

## THE VITAL ROLE OF PHYSICAL ACTIVITY IN PREVENTING LIFESTYLE DISEASES- A STUDY

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### ABSTRACT

Physical activity is a vital, non-invasive tool for preventing and managing lifestyle diseases, offering a proactive defense against the global surge in non-communicable conditions. By improving cardiovascular health, enhancing insulin sensitivity, and supporting mental well-being, regular exercise directly addresses the root causes of disorders like type 2 diabetes, obesity, and heart disease. While modern environments increasingly promote sedentary behaviors, committing to a consistent activity regimen—ideally combined with a balanced diet—remains the most cost-effective strategy to enhance long-term quality of life and reduce premature mortality.

**Keywords:** non-communicable diseases, regular exercise, obesity, diabetes, and heart disease, physical activity.

### INTRODUCTION

In an era characterized by sedentary lifestyles and increasing rates of lifestyle diseases such as obesity, diabetes, and heart disease, the importance of physical activity cannot be overstated. Regular physical activity is not just a component of a healthy lifestyle; it is a cornerstone in the prevention of lifestyle-related health issues.

Lifestyle diseases such as cardiovascular disease, type 2 diabetes, obesity, and certain cancers are among the leading causes of mortality worldwide. Sedentary behavior and other lifestyle factors that can be changed are highly associated with these non-communicable diseases. Physical activity has been consistently shown to play a critical role in the prevention and management of these conditions. Regular exercise improves cardiovascular health, enhances insulin sensitivity, regulates body weight, reduces inflammation, and lowers the risk of premature death. Additionally, exercise has a good impact on cognitive performance and mental wellness. Despite its proven benefits, global levels of physical inactivity remain high.

### Understanding lifestyle diseases

Lifestyle diseases, often referred to as **non-communicable diseases (NCDs)**, are long-term health conditions that develop gradually over time, primarily due to an individual's daily habits and environmental exposures. Unlike infectious diseases, they are not contagious and are often termed "diseases of civilization" because they are closely linked to modern lifestyles.

### Most Common Lifestyle Diseases

The primary conditions classified under this umbrella include:

- a. **Cardiovascular Diseases:** Including hypertension (high blood pressure), heart attacks, and strokes.
- b. **Type 2 Diabetes:** A metabolic disorder where the body becomes less responsive to insulin.

- c. **Obesity:** Excess body fat that acts as a major precursor to other chronic conditions.
- d. **Chronic Respiratory Diseases:** Such as Asthma and Chronic Obstructive Pulmonary Disease (COPD).
- e. **Certain Cancers:** Cancers of the lungs, breast, and colon linked to tobacco, alcohol, and poor diet.
- f. **Mental Health Disorders:** Increasing prevalence of depression and anxiety linked to chronic stress and isolation.

### Primary Risk Factors

These diseases are driven by three main categories of risk:

- **Modifiable Behaviours:** Poor diet (high sugar/salt/fat), physical inactivity, tobacco use, excessive alcohol consumption, and chronic stress.
- **Metabolic Risk Factors:** Intermediate conditions resulting from poor habits, such as high blood pressure, raised blood glucose, and high cholesterol.
- **Non-Modifiable Factors:** Elements out of an individual's control, including age, genetics/family history, and gender.

### The "Silent" Progression and Impact

- **Latency:** These diseases often have a long latency period, developing silently over years or decades before symptoms appear.
- **Global Burden:** NCDs account for nearly 75% of global deaths. In India alone, they are responsible for over 60% of all deaths.
- **Age Shift:** While once associated with the elderly, these conditions are increasingly affecting young adults in their 20s and 30s due to sedentary work and processed food cultures.

### Prevention and Management

The vast majority of lifestyle diseases are preventable or reversible if detected early. Key preventive steps include maintaining 150 minutes of moderate exercise per week, eating whole foods, ensuring 7–8 hours of quality sleep, and scheduling regular screenings for blood pressure and sugar.

### Between Lifestyle Diseases and Sedentary Living

Lifestyle diseases, also known as non-communicable diseases (NCDs), are conditions primarily caused by unhealthy lifestyle choices, including poor diet, smoking, excessive alcohol consumption, and a lack of physical activity. These diseases are responsible for a significant portion of global morbidity and mortality.

- **Obesity:** Sedentary living and poor dietary habits are leading causes of obesity, a risk factor for various NCDs.
- **Diabetes:** Physical inactivity and excessive weight gain contribute to the development of type 2 diabetes.
- **Heart Disease:** A sedentary lifestyle leads to risk factors such as high blood pressure, high cholesterol, and obesity, all of which increase the likelihood of heart disease.

- **Cancer:** Certain cancers, such as colon and breast cancer, are more prevalent among sedentary individuals.

## Physical Activity

Physical activity refers to any bodily movement produced by skeletal muscles that required energy expenditure.

