

A Comparative Study on the Physical Quality (Lower Body Strength and Endurance) of Boys Under -17 Youth Football Development Project and Non- athletes of the Same Age Group: The Case of Debre Markos Town

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Abstract

Professional spends a great deal of time and effort to improve athletic performance. The study was conducted to compare the physical qualities (lower body strength and endurance) of boys under 17 youth football development project participants and non-participants of the same age group at Debre Markos town. The research design was cross-sectional survey. The researcher selected 25 project participants by using stratified sampling and 25 non-athletes by using purposive sampling technique. The result of the test shows that project participants were better than non-participants in all three tests. Five football project participants squat test score found in average must do improve their lower body strength and 12-munits run test score found in marginal zone must do endurance activity. Five football project participants step test score found in above average score must do endurance activity.

Keywords:-Strength, endurance, football, physical qualities

DOI: 10.7176/JTHS/50-04

Publication date:September 30th 2020

1. INTRODUCTION

1.1 Background of the Study

The aim of this study was to determine the difference in selected basic physical qualities of lower body strength and endurance of boys' under-17 football development project and non-athletes of the same age. Best suite activity performance tests and new training methods achieve excellent. Evaluating an athlete performance test is common occurrences for strength and endurance of football development projects.

Testing an athlete's physical qualities is extremely important to the evaluation process and control of group players. Testing an athletes' may provide the coach with information about physical attributes of player. The physical attributes of under-17 youth football development project and non-athlete are measured in variety of ways in very different test design to assess on the athlete ability to perform a certain skill or function.

All coaches want to be sure that they are putting their best athletes in a game (Graham, 1994). Testing an athlete can help a coach determine the potential of player to play at certain position. This testing process needs to include all areas of training such as strength and endurance that might reflects strength and weakness of the athletes may possess the testing needs to be administered in an effective manner to ensure an accurate evaluation (Ebben, 1998).

1.2 Statement of the problem

Professional football is characterized by high physical qualities and frequent changes in exercise and density (Disalvo, et.al.2001). The physical fitness of players is one the crucial foundation which determines the efficiency of of the lower body strength and endurance performance. The research has been got the chance to observe boys in under-17 youth football development project and non-athletes of the same age group in Debre Markos town. The project participants and non-athletes are not effective because both are not engaged in regular training program. Athletes' strength and endurance have developed and accustomed for each repeated work any kind of work and sport are demands strength and endurance. Lack of activities leads to lack of fitness which leads to the loss of strength and endurance. Therefore; the researcher was interested to conduct the research on the comparative study on the physical qualities lower body strength and endurance) of boys under 17 youth male football development project participants and non- athlete at Debre Markos town.

1.3 Basic research questions

The following research questions were raised to achieve the objective of the research.

1. Is there a significance difference between under-17 youth male football development project participants and non- athlete participants in lower body strength qualities of the same age?
2. Is there significance different between less than 17 youth football development project participant and non- athletes participants in endurance of same age?

1.4 Objective of the study

1.4.1 General Objective

The overall aim of the research is to compare the physical qualities (lower body strength and endurance) of male in under 17 youth football development project participant and non- athlete participant of the same age group at Debre Markos town.

1.4.2 Specific objectives

The following specific objectives were addressed in this research:

1. To compare the physical qualities lower body strength of under-17 youth football development project participant and non-athlete participants of the same age group.
2. To compare the endurance qualities between boys in under-17 youth football development project participants and non-athlete participants of the same age group.

1.5 Significance of the study

The research has the following significances:

1. The prime significance of this research would be used for football development project players and non-athletes themselves about the level of lower body strength and endurance.
2. The research would come with possible solutions for the identify problem.
3. The research would provide valuable highlights' for coaches and stakeholders.
4. Used as base for further studies on under 17 youth football development project specially to lower body strength and endurance.

2 Methods and Materials

2.1 Study area and period

The study has been conducted in Debre Markos Town, which is located at North West of the capital city Addis Ababa with 300km distance and 265km south east of Bahir Dar; the capital of Amhara national regional stat. the town has 1380ml average annual rainfall and minimum and maximum temperature of 15⁰C and 22⁰C respectively. The study period was took place in 2011E.C/2019GC.

