Physical Activity and Adolescent Health: What Should We Know?

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Authors’ contributions
This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information
DOI: 10.9734/ACRI/2019/v19i430163

Received 25 November 2019
Accepted 27 January 2020
Published 05 February 2020

ABSTRACT

Adolescence is characterized by a period of physical, emotional, social and cultural transformations, significant increase in size and changes in physical appearance. At this stage of life the individual is very susceptible to influences of the environment, nutrition, climate, interpersonal relationships and physical activity, among others. This article presents some of the main physical and emotional characteristics of adolescence and the importance of physical activity, highlighting the benefits for physical and mental health, and proposing actions to increase this practice among adolescents.

Keywords: Adolescence; physical activity; puberty; sedentary lifestyle.

1. INTRODUCTION

Adolescence is characterized by a period of physical, emotional, social and cultural transformations, significant increase in size and changes in physical appearance, as well as confrontations with issues of personal, ethnic and sexual identity [1,2]. As this phase of life is a transitional period between childhood and adulthood, the development of physical and interpersonal skills is necessary to successfully integrate into society and community life [3,4].

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To develop healthy living in their social and family context, adolescents need adequate nutrition, protection from infectious diseases through vaccination, protection from unintentional injury and risk behavior, adequate night sleep and regular physical activity (PA) [5]. The way of life of many populations, especially in developed countries, has changed over time due to technological advances offered by smartphones, computers, video games, television and various other equipment with which we interact with the least possible effort [6]. This has contributed to the fact that the level of physical activity in all age groups is decreasing, making people more sedentary and isolated [7,8,9].

Modernization and urbanization of environments, combined with changes in work and leisure structures, can be barriers to the development of active lifestyles in adolescents. On the other hand, the environment in which adolescents live can condition the levels of physical activity, being the involvement of family and school essential to stimulate healthy living practices, supporting materially and emotionally the practice of regular PA. About 80% of teenagers worldwide are currently estimated to practice less physical activity than recommended [10,11,12].

2. ADOLESCENCE AND PUBERTY

While adolescence is a multifactorial process involving physical, emotional, social, cognitive and cultural aspects, at this stage of life a fundamental biological phenomenon occurs to transform the child into a complete and reproducible human being, which is puberty, which can be understood as a biologically oriented process through which the mature body enters the adult state with changes in size, shape, function and appearance [13].

The spurt of pubertal growth is the most impressive aspect observed when the growth rate rises due to the increase in bones, muscles and all body systems. Adolescents exhibit a gradual linear increase in muscle mass and strength up to about 15 years for girls and 17 for boys, and these changes are associated with changes in body size and fitness of movement skills [14,15,16].

The linear growth that occurs during the pubertal spurt is the most easily observed phenomenon in adolescence, resulting from the composition of genetic, environmental, nutritional and social factors. In addition, height increase is also influenced by physical activity which can induce significant increases in circulating growth hormone and insulin-like growth factor (IGF-1) concentrations [17,18]. This linear pubertal growth is characterized by three phases: 1) growth spurt that contributes more than 20% of the final adult height; 2) acquisition of bone mineral content or peak bone mass, when the process of bone formation overcomes bone resorption; 3) skeletal maturation that ends with the closure of the epiphysis [13,17,18,19].

3. PHYSICAL ACTIVITY

Physical activity is a complex behavioral phenotype determined by the interaction of biological and psychological factors with the physical environment, and can simply be defined as any body activity that results in energy expenditure [1,20]. According to World Health Organization adolescents should be physically active daily as part of play, games, sports, transportation, recreation, physical education, or planned exercise, in the context of family, school, and community activities. Therefore, it is recommended that adolescents practice 60 minutes of moderate to vigorous PA every day to optimize health benefits [21,22,23].

The practice of PA is very important for the development and improvement of adolescents in morphological, physiological and emotional aspects due to the potential to improve their genetically determined physical capacity and the development of multiple skills to become a complete adult human being.

There is evidence that regular PA provides direct and indirect positive health benefits such as improved cardiorespiratory capacity, increased muscle capacity, strengthening of bone structure and changes in body composition, as well as reducing risks for emotional and metabolic diseases [16,24]. In addition there are benefits of AF for immediate and long-term bone health, since bone mass tissue is highly responsive to osteogenic stimuli [14,14,18,25]. PA-induced mechanical forces act on osteoblasts to form new bone tissue and [15,20,25,26] help to optimize peak bone mass through periosteal expansion, providing a more durable bone throughout life.

