



Construction of adolescent physical health promotion system from the perspective of whole life cycle

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Abstract. Health is an issue of great concern at the national, social and individual levels. The whole cycle protection of people's health has risen to the strategic goal of our country. The adolescent stage plays an important role in the chain of human life cycle health management. This study uses literature review, logical analysis and other research methods to analyze the health problems, health risks and factors leading to these problems in the adolescent stage, and to find solutions to the problems. The main conclusions of this study are as follows: (1) At present, adolescent health problems are mainly reflected in body shape and myopia, among which obesity and scoliosis will become important hidden dangers of chronic diseases in middle and old age; (2) The main factors leading to adolescents' physical health problems are unhealthy lifestyle, including unhealthy diet, irregular work and rest, sedentary, etc.; (3) It is imperative to build a multi-agent collaborative adolescent physical health promotion system. An adolescent physical health information system that is shared by the government, schools, communities and families based on the physical examination and physical test data of adolescent students is established. Schools and community hospitals provide personalized services such as exercise prescriptions, meal matching programs and health guidance to teenagers in need. And work with families to actively implement, build a multi-subject collaborative promotion system, and jointly achieve the ultimate goal of promoting the healthy development of adolescents.

Keywords: health management, whole life cycle, adolescent physical health.

1 Introduction

The concept of "Managed Care" first appeared in the 1950s in the United States, which refers to the comprehensive use of modern medicine, traditional medicine, medical technology and other means to comprehensively detect, evaluate, effectively intervene and continuously track the medical behavior and process of individual or group health status and risk factors affecting health.^[1] The initial purpose of health management is to use limited medical resources to serve more elderly people. With the coming of China's aging society, health management has gradually begun to develop, the first health

management company in China in 2001, after experiencing the SARS crisis in 2003, health management related service institutions have increased significantly.^[2]

2 Health management is the direct manifestation of the change of China's health view

2.1 The "treatment" as the center to the "treatment of disease" as the center

After 20 years of development, China's health management on the basis of drawing lessons from foreign experience and combining with Chinese traditional medicine theory, put forward the health management concept in line with China's national conditions: Based on modern health concepts, new medical models and the idea of treating diseases in China, combined with the theories, technologies, methods and means of modern medicine and modern management, comprehensive and continuous monitoring of the health status of individuals and groups and their risk factors, analysis and assessment of risks, effective intervention, and continuous tracking services.^[3] The essence of health management is to mobilize the enthusiasm of individuals, groups and the whole society, in the aspect of human health prevention before it happens, to nip potential diseases in the bud or eliminate the hidden dangers of disease, to establish the concept of great health and great health, from the "treatment" as the center to the "treatment of disease" as the center.

2.2 The whole life cycle health management is a comprehensive care for human health

We will make people's health a strategic priority, focus on popularizing healthy living, optimizing health services, improving health security, building a healthy environment, and developing the health industry, accelerate the construction of a healthy China, and strive to ensure people's health in all aspects and throughout the whole cycle.^[4] The speech of President Xi Jinping at the 2016 National Health and Wellness Congress emphasized improving people's physical health at all stages (See Figure 1). The whole life cycle health management is to continuously supervise the medical and health service process of the whole life cycle from the birth of life to the end of life, and to monitor, evaluate and intervene in the medical behavior and process of the factors affecting human health at different stages.^[5] The health management system of the whole life cycle can implement targeted prevention and treatment according to the psychological characteristics, disease types and risk factors of the population at different stages, and according to the different health problems faced by the residents in the life gestation period, infant period, adolescent period, adult period and elderly period, so as to improve the health level of the population, extend the healthy life expectancy and achieve high-quality health management.^[6] At the same time, it can reduce medical costs, maximize health effects from limited medical resources, and help achieve the goal of healthy China.

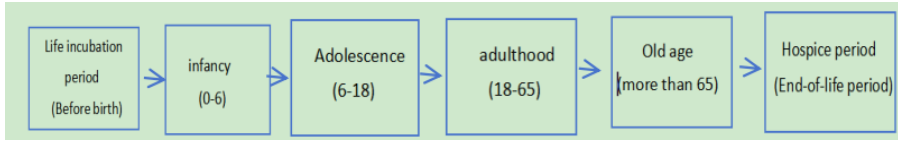


Fig. 1. The main stage of the whole life cycle

3 The necessity of building a physical health promotion system for adolescents under the concept of whole-life cycle health management