2.2 Study Design

Cross-sectional survey design was employed. The research selected to identify and justify the problem of comparative study of boys in fewer than 17 youth football development project and non-athletes of the same age group, due to lower body strength and endurance. Data was collected from primary source by testing athlete and none athlete.

2.3 Population of the study

The targeted populations of the study were 75. From these total populations 50 of them are boys in under- 17 youth football development and 25 of them are non-athletes of the same age group.

2.4 Sample size and Sampling techniques

The researcher selected 2 goal keepers,8 defenders, 10 midfielders and 5 strikers a total of 25 under-17 youth football development project by using stratified sampling techniques and also 25 non athlete by using purposive sampling techniques of the same age groups.

2.5 Source of data and data collection instrument

Primary source of experimentation on result was a source of data. Each subjects of the participants in series of testing conducted by tester and assistant. The two category groups' lower body strength and cardiovascular endurance would be compared by squat, step and 12 minute run test.

2.6 Data Analysis

The data scores from different testing results were analyzed and described by using performance testing methods. When the researcher test the performance of the two category groups each select test method and score results was calculated by descriptive statistics of mean values and percentage.

2.7 Ethical Consideration

Initially letter of permission was taken from Debre Markos University, College of Natural and computational science, especially Department of Sport Science and submitted to East Gojjam youth and sport affairs. Participants on the study were willing for the study. The researcher was explained the purpose of the study for every participant and obtain information consent before beginning of the test. Moreover, culture and traditional value of all participants were taken to an account.

2.8 Squat test standards (Lower strength test)

Table 1: Squat test standards for boys with age of 16

Score	Performance category
Excellent	>49
Good	44-49
Above average	39-43
Average	35-38
Below average	31-34
Poor	25-30
Very Poor	<25

Adopted from Concept of physical fitness active life style for wellness 10th edition, 2000

2.8.1 Testing procedure of squat test

- This test requires the athlete to complete as many squats as possible with no rest.
- Warm up for 5minutes of athlete and none athlete
- The athlete or non-athlete stand in front of the chair, facing away from it, with their feet shoulder width apart.
- The athlete or non-athlete squats down lightly touching the care with their sequence of movement until they are unable to continue.
- The assistant counts and records the number of successfully completed squats.

2.9 Standard of step test in 60 second heart rate

Table 2: Step test Standards in 60 second heart rate

Step test rating Standards	
Classification	60 second heart rate
High –performance zone	84 or less
Good fitness zone	85-95
Marginal zone	96-119
Low zone	120 and above

Adopted from Concept of physical fitness active life style for wellness 10th edition, 2000

2.9.1 Step test procedure

- Warm up prior to exercise
- Step up and down on 12 inch bench for three minutes at a rate of 24 steps per minute. One step consists of four beats; that is “up with the lift foot up with the right foot, down with the lift foot, down with the right foot”
- Immediately after the exercise, sit down on the bench and relax. Don’t talk.
- Locate your pulse or have another person locate it for you.
- 5 seconds the exercise ends, begin continuing your pulse. Count the pulse for 60 second
- Your score is your 60 second heart rate

2.10 Standard of 12- minute run test (Cardiovascular Endurance)

Table 3: The 12-minutes run test score in meters

Men	(age)			
	17-26	27-39	40-49	50+
High performance zone	2880+	2560+	2400+	2240+
Good fitness zone	2480-2779	2320-2559	2240-2399	2000-2239
Marginal zone	2160-2479	2080-2319	2000-2239	1760-1999
Low zone	<2160	<2080	<2000	<1760

Adopted from Concept of physical fitness active life style for wellness 10th edition, 2000

2.10.1 12-minute run test Procedure

- Locate an area where a specific distance is already marked, school truck or football field.
- Use stopwatch or wristwatch to accurately time a 12-minute period
- For best result warm up prior to test, and then run at a steady pace for the entire 12 minutes.
- Determine the distance you can run in 12 minutes
- Depending up on your age, locate your score in rating chart.

