International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

An Analysis of Body Mass Index and Psychomotor Ability Among Urban Rural and Tribal School Boys of Rayalaseema Region of Andhra Pradesh

Dr. P. Lakshman Naik[1], Mr. Thella Vamsi Krishna[2], Dr. Rameswaram Satya Prakash[3]

[1]Assistant Professor, Dr. Muscu MadhuSudhan Reddy College of Physical Education, Thangedapalli, Chotuppal, Bhuvanagiri (Dist), Telangana. India.
[2]Ph. D., Research Scholar, Department of Physical Education, Annamalai University, Chidambaram, Tamil Nadu. India.
[3]Assistant Professor, Jennys College of Physical Education, Tiruchirappalli, Tamil Nadu. India.

Abstract

The present study aimed to analyze Body Mass Index (BMI) and Psychomotor Ability among urban, rural, and tribal school boys of the Rayalaseema region of Andhra Pradesh. A total of 1,080 school boys aged 13–15 years were randomly selected from four districts of Rayalaseema, namely Ananthapuramu, Chittoor, Kadapa, and Kurnool. The sample comprised 360 urban, 360 rural, and 360 tribal school boys. Body Mass Index was assessed using standard anthropometric measurements, while Psychomotor Ability was evaluated through the Nelson Hand Reaction Test. The collected data were analyzed using Two-Way Analysis of Variance (ANOVA) to determine the influence of region and area on the selected variables. Whenever significant differences were observed, Tukey's post hoc test was employed to identify pairwise mean differences. The level of significance was set at 0.05. The results revealed that area-wise differences were significant for both BMI and Psychomotor Ability, whereas district-wise differences and the interaction effect between district and area were not statistically significant. Urban school boys demonstrated significantly higher BMI values compared to rural school boys, while no significant differences were found between urban and tribal or rural and tribal groups. In terms of Psychomotor Ability, rural school boys exhibited superior performance compared to tribal school boys, whereas the differences between urban and rural and between urban and tribal groups were not significant. The findings suggest that environmental, nutritional, and lifestyle factors associated with different residential settings may influence the physical and psychomotor development of adolescents. The study concludes that urban school boys possess relatively better BMI status, whereas rural school boys exhibit superior psychomotor ability. These findings provide valuable insights for educators, coaches, and policymakers in designing targeted health, fitness, and skill-development programs for school children across diverse populations.

Keywords: Body Mass Index, Psychomotor Ability, Urban School Boys, Rural School Boys, Tribal

School Boys, Rayalaseema Region, Adolescents.

Body Mass Index (BMI)

The ratio of weight and height is called the Body Mass Index (BMI). BMI is used to measure the status of body weight. It helps to correlate with the body fat for being relatively the easiest method to measure body weight. **(Dietz and Bellizzi, 1999)**

A unit of measure (kg/m^2) is produced by the formulae that are universally used in medicine.

$$BMI = \frac{\text{Body Weight (Kg)}}{\text{Height (Meter)}^2}$$

An additional growth of body fat is described by the term called 'obesity.' It causes to create a risk of illness and premature death for an individual. As there is no distinct point at which the body gains excessive fat, it is very problematic to specifically define the term. In addition, it is not always easy to measure body fat. But, measures of relative weight are used as a substitute for body fat for the epidemiological purposes. It is the most extensively used measurement of obesity **(Orden et al., 2007).** The relationship between BMI and the body fat is unclear. The relative components of Body Mass Index have changed among the children over a period of time. By using the Body Mass Index, the result shows that there is an underestimation of obesity occurrence in epidemiological study **(Wells et al., 2002).** As there is no particular threshold of the Body Mass Index, the relation between Body Mass Index and later morbidity is less distinct among children resulting them an increased risk. The Body Mass Index (BMI) takes a key role in measuring the overweight and obesity among children **(Cole et al., 1995).**

