

Current Situation and Trend of Research on Physical Fitness and Health Promotion of International Youth: Entertainments from the ACSM 64rd Annual Meeting

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Abstract: The physical health of adolescents has become a worldwide problem, and physical intervention and health promotion are the focus of social attention. This article took the research of proceedings in the 64th American Association of Sports Medicine (ACSM) Annual Meeting in 2017, took the youth physical intervention and health promotion as the perspective, and systematically analyzed four sides: the international status survey, influencing factors, physical intervention and health promotion. Three characteristics have been found throughout this year's research papers: The research topic focuses on the overall trends of adolescents in different regions and the current situation and development of disadvantaged regions and special groups; the research method has certain innovation and pays more attention to the application of objective indicators; The center of gravity also shifts from the theoretical type to the application type. The current situation and trend of the international youth physical fitness and health promotion research have been more specifically grasped by analyzing the proceedings. With the hope that it will provide some reference for the development of macroeconomic policies and regulations for adolescents' physical health and the empirical research on target populations in China.

Keywords: adolescents; physique; health promotion

Adolescents are the root of the nation, and physical health is the soul of the nation. The health level of adolescents is related to not only the quality of life and future of the individual, but also the rise and fall of a nation and, it is important for measuring the comprehensive strength of a country. The 64th Annual Meeting of the American Academy of Sports Medicine (ACSM) was held in Denver, Colorado, USA from May 30 to June 3, 2017. In this paper, starting with the papers and special reports collected at this annual meeting, the research on adolescent physical fitness and health promotion is systematically sorted out and its innovation, research trends and problems to be improved are

evaluated, with a view to providing useful reference for relevant domestic research.

1. Investigation on the Physical Fitness and Health Status of Adolescents

1.1. Investigation on the Current Situation of Different Countries (or Regions)

Looking at the ACSM annual meeting, there are both correlation and differences in the research on adolescents' physical fitness. In this paper, "adolescent", "fitness" and "health" are used as keywords for systematic retrieval, and the research contents are systematically sorted out by the state as a unit. The comprehensive research mainly involves China, the United States, New Zealand, Ireland, Portugal, Mexico and other countries (or regions), and its research focuses on the status quo, influencing factors and interventions of adolescents' physical health. Among them, American scholars tend to study the related diseases, behaviors and health promotion of adolescents, while Chinese scholars focus on the comprehensive effects of physical activities (PA), life style, such as sedentary (SB) and physical health promotion of adolescents. Generally speaking, scholars at home and abroad have realized that adolescents' physical health is not optimistic, obesity and other physical health problems and physical health promotion with pertinence and effectiveness have become the focus of attention of scholars all over the world for a long time.

1.2. Investigation on the Current Situation of Special Areas or Groups

In this annual ACSM conference, the research on adolescents' physical health in special areas or groups in the United States, the Netherlands, Brazil and other countries is mainly concentrated on underdeveloped areas and groups with special diseases.

Research Status of Adolescents' Physical Fitness in Special Areas. American scholar Abigail et al. [1] found that daily physical education can promote adolescents' cognitive and health level when evaluating the influence of daily physical fitness on mobile intelligence and

physical fitness in the southeastern United States with backward medical conditions. American scholar Sharon [2] investigated the correlation between PA level and family support of SES girls from the perspective of family influence. The results showed that there was no significant correlation between PA level and family support, and there was a significant negative correlation between body mass index (BMI) and family support.

Research Status of Adolescents' Physical Fitness in Special Groups. Dutch scholar Takken [3] found that arterial stiffness in children and adolescents with chronic diseases and physical disabilities is associated with cardiopulmonary fitness and waist circumference. Research of American scholars Arij et al. [4] on premature infants shows that premature infants have lower maximal aerobic capacity in adolescence, lower stroke index and quality index than their normal counterparts, and lower resolution in extreme exercise.

