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Effect of community fitness program in adolescents in cerebral palsy

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Abstract
Background and Propose: The study conducted on Energy Expenditure Index includes 3 minute walk for 3 days/week. To find out the flexibility sit and reach test, behind the back reach test, intermalleolar distance was measured and submaximal HR was calculated. The aim of the study is effect of community fitness program in adolescents with cerebral palsy.
Subjects: Sample of 30 adolescents with cerebral palsy.
Method: Participants performed Energy expenditure index, Flexibility measured by the sit and reach test, the behind-the-back reach test and intermalleolar distance, HR for a standardized submaximal exercise
Result: The study results as increase in energy expenditure index and flexibility in post exercise.
Discussion and Conclusion: There is significant difference in post energy expenditure index than pre energy expenditure index and post physical activity than pre physical activity which showed the increased value of both energy expenditure and physical activity.

Keywords: energy expenditure index, submaximal HR, sit and reach test, behind the back reach test, intermalleolar distance

1. Introduction

Cerebral palsy is defined as "a group of non-progressive, but often changing, motor impairments due to lesions of the central nervous system (CNS) in the early stages of development" [1]. Secondary complications such as decrease in range of motion (ROM), muscle strength and cardiovascular endurance occur as children enter adolescence[2]. Neurological disorders that appear in infancy or early childhood and permanently affect body movement and muscle coordination but don't worsen over time. Even though cerebral palsy affects muscle movement, it isn't caused by problems in the muscles or nerves. It is caused by abnormalities in parts of the brain that control muscle movements [1]. These changes may have a significant impact on the functional independence of persons with CP [2]. Decreased work capacity in adolescents in CP is caused by an increase in body weight and adipose tissue without a similar increase in muscle strength [1]. Often the injury happens before birth, sometimes during delivery, or soon after being born. Physical symptoms typically appear in the first few years of life. Infants with cerebral palsy are frequently slow to reach developmental milestones such as learning to roll over, sit, crawl, smile, or walk. Cerebral palsy occurs in 1 in every 300 children. CP can be mild, moderate, or severe. Mild CP may mean a child is clumsy. Moderate CP may mean the child walks with a limp. He or she may need a special leg brace or a cane. More severe CP can affect all parts of a child's physical abilities [3]. The position and extent of the damage determines the final clinical picture: (One side of the body affected) hemiplegia, (All four limbs affected, upper more than lower) quadriplegia, (All four limbs affected, one side more than the other) bilateral hemiplegia, (The legs mainly affected, but arms less)-diplegia, (One limb only affected) monoplegia which is very rare. Persons with cerebral palsy seem to respond to exercise in a manner similar to individuals without cerebral palsy. Specific resisted exercise of isolated muscles or muscle groups has improved individual muscle strength. Aerobic exercise programs for persons with CP have resulted in a decrease in sub maximal heart rate (HR) response and increases in maximal oxygen consumption (VO2max), physical work capacity, running time and number of sit-ups performed. The effect of a consistent stretching program on joint range of motion of adolescents with cerebral palsy has not been well evaluated[2]. No study reviewed described a conditioning program that combined aerobic exercises, muscle strengthening and flexibility exercises. This type of program typically is used by persons without disabilities in fitness centers. It is reasonable to assume that a similar regime could benefit persons with cerebral palsy. In addition, by offering the program in a community facility, participants are encouraged to view exercise as a social rather than a medical activity [2]. The program included aerobic exercise, flexibility exercise and weight training. 1) Overall exercise efficiency. 2) isometric strength of specific muscle groups 3) flexibility of specific joints 4) HR during a standardized sub maximal exercise 5) Perceived competence [2].

2. Methodology

The study was conducted among the age group 11-17 years. The participants were explained about the purpose of the study. An informed consent form was taken from the parents. Pen/Pencil, consent form, recording sheet, Data collection sheet were included for study purpose. Procedure was done by Energy Expenditure Index and flexibility that is resisted exercises of the isolated muscles, aerobic exercises which includes sub maximal heart rate and maximum oxygen consumption, physical work capacity.

3. Results

The data was analyzed by using unpaired t test

Table 1

Pre energy expenditure index mean	Post energy expenditure index	P value
1.2200	1.2860	0.6874

Table no.1 shows mean value of pre energy expenditure index is 1.2200 and post energy expenditure index is 1.2860, t value is 0.4044 and p value is 0.6874. Which shows that there is an increase in the energy expenditure index in post exercise session

Table 2

Pre physical activity mean	Post physical activity mean	P value
9.5970	10.4200	0.5427

Table no. 2 shows mean value of pre physical activity is 9.5970 and post physical activity mean value is 10.420, t value is 0.6123 and p value 0.5427. Which shows that there is an increase in the physical activity in post exercise session.

4. Discussion

The present study "Effect of fitness program in adolescents with cerebral palsy" was conducted in Pediatric Department of Physiotherapy, Pravara institute of medical sciences, Loni. Children with age group of 11-17 years old were assessed for Energy Expenditure index, Physical activities such as Sit and Reach test, behind the back reach test and Intermalleolar Distance to assess general Flexibility and Sub-maximal HR. After assessing the pre & post physical activity and pre & post energy expenditure index which showed marked improvement in the outcome measures.

Cerebral palsy (CP) describes a group of disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. Because of the impairments, many children and adolescents with CP have at least difficulty with activities such as walking independently, negotiating stairs, running, or navigating safely over uneven terrain. Improving one's ability to walk or to perform other functional activities are often the primary therapeutic goals for children with CP. Exercise refers to planned, structured activities involving repeated movement of skeletal muscles that result in energy expenditure and seeks to improve or maintain levels of physical fitness above the intensity of activities of daily living. Studies evaluating the effect of exercise on children with CP reported no adverse effect on patterns of movement, flexibility, or spasticity.

The most common functions of the lower extremity tend to be gross motor activities that involve repetitive, reciprocal, coordinated motions of both extremities to move through space and that often require little conscious effort once under way. Attention to general fitness may ameliorate some of the secondary complication that arises as children with cerebral palsy enter adolescence and young adulthood.

Exercise program for adults and children can have psychological effects that result in improve attitude and confidence about dealing with disability. Exercise program have improved the psychological state of clinical and non-clinical subjects and provided greater sense of control.

Physical activity involvement can improve the children self-confidence, discipline and motivation.

Energy expenditure index is also known as Physiologic Cost Index (PCI). It is used to assess difference between different walking aids, and as reason for funding equipment. Energy expenditure index determines efficiency of movement using HR and walking speed. EEI was measured by asking the cerebral palsy children to walk with or without assistive device for three minutes.

Physical activity simply means movement of the body that uses energy. Walking, gardening, briskly pushing a baby stroller, climbing the stairs, playing soccer, or dancing the night away are all good examples of being active. For health benefits, physical activity should be moderate or vigorous intensity.

5. Conclusion

From the above study it concluded that there is significant difference in post energy expenditure index than pre energy expenditure index and post physical activity than pre physical activity which showed the increased value of bothe energy expenditure and physical activity.

6. References

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