2.10.2 Over all procedures

There are two major testing periods (First and second testing period). The first testing periods is at the third week

of May and athletes are tested immediately. An athlete's score in squat, step test and 12-minute run test recorded during this testing period for both groups.

The second testing session began at the second week of Jun. test scores are gathered in squat, step and 12-minute run test scored during this testing period for both groups. This is a very important testing session because it is the last testing session of the day wants to look at the athletes last testing session the athletes test scores over, then the first period testing scores, so the investigator then picked their personal best scores.

The athletes have been tested and their tests have been recorded. While the athletes have been placed in to groups according to their position, they have also been given a playing status of either project participants or non-participants by central tendency statically analysis has been profound on each group. This analysis procedure is importance for each test for each group. This information would be used by the lower body strength and endurance professional. This information is a way to evaluate the tests being administered the athletes and this information is a way to evaluate lower body strength and endurance program.

3 Data analysis and Interpretation

The purpose of this study was to examine the change in the results of 3 physical performance test between project participants and non- participant after implementing general and specific warming up program. Squat test were recorded in a number of counts in minute, step test were recorded in heart beats and 12-minute run test were recorded in meter. Score of boys in under-17 youth football development project participants and non-participants according to row score norms in three performance tests variables were analyzed.

Table 4: Comparative analysis of strength between project participants & non-participants

Group	Sample	Mean	Median	Mode	Range	unit
Project participants	25	48	50	51	16	No of counts
Non-participants	25	38.8	36	34	20	

The analysis of table 4: indicates that the mean, median, mode and range values for strength variable for boys in under-17 youth football development project participants were recorded (48, 50, 51, and 16) frequency and non-participants recorded (38.8, 36, 34, and 20) frequency respectively. It show that boys in under-17 youth football development project participants have performed better as compared to their non-participants in strength variables. As table 6 has been observed that mean, median, mode and range score of project participants is higher than non-participants. We come to the conclusion that boys in under-17 youth football development project participants have better strength than non-participants.

Table 5: Comparative analysis of step test between project participants and non-participants

Group	Sample	Mean	Median	Mode	Range	unit
Project participants	25	89	90	96	24	Heart beats
Non-participants	25	94	92	90	27	

The analysis of tables 5: indicate that the mean, median, mode and range values for step test variables for boys in under-17 youth football development. Boys in under-17 youth football development project participants were recorded (89, 90, 96 and 24) heart beat and non- participants recorded (94,92,90 and 27) heart beat respectively. This shows that boys in under-17 youth football development project participants have performed better as compared to their non-participant in heart beat variables.

Table 5: has been observed that the mean, median, mode and range score of boys in under-17 youth football development project participants is higher than non-participants as compared participants. From the above raw data we deduce that boys in under-17 youth football development project participants have better heart (lower heart) beat than non-participants.

Table 6: comparative analysis of 12-minute between boys in under-17 youth football development project participants and non- participants

Group	Sample	Mean	Median	Mode	Range	unit
Project participants	25	2608	2640	2600	660	Meter
Non-participants	25	2466	2450	2430	680	

The analysis of table 6: show that the mean, median, mode and range value of 12- minutes run test variables for boys in under-17 youth football development project participants and non-participants were recorded 2608m, 2640m, 2600m, 660m and 2466m, 2450m, 2430m, 680m respectively. This reveals that boys in under-17 youth football development project participants run longer distance than non- participants in 12-minutes. From the above table we have been observed that the mean, median, mode and range score of boys in under-17 youth football development project participants is higher than non-participants.

4 Discussion

Physical fitness is a multidimensional state of being. It is the body ability to function efficiently and effectively. According to (Charles et.al., 2000) physical fitness is a state of being that consists of at least five health-related

and six skill-related physical fitness components, each of which contributes to total quality of life. Level of fitness depends on such physiological factors such as the heart ability to pump blood and the size muscle fiber.

To develop fitness, a person must perform enough physical activity to stress the body and cause long term physiological changes. Clarke and Clarke (1989) found that physical fitness is not a static factor and it varies from individual to individual and in the same person from time to time depending on factors. According to Nixon and cozens (1964), it was the desire to establish a scientific approach to the development of physical fitness. The United States president’s Council on physical fitness and sports defined the terms “physical fitness as the ability to carry out daily task with vigor and alertness, without undue fatigue, with ample energy to enjoy leisure time pursuits and to meet unforeseen emergencies” (Clarke, 1971).