2. Influencing Factors of Adolescents' Physical Fitness

2.1. Physical Activities

Physical activity has an irreplaceable role in promoting adolescents' physical fitness, which has been proved for a long time. Erin [5], an American scholar, has verified that the improvement of cognitive function is related to continuous participation in sports. Chinese scholars Gao Lulu et al. [6] explored the influence of improved Taiji on adolescents' physical fitness from the perspective of physical ability. American scholars Kyungun et al. [7] used meta-analysis to evaluate the effect of different types of exercise on visceral fat in obese adolescents. Studies show that the overall effect of exercise intervention on visceral fat in obese adolescents is greater. However, at present, the targeted measures and effects of sports intervention need further study.

2.2. Life style

The life style of adolescents has also changed accordingly with the development of society. Sedentary is the most prominent and has been identified as an independent risk factor for many health problems. A study of American scholars Seungho et al. [8] on Canadian adolescent SB shows that SB is related to muscle strength, but not to VO_{2max} and BMI. Spanish scholars Kayla et al. [9] assessed the association of PA and sedentary time with working memory capacity and academic achievement. Studies have shown that moderate PA may be beneficial to working memory, while SB may have adverse effects on working memory and academic performance, regardless of PA time.

2.3. Chronic Diseases in Adolescents

Obesity and overweight, especially in children and adolescents, have become an important public health problem, which may be related to heart disease and chronic diseases in adulthood. A tracking by the American scholars James et al. [10] for ten years shows that obese children and adolescents have an increased risk of overweight and obesity as adults, and a higher risk of chronic diseases and heart disease. Chinese scholars

Guo Qiang et al [11] conducted a study on 18,424 children and adolescents in six provinces in China, showing that the weight status of children and adolescents in China is closely related to the "U" type of PA. Therefore, BMI monitoring should start from adolescents and even children.

2.4. Sports Injury

Sports injury is one of the important factors affecting adolescents' physical health. Swedish scholars Julia et al. [12] studied the effect of daily musculoskeletal pain (MSP) on quality of life (QoL) and performance of adolescents who participated in sports. The results showed that MSP had a negative impact on QoL of adolescents, and was negatively correlated with male sports performance. Brazilian scholars Andrea et al. [13] used multiple linear regression method to analyze the correlation between genu valgus and PA. The results showed that genu valgus had no effect on the physical activity level of male adolescents.

3. Adolescent Physical Intervention and Health Promotion

3.1. Implementing Institutions of Adolescent Physical Intervention

Physical Education and Related Courses. Schools are regarded as the best place to control and reduce obesity among adolescents. Mexican scholar Marco [14] studied the effect of PA and nutrition counseling on physical health of school-age children and adolescents in Monterrey. It showed that metabolic behavior may change, and increasing the duration of PA combined with nutrition counseling was an effective method for comprehensive treatment of obesity. American scholars Megan et al. [15] explored the repetitive training of middle school students with employment as the core development curriculum and monitoring the level of PA, and found that employment-centered curriculum could solve academic performance and provide feasible choices.

Extracurricular Sports Activities. Extracurricular activities play an important role in improving hygiene and health, setting goals and solving problems. Chinese scholars Qin Xiong et al. [16] further tested the view that increasing the total time of PA after class can promote physical fitness by means of questionnaires and self-assessment. In addition, American scholar Jennifer [17] had come to a similar conclusion that after-school fitness programs and informal health and nutrition science curriculum interventions can promote the cognitive and scientific achievements of sedentary middle school girls. It can be seen from the above that school recess period is a part of school physical education intervention, which can provide opportunities for structural health care services, especially for young girls.

School Sports Program on Holidays. New Zealand scholars Myung Dong et al. [18] pointed out that summer school curricula have a positive effect on adolescents' physical fitness and cardiovascular system, especially in underdeveloped areas, in view of the effect of summer

school curricula on female adolescents' systemic blood inflammation and oxidative stress. The research in this field is still in its infancy and needs to be further explored.

