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Imperatives of Physical Exercise for a Healthy Living

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Abstract
This work focused on imperatives of physical exercise for a healthy living. Physical exercise is involving in regular activities with reduced sitting times, that enhances health, by improving the physiological functioning of the body which lowers risk of diseases. The paper identified some of the imperatives of physical exercise to be prevention of diabetes and heart diseases, reduces high blood pressure and generally, adds years to a persons life. So whether one is healthy or have medical issues, moderate activity is safe most for people and does a lot to improve the health, The paper concluded that lifestyle intervention such as promotion of physical activity in populations would result in significant improvements in health outcome. Therefore, recommended among others that during the daytime, all age groups should minimize the amount of time spent sitting (being sedentary).

Introduction

It has been identified that physical exercise improves ones physiological functioning. For instance, (Lee and Skerrett, 2001) maintained that physical exercise improves physiological functioning and lowers disease risk. Many people spend more than half their waking hours sitting down, and activities that don't enhance health account for quite a lot of the remainder. This growing trend may cause more trouble than most people realize. Observational studies suggest that habitual inactivity raises risks for obesity, diabetes, cardiovascular disease, deep-vein thrombosis, and metabolic syndrome. Blair, LaMonte and Nichaman (2004).

In fact, one study that followed more than 50,000 middle-aged women for six years found that even among women who were avid exercisers, the more television they watched, the more likely they were to gain weight or develop diabetes regardless of how much physical activity they did. For every two hours the women spent watching television each day, they had a 23% greater risk of becoming obese and a 14% greater risk of developing diabetes (Warburton Charlesworth, Ivey, Nettlefold and Bredin, 2010). Sitting at work for many hours also heightened their risks for obesity and diabetes. When planning your day, it may be beneficial not only to increase the time you spend exercising but also to try to reduce your sitting time. Decades of solid science confirm that adding as little as half an hour of moderately intense exercise to your day improves health and extends life. Here is a quick snapshot of the benefits exercise provides. (Sourced from Healthy Mind, Healthy Body. Longwood,(2014) outlined the following benefits of exercise.

i Lessens the likelihood of getting heart disease, the number 1 killer of both women and men in America. Exercising regularly helps prevent plaque buildup by striking a healthier balance of blood lipids (HDL, LDL, and triglycerides), helps arteries retain resilience despite the effects of aging, and bumps up the number of blood vessels feeding the heart. It also reduces inflammation and discourages the formation of blood clots that can block coronary arteries. Even if you already have heart disease, exercise lowers your chances of dying from it (Riddoch and Hinggins, 2010).

ii Lowers blood pressure, a boon for many body systems. Long-term hypertension (high blood pressure) doubles or triples the odds of developing heart failure and helps pave the way to other kinds of heart disease, stroke, aortic aneurysms, and kidney disease or failure (Gill and Cooper, 2014).

iii. Helps prevent diabetes by paring off excess weight, modestly lowering blood sugar levels, and boosting sensitivity to insulin so that less is needed to transport glucose into cells. If you have diabetes, exercise helps control blood sugar (Sigal Kenny, Wasserman, Castaneda-sceppa, and White, 2012).

iv. Helps shore up bones. When combined with calcium, vitamin D, and bone-saving medications if necessary, weight-bearing exercise like walking, running, and strength training helps ward off age-related bone loss. And balance-enhancing activities, including tai chi and yoga, help prevent falls that may end in fractures (Ekelund, Brage, Froberg, Harro, Anderssen, Sardinha,Riddoch ,and Andersen, 2009).

v. Helps protect joints by easing swelling, pain, and fatigue and by keeping cartilage healthy. Strong muscles support joints and lighten the load upon them. Activities that boost flexibility, such as stretching, yoga, and tai chi, extend range of motion (Ekelund *et al.*, 2009).

vi. May limit and even reverse knee problems by helping to control weight quite a bang for the buck, since every pound of weight lost reduces the load on the knee by 4 pounds.(Malina and Robert ,2010)

vii. Lifts spirits by releasing mood-lifting hormones and relieving stress. In some studies, exercising regularly has helped ease mild to moderate depression as effectively as medications; combining exercise with medications, therapy, and social engagement is even better (Haskell , Lee, Pate, Powell, Blair, Franklin, Macera, Health, Thompson, and Bauman, 2011).

viii. Adds years to your life. In the long-running Framingham Heart Study, moderate activity tacked on 1.3 years of life for men and 1.5 years of life for women versus low activity. Raising the bar to high activity added 3.7 years for men and 3.5 years for women (Malina *et al.*, 2010).