3.1 Adolescence is an important stage in the whole life cycle chain

The healthy growth of young people is an important symbol of national prosperity, national prosperity, social civilization and progress, family harmony and happiness, and an important basis for realizing the "Chinese Dream" of the great rejuvenation of the Chinese nation. The physical and health of young people are in a very important position for the country, society and family. Adolescence is also a very important period, because research shows that the health of individuals and groups is closely related to the behavior patterns formed in the first 20 years of life.^[7] About 90% of obese children will develop into obese adults, and 43% of children with high blood pressure will develop hypertension.^[8] The World Health Organization has given a health formula that health = 15% genetic + 10% social + 8% medical + 7% climate + 60% lifestyle.^[9] It can be seen that the factors affecting people's health in modern society have changed from simple biological genetic factors to a variety of comprehensive factors such as lifestyle, climate environment, social environment and medical services, among which lifestyle is the main factor affecting health. Adolescents are in an important stage for the establishment of outlook on life and values, as well as a key period for the formation of behavior habits. During adolescence, health promotion, health management and other methods should be used to effectively intervene in behavioral factors affecting their health, establish a practical and effective physical and health management and intervention system for students, and promote them to develop a healthy lifestyle. It is of profound significance not only to improve teenagers' physique and health, but also to people's lifelong health.

3.2 There are major health problems and hidden dangers during adolescence

Teenagers (6-18) are the most vigorous stage of human growth and development. Compared with infants, middle-aged and elderly people, the incidence of diseases is relatively low. However, due to the high-intensity learning tasks and heavy pressure of studying in this stage, coupled with the prevalence of electronic products, the change of transportation mode and the excessive abundance of nutrition, teenagers in this stage are under heavy pressure. It leads to an increase in sedentary behavior and a sharp

decline in physical activity among adolescents, leading to certain health problems and potential risks during adolescence.

1) Teenagers have great hidden dangers in body shape.

There are two extremes of adolescent body shape problems, namely thinness (malnutrition) and obesity, as well as poor body posture. Data from the sixth national Health Service Survey conducted by the NHC in 2018 shows that: The prevalence rate of malnutrition, overweight and obesity among adolescents aged 6-18 was 16.2%, 11.4% and 11.8%, respectively. There was no significant difference between the rural population and the urban population in the malnutrition rate. The overweight rate of the urban population was 12.1% higher than that of the rural population, and the obesity rate of the rural population was 12.7% higher than that of the urban population.^[10] (See Table 1) In addition to malnutrition and obesity, adolescents have poor body posture, mainly manifested as scoliosis, hunchback, straight back, etc. Scoliosis has become one of the health hazards of Chinese children and adolescents. A survey of 4531 students from grade 4 to Grade 3 in 16 primary and middle schools in 4 districts of Shanghai shows that The field detection rate of scoliosis was 7.4% and the prevalence rate was 2.2%. Scoliosis will not only affect the growth and development of adolescents, but also lead to spinal canal stenosis, affect cardiopulmonary function, dyspnea and other clinical symptoms, resulting in appearance deformity and psychological distress, seriously endangering the physical and mental health of adolescents.^[11]

Table 1. Impact of the sixth National Health Service Statistical Survey on children and adolescents aged 6-18 years

group	total	city			village				
		total	The east	Middle part	The west	The east	Middle part	The west	The east
Prevalence of malnutrition%	16.2	16.1	15.4	15.9	16.9	16.3	15.5	16.1	17.0
Normal weight detection rate%	60.6	61.1	61.2	58.7	63.0	60.2	61.6	60.5	59.2
The detection rate of overweight%	11.4	12.1	12.5	13.6	10.4	10.8	11.4	11.3	10.0
Obesity detection rate%	11.8	10.8	10.9	11.8	9.7	12.7	11.5	12.1	13.8

Source: Sixth National Health Service Statistical Survey

2) The problem of myopia among young students cannot be ignored.

According to the National Survey Report on Myopia of Children and Adolescents released by the National Health Commission, the overall myopia rate of children and adolescents nationwide in 2018 was 53.6%, of which the incidence of myopia among children aged 6, primary school students, middle school students and high school students was 14.5%, 36.0%, 71.6% and 81.0%, respectively.^[12] Three years later, the "Report on the Prevention and Control of Myopia in Children and Adolescents in the Information Age" released by Professor Li Ling's team at the China Health Develop-

ment Research Center of Peking University shows that the prevalence of myopia in children and adolescents in China in 2021 has exceeded 60%, and there will be at least 960 million myopic people in the whole population in the future. In the three years from 2018 to 2021, the incidence of myopia in children and adolescents increased from 53.6% to more than 60%, and if it is not effectively controlled, the proportion still has an upward trend. Nearsightedness has become an important factor that seriously threatens the health of the youth in our country, which not only hinders the individual development of our children and youth, but also brings significant harm to our social and economic development and even national defense security.

