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Review Article

Human physiological and psychological health maintenance through physical activity

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ABSTRACT

Maintaining physical well-being and controlling several illnesses, including depression, cancer, diabetes, osteoporosis, hypertension, obesity, and cardiovascular disease, need regular physical activity. It has the potential to enhance endothelial function, which is impacted by smoking, age, and chronic illness. Adults who engage in aerobic exercise have better vascular function, which assists people with a variety of illnesses. Research has concentrated on the processes that lower the likelihood and severity of specific disease states, as well as the connection between physical exercise and cardiovascular disease.

1. Introduction

For millennia, people have recognized the beneficial effects of physical activity on their health. For example, the ancient philosopher Plato highlighted the need of physical activity when he said, "Every human being's good condition is destroyed by lack of activity, but it is saved and preserved by movement and methodical physical exercise." This remark still holds true now just as it did in antiquity. In addition to reducing physical activity in performing daily tasks, the modern lifestyle has increased human reliance on technology. For example, people no longer need to walk to work or school; instead, they rely on cars. Naturally, this way of life has brought about numerous pleasures, but at the expense of people's physical health: the decline in physical activity has sparked serious worries about public health and wellbeing. Physical activities include lifting, exercising, playing, traveling, walking, cycling, dancing, gardening, and doing chores. Most of the risks connected with physical activity concern the musculoskeletal system, such as joint twisting and muscle strain. These difficulties are caused by performing too many activities without an appropriate warm-up or training. Strenuous activity without proper warming up raises the risk of a heart attack in people with heart disease. These dangers can be reduced by adequately warming up before to undertaking more intensive exercises. Strengthening exercises should be undertaken incrementally to prepare the body for greater demands on the heart, lungs, bones, and muscles. [1]

Frequent exercise is crucial for human growth over the course of a person's lifetime and helps to maintain and improve health. Strong evidence supports the positive health impacts of physical activity in the areas of cardiovascular, musculoskeletal, metabolic, cancer, neurocognitive, and all-cause mortality. Any movement that causes an increase in energy consumption due to skeletal muscle contraction is considered physical activity. The frequency, duration, intensity, and weekly extent are used to quantify and regulate it. Health-enhancing physical activity includes all types of movement that promote health and have a minimal risk of damage. Strength and coordination training as well as endurance-focused movement are suggested forms of physical activity that improve health. The purpose of physical activity is to improve functionality by starting

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adaption mechanisms. As a result, it needs to be tailored to the various degrees of performance ability, activity level, and age and should be done in accordance with certain guidelines. Positive changes in physiological parameters brought about by exercise are directly associated with an improvement in one's overall health. Wide-ranging health benefits can be attained by consistent physical activity that builds muscle and endurance. However, during action, unfavourable things can happen, and the circulatory and musculoskeletal systems can be especially impacted. However, the advantages of physical activity and sport for both individual and public health can be enhanced with proper planning, appropriate gear, and appropriate practice.

2. Methodology

This review article summarizes the most current findings about the physiological and psychological processes that underlie exercise and physical activity and are associated with improved mental health. Our search terms in PubMed, Google Scholar, and Medline included "exercise" or "physical activity" and "stress," "exercise" or "physical activity" and "psychosis," "exercise" or "physical activity" and "mental health," "exercise" or "physical activity" and "anxiety," "exercise" or "physical activity" and "depression," and "exercise" or "physical activity" and "addiction." For analysis of data Microsoft XL Sheet was used.

3. Discussion

Physical activity is crucial for maintaining good health and mental wellbeing, as it not only benefits physical health but also contributes to a country's economy. A lack of physical activity increases the risk of non-communicable diseases and higher morbidity and mortality rates. Regular exercise has been linked to various health benefits, including reduced death rates and lower risk of noncommunicable diseases like cardiovascular disease, cancer, and diabetic complications. Health and leisure advocates must raise public awareness of the value of physical activity in contemporary culture to contribute to a healthy society.

Physical activity has a positive impact on mental health, as physically inactive individuals have higher rates of morbidity and medical expenses. Exercise therapy is often recommended to address these concerns and promote mental wellness. Nonclinical research has shown that physical activity, including exercise, has the most positive impact on body image and self-concept. Exercise is known to preserve and restore homeostasis at various levels, promoting beneficial physiological adaptations that offer protection against various clinical illnesses.

Various theories explain the link between mental health and physical fitness, including treating mental health conditions, aiding sleep, improving quality of life, and managing substance cravings. Increased physical exercise may also help alleviate medical comorbidities linked with psychotic diseases while reducing some psychotic symptoms.