The Fundamentals: What you need to know to get started

How much exercise do I need?

You can track either your time or calories, or both, to make sure you're getting enough exercise. If you have been sedentary for a long time or have certain health problems, be sure to work up to these goals gradually. The 2008 Physical Activity Guidelines for Americans recommended at least two hours and 30 minutes (150 minutes) of moderate aerobic activity per week. If you enjoy vigorous aerobic activities, you can pare this down to at least one hour and 15 minutes (75 minutes) per week. An equivalent combination of the two also fills the bill. As a guide, one minute of vigorous-intensity activity equals about two minutes of moderate-intensity activity. Twice a week, also set aside time to do strength exercises for all the major muscle groups (legs, hips, back, chest, abdomen, shoulders, and arms). Older adults at risk for falls benefit from including balance exercises too, (WHO, 2003).

Even if you are not able to reach the minimum exercise guidelines right away, it is important to do as much exercise as you are able and try to increase it gradually. The physical activity guidelines reflect the minimum amount of exercise recommended for adults. For even greater health benefits, adults who are able should strive for five hours per week (300 minutes) of moderate-intensity aerobic activity or two-and-a-half hours (150 minutes) of vigorous-intensity aerobic exercise. Again, you can also mix the two. Adults with health problems that limit their ability to exercise should strive to do as much as they can. Health benefits kick in when you expend between 500 and 1,000 calories per week through physical activity, , although many studies find additional and extended health benefits flow from expending closer to 2,000 calories a week. (Paffenbarger, Hyde, Wing, and Hsieh, 2007). For example, one New England Journal of Medicine by Sandvick, Erikssen, Mundal, Rodahi (1993) study, analyzed research conducted on 17,000 Harvard alumni. The greatest gains in longevity and lowered risk for disease occurred among those expending approximately 2,000 calories per week through dynamic physical activity, such as walking, gardening, or sports. The most active group recorded an average two-year gain in life span (Kelly, Reilly, Fisher, Montgomery, Williamson, McColl, Paton,and Grant, 2006).

1. How Often should I Exercise?

The 2008 Physical Activity Guidelines don't spell out how many days a week you should exercise; instead, they focus on overall time per week. Generally, though, experts recommend spreading activity throughout the week and being active at least three days a week. Starved for time? It is tempting to wonder if you can compress activities into one or two days a week. While scientists haven't delved into this extensively, some research tantalizingly suggests that "weekend warriors" who regularly burn through more than 1,000 calories in one or two sessions a week do have a lower risk of dying than entirely sedentary adults that is, if they have no major risk factors (Dasgupta, O"Loughlin, Chen, Karp, Paradise, Tremblay, Hamet,and Pilot,2006). Howeverer, safety issues, common sense, and the bulk of research stressing benefits that flow from regular activity on most days of the week argue against adopting this pattern (Twisk and Mechelen, 2007).

2. How long must my Exercise Sessions be?

Sessions as brief as 10 minutes of aerobic exercise deliver health benefits, so do what works best for you. For example, one person may prefer doing three 10-minute exercise sessions a day for five days in order to meet the guidelines, while another may prefer walking 30 minutes twice a week and cycling along a bike path for 90 minutes on a sunny weekend day (Fagard, 2009).

3. How vigorously should I Exercise?

Whether you are healthy or have medical issues, moderate activity is safe for most people and does plenty to improve your health. If you are in good shape, adding vigorous activities to your workouts

cuts time spent exercising and is a boon to health. If you are not fit, work up to vigorous activities slowly (Alevizos, 2005).

