International Journal of Advanced Scientific Research
ISSN: 2456-0421; Impact Factor: RJIF 5.32
www.allscientificjournal.com
Volume 1; Issue 3; June 2016; Page No. 09-11

Assessment of lordotic curvature among tribal children and how it relate with body surface area (BSA)

[1] Santu Dhara, [2] Sagarika Bandyopadhyay

[1] Research Scholar, Department of Physical Education, Visva-Bharati University, West Bengal, India
[2] Professor, Department of Physical Education, Visva-Bharati University, West Bengal, India

Abstract
Objective: The purpose of the present study was to find out the status of Lordotic curvature of lateral spine among tribal school children and how this curvature was related with their body surface area (BSA).
Methodology: Twenty eight male tribal children (N=28), age ranged from 13-16 years were taken as the subjects from 'Nayantara Charitable Truest', Birbhum District, W.B, India. 'Inclinometer' was used to measure the degrees of angle (L^0) of Lordotic curvature and T12-S1 (lumbar lordosis, LL) degree of angle was taken respectively [2]. To measure the body surface area (BSA) the height and weight were respectively taken from the subjects for present study and put it in the Mosteller's formula, BSA (m2) = SQR RT ([Height(cm) x Weight(kg)]/ 3600) [3]. The collecting data were calculated by using Descriptive Statistic and Coefficient of Correlation "r" and level of significance was set at 0.05 levels.
Findings: There was a significant negative co-relation exists and the result was also shows that the mean, standard deviation has been found for lumbar lordosis curvature were $35.14^0 \pm 8.38^0$ and for BSA it was 1.34±0.164.
Conclusion: The results demonstrate that the high BSA among tribal school children may decries the Lateral Lordotic Curvature of Spinal as because negative relation between them.

Keywords: Lateral Lordotic Curvature, Body Surface Area (BSA), Lateral Spine, Inclinometer and Lumbar Lordosis (LL)

1. Introduction

Postural abnormalities in vertebral column of children are one of the common problems prevalent in today's society. From an early stage, children are often subjected to this deformity due to distortion in their posture as a result of faulty habits in life style and exposure to television, video entertainment, motorized transportation, fast food and lack of regular physical activity. It must be noted that the working efficiency and ability of men depend upon good posture.

Till now in India, socioeconomically status, modern thinking about wellness and fitness culture of tribal community are lower than the average that is somehow indirectly affect on their children's total health, and that was the researcher's queries that whether the lower status and poor concept about health practice, food and life style affected on normality of the spinal curvature and BSA among them and how it related to each other!

In physiology and medicine, the body surface area (BSA) is the measured or calculated surface area of a human body. For many clinical purposes BSA is a better indicator of metabolic mass than body weight because it is less affected by abnormal adipose mass [1]. On the other hand we can say that it is also an indicator of an individual's physiological and anatomical effectiveness or fitness.

The researcher's query is that weather if there is any relation between Lordotic curvature and BSA among tribal children! Thus, the present study is an effort for the path of investigation to seek Lumber curvature status of lateral spine of tribal school children and how it relates with their BSA.

1.1 Objectives

The purpose of the present study was to find out the status of Lumber curvature of lateral spine among tribal school children and how this curvature was related with their body surface area (BSA).

2. Methodology

In order to assess the Lordotic Curvature of the lateral spine among tribal school going children and its relation with Spinal flexibility, Twenty eight male tribal children (N=28) were randomly selected as the subjects for this study from 'Nayantara Charitable Truest', Bonovila, Birbhum District, W.B, India. Age group of the subjects was ranged from (13-16) years.

To measured the lateral curvature of the spine '4-1/18 inch Angle Finder Magnetic Base Inclinometer' (Made in Taiwan) was used, it used to examined the exert degrees of angle of lumbar lordosis, LL (T12-S1) curvature by measured the angle of T12 and S1 of Vertebral Column respectively [2]. That means the following formula was used:

$$\text{Lordotic Curvature } (L^0) = 180^0 - (\text{Degrees of Angle of } T^{12} + \text{Degrees of Angle of } S^1)$$

To measure the body surface area (BSA) the height were measured by Stadia meter and weight were measured by weighing machine respectively from the subjects and put it in the Mosteller's formula (1987) BSA (m2) = SQR RT ([Height(cm) x Weight(kg)] / 3600) [3].

