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Measuring Physical Fitness among Secondary School Students of ages between 10 to 15 Years

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Abstract

Background: Physical inactivity globally problem whereby a large number of the population do not take part in the sports and physical activity in order to increase health benefits. Sedentary behavior is a primary risk factor among children. The main purpose of the study was to measure the norm of physical efficiency test among

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the school students and to investigate the physical fitness level of the students aged 10 to 15 years. **Methods:** The total of 506 students participated in the study aged between 10 to 15 Years. They were regularly participating in physical activity and sports in their daily routine life. The norms of physical efficiency test were used for collecting data from the male students. The age, endurance, speed, muscular strength, explosive strength, and agility of all subjects were measured. **Results:** On the base of analysis of the study the strength of students ages between of 10-15 years were almost half of the students standing broad jump range was between 5-6 feet while almost one-third of the students were range between 4-5 feet. **Conclusion:** This study expressed that the norms of the physical efficiency test is valid and reliable to assess the level of fitness among the students. Future research can use these instruments for measuring the level of fitness among the participants.

Key Words: Physical Fitness, Strength, Agility, Speed, and Flexibility.

Medición de la aptitud física entre estudiantes de secundaria de edades comprendidas entre 10 y 15 años.

Resumen

Antecedentes: la inactividad física es un problema global por el cual una gran cantidad de la población no participa en los deportes y la actividad física para aumentar los beneficios para la salud. El comportamiento sedentario es un factor de riesgo primario entre los niños. El objetivo principal del estudio fue medir la norma de la prueba de eficiencia física entre los estudiantes de la escuela e investigar el nivel de aptitud física de los estudiantes de 10 a 15 años. Métodos: El total de 506 estudiantes participaron en el estudio con edades comprendidas entre 10 y 15 años. Participaban regularmente en actividad física y deportes en su vida cotidiana. Las normas de

prueba de eficiencia física se utilizaron para recopilar datos de los estudiantes varones. Se midieron la edad, la resistencia, la velocidad, la fuerza muscular, la fuerza explosiva y la agilidad de todos los sujetos. Resultados: Sobre la base del análisis del estudio, la fuerza de los estudiantes de edades comprendidas entre 10 y 15 años fue que casi la mitad de los estudiantes con un amplio rango de salto estaba entre 5 y 6 pies, mientras que casi un tercio de los estudiantes tenían entre 4 y 4 5 pies. Conclusión: Este estudio expresó que las normas de la prueba de eficiencia física son válidas y confiables para evaluar el nivel de condición física entre los estudiantes. La investigación futura puede usar estos instrumentos para medir el nivel de condición física entre los participantes.

Palabras clave: aptitud física, fuerza, agilidad, velocidad y flexibilidad.

1. INTRODUCTION

A global problem whereby many the population are sedentary and do not participate in sport and physical activity to increase health benefits (Engeroff, Füzéki, Vogt, & Banzer, 2017). Physical inactivity has been recorded the fourth main risk factor for global mortality and 6% of mortality rate from all over the world (World Health Organization, 2013). Last four decades have put forward the number of cases that are related to adults, coming from different ethnic/radical groups, ages & gender, being exposed to the plethora of overweight and as well as the diminishing level of physical fitness (King, et al. 2000). The effect of sports and physical activity on psychological and physical health has been well described in the literature (Holtermann et al., 2013). The most important health benefits of sports and exercise are

minimizing weight and prevalence of diseases (e.g. metabolic syndrome, sarcopenia, cardiopulmonary endurance, and health-related issues) in addition decreased mortal (Duarte-Rojo et al., 2018). The different types of exercises in different age groups can obtain spiritual, emotional, social, and physical benefits among children (Pan, 2019). There has been a significance relationship between education and co-curricular activities to improved psychological and physical health, such as improved mood, well-being, and quality of life (White, & Kem, 2018).

Regular participation in physical activity and sports represents one of the most health-promoting types of behavior and improve physical fitness (Well, 2012). According to World Health Organization physical activity guidelines for adults who participated in regular PA at least three times per week, for a minimum of 30 minutes (at least 150 minutes per week) of moderate to vigorous physical activity (WHO, 2013). However, if we do not attain the recommended level of physical activity engagement, any type of physical activity engagement is fruitful to one's health. Furthermore, research discloses that a minimum engagement of 15 minutes of physical activity per day can decrease mortality by 14%, potentially adding three years to longevity. Moreover, exercise also increases your life years and engagement in physical activity may also be a great source of fun and pleasure. In addition, continuous engagement in physical activity and sports is likely to improve the various physiological functions of the body (Well, 2012).

