown any improvement during the last 15 years. This is going to lead to far reaching public health consequences in future with prolonged morbidity and disability, increased cost of treatment and out of pocket expenses, and high premature deaths from NCDs.

At the national level, prevalence of insufficient physical activity among Indian adults in 2016 was 33.3% and, as high as 3 in 4 school-going adolescents (73.9%) did not meet WHO recommendations for physical activity. Adolescent girls seem to be less active as 76.3% of girls were physically inactive compared to boys (71.8%) and, there has been no significant change in physical activity status of adolescents from the overall prevalence of 76.6% in 2001.

As lifestyle is formed during the early years of life, persistence of such high levels of inadequate physical activity among

adolescents call for more concerted and comprehensive strategic interventions to promote physical activity among children and adolescents which will be maintained throughout adolescence and adulthood.

Regarding implementation of plans and policies to halt the pandemic of inadequate physical activity, about 80% of the countries are reported to have plans or national policies for promoting physical activity, but such policies were operational in only about 56% of countries.<sup>[21]</sup>

#### **Reasons for insufficient physical activity:**

Common reasons for insufficient physical activity may be person or environment specific or related to the prevailing culture and social norms. Urbanization, industrialization, inappropriate city planning, high traffic density, air pollution, lack of parks or spaces for physical activities, sedentary nature of jobs and modern system of transportation, communication and less leisure time movements and activities are among the major deterrents of physical activities.

Common barriers to physical activity as identified by CDC are: lack of time, inadequate social support, lack of energy or motivation, fear of injury, lack of skill, high costs / lack of facilities and adverse weather conditions.<sup>[22]</sup> Some of the important reasons for insufficient physical activity in children and adolescents of UK were lack of awareness of parents/ teachers of the importance of physical activity and the recommendations, non availability of play ground, poorly constructed and delivered physical education classes in schools etc.<sup>[23]</sup>

#### **WHO response<sup>24</sup>**

The "Global Strategy on Diet, Physical Activity and Health", adopted by the World Health Assembly in 2004, urged stakeholders to take essential public health actions at global, regional and local levels to increase physical activity.

The "Global Recommendations on Physical Activity for Health", WHO 2010, focused on primary prevention of NCDs through physical activity and proposed different policy options for the member states like raising of awareness of the benefits of being physically active, integration of physical activity within other related policy sectors, surveillance and monitoring of actions to promote physical activity etc. to achieve the desired levels of physical activity globally.

To measure physical activity in adults, WHO has developed the Global Physical Activity Questionnaire (GPAQ) to enable countries to measure and monitor physical activity of adults in three domains of activity - at

work, travel to and from places and recreational activities. The GPAQ has been integrated into the WHO STEP-wise approach, which is a surveillance system for the main NCD risk factors.

The Global school-based student health survey (GSHS) is a collaborative school-based surveillance project designed to help countries measure and assess the behavioural risk factors and protective factors of young people (aged 13 to 17 years) related to the leading causes of morbidity and mortality among children and adults worldwide<sup>[25]</sup>

In 2013, the World Health Assembly agreed on a set of global voluntary targets which include a 25% reduction of premature mortality from NCDs and a 10% decrease in insufficient physical activity by 2025. The "Global Action Plan for the Prevention and Control of Non-communicable Diseases 2013-2020" provides the road map and policy options for the countries to achieve these global targets.<sup>[26]</sup>

The United Nations 2030 agenda for Sustainable Development Goals (SDG) recognizes NCDs as a major threat for sustainable development and reduction by one third of premature mortality from non-communicable diseases is an important SDG target (3.4) to be achieved by 2030<sup>[27]</sup>.

#### **Indian scenario and national programme :**

India is experiencing a rapid health transition with a rising magnitude of Non-Communicable Diseases, which now accounts for 53% of total disease burden and 60% of all deaths.<sup>[28]</sup> The country has launched a comprehensive National Programme for Prevention & Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS)<sup>[29]</sup> in the year 2010. Among the key interventions to be implemented at different levels are monitoring of prevalence and risk factors of NCDs, awareness generation and promotion of healthy lifestyle including exercise promotion through behaviour change interventions involving the common people, civil society, community- based organizations, media etc. The newly established Health and Wellness Centres (HWCs) are intended to promote healthy lifestyles along with screening of NCDs at the community level as part of an expanded range of comprehensive primary health care services.<sup>[30]</sup>

#### **Responding to the challenges :**

Despite the well-documented benefits of regular participation in physical activity and global initiatives to improve physical activity level of the population, the current status and trends portray an abysmal picture where almost

80% of adolescents and 28% of adults globally are not meeting the WHO recommendations of minimum physical activity. The trend of insufficient physical activity levels worldwide show stagnation at best or deterioration in the levels of physical activities in high income countries. Obviously, the strategic interventions aimed at changing of sedentary behaviour of children and adolescents are not being able to break the inertia of inactivity and might not enable the countries to achieve SDG target 3.4 of one third reduction of premature mortality from NCDs by 2030. May be this is the time to revisit the ways we are planning and executing the behaviour change interventions for promotion of physical activity. Interventions need to be age-appropriate, population or person specific, based on the perceived barriers and to be implemented by skilled and motivated personnel at family, community, school and work-site levels. National Governments, NGOs, opinion leaders, grass- root level health workers, teachers, community members and individuals need appropriate advocacy and awareness on the negative consequences of lack of physical activity so that the agenda of promotion of physical activity finds priority at national developmental agenda. Mass awareness activities in the form of social movement, involving different strata of population, aimed at risk perception and promotion of healthy lifestyles together with initiatives to overcome different environmental constraints, like lack of parks, safe roads for walking and cycling etc. are needed to shape the lifestyle of people towards the desired direction.

The perfunctorily planned and delivered curriculum of physical education in schools needs drastic overhauling to make physical education sessions enjoyable. One or two physical education classes per week are too inadequate to enable students to meet the recommended 60 minutes of daily physical activity. Physical education as a subject needs due recognition and weightage and physical education teachers are expected to have the necessary knowledge, attitude and skills to act as role models for the students. Schools should be able to afford supportive environment conducive to physical activity and also should provide opportunities for students to be active outside the physical education classes.

Families play a key role in developing and shaping health-related habits and behaviours of the children and adolescents. There is a strong need for interventions that proactively work towards educating, empowering and supporting families to practice healthy behaviours.

Health care professionals are to shoulder higher responsibilities to sensitise and motivate clients towards active lifestyle. Can all clinicians and health service providers

make it a routine to enquire and record physical activity level of their clients (like routine checking of Weight, B.P., LMP in women etc) and start to prescribe exercise as a routine?

Health professionals have contributed in popularizing and implementing simple public health measures with immense returns e.g. promotion of ORS, exclusive breast feeding, immunisation etc. It is time that the profession takes up this challenge of breaking the inertia and show the path of good health and well-being through regular adequate physical activity.

Finally, charity begins at home and health professionals are expected to start practicing what they are preaching and public health associations like Indian Association of Preventive and Social Medicine has to show their eagerness and expertise towards promotion of active and healthy lifestyle.

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- How to cite this article:** Sinha R N. Insufficient Physical Activity: A Global Public Health Concern. *J Comprehensive Health* 2020;8(1):1-5.