Table 1: Average Values of BSA for children of various ages, for men, And for women, are taken to be [1]

Neonate (newborn)	Child of 2 years	9 years	10 years	12–13 years	Women	Men
0.25 m²	0.5 m²	1.07 m²	1.14 m²	1.33 m²	1.6 m²	1.9 m²

The collecting data were calculated by using Descriptive Statistic and Coefficient of Correlation "r" and level of significance was set at 0.05 levels.

Analysis of Data

To find out the relationship of degree of angle of Lumber Curvature (L^0) of lateral spine of the tribal children with their BSA, Descriptive Statistic and 'Coefficient of Correlation' "r" was applied at 0.05 level of Significant and it is presented in the following Tables-2 and Figures-1:

Table 2: Mean and Standard deviation of Lumbar Curvature (L^0) and BSA among Tribal Children and Their Coefficient of Correlation "r".

S. No	Variables	Mean	STD-Deviation	Coefficient of Correlation "r"
1.	Lumbar Curvature (L^0)	35.14^0	8.38^0	- 0.6776 *
2.	BSA (m^2)	1.34 m^2	0.164 m^2	

Table value- 'r' 0.05 (26) = 0.374, *= Significant, NS=Not- Significant.

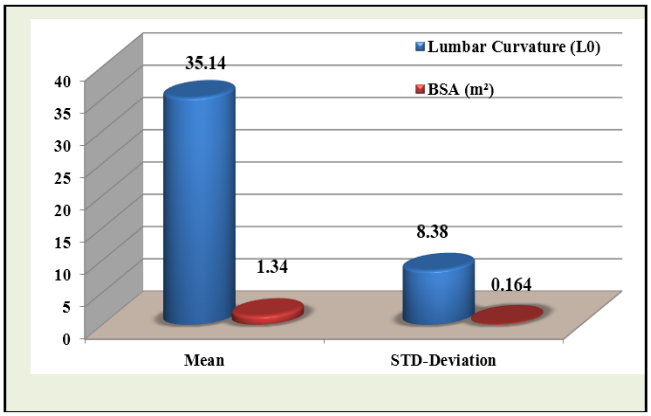


Fig 1: Graphical represent of the Table-1

Findings

From these findings clearly reveled that, there was a significant negative co-relational exist on Lumbar Lordosis (LL) or Lordotic Curvature with BSA as because Cal "r" value (-0.6776) higher than Tab "r" $_{0.05}$ (26) value (0.374). It is also evident from Figure-1 shows that the mean and standard deviation among tribal school children on Lordotic Curvature and BSA has been found
$35.14^0 \pm 8.38^0$ and 1.34 $m^2 \pm 0.164$ m^2.

3. Results and Discussion

Within the limitation of the present study a high negative co-relational direction was foundin case of Lordotic Curvature or Lumbar Lordosis (LL) with body surface area (BSA).
From the obtained data the researcher also can show that out of total twenty eight (N=28) subjects four (N=4) had hyperlordosis (above 45^0) [4], thirteen (N=13) had hypolordosis (below 35^0) [4] and eleven (N=11) had normal Lordotic curvature (35^0 - 45^0). That means the percentage of total hyperlordosis (14.28%), hypolordosis (46.42%) and normal Lordotic curvature (39.28%), and it is presented in the Table-3 and Figures-2:

Table 3: Lordotic Curvature Status of Total Numbers of Subjects and Their Percentages

Lordotic Curvature (L^0)	Total out of 28 Subjects	Percentages
Hyperlordosis (above 45^0)	4	14.28%
Hypolordosis (below 35^0)	13	46.42%
Normal (35^0 - 45^0)	11	39.28%

According to Obtain Data.