The dire consequences of having been physically not fit enough,

have not only acutely affected the individuals but also the entire society in multi-dimensional perspective (Schinke, Stambulova, Si, & Moore, 2018). This has been observed in adults that a well-established relationship exists between major factors working around them i.e. overall health of adults, their physical activities & fitness induced through healthy lifestyle (Vitali et al., 2018). Physical fitness can be expressed in a way that it is the ability of a person through which voluntarily completes daily routine activities an active manner (Nordenfelt, 2016). If one uses to actually travels through physical activities regularly he could seldom gain unnecessary weight while on the contrary, it could possibly augment his BMI known as body mass index (Andersen, Cohn, & Holbrook, 2010; Monaghan, 2008; and Vogel, 2013). A survey having been conducted by National College Health Risk Behavior (NCHRB) concluded its findings that almost 35% of students in US colleges are found to have overweight (Huang, et al. 2013). Not surprising though as the 2/3rd population of the US has been termed and classified overweight (Flegal, 2002),

The report of the National Research Council (US) (2005) brought out its own definition of physical fitness in a way that “the ability to undertake muscular work satisfactorily.” Therefore, physical fitness deems to be known as the capacity of one individual at times of performing multifarious activities in the best possible manner while not having been tired to the extent that is unreasonable & it also based upon his attributes that are crucial to his well-being & health status. According to American College of sports medicine (2013), every individual owns entirely different posture of physical fitness that is

believed to vary according to nature of work, its place and the time it takes to get it done. Study findings, having shown the mighty difference between rural and urban students of Class IX & X, that the students from rural background turned out physically fit as compared to the students from urban areas. In one of his study, Waltenequs, Habib, & Ayalew, (2018) went ahead to conclude the fact that based on cardiovascular fitness there existed a land-mark difference between urban and rural students.

The major focus of the study is to extend the research in the participation of physical activity and sports to maintain their physical fitness level of the students. The objectives of the study are to investigate the physical fitness level of the students and to find out the difference in fitness level of students. The main prediction is that to assess the components of physical fitness of the students' ages 10 to 15 years and to measure the validity of physical efficiency test norms.

There is ongoing research to discover how to encourage greater participation in physical activity and sport across the world's population especially school going children. The major focus of this study is to extend the current information and knowledge regarding the norms of physical efficiency test for measuring the level of physical fitness. Apart with this study also highlight the importance of understanding how to increase the level of fitness. Moreover, health professionals such as physical education trainers equipped with this new knowledge can develop effective programs to motivate students to participate in physical activity and sports.

2. RESEARCH METHODOLOGY

The quantitative research design was employed for measuring physical fitness among the school students. Pakistani male school students aged between 10 to 15 years who take part in the physical activity and sports in their daily routine life were selected for the study. Participants were consisted of those who participated in various sports and non-competitive physical activity and sports, like yoga, gym exercise, sports, racquet sports, team sports, swimming, jogging, walking, and exercise. They were recruited from their school, sports clubs, fitness centres, and recreational parks. The sample size was calculated based on a priori sample size calculator for correlation from an online statistical calculator. At the anticipated effect size $f^2 = 0.03$, desired statistical power level 0.80 or 80%, the number of predictors 6, and probability level 0.05, the minimum required sample size for this study is 506 (Soper, 2018).

3. DATA COLLECTION

The convenient sample technique was applied for data collection. The total of 506 students participated in the study with good physical condition and no disability. All the participants were secondary school students at district Bahawalpur. Those who volunteered to participate in the study completed the physical efficiency test. The students were briefed about the study. The norms of physical efficiency test were used

as a means of collecting data from the male students of age between 10-15 years. The test includes (a) standing broad jump, (b) 30 mint sprint race, (c) softball through, (d) 15×4=60 meter and (e) sit-ups. The age, height, agility, endurance, speed, muscular strength, explosive strength of all subjects measured.

3.1. Data analysis

The data analyzed with the help of statistical procedure in which mean, standard deviation, t test was used to compare the data. Test contained the following information.

Research Flow Chart

Subject	
Students of ages 10 to 15 years (N = 506)	
Predictor Variables	
Components of Fitness	
Variables	Test Administered
Endurance	15 ×4 = 60 Meters
Speed	30 meters
Strength	Standing Broad Jump
Arm Strength	Soft ball throw
Flexibility	Sit and Reach (Sit-ups)

3.2. Selection of Tests

The table below shows the variables test; tool and the units of the measurements of selected physical variables will be used in the study.

S.No	Variables	Test / Instruments	Measuring Units
1	Endurance	15×4=60 meters	Seconds
2	Speed	30 Meters running	Seconds
3	Strength	Standing Broad Jump	Feet
4	Arm Strength	Soft ball throw	Meters
5	Flexibility	Sit and Reach	Sit ups in 30 seconds

Tests: Each test represents a parameter in evaluating player’s performance.

Table 1: shows statistical analysis of strength

Items	Scale (f)	f	%	Mean	S. D	Sig.
Standing Broad Jump	3-4	12	2.4	2.83	.757	.000
	4-5	161	31.8			
	5-6	242	47.8			
	6-7	86	17.0			
	7-8	5	.9			

Data in table 1 shows the statistical analysis of strength between

ages of 10-15 years students in the different selected districts of Pakistan. Data reveals that (48.2%) students standing broad jump range was between 5-6 feet while (32.0%) students were range between 4-5 feet. The mean score 2.83 shows the inclination toward average marks. Its p -value is >0.5 which shows that the results were significant.