4. BENEFITS OF PA FOR ADOLESCENTS

The benefits of PA are numerous and can be classified into physical, emotional and social aspects.
1. Physical

Increase: Ref. [1,4,13,14,18,20,22,26,27,28,29]
Cerebral blood flow and circulating levels of endorphins, neurotrophic factor and hormones; angiogenesis and neurogenesis
Bone health, muscular fitness, strength, aerobic capacity, motor competence and endurance, healthy weight maintenance
Cardiovascular healthy (oxygen consumption, blood pressure, cholesterol and triglyceride levels)
Sleep quality, disease prevention and the treatment and rehabilitation

2. Emotional

Improve: Ref. [1,14,18,22,26,27,28,29,30,31,32,33].
Cognition measures: working memory, concentration, spatial learning, fine-tune interpersonal skill, academic achievement and classroom behavior
Mood, wellbeing, can alleviate symptoms of depression, anxiety and stress
Body image perception ability, self-esteem
Protection against the development of eating disorders
Conditions for treating mental illness

3. Social

Improve more effective communication and social connectedness
Develop quality peer relationships and team activities
Natural antidote for addictions of drugs, alcohol, cigarettes and marijuana
Ref. [1,13,18,22,26,28,34,35]

5. RISKS OF PA PRACTICE

The practice of PA may involve some risk for adolescents. However, they are considered very low compared to the potential health benefits [30]. The most frequent risks are: musculoskeletal injuries, osteochondrosis, tendonitis, apophysitis and fractures [18,36]. Therefore, to minimize these possible risks, the intensity of activities should be oriented according to the adolescent's body dimensions, maturity level and interest in practicing movements and developing natural activities. Also, choosing appropriate locations, times and weather conditions can also minimize the detrimental effects of physical activity.

6. STIMULATION AND ENCOURAGEMENT

According to WHO guidelines all adolescents, regardless of gender, ethnicity, race or income level, unless specific medical conditions indicate otherwise, should engage in physical activity. They should be encouraged to participate in a variety of physical activities that support the natural development and are enjoyable and safe. Whenever possible, adolescents with disabilities should follow these recommendations as long as they are under medical supervision to understand the types and amounts of physical activity appropriate for each person [23].

Although PA can be developed without prerequisites, it should be noted that social support from family and peers positively influences PA practice among adolescents [34]. Other factors such as social recognition, challenge and competition were identified as motivational elements, especially among boys [37]. In order to integrate certain communities emotional support with encouragement and minimal investment in physical resources can greatly increase the development of this behavior among adolescents [34,38].

In addition, school physical education can promote behaviors and skills related to emotional intelligence, such as empathy, self-concept, and altruism that trigger positive attitudes toward PA [39,40,41,42]. Therefore, it is very important to identify individual, cultural and social factors that may interfere with the PA, avoiding barriers that compromise this practice, such as unsafe environments, difficulties in accessing spaces for this practice and high costs related to public and private equipment [13,43,44,45,46].

7. CONCLUSION

There is evidence to suggest that behavioral levels of activities performed during adolescence may follow into adulthood [10,24,35,47,48,49,50]. Although the effects of chronic noncommunicable diseases manifest in adulthood, their development begins in childhood and adolescence [29]. As the adolescent's brain is malleable and susceptible to lifestyle and PA patterns are established during adolescence, the promotion of this practice offers a tool that helps to reduce morbidity and mortality related to chronic non-communicable diseases that occur in adulthood [12,27,35,51,52,53].
PA should lead the adolescent to an energy expenditure in pleasurable, motivating and recreational activities, allowing relaxation and the possibility of perceiving their own body [19,54,55]. Chronological age, physical, cognitive and social maturity, developmental physiology, and family social and cultural conditions should be considered when guiding PA among adolescents.

Finally, it is up to the wider community to promote active travel behavior as less traffic exposure, pedestrian infrastructure for walking and cycling, squares, parks and other public [56] spaces with facilities to encourage the practice of PA.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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