Higher-intensity activities raise your chances for muscle or joint injury and very slightly increase the odds of developing a serious heart problem. This applies particularly to people who are unaccustomed to physical activity, who suddenly start exercising vigorously (although the overall risk of dying from heart disease is lower than if you did no exercise). How can you judge the pace of your workout? The easiest way to measure exertion characterizes the intensity of an activity through broad categories, such as light, moderate, or vigorous, called perceived exertion, it is especially helpful for staying in a safe range of activity. As you improve your fitness, you will find your perception of the intensity of a particular activity walking up a nearby hill, for example changes. If you are just getting started with an exercise program, aim for a moderate pace. (If health problems or disabilities make moderate activity impossible, simply do as much as you can.) As you build up, try a mix of moderate and vigorous activities to help build endurance. As you work out more often, you will notice gains as exercises become easier. Whenever an activity becomes easy, boost the length of your workout or your intensity again (Longwood, 2014).

Exercising the Mind

A protein increased by endurance exercise has been isolated and given to non-exercising mice, turning on genes that promote brain health and encourage the growth of new nerves involved in learning and memory, scientists from Harvard Medical School and Dana-Farber Cancer Institute have reported by (Chief Medical Officers; Joann Manson, Philip Greeland, Andrea Lacroix, Marcia Stefanick, Charles Mounton, Albert Oberman, Michael Perri , David Siscovick 2002).

The findings, published in the journal Cell Metabolism, help explain the well-known capacity of endurance exercise to improve cognitive function, particularly in older people. If the protein can be made in a stable form and developed into a drug, it might lead to improved therapies for cognitive decline in older people and slow the toll of neuro-degenerative diseases such Alzheimer's and Parkinson's, according to the investigators (Kraus, Houmard, Duscha, Knetzger, Wharton, McCartney, Bales, Henes, Samsa, Otvos, Kulkarni, and Slentz, 2009).

What is exciting is that a natural substance can be given in the bloodstream that can mimic some of the effects of endurance exercise on the brain, the Spiegelman group previously reported that the protein, called Fibronectin type III domain-containing protein 5(FNDC5) the precursor of irisin, is a Protein that is encoded by the FNDC5 gene (Chief Medical Officers; Joann Manson, Philip Greeland, Andrea Lacroix, Marcia Stefanick, Charles Mounton, Albert Oberman, Michael Perri , David Siscovick 2002,Penedo and Dan, 2005).

FNDC5, is produced by muscular exertion and is released into the bloodstream as a variant called irisin. In the new research, endurance exercise mice voluntarily running on a wheel for 30 days increased the activity of a metabolic regulatory molecule, PGC-1α, in muscles, which spurred a rise in 'FNDC5 protein. The increase of FNDC5 in turn boosted the expression of a brain-health protein, BDNP (brain-derived neurotrophic protein) in the dentate gyrus of the hippocampus, a part of the brain involved in learning and memory (Penedo and Dan, 2005).

Life-Saving Exercise

In many common diseases, physical activity is as effective as taking drugs at reducing the risk of death. Physical activity is potentially as effective as many drug interventions for patients with existing cardiovascular diseases and other chronic conditions. In the few conditions where the life-saving benefits of exercise have been studied, physical activity was often found to be as effective as drugs at reducing the risk of death, according to the first study to aggregate and assess the comparative benefits of drugs and exercise for reducing mortality in a wide range of illnesses (Warburton,Charlesworth, Ivey, Nettlefolds, and Bradin, 2010).

The researchers were surprised to find that exercise seems to have such powerful life-saving effects for people with serious chronic conditions, (Haskell *et al.*, 2011). It was also surprising to find that so little is known about the potential benefits of physical activity for health in so many other illnesses. The study conducted found only four conditions where the effects of exercise on reducing mortality had been studied: prevention of severe illness in patients with coronary heart disease, rehabilitation from stroke, treatment of heart failure and prevention of diabetes (Kannus,Haapasalo, Sankelo, Sievanen, Pasanen, Heinonen, Oja, and Vuori 2010).

