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# Increased Physical Activity in a Public Health Perspective

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## Abstract

Human beings are born to be physically active. Being physically active gives several advantages and is essential for a healthy life. Physical inactivity is to date one of the major risk factors for developing non-communicable diseases (NCD), which are responsible for nearly 70% of all deaths. It is well documented in the literature that daily physical activity reduces the risk of non-communicable diseases NCDs. The level of physical activity differs between regions of the world and between the countries. Moreover, there are age and gender differences. WHO's Global action plan on Physical Activity and Health 2018–2030 and the UN Sustainable Goal are an important document and blueprint in the work for promoting a healthier world with reduced physical inactivity. Global action plans must be translated into national needs and adapted according to local variations. Successful implementation can only be achieved with anchoring of the strategies and policies at the top and within all sectors. Prioritization of actions and cooperation are also important factors for successful implementation. Work with the aim of increasing physical activity is intersectoral. Every sector is influenced, and no sector can disclaim liability. Physical inactivity is a global, increasing public health problem, and it will not disappear by itself.

**Keywords:** physical activity, physical inactivity, effects of physical activity, non-communicable diseases, policies and strategies, trends globally, gender differences

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## 1. Introduction

Non-communicable diseases (NCDs), also known as chronic diseases, are diseases of long duration and are consequences of a combination of genetic, physiological, environmental, and behavioral factors. The rise of NCDs heart disease, stroke, cancer, diabetes, and chronic

lung disease has been driven primarily by four major risk factors: tobacco use, alcohol use, physical inactivity, and unhealthy diets [1].

Physical inactivity is a public health problem and is considered as one of the greatest challenges for the future [1]. The time we spend being physically active during leisure is not enough to compensate for the great reduction in everyday physical activity and the increase of sedentary activities associated with life of today. The negative consequences of inactivity are many; physical, mental, and social. For example, inactive people are more likely to be overweight, and inactivity causes many redundant deaths each year [2].

Physical activity is described as any bodily movement produced by skeletal muscles, which requires energy expenditure [3]. It is well documented that regular physical activity reduces the risk of the non-communicable diseases like hypertension [4], coronary heart disease [5], stroke [4], diabetes 2 [6], some cancer types [2], and mental illness [2]. Being physically active improves bone and functional health [7] and maintains energy balance and weight control [8].

There exist large differences in physical activity between the different geographic regions of the world. In 2016, more than a quarter of the world's adults (27%) were insufficiently physically active. In the period between 2001 and 2016, the prevalence of insufficient physical activity ranged from 16% in Oceania to 39% in Latin America and the Caribbean [9]. During the same period, the frequency of physical inactivity increased more than 5% in high-income Western countries, while southeast Asia had a decrease of physical inactivity with 5% [9]. In 2016, insufficient physical activity in high-income countries was more than double compared to the prevalence in low-income countries. The prevalence increased over time in high-income countries from 32% in 2001 to 37% in 2016, whereas it was stable in low-income countries, 6% in 2001 and 2016 [9].

In addition to difference in physical activity levels between regions, there are also differences between genders. Women were less physically active compared to men in all regions except the east and southeast Asia. The lowest levels of reported physical inactivity were observed in men from the regions Oceania, east and southeast Asia, and sub-Saharan Africa in 2016 [9].

This chapter consists of seven sections. First, a short introduction of physical activity, physical inactivity, non-communicable diseases, and some regions and gender differences related to physical activity. Second, a description of global health determinants of physical activity is given. Third, follows a section describing the importance of anchoring and cooperation of policy documents for promoting physical activity. Subsequently follows two sections, one describing the benefits of being physically active and one describing the consequences of physical inactivity. Finally, some reflections of necessary actions to increase the level of physical activity are outlined.

## **2. Global determinants of physical activity**

Since the nineteenth century, there has been a steep increase in the knowledge of exercise and its effects on health. We have a large number of journals and books with quality research

within the field. The main challenge today is the never-ending work of how to use the results of the research in line with the major changes in the society that do not inherently promote increased physical activity. We know it is important to be physically active, but we have not managed to decrease the negative trend of increased inactivity globally. The health effects of physical activity are the same all over the world, but the local society in which the activity (or no activity) is performed is continuously developing.

### **2.1. Increased number of older inactive persons**

Older adults are more physically inactive compared to younger adults, and this is a major public health concern [10]. Not only is physical inactivity identified as the fourth leading risk factor for global mortality [11], but it is also a major contributing factor for disability and poor health outcomes [12]. Lack of physical activity is related to approximately 3 million deaths per year and to 6–10% of the occurrence of major non-communicable diseases [13]. Older adults have a more sedentary lifestyle [5]. Rates of self-reported physical inactivity in those aged 55 years and older varied from 5 to 29% across Europe [14].