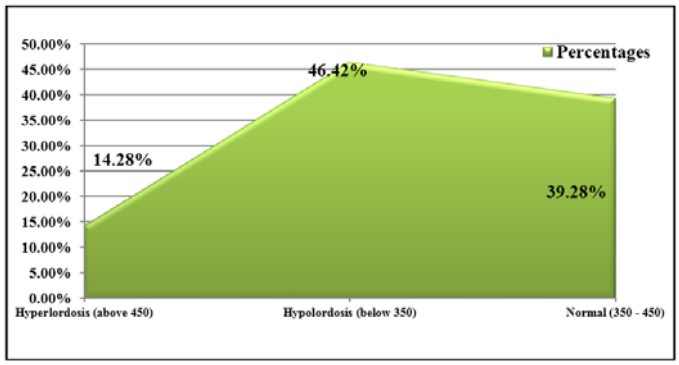
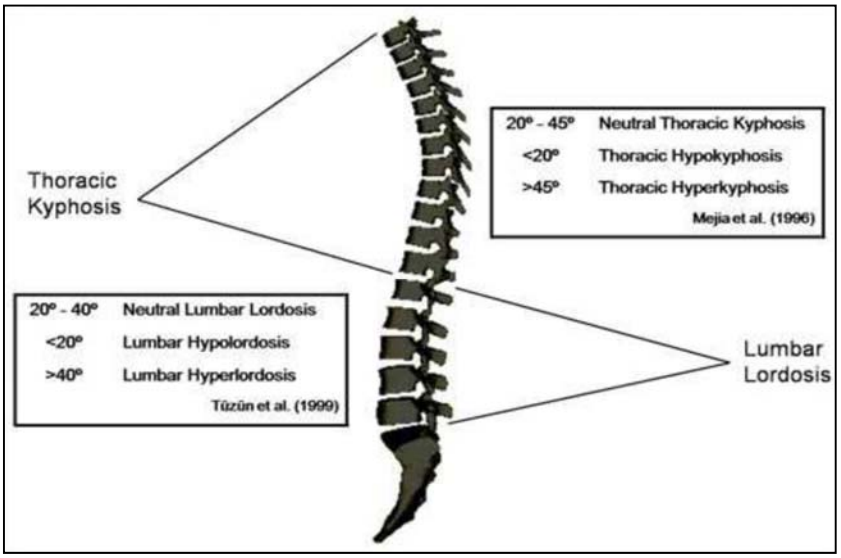


Fig 2: Percentage of Total Hyperlordosis, Hypolordosis and Normal Curvature

Graphical represent.

The researcher is greatly satisfied to mention that the findings have accomplished the purpose for which the study was initially conceptualized. The study done by 'American Medical Association', February-1989, and the review published by 'Australasian Medical & Therapeutic Instruments Pty Ltd'. It said that "the he evaluation of the spine uses inclinometers, rather than Goniometers, for the measurement of range of motion, a technique that provides more accurate, reproducible result. Only the inclinometer will be valid [6]."
There was an average BSA of 1.73 m2 for 3,000 cancer patients from 1990 to 1998 in a European Organisation for Research and Treatment of Cancer (EORTC) database.[7] During 2005 there was an average BSA of 1.79 m2 for 3,613 adult cancer patients in the UK. Among them the average BSA for men was 1.91 m2 and for women was 1.71 m2. [8] However, there is some evidence that BSA values are less accurate at extremes of height and weight, where Body Mass Index may be a better estimate [9].
On the bases of related reviews and result of the present study which the researcher had discussed above the certain conclusion drown by the researcher.



4. Conclusion

In this study there was a significant negative co-relational was exist between Lordotic Curvature and BSA, which suggests there is a high effect of Lordotic Curvature or Lumber Lordosis on BSA of the tribal school going children. It also demonstrates that the high BSA among tribal school children may decries the Lordotic Curvature of Spine because of high negative relation. That indicates towards the prevention of Hyperlordosis.