Psychomotor Ability

Psychomotor testing is useful for monitoring learner's progress and maintaining standards. Research over the years has revealed that individuals psychomotor abilities vary due to different levels of experience, age, gender, response accuracy, and adaptability. Considering the fact that individuals may have different levels of psychomotor ability, training courses need to provide learners with different levels of psychomotor training. When designing educational and assessment programs, learning curves need to be drawn to ensure that sufficient levels of psychomotor skills are achieved. Measuring the learning curve has potential benefits for patient safety and professional education. It has applications in training and the adoption of new procedures and equipment. The learning curve theory is based on the principle that repeated practice of a task reduces the time it takes to perform it. The learning curve refers to the changes in one's proficiency that occur when a particular skill is practiced repeatedly. Organizational factors (facilities and equipment), the surgical team (experience and cooperation), the complexity of the case, and the characteristics of the surgeon (experience, natural abilities, motivation, etc.) can influence one's learning curve in a particular procedure.

Hypotheses

- It was hypothesized that there would be significant difference in the Body Mass Index among urban rural and tribal area school boys.
- It was hypothesized that there would be significant difference in the Psychomotor Ability among urban rural and tribal area school boys.

Methodology

The present study was undertaken to find out the Body Mass Index and Psychomotor Ability among urban, rural, and tribal school boys. In order to achieve the purpose of the study, 360 boys from urban areas, 360 boys from rural areas, and 360 boys from tribal areas were selected randomly from various schools in the Rayalaseema region of Andhra Pradesh. Their ages ranged from 13-15 years. Two-way ANOVA was used for data analysis. Wherever the 'F' ratio was found to be significant, Tukey's test was followed as a post hoc test to determine the level of significant difference between the paired means.

Table - I

Two-way Analysis of Variance of the Mean Differences of Subjects Belonging to different Districts and Areas of the Rayalaseema Region on Body Mass Index

Religion	Area							
	Urban		Rural		Tribal		Total	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Ananthapuram	19.01	3.743	18.49	3.555	18.57	2.431	18.69	3.290
Chittor	20.29	15.498	17.33	2.337	17.88	2.426	18.50	9.213
Kadapa	17.83	3.295	18.04	3.119	18.41	3.137	18.10	3.182
Kurnool	19.46	3.935	18.07	3.639	18.86	3.193	18.80	3.633
Total	19.15	8.387	17.98	3.217	18.43	2.831	18.52	5.455

The results pertaining to the descriptive statistics of the variable Body Mass Index is shown in table – I. The mean and standard deviation values are obtained for each District of Rayalaseema region under three different areas (Urban, Rural and Tribal).

Table – II

Two-way Analysis of Variance for Body Mass Index of Region (Ananthapur, Chittor, Kadapa, Kurnool) and Area (Urban, Rural & Tribal) school boys of Rayalaseema Region

Source	Sum of Squares	df	Mean Square	F	Sig.
Region	76.305	3	25.435	0.863	0.460 ^{NS}
Area	248.010	2	124.005	4.208	0.015*
Region * Area	313.936	6	52.323	1.776	0.101^{NS}
Error	31442.873	1067	29.468		
Total	402165.000	1079			

('*' – Significant; 'NS' – Not significant at 5% level of significance)

The above table – II shows that the obtained p- value for Rayalaseema Region is 0.460 is greater than the 0.05 and for Area the p-value is 0.015 is less than the 0.05. It is also observed that the p-value of the interaction between Region and Area is greater than 0.05

The results of the study indicate that, there is no that much of considerable mean significant differences between Rayalaseema regions (Ananthapur, Chittor, Kadapa and Kurnool) and there is significance mean score of difference exists between Areas (Urban, Rural and Tribal) of the Rayalaseema region.

Since the p-value is witnessed as significant in Areas of the Rayalaseema region, there is a need to carry out the post hoc comparisons. Accordingly, Tukey's test is conducted. The results of pair wise comparisons are presented in table – III for area wise comparison.

