

Analysis of Photoscreening, The Adams Test, And Questionnaire Methods in Scoliosis Prevention, Posture Control, And Forming A Healthy Lifestyle Among Female Students

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ABSTRACT

This article analyzes the effectiveness of using photoscreening and questionnaire methods in preventing scoliosis, controlling posture, and forming a healthy lifestyle among female students. In the study, the posture of 120 female students was first examined through an initial questionnaire, and the problematic cases identified were additionally monitored using photoscreening. According to the results, 70 students showed a normal condition, 39 showed moderate changes, and 11 showed more pronounced body asymmetry and changes in spinal condition. During the study, it was found necessary not to limit posture assessment to a single examination, but to conduct regular monitoring among female students based on questionnaires and photoscreening. In particular, the importance of performing physical exercises regularly, incorporating them into daily activity, and organizing training sessions based on a special corrective health-improving exercise program was demonstrated. In the study, extracurricular sessions were organized for 39 female students, three days a week for one month, during which exercises aimed at the correct positioning of the shoulder girdle, shoulder blades, and body posture were performed. According to the results of the final questionnaire, it was found that 15 female students showed pronounced positive change, 17 showed moderate positive change, and 7 showed no noticeable change.

Keywords: Female students, scoliosis prevention, posture, photoscreening, questionnaire, physical exercises, corrective exercises, healthy lifestyle, physical activity, body asymmetry.

INTRODUCTION

Scoliosis prevention, posture control, and the formation of a healthy lifestyle among female students are today among the important directions of the physical education and health-improvement process. Prolonged sitting during the educational process, physical inactivity, incorrect sitting and standing habits, and insufficient performance of physical exercises can be factors leading to postural disorders. For this reason, regularly monitoring the posture of female students and detecting existing changes at an

early stage is considered an urgent task.

The use of photoscreening and questionnaire methods in assessing posture allows for a comprehensive study of students' condition. Through photoscreening, it is possible to observe the position of the shoulders and shoulder blades, body symmetry, and external changes in posture. Through the questionnaire, students' daily physical activity, habits of prolonged sitting, knowledge of maintaining correct posture, and attitude toward a healthy

lifestyle are determined. The combined analysis of this data serves as an important basis for properly organizing preventive training sessions.

Likewise, it is necessary to organize regular health-improving and corrective physical training sessions to prevent identified changes in posture. In such sessions, it is appropriate to use exercises aimed at strengthening the shoulder girdle, improving the function of the shoulder blades, keeping the body upright, developing the back muscles, and reducing excessive load on the spine. Regularly performing exercises helps female students form the skill of maintaining correct posture and incorporating physical activity into their daily lifestyle.

From this point of view, developing a special training program based on the analysis of photoscreening and questionnaire results, and regularly applying it, is of great importance as a practical direction for controlling posture, preventing scoliosis, and forming a healthy lifestyle among female students. In particular, organizing training sessions based on simple, safe, and regularly performed exercises increases students' interest in them and strengthens their sense of responsibility for maintaining healthy posture.

LITERATURE REVIEW

In the Republic of Uzbekistan as well, ensuring the healthy and well-rounded development of the younger generation has been defined as one of the priority directions of state policy; the Decree of the President of the Republic of Uzbekistan No. PF-6099, Resolution No. PQ-4884, and Decree No. PF-152 have set important tasks for widely introducing a healthy lifestyle, developing mass sports, and increasing the effectiveness of physical education classes in educational institutions.

In scientific-analytical reports published by international organizations within the United Nations system, particularly the World Health Organization (WHO) and UNESCO, insufficient physical activity, hypodynamia, excess body weight, and declining functional capacity among children and adolescents are assessed as one of the urgent public-health problems of modern society.

A study conducted by Aljohani, Alshehri, and Eweda (2025) among female students in Saudi Arabia found that scoliosis conditions were widespread, and the authors emphasized the need for regular assessment of posture and body condition among female students.

In a meta-analysis conducted by Peng and co-authors (2024), it was found that Schroth exercises and strength exercises produce positive results in mild to moderate idiopathic scoliosis. The authors emphasized the importance of organizing exercises regularly and purposefully.

Ahmedov F.Q., Atamurodov Sh.O., Avalboyev Z.A., and Abdulakhatov A.R. emphasize that the physical development of primary-school students is closely related to the natural growth of the organism and to physical education classes.

According to R. Salomov: "...the training process is closely related to the physical development of the participants" — based on the well-founded opinion of educators, it is possible to prevent scoliosis and improve health through teaching physical exercises.

The results of a systematic review and meta-analysis showed that special physiotherapeutic scoliosis-specific exercises may produce more positive results in improving spinal curvature compared with general exercises and certain traditional approaches.

O.V. Goncharova assessed motor activity as a leading factor in the development of physical abilities. Overall, researchers' studies show that regularly monitoring posture, increasing physical activity, and systematically performing special physical exercises are of great importance in maintaining the physical development and spinal condition of students and young people. According to researchers, regularly conducting preventive monitoring and timely organizing corrective health-improving training sessions appropriate to identified changes is considered an important pedagogical approach in preventing postural disorders.

