Comparison of Physical Fitness Between Rural and Urban Students in Bardiya District

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Abstract

This study examines the physical fitness of rural and urban students in the Bardiya district. A sedentary lifestyle has frequently been prompted by automation and technological progress, leading to hypokinetic disorders that impact global health. Physical fitness is characterized by an individual's capacity to do daily tasks effectively and efficiently; it involves various health-related components, including cardiovascular endurance, muscular strength, flexibility, and body composition. The present study employed a quantitative descriptive research method, assessing 80 secondary school boys with the AAHPER (American Association for Health, Physical and Recreation) Youth Fitness Test Battery, comprising 40 rural and 40 urban participants. Statistical analysis (T-test) revealed that rural pupils excel greatly in several physical fitness assessments, including pull-ups, knee bent sit-ups, standing broad jump, and endurance, due to their superior muscular and cardiovascular development. No notable changes were detected in the 50-yard dash between the two groups. The findings further substantiate the necessity of enhancing physical activity among urban populations to bridge the fitness gap and advocate for more participation in sports and exercise inside schools, particularly to alleviate the adverse effects of sedentary lives among urban adolescents.

Keywords: physical fitness, comparative study, rural students, urban students, AAHPER Youth Physical Fitness Test, t-test

Introduction

Due to automation and development in the field of information technology, human life has become easier, leading them to be more inactive and causing them different kinds of hypokinetic diseases and physical and mental health deformities (Akindutire & Olanipekun, 2017).

Physical fitness describes a person's ability to lead a complete and balanced life (Shahi, 2021). Physical fitness means that the lungs, blood vessels, muscles, and heart itself are in perfect working order (Campbell, De Jesus, & Prapavessis, 2020). Peak or optimal efficiency is the high level of health needed to participate in daily activities and feel enjoyment and enthusiasm (Shahi, 2021). Physical fitness is the capacity of the body to operate with efficiency and effectiveness. Comprising six skill-related and minimum five health-related physical fitness components, this condition of well-being increases general quality of life. Physical fitness is related to the ability to work efficiently, engage in leisure activities, sustain good health, protect against hypokinetic diseases, and withstand emergency situations (Campbell, De Jesus & Prapavessis, 2020). Though it still differs, physical fitness is exactly correlated with health and wellness. While many elements define physical fitness, regular exercise is necessary to reach desired levels of performance. Defined as the ability of the body to function effectively and efficiently, physical fitness is a state of health including a minimum of five health-related and six skill-related components, so enhancing one's quality of life (Bebcakova, et al., 2015). Physical fitness guarantees appropriate responses in crises, improves health, lowers hypokinetic disorders, helps to efficiently execute daily activities, and increases enjoyment of recreational activities (Campbell et al., 2020). Although related to health and well-being, physical fitness is a separate component of well-being, mostly dependent on regular physical activity for its accomplishment.

Physical fitness consists of five health-related components: cardiovascular endurance, flexibility, muscular endurance, strength, and body composition (Bebcakova, et al., 2015). Every quality of health-related fitness is exactly connected to an ideal condition and a lower risk of hypokinetic diseases. Kahan & McKenzie (2015) also emphasized that weight control and obesity prevention are increasingly being included in physical education courses by many physical education teachers. The medical field was the inspiration for this. The several medical problems connected to obesity demand

coordinated efforts from the medical and physical education domains. Although the causes of obesity are several, most obese people exhibit a common behavior: physical inactivity. One great way to reduce adipose tissue and maintain ideal muscle mass is regular physical activity. Another definition of physical fitness is the capacity to perform tasks. Obesity is a negative element; hence, its absence is a reasonable feature of physical education connected to health (Campbell et al., 2020).

