

## A Comparative Intellectual Endeavor of Strength and Power in City and Non-city Youngsters at Secondary Level in District Mardan

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### Abstract

The purpose of the intellectual endeavor is to make analysis of the strength and power of 13-15-year-old Secondary school youngsters and to make comparison of city and non-city youngsters living in district Mardan. The target population of the intellectual endeavor was chosen from Secondary school youngsters (400) by applying simple random techniques. Three test sit-ups (SUs), a supine support (SU), and a standing broad jump (SBJ) were used to measure youngsters' strength and power. Data were accumulated through observation and made analysis employing SPSS version 20. Quantitative analytical instruments were employed to make analysis of the data. The data analysis reproduces that non-city youngsters had moderately more power and strength than their city colleagues.

**Keywords:** Sit-ups, Push-ups, Standing Broad Jump

### Introduction

It is smart universally for both young individuals and grown-ups to demonstrate that they do not meet standards of corporeal activity (Eberline, Judge, Walsh, & Hensley, 2018), and this level of corporeal inactivity is remarkably extraordinary (Lye, Mukherjee, & Chia, 2015). Corporal fitness has been found in many investigational studies, associated to corporal activity (Emeljanovas, 2018; Vedul - Kjelsås, Sigmundsson, Stensdotter, & Haga, 2012). Any decline in corporal activity induces corporal fitness and declines as a result of this active corporal fitness.

Over the last forty years, the growth in bulkiness and overweightness (Hussain, 2018) has triggered an extreme decline in corporal and multi-faceted corporal fitness (Mukherjee, Nayek, & Chatterjee, 2016). Declined corporal fitness damages not only individuals but social order too. Corporal fitness is beneficial for health and well-being (Jeng et al., 2017). Strong compeers are the assets of the nation, while weak health progresses the money expended on health and decreases work efficiency. Regular fitness activities assist youngsters to uphold fitness, grow strength, and develop cardiac health (Nagaraja & Nagaraja, 2018). Therefore, weak corporal fitness is associated with a high risk of heart and entire death (Bunc, 2018). So, heart strength is worrying. The variable chosen for the intellectual endeavor was strength and performance as a fitness component.

Strength is a strong capability of nerve that promotes corporal existence to perform and maintain healthy activities. This capability is the force exerted against the force of hindrance or inactivity (Haff & Triplett, 2015). In other cases of coordinative physics, certain factors, such as power, negatively contribute to the muscles formed during athletic tightening, do not attach secondary importance to the consideration of strength strategies. Metabolic energy, muscle retrenchment, muscle mass applied to muscles, and a cerebrally driven factor are four factors reflected in strength therapies (S. Kumar, Amell, Narayan, & Prasad, 2004).

The nature and application of force can be categorized as variable, high strength, instable force, and strength, which means muscle endurance and afford capability. Corporal strength and volatile strength are primarily affected by the subcategory of maximum strength or growth strength (Schmidtbleicher & Baumann, 2003). Many research topics in the topic show that each of the upper considerations is exceedingly mutually dependent and reciprocally comprehensive. As A Result, a

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further growth in growth strength has an obvious impact on both volatile and strong corporal survival in formerly untrained healthy performance (Schlumberger & Schmidtbleicher, 2004).

Therefore, it is presumed that the entire power required to prevail over the opposite hindrance (changing and static) is the greatest force examined. It is exposed to a cross-sectional zone that moves during the misuse of muscle organs as well as filament arrangement.

Surmounting hindrance to movement of the body and organs at speeds greater than 200 m / s for the very expanding pulse of the capability provided by speed and explosive force. This is the release of a large force in a minimum unit of time (Frey & Hildenbrandt, 1994). Kaplun and Ulinova (2020) define velocity strength as a capability that is in strong nerve coordination and that opposes all opposing forces / resistors at high contractile velocities. Potency and harmonization are the essential factors that affect. Thus, the above definition can be formulated to the degree that the greatest power can be employed (Graf & Rost, 2001; S. Kumar et al., 2004). The biggest impetus that the nerves in the muscles generate in the shortest amount of time is the explosive force. Strong nerve coordination has an observable effect on explosive force (Hartmann, Bob, Wirth, & Schmidtbleicher, 2009).