3.3 The existing lifestyle of adolescents affects their physique and health

Whether it is malnutrition, obesity or myopia, it is inseparable from the lifestyle of teenagers. Bad habits such as not getting enough sleep, skipping breakfast or eating junk food, and spending too much time on mobile phones and computer screens are common among teenagers. According to the survey results of the Institute of Child and Adolescent Health of Peking University in 2019, 76.2% of Chinese children and adolescents eat sweets (including candy, cake, chocolate, sweet soup, etc.) less than once a day, and 12.8% of students eat sweets once a day or more. 76.8% of Chinese children and teenagers eat fried food (such as churros, fritters, French fries, fried chicken wings, etc.) less than once a day, 7.6% of students eat fried food once a day or more.^[13] According to a 2020 study, about 20% of teenagers watch TV for more than 4 hours a day on average, more than 60% of children begin to contact the Internet during the age of 6-10, and the eye time of short video software accounts for more than 20% of the total time of young people's online entertainment life.^[14] Adolescence is an important period to develop behavioral habits, at this stage to intervene and guide their habits, so that they can establish a healthy lifestyle, not only to avoid some diseases in adolescence, but also to bring greater benefits to lifelong health. Healthy lifestyle includes healthy diet, regular work and rest, scientific physical exercise. Healthy diet advocates smoking and alcohol restriction, balanced diet, reasonable combination of various foods, eating less and more meals, reducing sugary carbonated beverages and various additives in drinks and food.

4 Construct the adolescent physical health promotion system from the perspective of the whole life cycle

It is a comprehensive social problem to promote the healthy development of adolescents' physical health. From the perspective of adolescent health management, it includes the protection of adolescents' physical growth, intellectual development, mental health, disease protection, life safety education and health education. The subjects involved include government, school, community, family and individual adolescents; From the perspective of using means, it includes strengthening health publicity and education, raising adolescents' health awareness, providing adolescents' physical monitoring services, providing personalized exercise prescriptions, and establishing a

comprehensive evaluation system of health promotion effect. The construction of adolescent physical health promotion system is conducive to the transformation of adolescent health management implementation path from fragmented and piecemeal actions to collaborative governance, and promote the "co-construction and sharing" of social resources.

4.1 Main body and responsibility of adolescent physical health promotion system

1) The Government shall provide all-round services to promote the physical health of adolescents.

As an important body in the youth sports and health promotion system, the government should make top-level design and overall arrangement from the macro aspects in the formulation of policies and regulations, the construction of public facilities, financial investment and legal protection. a) In terms of policies and regulations, strengthen the overall planning of adolescents' physical health promotion, formulate policies conducive to reducing the pressure of adolescents' studies and further studies, organize professionals to develop policies encouraging adolescents to participate in physical exercise, and take students' physical health needs as the guide. Continuously change the supervision and evaluation mode of school sports, health education, health care services, etc. b) In terms of public facilities, strengthen the investment in other bodies of the adolescent physical health promotion system. For schools and communities, the government should increase the investment in hardware facilities, so that schools and communities at different levels have basic sports facilities. Enabling young people to participate in physical activity anytime and anywhere in their free time, especially in smaller schools and older communities, is a focus. Strengthen the training of physical education and health education teachers. c) In terms of financial investment, increase funding investment and policy guidance, and promote the construction of a "long-term" operating mechanism for the network adolescent physical health promotion system and cooperation between various organizations. We will increase funding for policy support and nutritious lunches for students. d) In terms of laws and regulations, constantly strengthen the construction of laws and regulations, promote the transformation of social norms, and effectively provide legal protection for the healthy growth of students.

2) School is the main service carrier of adolescent physical health promotion system.

