

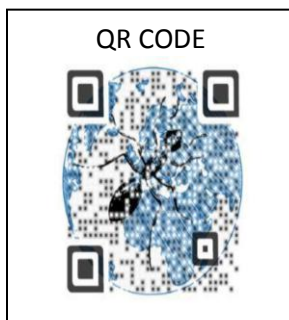
# Anthropometric Study of Cormic Index of Itsekiri and Ijaw Ethnicities in Delta State, Nigeria.

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## ABSTRACT

**Introduction:** Cormic index is a measure of the relative length of trunk and lower limb. This study aimed at establishing the cormic indices of the itsekiri and ijaw ethnic groups in Delta State.

**Materials and Methods:** This cross sectional study comprises of 384 subjects made up of male and female students of Itsekiri and Ijaw ethnicity within the ages of 17-35 years in Delta State University. Data obtained were analyzed using Descriptive statistics. The mean and standard deviation was calculated, as a two tailed t-test of 95% confidence interval and P value lesser than 0.05 was considered to be statistically significant. Approval for this study was obtained from the Ethical Committee of the Department of Human Anatomy and Cell Biology.

**Results:** All male subjects had higher standing (164.82) and sitting height (89.41) when compared to females (161.41; 87.70). However, cormic index was higher in females. There was a negative correlation between age, standing and sitting height. It was observed that standing height and sitting height was higher among the Ijaws, while the mean cormic index was calculated as 54.32 and 54.29 for Itsekiri and ijaw ethnic groups.

**Conclusion:** The cormic index of male and female subjects of both ethnicities established in this study supports the assertion that these anthropometric measure differs across races, ethnicities and population groups

## Key words:

*Cormic Index, Anthropometry, Itsekiri, Ijaw*

## INTRODUCTION

Cormic index is a bi-variate index of body shape measured as the ratio of sitting height to total height, often considered as a useful anthropometric tool in comparing nutritional status among different populations.<sup>1</sup> It is used to modify the body mass index values and seen as a measure of the relative length of trunk and lower limb.<sup>2</sup> Height and weight are often used to demonstrate associations between nutritional deprivation, poor socioeconomic status, and the risk of chronic health problems in adulthood.<sup>3, 4</sup> Previous studies have shown that increase in sitting height is relatively faster than leg length in late childhood.<sup>5</sup> The Cormic Index (CI) expresses sitting height as a proportion of full height varies among different individuals and groups, it has been observed that Africans tend to have longer lower extremities with CI of 51-52% however Asian and Far East populations have short lower limbs with mean Cormic index of 53-54%.<sup>6, 7</sup> Although it could be relatively affected by factors such as age, genetics, environment, and lifestyle.

Reports validate nutritional influence on stature as individuals with better living standard and nourishment have similar size and shape.<sup>8, 9</sup> Differences in anthropometric dimensions have been observed amongst different age, gender, races, and ethnicities<sup>10</sup>. Anthropometric assessment of cormic index in Northern Nigeria among young adolescents affirmed that mean cormic index for male and female was 49.86% and 50.45% respectively.<sup>11</sup> Ukuma, 2009 also reported mean cormic index as 48.6% and 47.89% for males and females from the south eastern region of Nigerian.<sup>12</sup>

The Itsekiri ethnicity is made up of about one million people spread across Warri North, Warri South and Warri South west local government districts of Delta State on the Atlantic coast of Nigeria. The Ijaw ethnic group consists of fifty clans categorized based on royal

affiliations with common cultural and religious beliefs. They are located in various regions of the Niger Delta in Nigeria.<sup>13, 14</sup> Due to existing differences in CI of individuals, ethnic groups and races, this study was undertaken to derive anthropometric value for Cormic indices of itsekiri and ijaw ethnic groups and also determine its relationship between genders among the groups. Findings from this study will be of importance in stature estimation, calculation of nutritional indices and add to baseline data for further studies.

## MATERIALS AND METHODS

**Ethics:** Approval for this study was obtained from the Ethical Committee of the Department of Human Anatomy and Cell Biology, Faculty of Basic Medical Sciences, Delta State University with reference number DELSU/CHS/ANA/18/35. Prior to data collection, the subjects were informed of the nature and purpose of the study and only those who gave informed consent participated.