### **2.2. Increased urbanization and decreased physical activity**

Urbanization leads to more violence, traffic, low air quality, and increased pollution. Many places lack access to parks and free sports and recreation areas. It seems that increased urban living discourages physical activity. Assah et al. found that living in an urban area was associated with lower levels of energy expenditure from physical activity and a higher prevalence of metabolic syndrome compared to rural dwelling adults in Cameroon [15]. Similar differences in physical activity were found in urban versus rural dwelling minors in the United States [16] and female adolescents in Portugal [17]. Other studies [18, 19] have demonstrated no or an inverse relationship between physical activity and the degree of urbanization.

### **2.3. Modernization leads to less physical activity**

Mechanization is the process of replacing manual labor with machinery. New technology improves task efficiency, personal safety, and mobility. On the other hand, technology decreases the physical effort required for self-transport and the performance of occupational and domestic activities. Mechanization and automatization contribute to less physical activity levels even in those cases where equivalent physical activity during the spare time place was equal [11].

### **2.4. Large variations in women's physical activity level globally**

There are large differences in women's level of physical activity in different countries. Women in Uganda are active during domestic work or house chores, farming, tending shops or small businesses, active transport to church, markets, and gardens [11, 20]. In comparison, only 34% of the women in Norway meet the national recommendation of physical activity [21]. Women living in countries with high gender equality were more likely to be physically active compared to their counterparts living in countries with low gender equality. This phenomenon

is the same for men. Some of the barriers to physical exercise that women face include family responsibilities, as well as cultural or social beliefs, economic or employment status, and level of education.

### **2.5. Climate change influences physical activity habits**

Climate change affects physical activity habits. Extreme cold, heat, and rain lead to less physical activity [22]. On the other hand, increasing temperature in places which are affected by cold climate may over time increase the level of physical activity. The challenges with increased physical inactivity occur in locations which already experience high temperatures [22] and which already have overwhelming problems with population health. Climate change with global warming will play a growing role on physical activity levels in the future [22, 23].

## **3. Policy strategies for promoting physical activity**

A policy consists of a set of ideas or a plan of what to do in situations that have been agreed to officially by a group of people, a government, or a political party. Today there exist several policies for promoting physical activity. A key factor for successful policy or a strategy document for promoting increased physical activity is cross-sectorial anchoring. Compared to earlier times in which the focus has been to generate as much knowledge as possible on the physiological health effects of being physical active, especially within the health sector, the focus now is how to implement the knowledge cross-sectional. The health sector is not the only sector responsible for physical activity. To increase the level of physical activity in the cities, there must be room for establishing green lounges and making bicycle roads and paths for the pedestrians (collaboration between the sectors transport, climate, and finance). Children should learn how to make the active choices and why we must be physically active at school from educated personnel (collaboration between the sectors health, knowledge, and education). Buildings must be adapted to the possibility of being active (collaboration between architecture and health). It should not be necessary to search for stairs and get the feeling that things are cumbersome, and the autowalks could, for example, keep as slow speed as possible which will lead more of us to walk. Every workplace that is affected by restructuring and mechanization should introduce the possibility of being physically active at work (collaboration between the sectors labor, health, and finance). A universal design for increased physical activity should be in focus in every sector.

In 2004, the 57th World Health Assembly (WHA) endorsed the World Health Organization's (WHO) Global Strategy on Diet, Physical Activity and Health. The strategy was developed with all concerned stakeholders in response to a request from Member States at World Health Assembly 2002 (Resolution WHA55.23). The strategy is followed up with the WHO Global action plan on Physical Activity and Health 2018–2030: more active people for a healthier world, which was launched in 2018. The global aim is to reduce physical inactivity across the globe by 10% by 2025 and 30% by 2030, setting out a plan with four objectives and 20 recommended policy actions.

UN Sustainable Goal was decided by the member countries in 2015. The Sustainable Development Goals are a call for action by all countries – low, high, and middle-income. Actions for healthy life through physical activity are to be found in Goal 3, where the aim is to ensure healthy lives and promoting the well-being at all ages.

At the national level, there is a need for a scale-up of implementations of effective policies in all countries. Implementation of national plans requires bold leadership and full engagement across sectors. The advantages with collaboration which support increased physical activity across sectors is that it generates significant returns through policies which support increased physical activity also leads to other benefits to health, local economies, community wellbeing, and environmental sustainability.

