

RESEARCH PROGRESS ON ADOLESCENT SPINE HEALTH EDUCATION

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Abstract: With the development of science and technology causing great changes in lifestyles, abnormal body posture and spinal health problems among adolescents have become new public health issues. A systematic review of relevant external studies was carried out, and the content, education objects, education timing, teaching models and evaluation methods of adolescent spine health education were sorted out. Based on this, the Recommendations for spinal health education for adolescents include: Develop a spinal health education program based on the theoretical framework of social sciences, using a teaching format that combines theory and practice style and explore the “student-centered” teaching model; The content of spine health education should include basic knowledge, knowledge of posture habits and knowledge of sports exercises; Should be guided by knowledge Evaluate spinal health education from dimensions such as grasp, skills, daily behavioral habits, and self-efficacy. Students, parents, and teachers should be included in spine health education programs.

Keywords: Spine; Health education; Teenager

1 TEACHING CONTENT OF SPINE HEALTH EDUCATION FOR ADOLESCENTS

China in 2019 Diseases of low back pain in children and adolescents aged 5 to 14 years old Burden ranks first 10. Neck, shoulder, lower back pain is common among children and adolescents. Occurrence [1-5]; The number of adolescents with scoliosis in my country exceeds 5 million, and every year The number increased by 300,000, becoming a prominent health problem.

Spinal health in children and adolescents may be related to genetics, trunk asymmetry and and behavioral factors (such as incorrect posture, incorrect backpacking method, close proximity (vision, academic pressure and sedentary lifestyle, etc.) Related [5-7]. study Researchers believe that because of its huge population base, schools can continuously provide feedback [8] and have the ability to help students master the knowledge and skills required for health. Huge potential [9]. Given students’ knowledge of spine health Extremely lacking [10], therefore, to improve spinal health, we should carry out spinal education based on schools. Pillar health education is very important.

At present, relevant domestic research is concentrated in the medical field on specific Patient health education, a study on adolescent body posture Using a combination of health education and exercise intervention in physical education classes, and exercise intervention accounts for a large proportion, it is impossible to draw conclusions about the effectiveness of health education. On [11]. There is no discussion on how to carry out spinal health education in primary and secondary schools. Detailed research. Although there is a certain amount of research accumulation abroad, there is no Specific guidelines. Therefore, it is necessary to sort out the existing information about student spine in foreign countries. Health education literature, summarizing effective spine health education methods method and content, providing theory for carrying out adolescent spine health education in China support.

Cardon et al [12] summarized ten principles of back health and divided them into as the core content of their series of spine health education studies. according to According to this principle, Cardon et al. [12] first conducted a test on students 6 times of back health education, using cartoons, games and a large number of materials, so that the principles of back health can be conveyed to children in an easy-to-understand and attractive way. The results of the study showed that the back health behaviors and knowledge of students in the intervention group were significantly lower than those in the intervention group. Grip was improved. The research results of Dolphens et al. [13] showed that short-term health Health education can improve students’ spinal health knowledge as adults, but it does not Utilization of spine health behaviors, self-efficacy, and pain prevalence did not. Influence. On the basis of this research, Cardon et al. [14] further discussed the Effects of adding physical activity promotion content to back health education. Knot Results show that while increasing physical activity promotion content increases physical activity.

The comprehensive intervention method adopted by Geldhof et al [15] includes physical therapy Professor Therapist 6 lessons, distribution of educational materials to class teachers, in the classroom Multi-factor intervention, encourage class teachers to teach students activity methods and change Class layout, etc. The results of the study showed that the back health of students in the intervention group Improved knowledge and self-reported ability to apply back posture principles for daily life; However, the postures and postures of the intervention group and the control group when studying were The difference in pain incidence was not statistically significant. Dullien et al. [16] conducted a total of intervention on primary school students. 5 classes, including back health knowledge and posture awareness Exercises and core strength exercises 3 aspects of content. The results show that dry The incidence of back pain and core muscle endurance test in the pre-intervention group and the control group There was no statistical significance in the experimental differences, but the incidence of kyphosis decreased, dry The movement habits and knowledge test scores of the pre-group moving boxes were significantly improved. Vi- cente et al [17] on fifth grade

students intervention adoption 7 health education classes, including 1 theory lesson and 6 practical lessons, students' performance after intervention Spinal health knowledge and postural habits improved significantly but intervention ended 1 These improvements subsided after a few months. Blanco-Morales et al. [18] carried out In addition to teaching students spinal health knowledge and stretching exercises, spinal health intervention learning methods, and also adopts the cooperation method of students, teachers and researchers to develop Make posters, carry out occupational injury prevention projects, and encourage students to actively participate project, results showed that students' knowledge of spine health after the intervention get promoted.

