

THE EXAMINATION OF THE STRENGTH AND AEROBIC EXERCISE ON DOWN SYNDROME PATIENTS

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ABSTRACT

As a population, people with Down Syndrome (DS) engage in a lower degree of physical activity than those with good development, and they encounter challenges such as medical comorbidity, access issues, and the social perspective of being physically active. As specialists in the exercise of prescription and physical activity, therapists who work with children with developmental disabilities (DS) confront several problems in their work. People who engage in regular physical activity are less likely to suffer from a variety of health conditions. Exercises may be a fun and engaging way to get people to exercise more often, while also improving their physical health and motor skills. Cycling, dancing, jogging (long-distance running), swimming, and walking are all examples of activities that can increase cognitive function and aerobic capacity as well as physical strength. Disabled people's everyday life depend on them getting enough physical activity and exercise. Accordingly, the purpose of this research is to look at how exercise affects DS's physical and functional fitness.

Keywords: *Down syndrome, developmental disabilities, births*

I. Introduction

Trisomy 21, mosaic, or translocation (DS) is the most prevalent chromosomal abnormality and one of the most common causes of intellectual impairment (ID). Between 0.0009–0.001 live births globally (1 in 1000–1100 live births), the World Health Organization (2020) reports the prevalence of DS. Many infants are born with Down syndrome each year, and it is estimated that 250,000 families in the United States are impacted.

According to the WHO, Malaysia has a higher than expected rate of people with Down syndrome. In one of Malaysia's major government hospitals, (Barnard, et al. 2019) found that the incidence of Down syndrome was 1:959 live births. (Ruiz-González, et al. 2019) discovered,

Down syndrome is present in one in every Malay, Chinese, and Indian newborns, respectively, based on their findings. There is just one known risk factor for Down syndrome: advanced maternal age. According to the National Down Syndrome Society, a 35-year-old woman has a 1 in 350 chance of being pregnant with a child who has Down syndrome, and that risk rises steadily as she gets older.

DS suffers from a greater prevalence of secondary complications, which can lead to a sedentary lifestyle and poor nutritional habits. Complex interdisciplinary illnesses, such as congenital cardiovascular disease, gastrointestinal anomalies, development concerns, vision and hearing impairments, and respiratory ailments, are commonly found in people with Down syndrome (DS). Obesity and chronic diseases including obstructive sleep apnea and diabetes mellitus increase their long-term risk of mortality from pneumonia and other infections, the most prevalent causes of death for these people. It is possible that the lower levels of cardiorespiratory fitness that children and young people with DS have compared to their peers without DS have an unfavourable effect on their health and well-being. At least 31% to 47% of people in DS are obese; a significant degree of obesity has already been linked to inactivity and poor nutrition. According to (Silva, et al. 2018), DS had an unusually high amount of cholesterol and was linked to coronary artery disease. Physical inactivity between DS is linked to increased obesity, reduced cardiorespiratory capacity, muscular mass, strength, endurance, and tone, as well as a reaction of the sympathetic nervous system to exercise, as cited by (Barnard, et al. 2019) in the article.

Predictors of death, according to (Díaz, et al. 2019), include physical activity (PA) and physical fitness. There is significant evidence that regular physical activity may have a positive impact on one's health. People who engage in regular physical activity appear to be healthier than those who do not. Individuals with and without DS benefit from improved cardiovascular, metabolic, musculoskeletal, and psychological health. It is also worth noting that the Physical Activity Guidelines for Americans (2008) indicate that people with Down syndrome engage in 150 minutes of moderate-intensity aerobic activity per week, if they can do so. Only 75 minutes of aerobic exercise per week is required if they engage in high-intensity exercise. Combining moderate and strong intensities is an option if desired.

II. Physical activity (PA) and Down syndrome

It is one among the top 10 major causes of death in the world today. People who are not physically active had a 20% to 30% higher risk of death from all causes, according to a study.

Children, adolescents, and adults with Down syndrome (DS) are less physically fit than other persons with intellectual disabilities, according to (Uchiyama, et al. 2019). Difficulties with health, low motor skill and fitness, a lack of investment and adequate transportation are just a few of the many obstacles that DS must contend with. They also face a lack of support from loved ones and employers. Nonetheless, (Park, et al. 2019) advised that DS be encouraged to strengthen their motor skills in order to increase their level of physical activity. Because of this, DS must overcome social and environmental hurdles in order to engage in physical exercise.

Having the capacity to carry out everyday tasks without feeling exhausted is referred to as functional fitness (Ptomey, et al. 2018). Functional fitness, rather than physical fitness, may be used in many research since it encompasses characteristics like wellbeing, independence, and functional capacity for groups such as the elderly and individuals with impairments or chronic medical issues. It is essential for the health and well-being of any demographic group to have a strong cardiovascular system, muscular strength and endurance, flexibility, balance, functional capacity, and a healthy body mass index. The inability to live an independent and disease-free life is hindered by functional fitness limitations.

Cardiorespiratory endurance, muscular strength and balance, and functional ability have all improved significantly in DS patients who have been trained in a variety of exercise methods, including a combination of these methods. However, a number of studies have failed to show substantial changes in body mass and/or variables linked with body composition through experimental exercise. DS's body mass index (BMI) reduced and their aerobic capacity was increased, according to (Sweegers, et al. 2019). Muscular strength and cardiovascular endurance are improved among people with DS who engage in regular exercise.