3.1. Effects on mental health

By lowering the impacts of depression, raising stress awareness, and enhancing sleep quality, exercise can improve mental health. In both young people and older folks, it enhances cognitive capacities, academic performance, and cognitive abilities.[2] Exercise routines can lessen the correlation between mental and physical well-being. Frequent exercise provides advantages like meditation or relaxation and can help manage mild to moderate mental health conditions like anxiety and depression.[3] Exercise has been demonstrated to be a successful supplemental treatment for mood disorders, such as bipolar disorder and major depressive disorder. According to a recent study, a multimodal fitness program significantly reduced depression ratings in youth with severe depressive disorder, ages 15 to 25. According to estimates, 22.1% of people worldwide suffer from mental illnesses such depression, bipolar disorder, schizophrenia, and posttraumatic stress disorder. Given the well-established link between depression and quality of life, exercise has been demonstrated to be a successful adjunct treatment for reducing depressed symptoms. Studies have demonstrated a dose-dependent link between exercise and depression ratings, and regular leisure-time physical activity has been proven to lower the incidence of depression. According to guidelines, encouraging exercise in primary care settings can help manage symptoms of a variety of mood disorders and offer advantages that have been clinically demonstrated.

3.2. Effects on obesity and weight management

A combination of a diet high in fast and fried foods and a decline in physical activity has led to an alarming rise in obesity rates globally. Furthermore, this has led to a rise in the prevalence of non-communicable diseases such diabetes, cancer, heart disease, and inflammatory illnesses, which has raised morbidity and mortality.[4,5] In addition to being a concerning problem, this has a significant socioeconomic influence on the healthcare system, as countries spend millions of dollars on programs that promote physical activity and on maintaining physically inactive populations. Public awareness of the value of physical activity, either by itself or in conjunction with a balanced diet, is therefore desperately needed.

Physical inactivity and obesity are closely related; sedentary lifestyles lead to weight gain and decreased metabolic rates. Dietary practices and a Westernized eating regimen are largely to blame for the obesity epidemic, which has nearly half of the world's population obese.

Half of the Western population has a high BMI, which is linked to eating more fried, fattening foods, consuming more sugar and salt, and consuming fewer fruits and vegetables. Sedentary lifestyles and inadequate physical activity are contributing factors to the rise in overweight and obesity. Increased energy expenditure, decreased stored fat, a lower body mass index, diabetes, high blood pressure, and improved lipid profiles are all consequences of excessive physical activity, which lowers the risk of cardiovascular disease.[6]

3.3. Effects on musculoskeletal health

Frequent exercise increases growth, improves bone density, joints, muscles, tendons, and ligaments, lowers the risk of hip fractures and osteoporosis in the elderly, and hence lowers the incidence of musculoskeletal disorders.[7] It has been demonstrated that weight-bearing exercise, especially resistance training, has the biggest effects on bone mineral density. Regular exercise, particularly weight-bearing and impact exercises, has been demonstrated in studies to prevent the aging-related loss of bone. Exercise training regimens were found to prevent or reverse about 1% of annual bone loss in the lumbar spine and femoral neck in both premenopausal and postmenopausal women, according to a meta-analysis of randomized control trials. Additionally, exercise training dramatically lowers both the risk and frequency of falls. Furthermore, a lower incidence of hip fractures was linked to baseline levels of severe physical activity. In conclusion, regular exercise is crucial for avoiding osteoporosis and bone mineral density loss, especially in postmenopausal women.

3.4. Effects on heart conditions

Men are typically less likely to develop severe heart disease, and physical activity enhances circulation and heart function. However, because of their better cardiovascular systems and lung capacities, women are 30–40% less likely to suffer from cardiovascular diseases.[8] High blood pressure and abnormal blood lipid profiles are risk factors for heart disease and stroke that can be decreased by increasing the HDL-LDL ratio and fat consumption.[9]

3.5. Impact on cancer

Sedentary lifestyles are a major cause of cancer in Europe. Men and women who are physically active have a 30–40% lower risk of colon cancer and a 20–30% lower risk of breast cancer, indicating that physical activity considerably lowers cancer risk.[10] This is because it improves immune system performance, balances hormones, and reduces inflammation in the stomach.[7] Frequent exercise, whether done for work or as a hobby, has been associated with a lower risk of developing certain cancers, especially breast and colon cancer. Compared to less intense activities, moderate physical activity has a stronger protective impact. Compared to their inactive counterparts, physically active men and women had a 30%–40% lower relative risk of colon cancer and a 20%–30% lower relative risk of breast cancer. However, little is known about how well physical activity works to keep cancer patients from dying of the disease or from any other cause. Frequent exercise has also been linked to better health and a higher general quality of life. To completely comprehend the significance of regular physical activity for cancer patients, more research is required.