In addition to the above intervention time exceeding 1 month or more class hours research, and some scholars have explored health education that is short in time and frequency. Effect. "Ergonomics Health Promotion Project" in Malaysia " (Ergonomic Health Promotion Program, EHPP) only Conducted by professionals to students 2 times duration 30 min courses, and also distribute posters, leaflets, brochures and teaching videos. After the intervention, the students in the intervention group increased their understanding of ergonomics and improved their sitting posture. Good, the weight of the schoolbag is reduced [19]. Minghelli [20] The research is conducted by Physics The therapist conducts 1 times duration 90 min A course that combines theory and practice. The results show that immediately after the course ends, after the course ends, In one month, students' various behavioral habits such as sitting, using schoolbags, and tying The incidence of incorrect methods such as talking on the phone and lifting heavy objects is greatly reduced. The above two studies suggest that if class time and teachers are tight, targeted health education should be carried out at a longer interval to target certain specific problem points. Education can also achieve better results. In addition, students' sitting performance is regularly assessed ergonomic problems can be discovered in a timely manner, and desks, chairs and study equipment can be matched in a timely manner. Birth height is also important in preventing spinal problems in students. Hill et al [21] taught students 4 simple spinal exercises, and provide cards about specific exercises for subjects to stick in a place where they can often see them, and ask them to learn them. It is best for students to practice every day 1 time, every time 3 groups. But researchers are 9 During the monthly follow-up, it was found that as time went by, students' reliance on practice Compliance is greatly reduced.

Given that it is time-consuming to rely on professionals to conduct health promotions on a school-by-school basis, It is too long and cannot cover more schools. Park [22] explored the difference in effectiveness between online and offline health education and found that both can significantly improve Students' spine health knowledge, practice, and self-efficacy scores. researcher Members believe that online spinal health education can extend health education to schools It is a health education method that can be promoted by doctors, teachers and parents.

Calvo-Munoz et al. [23] conducted preventive intervention on the back of children and adolescents. related research on Meta- analysis, results show changes in children and adolescents In terms of back health behaviors, relevant knowledge and behavioral habit correction are combined The effect of combined health education content is better than that of teaching relevant knowledge alone health education; A teaching method that combines theory and practice is better than a single Theoretical teaching. Studies have shown that after intervention, students' health knowledge and Some health behaviors have some improvement, but there are many is not applied to daily life and students' self-efficacy does not significantly improve Good, believes it is very difficult to change children's spine health-related behaviors, Behavior is likely to change only when the cognitive factors of the behavior change Change [21]. Therefore, scholars have begun to pay attention to the theoretical framework of behavior change. refer to guide Down open exhibition ridge column healthy Healthy teach Education. Akbari- Chehrehbargh et al. [24] explored the impact of spinal health education based on social cognitive theory on improving Effectiveness in changing student behavior. The health education used in this study Contains beliefs, knowledge, skills and self-efficacy 4 aspects of content. After the intervention, the experimental group's back health behaviors, knowledge, skills, and self- efficacy Scores on each dimension of belief were significantly improved. This scholar believes that palm Grip-based learning can effectively promote students' skill acquisition and may also be beneficial to themselves. Improvements in efficiency have important consequences.

In addition to designing a relatively comprehensive health education plan, there is also the need to learn The researchers conducted specific research on the micro aspects of spine health education. have Scholars have conducted specialized research on specific carriers of spine health knowledge. Cardoso et al. [25] discussed the use of comics and puppet shows to educate primary school students. The effect of body posture health education for students. There are also scholars surrounding the ridge Targeted interventions were carried out to identify specific risk factors for health. Ro - driguez-Oviedo Wait [26] for Teenagers aged 12 to 16 carried out backpacking Related health education to reduce back pain, Sara et al. [27] 9~10 young Students received health education on ergonomics of using computers, Use the "problem-solving" teaching model to allow students to identify when they are using computers Correct and incorrect postures when thinking.

2 PARTICIPANTS OF ADOLESCENT SPINAL HEALTH EDUCATION

the form of researchers teaching directly to students. However, from the perspective of practical application and promotion, relying entirely on professionals to carry out health education in schools one by one for a period of time is time-consuming and labor- intensive, and it cannot cover more schools. Therefore, the feasibility of incorporating school teachers into spine health education programs needs to be explored. In a school environment, since class teachers spend the most time with students, they are more likely to discover students' health problems, but they lack professional knowledge in health. Surveys show that teachers' knowledge of body posture and spinal health is very weak [28]. Therefore, scholars included head teachers in the spine health education program and conducted an exploratory study.

