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Measurements of Fitness through Agility and Endurance of Under-19 Cricket Players of Pakistan

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ABSTRACT

The leading objective of the present research was to determine the comparisons of pre and post-tests of agility and endurance as fitness measures of under-19 cricket players of Pakistan. The quasi-experimental research design as pre-test and post-test was applied to 40 players' samples representing equal control and experimental groups. Run A3, 40 m sprint, and explosive power were the batteries applied to measure agility, whereas, the YOYO test was used to record the endurance of cricket players for 12 weeks. The findings of the present research revealed that the players improved their agility and endurance comparatively better in their post-test. The results revealed that the control and experimental groups found a significant difference (< 0.05) from each other after post-test. It was concluded that trainers should focus on the development of agility and endurance to enhance the fitness of players. Cricket trainers should be encouraged and supported to attend diverse fitness courses to improve their fitness dexterity and to apply them to their players in ground/practical settings.

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Introduction

Agility is explored in adults to accelerate performance in sports (Škopek & Laun, 2018). It is the capacity to a quick start as realizes short-term physical activity with great intensity on outside stimulus (Horníková *et al.*, 2019). At present, agility is considered an essential aspect of a team sport (Izzo & Varde, 2018). Furthermore, agility is a complex skill since it depends on numerous aspects such as strength, range of motion, precision, complexity, and duration. In speed and agility, youngsters accelerate high-speed exercises to enhance their sports performance (Mathisen & Danielsen, 2014; Yauch, 2011).

The level of performance of various sports disciplines is determined by the capability to respond on time to stimulus awareness of numerous nature and to complete the kinetic reactions as quickly as probable and accomplish the precise performance with the optimal range of motion (Izzo & Varde, 2018). Agility and speed are thoroughly connected to the utilization of the motor action and consequently, they would be preserved as a solitary component (Domenico & D'isano, 2019; Shaarabh *et al.*, 2014).

In sports situations, the efficiency of several practical features depends on the speed measured performed (Pasko *et al.*, 2019). Extreme aerobic speed permits to recognition of the aerobic skills of an athlete and is

established on his actual athletic capacity to adjust the training in an optimal approach (Agostino & Italy, 2019). An athlete with poorer body power has revealed an association with short sprint performance (Lockie *et al.*, 2015). Through movement, the stretching forces happen, and leap increase to eccentric muscle contractions that provide compensations to increase strength (Fischetti *et al.*, 2018).

Agility is demonstrated to preserve high accomplishment speed even in the condition of muscle fatigue (Izzo & Varde, 2018). Moderate speed is influenced by two factors comprised of frequency and stride length (Koji *et al.*, 2020). However, it is undecided whether plyometric training within 10-11 years and 14-16 years of age, these phases may produce more training variations than those that could be attained through the biological development of the individual young athlete (Fischetti *et al.*, 2018). The response of speed does not inspire the results of sports (Korobeynikov *et al.*, 2019). The strategy of event is the approach by which athletes distribute speed and energy spending during the event (DaSilva *et al.*, 2020).

In the training of an athlete in maximum sports, physical endurance is essential (Guzii & Romanchuk, 2017). Literature about blood lactate metabolism in physiology and biochemistry is producing a vast foundation of means telling muscle exertion (Jozef *et al.*, 2018). Mostly in instruction to apprehend the density of the body's corresponding motion to attain coordination and flexibility, the construction of organized movements includes interactions with growing practice and its achievement severance in imperative (Dedieu *et al.*, 2020). Interval training is an essential procedure that purposes to reduce fat, increase the endurance of the body and strengthen muscles (Görner & Reineke, 2020).

Speed endurance is recognized as the main module of physical fitness, data of sports training research at the phase of sports precision as imperfect uniting speed and endurance abilities of apparatus (Georgieva & Kotsev, 2016; Kevi *et al.*, 2013). Somatic growth is one essential exhibition of human abilities and it is also the element of the perception of a person's health like muscle strength and endurance (Škopek & Laun, 2018; Bosquet *et al.*, 2002).