In addition to providing guidance for patients and clinicians about the importance of discussing the potential benefits of exercise, the researchers highlighted the importance of continuing to research the value of exercise for health. The researchers argue that more trials comparing the effectiveness of exercise and drugs are urgently needed to help doctors and patients make the best treatment decisions. In the meantime, they say exercise "should be considered as a viable alternative to, or alongside, drug therapy."

The researchers are not saying people who have had a stroke should go off their medication and head to the gym "but having a conversation with their physician about incorporating exercise into their treatment might be beneficial in many cases." In the United States, 80 percent of people 18 and older failed to meet the recommended levels of aerobic and muscle-strengthening physical activity in 2009, according to the Centre for Disease Control(CDC). What's more, the average number of retail prescriptions per capita for calendar year 2009 was 12.1, according to the Kaiser Family Foundation (CDC, 2010).

For the current study, the researchers analyzed the results of 305 randomized controlled trials involving 339,274 individuals and found no statistically detectable differences between exercise and drug interventions for secondary prevention of heart disease and prevention of diabetes. Among stroke patients, exercise was more effective than drug treatment, while in congestive heart failure diuretic drugs were more effective than all other types of treatment, including exercise (CDC, 2009).

The authors pointed out that the amount of trial evidence on the mortality benefits of exercise is considerably smaller than that on the benefits of drugs, and this may have had an impact on their results. Of the nearly 340,000 cases analyzed, only 15,000 patients had had exercise based interventions (Mittleman, Maclure, Tofler, Sherwood, Goldberg, and Muller,2007). The researchers argue in the paper that this "blind spot" in available scientific evidence "prevents prescribers and their patients from understanding the clinical circumstances where drugs might provide only modest improvement but exercise could yield more profound or sustainable gains in health. Despite this uncertainty, the authors claim that based on the available data, physical activity is potentially as effective as many drug interventions and more trials to address the disparity between exercise and drug-based treatment evidence are needed, (Haskell, Crystal. David. Kennedy, Keith. Wesnes, Andrew, Scholey, 2005).

Physical Activities and Health

Physical activity has consistently been associated with improved physiological functioning and lower disease risk according to observations drawn from controlled experimental trials and population based epidemiological studies (Lee and Skerrett, 2001). There is sufficient scientific evidence to conclude that physical activity has beneficial effects on adiposity levels in those with a normal body weight, on blood pressure in normotensive youth, on plasma lipid and lipoproteins levels, on nontraditional cardiovascular risk factors (inflammatory markers, endothelial function and heart rate variability) and on several components of mental health (self-concept, anxiety and depression) (Balasch, 2005).

The benefits of regular physical activity have been clearly set out across the life course. In particular, for adults, doing 30 min of at least moderate intensity physical activity on at least 5 days a week helps to prevent and manage over 20 chronic conditions including coronary heart disease, stroke, type 2 diabetes, cancer, obesity, mental health problems and musculoskeletal conditions (Ekelund, Bauman, .Booth, Ainsworth, .Pratt, .Yngve, . Sallis, and OJA, 2003).

Furthermore, there is a clear causal relationship between the amount of physical activity people do and all-cause mortality. On the other hand, spending large amounts of time being sedentary may increase the risk of some health outcomes, even among people who are active at the recommended levels (CDC, 2010). Physical inactivity is responsible for 6% of deaths globally around 3.2 million deaths per year, including 2.6 million in low and middle income countries and 670,000 of these deaths are premature (CDC, 2010). A recent analysis indicated that reaching the recommended minimum level of physical activity (at least 30 min/day) compared with no activity was found to lead to a reduction in all cause mortality by 19% and this rose to 24% if an hour a day was spent in physical activity.

Furthermore, there is 31% lower risk for all cause mortality in active individuals (CDC, 2010). This demonstrates a positive dose response, in other words, that the benefits of physical activity increase as the amount and intensity of the activity increases (Haskell and Haaz 2007). In adults, the improvements in physical activity are especially pronounced for high risk individuals, for example, those who are obese or have high blood pressure (hypertensive) (Mittleman *et al.*, 2007).