The dilated and round area of the muscles as well as the figures assists to discover the cross over zone within it. Both structural and functional examinations are used to understand the correct quantity and frame of strengths. Even though the crisscross of the muscles is physiologically and anatomically the same, the cross-section of the muscles in the pen is physiologically larger. The muscle fibers are located slightly obliquely in the longitudinal segment of the physiques of the fledged muscles; therefore, they enlarge marginally. The applied strain is physiologically corresponding with the cross section of the muscles (Spring, 2008). Thus, according to the biological specialties, all harmonizing muscles contrast with each other across agonist and antagonist muscle samples during enunciation of vibrant limbs.

To determine stamina, it is imperative to know that stamina is the capability of physiques to withstand high loads in a given phase / period (Schlumberger & Schmidtbleicher, 2004). The force required withdrawing the movement of energy released during anaerobic respiration or hindrance to lethargy is also called force retention (Spring 2008). Kaplun and Ulinova (2020) support and additionally added to the claim that the distribution of power / gravity and stress may be omitted. The accuracy of fatigue hindrance is best achieved when it is achieved under high and frequent loads. At a given phase, the entire impulse is at its peak and sometimes the maximum stress, the maximum number of repeated experiments, is experienced (Schlumberger & Schmidtbleicher, 2004).

There is no improvement in the Secondary stages of strength capability; years later, however, it is noticeable. Non-city outperforms City and Non-city in this respect. Therefore, it should be borne in mind that early childhood strength improves through capability-founded duties and coaching (Verschuren et al., 2007). The nursing home or family unit is an essential part of community configuration to intellectual endeavor relationships with the promotion of abilities (Karim & Halim, 2013). In addition, Kretschmer and Wirsching (2007) and Baur, Bös, Conzelmann, and Singer (2009) agree that the convenience of sports equipment and more amenities in gardens, sports event, remarkably improves engine performance. In a mile run test, T. Kumar (2019) found that non-city youngsters performed better than city youngsters in heart fitness. The aim of the intellectual endeavor is to reply the subsequent queries:

What is the strength and power of the fitness components of elementary school youngsters?  
How is the capability of non-city youngsters to be different from city youngsters?

### **Method**

The population of this special intellectual endeavor was Secondary school youngsters in District Mardan. Because of fiscal and schedule restrictions, it was difficult to access all parts of the district and test all youngsters at the chosen level. A comfort sampling method was used in the intellectual endeavor. To prepare a sample, Krejcie and Morgan (1970) youngsters used a standard sample definition table and chosen 400 of the desired population from the desired age group as a sample from the target population. The sample was taken from ten public Secondary schools in the city and non-city zones of district Mardan. Information from (EDEO) schools and literacy was used to identify non-city and city schools. Five schools from city and non-city zones were chosen to perform strength and strength tests. Fifty youngsters from each school participated in the intellectual endeavor: 10 from the specified age group, i.e., 6,7,8,9 and 10 years. These youngsters from grades 8, 9, and 10 were randomly chosen from the school attendance register (8, 9, and 10).

### **Instruments and Procedures.**

Tests to measure strength and performance were taken from Bös, Schlenker, and Seidel's (2009) test battery (GMT), which measures the strength and power of youngsters aged 6–18 years.

#### **Push-Ups (PU):**

**Purpose:** *This test measures the power/ strong strength of the upper extremities.*

**Equipment:** *Gym mat, stopwatch.*

**Procedure:** This test is used to measure the strength / strength of the upper limbs. The subject should perform as many supine's supports as possible within 40 seconds. In the initial position, the subject's body is adjusted so that all parts of the body touch the ground. The subject then stretches out his hand and presses his chest and abdomen off the ground. The legs and upper body must leave the floor at the same time. This process is repeated every 40 seconds for the maximum duration. The end result is the number of correctly performed push-ups in 40 seconds.