Most of research in the field of Physical Education and fitness science suggest that obesity or heavy body weight proportionally effect on the spinal curvature that means BSA causes of spinal abnormality. But in case of tribal children they are already suffer from malnutrition, poor fitness, and negative health care, poor knowledge about total health and most importantly inadequate muscle & bone mass, because of those reasons most of them suffer from spinal abnormality, as because they have poor muscle & bone mass that directly effect on their posture as well. Because for that the researcher thinks that if they have more BSA so proportionally they achieve more muscle mass and also bone mass which help them to put their spinal posture hold in a normal position and also help to maintain normal spinal curvature angle.

That means the researcher's queries towards the result of the present study is correct, the findings demonstrates that the lower status and poor concept about health practice, food and life style affected on normality of the spinal curvature among tribal school children and there was also having a significant relationship between them.

5. References

1. Body surface area Wikipedia, the free encyclopedia, https://en.wikipedia.org /wiki/Body_ surface area.
2. Łukasz Stoliński, Tomasz Kotwicki and Dariusz Czaprowski, 'Active self-correction of child's posture assessed with plurimeter and documented with digital photography'.
3. Kansal Devinder K. Ph.D, Textbook of Applied Measurement, Evaluation & Sports Selection, *SSS Publication*, 2nd edition, ISBN NO. 81-902282, 3-4, 2008, 234.
4. http://www.chiro.org/forms/latlum.html#ANGLE%20OF%20CURVATURE
5. http://www.spine-health.com/glossary/lumbar-spine
6. Guides to the Evaluation of Permanent Impairment. American Medical Association, *Third Edition- 2nd* Printing February (1989), Published by: Australasian Medical & Therapeutic Instruments Pty Ltd, PO Box 618, Albany Creek Q4035, Brisbane Australia, ABN 67-755 318-970, ACN 059-405-864.
7. Sparreboom A, Verweij J. (15 Jul 2003). "Paclitaxel Pharmacokinetics, Threshold Models, and Dosing Strategies" (http://jco.ascopubs.org/content/21/14/2803.full). *Journal of Clinical Oncology* 21 (14): 2803–4. doi:10.1200/JCO.2003.99.038 (https://dx. doi.org/10. 1200%2FJCO.2003.99.038). PMID 12860961 (https://www. ncbi.nlm.nih. gov/pubmed/12860961). Retrieved 20120909.
8. Sacco JJ, Botten J, Macbeth F, Bagust A, Clark P (28 Jan 2010). "The Average Body Surface Area of AdultCancer Patients in the UK: A Multicentre Retrospective Study"(http://ukpmc.ac. uk/articles/ PMC2812484/ reload= 0;jsessionid= VMxGfFGKF2 er3zi0XF6N.4). *PLoS One* 5 (1): e8933. doi:10.1371 /journal.pone.0008933 (https:// dx.doi.org/ 10.1371%2Fjournal. pone. 0008933).PMC 2812484 (https://www.ncbi. nlm.nih.gov/pmc/articles/PMC2812484). PMID 20126669 (https://www. ncbi.nlm.nih.gov/ pubmed/20126669). Retrieved 20120909
9. Adler, AC; Nathanson, BH; Raguhunathan, K; McGee, WT (2012). "Misleading indexed hemodynamic parameters: the clinical importance of discordant BMI and BSA at extremes of weight" (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3672608). *BioMed Central: Critical Care* 16 (6): 471.doi:10.1186/cc11876 (https://dx.doi. org/10. 1186%2Fcc11876). PMC 3672608(https://www. ncbi.nlm.nih. gov/pmc/articles /PMC36 72608). PMID 23273020 (https: // www.ncbi.nlm.nih.gov/pubmed/23273020).
10. Prof. Verma JP. 'A Text Book on Sports Statistics', Published by: Sports Publication (2009)7/26, New Delhi-110002, *ISBN- 978-81-7879-4146.*