A prominent lifestyle risk factor in many Western countries today is physical inactivity, which is firmly linked to an elevated risk of early disease and mortality (Saltin & Pilegaard, 2002). This is where aerobic fitness, or the ability to maximally absorb oxygen, and muscular metabolic capacity come into play. The development of metabolic-related disorders and, by extension, an individual's health, appears to be largely influenced by their metabolic capacity and the fitness levels of their muscle. As a result, the amount of muscle used is a direct indicator of metabolic fitness; yet, even moderate exercise improves health and fitness (Soyuer, 2021). Transportation, education, sports, unstructured play, and organized exercise should all contribute to at least 60 minutes of physical activity per day for children and it's best to strike a balance between moderate and vigorous activity, with the former increasing heart rate, respiration, and sweating, and the latter lowering these vital signs (WHO, 2020).

Sedentary lifestyles, characterized by less physical exercise, are widespread in both industrialized and developing countries. These activities encompass sedentary pursuits such as reading, viewing television, engaging in video gaming, and utilizing computers. Prolonged screen time, a prevalent contributor to mortality, has several detrimental health consequences (WHO, 2020). A person's physical inactivity fosters a sedentary lifestyle, resulting in several psychological and health consequences. Consequently, consistent engagement in physical activities of moderate to vigorous intensity enhances longevity and mitigates the consequences of a sedentary lifestyle (Akindutire & Olanipekun, 2017).

Insufficient physical exercise is a primary contributor to preventable mortality globally, with sedentary behavior elevating the risk of premature death. Prolonged sitting beyond five hours daily elevates the risk of chronic diseases, whereas individuals engaging in a minimum of four hours of exercise weekly maintain comparable health (Soyuer, 2021). Sedentary lifestyles elevate mortality rates and contribute to cardiovascular illnesses, diabetes, obesity, colon cancer, hypertension, osteoporosis, lipid

disorders, depression, and anxiety. Between 60% and 85% of individuals globally exhibit sedentary behaviors, with two-thirds of youngsters lacking adequate physical activity (Akindutire & Olanipekun, 2017).

Active play and exercise have always been an important component of the day for kids and adolescents. Today, computers and the social media scene have reduced the need and desire for them to travel around and play. Exercise declines with age and is more prevalent in girls than boys (WHO, 2020). Challenges of getting the kids and adolescents moving daily should be countered using age-appropriate activities, vibrant leadership, and support from friends and family.

In 2012, Sengupta and Bhattacharya sought to explain, for young Pokhara's physical fitness, the effects of the high-altitude surroundings and dietary components. 'Effects of high altitude and nutritional status on the physical fitness of young Nepalese residents in Pokhara, Kaski district of western Nepal' was the title. That was an experimental and quantitative design. Twenty-25 sedentary college students of Kolkata, India (mean age 21.9) and twenty-25 Nepalese men (mean age 21.6) from Pokhara, Nepal were chosen as controls at random. With $P<0.05$, results showed that BMI, body fat percentage, pre- and post-exercise BP, PFI, VO2 max energy expenditure, and anaerobic power exhibited a significant change. Protein, calcium, and iron shortages in the diet also helped to explain the poor nutritional situation of young people from Nepal. These statistics show that young people's physical fitness in Nepal is influenced not just by their dietary situation but also by environmental elements.

In 2015, Sedai conducted a comparative analysis of the physical fitness levels of students in the Terai and the hilly region of Nepal. The objective was to assess and contrast the physical fitness levels of students from the terai and highland regions of Nepal, as well as to monitor the impact of gender on the outcome. This investigation was both descriptive and quantitative. In the present investigation, the exercise level of students aged 10–13 in the Terai Region of Nepal was investigated. 49 boys and 31 girls from the terai region and 75 boys and 73 girls from the hilly region were chosen for the research. The study employed five tests: Push-Up, Sit-Up, Sit and Reach, 4 x 10m Shuttle Run, and 1 mile run. The results indicated that males outperformed females in all but the Sit and Reach test. The students from the Hilly Region are outperforming the students from the Terai Region in the push-ups, sit-ups, and 1-mile run evaluations. In the 4 x 10m Shuttle Run, the Hilly Region girls once again outperformed the Terai

Region girls. Nevertheless, the Sit and Reach examination yielded inferior results for students from the Hilly Region in comparison to those from the Terai Region. The research determined that Terai Region students must be more actively involved in physical activities and should be included in school games and sports activities. This is because Terai Region students are capable of performing at the same level as Hilly Region students if they are given the opportunity.