METHODS

Body asymmetry characteristic of scoliosis in female students can become more pronounced or be detected under the following conditions: sitting tilted to one side for a long time, always turning the body to the same side while working, regularly placing a heavy load on one shoulder, remaining in an incorrect body position for a long time, and insufficient physical activity. However, not all of these can be considered a direct cause of structural scoliosis; they may intensify postural imbalance.

Questionnaire for assessing spinal condition and scoliosis-characteristic signs in female students

Table 1

#	Questions	Type of answer	Assessment score
1.	Do you experience discomfort in the lower back or back area when sitting for a long time?	Never	1
		Sometimes	2
		Often	3
2.	Have you noticed your body leaning to one side when sitting on one side for a long time?	No	1
		Sometimes	2
		Yes, often	3
3.	Have you noticed that your shoulders are not the same height when looking in the mirror?	No	1
		Slightly	2
		Clearly	3
4.	Have you noticed one shoulder blade protruding more than the other?	No	1
		Sometimes	2
		Yes	3
5.	Do you use a phone or computer for a long time?	Up to 1 hour	1
		1–3 hours	2
		More than 3 hours	3
6.	Do you sit for a long time during classes without changing your body position?	Rarely	1
		Sometimes	2
		Often	3
7.	Do you perform physical exercises	Yes, regularly	1

	regularly?		
		Sometimes	2
		No	3
8.	When bending forward, have you noticed a difference between the right and left sides of the back or lower back?	No	1
		Not entirely sure	2
		Yes	3

The results of the initial assessment of scoliosis-characteristic signs and spinal condition among female students were classified based on a scoring criterion. The answers given to the questionnaire questions were summarized, and according to the final score, the condition was assessed at three levels: 20–24 points — scoliosis-characteristic, i.e., a condition with signs of spinal curvature and body asymmetry; 10–16 points — moderate condition, i.e., certain changes observed in body condition; 5–6 points — normal condition, i.e., a condition in which no pronounced scoliosis-characteristic signs were detected. To study the initial problem, 120 students from 4 groups were involved.

Of the 120 students, 70 were normal, 39 were at a moderate level, and 11 reported experiencing such problems. The 11 female students identified in the initial questionnaire were individually included in additional examination. Each female student was re-examined individually in a separate room based on the photoscreening process. During photoscreening, shoulder symmetry, shoulder-blade condition, body axis, and body structure in lateral position were assessed based on a 3–2–1 point scoring criterion. This re-examination was carried out to visually clarify the body asymmetries identified in the initial questionnaire results and to reassess signs characteristic of spinal curvature.

In terms of outcomes, monitoring work was carried out for the 11 female students facing problematic situations through both the questionnaire and the photoscreening test. The photographing conditions were made identical: the same room; the same camera/phone; the same camera

height; the same distance between the camera and the student; the same lighting; bare feet; hair not covering the shoulders and shoulder blades; the student standing naturally, without straining. Most importantly, the initial and final photographs were taken under exactly the same conditions.

Each student could be photographed in 4 different views: 1. From the front — head position, shoulder height, collarbone area, symmetry of the arms and body, and pelvic condition are observed.

From the back. This is especially important for observing body asymmetry related to scoliosis: right and left shoulder height, position of the shoulder blades, approximate direction of the spinal line, symmetry of the waist triangles, and pelvic height are assessed.

From the right side — forward head displacement, shoulder position, rib cage, lower back, and pelvic condition are observed.

From the left side — compared with the indicators from the right side. The best method is to place marking points on the body; to obtain a more precise result, anatomical landmarks can be marked before photographing. For example: shoulder points; the lower angles of the shoulder blades; the upper points of the pelvis.

In the photo taken from the back, a vertical reference line can also be drawn along the midline of the spine. This makes it easier to see the difference between the right and left sides.

Criteria for assessing body condition and spinal symmetry in female students based on photoscreening

Table 2

№	Criterion	3 points	2 points	1 point
1	Shoulder symmetry	Symmetric	Slight difference	Pronounced difference
2	Shoulder blade condition	Symmetric	Slight asymmetry	Pronounced asymmetry
3	Body axis	Straight	Slight deviation	Pronounced deviation
4	Lateral posture	Normal	Slight change	Pronounced change

The results of the initial assessment of spinal condition in female students were divided into three levels based on a scoring criterion. 10–12 points — normal condition, i.e., no pronounced negative changes observed in the spine and body condition; 6–8 points — moderate condition, i.e., certain changes present in body condition; 2–4 points — a condition characteristic of spinal curvature, i.e., characterized by significant changes in body asymmetry and spinal condition.

In the results of the initial questionnaire and photoscreening, 11 female students showed more pronounced body asymmetries characteristic of spinal curvature. Bringing the condition identified in these female students to a mild level in a short time using physical exercises alone proved relatively difficult, and it became necessary to carry out corrective health-improvement measures over a longer period. For this reason, in order to effectively organize the main preventive direction of the study, 39 female students with moderate-level conditions and signs of predisposition to scoliosis were selected. For them, a special daily corrective health-improving exercise

program was developed, aimed at normalizing body posture, maintaining body symmetry, and preventing the worsening of spinal curvature.

