



Combating Human Diseases through Physical Activity

KEYWORDS

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Introduction

Substantial data are available regarding the benefits of physical activity. For primary preventative benefits, physical activity patterns should begin in the early school years and continue throughout an individual's life. Schools must specifically designate physical education programs for children at early ages.

Programs should include recreational sport (e.g. running, dancing, swimming etc.). Support at home for an active lifestyle for children helps to promote healthy physical activity patterns.

A lifestyle of physical activity from childhood throughout the adult years fosters health and longevity. Even brisk walking as a physical activity/exercise habit promotes health benefits. This is the simplest program for most individuals and has clear benefits. This improved state of health is enhanced by weight control, restricted intake of saturated fat and cholesterol, abstinence from cigarette smoking, and control of high blood pressure and glucose intolerance.

Benefits of Exercise

Routine exercise improves insulin sensitivity, improves glycolic control in persons with type 2 diabetes (and, hence, decreases overall mortality), decreases blood pressure, decreases low-density lipoprotein and triglyceride levels and increases high-density lipoprotein levels.

In one report, persons who increased their activity levels were at no greater risk for depression than those individuals who were active all along; however, persons who were active and became inactive were 1.5 times as likely to become depressed compared with those who maintained an active lifestyle. Longitudinal studies have also documented significant improvement in psycho logic functioning. Exercise training reduces depression in healthy individual and in persons with cardiac disease or major depression. Exercise also improves self-confidence and self-esteem, attenuates cardiovascular and neurohumoral responses to mental stress, and reduces some type A behaviors.

Physical Activity and Good Physical Health

Participation in regular physical activity at least 30 minutes of moderate activity on at least five days per week, or 20 minutes of vigorous physical activity at least three times per week is critical to sustaining good health. Youth should strive for at least one hour of exercise a day. Regular physical activity has beneficial effects on most (if not all) organ systems, and consequently it helps to prevent a broad range of health problems and diseases. People of all ages, both male and female, derive substantial health benefits from physical activity.

Physical Activity and Good Mental Health

Regular physical activity reduces morbidity and mortality from mental health disorders. Mental health disorders pose a significant public health burden and they are a major cause of hospitalization and disability. Increasing physical activity level could substantially reduce medical expenditures for mental health conditions.

In adults with affective disorders, physical activity has a

beneficial effect on symptoms of depression and anxiety. Animal research suggests that exercise may stimulate the growth of new brain cells that enhance memory and learning—two functions hampered by depression. Clinical studies have demonstrated the feasibility and efficacy of exercise as a treatment for depression. Currently, National Institute of Mental Health (NIMH) investigators are conducting research comparing the effectiveness of home-based and supervised aerobic exercise to the use of antidepressants in relieving depression in these groups, and reducing relapse rates. Regular physical activity also appears to enhance well-being.

Different Types of Exercise

Exercise has been defined as an activity for the express purpose of improving fitness or health. Physical activity includes all forms of activity (eg, occupational, recreational, sports-related) that are performed without the specific purpose of fitness or health. Different types of exercise are as follows:

- **Aerobic**

Aerobic exercise is physical exercise that intends to improve the efficiency of the cardiovascular system in absorbing and transporting oxygen. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process. Many types of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time. E.g. Walking, Swimming, Cycling etc

- **Anaerobic**

Anaerobic is a technical word which literally means without air (where "air" is generally used to mean oxygen), as opposed to aerobic. Anaerobic exercise is any activity in which the working muscles require and utilize oxygen at a faster rate than your body can supply it. Anaerobic exercise is short-term exercise lasting usually less than a minute before lactate and hydrogen ions bring muscle activity to a halt. Weight training is essentially an anaerobic activity using muscle glucose for energy. E.g. Sprinting

- **Isotonic**

In an isotonic contraction, tension remains unchanged and the muscle's length changes. Lifting an object off a desk is an example of isotonic contractions. A near isotonic contraction is known as Auxotonic contraction.

Isotonic, exercise: Exercise when a contracting muscle shortens against a constant load, as when lifting a weight. Isotonic exercise is one method of muscular exercise. In contrast, isometric exercise is when muscular contractions occur without movement of the involved parts of the body.

