

A Comparative Analysis of Hand Grip Strength and Level of Concentration Between Students Studying in Schools of Rural and Urban Area of Haridwar

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Abstract

This study aimed to compare hand grip strength and the level of concentration among male students from rural and urban schools in Haridwar, Uttarakhand, India. A total of 70 students (35 from rural schools and 35 from urban schools), aged 11 to 13 years, were selected using random sampling. Hand grip strength was measured using a dynamometer, while the level of concentration was assessed using the Letter Cancellation Task. Data analysis was conducted using descriptive statistics and an independent t-test. Results indicated that rural students exhibited significantly higher hand grip strength, whereas urban students demonstrated significantly better concentration levels. These findings suggest that environmental factors may influence both physical and cognitive development in school-aged children.

Keywords: Hand Grip Strength, Concentration, Rural, Urban, Adolescents, Haridwar

1. Introduction

Physical and cognitive developments are closely linked and play a critical role in the overall well-being and academic performance of children. Hand grip strength serves as a simple yet reliable indicator of overall muscular strength, which is important for daily functioning and physical fitness. Similarly, concentration is a fundamental cognitive ability that impacts learning, memory, and performance in educational settings.

There is a growing body of literature examining the influence of environmental and socioeconomic factors on the physical and cognitive abilities of children. Rural environments may encourage more physical activity, while urban environments often provide better academic resources and cognitive stimulation. This study seeks to investigate the impact of such contrasting environments by comparing hand grip strength and concentration levels among male students from rural and urban schools in Haridwar.

Past studies, such as those by Sonika Lamba et al. (2014) and Alessandro P. Silva et al. (2015), have demonstrated the significant effects of teaching time and physical activity on attention and concentration. These studies highlight the importance of both environmental and educational factors in shaping children's cognitive and physical performance.

Purpose of the Study

1. To assess the hand grip strength of male students studying in rural and urban schools.
2. To evaluate the level of concentration among male students from rural and urban schools.

Materials and Methods

Subjects

The sample consisted of 70 male students aged between 11 and 13 years. Thirty-five students each from rural and urban schools in Haridwar were selected using random sampling.

Tools

1. **Hand Grip Strength:** Measured using a standard hand-held dynamometer.
2. **Concentration Level:** Measured using the **Letter Cancellation Task** (Kumar & Telles, 2009), which assesses attention and concentration.

Procedure

Data were collected through school visits using standardized procedures for both the dynamometer and the letter cancellation task. Each participant was tested individually under similar conditions to minimize external influences.

Statistical Analysis

The mean, standard deviation, and independent t-test were applied to compare hand grip strength and concentration levels between the two groups. The significance level was set at 0.05.

2. Results

Table 1: Comparison of Hand Grip Strength between Rural and Urban Boys

Group	N	Mean	SD	SEM	t-value	df	p-value
Rural Boys	35	23.4	6.10	1.03	1.705	68	0.092
Urban Boys	35	20.4	4.39	0.74			

Interpretation: Although rural boys showed higher hand grip strength, the difference was not statistically significant ($p > 0.05$).