RESULTS AND DISCUSSION

In the initial stage of the study, two diagnostic tests were used to identify postural changes characteristic of scoliosis among female students. Through the selected tests, indicators related to students' posture, spinal symmetry, and body asymmetry were comprehensively assessed. A total of 39 female students participated in the initial diagnostic stage of the study. Particular attention was paid to incorporating these exercises into daily physical activity and gradually turning them into a habit. Furthermore, taking into account the identified postural characteristics, it was proposed to organize systematic training sessions based on a specially developed health-improving exercise program. This approach was recommended as a preventive tool aimed at correctly forming posture, improving muscular balance, increasing motor activity, and reducing the risk of scoliosis development among female students.

Recommended exercise methodology aimed at correcting body posture in female students

Table 3

№	Type of exercise	Rules for performing	Daily frequency
1	Standing straight against the wall	Bring the heels, buttocks, shoulder blades, and head as close to the wall as possible.	3 times

		Hold for 30–40 seconds with the abdomen slightly drawn in; performed 3 times.	
2	Shoulder-blade squeeze exercise	Standing upright with arms at the sides. Slowly pull the shoulder blades back and down. Hold for 5–7 seconds, then relax. Performed 10–12 times.	10–12 times
3	Shoulder external rotation	Elbows close to the body, arms forward. Open the forearms outward without raising the shoulders, then return. 10–15 times, 2–3 sets.	10–15 times

During the study, training sessions were organized sequentially and systematically to regularly increase the physical activity of female students. After classroom sessions, students were given 3 special physical exercises as homework to perform independently. Through regularly performing these exercises, it was intended to help students incorporate physical activity into their daily routine and develop the skill of performing exercises independently. In

addition, to reinforce the exercises in practice, extracurricular club sessions were organized for female students of the Andijan branch of Kokand University. The sessions were held in the fitness hall three days a week and were conducted consistently for one month. In the sessions, the designated exercises were first explained and demonstrated under the instructor's supervision, and subsequently the students' independent performance was monitored.

Comparative analysis of the results of the initial and final questionnaires

Table 4

Training results	High effectiveness — pronounced positive change in body condition	Moderate positive change observed, transitioning to moderate level	No noticeable change observed
Number of students	15	17	7

Final Questionnaire Analysis
(n = 39)

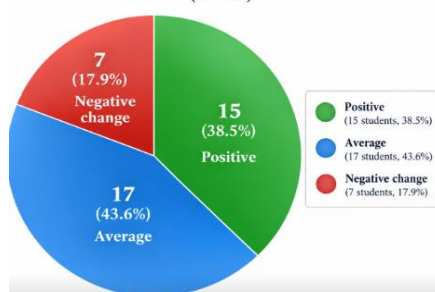


Figure 1. The comparative impact of modern educational technologies on the development of students' competitive qualities

The final questionnaire was conducted. According to the results of the final questionnaire, the effectiveness of the recommended exercise methodology was analyzed based on the subjective assessments of the female students. Of the 39 female students, 15 noted a positive change and felt lighter after the sessions, 17 noted a moderate positive change, and 7 noted that they did not feel a significant change. Cases where no change was noticed may be related to not regularly performing the exercises at home, insufficient adherence to the sessions, or insufficient additional psychological-pedagogical support. For this reason, regularity, individual monitoring, and psychological support are considered important factors in increasing the effectiveness of the exercises.

CONCLUSION

The results of the study showed the necessity of regularly monitoring posture, early detection of scoliosis-characteristic signs, and timely organization of preventive measures among female students. As a result of the initial questionnaire involving 120 female students, 70 showed a normal condition, 39 showed moderate changes, and 11 showed more pronounced body asymmetries, establishing the need to monitor problematic cases through additional photoscreening.

During the photoscreening process, assessing shoulder symmetry, shoulder-blade condition, body axis, and body structure in lateral position under identical conditions made it possible to consistently monitor changes in posture. At the same time, the results of the study showed that conducting the questionnaire not just once but regularly, and comparing its results with photoscreening data, is important for monitoring the condition of female students dynamically.

In the study, a special physical-exercise program aimed at correct body posture and improving the function of the shoulder girdle and shoulder blades was organized for 39 female students. The sessions were held three days a week for one month, during which exercises such as standing correctly against the wall, bringing the shoulder blades together, and performing external shoulder rotation were regularly performed; in the final questionnaire, 15 female students showed pronounced positive change and 17 showed moderate positive change.

Overall, the results obtained showed that combining the

questionnaire, photoscreening, and regular physical training sessions has practical significance for controlling posture and organizing preventive work among female students. For this reason, it is appropriate to regularly monitor postural changes, recommend corrective health-improving exercises suited to individual characteristics, and incorporate them into daily physical activity, with particular attention to regularity and individual monitoring in increasing the effectiveness of the exercises.

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