(Ptomey, et al. 2018) indicated that DS will not meet the prescribed amount of physical exercise for his age group. At least one hour of moderate-to-vigorous physical activity per week is recommended for children, while adults should engage in at least 150 minutes of moderate aerobic activity each week, as well as two weekly sessions of strengthening training. Recommendations explicitly indicated that DS should act in accordance with suggested parameters or conduct as much exercise as feasible, even if DS may have diminished exercise performance. Reduce the chances of osteoporosis and depression, as well as obesity and fat, by engaging in regular physical exercise.

III. Literature Review

Regular exercise has been extensively examined and proven to be beneficial to the general population (Watson, et al. 2018). A number of studies have shown this, and the health benefits of regular aerobic (cardiovascular) exercise are significant. Among these adaptations, perhaps the most important are an increased myocardial function and efficiency, decreased cholesterol levels, decreased systolic and diastolic blood pressure at rest and during exercise, decreased adipose tissue stores, and the concomitant result in a decreased prevalence of the contraindications to health such as diabetes mellitus and coronary heart disease (Lu, Wang, & Lu, 2019).

The advantages of exercise on health and well-being are well known, but for people with intellectual impairments, there is a dearth of relevant information. Given that people with less education, lower earnings, and blue-collar jobs are more likely to be physically inactive than those with more education, higher incomes, and white-collar jobs, this finding should be viewed as both surprising and alarming. When compared to their age-matched peers, people with an intellectual impairment fall into the low-education, low-income blue-collar job category and have been demonstrated to be less physically active.

Among those with intellectual impairments, men are more active than women, and those with Down's syndrome had lower levels of physical activity than those without Down's syndrome, according to a study. Although no participant reached the UK's current physical activity requirements, regardless of age or intellectual impairment severity. For example, in their study of sibling groups (which included both a kid with Down's syndrome and a sibling who did not have any problems), the researchers found that nearly all of the children met or surpassed the recommended daily allowance of 30 minutes of physical exercise (Sweegers, et al. 2019). Children with Down's syndrome and their unaffected siblings did not vary significantly in their levels of inactivity, low physical activity, or moderate physical activity; only their levels of vigorous physical activity were greater than those of their unaffected siblings. People with intellectual disabilities are more physically active if their condition is more severe, according to a wide range of studies. Severe intellectual disability is associated with a sedentary lifestyle, whereas lower degrees of impairment lead to more engagement in physical exercise.

IV. Discussion

Down syndrome individuals' strength, cardiovascular endurance, balance, and cognitive ability will be the focus of the talk. A variety of improvements in physical and functional fitness for people with Down syndrome who participated in the workouts. People with Down's syndrome can be more self-reliant in their leisure time and pursue work prospects if they learn new skills via exercise.

Because of their poor muscle tone and hypermobility, people with Down syndrome have weaker muscles than their counterparts. Understanding the advantages of strengthening exercises for people with Down syndrome is critical (Watson, et al. 2018). Fine motor skills, everyday living tasks, focus, and participation in sports and other high-level physical activities are only a few of the possible side effects. Static and dynamic balance can be improved by eight weeks of weight training and balance exercises like the swill ball. Functional balance was also improved after eight weeks of core stability and cardiovascular endurance training (treadmill). It is also possible to increase lower limb muscular strength and cardiovascular capacity by combining exercise with computer games such as Nintendo Wii. Strength and coordination may be improved by playing computer games that mix resistance training with physical activity. Improved daily work performance and reduced risk of secondary health problems linked with physical inactivity can be achieved by strengthening exercise for persons with Down syndrome. Reduced peak oxygen consumption, functional aerobic impairment, peak ventilation, increased heart rate variability, and respiratory exchange ratio maybe some of the contributing factors for decreased fitness levels on individuals with Down syndrome. Down syndrome is often associated with being overweight or obese (Lu, Wang, & Lu, 2019). Abnormal lipid metabolism has been related to premature risk for the development of atherosclerosis among down syndromes. In addition, aerobic training, which include exercise on a treadmill or bike, increased work capacity. After twelve weeks of aerobic training, Boer and Moss (2016) found that there was also a greater reduction in body weight and body mass index. Besides, it also improves cardiac efficiency during submaximal activities and increases maximum ventilation, indicating a cardiorespiratory improvement. Aerobic exercises, such as walking and jogging to music, dancing, as well as strength exercises, such as vertical jumps, bicep curls, and squats, also helps to improve memory and cognitive functions among Down syndrome individuals. Aerobic exercise has been shown to boost the size of the hippocampus. This may help them improve their overall health, lowering their risk of developing other health problems such as diabetes.

V. Conclusion

To sum it up, DS has poor cardiovascular and muscular fitness, is overweight, and engages in less physical activity than the average person. An exercise programme for people with Down syndrome (DS) that targets these aspects of their health and well-being has been shown to be beneficial. Therapists or instructors should develop an exercise programme for people with Down syndrome (DS) in order to inspire their families and communities to become more physically active. To enhance their health and quality of life, people with Down syndrome (DS) should be encouraged to engage in physical exercise.

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