

Comparison of health related physical fitness in children with intellectual disability vs. typically developing children: A case control study; A hypothesis

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Abstract

Background: Health related physical fitness is a key indicator of health outcome. It is necessary to carry out day to day physical activity. Association between levels of physical activity and fitness is an indicator that lack of physical activity will lead to lower levels of physical fitness and vice versa. In children population, it is been stated that daily needs of physical activity are not met as per the standards and the scenario appears to be worse for the population of children with intellectual disability. Attempts have been made to assess health related physical fitness of children with intellectual disabilities and comparisons have been made with their typically developing peers or more normal children, these children are more likely to be obese compared to typically developing children. But as most of these studies are carried out in the western countries there is a dearth of literature in understanding health related physical fitness of children with intellectual disability in India. 95% of children in India fall under the category of intellectually disabled. There is also a lack of nutrition in such special children. Present study hypothesized that there is a difference in health related physical fitness of children with intellectual disability versus their typically developing peers. 224 children will be recruited and divided among the case and the control group. Assessment will be done using the Brockport physical fitness test (BPFT) battery. Statistical analysis will be done using unpaired t test.

Clinical importance: Knowing the differences in the physical fitness levels of intellectually disabled and typically developing children will help in targeting the population with lower levels of fitness by planning out specific group activities.

Future directions: On the basis of the assessment an exercise protocol can be planned to improve overall physical activity levels and health.

Keywords: Physical fitness, special children, disabilities, intellectual, learning.

THESIS SUMMARY

Introduction

Health related physical fitness is defined as “a set of attributes that people have or achieve that relates to the ability to perform physical activity. It is characterised as, an ability to perform daily activities with vigour,” as stated by American College of Sports Medicine [ACSM]. As per American physical activity guidelines it is recommended to perform 60 minutes moderate to severe physical activity daily for school going children. Engaging in physical activity promotes health related physical fitness [1]. However, studies have shown that children do not meet these guidelines and possess lower physical fitness. Also, it is found that much less attention is given to measurement and assessment of health related physical fitness among children with disabilities [2]. World Health Organisation [WHO] defines children with intellectual

disability as “children who have reduced ability to understand new or complex information and to learn and apply new skills. As per WHO 1-3% of global population has intellectual disability. In India, the prevalence for children under the age of 18 is 3% as per a survey done by WHO [3]. As less attention is given to physical fitness of ID children compared to their typically developing peers (TDI), this might make children with ID vulnerable to health problems in adulthood. Children with ID are likely to have lower physical fitness levels and they tend to have higher risk of overweight or obesity [2]. On the contrary, Mathur M et al. in the study done to evaluate nutritional status of mentally retarded children in India has shown that diets of MR (Mental retardation) children in India lack nutrients which are necessary [4]. This might give us a contradictory scenario as per obesity in ID children

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is concerned. Treatment of children with intellectual disability in India include individualized education, skill training for age 3-21 years. Hence this study aims at assessing health related physical fitness of children with intellectual disability.

Hypothesis

As per American physical activity guidelines it is recommended to perform 60 minutes moderate to severe physical activity daily for school going children. Engaging in physical activity promotes health related physical fitness [1]. But, fewer and fewer young people meet the recommended guidelines of 60 min of moderate to vigorous PA (MVPA) needed to maintain good health. This situation seems to be more dramatic in persons with intellectual disability (ID) than among typically developed individuals (TDI). Studies of physical activity in persons with intellectual disability states that intellectually disabled children are less physically active than their typically developing peers[5]. Hence assessing physical fitness parameters in children with intellectual disability is necessary due to dearth in literature for the same and the lack of focus on physical fitness compared to vocational training. The present study hypothesizes that health related physical fitness differs in children with intellectual disability when compared to their developing peers in the Indian scenario. To prove this hypothesis a case control study will be conducted. Approval of the study has been obtained from the institutional review board. The sample will be collected from special schools for training of intellectually disabled children and community settings by stratified random sampling. On the basis of intellectual quotient (IQ) children with mild to moderate intelligence will be included in the case group. For control group children with intelligence above borderline are selected. The age criteria will be kept of 8-12 years to eliminate the potential confounder of pubertal changes affecting physical fitness parameters. Children with any locomotor or musculoskeletal conditions e.g. spasticity will be excluded from the study. The data collection, assessment and analysis will be done as per the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guidelines. The components that will be assessed using Fitnessgram's Brockport physical fitness test (BPFT) designed to assess health related physical fitness parameters in children with intellectual disability include body composition using body mass composition (BMI), muscular strength using the modified curl up test, modified pull up test for muscular endurance, cardiorespiratory fitness using 20m Progressive Aerobic Cardiovascular Endurance Run (PACER) test and lastly the flexibility component using back saver sit and reach test. Statistical analysis will be done using unpaired t test.

