

# Prevalence of scoliosis in female students 11–15 years of age in Ahwaz, Iran

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## ABSTRACT

**Objective:** To determine the prevalence of scoliosis in school-going children of different age groups for correct diagnosis and treatment of scoliosis.

**Methods:** In 2004, we screened 1400 children from secondary schools in Ahwaz City, Southwestern Iran, for scoliosis. We carried out random sampling and used the necessary equipment for measurement and examination.

**Results:** Our results indicate that the prevalence of scoliosis was 2% among all the candidates. However, the prevalence of scoliosis among 12-year-old children was 42.9%, while, among 11 and 15-year-old children was 3.6%, showing

that the prevalence of scoliosis was higher in children 12-year-olds compared with 11 and 15-year-olds. Among all the candidates, 12 had deformities, such as, lordosis and kyphosis. Our data showed a significant difference between scoliosis and deformity ( $p < 0.001$ ). We also report that there was no significant relationship between hand dominance, and the weight of healthy persons compared with scoliosis subjects.

**Conclusion:** The correct diagnosis and treatment in the early stages of adolescence can prevent the spread of scoliosis.

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Human beings specifically care about the suitability of body shape. The body shape, in fact, is inevitably dependent on the factor of posture. Moreover, posture is specified to be the relationship of different parts of the body to the axis of gravity.<sup>1</sup> Scoliosis causes the body to lose its suitability, and unsuitability of shape accordingly has a negative impact on the internal organs.<sup>2</sup> Prevention is said to be cheaper than treatment. In the normal position, the human vertebral column has cervical and lumbar curvature with anterior convexity and thoracic and sacral curvature with posterior curvature, without any lateral curvature in sight. Any lateral deviation in any part of the vertebral column is technically referred to as scoliosis.<sup>2,3</sup> The rapid growth of puberty is distinguished to play a significant role in the emergence and development of scoliosis. According to the victims' age at the time of diagnosis, scoliosis

is classified into infantile, juvenile and adolescent categories.<sup>2</sup> Adolescent scoliosis demonstrates a higher percentage, and possibly increases during puberty.<sup>4</sup> In the last few years, a lot of school screening research for detecting scoliosis has been carried out, and different reports have been documented. The aim of this study was to designate the percentage of scoliosis, and its relationships with that of the symptoms, hand dominance, height, as well as weight, among girls aged 11-15 years in Ahwaz, Iran.

**Methods.** One thousand four hundred subjects (girls of 11-15 years) were selected from guidance schools in a cluster style as well as randomly, in Ahwaz, Iran in 2004. The equipment utilized was plumb line, magic pen, ribbon meter, and scale. The vertebral column of each subject, in the vertical position and looking straightforward, was examined.

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Their spinous processes were felt and printed with a marker. Subsequently, a plumb-line was held at the base of the subjects occipital bone, and if the plumb-line passed between the 2 gluteal regions classified as balanced, otherwise, it was found unbalanced. In the case of noting lateral deviation to either side, the type of scoliosis was noted. In the next examination, the subject was asked to straighten their knees, and bend 90 degrees forward and then sideways. The vertebral column was examined for scoliosis. The subjects were interviewed to elicit information about their past records, background and any disease relating to the victims deformity, such as, kyphosis, and lordosis, and hand dominance. Finally, they were scaled and their height measured. Skeptical subjects were referred to an orthopedists for further inspection. The data obtained was analyzed manipulating SPSS statistical software and Chi-square test, with  $p < 0.05$  rendered as significant.

**Results.** The prevalence of scoliosis in the selected subjects was found to be 2%, with the thoracic curvature highest at 39.3%, and the cervicothoracic lowest at 3.6%. Subjects of 12 years of age showed the highest percentage at 42.9% and those of 11, and 15 showed the lowest at 3.6%. The study population included 92% right-handed subjects, and 8% left-handed. In the scoliosis subjects, the right-handed subjects comprised 82.1%, and the left-handed subjects comprised 17.9%. The Chi-square test did not indicate any relationship between hand dominance and scoliosis ( $p > 0.05$ ). In the examination of the subjects, 4 had respiratory disease, and lumbar pain was observed. Statistical data failed to demonstrate any relationship between the above disease and scoliosis. Twelve victims of lordosis and kyphosis were also recognized. Symptoms of lordosis and kyphosis were detected to eventually render meaningful dependency ( $p < 0.001$ ). The measurements showed that the average height of healthy subjects was 152.1 cm, and 152.2 cm among the scoliosis subjects. The average weight of healthy subjects was 44.2 kg, and 44.7 kg among the scoliosis subjects. In statistical computation carried out, no significant relationship was found between the factors of height, weight, and scoliosis.

**Discussion.** The prevalence of scoliosis in this study has been calculated to show no more than 2%. Compared to Karachalios<sup>5</sup> of 1.18%, Koukourakis<sup>6</sup> of 1.7%, Nussionvitch<sup>7</sup> of 1.6%, Yawn<sup>8</sup> of 1.8%, and Safikhani<sup>9</sup> of 1.4%, the findings of this study show a higher percentage. This result in fact, has been distinguished to be the outcome of the dominance of

a female population. In this study, the 12-year-old population had the highest percentage of scoliosis (42.9%), whereas in a male population of Safikhani's study,<sup>9</sup> those who were 13 years of age had the highest percentage (50%). Safikhani<sup>9</sup> also reported that girls of 11 and 15 had the lowest percentage (3.6%) whereas in the boys, 11 year olds had the lowest percentage, with an average of 7.6%. The prevalence of the disease among the female victims was 1.47 compared with 1 among the male victims. However, based on reports by Herman,<sup>10</sup> this proportion has been reported as 1.3 to 1 and by Soucacos,<sup>11</sup> as 2.1 to 1.

Scoliosis as a defect has been detected as popularly existing among the juvenile and adolescent population of this region. Having accepted the idea that prevention is better than treatment, it is required, with the aid of school screening for scoliosis, to readily spot and distinguish the scoliotics. Consequently, prevention and subsequent timely treatment can help to avoid the adverse consequences prospectively. We suggest that scoliosis be screened in different parts of Iran in both sexes, according to race, nutrition, culture, and environmental parameters.

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