Shrestha and Acharya examined and contrasted physical fitness levels between indigenous and non-indigenous students in 2017. The research followed a descriptive quantitative study design. Samples were selected at random from ten schools, and data collection was based on a pre-existing standard AAHPER youth physical fitness test battery. Although the study found no substantial difference in the physical fitness of both groups, when mean scores were compared, indigenous students showed somewhat more competency than their non-indigenous counterparts. When each test is examined individually, indigenous students have much better arm strength and leg power than their non-Indigenous counterparts. While Indigenous students excelled in the remaining five components, non-indigenous children showed faster speed.

The research work entitled "Attitudes of physical fitness among girl students in Nepal", conducted by Shahi, 2018 was an effort to compare and contrast private and government campus girl students' attitudes toward physical fitness. The nature of the study was descriptive cum quantitative in a comparative style. The instrument used for the study is the five-point Likert scale. Data were calculated for mean, standard deviation, and coefficient of variation. The current study concludes that attitudes towards physical fitness scores are significantly different among two-campus female students. The difference is concluded by the current study to be attributed to involvement in sporting activities being higher among female students from private campuses than among government campuses.

Amatya in 2020 investigated the physical fitness level of Nepal's elite players by sampling 32 female and 55 male players in preparation for the international sports competition in judo, athletics, weight lifting, karate, taekwondo, boxing, and wushu. Various tests of fitness were utilized in this exploratory and descriptive research: the 30-meter sprint test for speed, the Sit and Reach test for flexibility, and the Cooper test for cardiovascular endurance, as well as the calculation of BMI. General physical fitness was determined as average, but that of flexibility was well below average. More than a quarter

of the players were determined to be overweight. Maximum flexibility was exhibited by the Wushu players, and weightlifters were the least explosive. Maximum performances for speed and agility were exhibited by Taekwondo players, and in athletics, maximum running times were exhibited by the players of this sport. The study concluded that the physical fitness level of the players needs to be enhanced to excel in international games.

The study conducted in 2023 by Paudyal, Shukla, and Sherchan is titled "Physical fitness between Kho-Kho and Kabaddi players in Butwal multiple campus Rupandehi, Nepal." The study's goals were to compare and evaluate the physical fitness of Kho-Kho and Kabaddi players who were 19 to 22 years old, pursuing a bachelor's degree in education, and had competed at the intercollegiate level. Descriptive quantitative was the sort of study design used. The basic random lottery approach was used to choose a sample of thirty male participants. Data was gathered using a pre-made test battery called the AAHPER physical fitness test. The data has been analyzed for the test score comparison using the mean, standard deviation, t-test, and p-value. One speed test item, the 50-yard dash, revealed a significant difference in physical fitness between the two groups of players, i.e., college-level Kho-Kho and Kabaddi players, but the other five test items showed no significant differences.

Shakya, Byanju, Maharjan, and Bhaila (2023) also carried out a study known as "Assessment of Cardiovascular Fitness among Medical Students at Patan Academy of Health Sciences, Lalitpur, Nepal." The study was done to examine the cardiovascular fitness of the students in the institution through a YMCA (Young Men's Christian Association) 3-minute step test that measures their level of fitness. It was a study in which they considered a particular group of 92 medical students. They employed a strategy known as stratified random sampling to select the students. The age of the students in this study ranged from 18 to 25 years, and both boys and girls were included. Most of the medical students were not physically fit. 43.6% were very poorly fit, 29.3% were poorly fit, 9.8% were below average, 6.5% were average, and 5.4% were above average and good in terms of physical fitness. Based on this, it was concluded that the physical fitness among the students was not a satisfactory level of cardiovascular fitness among the students, which is overall very poor.