### The Role of Physical Activity

- Weight Management:** Regular physical activity helps control body weight by burning calories, which, in turn, reduces the risk of obesity and its associated diseases.
- Improved Insulin Sensitivity:** Exercise enhances the body's ability to use insulin effectively, reducing the risk of type 2 diabetes.
- Cardiovascular Health:** Physical activity strengthens the heart, lowers blood pressure, improves cholesterol levels, and reduces the risk of heart disease.
- Mental Health:** Exercise releases endorphins, reducing stress, anxiety, and depression, promoting mental well-being.
- Reduced Inflammation:** Regular physical activity helps reduce chronic inflammation, a common factor in many lifestyle diseases.
- Stronger Bones and Joints:** Weight-bearing exercises like walking and resistance training can increase bone density and reduce the risk of osteoporosis.
- Enhanced Immunity:** Physical activity boosts the immune system, reducing the risk of infections and some chronic diseases.
- Better Quality of Life:** Engaging in regular physical activity is associated with improved sleep, increased energy levels, and a higher overall quality of life.

### WTO recommendation

The World Health Organization (WHO)—often referred to as the WHO in health contexts—provides specific guidelines for physical activity across different age groups to prevent non-communicable diseases (NCDs) like heart disease, type 2 diabetes, and cancer.

### Core Recommendations by Age Group

The WHO provides general recommendations for different age groups:

- ❖ **Adults (18–64 years):** Aim for 150–300 minutes of moderate-intensity or 75–150 minutes of vigorous-intensity aerobic activity per week, plus muscle-strengthening activities on two or more days per week.
- ❖ **Children and Adolescents (5–17 years):** Should engage in an average of at least 60 minutes per day of moderate-to-vigorous intensity physical activity throughout the week, including vigorous-intensity aerobic activities and muscle- and bone-strengthening activities at least three days a week.
- ❖ **Older Adults (65+ years):** Follow the adult guidelines, adding multicomponent physical activities like balance and strength training at least three days a week.
- ❖ **Pregnant and Postpartum Women:** Are recommended to do at least 150 minutes of moderate-intensity aerobic physical activity per week.

## Mechanism by which physical activity prevents lifestyle diseases

Physical activity prevents lifestyle diseases—such as cardiovascular disease, type 2 diabetes, and certain cancers—through several integrated biological mechanisms that optimize the body's physiological and molecular functions.

### Key Biological Mechanisms

**Anti-Inflammatory Effects:** Regular activity reduces chronic low-grade inflammation, a root cause of many lifestyle diseases. It promotes the release of myokines (anti-inflammatory proteins) from contracting muscles and reduces pro-inflammatory cytokines like TNF- $\alpha$  and IL-6 from adipose tissue.

### Metabolic Optimization:

**(a). Insulin Sensitivity:** Exercise increases the expression and translocation of GLUT4 (glucose transporter) to cell membranes, allowing muscles to absorb glucose more efficiently even without insulin.

**(b). Cardiovascular Conditioning:** Physical activity strengthens the heart muscle, increases stroke volume, and improves the health of the endothelium (blood vessel lining). It enhances nitric oxide (NO) production, which promotes vasodilation and lowers blood pressure.

**(c). Neuroendocrine Regulation:** Consistent exercise "blunts" the body's stress response by optimizing the HPA axis and sympathetic nervous system. This lowers resting levels of stress hormones like cortisol and epinephrine, which are linked to chronic illness.

**(d). Antioxidant Defence:** While acute exercise briefly increases oxidative stress, regular training upregulates antioxidant enzymes like superoxide dismutase (SOD) and catalase, protecting cells from long-term damage.

**(e). Enhanced Immunosurveillance:** Moderate activity improves the circulation of immune cells (NK cells, T cells), allowing the body to detect and destroy pathogens or early-stage cancer cells more effectively.

**(f). Neuroplasticity:** Exercise increases growth factors like Brain-Derived Neurotrophic Factor (BDNF), which supports brain health and protects against dementia and depression.

### Disease-Specific Prevention

Disease	Primary Preventive Mechanisms
<b>Type 2 Diabetes</b>	Enhanced glucose uptake (GLUT4), improved insulin sensitivity, and reduced visceral fat.
<b>Heart Disease</b>	Lowered blood pressure, improved lipid profile, and enhanced coronary blood flow.
<b>Cancer</b>	Reduced sex hormones (e.g., estrogen), improved immune surveillance, and decreased gut transit time (for colon cancer).
<b>Osteoporosis</b>	Mechanical loading from weight-bearing exercises increases bone mineral density.

## Recommended physical activity levels

Current global health guidelines, including those from the World Health Organization (WHO) and the CDC, recommend different levels of physical activity based on age and functional ability. The core principle across all groups is that some activity is better than none.

