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# Survey on Postural Deformities of High School Students in Kannur District

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## Abstract

The researcher conducted a study on postural deformities of high school students in Kannur district. A total of 600 (three hundred boys and three hundred girls) were selected from various schools in Kannur district Kerala, and the age group of the subject ranged from 13-15 years. The New York posture rating test were used to assess the postural deformities. Based on the findings of this study, postural deformities are prevalent in high school students in kannur district and also there is a significant difference between girls and boys on anterior posterior head deviation, ankle deviation, foot arch and lateral lower back deviation, anterior posterior spine deviation, anterior posterior hip deviation, lateral head deviation, lateral chest deviation, lateral shoulder deviation, lateral upper back deviation, lateral trunk deviation and lateral abdomen deviation.

## Introduction

Posture is simply a person's body position when standing or sitting. It refers to the way a person holds their body when standing or sitting. It refers to how the body is positioned when sitting or standing. Good posture is a good habit that contributes significantly to happiness. Postural spinal curves and associated reflexes develop in the womb and continue as we begin to lift our heads and crawl as babies and walk as toddlers. The spine and nervous system grow rapidly during the first four years of life. While the spine is growing at such a rapid rate, the preschool years are critical in establishing a solid postural foundation. Human physical posture is a motor habit formed on a predetermined morphological and functional foundation. It is a manifestation of a person's bodily and psychological state. As a result, it measures the mechanical efficacy of the kinetic sense, as well as muscular balance and nerve muscle coordination. Human body posture changes over the course of a person's life. This is especially visible during periods of vigorous development.

Rapid environmental change, sedentary lifestyles, physical activity limitations, and insufficient nutrition are inextricably linked to the advancement of civilisation. There are both internal and external factors that can affect a child's posture. These include the child's genes, the environment or physical conditions in which the child lives, the amount of physical activity, the child's socioeconomic status, emotional problems, and abnormalities in the way the body grows and develops. Also, how the body

responds to the demands of daily life depends on the gender and how your bones are growing.

The pre-pubertal phase and puberty are phases in life when posture changes as a result of changes in the body. Human posture experiences significant changes between the ages of 7 and 12 in order to balance the altered body proportions. These variations in body proportions can be attributed to variations in the growth rates of bone and muscle tissue. It is crucial to evaluate postural aberrations between the ages of 7 and 14 not only because the child is more susceptible to bone system changes, but also because poor bone production and poor posture are more easily corrected during this period. It has been reported that the poor postures of children at home and at school lead to musculoskeletal imbalances, which in turn result in postural abnormalities. If not rectified, these alterations can remain throughout adulthood and create painful disorders.

A good posture is that in which the skeleton is held erect and if an imaginary vertical line is drawn from the highest point of the skull downwards, it should pass through the weight bearing surfaces of the cervical and lumbar vertebrae and through the centre of the hip, knee and ankle joint and where minimum cost of energy is required in balancing and maximum advantage is taken in transferring body weight. Good posture is vital for functional strength and motor control and is absolutely necessary to produce efficient movement along the kinetic chain there is no single good posture there are many. Goodness of a posture consists in alignment of the body parts, in relaxation rather than tension and readiness for action.

## Methods

For the present study the research scholar intended to study the postural deformities of high school students in Kannur district. A total of six hundred boys and girls school students (N=600) were selected as subjects. They were selected (n=300) from boys and girls school students from Kannur district. The age group of the subjects ranged from 13-15 years. To test various postural aspects New York State Posture Rating Test was used. Anterior posterior head deviation, Anterior posterior shoulder deviation, Anterior posterior spine deviation, Anterior posterior hip deviation, Ankle deviation, Foot arch, lateral neck deviation, lateral chest deviation, lateral shoulder deviation, lateral upper back deviation, lateral trunk deviation, lateral Abdominal deviation and lateral lower back deviation were the variables of the study.