Table 2: shows statistical analysis of speed between ages of 10-15 years students.

Items	Scale (sec)	f	%	Mean	S. D	Sig.
30 m Sprint Race	7-8	8	1.6	3.18	.720	.000
	6-7	60	11.8			
	5-6	293	58.0			
	4-5	128	25.3			
	3-4	17	3.4			

Data in table 2 shows the statistical analysis of speed ability between ages of 10-15 years students. Data reveals that (58.0%) student's 30-meter Sprint race range was between 5-6 seconds while (25.3%) students were range between 4-5 feet. The mean score 3.18 shows the inclination toward appropriate marks. Its p -value is >0.5 which shows that the results were significant.

Table 3: Shows statistical analysis of arm strength between ages of 10-15 years students

Items	Scale (m)	f	%	Mean	S. D	Sig.
Soft Ball Throw	10-20	48	9.5	2.79	.948	.000
	21-30	139	27.5			
	31-40	204	40.3			
	41-50	103	20.4			
	51-60	13	2.6			

Data in table 3 shows the statistical information of arm strength between ages of 10-15 years students. Data reveals that (40.3%) student’s soft ball Throw range was between 31-40 meters while (27.5%) students were range between 21 - 30 meters. The mean score 2.79 shows the inclination toward average marks. Its *p*-value is >0.5 which shows that the results were significant.

Table 4: Shows statistical analysis of endurance between ages of 10-15 years students

Items	Scale (sec)	f	%	Mean	S. D	Sig.
15×4=60m	11	133	26.3	2.21	.934	.000
	12	185	36.5			
	13	149	29.4			
	14	34	6.7			

	15	5	0.9			
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Data in table 4 shows the statistical analysis of endurance ability between ages of 10-15 years students. Data reveals that (36.5%) student's endurance was 12 seconds while (29.4%) students were range 13 seconds. The mean score 2.21 shows the inclination toward below average marks. Its p -value is >0.5 which shows that the results were significant.

Table 5: shows statistical analysis of flexibility between ages of 10-15 years students

Items	Sit-ups in 30 sec.	f	%	Mean	S. D	Sig.
Sit Up	10-15	62	12.4	2.42	.756	.000
	16-20	188	37.6			
	21-25	230	46.0			
	26-30	20	4.0			
	31-35	06	1.2			

Data in table 5 shows the statistical information of flexibility ability between ages of 10-15 years students. Data reveals that (46.0%) student's flexibility range was 21-25 in 30 seconds while (37.6%) students were range 16-20. The mean score 2.42 shows the inclination toward average marks. Its p -value is >0.5 which shows that the results were significant.

ANOVA					
Fitness Norms		Sum of Squares	Df	Mean Square	F
Standing Broad Jump	Between Groups	33.572	4	8.393	16.467
	Within Groups	252.290	495	.510	
	Total	285.862	499		
30 m Sprint Race	Between Groups	37.252	4	9.313	20.835
	Within Groups	221.260	495	.447	
	Total	258.512	499		
Soft Ball Throw	Between Groups	44.068	4	11.017	13.489
	Within Groups	404.300	495	.817	
	Total	448.368	499		
15 x 4= 60m	Between Groups	52.640	4	13.160	17.039
	Within Groups	382.310	495	.772	
	Total	434.950	499		
Sit Ups	Between Groups	49.792	4	12.448	26.145

	Within Groups	235.680	495	.476	
	Total	285.472	499		

4. DISCUSSION

On the base of analysis of the study, the strength of students' ages between of 10-15 years was almost half of the students standing broad jump range was between 5-6 feet while almost one-third of the students were range between 4-5 feet. Data reveals that most of student's 30-meter Sprint race range was between 5-6 seconds while one-fourth of the students were range between 4-5 feet. Data reveals that less than half of student's softball Throw range was between 31-40 meters while one fourth of the students were range between 21-30 meters. Data shows the statistical analysis of endurance ability between the ages of 10-15 years students. Data reveals that more than one-third of the student's endurance was 12 seconds while almost one-fourth students were found between the ranges of 13 seconds. Further data shows the statistical information of flexibility ability between the ages of 10-15 years students. According to data most of the student's flexibility range was 21-25 in 30 seconds while almost one-third of students were range 16-20.

5. CONCLUSIONS

The norm of physical efficiency test namely speed, strength, endurance, agility, and flexibility in the present sample comprises of 506 school students aged between 10 – 15 years to investigate the physical Fitness level of the students. Based on the results most of the students are physically moderate active. This study expressed that the norms of the physical sufficiency test are valid and reliable to assess the level of fitness among the students. Future research can use these instruments for measuring the level of fitness among the participants.

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