Research has also shown that being physically active daily will reduce the chances of mortality associated with cardiovascular disease: 30 min of moderate intensity exercise on most days of the week, equivalent to 4.2 MJ (1000 kcal) a week, was enough to reduce cardiovascular related mortality (CDC, 2009). Physical activity has beneficial effects on blood glucose levels. Gill and Cooper reviewed 20 longitudinal cohort studies and revealed that regular physical activity substantially reduces the risk of type 2 diabetes (Ekelund, Andersen, Bull, Guthold, Haskell, Hallal, 2006). Adjustment for differences in body mass index (BMI) between active and inactive adult groups attenuates the magnitude of risk reduction but even after adjustment, a high level of physical activity was associated with a 20-30% reduction in diabetes risk (Strong, Malina, Blimkie Daniels Dishman, Gutin,. Hergenroeder, Must, Nixon, Pivarnik,. Rowland, Trost Trudeau and Pediatric, 2008).

The data indicated that protection from diabetes can be conferred by a range of activities of moderate or vigorous intensity and that regular light intensity activity may also be sufficient, although the data for this was less consistent (Ekelund *et al., 2006*). The risk reduction associated with increased physical activity appears to be greatest in those at increased baseline risk of the disease, such as the obese, those with a positive family history and those with impaired glucose regulation (Dasgupta, O'Loughlin, Chen, Karp, Paradis, Tremblay, Hamet and Pilote 2006)

Regular exercise constitutes strong protection against the increased risk of cardiac infarction in connection with physical exertion and the risk has been estimated to be only 2.5 times greater than at rest for men who exercise regularly (Blair, La Monte, and Nichaman, 2009). For women, the risk of suffering a heart attack during and in connection with physical exertion is very small (compared with the risk during a randomly selected hour without physical exertion) and the small risk that has been reported appears to vanish with regular exercise (Trost,Way, and Okely, 2011). For both men and women who exercise regularly, the risk of having a heart attack at all (that is at any hour of the day) is less than half of that among untrained individuals (Karlsson, 2002).

It is known that intense physical exercise in children and adolescents, meaning mechanical loading on the skeleton, results in larger, stronger and more mineral dense bones and that this effect is more pronounced if the exercise is begun early (Ekelund *et al.,* 2009). If the exercise starts at an adult age, only small improvements in bone density are achieved. Nevertheless, it has clearly been shown that the risk of a hip fracture is lower among trained individuals, while evidence is accumulating (albeit less strong) that exercise at an adult age reduces other types of fractures related to osteoporosis (Paffenbarger,Hyde, Wing,and Hsieh 2007).

Interestingly, veteran cyclists with many years of training had significantly lower bone density than control persons of the same age and, although very physically fit, they had a higher risk of being affected by brittle bones with increasing age (Sigal, Connell and Bell,2007). Among women, intense exercise training such as long distance running can also lead to diminished bone density (Paffenbarger *et al.*, 2007). There is also evidence that among adolescents, increased leisure time physical activity (i.e. outside structured school programmes) is significantly associated with fewer depressive symptoms (over a two year period) and accelerates learning by increasing cognitive processes (e.g. Memory functioning). In summary, the relationship between physical activity, fitness and health outcomes demonstrates a reciprocal relationship (Carnethon, Henchoz,. and Kai-Lik 2002).

Physical Activity and the Environment

From an evolutionary perspective, humans are designed for a physically active lifestyle, while cultural circumstances permit and reinforce an inactive alternative in industrialised countries (Fagard, 2009). Throughout human evolution history, the lifestyle of humans included physical activity on a regular basis except for the past two or three generations. Consequently, the combined effects of the transition to a sedentary lifestyle and attendant dietary changes have resulted first in an epidemic of coronary heart disease and more recently an epidemic of overweight/obesity in post-industrial societies (Kannus, . Haapasalo, Sankelo, Sievänen, Pasanen, Heinonen, Oja and Vuori, 2010)). Social and environmental changes have accompanied the ongoing rapid urbanisation in a number of countries during recent decades and therefore, understanding the role of urbanisation in the health risk transition is important for health policy development at national and local levels (Mittleman *et al.*, 2007).