**Study Design:** This cross-sectional study comprised of 384 subjects made up of male and female students of Itsekiri and Ijaw ethnicity within the ages of 17-35 years in Delta State University. The sample size was determined following guidelines of Cochran.<sup>15</sup> Individuals below or above the age group designated, non-indigenes of the ethnic groups outlined with any known ailment or deformity were excluded from the study.<sup>16</sup> Measurements were taken using a Stadiometer, Tape rule, Data Sheet and Pen and the following parameters were measured and recorded.

Standing height; taken with the subjects standing in anatomical position and their back in resting position

Sitting height; taken from the vertex of the head to the seated buttocks. The subject's head was positioned in the

Frankfort horizontal plane, the shoulders relaxed, and the back straight.<sup>17</sup> The index was measured using the formula;

$$\text{Cormic Index: } \frac{\text{Sitting Height}}{\text{Standing Height}} \times 100$$

**Statistics**

Data obtained was analyzed using descriptive statistics. The mean and standard deviation was calculated, levels of significance were determined at 95% confidence interval with P value lesser than 0.05 considered statistically significant. Pearson’s correlation was used to analyze the relationship of cormic index with other variables.

**RESULTS**

Descriptive analysis of the general sample population showed mean age of 22.73±3.04. The standing height ranged from 145.40-189.00 with a mean value of 163.02±7.81 while the sitting height ranged from 79.70-101.50 with a mean value of 88.51±3.90. The mean value for cormic index was 54.30±.21 (Table 1). The male subjects had higher mean standing and sitting height when compared to females (Figure 1). However, cormic index was higher in females (Table 2). There was a negative correlation between age, standing and sitting height. However, age was positively correlated with the cormic index. This was not statistically significant (p>0.05) (Table 3).

**Table 1: Descriptive Statistics of variables showing Mean and Standard Deviation**

Parameters	Minimum	Maximum	Mean	S.D
Age	17	35	22.73	3.04
Standing height	145.40	189.00	163.02	7.81
Sitting height	79.70	101.50	88.51	3.90
Cormic index	53.70	54.81	54.30	0.21

**Table 2: Descriptive Statistics among Gender**

Parameters	Gender	Mean	S.D
Age	M	22.75	3.14
	F	22.71	2.96
Standing height	M	164.82	7.77
	F	161.41	7.50
Sitting height	M	89.41	3.89
	F	87.70	3.75
Cormic index	M	54.26	0.01
	F	54.35	0.01

**Table 3: Correlation of Age with Standing, Sitting Height, and Cormic Index**

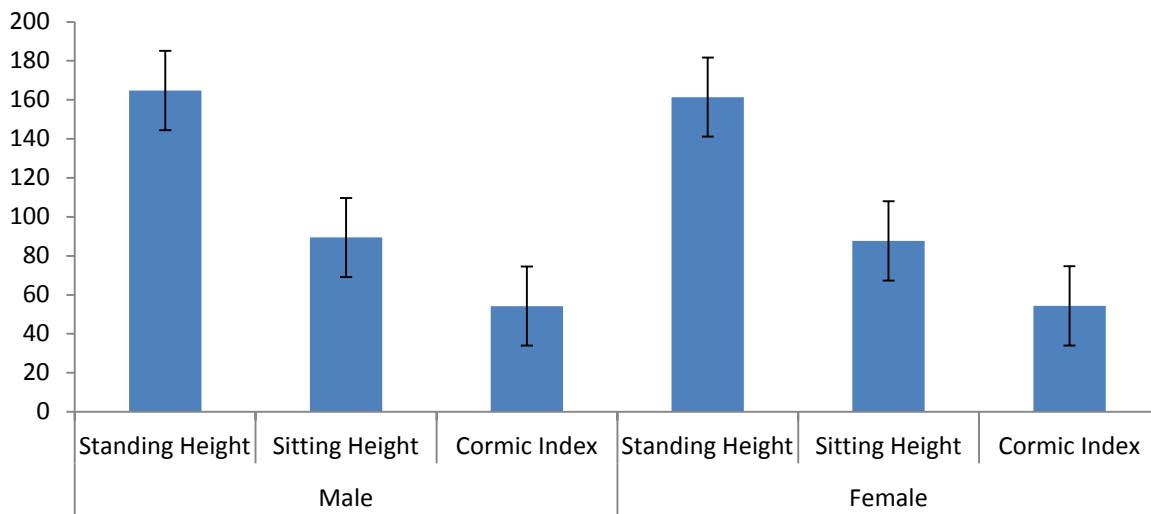
Parameters	r	P value	N
Standing height	-0.028	0.581	384
Sitting height	-0.028	0.580	384
Cormic index	0.030	0.556	384

Analyzing the comparison of cormic indices between the two ethnicities, subjects were equally distributed among the groups (n=192, 50.0% respectively).