- **Resistance training**

This involves providing some form of resistance to the contracting muscles to stimulate the body to increase strength. Multiple types of equipment are used for resistance training, including hand weights; cam machines; pulleys; and hydraulic, elastic, rubber, fiberglass, and magnetic equipment.

Diabetes

- Exercise should be of short duration with a gradual progression to longer durations, as tolerated.

- Exercises include aquatic aerobics, swimming, walking, jogging, or bicycling, among others.
- Monitor blood sugar because hypoglycemia or hyperglycemia can occur in diabetic persons during exercise.

Obesity

- Individuals who are morbidly obese should be cautious of orthopedic stresses.
- They may start with non-weight-bearing exercises (eg, swimming, water aerobics, and floor exercises).
- These individuals should avoid high-impact aerobic activities.
- Emphasize duration as tolerated and exercise frequency (sessions per week).
- Emphasize primeval exercise, especially exercise in the morning before eating breakfast to mobilize fats (biolysis).

Osteoporosis

- Exercise is an essential part of treatment for patients with osteoporosis. Just as regular workouts build muscle, these activities also maintain and may even increase bone strength. By strengthening the muscles and bones and improving balance, exercise can reduce the risk of falls and resulting fractures.
- Exercise works well with medications that increase bone density and strength.
- Exercise, medication, and proper diet, including an absorbable source of calcium, phosphorus, boron, and other bone-building minerals, are more effective in combating osteoporosis than any one treatment alone.
- Weight-bearing exercises and resistance training benefit bones and muscles as well as help improve general health.
- For most people who have osteoporosis, brisk walking is ideal.
- Walking can be performed anywhere, requires no special equipment, and carries minimal risk of injury.

Exercise Prescription for Individuals with Coronary Artery Disease

Physical inactivity is recognized as a risk factor for coronary artery disease. Regular aerobic physical activity increases exercise capacity and plays a role in both primary and secondary prevention of cardiovascular disease.

Exercise increases cardiovascular functional capacity and decreases myocardial oxygen demand at any level of physical activity in apparently healthy persons and in most individuals with cardiovascular disease. Regular physical activity is required to maintain these training effects. Myocardial work can be affected by caffeine intake, and caffeine intake has been shown to increase blood pressure response to exercise. The potential risks of physical activity can be reduced by receiving a medical evaluation, risk stratification, supervision, and education.

Aerobic exercise adds an independent blood pressure-lowering effect in certain hypertensive patient groups, with a decrease of 8-10 mm Hg in both systolic and diastolic blood pressure measurements.

The Epidemic of Overweight and Obesity

As a result of lifestyle and dietary changes, overweight and obesity have reached epidemic proportions. The Body Mass Index (BMI) is the most commonly used measure to define overweight and obesity. BMI is a measure of weight in relation to height.

$$\text{BMI} = \frac{\text{Weight (Kg)}}{\text{Height}^2 \text{ (M)}}^2$$

OBESITY METER	
Revised BMI	Status
23 – 25 kg/m ²	Overweight
25 – 27 kg/m ²	Obesity G1
27 – 29 kg/m ²	Obesity G2
29 – 32 kg/m ²	Obesity G3
32 kg/m ²	Morbid Obesity

Obesity is associated with an increased risk of premature death, type 2 diabetes, heart disease, stroke, hypertension, gallbladder disease, osteoarthritis (degeneration of cartilage and bone in joints), sleep apnea, asthma, breathing problems, cancer (endometrial, colon, kidney, esophageal, and postmenopausal breast cancer), high blood cholesterol, complications of pregnancy, menstrual irregularities, stress incontinence

Conclusion

Physical inactivity is a risk factor for many diseases and conditions. Thus, physical activity should be made an integral part of daily life. Physical activity need not be strenuous. People of all ages can get benefit from moderate physical activity.

This article makes clear the pressing need to encourage more active lifestyle among the people. Encouraging more activity can be as simple as establishing walking programs at schools and in the community. Some communities have an existing infrastructure that supports physical activity, such as sidewalks and bicycle trails, and work sites, schools and residential areas. Schools should provide opportunities to engage children in physical activity as well as healthy eating. Perhaps the most important change, however, is at the individual and family level.

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