Urbanisation is recognized as a driver of the globally changing health hazard panorama with specific proximate social, economic, environmental and behavioural health risks developing in the wake of urbanization (Carnethon, Gulati, and Greenland, 2009). Low participation in health enhancing physical activity may be ascribed to urbanisation, which inevitably affects population health substantially. Urbanisation is a global trend which may be altering habitual physical activity and sedentary behaviour of children, adolescents and adults unfavourably (Kelly. Reilly,Fisher, Montgomery, Williamson, McColl, Paton and Grant, 2013). These disturbing findings reflect an ongoing decline in physical activity across all age groups during the past several decades in Europe based on questionnaire based studies. This decline in physical activity may be explained by the mechanisation of work and daily tasks and thus, not labour intensive, the increased use of motorized transport instead of walking or cycling and increased sedentary behaviour such as inactive leisure pursuits (such as watching television and using a computer). These trends are beginning to be replicated in the developing world (Riddoch, and. Higgins, 2012)). For example, it is estimated that by 2020 chronic diseases of lifestyle will be almost 50% of the burden of disease in Sub Saharan Africa. Rapid urbanisation with changes in lifestyle, such as physical activity patterns could explain at least partially, the ongoing epidemiological transition in Sub Saharan Africa (Riddoch *et al.,* 2012).

Conclusion

There is empirical evidence implicating physical inactivity in several lifestyle disorders such as diabetes, obesity and hypertension. Based on this evidence, it is recommended that lifestyle interventions such as promotion of physical activity in populations would result in significant improvements in health outcome.

Summary

Physical activity is emerging as an important modifiable disease risk factor in developing countries. This notwithstanding, the effects of physical activity on health outcomes remain incompletely understood; however there is ample evidence that physical activity is associated with low body weight and low fat mass. Furthermore, assessment of energy expenditure in free-living subjects is central to complete understanding of the a etiology of obesity, diabetes, hypertension, coronary heart disease, and osteoporosis amongst other lifestyle-related disorders. Recent studies have indicated a clear epidemiological transition in disease profiles in Africans with an increasing prevalence in lifestyle related disorders such as obesity and related co-morbidities. There has also been a clear trend in these lifestyle disorders with the development of urbanization and consequently; adoption of Westernized lifestyles associated with decline in physical activity due primarily to mechanization/automation of occupational and leisure time activities. Furthermore, there is also developing interest in the concept of sedentary behaviour. It is now increasingly accepted that sedentary behaviour is not simply a lack of physical activity but is an independent behaviour (TV/computer use, reading, homework, etc.), which constitutes a potential risk to health irrespective of physical activity level. Current empirical evidence linking physical inactivity and health outcomes is substantial.

Recommendations

During the daytime, all age groups should minimise the amount of time spent sitting (being sedentary).

- Physical activity should be encouraged from birth, and children of preschool age who are capable of walking unaided should be physically active daily for at least 180 minutes (three hours), spread throughout the day
- Children and young people (aged 5-18 years) should engage in moderate- to vigorous-intensity physical activity for at least 60 minutes and up to several hours every day.
- Adults (aged 19- 64 years) should add up to at least 150 minutes (2½ hours) of moderate-intensity activity in bouts of 10 minutes or more. Comparable benefits can be achieved by 75 minutes of vigorous-intensity activity spread across the week.
- Older adults should aim to be active daily and, if possible, aim for the same amount of physical activity as younger adult.
- Children and teenagers should have at least 60 minutes of moderate-intensity physical activity per day. School, games, dance, cycling, a brisk walk to school, sports, various outdoor activities, etc.
- For pregnant women, it is safe to continue to do some physical activity during pregnancy. However, the type of activity that you choose needs to be appropriate, and if possible recommended by a physician.

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