**Statistical Techniques**

The basic feature of the data in this study was described using percentage analysis. In order to examine the difference, if any existed between girls and boys in the chosen variables, the chi-square test was used.

## Findings

**Table 1**

**Descriptive Statistics of Postural Deformities of Boys and Girls High School Students**

| Variables | M | SD | V |
|---|---|---|---|
| Anterior posterior head deviation | 3.70 | 1.11 | 1.23 |
| Anterior posterior shoulder deviation | 3.08 | .97 | 0.95 |
| Anterior posterior spine deviation | 3.34 | 1.13 | 1.29 |
| Anterior posterior hip deviation | 3.43 | 1.17 | 1.37 |
| Ankle deviation | 3.22 | .91 | 0.84 |
| Foot arch | 3.59 | 1.22 | 1.49 |
| Lateral head deviation | 4.02 | 1.28 | 1.64 |
| Lateral chest deviation | 3.44 | 1.15 | 1.33 |
| Lateral shoulder deviation | 3.10 | 1.07 | 1.15 |
| Lateral upper back deviation | 2.95 | 1.12 | 1.27 |
| Lateral trunk deviation | 3.15 | 1.38 | 1.90 |
| Lateral abdominal deviation | 3.56 | 1.37 | 1.90 |
| Lateral lower back deviation | 3.68 | 1.28 | 1.64 |

The table 1 shows, the descriptive statistics of the total sample (boys and girls) of subjects indicate that the mean of posture deformities. The mean value of anterior posterior head deviation, Anterior posterior shoulder deviation, anterior posture spine deviation and anterior posterior hip deviation of boys and girls school students are 3.70, 3.08, 3.34 and 3.43 respectively. The mean values of ankle deviation and foot arch are 3.22 and 3.59 respectively. The mean values of lateral head deviation, lateral chest deviation, lateral shoulder deviation, lateral upper back deviation, lateral trunk deviation, lateral abdominal deviation and lateral lower back deviation are 4.02, 3.44, 3.10, 2.95, 3.15, 3.56 and 3.68 respectively.

**Table 2**
**Total Percentage Analysis of Anterior Posture Grade of Total Subjects**

| Body Parts | No. of Students Categorizedas Good | % of Good | No. of Students Categorizedas Fair | % of Fair | No. of Students Categorizedas Poor | % of Poor |
|---|---|---|---|---|---|---|
| Head | 235 | 39.2 | 341 | 56.8 | 24 | 4.0 |
| Shoulder | 85 | 14.2 | 456 | 76.0 | 59 | 9.8 |
| Spine | 158 | 26.3 | 388 | 64.7 | 54 | 9.0 |
| Hip | 181 | 30.2 | 367 | 61.2 | 52 | 8.7 |
| Feet | 101 | 16.8 | 466 | 77.7 | 33 | 5.5 |
| Arches | 228 | 38.0 | 323 | 53.8 | 49 | 8.2 |

From the table 2, the total subjects scored in the case of head they had 39.2% of good, 56.8% of fair and 4.0% of poor. In the case of shoulder, 14.2% of students are good, 76.0% of students are fair and 9.8% of students are poor as calculated. The 26.3% of students are good, 64.7% of students are fair and 9.0% of students are poor in spine as calculated. 30.2% of boys scored as good, 61.2% are fair and 8.7% are poor in the case of the hip. In the case of feet, 16.8% of students are good, 77.7% of students are fair and 5.5% of students are poor as calculated. In the case of arches, 38.0% of students are good, 53.8% of students are fair and 8.2% of students are poor as calculated.

