TITLE: Dietary Intake and physical activity as a measure of Posture analysis Found Among School Going Girls and Boys of 12 To 14 Years of age.

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INTRODUCTION:

Posture is an upright position which is generally maintained against the gravity. [Kisner and Colby, 2007] The general concept of human posture refers to “the carriage of the body as a whole, the attitude of the body, or the position of the limbs (the arms and legs) to attain maximum balance and proportion of one’s framework. A good posture is in which the spinal curvatures lie in neutral position and all other joints in upper and lower limbs are in an alignment. [Kauffman, 1990] The postural development in during early growing years of life has proved a significant impact on the normal functioning of musculoskeletal system as well as psychology. Any shifting from this neutral body alignment can lead to various musculoskeletal pains and deformities, and may also alter mood or lead to depression.[Schubbe, 2004 and Pepper and Lin, 2012] Various past researches has shown the association of posture with musculoskeletal system pain, deformities, as well as association of poor posture with depression, influence of posture over body energy levels [Schubbe, 2004, Pepper and Lin, 2012 and Morris et al, 1992] Body posture, as said, is influenced by many factors including musculoskeletal alignment, muscle strength, body endurance, fatigue, general health, state of mind, occupation, age, weight, height, etc. Many studies have been conducted to model some of these factors to establish their correlation with Posture [Angyan et al, 2007]. However, the postures generated by human body are difficult to simulate since the human body is composed of a large number of interrelated muscles which in turn helps in the formation of various postures. As the adolescent phase of life is one of the most important domain in human growth and development the present study has been conducted on school children to analyze the impact of adolescent age group on posture. The aim of our study was to find out the prevalence of poor posture among school going girls and boys between the age group 12 to 14 years. The results of this study might help to establish the importance of maintaining normal posture right from early years of life.

METHODOLOGY

All the participants were between the Age limit of 11.5-13.45 Years. The chronological age of all the participants boys (n= 41) and girls (n= 39) was calculated from their date of birth using the following formula:

\[
\text{Year Month Day (Test Date)} - \text{Year Month Day (Birth Date)} = \text{Chronological Age} \quad [\text{Kumar et al, 2013}]
\]

**Posture analysis:** A plumb line was used for this observation method. The plumb line was suspended from overhead and the plumb bob was hung in line with a standard base point which is anterior to the lateral malleolus in sagittal view and midway between the heels in back view of a subject. The subjects stood in between the footprints drawn on the posture boards. Anterior, Posterior and Lateral view of each subject was observed. [Norkin and Levangie, 1992]

**Anterior view:** In this view Position of the feet, knees, patella, legs and toes, longitudinal arch, is observed. Any rotation of the head or position of the ribs was also noted.

**Lateral view:** It was observed from the right side in each subject. In this view Position of knees, pelvis, lumbar and thoracic spine region curves, head, chest and the abdominal wall was observed.
**Posterior view:** from the Posterior View the relationships of the body or parts of the body to the plumb line and any deviations towards the right or left side were observed. [Morris et al, 1992]

Main outcome measures were: Age and Posture Analysis.

**Statistical analysis**

SPSS software (v. 16.0, SPSS, Inc) was used for the purpose of statistical analysis. Descriptive statistics was used to compute frequency of Good Posture, Poor Posture and various postural variations in percentage form among boys and girls subjects. Bar charts and pie charts were also used to represent the data in graphical forms. Confidence Interval (CI) was set at 95% for all the statistical analysis.

**RESULTS**

The age group of study subjects was taken between 11.5-13.5 years of their chronological age. Table 1 represents the Frequency of Good and Poor Posture found among school going boys and girls subjects. The percentage of good posture found in school going girls and boys was 43.75 % and the percentage of poor posture was 56.25%. There was a significant difference between the percentage of good and poor posture in school going boys and girls subjects (p <0.05).

Table 2 represents the Frequency of various spinal variations found among school going boys and girls subjects. Among the various spinal variations found the percentage of kypholordotic posture was 23.75% increased lumbar Lordosis was 11.25% sway back was 15% and any other was 6.25%. There was a significant difference between the percentage of various spinal variations found among school going boys and girls subjects (p <0.05).

Figure 1 displays the frequency of Good and Poor Posture found among school going boys and girls subjects in the form of a pie chart.

Figure 2 displays the frequency of various spinal variations found among school going boys and girls subjects in the form of a bar diagram.

<table>
<thead>
<tr>
<th></th>
<th>Good Posture</th>
<th>Poor Posture</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>%</td>
<td>43.75</td>
<td>56.25</td>
</tr>
</tbody>
</table>

**Table 1 Comparison of Frequency of Good and Poor Posture in boys and girls participants between age group of 12 to 14 years of age using student’t’ test**

The data is represented as the total number and percentage of values found among all the subjects.
Table 2 Comparison of the Frequency of various spinal variations found among school going boys and girls subjects.