Cardon [29] randomly divided fifth-grade primary school students into an intervention group with additional guidance from the class teacher, an intervention group without additional guidance from the class teacher, and an intervention group without additional guidance from the class teacher. Control group to explore the role of head teachers in spine health education. The results showed that the post-intervention behavioral test of the intervention group with additional guidance from the head teacher and observation scores were higher than those of the intervention group without additional guidance from the head teacher, in knowing There was no statistically significant difference between the two intervention groups in the recognition test scores. Spinal health education with the participation of head teachers has better results, but the effect is The results are reflected in daily behavioral habits, and the consolidation of knowledge is not obvious. show effect.

it is indeed difficult for school teachers to carry out spine health education, such as how to convince teachers to teach students in schools that are already full. Add new content to course teaching and how to train teachers so that Enabling teachers to confidently teach content to students, etc. Cardon et al [29] believe that class teachers should play an important role in strengthening the implementation of spinal health projects and providing long-term feedback, rather than teaching health. Health knowledge. However, the premise is that teachers recognize spine health education and have the initiative Observe agency to implement health education programs.

Cardon [30] also explored parents' role in children's health education. role, the study additionally asked parents 1 health presentation, research results showed that although parents in the intervention group had higher back health knowledge scores, Parents' back health knowledge scores and children's back health knowledge scores There is no correlation between the scores. But at the same time, after health promotion, 75% of Parents checked their children's posture, suggesting that health education for parents can be improve Home long right body body posture Stateful Heavy See Procedure Spend. Jankowicz - A survey by szymañska et al. [31] showed that parents' understanding of children's body posture Solutions are quite scarce, only 25% of parents have been exposed to risk factors for body posture knowledge about elements. Therefore, it is important to strengthen spinal health education for parents very necessary.

To sum up, the targets of spine health education should include students and the whole society. school teachers and parents to ensure that students receive regular information about their spine Feedback on healthy behaviors to better develop spine healthy behaviors.

3 THE TIMING OF SPINAL HEALTH EDUCATION FOR ADOLESCENTS

3.1 The Duration of Spine Health Education in Existing Studies

The duration of spine health education starts from 1 course arrives 15 weeks or less, healthy The frequency of recreational education courses is mostly every other week 1 time, spine health education effect The tracking time is from Arrive in 2 months It ranges from 8 years. Although some studies have shown that expired 12 weeks of intervention, at the end of the intervention After 2 years, students in the intervention group Still able to apply learned back health behaviors to sitting and lifting movements [15], but because this study used questionnaires to collect students' own I report results, therefore, whether the effects of spine health education can be sustained Continuation into adolescence is questionable. Dolphens etc [13] right 9~ 11 young students conduct 6 times of back health education, discover short-term health education Prevalence of spinal pain, spine health behaviors, and self-efficacy in adulthood None can have an impact. Minghelli etc [32] Compared for each class separately 3 lessons (every time 45 min) and for all students 1 Lessons (90 min), it was found that the former can better promote students' knowledge and skills. Since existing studies are all short-term interventions, more objective evaluation methods should be used in the future to explore the effects of long-term intervention on adolescent spine health. health behaviors and self-efficacy.

3.2 Among the Existing Research Evidence for the Age Groups for Spine Health Education

Most studies focus on primary school students in fourth to fifth grade (9 to 11 years old) carry out ridge pillar health education, there are also a few studies using junior high school students or high school students as intervention object. Research reports that the incidence of low back pain in adolescents increases with age It increases with growth [33-34]. The age group of 10 to 14 years old is the age group in which the incidence of low back pain increases significantly [35]. Some scholars have also found that Back pain before 9 to 10 years old The incidence of pain increases rapidly [36], and it is easy to relapse in adulthood [37]. possible is the choice for most studies An important basis for students aged 9 to 11 years old. With the near The dramatic changes in lifestyle over the past two decades, the age at which back pain is most common among teenagers Whether the segment moves anteriorly is unclear. Taken before and during this age mark Corresponding intervention measures can prevent the recurrence of neck, shoulder, lower back pain in adulthood should be very critical. More information should be added to the health education curriculum at the primary school level Multi-spine health-related knowledge. Study confirms that primary school students are more concerned about back health Have good receptivity to knowledge and behavior [16]. Therefore, combined with the research evidence on the duration of spine health interventions, future consideration should be given to Pillar health education runs through health education from primary school to high school, and The content of spinal health education needs to be adapted to the cognitive development level of students. To sort out the scientific teaching sequence.