**Table 3**
**Percentage Analysis of Lateral Posture Grade of Total Subjects**

| Body Parts | No. of Students Categorizedas Good | % of Good | No. of Students Categorizedas Fair | % of Fair | No. of Students Categorizedas Poor | % of Poor |
|---|---|---|---|---|---|---|
| Neck | 356 | 59.3 | 196 | 32.7 | 48 | 8.0 |
| Chest | 181 | 30.2 | 371 | 61.8 | 48 | 8.0 |
| Shoulder | 103 | 17.2 | 426 | 71.0 | 71 | 11.8 |
| Upper Back | 88 | 14.7 | 409 | 68.2 | 103 | 17.2 |
| Trunk | 168 | 28.0 | 311 | 51.8 | 121 | 20.2 |
| Abdomen | 250 | 41.7 | 268 | 44.7 | 82 | 13.7 |
| Lower Back | 260 | 43.3 | 284 | 47.3 | 56 | 9.3 |

From the table 3, the total subjects scored in the case of neck they had 59.3% of good 32.7% of fair and 8.0% of poor. In the case of chest, 30.2% of students are good, 61.8% of students are fair and 8.0% of students are poor as calculated. The 17.2% of students are good, 71.0% of students are fair and 11.8% of students are poor in shoulder as calculated. 14.7% of boys scored as good, 68.2% are fair and 17.2% are poor in the case of the upper back. In the case of trunk, 28.0% of students are good, 51.8% of students are fair and 20.2% of students are poor as calculated. In the case of abdomen, 41.7% of students are good, 44.7% of students are fair and 13.7% of students are poor as calculated. 43.3% of boys scored as good, 47.3% are fair and 9.3% are poor in the case of the lower back.

**Table 4**
**Percentage Analysis of Anterior Posture Grade of Boys**

| Body Parts | No. of Students Categorizedas Good | % of Good | No. of Students Categorizedas Fair | % of Fair | No. of Students Categorizedas Poor | % of Poor |
|---|---|---|---|---|---|---|
| Head | 140 | 46.7 | 150 | 50.0 | 10 | 3.3 |
| Shoulder | 42 | 14.0 | 229 | 76.3 | 29 | 9.7 |
| Spine | 84 | 28.0 | 189 | 63.0 | 27 | 9.0 |
| Hip | 93 | 31.0 | 180 | 60.0 | 27 | 9.0 |
| Feet | 35 | 11.7 | 248 | 82.7 | 17 | 5.7 |
| Arches | 96 | 32.0 | 177 | 59.0 | 27 | 9.0 |

From the table 4, the boys students scored in the case of head they had 46.7% of good,50.0% of fair and 3.3% of poor. In the case of shoulder, 14.0% of students are good, 76.3%of students are fair and 9.7% of students are poor as calculated. The 28.0% of students are good, 63.0% of students are fair and 9.0% of students are poor in spine as calculated. 31.0% of boys scored as good, 60.0% are fair and 9.0% are poor in the case of the hip. In the caseof feet, 11.7% of students are good, 82.7% of students are fair and 5.7% of students are poor as calculated. In the case of arches, 32.0% of students are good, 59.0% of students are fair and 9.0% of students are poor as calculated.

**Table 5**
**Percentage Analysis of Lateral Posture Grade of Boys**

| Body Parts | No. of Students Categorized as Good | % of Good | No. of Students Categorized as Fair | % of Fair | No. of Students Categorized as Poor | % of Poor |
|---|---|---|---|---|---|---|
| Neck | 182 | 60.7 | 96 | 32.0 | 22 | 7.3 |
| Chest | 83 | 27.7 | 196 | 65.3 | 21 | 7.0 |
| Shoulder | 43 | 14.3 | 223 | 74.3 | 34 | 11.3 |
| Upper Back | 39 | 13.0 | 211 | 70.3 | 50 | 16.7 |
| Trunk | 75 | 25.0 | 160 | 53.3 | 65 | 21.7 |
| Abdomen | 115 | 38.3 | 145 | 48.3 | 40 | 13.3 |
| Lower Back | 115 | 38.3 | 144 | 48.0 | 41 | 13.7 |

From the table 5, the boys students scored in the case of neck they had 60.7% of good 32.0% of fair and 7.3% of poor. In the case of chest, 27.7% of students are good, 65.3% of students are fair and 7.0% of students are poor as calculated. The 14.3% of students are good, 74.3% of students are fair and 11.3% of students are poor in shoulder as calculated. 13.0% of boys scored as good, 70.3% are fair and 16.7% are poor in the case of the upper back. In the case of trunk, 25.0% of students are good, 53.3% of students are fair and 21.7% of students are poor as calculated. In the case of abdomen, 38.3% of students are good, 48.3% of students are fair and 13.3% of students are poor as calculated. 38.3% of boys scored as good, 48.0% are fair and 13.7% are poor in the case of the lower back.