Standing and sitting height were higher among the Ijaws when compared to the Itsekiris. However, there was no statistically significant difference between the cormic indices of both ethnic groups (Table 4).

**Table 4: Comparison of Parameters among Ethnic Groups**

Parameters	Gender	Mean	S.D	P Value
Standing height	Ijaw M	166.16	7.94	0.119
	Ijaw F	160.66	8.45	
	Itsekiri M	163.01	7.21	
	Itsekiri F	161.98	6.66	
Sitting height	Ijaw M	90.08	3.97	0.119
	Ijaw F	87.33	4.23	
	Itsekiri M	88.50	3.60	
	Itsekiri F	87.99	3.33	
Cormic index	Ijaw M	54.22	0.20	0.170
	Ijaw F	54.37	0.23	
	Itsekiri M	54.30	0.19	
	Itsekiri F	54.33	0.18	



**Fig 1: Gender Comparison of Parameter**

## DISCUSSION

Cormic index (CI) as ratio of sitting to standing height varies among race, ethnicity and gender.<sup>18</sup> It was observed that females have higher CI than their male counterpart, which is in agreement with the findings of Leyla *et al.*, 2018 who reported that the difference in mean cormic indices was higher in females and statistically significant among both sexes ( $p < 0.05$ ).<sup>19</sup> No statistically significant relationship exist between standing and sitting height of both sexes however male subjects had higher values for height measures when compared to females; this is consistent with previous the report of keywan *et al.*, 2103.<sup>20</sup>

There was strong negative correlation between age and cormic index of the study population which was not statistically significant ( $p > 0.05$ ), similar to the findings of Samuel *et al.*, (2014),<sup>21</sup> these could be as a result of cessation of growth of long bones in adult as studies in school children aged 6-12years showed inversely significant relationship with age ( $p < 0.01$ ).<sup>22</sup>

Published data reflects the standard range of cormic index as 0.48-0.55 (48-55%) across all population groups and races,<sup>23</sup> the index of itsekiri and ijaw ethnicities fall within this standard range. Male and female subjects of ijaw ethnicity had cormic index of 54.22 and 54.37 respectively however subjects of itsekiri descent had 54.30 and 54.33. This is at variance with the index of other ethnic groups within Nigeria; cormic index for individuals from Northern Nigeria reportedly show 49.86 in male and 50.45 in female<sup>[11b]</sup> while that of south east was 48.60 for male and 47.89 for female<sup>12b</sup>. These differences observed may be attributed to genetic and nutritional factors, It is has been observed that people with shorter limbs and stature have higher cormic index, because the index tend to decrease with growth of the limbs and general body stature.<sup>24</sup>

## Conclusion

The mean cormic index established for both male and female subjects of itsekiri and ijaw ethnic groups falls within the global range and will be useful as baseline data for future studies.

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## Conflicts of interest

There are no conflicts of interest

## REFERENCES

1. Siahkoughian, M. and Hedayatneja, M. Correlations of Anthropometric and Body Composition Variables with the Performance of Young Elite Weight Lifters. *J of Hum. Kinet*; 2010; 25 (1): 125–131.
2. Marefat, S. and Meysam, H. Correlations of Anthropometric and Body Composition Variables with the Performance of Young Elite Weightlifters. *J of Hum Kinet*; 2010; 25: 125-131.
3. Goldbourt, U. and Tanne, D. Body Height is Associated with Decreased Long-Term Stroke but not Coronary Heart Disease Mortality *Stroke*; 2002; 33: 743–748.
4. Sichieri, R., Silva, C. V. and Moura, A. S. Combined Effect of Short Height and Socioeconomic Status on Body Mass Index and Weight Gain during Reproductive Age in Brazilian women. *Braz J of Med Biol Res*; 2003; 36: 1319–1325.
5. Zemel, B. S., Kawchak, D. A., Ohene-Frempong, K., Schall, J. I. and Stallings, V. A. Effects of Delayed Pubertal Development, Nutritional Status, and Disease Severity on Longitudinal Patterns of Growth Failure in Children with Sickle Cell Disease. *Pediatr. Res*; 2007; 61 (5): 607–613.
6. Burton, R. F., Nevill, A. M., Stewart, A. D., Daniell, N. and Olds, T. Statistical Approaches to