In the context of Nepal, Konomi, Osaka, Ogaki, Yoshimizu, and Chijiiwa (1991) found that the mean percentage of fat in suburban districts in each age was higher than that of rural districts with the same age, especially in male subjects. The study also

concluded that the difference between the percentages of fat in both districts is due to the change in their physical activities. This study proves that the problem of obesity in children in Nepal is not a problem that has arisen now; it's a problem from a long time ago.

Shahi (2018) also concluded that there is a difference between the attitude of girls of private and government colleges, which may affect their practice in physical activity. Similarly, a study by Kim, Son, Sim, Lee, and Oli Saud, (2020) disclosed higher BMI and percentage of body fat in females than in males in older adults.

Likewise, Subedi, Paudel, Nepal, Karki, Magar, and Mehata, (2020) also claimed that overall participation in physical activity for children and youth appears to be low. The study also recommended that the lack of data related to physical fitness suggested the necessity for more study with a higher sample, a more rigorous design, and objective assessment of physical activity for upcoming physical activity and physical fitness surveillance in Nepal.

The statement that rural children are more physically fit than urban children is based on surface studies and hypotheses. Rural children are engaged in farming and other physical activity-related tasks. On the other hand, due to the lack of outdoor playing facilities, urban children spend most of their time on screens. As the children of rural and urban communities have many similarities, differences can be seen in terms of their way of living, eating habits, and so on. What differences are there in the aspect of physical fitness? It is a relevant question for a researcher in physical education.

The researcher's area of interest for the study is exercise science, focusing mainly on the comparison of physical fitness of school students, especially those living in urban and rural areas, who spend most of their time behind screens. So, the study was conducted to measure and compare the physical fitness of rural and urban children. Thus, the title of the research paper was "Comparison of physical fitness between rural and urban students in Bardiya district".

Research Questions

- What is the physical fitness status of the rural and urban students?
- What is the difference in the physical fitness status of the rural and urban students?

Methodology

Mostly descriptive methodology and quantitative analysis was followed in this study. This study included boy students enrolled in rural and urban secondary schools in the Bardiya district. Schools were chosen for data collection depending on the availability of facilities in urban and rural environments. Following confirmation of the schools, the samples were chosen using simple random sampling, then a lottery technique. For the study, a total of eighty students, forty from rural and forty from urban areas, were chosen. The main instrument of the research was the AAPHER Youth Fitness Test Battery for data collection. Pull-up, sit-ups, shuttle runs, standing broad jumps, 50-yard dash, and 600-yard run make up the battery.

The data were collected by the researcher himself from the respective schools after informing the headmaster about the purpose of the study and requesting that to manage students (respondents) and facilities to conduct the test items. The researcher himself arranged a measuring tape, score sheets, a stopwatch, and lime powder. The schedule for conducting test items was informed to the school administration and the respondents. After preparing all the above-mentioned equipment and schedule, the researcher conducted the test as per the recommendations mentioned in the test battery. Before starting the test, the researcher described and demonstrated the test items. Then, the researcher organized a warm-up exercise for 10-15 minutes and then conducted the test items.

Numerous organized and scientific methods are used to analyze and interpret data in research. It is extremely vital in research as it indicates what was discovered and examines all the responses of participants. Raw information has no meaning by itself without analyzing the data. The researcher utilized SPSS version 20 software for data analysis and interpretation after gathering the required data. The data gathered were organized, analyzed, and interpreted based on the objectives determined for the study.

Results and Discussion

Comparison of Pull-Ups

After conducting the pull-up test, the test scores of rural and urban students are synthesized in the table below:

Table 1

Pull-Up Score Between Rural and Urban Students

Cases	Rural	Urban
Mean	10.43	6.33
Standard Deviation	4.48	2.01
Standard Error	0.71	0.32
Minimum	02	01
Maximum	20	10
Range	18	09
CV (%)	43.00	31.70
p-value of t-test (at α=0.05) (p) = 0.00 (i.e. p<α)		
Finding: *Significant difference between the means*		

A t-test for independent samples was used to compare the pull-up results of students in rural and urban areas. The data indicate that the mean score for rural students is 10.43, whereas urban students have a mean score of 6.33 in Pull-Ups. This implies that, on average, rural students performed Pull-Ups 10.43 times, compared to 6.33 times for urban students, demonstrating superior arm strength among rural students.