**Table 6**
**Percentage Analysis of Anterior Posture Grade of Girls**

| Body Parts | No. of Students Categorized as Good | % of Good | No. of Students Categorized as Fair | % of Fair | No. of Students Categorized as Poor | % of Poor |
|---|---|---|---|---|---|---|
| Head | 95 | 31.7 | 191 | 63.7 | 14 | 4.7 |
| Shoulder | 43 | 14.3 | 227 | 76.7 | 30 | 10.0 |
| Spine | 74 | 24.7 | 199 | 66.3 | 27 | 9.0 |
| Hip | 88 | 29.3 | 187 | 62.3 | 25 | 8.3 |
| Feet | 66 | 22.0 | 218 | 72.7 | 16 | 5.3 |
| Arches | 132 | 44.0 | 146 | 48.7 | 22 | 7.3 |

From the table 6, the girls students scored in the case of head they had 31.7% of good,63.7% of fair and 4.7% of poor. In the case of shoulder, 14.3% of students are good, 76.7%of students are fair and 10.0% of students are poor as calculated. The 24.7% of students are good, 66.3% of students are fair and 9.0% of students are poor in spine as calculated. 29.3% of girls scored as good, 62.3% are fair and 8.3% are poor in the case of the hip. . In the caseof feet, 11.7% of students are good, 72.7% of students are fair and 5.3% of students are poor as calculated. In the case of arches, 44.0% of students are good, 48.7% of students are fair and 7.3% of students are poor as calculated.

**Table 7**
**Percentage Analysis of Lateral Posture Grade of Girls**

| Body Parts | No. of Students Categorized as Good | % of Good | No. of Students Categorizedas Fair | % of Fair | No. of Students Categorizedas Poor | % of Poor |
|---|---|---|---|---|---|---|
| Neck | 174 | 58.0 | 100 | 33.3 | 26 | 8.7 |
| Chest | 98 | 32.7 | 175 | 58.3 | 27 | 9.0 |
| Shoulder | 60 | 20.0 | 203 | 67.7 | 37 | 12.3 |
| Upper back | 49 | 16.3 | 198 | 66.0 | 53 | 17.7 |
| Trunk | 93 | 31.0 | 151 | 50.3 | 56 | 18.7 |
| Abdomen | 135 | 45.0 | 123 | 41.0 | 42 | 14.0 |
| Lower back | 145 | 48.3 | 140 | 46.7 | 15 | 5.0 |

From the table 7, the girls students scored in the case of neck they had 58.0% of good 33.3% of fair and 8.7% of poor. In the case of chest, 32.7% of students are good, 58.3% of students are fair and 9.0% of students are poor as calculated. The 20.0% of students are good, 67.7% of students are fair and 12.3% of students are poor in shoulder as calculated. 16.3% of girls scored as good, 66.0% are fair and 17.7% are poor in the case of the upper back. In the case of trunk, 31.0% of students are good, 50.3% of students are fair and 18.7% of students are poor as calculated. In the case of abdomen, 45.0% of students are good, 41.0% of students are fair and 14.0% of students are poor as calculated. 48.3% of boys scoredas good, 46.7% are fair and 5.0% are poor in the case of the lower back.