The somatic and societal situation, deliver a basic perspective for fixed and organized physical activity contribution, limited studies have concentrated on strength training must follow endurance training (Costa *et al.*, 2016). The improvement and control of specific endurance show an essential character in progressing the sports skills of early athletes and that one is also considered the most relevant practice and theory of sports (Cheng *et al.*, 2019; Faizrakhmanov *et al.*, 2017; Vaccaro & Huffman, 2016).

Objectives of the Research

The following objectives were developed for the present research:

i. To determine the comparison of pre and post agility of under-19 cricket players of Pakistan.
ii. To determine the comparison of pre and post endurance of under-19 cricket players of Pakistan.

Research Questions

Q1: What is the difference between pre and post agility of under-19 cricket players of Pakistan.
Q2: What is the difference between pre and post endurance of under-19 cricket players of Pakistan.

Research Methods

Participants

All National under-19 cricket players of Pakistan were considered as population. These cricket players participated in this intervention study. Two groups comprising 20 players each were divided into control group and experimental group. At the initial stage, 60 players were selected for the study under two groups. In this regard, simple random sampling was employed to select the players. All participants were engaged in the fitness formula for further selection. Speed and endurance tests were taken on sixty participants. Finally, based on their physical fitness, 20 players were selected from each group (control and experimental).

Experimental Design

The study has a quasi-experimental research design in nature. The intervention method was applied to investigate the agility and endurance level of national under-19 cricket players of Pakistan for fitness awareness and professional development of the cricket players.

Intervention Program

A control group and an experimental group of cricket players were involved in the present research. Therefore, the agility of the experimental group was measured through 40 M Sprint, Run A 3, and Explosive Power, whereas, endurance was tested by the use of YOYO test. This intervention of 12 weeks was applied to the experimental group. In the meanwhile, the control group was engaged in its normal fitness activities.

The batteries of the agility and endurance tests were described in Table 1 to measure the fitness of national under-19 cricket players.

Table 1: *Agility and endurance test batteries*

Agility Batteries						**Endurance Battery**	
40m Speed Test (Seconds)	Points	Run A 3 (Seconds)	Points	Standing Broad Jump (Meters)	Points	YOYO Test (Level)	Points
6	20	11	20	2.10	20	15.1	20
5.95	24	10.95	24	2.11	24	15.2	24
5.90	28	10.90	28	2.12	28	15.4	28
5.85	32	10.85	32	2.13	32	15.6	32
5.80	36	10.80	36	2.14	36	15.8	36
5.75	40	10.75	40	2.15	40	16.1	40
5.70	44	10.70	44	2.16	44	16.2	44
5.65	48	10.65	48	2.17	48	16.4	48
5.60	52	10.60	52	2.18	52	16.6	52
5.55	56	10.55	56	2.19	56	16.8	56
5.50	60	10.50	60	2.20	60	17.1	60
5.45	64	10.45	64	2.21	64	17.2	64
5.40	68	10.40	68	2.22	68	17.4	68
5.35	72	10.35	72	2.23	72	17.6	72
5.30	76	10.30	76	2.24	76	17.8	76
5.25	80	10.25	80	2.25	80	18.1	80
5.20	84	10.20	84	2.26	84	18.2	84
5.15	88	10.15	88	2.27	88	18.4	88
5.10	92	10.10	92	2.28	92	18.6	92
5.05	96	10.05	96	2.29	96	18.8	96
5	100	10	100	2.30	100	19.1	100

a. 40 M Sprint

The sprint (40m) measured in seconds in the pretest and posttest to test the anaerobic fitness of players. To enhance the aerobic fitness of players, weight training was applied. Half squats, full squats, and bar weights with shot running (15-20m) repetitions were used twice a week to enhance muscular power of players.

b. Run A 3

Run A 3 means that the players completed 3 shuttle runs within the cricket pitch (running between wickets) with bats. This exercise became a source to better the reaction time of the players and develop agility by turning quickly between the wickets. The players remained to engage in run a 3 repetitions two days a week for 6 weeks of the intervention period.

c. Explosive Power

The explosive power of players was amplified and strengthened through standing broad jump. The players performed standing broad jumps between the ranges of 2.10m to 2.30m for one day a week of the 8 weeks of the intervention period. The purpose of the standing broad jump was to enhance the explosive power of lower muscles.