Some conditioning programs aimed at improving sport performance, may reduce the risk disease this is not their primary purpose. The single goal of sport conditioning is to improve physical performance in a specific sport. However, the weekend athlete who engages in a total health related physical fitness program could also improve his or her physical performance in many sports. Specifically, a health related fitness program improves sport performance by increasing muscular strength and endurance, improving flexibility and reducing the risk of injury. According to Thomas.D et.al (2001), physical fitness is a set of physical attributes that allows the body to respond or adapt to the demand and stress of physical effort-to perform moderate to vigorous level of physical activity without becoming over tired. Charles (2000) suggests that, specialized forms of training are needed to optimize adaptations to exercise and performance in sports. Fitness is needed for success in many sports. According to Thomas.D et.al (2001), Skill-related fitness refers to a group of basic abilities that helps you perform well in sports and activities requiring certain physical skills.

5 Results

The results of this study was to examine the change in the results of 3 physical performance test between project participants and non- participant after implementing general and specific warming up program. Squat test were recorded in a number of counts in minute, step test were recorded in heart beats and 12-minute run test were recorded in meter.

Table 7: Raw score norms for squat test

No	Classification	Score	Project participants		Non-participants	
			No of Participants	%	No of Participants	%
1	Excellent	>49	13	52%	-	-
2	Good	44-49	7	28%	7	28%
3	Above average	39-43	5	20%	3	12%
4	Average	35-38	-	-	5	20%
5	Below average	31-34	-	-	8	32%
6	Poor	25-30	-	-	2	8%
7	Very poor	< 25	-	-	-	-
Total			25	100%	25	100%

According to row score on table 7 norms of boys in under-17 youth football development project participants personal best score found in excellent, good and above average zone but non- participants score founded good zone up to poor zone. Thus overall we can say that strength of boys in under-17 youth football development project participants were better than non-participants.

Table 8: Raw score norms for step test

No	Classification	Score	Project participants		Non-participants	
			No of Participants	%	No of Participants	%
1	High performance zone	84 or less	6	24%	-	-
2	Good fitness zone	85-95	13	52%	16	64%
3	Marginal zone	96-119	6	24%	9	36%
4	Low zone	120 & above	-	-	-	-
Total			25	100%	25	100%

According to row norms of table 8: the project participants personal best score found in high performance zone, good fitness zone and marginal, but non-participant personal score found only good fitness zone and marginal zone. So we can say project participants have better (lower heart) beats than non- participants.

Table 9: Raw score norms for 12-minut run test

No	Classification	Score	Project participants		Non-participants	
			No of Participants	%	No of Participants	%
1	High performance zone	2880+	-	-	-	-
2	Good fitness zone	2480-2779	20	80%	12	48%
3	Marginal zone	2160-2479	5	20%	12	48%
4	Low zone	<2160	-	-	1	4%
Total			25	100%	25	100%

According to raw score norms of table 9: project participants more personal score found good fitness zone and marginal, but non-participants personal score found in good fitness zone, marginal zone and low zone. So, we simply deduce that project participants have better score in 12- minute run test than non-participants.

6 Conclusion

- In conclusion the result of the study confirm the fact that boys in under-17 youth football development project participants are comparatively better lower body strength and endurance than non-participants.
- In conclusion results of the study confirmed that boys under-17 youth football development project participants are comparatively better cardiovascular endurance than non-athlete
- Five football project participants squat test scores were found above average zone.
- Six football project participants step test scores were found marginal zone.
- Five football project participants 12 minute run test score were found in marginal zone.