**Note:** The test tasks are executed on a thin gym mat and it must be demonstrated.

#### **Sit-Ups (SU):**

(a) **Purpose:** This test is performed to check the power/strength endurance of youngsters.

(b) **Equipment:** Gym mat, stopwatch.

(c) **Procedure:** *This test is used to measure force / strength endurance. The child should complete the largest possible session within 40 seconds. During crunches, the subject's legs are fixed, and the legs are bent at an angle of 80 °. The fingertips are held in the temple while the thumb is placed on the earlobe. The position of the hand must remain constant during testing. The subject touches his knees with both elbows. In its original position, both of its shoulder blades should touch the carpet. The final score is the number of sit-ups performed in 40 seconds.*

Note: The strain on the spine is unproblematic with healthy subjects.

#### **Standing Broad Jump (SBJ):**

(d) **Purpose:** The test serves to check the power/ strength of the lower extremities while jumping.

(e) **Equipment:** Measuring tape, White powder.

(f) **Procedure:** *The test measures velocity force (lower body force) while jumping. In two valid attempts, the child must jump one of the farthest. A two-legged child lands with both legs at the same time. The distance is measured in inches from the jump line to the corner of the foot. Out of 2 experiments, the end result is better.*

**Note:** The test was performed on the grassy ground.

### **Data Analysis**

Data were analyzed using version 20 of a social science statistics package (SPSS). Quantitative analytical tools were employed to make analysis the data. An independent sample test was used to make comparison the BMI of non-city and city youngsters.

### **Results**

#### **Power: Push-Ups**

Table 40-second push-up data analysis shows that the average of city and non-city zones in 40 seconds is 16.48 jumps and the STD is 2.52. While the disparity is between non-city (mean = 16.95 structure in 40 seconds and SD = 2.04) and city (mean = 16.01 structure at 40 seconds and SD = 2.84). The disparity between the two seems to be 0.94 push-ups per 40 seconds. In addition, we have 95% confidence that the true average disparity will remain between .4009 and 1.3711 (Table 1.2).

An independent sample t-test was used to make comparison the disparity in mean push-up (PU) values between city and non-city youngsters aged 13–15 years. The calculated p-value is 0.00 (Table 1.2), which is <0.05. Therefore, the disparity between the means of the two groups is analytically noteworthy at the 5% confidence level. Estimated change 0.93 (SE = 0.22) (Table 1.2). The graph shows this disparity in the average performance of subjects in both city and non-city zones over 40 seconds on a supine position.

Based on data analysis, the average performance of non-city youngsters in terms of performance (PU) appears to be relatively better than that of city youngsters. However, non-city youngsters are better suited to the beds than city youngsters (Table 1.1).