Discussion

As stated earlier, children do not meet the daily recommended dose of physical activity and the situation is worse for children with intellectual disability. Physical activity is linked with physical fitness. Lack of physical activity hence will cause lower levels of physical fitness[1]. A study done previously by Einarsson IO et al, to compare physical activity levels in youth with and without intellectual disability

concludes that children with intellectual disability is 40% less physically active compared to their TDI peers [5]. Studies were also done to report differences in physical activity levels in children with and without disabilities and physical activity was found to be lower in males with disabilities than their same sex peers[6].

Overweight children with intellectual disabilities have lower levels of physical fitness than healthy weighing children with intellectual disabilities. Wouters M et al. have conducted a study to assess health related physical fitness in children with mild to moderate intellectual disabilities. The study concluded that these children have high levels of overweight, obesity and lower levels of muscular strength, cardiorespiratory fitness and muscular endurance[7]. Similar findings were proposed by Izquierdo-Gomez R et al in children with Down's syndrome[8]. Children with intellectual disability were shown to have poor levels of endurance whereas women with intellectual disability have lower physical fitness levels on physical fitness parameters[9,10]. Children with intellectual disabilities tend to have overweight and obesity compared to their TDI peers as shown in some of the studies[11,12].

Above mentioned studies are performed mostly on the European and American population. But there is been a lacunae in the literature targeting the population of children with intellectual disabilities in India. Although prevalence of intellectual disabilities in India is almost 10 out of 1000 children[13]. Population of nine million children in the age group of 5-14 show mild to moderate intellectual disability. In addition to the prevalence, the nutritional status of intellectually disabled children is poor. A study done by Mathur M et al, to know the Dietary Habits and Nutritional Status in Mentally Retarded Children and Adolescents in North Western India states that children with MR are underweight compared to more normal children and their diet lacks most of the nutrients[4].

Thus this study will be focusing on the health related physical fitness assessment of children with intellectual disability and difference in the physical fitness parameters of children with intellectual disability and typically developing children.

Clinical Implication

Assessment of health related physical fitness in children with intellectual disability will make us understand the difference between physical fitness parameters of body composition, muscular strength, muscular and cardiorespiratory endurance and flexibility of children with intellectual disability and their typically developing peers.

As these parameters have an impact on the overall health of such children, it will help us plan preventive measures to counter any future decline in physical health and fitness. Specific or generalized fitness protocols can be planned to be carried out in schools or it can be included in the curriculum of education of special children. Motivational and informative lectures, group activities involving parents and teachers can be undertaken. Basic clinical goal achieved with the assessment of health related physical fitness will be to obtain the direction in improvement and maintenance of health as a whole in

special children.

Future direction

Child specific or a definite exercise protocol or group activities which target components of body composition, strength, endurance, aerobic fitness and flexibility can be designed and implemented to look for the benefits of the exercises and they can further be included in daily physical activity routine of children with intellectual disabilities in special schools or vocational training centers for special children.

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Declaration of patient consent : The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient's parents have given their consent for patient images and other clinical information to be reported in the journal. The patient's parents understand that his names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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