For both global and national strategies, it is difficult to keep up the efforts of increasing physical activity all the time, but in the long run, this should be part of all planning. It is time consuming and resource demanding to integrate the promotion of physical activity between various sectors, and very often one area will lose in the battle with other sectors' needs. For example, resources for in-hospital treatment or building a motor road may often be more available than for public health initiatives.

#### **4. Why being physically active is so important**

Good health and quality of life are important for the individual. The health and quality of life of the population have an impact on social development and are themselves influenced by how society changes. Good living conditions, good health, quality of life, and well-being are inter-linked.

Children who are physically active have a number of health benefits during their whole life [24]. Children who are not physically active from early age will not have these benefits and it might be difficult to catch up with it later in life. With a generally decreasing level of physical activity [25], parents or other people who are in daily contact with children are responsible for stimulating to develop positive exercise habits among children. Physical activity is crucial for children to achieve normal growth and development of muscle strength and motor skills [24] and it is of great importance to the skeleton. Weight-bearing activities, such as running, jumping, and walking, all influence the skeleton in a positive way. Physical activity strengthens the skeleton in the same way as exercise strengthens the muscles. A passive lifestyle leads to thin bones, low mineral content, and reduced strength [2]. Bone structure is completely developed when you are 20 years old. This means you can never compensate for what you did not do before turning 20.

Being in good shape results in using less energy to execute various activities. Consequently, fit persons have more excess energy and can do more things in everyday life. Adults and elderly people who are physically active and in good physical shape will also to a greater extent be self-reliant in everyday life and stay home longer. The fitness decreases with age, but the effects of cardiovascular exercise (aerobe) are the same in healthy elderly as in younger ones. The body's muscle mass decreases as you get older, and this leads to reduced muscle

strength, but it is never too late to start being physically active. People who start exercising in adulthood have much to gain. Positive gains start already at very low training volumes, which mean small efforts make a big difference. Going beyond such very low training volumes, there is a clear connection between the time you spend on physical activity and the fitness.

## 5. Consequences of physical inactivity

A hundred years ago, the main task for the public health work was to stop the infectious diseases. Today, public health work is more focused on reducing the incidence of the non-infectious lifestyle diseases. Compared to earlier times, more people are being diagnosed with cardiovascular diseases, diabetes, chronic lung diseases, and cancer as a result of multiple factors such as tobacco use, unhealthy diet, physical inactivity, and alcohol use.

NCDs kill about 41 million people each year, equivalent to 70% of all deaths globally [1]. Fifteen millions of all deaths attributed to NCDs occur between the ages of 30 and 69 years. An estimation is that over 85% of the 15 million deaths occur in low- and middle-income countries [1]. Social inequality is still a challenge.

The economic burden of physical inactivity remains unquantified at the global level, although some estimates have been made. Ding et al. reported, based on data from 142 countries, representing 93% of the population of the world, that direct health-care costs for coronary heart disease, stroke, type 2 diabetes, breast cancer, and colon cancer attributable to physical inactivity amounts to \$ 53.8 billion worldwide in 2013, of which \$31.2 billion was paid by the public sector, \$12.9 billion by the private sector, and \$9.7 billion by households. High-income countries bear a larger proportion of the economic burden (80.8% of health-care costs and 60.4% of indirect costs) [26]. Physical inactivity related deaths contribute to \$13.7 billion in productivity losses worldwide [26].

## 6. How to increase the level of physical activity in all ages

The challenge today is that in many cases we do not need to be physically active to survive in our work and leisure. Activities that we earlier needed for surviving, for example, hunting and collecting food, are replaced with, that is, driving cars, sitting on a bus or a train or even standing still in an escalator. The ordinary daily life activities are no longer enough to keep us healthy, but the resulting inactive lifestyle leads to several health problems.

Children are more inactive compared to earlier. Eighty percent of the young population in Europe does not reach the minimum recommended amounts of physical activity [4]. Adults are more inactive compared to earlier. We get a situation with inactive children, an increasing number of adults with a less healthy lifestyle, along with an increasing number of elderly people who needs health and care services. This is a growing problem that can be difficult to handle if we do not address it actively.

Kindergarten and schools have a great opportunity to contribute developing a healthy lifestyle, but this requires focus and priority from the national government in the form of resources and financing. The education training for teachers and other personnel that work with children is also an important arena for providing the personnel with the right knowledge. Developing a healthy lifestyle is a lifelong trip. It is not enough to be physically active occasionally, and we must be physically active every day without the feeling that we are doing something extra. We must learn to choose to walk the stairs again and again rather than standing in an escalator, we must, when it is possible, choose to walk to the shop or school rather than driving a car. We must learn to take the physically active choices. And if we do not do this, the negative consequences will escalate.