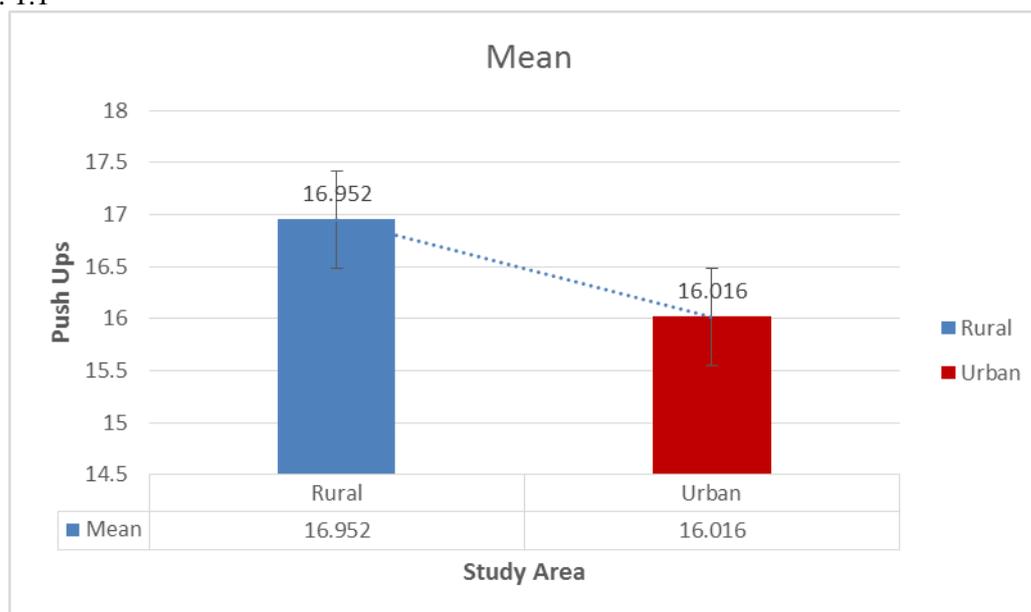
Table 1.1 Group Statistics concerning Push-Ups

| Entire / Group |          | N   | Mean   | Std. Deviation | c.v    |
|----------------|----------|-----|--------|----------------|--------|
| PU             | Entire   | 400 | 16.484 | 2.5176         | 15.27% |
|                | Non-city | 200 | 16.952 | 2.0451         | 12.06% |
|                | City     | 200 | 16.016 | 2.8425         | 17.74% |

Table 1.2 Independent sample t-test for Push-Ups

| T     | Df  | Sig. (2-tailed) | Mean Disparity | Std. Error Disparity | 95% Confidence Interval of the Disparity |        |
|-------|-----|-----------------|----------------|----------------------|--|--------|
|       |     |                 |                |                      | Lower                                    | Upper  |
| 4.226 | 498 | .000            | .9360          | .2215                | .4009                                    | 1.3711 |

Graph: 1.1



Power: Sit-Ups

Tabular data analysis of sessions longer than 40 seconds shows that the average of city and non-city residents jumps 16.11 in 40 seconds and the STD is 3.65. While non-city youngsters completed an average of 16.62 sessions in 40 seconds (SD = 2.50), city youngsters completed 15.61 sessions in 40 seconds (SD = 4.46) (Table 1.3). Estimated disparity / change 1.00 (SE = 0.32). In addition, we have 95% confidence that the true average disparity will stop between .3682 and 1.6398 (Table 1.4).

An independent sample test is performed to make comparison the average session (SU) of city and non-city youngsters aged 13–15 years. The calculated p-value is 0.005 (Table 1.4), which is <0.05. Therefore, the disparity between the means of the two groups is analytically noteworthy at the 5% confidence level. The figure shows the average performance of city and non-city zones in sit-ups.

Based on the data analysis, the average performance of non-city youngsters in terms of performance (SU) is relatively better than that of city youngsters. Non-city youngsters are more suited to the color of the seats blue than city youngsters.