**Table 8**
**Chi-square Test Results on Gender Wise Comparison of Lateral Posture Grade**

| Variables | Chi-square test | Sig. |
|---|---|---|
| Anterior Posterior Head Deviation | 14.21 | .00 |
| Anterior Posterior Shoulder Deviation | 0.03 | .98 |
| Anterior Posterior Spine Deviation | 0.89 | .64 |
| Anterior Posterior Hip Deviation | 0.34 | .84 |
| Ankle Deviation | 11.47 | .00 |
| Foot Arch | 9.17 | .01 |

The above table displays a chi square analysis of lateral posture grade by gender. The results show that, the following comparison indicates significant differences at the 0.05 level.

- Anterior posterior head deviation between boys and girls school students ($X^2 = 14.21$, $p < 0.05$).
- Ankle deviation between boys and girls school students ($X^2 = 11.47$, $p < 0.05$).
- Foot arch between boys and girls school students ($X^2 = 9.170$, $p < 0.05$).

The results also indicate that the following comparison was not significant at 0.05 level.

- Anterior posterior shoulder deviation between boys and girls school students ($X^2 = 0.03$, $p > 0.05$).
- Anterior posterior spine deviation between boys and girls school students ($X^2 = 891$, $p > 0.05$).
- Anterior posterior hip deviation between boys and girls school students ($X^2 = 0.349$, $p > 0.05$).

**Table 9**
**Chi-square Test Results on Gender Wise Comparison of Lateral Head Deviation**

| Variables | Chi Square | Sig. |
|---|---|---|
| Lateral head deviation | .59 | 0.74 |
| Lateral chest deviation | 3.18 | 0.20 |
| lateral shoulderdeviation | 3.87 | 0.14 |
| lateral upper backdeviation | 1.63 | 0.44 |
| lateral trunk deviation | 2.85 | 0.23 |
| Lateral abdominal deviation. | 3.45 | 0.17 |
| lateral lower backdeviation | 15.58 | 0.00 |

The above table displays a chi square analysis of lateral posture grade by gender. The results show that, the following comparison indicates significant differences at the 0.05 level.

- Lateral lower back deviation between boys and girls school students ($X^2$ = 15.58, $p < 0.05$).

The results also indicate that the following comparison was not significant at 0.05 level.

- Lateral head deviation between boys and girls school students ($X^2$ = 0.59, $p > 0.05$).
- Lateral chest deviation between boys and girls school students ($X^2$ = 3.18, $p > 0.05$).
- Lateral shoulder deviation between boys and girls school students ($X^2$ = 3.87, $p > 0.05$).
- Lateral upper back deviation between boys and girls school students ($X^2$ = 1.63, $p > 0.05$).
- Lateral trunk deviation between boys and girls school students ($X^2$ = 2.85, $p > 0.05$).
- Lateral abdominal deviation between boys and girls school students ($X^2$ = 3.45, $p > 0.05$).

## Discussion of Findings

The findings of the study revealed that all the segments which were measured except lateral neck deviation and lateral lower back deviation. Most of the children both boys and girls were comes under in ‘fair’ category that means now their body alignment is slightly deviated from the normal posture, whether they continue with that may be the chances to slip into poor posture and in the case of lateral neck deviation most of the children which were selected for the study comes under in ‘good’ category which means their position of neck alignment is correct now. In the case of lateral lower back most of the girls were comes underin category ‘good’ that means now their lateral lower back alignment is almost near to the normal posture.

The study also revealed that there was a significant difference between boys and girls on four segments measurements that are anterior posterior head deviation, Ankle deviation, Foot arch and lateral lower back deviation. This may be due to in this four segments most of the children comes under in ‘fair’ and ‘good’ category. Only few people comes under only in ‘poor’ category so most of the students are keeping a normal posture but now a days girls are more conscious about their body and may be they are getting enough practices from their home like good manners of sitting, standing etc. that why may the girls are maintaining proper posture compare to boys. This may be the reason for the significant difference between boys and girls on four these segment measurements.