References

- ACSM.(2006) ACSM's Guidelines for Exercise Testing and Prescription. (7th Ed.). Philadelphia: Lippencott, Williams & Wilkins.
- Baechle.T.R and Earle R.W (2008) Essentials of strength training and conditioning. (3rd ed) USA
- Coulson,M and Archer.D (2009) practical fitness testing. USA
- Charles B.Corbin Ruth and Grey Welk (2000). Concept of Physical Fitness. *Active life style for wellness* (10th ed) Mc Graw-Hill Higher Education
- Charles B. Corbin, Gregory J. Weik, William R. Corbin and Karen A. Welk (2006) Concepts of fitness and wellness: a comprehensive lifestyle approach. (6th ed).
- Charles B. Corbin and Ruth Lindsey (1990), Fitness for life, (3rd ed) Scott.
- Clarke, B. (2006). 5 and 10K training. Champaign. IL: Human Kinetics.
- Delavier, F. (2006). Strength Training Anatomy (2nd ed.) Champaign, IL: Human Kinetics
- Dick.F.W (2007) Sport training principles (5th ed) USA.
- Ebben.W.P (1998) Review of football fitness testing and evaluation strength and Conditioning.
- Frank Moran (2010) Glossary of Fitness and Health Terms. USA
- Grahm.J. (1994) Guide lines for providing valid testing of athletes fitness levels, strength and endurance.
- Heyward,V.H, (2006). Advanced Fitness Assessment and Exercise Prescription, (5th ed) *human kinetics*. USA.
- Paul M, and Walton T. (2006), Core Concepts in Health. (10th ed). USA
- Scott F. et al., (2008) "Concepts of Fitness and Wellness (2nd ed.) *Nursing and Health Sciences Open Textbooks*.
- Schott k. Powers, Stephen L. Dod and Virginia J. (2006), Total Fitness and Wellness. USA
- Thomas D.Fahey et.al.(2001) Feet and well (4th Ed) *core concept and labs in physical fitness and Wellness* Mayfield publishing company

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Appendix I**Football development project participants' results**

No	Personal best score of test	Sex	Age	Squat test no of count	Step test heart beat	12-minute test in meter
1	A	M	16	52	95	2400
2	B	M	16	50	98	2280
3	C	M	16	49	85	2700
4	D	M	16	48	89	2680
5	E	M	16	43	96	2450
6	F	M	16	44	94	2500
7	G	M	16	46	92	2600
8	H	M	16	53	83	2800
9	I	M	16	52	85	2730
10	J	M	16	51	86	2690
11	K	M	16	55	74	2860
12	L	M	16	51	91	2640
13	M	M	16	51	88	2750
14	N	M	16	50	90	2680
15	O	M	16	47	96	2580
16	P	M	16	50	80	2780
17	Q	M	16	54	76	2820
18	R	M	16	52	78	2810
19	S	M	16	51	82	2730
20	T	M	16	49	90	2600
21	U	M	16	39	94	2500
22	V	M	16	48	91	2600
23	W	M	16	42	96	2490
24	X	M	16	40	98	2200
25	Y	M	16	41	97	2300
	Mean			48	89	2608
	Median			50	90	2640
	Mode			51	96	2600
	Range			16	24	660

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Appendix II**Non-Project participants' athlete results**

No	Personal best score of test	Sex	Age	Squat test no of count	Step test heart beat	12-minute test in meter
1	A	M	16	32	98	2210
2	B	M	16	34	98	2450
3	C	M	16	30	110	2120
4	D	M	16	31	100	2250
5	E	M	16	44	89	2670
6	F	M	16	41	90	2500
7	G	M	16	37	98	2430
8	H	M	16	47	85	2760
9	I	M	16	45	88	2670
10	J	M	16	47	88	2600
11	K	M	16	32	97	2400
12	L	M	16	33	95	2310
13	M	M	16	34	109	2260
14	N	M	16	28	112	2180
15	O	M	16	44	86	2730
16	P	M	16	41	90	2650
17	Q	M	16	38	92	2510
18	R	M	16	36	91	2530
19	S	M	16	35	90	2520
20	T	M	16	48	88	2690
21	U	M	16	34	96	2430
22	V	M	16	46	86	2800
23	W	M	16	33	94	2240
24	X	M	16	35	93	2320
25	Y	M	16	40	90	2430
	Mean			38.8	94	2466
	Median			36	92	2450
	Mode			34	90	2430
	Range			20	27	680