### Summary of Recommendations by Age Group

Age Group	Aerobic Activity (Weekly)	Strengthening & Balance
<b>Children &amp; Adolescents (5–17)</b>	At least <b>60 minutes daily</b> of moderate-to-vigorous intensity.	At least <b>3 days/week</b> of muscle and bone-strengthening activities.
<b>Adults (18–64)</b>	150–300 minutes of <b>moderate-intensity OR 75–150 minutes of vigorous-intensity.</b>	<b>2 or more days/week</b> targeting all major muscle groups.
<b>Older Adults (65+)</b>	Same as adults ( <b>150–300 min</b> moderate/75–150 min vigorous) as functional ability allows.	<b>3 or more days/week</b> of multicomponent balance and strength training to prevent falls.

### Challenges in adopting physical activity

Adopting regular physical activity involves navigating a complex landscape of **personal, environmental, and social** barriers. While many individuals understand the benefits, consistent adherence is often hindered by practical constraints and psychological hurdles.

### Important Considerations

**(i). Sedentary Behaviour:** High levels of sitting are linked to increased risk of heart disease and type 2 diabetes. Guidelines strongly advise limiting sitting time and breaking up long periods of inactivity with even light movement.

**(ii). Progression:** If you are currently inactive, start with small bouts (even 5–10 minutes) and gradually increase frequency and intensity over weeks to avoid injury.

**Special Populations:** Pregnant women and individuals with chronic conditions should aim to meet these guidelines as they are able, ideally consulting the NHS or a healthcare provider for tailored advice

### Public Health importance

From a public health perspective, regular physical activity is a cornerstone for reducing the global burden of non-communicable diseases (NCDs), which account for over 70% of deaths worldwide. Insufficient activity is a leading risk factor for global mortality; meeting recommended levels could prevent up to 5 million deaths annually and significantly decrease the prevalence of coronary heart disease, type 2 diabetes, and specific cancers like breast and colon cancer. Beyond direct health outcomes, active populations experience improved mental well-being, reduced cognitive decline, and greater functional independence in older age, which collectively lowers the demand on overburdened healthcare systems.

Economically, the cost of physical inactivity is immense, with a projected impact on global healthcare systems of US\$ 300 billion by 2030 if current trends continue. Conversely, increasing population-level activity could boost global GDP by hundreds of billions of dollars by enhancing workplace productivity and reducing absenteeism. Consequently, public health initiatives—such as urban designs that favor walking and cycling, school-based activity programs, and community-wide campaigns—are essential for fostering a healthier, more sustainable, and economically prosperous society.

### Common Personal Barriers

- **Lack of Time:** The most frequently cited barrier, often due to competing priorities like work, school, and family obligations.
- **Low Motivation and Willpower:** Difficulty in getting started or maintaining a routine is a primary internal hurdle for many.
- **Lack of Energy:** Feelings of constant fatigue, often exacerbated by sedentary work or high-stress environments, deter individuals from exercising.
- **Fear of Injury:** Especially prevalent among older adults or those with pre-existing conditions, the fear of getting hurt or causing a heart attack often limits activity.
- **Lack of Skill:** Feeling uncoordinated or not knowing how to perform specific exercises can lead to embarrassment and avoidance.

### Environmental and Social Obstacles

- **Poor Infrastructure:** A lack of safe walking paths, parks, or cycling trails near homes or workplaces makes physical activity inconvenient.
- **Safety Concerns:** Issues such as heavy traffic, poorly lit areas, or even the presence of street dogs can make outdoor activity feel unsafe.
- **Lack of Social Support:** When friends or family do not share an interest in being active, it can be difficult to find the encouragement or companionship needed to sustain a routine.
- **Cost and Resources:** Expenses related to gym memberships, specialized equipment, or exercise classes can be a significant barrier for lower-income groups.

### Health System Barriers

- **Insufficient Medical Guidance:** Patients often report that healthcare providers focus primarily on medication rather than offering tailored, actionable advice on physical activity.
- **Misconceptions:** Some individuals believe that their existing health conditions (like knee pain or chronic disease) make exercise impossible, when tailored low-impact activities might actually be beneficial.

## CONCLUSION

Physical activity is a powerful tool in the prevention of lifestyle diseases. It not only helps manage weight but also positively impacts mental health, heart health, and overall well-being. The benefits of regular physical activity are far-reaching, making it an essential aspect of a healthy lifestyle. By prioritizing physical activity in your daily life, you can significantly reduce the risk of lifestyle-related diseases and enjoy a healthier and more fulfilling life.

## REFERENCES

1. The Vital Role of Physical Activity in Preventing Lifestyle Diseases.
2. Lee, I-Min, et al. (2012). "Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy."
3. Strain, T., et al. (2020). "Use of the prevented fraction for the population to determine deaths averted by existing levels of physical activity: a descriptive study.
4. Warburton, D. E., & Bredin, S. S. (2017). "Health benefits of physical activity: a systematic review of current systematic reviews.
5. Ding, D., et al. (2016). "The economic burden of physical inactivity: a global analysis of major non-communicable diseases.