3.2. Intervention Methods and Contents of Adolescents' Physical Fitness

Exercise Intervention. Exercise intervention is currently the most commonly used method of adolescent physical intervention, and the content of intervention is also constantly enriched. Chinese scholars Li Xin et al. [19] analyzed the cardiopulmonary function and BF% of adolescents and found that aerobic training improved cardiopulmonary fitness. American scholars Shlomit et al. [20] explored the effect of acute strenuous exercise on plasma metabolism in healthy adolescents. The results showed that plasma metabolites induced by exercise were mainly related to bioenergy, oxygen uptake and amino acid metabolism.

Comprehensive Intervention. The correlation between PA and endocrine regulation and positive dietary changes has long been confirmed. Among them, energy and metabolic markers can promote and inhibit satiety, and play an important role in weight gain or weight loss. Mexican scholars Marco et al. [21] explored the effects of intervention on metabolic behavior of children and adolescents by measuring and analyzing the changes of metabolic markers, and found that the combination of exercise and nutrition counseling was closely related to metabolic and sleep parameters, and that changing diet and increasing the duration of physical activity was one of the comprehensive treatments for obesity.

New Intervention Methods. The research on intervention methods of adolescent physical health is in the ascendant, and more and more new methods are used, for example: Chinese scholars Zhang Tao et al. [22] evaluated the measurement and structural parameters of the participants' attitudes, perceived behavioral control, behavioral intentions and self-reported PA behavior, which provided some support for the strengthening relationship between behavioral intentions and PA. American scholar Shlomit [23] analyzed the effects of 28 individualized exercise interventions on attention, processing speed, inhibition control and transfer of healthy adolescents' executive function, and found that individualized exercise intervention had a certain promoting effect on adolescents' physical fitness. Brazilian scholars Wagner et al. [24] analyzed the effect of exercise prescription on cardiopulmonary function of obese adolescents under different exercise intensity recommended by ACSM, and found that exercise prescriptions based on ACSM recommendation had the following effects on cardiopulmonary function: 60% VO₂max, 70% HRmax and ventilation threshold.

4. Enlightenment to the Study of Adolescent Physical Fitness in China

Through the study on PA, SB, nutrition and diet, it can accurately analyze the reasons that affect the physical health of adolescents, and to some extent improve the

safety of adolescents' sports. However, there are few studies on the impact of single and multiple factors and related mechanisms, which need to be further studied.

With regard to adolescent physical intervention and health promotion, a sound mechanism of "family-school-society" linkage should be formed. On the basis of scientific nutrition and fitness, an extracurricular fitness program that matches the curriculum should be formed to promote the rational use of school recess time, and the holiday school sports program and specific courses should be appropriately set up to reverse the decline trend of Chinese youth physical fitness.

As an international academic exchange platform of sports medicine, ACSM annual meeting collects the latest papers on physical health promotion of adolescents from many countries. It contains a large number of papers covering many countries, covering a wide range of areas, unique perspectives and strong practicability. China should actively encourage and create opportunities for teachers and researchers to participate in the conference, which can not only show the achievements of sports medicine research in China, but also learn from the advanced ideas and methods of foreign countries.

5. Conclusions

The monitoring and investigation of adolescents' physical fitness has become the main content of adolescents' health management and school education all over the world. Obesity and sedentary behavior are the main factors affecting adolescents' physical fitness and health, and they are also the focus of attention in various countries. Physical intervention and health promotion of adolescents in economically underdeveloped areas and special groups will become the focus of research.

Regarding physical fitness and health promotion of adolescents, a sports education model integrating physical education, extracurricular activities and inter-school sports should be formed on the basis of scientific nutrition and fitness, and a management mechanism of "parent-school-society" linkage should be established so that the scientific, informative, portable and wearable trend of teenagers' physical fitness monitoring and evaluation are really available in the schools.

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