Graphical representation

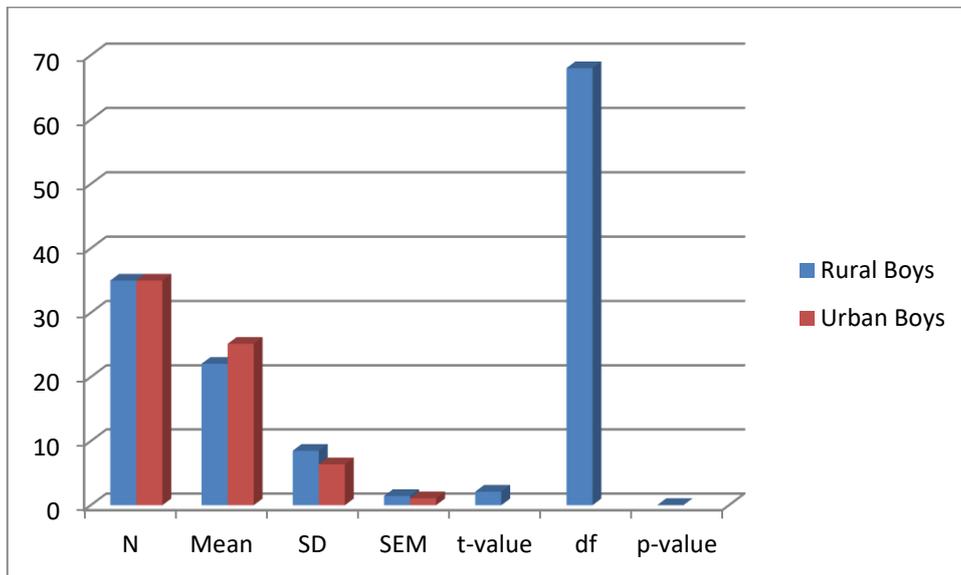
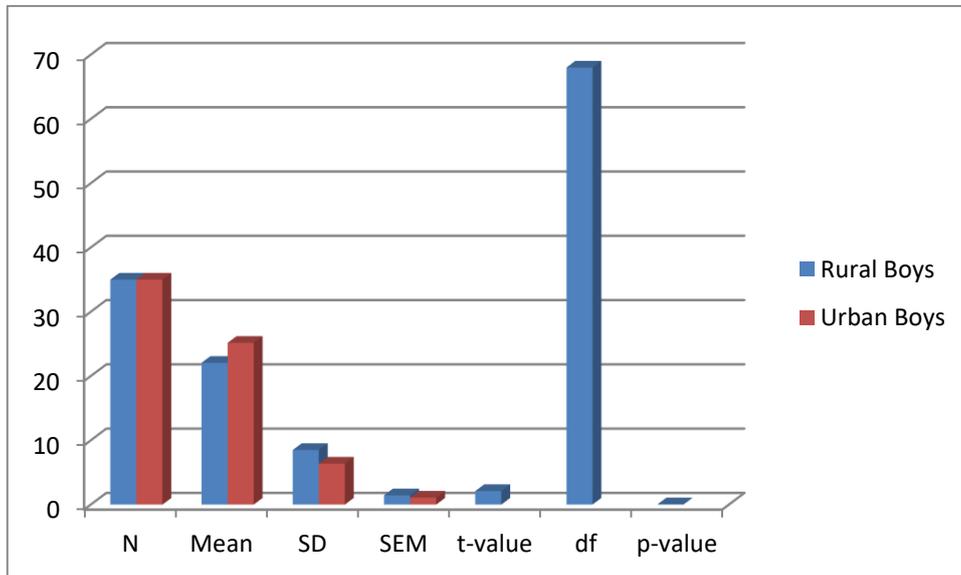


Table 2: Comparison of Concentration Levels between Rural and Urban Boys

Group	N	Mean	SD	SEM	t-value	df	p-value
Rural Boys	35	22.06	8.50	1.44	2.113	68	0.038
Urban Boys	35	25.17	6.38	1.08			

Interpretation: Urban boys demonstrated significantly higher concentration levels than rural boys ($p < 0.05$).

Graphical representation



3. Discussion

The findings of this study suggest a noticeable disparity between rural and urban students in terms of both physical and cognitive development. The superior hand grip strength observed in rural students could be attributed to increased physical activity and less sedentary lifestyle. Conversely, better concentration levels in urban students may reflect the advantages of improved educational infrastructure, cognitive stimulation, and access to academic resources.

This is consistent with Silva et al. (2015), who found that physical activity enhances cognitive function, especially in attention-demanding tasks. It also aligns with the findings of Lamba et al. (2014), who demonstrated the importance of structured educational environments in fostering attention and learning outcomes.

4. Conclusion

Based on the analysis, it can be concluded that:

1. **Hand grip strength** is higher in male students from rural schools.
2. **Concentration levels** are significantly better in male students from urban schools.

These differences highlight the impact of environment and lifestyle on students' physical and cognitive development. The results may help educators and policymakers in designing targeted interventions to foster balanced development across diverse school settings.

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