d. YOYO Test

Endurance was increased by applying YOYO test on cricket players for 12 weeks intervention. The players participated in different levels such as level 15.1 to level 19.1 on 3 day a week. The basic purpose of the yoyo test is to develop the endurance level of players.

e. Tool of Assessment

SPSS as a survey measuring tool (version-26) was employed for data anatomization. Therefore, descriptive statistics, independent-sample t-test, and paired-sample t-test have been exploited to explore and compare the fitness level of the control group with the experimental group from pre-test and post-test interventions.

Results

The mean age of the players has measured as 16.9 years and std. deviation was indicated at 1.93. The age ranges of players were confirmed as between 15 to 18 years.

Table 2: *Difference of agility level between groups*

Agility	Groups	N	M	SD	T	df	Sig.
Pre-test	Control Group	20	19.80	5.72	-.168	38	0.791
	Experimental Group	20	20.10	3.96			

The mean score of agility construct of both groups at pre-test was analyzed through an independent-sample t-test and shown in Table 2. The findings revealed significant difference between control group (*M*= 19.80; *SD*= 5.72) and experimental group (*M*= 20.10; *SD*= 3.96), *t*(38)= -.168, and *p*= 0.79. The results indicated that both the control group and experimental group had similar agility levels after intervention.

Table 3: *Difference of intervention scores of control group (before and after)*

Agility		N	M	SD	t	df	Sig.
Control Group	Pre-test	20	19.80	5.72	-41.84	19	0.000
	Post-test	20	29.30	6.67			

Paired-sample t-test was applied to determine the mean score of the control group through pre and post-tests displayed in Table 3. The results indicated that mean value of pre-test (*M*= 19.80; *SD*= 5.72) was found significantly below than the post-test value (*M*= 29.30; *SD*= 6.67), *t*(19)= -41.84, *p*= 0.001. After the intervention, the players improved their agility comparatively better in their post-test.

Table 4: *Difference of agility before and after intervention scores of experimental group*

Agility		N	M	SD	t	df	Sig.
Experimental Group	Pre-test	20	20.10	3.96	-32.36	19	0.000
	Post-test	20	47.50	1.13			

The mean scores through pre and post-tests of the experimental group were determined statistically by paired-sample t-test shown in Table 4. The findings displayed that mean pre-test value (*M*= 20.10; *SD*= 3.96) was revealed significantly below than the value of post-test (*M*= 47.50; *SD*= 1.13), *t*(19)= -32.36, *p*= 0.001. After the intervention, the players executed their level of agility comparatively better in their post-test.

Table 5: *Difference of agility level between groups*

Agility	Groups	N	M	SD	t	Df	Sig.
Post-test	Control Group	20	29.30	6.67	-4.49	38	0.000
	Experimental Group	20	47.50	1.13			

A paired-samples t-test was applied to compare the mean value of the post-test of control and experimental groups after the intervention displayed in Table 5. The results showed that a significant difference was found in agility mean value of control group (*M*= 29.30; *SD*= 6.67) and experimental group (*M*= 47.30; *SD*= 1.13), *t*(38)= -4.49, *p*= 0.001. It has revealed that the control and experimental groups were found a different from each other after post-test.

Table 6: *Difference of endurance level between groups*

Endurance	Groups	N	M	SD	T	df	Sig.
Pre-test	Control Group	20	16.60	7.24	-.189	38	0.918
	Experimental Group	20	17.40	5.61			

The mean score of the endurance construct of both groups at the pre-test was analyzed through independent-samples t-test indicated in Table 6. The findings revealed significant difference between control group (*M*= 16.60; *SD*= 7.24) and experimental group (*M*= 17.40; *SD*= 5.61), *t*(38)= -.189, and *p*= 0.91. The results indicated that both the control group and experimental group had similar endurance levels.