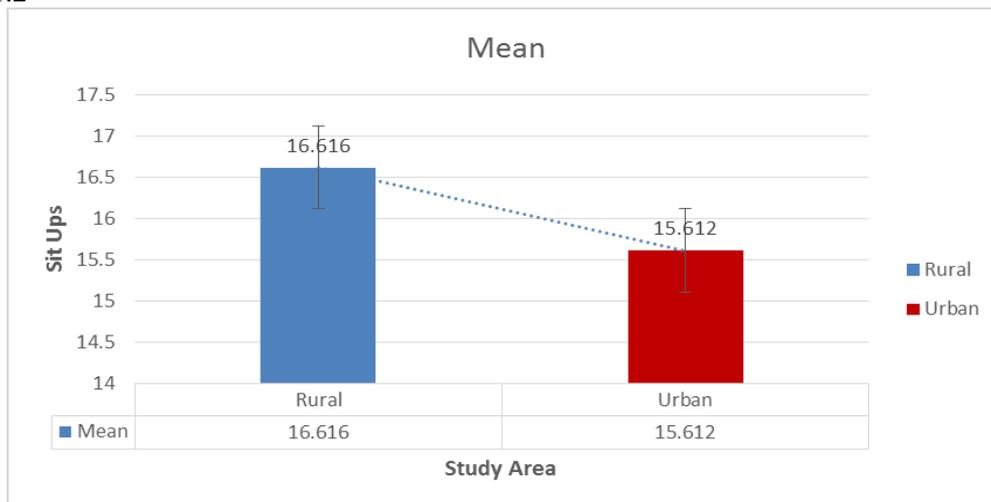
Table 1.3 Group Statistics concerning Sit-Ups

| Entire / Group |          | N   | Mean   | Std. Deviation | c.v    |
|----------------|----------|-----|--------|----------------|--------|
| SU             | Entire   | 400 | 16.114 | 3.6491         | 22.64% |
|                | Non-city | 200 | 16.616 | 2.5055         | 15.08% |
|                | City     | 200 | 15.612 | 4.4611         | 28.57% |

Table 1.4 Independent sample t-test for Sit-Ups

| T     | df  | Sig. (2-tailed) | Mean Disparity | Std. Error Disparity | 95% Confidence Interval of the Disparity |        |
|-------|-----|-----------------|----------------|----------------------|--|--------|
|       |     |                 |                |                      | Lower                                    | Upper  |
| 3.103 | 498 | .002            | 1.0040         | .3236                | .3682                                    | 1.6398 |

Graph: 1.2



**Power: Standing Broad Jump**

The data in the table show that the entire value of city and non-city zones is 53.99 inches, and the STD is 7.52. There is a slight disparity between non-city (mean = 54.62 inches and SD = 8.96) and city (mean = 53.35 inches and SD = 5.67) youngsters. Estimated disparity / change 1.27 inches (SE = 0.67) (Table 1.6). In addition, we have 95% confidence that the true mean will remain between -0.0496 and 2.5856 (Table 1.6).

An independent sample t-test is performed to make comparison the disparity in mean standing wide jump (SBJ) of 13 – 15-year-old city and non-city youngsters. The p-value was calculated to be 0.059 (Table 1.6), which is > 0.05. Therefore, the disparity between the means at the 5% confidence level is not analytically noteworthy. The Figure shows the average performance of subjects in city and non-city zones in a standing wide jump.

Based on the data provided, it can be concluded that the average performance of non-city youngsters' power (SBJ) is almost the same as that of city youngsters. But city youngsters are more in line with SBJ than non-city youngsters (Table 1.5).

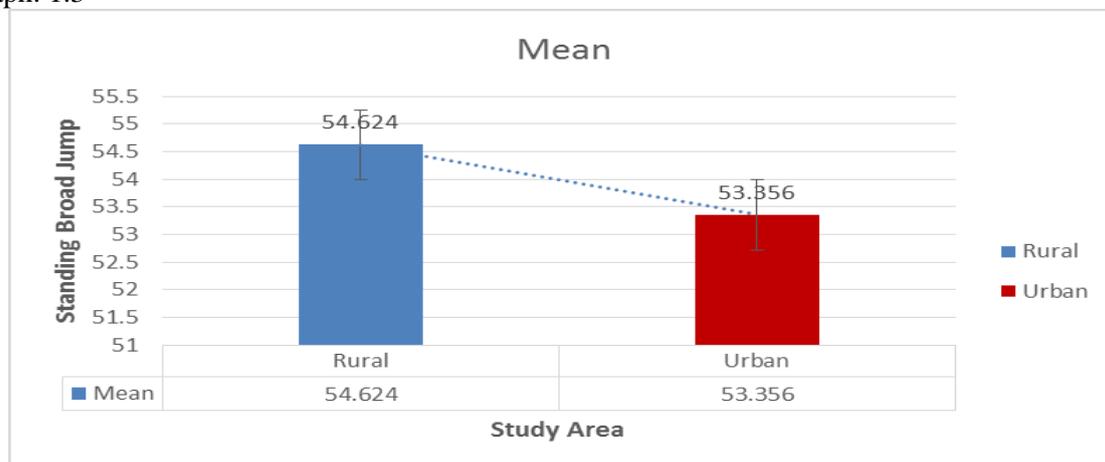
Table 1.5 Group Statistics concerning Standing Broad Jump