The result of the study shows that only few persons comes under in ‘poor’ category at all these segments which were measured. That may be basically due to the wrong posture maintained by a person. Improper ways of sitting, standing, lifting weights, and positioning while at work or play are the main causes of posture deformities or poor posture and 75% of children comes under in fair and good category because the schools were selected for the study is in rural area of Kannur district and most of the schools are government schools. these schools are incorporate studies with extra-curricular activities like sports, arts, NCC, NSS and different club activities etc. so the students are getting adequate knowledge about good posture as well as through their activities itself they are trained for that. It may help them to maintain proper posture.

The results of the study also revealed that proper exercises or activities such as minor games and major games, yoga, callisthenic exercises can reduce or wipeout the postural deformities because all the students in these schools are practicing one or whole these activities on daily basis in their schools and also the schools are in rural area so the students are highly motivated in physical activities and they are very active too. May be these are the reasons behind their good postures.

So the finding of the study concluded that postural deformities are existing in school children of Kannur district at a small quantity and there is a significant different between girls and boys on anterior posterior head deviation, Ankle deviation, Foot arch and lateral lower back deviation and there is no significant in anterior posterior shoulder deviation, anterior posterior spine deviation, anterior posterior hip deviation, lateral head deviation, lateral chest deviation, lateral shoulder deviation, lateral upper back deviation, lateral trunk deviation, lateral abdominal deviation. The findings of the study are supported by the following references.

Preeti (2015) found out that males are more prevalent to the postural deformities suchas ankle deviation and foot arch compare to females. This study is supported to result of this study.

## Conclusions

1. The study revealed that, postural deformities are prevalent in high school students in Kannur district.
2. The study revealed that, there was a significant difference in boys and girls of high school students.
3. There was a significant difference in lateral head deviation of high school students.
4. There was a significant difference in ankle deviation of high school students.
5. There was a significant difference in foot arch of high school students.
6. There was a significant difference in anterior posterior lower back deviation of high school students.
7. There was no significant difference in lateral shoulder deviation, lateral spine deviation, lateral hip deviation, anterior posterior head deviation, anterior posterior chest deviation, anterior posterior shoulder deviation, anterior posterior upper back deviation, anterior posterior trunk deviation, anterior posterior abdominal deviation of high school students.

## References

Brzek, A., & Plinta, B. (2016). Exemplification of Movement Patterns and Their Influence on Body Posture in Younger School-Age Children in the Basis of an Authorial Proram " i take care of my spine". Medicine.

Dharmayat, S., & Shrestha, S. (2017). Assessment of Posture and Musculoskeletal Pain in School Going Girls Using Backpacks. *Journal of Nursing and Health Science*, 09-12.

KC, S., A, D., PK, B., & M, B. (2002). Scoliosis: an Epidemiological Study of School Children in Lower Assam. *Indian Journal of Orthopaedics*, 243-245.

Kratenova, J., Zejglicova, K., Maly, M., & Filipova, V. (2007). Prevalence and Risk Factors of Poor Posture in School Children in the Czech Republic. *Journal of School Health*, 131-137.

Morris, P. G., Larson, K., Klaus, K. M., & Oatis, C. A. (1992). Incidence of Common Postural Abnormalities in the Cervical, Shoulder, and Thoracic Regions and Their Association with Pain in two Age Groups of Healthy Subjects. *Journal of the American Physical Therapy Association*, 425-431.

Milenkovic, S., Bubanj, S., Zivkovic, M., Zivkovic, D., Stankovic, R., Bubanj, R., Cvetkovic, T. (2011). The Incidence of Scoliotic Bad Posture Among High School Students: Preliminary Study. *Physical Education and Sport*, 365-373.

Ninomiya, S., Morita, A., Teramoto, H., Akimoto, T., Shiota, H., & Kamei, S. (2015). Relationship between Postural Deformities and Frontal Function in Parkinson's Disease. Research Article.

Rai, A., Agarwal, S., & Bharti, S. (2013). postural effect of back packs on school children: its consequences on their body posture. *International Journal of Health Sciences and Research*.