Table – III

Tukey's Post Hoc Test for Differences between the Paired Mean on Body Mass Index among Urban Rural and Tribal Area School Boys

Urban	Rural	Tribal	Mean Difference	P- Value
19.15	17.98		1.17	0.011*
	17.98	18.43	0.45	0.516^{NS}
19.15		18.43	0.72	0.177^{NS}

('*' – Significant; 'NS' – Not significant)

From the results, the statistical significance is witnessed between the Urban and Rural areas only. The other pair wise comparisons (Urban & Tribal, Tribal & Rural) are showing that, there are no significance results (mean differences are very low) of Rayalaseema Region.

Figure 1: Line Diagram Showing the Mean Differences of Various Districts of Rayalaseema Region of Urban Rural and Tribal School Boys on Body Mass Index.

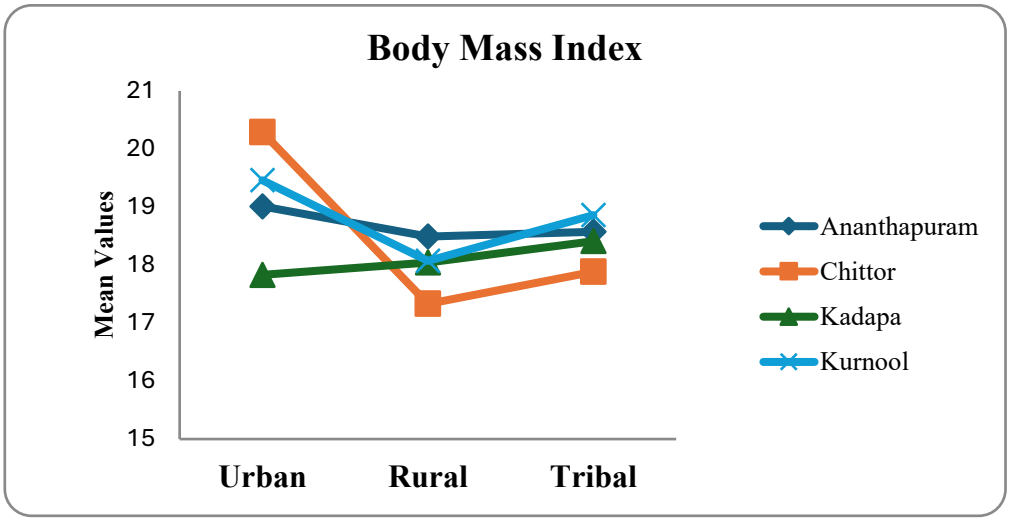


Table – IV

Two-way analysis of variance of the Mean Differences of Subjects Belonging to Different Regions and Areas of the Rayalaseema Region on Psychomotor Ability

Religion	Area							
	Urban		Rural		Tribal		Total	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Ananthapuram	15.00	4.581	16.33	4.280	14.91	3.809	15.41	4.270
Chittor	15.09	4.749	16.21	4.377	14.96	4.036	15.42	4.417
Kadapa	16.14	5.043	15.63	4.123	14.66	4.174	15.48	4.493

Kurnool	14.32	4.829	15.84	4.908	15.60	5.005	15.26	4.942
Total	15.14	4.828	16.01	4.422	15.03	4.276	15.39	4.532

The results pertaining to the descriptive statistics of the variable Psychomotor Ability is shown in table – IV. The mean and standard deviation values are obtained for each District of Rayalaseema region under three different areas (Urban, Rural and Tribal).

Table – V

Two-way analysis of variance for Psychomotor Ability of Region (Ananthapur, Chittor, Kadapa, Kurnool) and Area (Urban, Rural & Tribal) school boys of Rayalaseema Region

Source	Sum of Squares	df	Mean Square	F	Sig.
Region	7.344	3	2.448	.120	.948 NS
Area	205.617	2	102.808	5.054	.007*
Region * Area	217.554	6	36.259	1.782	.099 NS
Error	21726.811	1068	20.343		

('*' – Significant; 'NS' – Not significant at 5% level of significance)

The above Table – V show, the obtained p - value for Rayalaseema Region is 0.948 is greater than the 0.05 and for Area the p-value is 0.007 is less than the 0.05. It is also observed that the interaction between Region and Area of the p-value is 0.099 is greater than 0.05.