| Entire / Group |          | N   | Mean   | Std. Deviation | c.v    |
|----------------|----------|-----|--------|----------------|--------|
| SBJ            | Entire   | 400 | 53.990 | 7.5174         | 13.92% |
|                | Non-city | 200 | 54.624 | 8.9606         | 16.40% |
|                | City     | 200 | 53.356 | 5.6701         | 10.62% |

Table 1.6 Independent sample t-test for Standing Broad Jump

| T     | df  | Sig. (2-tailed) | Mean Disparity | Std. Error Disparity | 95% Confidence Interval of the Disparity |        |
|-------|-----|-----------------|----------------|----------------------|--|--------|
|       |     |                 |                |                      | Lower                                    | Upper  |
| 1.891 | 498 | .059            | 1.2680         | .6706                | -.0496                                   | 2.5856 |

Graph: 1.3



## **Discussion**

1.9.1 The intellectual endeavor found that there was a significant disparity in strength-changing abilities between city and non-city youngsters. Non-city youngsters aged 6-10 are stronger than city youngsters. The superiority of non-city youngsters in the supine (PU) and sit-up (SU) tests, as well as the small disparity in standing wide jumps (SBJ) and the consistency of all tests, were also better than those of city youngsters. According to the findings of Verschuren et al. (2007) suggest that early childhood strength improves with capability-based tasks. In light of the research, the skills-based tasks of non-city youngsters are better than their city compeers. Heart fitness of non-city youngsters in Bangalore, India is better than that of their city compeers (T. Kumar, 2019), which is consistent with the same intellectual endeavor. 1.9.2 According to Karim and Halim (2013), home and family are fundamental units of social structure in promoting abilities, Kretschmer and Wirszing (2007) and Baur et al. (2009) agree that the convenience of parks, sports fields, sports equipment, and other facilities such as tennis rackets and cycling impressively growths motor skills. These investigational works support the environment and area where the child was raised. Therefore, the superiority of non-city youngsters and the inferiority of city youngsters over the capability of power are significant.

## **Focus Group**

The focus group discussed the superiority of non-city youngsters in terms of both strength and power over city youngsters and identified the following factors responsibly: his lack of recreational zones in city zones does not allow youngsters to move properly, which in turn has made them lazy. Additionally, youngsters in non-city zones have relatively better engines due to commodious locations. Defense warnings to youngsters in towns limit movement in comparison to their non-city / non-city compeers, who are given ample opportunity to exercise full mobility. In cities, over contracting excludes or minimizes opportunities that can promote motor skills, while those living in non-city environments enjoy greater freedom in time and movement.

1.12 Indoor sports facilities in city zones are not accessible to everyone and, due to space constraints, also hamper the necessary growth activity of force. Additionally, youngsters living in non-city zones do not have indoor facilities but use outdoor spaces to make their city peers stronger and stronger. Lack of natural food and growth consumption of milk powder worsen the health of city zones; the lack of carbohydrate-rich bread also relieves / alleviates youngsters' stamina, but also affects their strength. Additionally, unlike city youngsters, non-city youngsters show better strength and power while consuming organic nutrients. Societal aspects i.e. reduced community connections and shortage of time for youngsters limit their movement in city zones make comparison to those living in non-city zones that have better strength and power.