The workplace is a good arena for either influencing adults to being active during a workday or giving the workers an arena for being active [27]. Examples exist in which the workplace gives room for physical activity during the work time [27, 28]. It might seem unnecessary and expensive right away, but in a long term, it is the right priority, which will be expressed through less absence at work and a more efficient workforce that creates more values for the company.

The retired population should have access to society-based actions from the government for being active, for example, open activity in parks, meeting centers for elderly, etc. Smart cities must facilitate free physical activity, which will give us a large population in good physically health and with a strong mental health.

Future society must be built on how we can be physical active. In every plan for building roads for traffic, a plan for establishing bicycling road and pavement should be included. For every area which will be used for automatized vehicles, there should be made a room for recreation and sport. This is difficult to manage in geographic areas with a large population density.

## **7. Methods for registering of physical activity**

There are several methods for measuring level of physical activity. Each method works according to the purpose of the method, but it is difficult to compare data when comparing level of physical activity between groups, countries, regions, and between gender. For example, when comparing countries, there is a large difference in reported number of the fraction of a population that meets recommendations for physical activity. These numbers depend on how you define and operationalize the recommendations, as well as how data are collected and processed.

The most common method for registering physical activity is questionnaires [29]. Among the several hundred variants which are available, the easiest way is to ask about a person's exercise habits and grade the answers. A more demanding questionnaire contains more concrete questions about what the persons have been doing and for how long time the activity was executed. International Physical Activity Questionnaire (IPAQ) was developed in 2000 [30]

and is used to classify individuals into different activity categories described in the recommendation for physical activity.

Diaries are often used when the aim is to measure how the activity is distributed through a day. Diaries give information about the persons' state and what has been done [29].

Pedometer gives a rough measure of the activity and is particularly suited in combination with activity enhancing tools. In this way, people can follow the activity development themselves by getting direct feedback.

Acceleration is a direct measure of body movement, and the higher the acceleration, the higher the intensity. In addition to the total physical activity, an accelerometer can also measure the intensity, duration, and frequency, that is, the pattern of the activity. Another advantage of an accelerometer is that it can assess inactivity and sedentary behavior. However, an accelerometer is more expensive than a pedometer, but it is preferable if high precision is needed.

There is a need for standardized methods and harmonization of data from different countries. There is also a lack of data from low- and middle-income countries, which would be very useful for making better comparisons and analyses between different types of countries.

## 8. Summary

Physical activity every day is essential for a long healthy life. Physical activity is an important element in the fight against non-communicable diseases. It is never too late to start being physically active. Being physically active must be integrated in our daily life from walking age to end of life. This will be beneficial for each and one of us, but also for the society as a whole.

Public health work must facilitate good health for all and contribute to less social inequalities in health. One of the hallmarks of public health work is the cross-sectoral effort and understanding of how important it is that the entire society makes an effort to influence factors that promote health and well-being. Private actors and volunteers must collaborate with public authorities. Efficient public health work entails good organization of work, a system for monitoring efforts, and developments in health status and risk factors. This applies both at national, municipal, and county level.

Public health work is demanding. It is demanding to try to make people change their lifestyle and living habits (stop smoking, being physically active, etc.), because it is hard to make the population understand that it is necessary.

Preventive public health work does not give the results right away, and it is a slow job, which needs to be prioritized by the governments. Public health work is not free, but it is cheaper compared to treat everybody who in the future will be diagnosed with a chronic disease. It is never too late to turn this negative trend.

Physical activity should be something we do without thinking that we are physically active. Many people do not like to exercise or to be physically active, and because the daily life for

most people does not require physical activity, the challenge is to integrate the activity naturally in our lives. Being physically active does not demand new shoes, new clothes, or any other fancy equipment. It must be a natural part of what we are.

Teachers, health care personnel, and other personnel who are in daily contact with people should be educated in the importance of physical activity. Knowledge about the effects and how to put together an activity program must be mandatory in the relevant educations. Efforts for preventive public health work must increase, along with the social status of preventive workers. Preventive health care is not something that can be addressed with medicine or a single treatment. Preventive public health work starts with children and adolescents and lasts throughout their lives. It is a continuous work. In the long term, the work will pay off and produce results in terms of fewer diagnosed with non-communicable diseases.

There is a need for data regarding levels of physical activity, especially data from low- and middle-income countries. Obtaining data from all countries are essential for tailoring global physical activity promotion to population specific needs/trends.

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