The table above indicates that the p-value of 0.00 is significant at the 0.05 threshold of significance ($p = 0.00 < \alpha = 0.05$). The table provides sufficient data indicating a disparity between the mean scores of rural and urban students. Statistically, a considerable difference has been established between the mean scores of rural and urban student groups.

This is because children in rural areas have stronger arms than their urban counterparts and engage in more labor-intensive activities like digging, wood-cutting, carrying heavy objects, etc.

Comparison of Knee Bent Sit Ups

The following table displays the researcher's data on knee-bent sit-ups performed by students in rural and urban areas:

Table 2

Knee Bent Sit Ups Score Between Rural and Urban Students

Cases	Rural	Urban
Mean	23.58	19.98
Standard Deviation	5.89	6.34
Standard Error	0.93	1.00
Minimum	3.00	8.00
Maximum	34.00	33.00
Range	31.00	25.00
CV (%)	24.97	31.75
p-value of t-test (at α=0.05), $p = 0.01$(i.e. $p<\alpha$)		
Finding: *Significant difference between the means*		

Table 2 indicates that the mean of rural students in the Knee Bent Sit Ups test is 23.58, whereas the mean of urban students is 19.98. The average score of rural students exceeds that of urban students. A t-test was employed to assess the significant difference among the means of the two groups.

The table indicates that the p-value of 0.01 is significant at the 0.05 threshold of significance ($p = 0.000 < \alpha = 0.05$). The table provides sufficient proof of a disparity between the mean scores of rural and urban students. Statistically, rural students demonstrated superior performance in knee-bent sit-ups compared to urban students, attributed to their enhanced abdominal strength. The performance disparity is attributed to rural students exhibiting greater diligence, which fortifies their abdominal muscular strength relative to urban students.

Comparison of Standing Broad Jump

The following table displays the Standing Broad Jump scores of students from rural and urban areas:

Table 3

Standing Broad Jump Score Between Rural and Urban Students

Cases	Rural	Urban
Mean	2.28	2.01
Standard Deviation	0.21	0.18
Standard Error	0.03	0.028
Minimum	1.43	1.55
Maximum	2.68	2.32
Range	1.25	0.77
CV (%)	9.39	8.72

p-value of t-test (at α=0.05), p = 0.00(i.e. p<α)

Finding: *Significant difference between the means*

The table indicates that the mean score for the Standing Broad Jump among rural students is 2.28m, while for urban students it is 2.01m. The average scores indicate that rural kids can jump longer distances than urban students. Consequently, the leg power from the muscles of rural pupils surpasses that of urban ones. The disparity in mean scores alone does not indicate a substantial disparity between the means of the two groups. The researcher utilized the t-test to determine the significant difference between the means.

Table 3 indicates that the p-value of 0.00 is significant at the 0.05 threshold of significance ($p = 0.000 < \alpha = 0.05$). The aforementioned table provides sufficient evidence indicating a disparity between the mean scores of rural and urban students. Statistically, a considerable difference has been established among the mean scores of rural and urban student groups.

Consequently, rural students exhibited superior leg muscular power compared to their urban counterparts, as they engage more frequently in activities such as walking, jogging, and carrying loads.

Comparison of 50-Yard Dash

The following was the outcome of a 50-yard dash test given to pupils in both rural and urban areas:

Table 4

50 Yard Dash Score Between Rural and Urban Students

Cases	Rural	Urban
Mean	698	718
Standard Deviation	0.52	0.55
Standard Error	0.08	0.09
Minimum	5.83	5.90
Maximum	7.85	8.49
Range	2.02	2.59
CV (%)	7.38	7.70

p-value of t-test (at α=0.05), p = 0.09(i.e. p>α)

Finding: *No significant difference between the means*

Table 4 indicates that, on the 50 Yard Dash, the mean of rural students is 6.98 seconds, and the mean of urban students is 7.18 seconds, indicating that, generally, rural students can run faster than urban ones. But the important difference cannot be

ascertained by merely comparing the means only. Thus, the researcher used t-tests to identify notable variations between the means of urban and rural students.