1.13 In non-city zones, youngsters usually breastfeed for two years or more, but this is not the case in cities. In non-city zones, youngsters are mentally free and work alone (investigational works), etc. While city youngsters do no more corporal work out, such as getting grass, feeding their livestock or domestic animal, rushing after herd, and so on. Their peers wrestle, climb trees, climb walls, run after dragon blowing, and allow plenty of other practices and activities that are both corporally and mentally appropriate make comparison to their city peers. Non-city youngsters are generally unaware of the complexities of future life; therefore, they are completely satisfied, sleep peacefully, and are psychologically stronger than city youngsters.

The environment in city zones is so polluted that there is no clean oxygen for inhalation, which affects their strength and power. Due to population and industrialization growth, more counterfeiting has been discovered in edible foods, which has a greater impact on the health of youngsters in city zones. Most city youngsters use beef, rice, and rich dishes that comprise protein, starches, and margarines that trigger bulkiness and overweightness. Non-city youngsters use legumes containing milk, sweet potato and mineral deposits, as well as vitamins, so they are enthusiastic and usual. In city zones, there are associations and parks owned by leagues and conservatories wherever youngsters cannot play at this age. In addition, city youngsters mainly expend moments at hometown, while in non-city zones, due to the convenience of free space and terrain, all youngsters can play there. City kids only play enclosed tournaments. Because of strong competitions and physical activity, non-city kids are stronger than city kids.

Non-city youngsters have a limited schedule in the media and societal networks, etc. Consequently, they go to bed in the early hours. There is no commotion contamination in non-city zones. In city zones, some youngsters watch videos, play video contests, and video competitions that

do not leave sufficient moment to take a nap and dampen them. Manufacturing and transport contamination affect the lung system, causing a lack of speed and endurance over time. In non-city zones, there is no contamination (clean and sufficient air) that promotes the system of life blood and air, stemming in growth stamina and strength.

### **Conclusion**

Data analysis of 40-second recliners shows that both city and non-city zones made an average of 16.48 jumps in 40 seconds, with a std of 2.52, and accidents averaged 16.11 jumps in 40 seconds for city and non-city residents. 40 sec and STD 3.65. The city and non-city SBJ have a mean of 53.99 inches and a STD of 7.52. The intellectual endeavor concludes that the strong capacity of non-city youngsters appears to be fairer than that of their city compeers of the similar time. The predominance of the resilience of non-city youngsters seems to be because of the social and artistic restrictions of social order and the capacity and excellence of youngsters' movement and corporal activity both inside and outside school. City youngsters are detrimental to their conditions and practices in terms of their reduced mobility and energy.

### **Declaration of Conflicting Interests**

The researcher acknowledged no possible disputes of concern pertaining to the investigation, production, and journal report.