The results of the study indicate that, there is no that much of considerable mean significant differences between Rayalaseema region (Ananthapur, Chittor, Kadapa and Kurnool) and there is significance mean difference between Areas (Urban, Rural and Tribal) of the Rayalaseema region.

Since the p-value is witnessed as significant in Areas of the Rayalaseema region, there is a need to carry out the post hoc comparisons. Accordingly, Tukey's test is conducted. The results of pair wise comparisons are presented in table – VI.

Table – VI

Tukey's Post Hoc Test for Differences between the Paired Mean on Psychomotor Ability among Urban Rural and Tribal Area School Boys

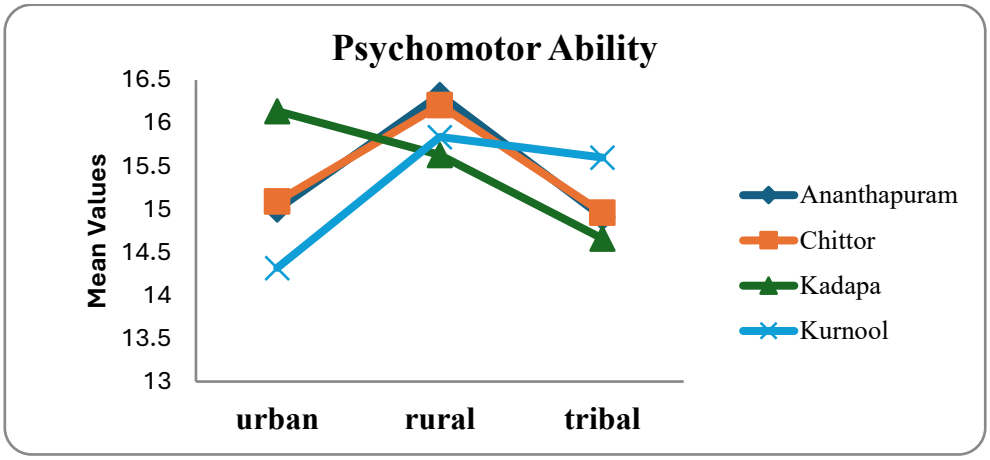
Urban	Rural	Tribal	Mean Difference	P - Value
15.14	16.01		0.87	.027NS
	16.01	15.03	0.98	.011*
15.14		15.03	0.11	.944 NS

('*' – Significant; 'NS' – Not significant).

From above table – VI results, the pair wise comparisons are showing that, the statistical significance is

witnessed between the Rural & Tribal areas of Rayalaseema region. The other pair wise comparisons are showing that, there is no significance between Urban & Rural and Urban & Tribal areas of Rayalaseema region. The mean psychomotor ability is observed to be slightly better in rural than the urban and tribal areas.

Figure 2: Line Diagram Showing the Mean Differences of Various Districts of Rayalaseema Region of Urban Rural and Tribal School Boys on Psychomotor Ability.



Conclusions

1. This study shows that Kurnool district school boys were better in Body Mass Index variables than the other three districts namely Ananthapur, Chittor and Kadapa of Rayalaseema region. Further it was also observed from the study's findings show that the body mass index of Kadapa district school boys is lower than the Ananthapur, Chittor and Kurnool district school boys of Rayalaseema region.
2. This study shows that urban area school boys were better in body mass index variables than the other two areas namely rural and tribal school boys of Rayalaseema region. It was also observed the study's findings show that the body mass index of rural area school boys is lower than the urban and tribal area school boys of Rayalaseema region.
3. This study shows that Kadapa district school boys were better in Psychomotor Ability variables than the other three districts namely Ananthapur, Chittor and Kurnool of Rayalaseema region. Further it was also observed from the study's findings show that the Psychomotor Ability of Kurnool district school boys is lower than the Ananthapur, Chittor and Kadapa district school boys of Rayalaseema region.
4. The study shows that rural area school boys were better in Psychomotor Ability variables than the other two areas namely urban and tribal school boys of Rayalaseema region. It was also observed the study's findings show that the psychomotor ability of tribal area school boys is lower than the urban and rural area school boys of Rayalaseema region.

