

## Urban-rural contrasts in biomotor features of male children in the district of Mirzapur and Chandauli, Uttar Pradesh, India

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### **ABSTRACT**

*Biomotor features of an individual comprise his control the causes of bodily action to perform a successful effect. In the present research, an attempt has been made to compare urban-rural contrasts in biomotor features of male children in the districts of Mirzapur and Chandauli, in the state of Uttar Pradesh. To conduct the study, the investigators had selected a total of two hundred and fifty (N=250) subjects, 140 from the urban areas and 110 from rural areas of ages ranging from 12-14 years. The subjects were selected through the use of multistage random sampling technique. During the study, numerous biomotor features such as sprinting speed, LES, HF, agility and balance were taken into account. The Kolmogorov test was implemented at ( $P < 0.05$ ) level to ascertain the normality of the data; and to compare the biomotor features between the urban and rural subjects, the independent 't' test was applied at ( $P < 0.05$ ) level of significant. The results of the study indicate that the rural children are having better biomotor features namely 50 yards sprints, Leg explosive strength, hamstring flexibility, and balance than their urban counterparts. The present study concludes that rural children show better biomotor features than urban children. Moreover, the rural way of living is more physically active in nature than life in urban areas; and it produces a high level of physical and physiological functioning in rural residents. The place of residence, apart from other environmental factors, should be taken into account when promote physical activity and health. In spite of the fact that regular involvement in energetic physical activities could improve biomotor fitness of children. Moreover, the rural way of living is more physically active in nature than life in urban areas; and it produces a high level of physical and physiological functioning in rural residents.*

**Keywords:** Rural areas, Urban areas, Biomotor features, Male children, Agility

## INTRODUCTION

Biomotor features determine the ability of an individual to perform a physical exercise. The desire to perform being the cause, and the movement itself being just the effect; therefore, it is the ability to control the causes to perform a successful effect. The biomotor abilities are acquired largely through genetic inheritability (Bompa, 1999). However, fitness comprises of different components or abilities. The movement of the body is affected by these abilities, and hence these are known as “Biomotor Skills”. Biomotor skills are defined as the abilities to execute a variety of activities. For example, Speed, Endurance, Strength, Coordination, and Flexibility.

Biomotor features are genetically determined but can also be influenced by environmental factors. Physical activity is one of the main determinants of the physical fitness (Ruiz et al., 2006; Hussey et al., 2007). Life in areas with different population densities can be associated with different dietary habits, access to sports facilities and the possibilities of physical activities, among other things. This exposure to the environment can affect lifestyle (Roemmich et al., 2006; De Vries et al., 2007), which in turn may be related to the level of physical fitness.

Several studies have researched the relation between the place of residence (urban or rural) and the level of physical fitness in children and adolescents all around the world, e.g. USA (McMurray et al., 1999), Turkey (Özdirenç et al., 2005), Switzerland (Kriemler et al., 2008), Cyprus (Tinazci & Emiroglu, 2009), Greece (Tsimeas et al., 2005), Mexico, (Peña Reyes et al., 2003), Australia (Dollman et al., 2002) and Oman (Albarwani et al., 2009), Spain, Slovak and observed inconsistent results.

It is now widely accepted that urbanization is a very social process where societal and biological alterations of populations occur. The differences in urban and rural environments in the growth of children have come into focus as subjects of interest in the last few years (Das & Chatterjee, 2013). An urban area is an area with an increased density of human-created structures in comparison to the areas surrounding it. Urban areas may be cities, towns or conurbations. In fact, urbanized areas agglomerate and grow as the core population/economic activity center within a larger metropolitan area or envelope. People living there are open, they choose their cultures and their beliefs and share them; and that is what makes them a very modern society. Rural areas are mostly recognized as farms and lower population density areas, and also mostly have tightly-knit communities where individuals can affect one another easily. In summary, rural area is any territory that is not urban; or in other words the term ‘rural’ is what remains after the urban areas have been defined (Kuriakose & Abraham, 2015). Environmental and societal alteration connected with urban dwelling, such as changing neighborhoods, crowding, concern for protection, lack of sufficient space for playing games and other physical activities etc., may contribute to reduced levels of physical activity and physical fitness (Peña et al., 2003). In contrast, rural residence is commonly associated with a more dynamic, physically active lifestyle, which is very beneficial for physical fitness (according to Dollman et al. (2002).

## 2. MATERIALS AND METHODS

### 2.1. Subject

Two hundred and fifty male children, 140 from rural areas and 110 from urban areas, with ages ranging from 12 to 14 years, were selected from junior and high schools in the districts of Mirzapur and Chandauli, Uttar Pradesh, in the year 2015. Multistage random technique was utilized in selecting the subjects of the study. The ages of the children were determined from their dates of birth in their school registers. Consents were taken from the parents as well as from school authorities prior to the measurements. The study was approved by the Research Ethics Committee of Pondicherry University.

### 2.2. Administration of Biomotor tests

There were numerous biomotor tests used in the study namely: **-Speed** was recorded in seconds to complete the 50-yard dash and **Balance ability** was measured through Stork Stand Test. The maximum time was recorded in seconds as recommended by Johnson and Nelson, (1969). **Leg explosive** strength was measured using Sargent jump test (Sargent, 1921)., with the score being recorded to the nearest 1 mm. **Hamstring flexibility** was measured through Sit and reach test. The score was recorded to the nearest 1 mm and the **Agility** was measured through the 4 ×10 m shuttle run. The score was recorded to the nearest 0.01 seconds. All the tests adopted the methodology recommended by (Singh et al, 2016, & Catapang, 2000).

### 2.3. Statistical Analysis

All statistical analyses were done using the SPSS version 16 software. Descriptive statistics such as mean, standard deviation, minimum and maximum values were used to describe the characteristics of the sample. For assessing the normality of data, the researcher used Kolmogorov test; and to compare the biomotorfeatures, the independent ‘t’ test was applied at P<0.05 level of significant.

## 3. RESULTS

**Table 1: Test of Normality**

<b>Kolmogorov test</b>		
<b>Variables</b>	<b>df</b>	<b>Sig.</b>
<b>Sprints</b>	115	0.19
<b>LES</b>	115	0.21
<b>HF</b>	115	0.09
<b>Agility</b>	115	0.12
<b>Balance</b>	115	0.81

\*Significant at P<0.05

Sprints: 50 yards sprints, LES: Leg explosive strength, HF: hamstring flexibility, and balance  
From the table 1: the Kolmogorov test indicated that all the biomotor features displayed insignificant at  $P < 0.05$  level. Therefore, all chosen biomotor features were normally distributed.

**Table 2: Descriptive statistics and independent ‘t’ test of biomotor features of urban and rural male children**

Variables	Urban				Rural				‘t’
	Mean	S d	Max	Min	Mean	S d	Max	Min	
<b>Speed</b>	7.39	0.46	10.02	7.10	7.12	.72	10.20	7.20	2.36*
<b>LES</b>	24.78	3.6	35.1	28.0782	26.79	4.3	37.4	27.7	3.31*
<b>HF</b>	22.7801	3.29	34.50	24.52	25.27	4.9	36.2	23.2	2.37*
<b>Agility</b>	12.06	.91	14.30	10.10	11.96	0.86	14	11.01	2.01*
<b>Balance</b>	38	4.62	44	36	41	5.3	46	34	2.78*

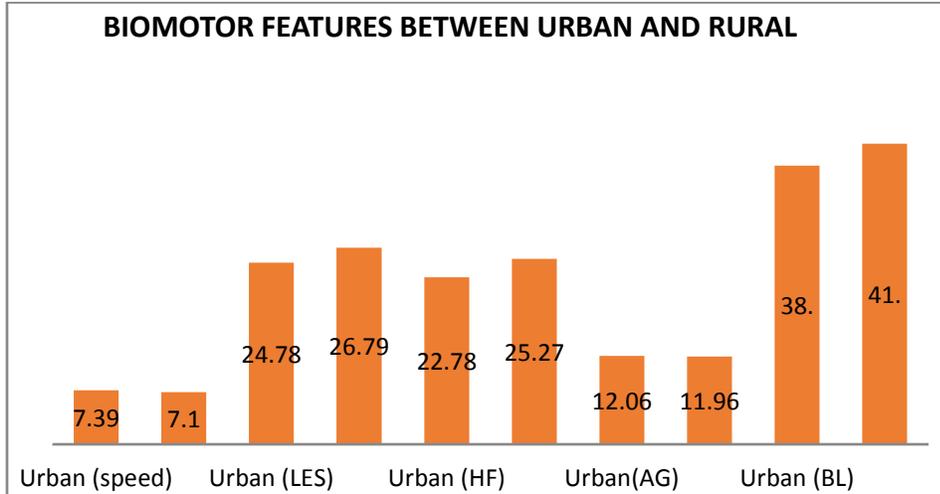
\*Significant at  $P < 0.05$

The table 2 indicates the mean, s.d, max. and min. values of biomotor features of urban and rural male children. The independent ‘t’ test revealed that all biomotor features, namely speed, LES, HF, Agility and Balance were indicating significant difference between urban and rural children. The independent ‘t’ test showed significant at  $P < 0.05$  level, of all the selected biomotor features between urban and rural children. It means rural children were having better biomotor features than their urban counterparts.

## DISCUSSION

There are numerous studies that indicate that children’s biomotor features tend to lag behind their physical development (Findak et al., 1996; Kuznjecova, 1985; Tokmakidis&Kasambalis, 2006). This entropy foregrounds that children are born with relatively large motor potential (Novak et al 2015.,& Jureša et al.,200). The aim of this study was to assess the biomotor features of urban and rural male children in the district of Mirzapur and Chandauli, Uttar Pradesh. Based on the current findings, the rural children showed better biomotor features than their suburban counterparts.

These findings are in line with (Gill et al., 2010, Das & Chatterjee, 2013, Kolekar and Sawant 2013, Yadav 2016, Tsimeas & Tsigilis 2005) and run counter to (Novak et al., 2015 and Sylejmani, B et al., 2006).



**Fig. 1. Graphical Representation of the Mean of Biomotor features between urban and rural Children in the district of Chandauli**

Physical inactivity and the lack of exercise result in numerous health problems for individuals. Generally, the health habits and fitness level characteristics are directly dependent on the quality of life. However, recent data indicate an alarming trend. Considering the sedentary lifestyle followed by people living in cities nowadays (Seefeldt et al., 2002), students in urban areas spend more time sitting and watching the television as compared to their counterparts in rural areas (Ruel et al., 1998). On the other hand, the better developed biomotor features of the rural boys may be due to the impact of their regular involvement in habitual physical activities or favorable environmental influence. The latter areas offer more readily available outdoor spaces along with opportunities for children to spend more time outdoors, as well as providing them with freedom to move and play. But, the consequences of mechanization, modernization, computerization and urbanization are being increasingly felt in the rural areas; and hence it is not surprising that the students there are spending more and more time at home, watching the television or playing computer games. These habits result in reduced levels of physical exercise which contribute to the lower levels of their biomotor abilities. It may be reasonable to speculate that urban children have lower biomotor abilities than their rural counterparts.

## CONCLUSION

The results of the study conclude that the rural male children have better biomotor features, namely: 50 yards sprints, leg explosive strength, hamstring flexibility, agility and balance in comparison to their urban counterparts. In spite of the fact that regular involvement in energetic physical activities could improve biomotor fitness of children. Moreover, the rural way of living is more physically active in nature than life in urban areas; and it produces a high level of physical and physiological functioning in rural residents.

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## REFERENCES

1. Albarwani D, Phil, S, Al-Hashmi, K, Al-Abri, M, Jaju, D and Hassan, MO. 2009. Effects of overweight and leisure-time activities on aerobic fitness in urban and rural adolescents. *Metabolic syndrome and related disorders*, 7(4):369-74. <https://doi.org/10.1089/met.2008.0052>.
2. Bompa, TO.1999. *Periodization: theory and methodology of training* (4th edition). Champaign, IL: Human Kinematics.
3. Catapang, J. 2000. *Manual on Physical Fitness. Quezon City: Sports Psychology Training, Consultancy, and Research Center, City New York: Mac Millan Co*
4. Das, P. and Chatterjee, P., 2013. Urban-rural contrasts in motor fitness components of youngster footballers in West Bengal, India. *Journal of Human Sport and Exercise*, 8(3), pp.797-805.
5. De Vries, S.I., Bakker, I., Van Mechelen, W. and Hopman-Rock, M., 2007. Determinants of activity-friendly neighborhoods for children: results from the SPACE study. *American journal of health promotion*, 21(4\_suppl), pp.312-316.
6. Dollman, J., Norton, K. and Tucker, G., 2002. Anthropometry, fitness and physical activity of urban and rural South Australian children. *Pediatric Exercise Science*, 14(3), pp.297-312.

7. Dudhale, S. and Bhate, B., 2015. A Comparative Study of Psycho-Motor Abilities of Tribal and Non-tribal Gymnasts. *Research Journal of Physical Education Sciences*, 3(2), pp.9-10.
8. Findak, V., Metikoš, D., Mraković, M. and Neljak, B., 1996. Primjenjena kineziologija u školstvu–NORME. *Hrvatski pedagoški-književni zbor. Zagreb. Fakultet za fizičku kulturu Sveučilišta u Zagrebu*.
9. Hussey, J., Bell, C., Bennett, K., O'Dwyer, J. and Gormley, J., 2007. Relationship between the intensity of physical activity, inactivity, cardiorespiratory fitness and body composition in 7–10-year-old Dublin children. *British journal of sports medicine*, 41(5), pp.311-316.
10. Johnson, BL and Nelson, JK, 1969. *Practical Measurement for Evaluation in Physical Education*.
11. Jureša, V., Ivanković, D., Vuletić, G., Babić-Banaszak, A., Srček, I., Mastilica, M. and Budak, A., 2000. The Croatian health survey–SF-36: I. General quality of life assessment. *Collegium antropologicum*, 24(1), pp.69-78
12. K, Santhosh Kuriakose and Abraham, G., 2015. Comparison of motor fitness abilities of rural and urban school students. *International Journal of Multidisciplinary Research and Development*, 2(11), pp. 445-447
13. Kolekar, S.M. and Sawant, S.U., 2013. A comparative study of physical growth in urban and rural school children from 5–13 years of age. *Int J Recent Trends Sci Technol*, 6(2), pp.89-93
14. Kriemler, S., Manser-Wenger, S., Zahner, L., Braun-Fahrländer, C., Schindler, C. and Puder, J.J., 2008. Reduced cardiorespiratory fitness, low physical activity and an urban environment are independently associated with increased cardiovascular risk in children. *Diabetologia*, 51(8), pp.1408-1415.
15. Kuznjecova, Z. 1985. *Kogdaičemu – Kritičeskijeperiodirazvitjadvigateljnihkačestvškoljnikov. Fizičeskajakultura v škole* [What and why? - Critical periods of development of pupils. Physical education in schools]. Moskva, 14, 61–69.
16. McMurray, R.G., Harrell, J.S., Bangdiwala, S.I. and Deng, S., 1999. Cardiovascular disease risk factors and obesity of rural and urban elementary school children. *The Journal of Rural Health*, 15(4), pp.365-374.

17. Novak, D., Bernstein, E.R., Podnar, H. and Vozzolo, Y., 2015. Differences in the fitness levels of urban and rural middle school students in Croatia. *Physical Educator*, 72(4), pp.553-576.
18. Özdirenç, M., Özcan, A., Akin, F. and Gelecek, N., 2005. Physical fitness in rural children compared with urban children in Turkey. *Pediatrics international*, 47(1), pp.26-31.
19. Peña Reyes, M.E., Tan, S.K. and Malina, R.M., 2003. Urban–rural contrasts in the physical fitness of school children in Oaxaca, Mexico. *American Journal of Human Biology: The Official Journal of the Human Biology Association*, 15(6), pp.800-813.
20. Roemmich, J.N., Epstein, L.H., Raja, S., Yin, L., Robinson, J. and Winiewicz, D., 2006. Association of access to parks and recreational facilities with the physical activity of young children. *Preventive medicine*, 43(6), pp.437-441.
21. Ruel, M.T., Garrett, J.L., Morris, S.S., Maxwell, D.G., Oshaug, A., Engle, P.L., Menon, P., Slack, A. and Haddad, L.J., 1998. *Urban challenges to food and nutrition security: a review of food security, health, and caregiving in the cities* (No. 583-2016-39546, pp. 1-129)
22. Ruiz, J.R., Rizzo, N.S., Hurtig-Wennlöf, A., Ortega, F.B., Wärnberg, J. and Sjöström, M., 2006. Relations of total physical activity and intensity to fitness and fatness in children: the European Youth Heart Study–. *The American journal of clinical nutrition*, 84(2), pp.299-303.
23. Sargent, D.A., 1921. *The physical test of a man*. *American physical education review*, 26(4), pp.188-194.
24. Seefeldt, V., Malina, R.M. and Clark, M.A., 2002. Factors affecting levels of physical activity in adults. *Sports medicine*, 32(3), pp.143-168
25. Singh, A.K., Elayaraja, M. and Jaiswal, A., 2016. Somatotyping and Biomotor Features of Male Children of Chandauli and Mirzapur Districts of Uttar Pradesh, India. *American Journal of Sports Science*, 4(1-1), pp.9-14.
26. Sylejmani, B., Myrtaj, N., Maliqi, A., Gontarev, S., Georgiev, G. and Kalac, R., 2019. Physical fitness in children and adolescents in rural and urban areas. *Journal of Human Sport and Exercise*, in press.
27. Tinazci, C. and Emiroglu, O., 2009. Physical fitness of rural children compared with urban children in North Cyprus: a normative study. *Journal of physical activity and health*, 6(1), pp.88-92.

28. Tsimeas, P.D., Tsiokanos, A.L., Koutedakis, Y., Tsigilis, N. and Kellis, S., 2005. Does living in urban or rural settings affect aspects of physical fitness in children? An allometric approach. *British journal of sports medicine*, 39(9), pp.671-674.
29. Yadav, S.K.S., 2016. A comparative study of speed and explosive strength of 14 to 20 years football players of rural and urban area of Bilaspur. *IJPESH*, 3(5): 323-325