3.6. Effects on type 2 diabetes

Adults over 40 and youngsters who have sedentary lives and are obese are more likely to have type 2 diabetes. For both men and women, exercise can help regulate blood sugar levels and delay the onset of the condition.[11] Improved insulin activity can lower the incidence of diabetes in high-risk people with obesity and impaired glucose tolerance.[12] Frequent exercise is associated with a lower incidence of type 2 diabetes, especially among high-risk individuals. According to research, a weekly increase in energy expenditure of five hundred kilo calories can reduce the risk of type 2 diabetes by six percent. Additionally, middle-aged men who engage in moderately vigorous physical exercise and maintain cardiovascular fitness are protected against the onset of type 2 diabetes. It has been demonstrated that lifestyle changes, such as modest weight loss through diet and exercise, can lower the disease's incidence by 40% to 60% over the course of three to four years. To identify the most effective exercise regimens and degrees of intensity, more research is required.

3.7. Socio-economic paradigm of physical activity versus inactivity

Physical activity enhances brain development, emotional and social health, job performance, and productivity by bolstering life skills such as grit, self-control, punctuality, emotional regulation, decision-making, and goal-setting.[13] Conversely, sedentary lifestyles are a modifiable risk factor for cardiovascular disease and an increasing number of other chronic conditions, such as diabetes mellitus, obesity, hypertension, cancer (both breast and colon), bone and joint diseases (osteoporosis and osteoarthritis), depression, and more.[14,15] Exercise has been shown to reduce mortality, and because it helps prevent diseases like cancer, it is now considered medicinal in addition to being a good habit. Exercise, for instance, has been shown to reduce tumor growth and incidence by 60% in a number of mice models. This may be because exercise causes immune cells to infiltrate tumors.[16,17]

Large cohort studies that revealed that following physical activity guidelines was helpful have also demonstrated the longevity benefits of exercise.[18] Furthermore, compared to

the minimum recommendations for adults, the threshold for exercise-induced longevity benefits is three to five times greater (450–750 min/week).[19] According to the federal government's initial physical activity recommendation guidelines, which were published in 2008, 150–300 minutes of moderate-intensity aerobic exercise or 75–150 minutes of vigorous-intensity aerobic exercise can have significant positive health effects. Research has also examined how the environment affects a child's propensity to exercise, with the effect of coaches, parents, and peers being shown to contribute to a motivating setting.[20,21] The list of physical activities can be used to calculate an activity's metabolic intensity in terms of metabolic equivalent tasks in comparison to a resting state.[22] Sedentary or inactive activities include watching television, lying down, working at a desk, light-intensity or effortless behavior, grocery shopping, slow walking, moderate-intensity activities like slow cycling, and lawn mowing, and energetic activities such as fast cycling, jogging, and running. In addition to physical activity levels, an individual's genetics influence physical activity outcomes and the onset of noncommunicable diseases such as obesity and cardiovascular disease.[23,24]

Additionally, research has shown that exercise is a promising adjunct strategy for mood disorders, such as major depressive disorder and bipolar disorder.[25] However, several exercise-related criteria, including kind, intensity, duration, and individual training status, remain equivocal, making it more difficult to advocate exercise as a significant therapy to prevent or control diseases.

4. Conclusion

Physical activity, particularly exercise, has been linked to the prevention of various diseases such as metabolic disorders, cancer, and mood disorders. However, its therapeutic activity is unclear in terms of forms, intensity, and individual training status. The benefits and impact of exercise are linked to a genetic connection, resulting in a niche of personal genomics where an exercise regimen can be tailored to everyone. Genetic markers related to fat, obesity, hunger, and satiety significantly impact the type of benefit that can be obtained from exercise and training.

There is overwhelming scientific evidence around the advantages of exercise, which has been a pressing issue since the twenty-first century when belief in exercise began to wane, leading to lifestyle and noncommunicable diseases. Physical activity is critical for preventing chronic diseases and premature mortality, but the optimal amount and intensity for health benefits are unknown. Evidence suggests that the intensity of physical activity is inversely and linearly related to mortality. Regular physical exercise is connected to a one to two-year improvement in life expectancy by the age of 80. Moderate physical activity is more protective of colon and breast cancer than low-intensity activities. Regular physical activity is linked to a lower risk of chronic disease and premature death, improving body composition, lipid lipoprotein profiles, glucose homeostasis, insulin sensitivity, blood pressure, and systemic inflammation.

5. Source of Funding

None.

6. Conflict of Interest

None.

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