References:

1. Chotemiya, M. M., & Vairavasundaram, C. (2026). Influence of resistance and water-based resistance training on selected kinanthropometric variables in basketball players. *International Journal of Advance and Innovative Research, 13*(1), 151-155.
2. Chotemiya, M. M., & Vairavasundaram, C. (2026). Effect of resistance and aqua resistance training

on selected corporeal variables among men basketball players. *International Journal of Physical Education, Sports and Health, 4*(13), 269-272.

3. Chotemiya, M. M., & Vairavasundaram, C. (2025). Effect on Resistance and Aqua Resistance Training on Selected Anthropometric Variables among Basketball Players. *Shodha Samiksha*, *15*(1): 144-149.
4. Chotemiya, M. M., & Vairavasundaram, C. (2025). Impact of aqua resistance and resistance training on selected anthropometric variables among Basketball players. *International Journal for Multidisciplinary Research, 7*(4):1-7.
5. Chotemiya, M. M., & Vairavasundaram, C. (2023). Resistance and aqua resistance training packages and its impact on selected kinanthropometric variables among Basketball players. *Journal of Data Acquisition and Processing*, *38*(2), 4199.
6. Chotemiya, M. M., & Vairavasundaram, C. (2023). Resistance and aqua resistance training packages and its impact on selected functional variables among men Basketball players. C*orrosion and Protection*, *51*(1), 478-487.
7. Chotemiya, M. M., & Vairavasundaram, C. (2023). Resistance and aqua resistance training packages and its impact on selected corporeal variables among men Basketball players. *BioGecko, 12*(3), 175-182.
8. Chotemiya, M., Itoo, J. A., & Vairavasundaram, C. (2021). Effect of Resistance training on selected corporeal variables among Basketball players. *Indian Journal of Applied Research*, *11*(1), 1-2.
9. Mandava, M. Y., Vairavasundaram, C., & Chotemiya, M. M. (2020). Effect of low intensity plyometric training on selected neuro muscular activities of School students. *Journal of Xi'an University of Architecture & Technology, 12*(6), 1418-1423.
10. Chotemiya, M. M., Vairavasundaram, C., & Jany, M. S. H. (2020). Isolated and Combined effect of Aqua and Resistance training on selected Physiological variables among men Basketball players. *XI'n University of Architecture and Technology*, *12*(7), 743-754.
11. Jany, M. S. H., Vairavasundaram, C., & Chotemiya, M. M. (2020). Effect of kettlebell training on selected physical fitness variables among students from Alagappa University college of Physical education. *Journal of Xidian University, 14*(5), 5268-5275.
12. Kaminsky Leonard.A. (2005) Health Related Physical Fitness Assessment Manual,Indiana:
13. Acsm group publisher, p.2.
14. Chu, C., Chen, F., Pontifex, M. B., Sun, Y., & Chang, Y. (2016). Health-related physical fitness, academic achievement, and neuroelectric measures in children and adolescents. International Journal of Sport and Exercise Psychology, pp. 1-16.
15. Deb, P and Dhara, PC (2020) comparative study on health related physical efficiency between Tribal and non tribal school going boys of south tripura, india, International Journal of Recent Scientific Research Research, Vol. 11, Issue, 05(A), pp. 38388- 38393.
16. Miss Tadang Minu, Sudarsan Biswas (2016) "A comparative study of psychomotor abilities
17. sub-junior, junior and senior levels of women boxers." International journal of
18. physical education, sports and health, volume-3, pages:400-402.
19. Dudhale Sunil, Bhate Bhalchandra (2015) "A Comparative Study of Psycho-Motor Abilities of Tribal and Non-tribal Gymnasts." Res. J. of Physical Education Sci., Volume 3, Issue (2), Pages 9-10.

20. Mishra Anshuman (2015) comparison of selected sports specific psychomotor abilities between batsmen and bowlers in cricket. Scholarly Research Journal for Interdisciplinary Studies. Vol. III/XVII, pp: 3024 – 3032.