At a 0.05 level of significance ($p = 0.000 > \alpha = 0.05$), the p-value = 0.09 is likewise not significant from the table above. From the above table, the evidence is sufficient to show that the mean scores of urban and rural students are not significantly different. Based on statistics, it is found that the mean score of groups representing rural and urban students is not significantly different. It is so because both student groups engage in the same kind of physical drills that aid in increasing speed.

Comparison of 600-Yard Run

The table below shows the information the researcher gathered from 600 Yard Run tests on urban and rural students:

Table 5:

600-Yard Run Score Between Rural and Urban Students

Cases	Rural	Urban
Mean	141.93	169.95
Standard Deviation	14.20	30.17
Standard Error	2.25	4.77
Minimum	123.00	125.00
Maximum	190.00	240.00
Range	67.00	115.00
CV (%)	10.00	17.75
p-value of t-test (at α=0.05), $p = 0.00$(i.e. $p<\alpha$)		
Finding: *Significant difference between the means*		

On the 600 Yard Run Test, the mean of rural students is 141.93 seconds, and that of urban students is 169.95 seconds shown in the table above. Rural students possess better endurance than urban students since their mean score is higher than that of the former. But one cannot compare the differences between the means of two groups. So, a t-test was applied to find the notable variations in the means of urban and rural students.

At a 0.05 level of significance ($p = 0.000$, $\alpha = 0.00$ the p-value = 0.00 is also significant. From the table above, sufficient data indicate that the mean scores of urban and rural students vary. Based on statistics, it was found that rural students showed better endurance than urban students; that is, their means differ significantly. The reason behind this is that rural students increase their endurance by walking a great distance on foot while grazing cattle.

Comparison of Shuttle Run

The following was the outcome of a Shuttle Run test given to pupils in both rural and urban areas:

Table 6:

Shuttle Run Score Between Rural and Urban Students

Cases	Rural	Urban
Mean	11.09	12.08
Standard Deviation	0.72	1.01
Standard Error	0.11	0.16
Minimum	10.03	10.81
Maximum	13.27	16.28
Range	3.24	5.47
CV (%)	6.49	8.31
p-value of t-test (at α=0.05), p = 0.00(i.e. p<α)		
Finding: *Significant difference between the means*		

Rural students have enhanced agility than urban students, as evidenced by Table 6, which confirms that the mean of rural students on the Shuttle Run Test is 11.09 seconds while the mean of urban students is 12.08 seconds. However, the disparity in mean scores alone is unable to demonstrate disparity in agility among students in rural and urban areas. To determine the significant difference between the means of two groups t-test was used.

At the 0.05 level of significance ($p = 0.000 < \alpha = 0.05$), Table 6 demonstrates that the p-value = 0.00 is significant. The aforementioned table provides sufficient proof that the mean scores of students in rural and urban areas differ. According to statistics, there is a significant difference between the two groups' means, meaning that students in rural areas are more agile than those in urban areas. The reason for this is that rural students are more agile due to their involvement in various manual labor tasks.

Conclusion

There is a notable disparity between the means of students residing in rural and urban areas, according to the above analysis of the test items separately. The mean of rural students was found to be higher or better than that of urban students in every test. The t-test revealed a significant difference in pull-ups, standing broad jump, 600-yard run, knee-bent sit-ups, and shuttle run when each test item was compared separately. Using the t-test alone, there was no significant distinction between the two groups' means

in the 50-yard dash test. The aforementioned findings demonstrate that there was a notable disparity in the physical fitness of students in rural and urban areas.

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