Table 7: *Difference of intervention scores of control group (before and after)*

Endurance		N	M	SD	t	df	Sig.
Control Group	Pre-test	20	16.60	7.24	-34.41	19	0.000
	Post-test	20	25.20	5.72			

Paired-sample t-test was applied to determine the mean value of the control group through pre and post-tests shown in Table 7. The results indicated that mean value of pre-test (*M*= 16.60; *SD*= 7.24) was found significantly below than the post-test value (*M*= 25.20; *SD*= 5.72), *t*(19)= -34.41, *p*= 0.001. After the intervention, the players improved their endurance comparatively better in their post-test.

Table 8: *Difference of endurance before & after intervention scores of experimental group*

Endurance		N	M	SD	T	df	Sig.
Experimental Group	Pre-test	20	17.40	5.61	-26.79	19	0.000
	Post-test	20	45.90	3.97			

The mean scores through pre and post-tests of the experimental group were determined statistically by paired-sample t-test and shown in Table 8. The findings displayed that the pre-test mean value (*M*= 17.40; *SD*= 5.61) was revealed significantly below than the value of post-test (*M*= 45.90; *SD*= 3.97), *t*(19)= -26.79, *p*= 0.001. After the intervention, the players executed their level of endurance comparatively better in their post-test.

Table 9: *Difference of endurance level between groups*

Endurance	Groups	N	M	SD	t	df	Sig.
Post-test	Control Group	20	25.20	5.72	-3.43	38	0.000
	Experimental Group	20	45.90	3.97			

Paired-sample t-test was used to compare the mean values of post-tests of control and experimental groups after intervention displayed in Table 9. The results showed that a significant difference was found in agility mean value of control group (*M*= 25.20; *SD*= 5.72) and experimental group (*M*= 45.90; *SD*= 3.97), *t*(38)= -3.43, *p*= 0.001. It was revealed that the control group and experimental group were found significantly different from each other after post-test.

Discussion

The development of agility and endurance is identified a basic need of cricket players to show their optimal performance in the game. The present research aimed to determine the levels of agility and endurance in under-19 national players of cricket. The findings of the current research authenticated the effectiveness of agility and endurance of players at the national level. The findings were in line with the prior research concluded that these two measures (agility and endurance) were equally effective (Škopek & Laun, 2018; Horníková *et al.*, 2019; Mathisen & Danielsen, 2014; Domenico & D'isano, 2019; Jozef *et al.*, 2018; Costa *et al.*, 2016; Faizrakhmanov *et al.*, 2017; Korobeynikov *et al.*, 2020) and/or agility is more effective than the endurance (Škopek & Laun, 2018; Izzo & Varde, 2018).

The development of agility and endurance centrally involves in the performance of cricket players at under-19 level due to improvement in fitness levels. In Pakistan, less attention is focused on the increase of agility of players to develop the elasticity in their physique where low agility leads to muscle injuries and stiffness in players. Batsmen need more agility when they engage in running between the wickets (Jozef *et al.*, 2018; Faizrakhmanov *et al.*, 2017). Secondly, endurance is a long workout activity in which muscles remain in contraction. Fast bowlers are required to enhance their endurance to complete their bowling spells accordingly (Dedieu *et al.*, 2020; Costa *et al.*, 2016).

Moreover, the present research compared the mean scores of under-19 cricket players in control and experimental groups regarding the agility and endurance to determine the fitness level. The experimental group found better, effective, enjoyable, motivating, interesting, and interactive in achieving their agility and endurance levels as parallel to the control group. The results of Mathisen and Danielsen (2014) concluded that players with greater agility perform at their optimal achievements in game. Endurance enhances the capacity of working muscles during practices and competitions (Görner & Reineke, 2020).

Conclusion

The findings of the present research concluded that trainers should focus on the development of the agility and endurance to enhance the fitness of players. Specific training proved very useful to enhance agility and endurance before competitions. Fitness camps conducted in this scenario may be effective for the players. Cricket trainers should be encouraged and supported to attend diverse fitness courses to improve their fitness dexterities and apply them on their players in ground/practical settings. The findings of the present research may not be pertinent for diverse players as the generalization of the experimental study is limited to practical settings. With broad view of the results, it has proposed that the similar research conducted with large sample size and national players.

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Conflict of Interest

Authors have no conflict of interest.

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