School is the main activity field of adolescent period, and is the main service carrier and responsibility subject of adolescent physical health promotion. Implement the school's responsibility to help students develop a healthy mind and body. Regularly carry out various forms of life and health education, promote students' respect for life, conduct health knowledge lectures, cultivate a healthy lifestyle, strengthen students' physical exercise in school, and ensure that students have at least one hour of activity time in school every day. Schools at all levels should fully study and implement the national physical education and health curriculum standards, pay close attention to their implementation, avoid one-sided emphasis on academic performance at the cost of students' health, and local governments should reasonably arrange student assessment

and comprehensively evaluate the quality of students. The national physical fitness test is carried out every school year, the data is uploaded to the physical fitness and health information system for young students, and the data information is shared with the community and family. Exercise prescriptions are formulated according to the physical conditions of different students, so that students can exercise in physical education classes, physical exercise classes and extracurricular sports activities in a targeted manner, so as to effectively improve their physical health. Community hospitals based on the shared data, combined with the physical examination results of students, do a good job of health monitoring, to prevent the occurrence of diseases. At present, our students' physical health information management system is biased towards macro statistics and analysis of data, and lacks personalized data analysis and follow-up tracking; The participants are relatively simple, lacking the participation of medical and health departments, and lack of feedback and interaction with students and parents.

3)Community hospitals provide medical security for the adolescents' physical health promotion system.

Community hospitals play the role of physical examination, supervision and promotion in the adolescent system and promotion system. In cooperation with schools, they regularly perform physical examination for adolescents every year, establish student physical examination files, focus on supervision of students with health risks, and screen and classify adolescents based on the results of physical examination of adolescents in the shared database. Then, according to the health problems and risk factors of different populations, health improvement targets are formulated, and targeted intervention measures are selected on this basis to achieve the purpose of effectively reducing risk factors. Preventive health management for healthy people, health intervention for high-risk groups, and health management services for sick people. Through lectures and practical activities, the community should improve parents' physical and health knowledge reserve, exercise ability, and health awareness level, promote the formation of family healthy behavior pattern, and provide family environment for the healthy growth of adolescents.

4)Families provide the fundamental driving force for adolescents' physical health promotion system.

Family is an important field of young people's life, and parents, as children's first teachers, have a direct impact on the formation of young people's values, living habits, interests and hobbies. The exemplary role of parents plays an important role in the process of youth lifestyle training, especially parents to maintain a healthy diet, regular work and rest time, regular physical exercise and other aspects can subtly affect children to establish a healthy lifestyle. Parents should pay attention to the physical examination results and physical test data of teenagers, timely discover the problems and hidden dangers in physical fitness and health of children, actively promote physical exercise for children, and jointly promote the healthy development of adolescents with schools and communities.

4.2 Operation mode of adolescent physical health promotion system

Cooperate with schools, community hospitals, families and other promotion system subjects to establish a big data platform based on the physical examination and physical test results of adolescent students, the investigation of student health risk factors, and the health records of residents of grass-roots community hospitals, so as to form a shared physical and health information system for adolescent students.^[15] To analyze the physical and health status of different groups and individuals, attach importance to the follow-up management of physical examination and physical examination of young students and intervention of behavior patterns, especially for the overweight, obesity, obvious lack of exercise and physical examination results of young people fail to develop exercise prescriptions, strengthen the scientific guidance of physical exercise for young people. Parents conduct dynamic supervision of their children, and link schools to conduct real-time electronic records of children's daily health behavior activities to form health track files. The new network technology based on the Internet is used to strengthen the effectiveness and quality monitoring of physical health management, and provide data reference for children's behavioral health monitoring.

5 Conclusions and Suggestions

5.1 Conclusion

The concept of health in our country has changed from "treatment as the center" to "health as the center", and the establishment of healthy life style is an effective means to prevent diseases at all stages of the whole life cycle. The adolescent period is an important stage to develop good living habits and establish a healthy lifestyle. The effective intervention of behavioral factors affecting their health by health promotion and health management in the adolescent period is not only of profound significance to improve their physical health level, but also to their lifelong health. Therefore, it is imperative to build the adolescent physical health promotion system for the high-quality and healthy development of adolescents and the whole life cycle.

5.2 Suggestions

To build the adolescent physical health promotion system, it is necessary to cooperate with the government, schools, communities, families and individuals, establish a big data platform based on the physical examination and physical test results of adolescent students and the investigation of students' health risk factors, and form an adolescent physical health information system shared by the government, schools, communities and families. Schools and community hospitals provide health guidance. According to the monitoring results, personalized services such as exercise prescriptions, meal matching programs, and health guidance are provided to teenagers in need, and feedback mechanisms are established to exercise the right of supervision, so that students with problems in physical tests and physical examination results can actively complete

necessary tasks under the supervision of their families, and multi-subject cooperation can achieve the ideal effect of promoting the healthy development of teenagers.

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