<table>
<thead>
<tr>
<th></th>
<th>Kypholordotic posture</th>
<th>Increased lumbar Lordosis</th>
<th>Sway back</th>
<th>any other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys and girls subjects</td>
<td>23.75</td>
<td>11.25</td>
<td>15</td>
<td>6.25</td>
</tr>
<tr>
<td>N= 80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The data is represented as the percentage of values found among all the subjects.

DISCUSSION

Body posture of an individual outlines the position and function of muscles in human body. Poor posture in part comes from weak muscles and often studies have shown that poor posture has significantly been linked with Back, neck and various other musculoskeletal pains.

![Pie chart showing 56.25% good posture and 43.75% bad posture](image)

Figure 1 The frequency of Good and Poor Posture found among school going boys and girls subjects

The present study has been conducted to find out the Prevalence of Poor Posture Found among School Going Girls and Boys of Age Group 12 To 14 Years

The overall analysis of posture of all girl and boy participants confirmed that only 43.75 % of total subjects had good Posture while 56.25 % were found to have various postural deviations from the Normal or good Posture. Normal posture as analyzed with the help of a plumb line is an ideal position of body in which the plumb line passes through the calcaneocuboid joint, slightly anterior to lateral malleolus, anterior to knee joint axis, posterior to hip joint, through sacral promontory and lumbar...
vertebrae, through midway shoulder joint, odontoid process of axis, and external auditory meatus and slightly posterior to apex of coronal suture while observing in side view. [Norkin and Levangie, 1992] In spite of this strict criteria slight deviations found among various age group especially children and adolescent groups is considered as normal because these age groups are considered as phases of growth and development where continues change and adjustments are both expected and required. As the matter to be believed once the age increases these variations automatically disappear without taking any advance measures for correction. [Nissinen, 1995] However few other deviations in adolescent age groups are said to be abnormal or poorly held postures which are usually habitually acquired or happens because of poor functioning of muscles. Other causes may also be of some skeletal origin or the deformity may be bony in origin.

Careful observations had been taken in this study to outline those variations which are said to be normal for this adolescent age group of 12-14 years and only the variations of significant deviation from normal or good posture which may show its impact in later years of life were considered in the poor posture percentage found among both boys and girls subjects.

![Figure 2](image-url)  
**Figure 2** the frequency of various spinal variations found among school going boys and girls subjects

**POSTURE FOUND AMONG BOY AND GIRL SUBJECTS OF AGE GROUP 12 TO 14 YEARS**

As there was higher percentage of poor posture (56.25 %) found among both school going girls and boys of age group 12 to 14 years as shown in table 1 and figure 1 it should be of increase concern to the overall wellbeing of both boy and girl subjects belonging to this particular age group. Parents and teachers should be able to recognize the factors and habits that help to develop good or faulty posture and should encourage children to maintain and develop good posture in early periods of life itself. As the age group of 12-14 years demarks the onset of puberty in both boys and girls the
presence of poor posture could be because of their growing insecurities and mental confusions as they approach puberty which influences their habitual adaptations of specific body posture and also may be due to relative physical inactivity as the age advances. Although these variations could be due to the imbalance of strength of flexor and extensor group of muscles of trunk and neck region which is assumed as normal in this age group however the marked deviation from the plumb alignment supports the need of inducing corrective measures including therapeutic exercise programs or standard other regimes to maintain correct body alignment in later stages of life. [Nissinen, 1995 and Willner & Johnson, 1983] The postural variations found in this age group were kypholordotic posture (23.75 %), sway back posture (15 %), increased Lumbar Lordosis (11.25 %) and others (6.25 % ) as shown in Table 2 and Figure 2. Although the sample taken in this study was small to make more specific conclusions but presence of high number of various postural variations might be because of the general growth pattern of human body and it may relatively be habitual or temporary rather than of skeletal origin. Further studies should be conducted to define the influence of growing years on human postural patterns. The students should be educated about the importance of maintaining good posture so as to make conscious efforts rather than just growing into various postural variations which in turn leads to overall adverse affects on the quality of life as the posture had shown its association with both mind and body in various previous studies. Hence students should particularly be encouraged to adapt good posture patterns early in their life itself.

CONCLUSION

An increased evidence of presence of poor posture among adolescent group of boys and girls define the necessity to take conscious efforts and compulsory education to the students about the relative importance of having and maintaining good posture and taking efforts for the same.

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Competing interests: None.

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Reference list:


