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A Study on Motor Performance Measurement and Physical Fitness in Urban Tribal and Non-Tribal Boys of Malwa Region Indore

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Abstract

Background: There is not enough knowledge regarding how indigenous children and youth develop and mature. Children from Indore's indigenous communities don't have particularly impressive profiles for growth studies and motor skills. For teenage indigenous children, there are currently no easily accessible norms for body size and motor function.

The objective of the study: the present study was on the motor performance and physical fitness of the tribal and non-tribal boys.

Methods and materials: The present study was performed on 300 participants, collected from the different institutes of Malwanchal University, Indore, Madhya Pradesh.

Discussion and conclusion: Between the pre-pubertal urban tribal and non-tribal boys and the post-pubertal urban tribal and non-tribal boys, there were substantial disparities in the Motor performance measurement and physical fitness.

Keywords: Puberty, Tribal, and Non-tribal

Introduction

The world's largest tribal population resides in India. According to the 2001 census, there were 84.33 million tribal people in India or roughly 8.20 percent of the total population. The number of tribes was estimated at 635 groupings, although the census of 2001 recognized 461 groups as tribes. India's tribal population is more heavily concentrated in rural than urban areas. According to the 2001 census, indigenous people made up more than 10% of the country's rural population, compared to less than 2.5% of people living in urban areas. India's central and northeastern regions are home to the majority of the nation's tribal people1.

Although the overall pattern of healthy growth is generally consistent from person to person, there is significant individual variation in the size attained and the pace of growth at different ages, both in terms of the body as a whole and its various sections. Therefore, it is necessary to measure both the entire body and its constituent components, and measurements are, in many ways, synonymous with the study of growth. The evaluation is more trustworthy if we look at the findings of global or regional growth studies, even though individual growth and development is the objective mirror of the link between the hereditary and environmental elements that influence this complex process. The regional distribution of the published data reveals a significant amount of diversity. Europe is the most extensively mapped region in this regard because it is made up of mostly tiny nations with rather uniform racial and ethnic compositions. However, for countries like China, Russia, or the United States of America, for example, there are no comprehensive, representative growth studies.

The combination of genes, hormones, and nutrients maintains the integrated nature of development and maturation; it would seem (as one of the dominant components of the environment). There are clear environmental sources of variance in growth and maturation since these interact not only with one another but also with the contexts in which the child lives. The benefits of exercise are frequently acknowledged. The socioeconomic position of the family, a history of the disease, the size of the family, and the climate are additional environmental factors that may have an impact on a person's growth and maturation.

It is crucial to take note of patterns in physical activity during childhood and adolescence that are related to age and sex to assess the impact of regular physical activity on growth and maturation. Results of surveys of older children and activity monitoring of young children give some indicators of the amount of time spent engaging in physical activity, but they typically do not provide information on the intensity, energy expenditure, or type of activity.

Sex, race, various environmental stresses acting on the growing and maturing individual, nutritional intake, infant and childhood illnesses, patterns of physical activity, and other environmental stresses can all have an impact on a person's growth, maturation, and development. These environmental stresses can also interact with a person's genetic potential for growth and maturation. The end consequence is a great deal of individual variety2,3,4,5,6.

Statement of the problem

There is not enough knowledge regarding how indigenous children and youth develop and mature. Children from Indore's indigenous communities don't have particularly impressive profiles for growth studies and motor skills. For teenage indigenous children, there are currently no easily accessible norms for body size and motor function.

Hypothesis

The present study was a significant contribution to health research through its scientific application and interpretation because there is a dearth of literature disclosing comprehensive studies on the growth pattern, motor ability, and physical fitness of tribal boys of Indore. The nature of these features in them was made clear by this investigation. The status of the tribal boys of Indore in this regard was reflected in a comparison of the data with other national statistics gathered by other investigators. Additionally, these were useful in identifying tribal youngsters with athletic and sporting abilities. The findings could reveal a brand-new relationship between some already-known facts in the aforementioned scenario. Through a rigorous examination of the outcomes; it was furthermore possible to draw attention to several fresh, noteworthy interpretations.

The findings may also offer useful baseline information for sports and fitness coaches who are interested in adolescent youth's physical characteristics to identify talent, track the effectiveness of training regimens, and make scientific predictions about adult performance that are specific to their sport. The findings of this study may offer valuable information for therapeutic decision-making regarding the sizes, ratios, and proportions unique to the population of children in Indore. These choices could involve figuring out the proper medicine dosages and dietary needs based on age.

Methods and Materials

A cross-sectional study was carried out among the tribal and non-tribal boys in the Department of Physiology of Index Medical College and research center, Indore (MP). Collected from the different institutes of Malwanchal University, Indore, Madhya Pradesh. Data were collected by purposive random sampling. One of the objectives of the present study was to evaluate the growth and physical development of the tribal and non-tribal boys of Malwa region Indore through a cross-sectional study.

The following measurements were made on them to study their motor ability and physical fitness:

Motor performance measurement

a) Sprint test
b) Shuttle runs
c) Standing broad jump (SBJ)
d) Sit and reach the test

Physical fitness test

Queen's College Step Test measurement

Results and Discussion:

Table 1. Comparison of the motor fitness and physical fitness (VO2 max) of pre-pubertal tribal boys and non-tribal boys

Variables	Tribal Boys (n=150)	Non-Tribal Boys (n=150)	p-Value
Sprint test (Sec)	4.27±0.75	5.10±0.60	<0.01
Shuttle runs (Sec)	15.00±1.52	16.25±1.61	<0.01
Standing broad jump (m)	1.59±0.13	1.74±0.20	<0.01
Sit and reach test (cm)	11.95±1.73	10.60±1.61	<0.01
VO_2 max (ml .kg–1 mn–1)	48.52±1.70	46.25±1.52	<0.01

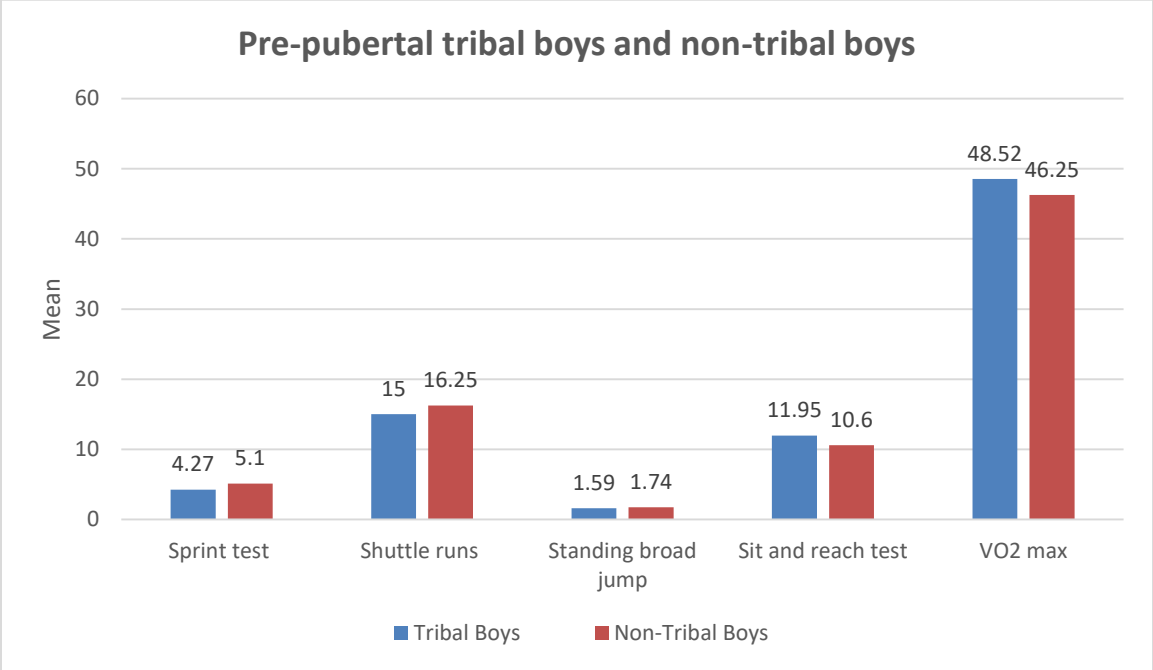

Figure 1. Comparison of the motor fitness and physical fitness (VO2 max) of pre-pubertal tribal boys and non-tribal boys

Table 2. Comparison of the motor fitness and physical fitness (VO2 max) of post-pubertal tribal boys and non-tribal boys

Variables	Tribal Boys (n=150)	Non-Tribal Boys (n=150)	p-Value
Sprint test (Sec)	4.90±0.87	5.58±0.62	<0.01
Shuttle runs (Sec)	14.19±1.6	15.48±2.2	<0.01
Standing broad jump (m)	1.80±0.24	2.00±0.30	<0.01
Sit and reach test (cm)	12.90±1.5	11.28±1.4	<0.01
VO_2 max (ml .kg–1 mn–1)	49.91±1.6	47.38±1.5	<0.01

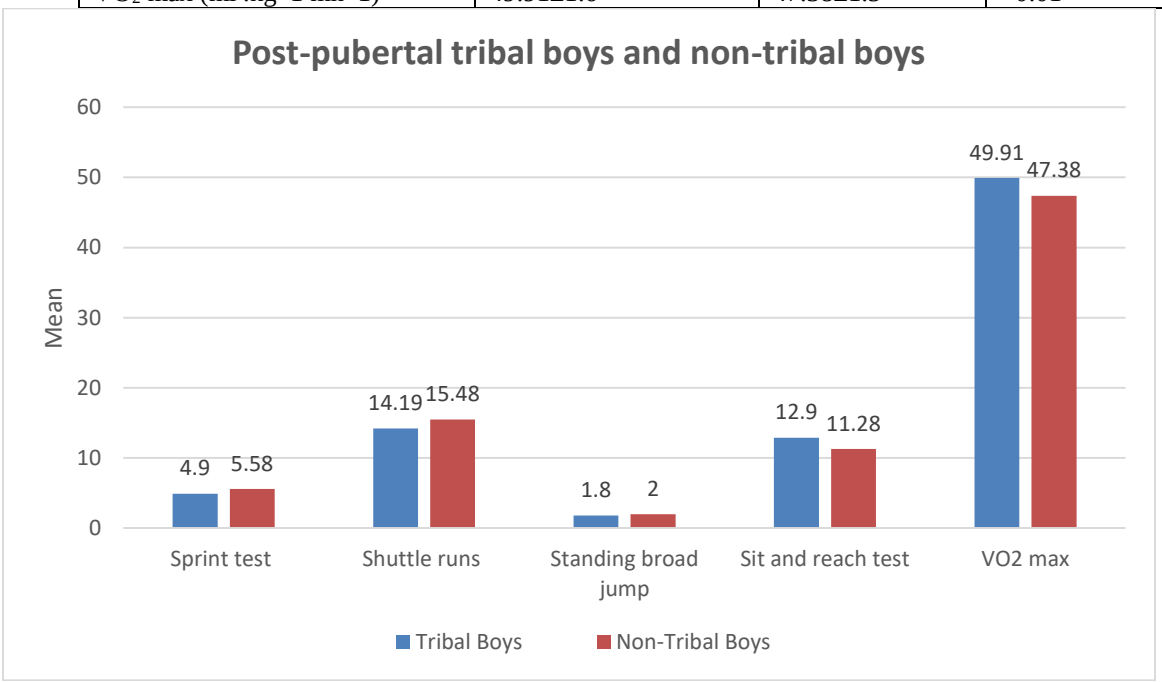

Figure 2. Comparison of the motor fitness and physical fitness (VO2 max) of post-pubertal tribal boys and non-tribal boys

Sprint test measurement

This was observed that the average (mean ± SD) Sprint test in pre-pubertal for tribal 4.27±0.75 and non-tribal 5.10±0.60 and in post-pubertal for tribal 4.90±0.87 and non-tribal 5.58 ± 0.62.

To track the growth of the child's capacity to effectively and efficiently build up acceleration, from a standing start or from starting blocks, to maximum speed, a 30-meter sprint test was conducted. The tribal boys ran the 30-meter sprint much quicker than the non-tribal ones who were prepubescent and postpubescent, respectively. In the pre-pubertal stage, there was a 21.9% difference between the two groups, but by the post-pubertal period, this difference had decreased to 8.0%. When compared to the value of pre-pubertal tribal and non-tribal groups, the speed of tribal groups is slower at the post-pubertal stage (18.2%) than it is for non-tribal groups (4.8%).

Shuttle runs measurement

This was observed that the average (mean ± SD) Shuttle runs in pre-pubertal for tribal 15.00 ± 1.52 and non-tribal 16.25±1.61 and post-pubertal for tribal 14.19±1.6 and non-tribal 15.48 ± 2.2.

A shuttle run test was conducted to gauge the kids' agility when running and changing lanes. In the shuttle run, pre-pubertal and post-pubertal tribal boys had considerably faster times than pre-pubertal and post-pubertal non-tribal boys (P 0.01). Boys from non-tribal groups score poorly in shuttle run tests, which may be caused by high proportional body weight.

In the pre-pubertal period, there was a 7.7% difference between tribal and non-tribal children, and this gap increased to 8.5% in the post-pubertal stage. When compared to the value of pre-pubertal tribal and nontribal groups, the speed of tribal groups (5.0%) and nontribal groups (4.5%) is slower at the post-pubertal stage.

Standing broad jump (SBJ) measurement

This was observed that the average (mean ± SD) Standing broad jump in pre-pubertal for tribal 1.59±0.13 and non-tribal 1.74±0.20 and post-pubertal for tribal 1.80±0.24 and non-tribal 2.00 ± 0.30.

A standing broad leap was performed to gauge children's legs' explosive potential. According to the current study, pre-pubertal and post-pubertal tribal boys' SBJ values were considerably lower than those of pre-pubertal and post-pubertal non-tribal boys. The fundamental cause may be the tribal boys' reduced size, which had a detrimental effect on their capacity for jumping. In the pre-pubertal period, there was a 10.4% difference between tribal and non-tribal boys, and this gap grew to 12.9% in the post-pubertal stage. When compared to the value of pre-pubertal tribal and non-tribal groups, the strength of the leg muscle is increased in post-pubertal tribal groups (14.1%) and non-tribal groups (16.6%).

Sit and reach test measurement

This was observed that the average (mean ± SD) Sit and reach test in pre-pubertal for tribal was 11.95±1.73 and non-tribal 10.60±1.61 and in post-pubertal for tribal 12.90±1.5 and non-tribal 11.28 ± 1.4.

Flexibility, which is defined as the functional ability of a joint to move through its full range of motion, is another crucial aspect of physical fitness for health. A field test called the sit-and-reach is used to measure hamstring and low back flexibility.

In comparison, pre-pubertal and post-pubertal tribal boys performed better on the sit and reach test than pre-pubertal and post-pubertal non-tribal boys and the difference was statistically significant (P 0.01). Pre-pubertal stage differences between the two groups were 10.0 percent, while post-pubertal stage differences were 12.3 percent in magnitude.

When compared to the value of pre-pubertal tribal and non-tribal groups, the flexibility of tribal groups is lower at the post-pubertal stage (8.3%) than that of non-tribal groups (5.5%). It is thought that the body's teenage changes, particularly the body's enhanced muscular development and associated structures during this era of growth, are to blame for the decline in the sit-and-reach test's (flexibility) results around the age of 14 to 15. Children in metropolitan regions had lower levels of flexibility and muscle endurance fitness because they were less active and fatter.

The present study's findings thus demonstrate that, overall, tribal boys performed better in terms of motor function and fitness than non-tribal boys, which may be related to social and economic factors, levels of physical activity, and involvement in extracurricular activities that may have had an impact on strength performance. However, tribal boys performed worse in the standing broad jump, which may be related to their diminutive stature. Additionally, non-tribal boys' typical fat level is higher than that of tribal boys', which has a deleterious impact on motor function, particularly in tasks requiring projection or movement of the body.

Physical fitness test

Queen's College Step Test measurement

The Queen's College Step Test measures cardio-respiratory or endurance fitness since it indirectly estimates VO2 max. The most often used indicator of cardiorespiratory fitness is VO2 max, which is defined as "the highest rate at which oxygen may be consumed during exercise7.

This was observed that the average (mean ± SD) VO2 max in pre-pubertal for tribal was 48.52±1.70 and non-tribal 46.25±1.52 and in post-pubertal for tribal 49.91±1.6 and non-tribal 47.52 ± 1.70. The VO2 max of pre- and post-pubertal tribal boys are higher than pre-and post-pubertal non-tribal boys at $P<0.01$.

Due to their greater stature and leaner body composition, the tribal boys' VO2 max was noticeably higher than that of non-tribal boys. Pre-pubertal stage differences between the two groups were found to be 5.1%, while post-pubertal stage differences were found to be 6.7%. When compared to the values of pre-pubertal tribal and non-tribal groups, the cardiorespiratory fitness of tribal groups (3.2%) and non-tribal groups (1.5%) is lower at the post-pubertal stage.

These findings were in line with the findings of prior research conducted by Deb et al., (2020)8, Sarkaret al., (2015)9, Halme et al.,(2009)10, Barnett et al., (2008)11, Rodrigues et al., (2006)12 they conducted a study on motor ability and physical fitness between Tribal and Non-Tribal and suggested that the sprint test, shuttle runs, standing broad jump, sit and reach test and VO2 max values were highly significant.

Conclusion

Between the pre-pubertal urban tribal and non-tribal boys and the post-pubertal urban tribal and non-tribal boys, there were substantial disparities in motor ability and physical fitness. First and foremost, a large-scale replication of the study is possible for improved results validation.

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