4 TEACHING MODEL OF SPINE HEALTH EDUCATION FOR ADOLESCENTS

Although some studies attempt to stimulate students' initiative in intervention [12, 18], but most studies adopt the "teacher-centered" teaching model. The "teacher-centered" teaching model is a teaching model that focuses on concentrated lectures and indoctrination in the classroom, and is also a traditional teaching model. With the rise of constructivist theory, the "student-centered" teaching model has developed rapidly. In the communication between teachers and students, innovative teaching methods are used to focus on cultivating students' problem-solving abilities, critical thinking, reflective abilities and transferable abilities [38]. The teaching methods used in the "student-centered" teaching model include group discussions, collective discussions, case analysis, research, watching teaching videos after class, and APP Assisted teaching, etc. Therefore, in future spinal health education, the "student-centered" teaching model should be explored to stimulate students' subjective initiative and improve their learning efficiency.

5 METHODS FOR EVALUATING THE EFFECTIVENESS OF SPINE HEALTH EDUCATION FOR ADOLESCENTS

previous studies In evaluating the effectiveness of spine health education for adolescents When doing so, a combination of objective testing and questionnaire surveys is often used, but it is also Some studies only evaluated the effect of intervention through questionnaire surveys.

Cardon etc [12] In the study, knowledge tests and behavioral tests were used to evaluate the effect of back health education, and observations were added in subsequent studies. Dullien et al [16] In the study, exercise testing, Back behavioral tests, clinical examinations by orthopedic surgeons, health questionnaires and back-related knowledge tests were used to evaluate the effectiveness of the intervention. In studies that only use questionnaires as an evaluation method, scholars often develop questionnaires containing multiple dimensions on their own. Park et al. [22] developed a questionnaire that included spine health-related knowledge, practice and self-efficacy. 3 From this dimension, Akbari - Chehrehbargh et al. [39] developed a back health program suitable for students. For the assessment questionnaire (Back-care Behavior Assessment Question- naire, BABAQ), from skills, knowledge, self- efficacy, beliefs and behaviors It is evaluated in 5 dimensions. The questionnaire developed by Dolphens et al. [13] includes back Back health knowledge, application of back health principles in daily life, self- Self-efficacy, fear - escape beliefs 4 dimensions.

Notably, reducing the incidence of spine-related pain in adolescents is one of the important purposes of spinal health education, but most studies have not Taking the incidence of pain as an evaluation index of the effectiveness of spine health education, Studies on pain incidence as an indicator of the short-term effectiveness of intervention also show that dry Prognosis: Prevalence of pain in students has not changed, although long-term follow-up studies Neck and back in adults showing students who received spine health education The incidence of pain increased slightly less than those who did not receive spinal health educated students, but the difference is not statistically significant [15]. Scholars believe that Pain is a subjective feeling. Children are learning to feel the body and pain. pain process, so the results on pain incidence should be interpreted with caution. exist Early education intervention implemented during childhood should focus on Changes in behavioral habits can improve the load on the spine, thereby reducing Risk of pain in adolescence and adulthood. Therefore, on the back In the evaluation of health education, back health behaviors and knowledge should be given priority and physical activity levels, and pain incidence as spine health education long-term evaluation indicators.

6 SUGGESTIONS ON SPINE HEALTH EDUCATION FOR ADOLESCENTS

As spinal health problems among adolescents become increasingly prominent, spine health education should be put on the agenda. It is recommended to formulate spine health education programs based on the theoretical framework of social sciences, adopt a teaching form that combines theory and practice, and explore a "student-centered" teaching model. The content of spinal health education should include basic knowledge such as spinal anatomy, physiology, Pathology and spinal health risk factors; Knowledge of posture habits such as ergonomics, sitting and standing postures, lifting postures, carrying postures, backpacking methods, etc.; Exercise knowledge such as exercises beneficial to spinal health, strength exercises, stretching exercises, muscle activation exercises, etc. Students, parents, and teachers should all be included in spinal health education programs to improve educational effectiveness. In terms of evaluation, it is recommended to evaluate the effectiveness of spine health education from dimensions such as knowledge mastery, skills, daily behavioral habits, and self- efficacy. In order to promote the smooth implementation of spine health education, spine health education should become an integral part of the school curriculum system, and a fixed time for spine health exercises should be planned. To keep students motivated, set short-term goals and incentives and tie spine health exercises to more popular sports. In addition, with the development of current technology, technical means such as mobile terminals or on-campus reminder devices can be used to regularly monitor students' health behaviors.

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COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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