- Relationships between Sitting Height and Leg Length in Adults. *Ann. Hum Biol*; 2013; 40 (1): 64-69.
7. Salama P., Fitsum A., Leisel., Spiegel P., Albertien V., Gotway C. A. JAMA, 2001; 286 (5) 565.
  8. Woodruff, B A and Duffield A. Anthropometric assessment of nutritional status in adolescent populations in humanitarian emergencies. *Eur J of Clin Nutr*. 2002; 56: 1108–1118.
  9. Height and weight standards for preschool children. How relevant are ethnic differences in growth potential? *Lancet* 1, 611 – 614.
  10. Norgan, N.G. "Interpretation of low body mass indices in Australian Aborigines" *Am. Phys. Anthropol*. 1994; 94: 229 - 237
  11. Adeyemi, D. O., Komolafe O. A. & Abioye A. I. Variations in Body Mass Indices among Post-Pubertal Nigerian Subjects With Correlation To Cormic Indices, Mid-Arm Circumferences And Waist Circumferences. *The Intr J of Biol Anthropol*. 2009; 2(2)
  12. Ukwuma, M. C. A study of the Cormic Index in a Southeastern Nigerian Population. *The Intr. J of Biol Anthropol*; 2009; 4 (1): 1-5.
  13. Appiah, A. and Henry L. *Encyclopedia of Africa*. Oxford University Press. 2010; 596. ISBN 9780195337709.
  14. John, A.S. Ethnic groups in Africa and the Middle East. *An encyclopedia*. ABC-CLIO. 2011; 130. ISBN 9781598843637.
  15. Cochran, W.J. *Sampling Techniques*, New York: John Wiley & sons. 1997; 3: 14-19.
  16. Dipak, K.A, Rajesh, K.G and Ajay, K.G. Assessment of Nutritional Status through Body Mass Index among Adult Males of 7 Tribal Populations of Maharashtra, *India Mal. J of Nutr*. 2009; 12 (1):23-31.
  17. Parker, D. R., Lapane, K. L., Lasater, T. M. and Carleton, R. A. Short Height and Cardiovascular Disease among Men and Women from Two Southeastern New England Communities. *Int J of Epidemiol*; 1998; 27: 970–975.
  18. Maryam, P., Nahid, G., Habibollah, E., Samira, E. Z. and Fatemeh, T. The Relationship between Cormic Index and Mode of Delivery. *J of Midw. Repro Health*; 2017; 5(1): 800-805.
  19. Leyla, K. B., Fatima, A., Konca, A. and Hakan, A. Can Cormic Index be a Marker of Pubertal Onset and Progress? *J of Trop Pediat*; 2018; 58 (4): 334-336.
  20. Keywan, M., Fatemeh, S., Gholamreza, H., Noushin, A. and Ali, D. Anthropometric Features of Body Index in Natives of Qazvin, *Iran.J. of Anatom. Sci*; 2013; 10 (3): 166-171.
  21. Samuel, O. A., Olisamedua, F. N. and Omolara, A. K. Cormic Index Profile of Children with Sickle Cell Anaemia in Lagos, Nigeria. *Hindawi*: 2014; 1-6.
  22. Ghosh J R and Bandyopadhyay A R. A Study on Cormic Index among Semi-Urban Bengalee Boys of West Bengal, *India. Coll. Anthropol*. 2005; 29 1: 33-36
  23. Wilby, J, Linge, K, Reilly T, Troup T.D.G. Circadian variation in effects of circuit weight training. *Bri J. of Sports Med*. 1985; 19: 236.
  24. Eveleth, P.B. Differences between population in body shape of children and adolescent. *Am. J of Phy Anthropol*. 1978; 373-382.