### **References**

- Baur, J., Bös, K., Conzelmann, A., & Singer, R. (2009). *Handbuch Motorische Entwicklung* (Vol. 106): Hofmann.
- Bös, K., Schlenker, L., & Seidel, I. J. M. T. f. N.-W. D. K. I. f. T. (2009). Deutscher Motorik-Test (DMT 6-18).
- Bunc, V. (2018). A movement intervention as a tool of the influence of corporal fitness and health.
- Eberline, A., Judge, L. W., Walsh, A., & Hensley, L. D. (2018). Relationship of enjoyment, perceived competence, and cardiorespiratory fitness to corporal activity levels of elementary school youngsters. *Corporal Educator*, 75(3), 394-413.
- Emeljanovas, A. (2018). The effect of an interactive program during school breaks on attitudes toward corporal activity in Secondary school youngsters. *Anales de psicología*, 34(3), 580-586. doi:<http://dx.doi.org/10.6018/analesps.34.3.326801>
- Frey, G., & Hildenbrandt, E. J. H.-V. S. (1994). Einführung in die Trainingslehre. Teil 1: Grundlagen.
- Graf, C., & Rost, R. J. L. d. S. (2001). Sportmotorische Hauptbeanspruchungsformen. 41-44.
- Haff, G. G., & Triplett, N. T. (2015). *Essentials of strength training and conditioning 4th edition: Human kinetics*.
- Hartmann, H., Bob, A., Wirth, K., & Schmidtbleicher, D. (2009). Effects of different periodization models on rate of force development and power capability of the upper extremity. *The Journal of Strength Conditioning Research*, 23(7), 1921-1932.
- Hussain, B. (2018). *Motor Performance Capability of Youngsters: A Comparative Intellectual endeavor of City and Non-city Youngsters at Secondary Level in Khyber Pakhtunkhwa*. (MS), Sarhad University of Science and IT Peshawer,
- Jeng, S.-C., Chang, C.-W., Liu, W.-Y., Hou, Y.-J., Lin, Y.-H. J. D., & Journal, H. (2017). Exercise training on skill-associated corporal fitness in adolescents with intellectual discapability: A systematic review and meta-analysis. *10(2)*, 198-206.
- Kaplun, D., & Ulinova, A. (2020). ACL Prevention Programs and Its Effectiveness in Reducing the Rate of Injury in the College Athlete.
- Karim, A., & Halim, O. M. A. (2013). Motor and cognitive development of chosen Egyptian and German Secondary school aged youngsters-a cross-cultural intellectual endeavor.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Journal of Educational Psychological Measurement*, 30(3), 607-610.
- Kretschmer, J., & Wirszing, D. (2007). *Mole: motorische Leistungsfähigkeit von Grundschulkindern in Hamburg; Abschlussbericht zum Forschungsprojekt: Jürgen Kretschmer*.
- Kumar, S., Amell, T., Narayan, Y., & Prasad, N. J. M. S. (2004). Measurement of localized muscle fatigue in biceps brachii using objective and subjective measures. 105-121.
- Kumar, T. (2019). A intellectual endeavor on the health associated corporal fitness of city and non-city high school youngsters of Bangalore district.

- Lye, J. C. T., Mukherjee, S., & Chia, M. (2015). Corporal activity and sedentary behavior patterns of Singaporean adolescents. *Journal of Corporal Activity and Health*, 12, 1213-1220. doi:<http://dx.doi.org/10.1123/jpah.2014-0207>
- Mukherjee, S., Nayek, B., & Chatterjee, K. (2016). A comparative intellectual endeavor on skill-associated fitness between residential and non-residential schoolboys. *International Journal of Physiology, Nutrition & Corporal Education*, 1(2), 77-80.
- Nagaraja, Y., & Nagaraja, D. (2018). A comparative intellectual endeavor on corporal fitness components between residential and non-residential high school boys.
- Schlumberger, A., & Schmidtbleicher, D. (2004). Grundlagen der Kraftdiagnostik. In *Funktionsdiagnostik des Bewegungssystems in der Sportmedizin* (pp. 87-106): Springer.
- Schmidtbleicher, D., & Baumann, W. J. S. L. (2003). Kraft. 7, 316-317.
- Spring, H. (2008). *Theorie und Praxis der Trainingstherapie: Beweglichkeit, Kraft, Ausdauer, Koordination; 29 Tabellen*: Georg Thieme Verlag.
- Vedul-Kjelsås, V., Sigmundsson, H., Stensdotter, A. K., & Haga, M. (2012). The relationship between motor competence, corporal fitness and self-perception in youngsters. *Child: care, health and development*, 38(3), 394-402.
- Verschuren, O., Ketelaar, M., Gorter, J. W., Helders, P. J., Uiterwaal, C. S., Takken, T. J. A. o. p., & medicine, a. (2007). Exercise training program in youngsters and adolescents with cerebral palsy: a randomized controlled trial. *161*(11), 1075-1081.