

RESEARCH ARTICLE

EFFECTS OF PILATE TRAINING ON PHYSICAL PERFORMANCE OF CRICKETERS

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ABSTRACT

Objective: to determine the effectiveness of Pilate training on physical performance of cricket players. **Methodology:** A two-arm, single-centred, randomized control trial was conducted at LFR I8Active Gym I8, Islamabad for time duration of six months from June 2020 to March 2021. The active male cricketers aged between 19-30, who had practiced for at least 2 years and had normal BMI (ranging in between 18.5 to 24.9) were included in the study. The n=20 participants fulfilled the inclusion criteria and recruited through non-probability convenient sampling technique and divided in two groups. The experimental group received Pilate training (PT) with conventional training (CT) exercise plan. However, control group received only CT exercise plan. The 30 feet agility shuttle run test, core strength test, endurance test, underarm throw accuracy test, throw-length test and ground fielding test was performed before and after the intervention. The MANCOVA was applied to see the differences in group while controlling the confounding variables. The level of significance was set at 95% CI ($p \leq 0.05$). **Results:** The mean age of study participants was 23.95 ± 2.7 years, while average BMI was 22.4 ± 3.79 . After running MANCOVA test on combine dependent variables, while controlling BMI and pre-test score, statistically significant difference $\{F(6, 12) = 12.95, p < 0.001, \eta^2 = .866\}$ between groups was observed. All variables except endurance fitness ($p = 0.217$), showed significant improvement in cricketer receiving combined conventional training and Pilates training ($p < 0.05$). **Conclusion:** It was concluded that Pilates with conventional training significantly improved physical performance of cricketers.

Keywords: Core, Cricketer, Physical Fitness, Pilates training

INTRODUCTION

Cricket has become the most popular game among both genders all over the world^{1,2} The previous literature draws attention towards physiological and psychological needs of cricketers, as well as biomechanics, performance analysis and injuries during the game play.³ The risk of injury may increase due to increase physical demands as during game, players are required to field, bat and ball throughout the game. In order to avoid such complications, athlete must have strong core musculature, and endurance.^{1,4,5} The core contains the muscles of pelvis and trunk which provides stability.⁶ Thus strengthening of core musculature is important to avoid injuries in cricketers. Core weakness leads to incorrect movement pattern and less force production during the game.^{1,6} Hibbs et al discussed that for sport performance athletes must have good core strength and for this purpose rehabilitation programs should be designed to enhance the function and performance.⁷

There are several ways to strengthen the core muscles such as medicine balls, stability balls, balance board, yoga, conventional resistance exercises, Pilates and other exercises, such as swimming. Also bands, and pulleys have been some of the approaches to train the core.^{8,9,10} Performing

conventional exercises on unstable rather than stable surfaces, while standing, with free weights and unilaterally rather than doing exercises on machines, in sitting position or bilaterally provides additional good results.⁹

Pilates is considered as physical fitness system which improves strength, flexibility and endurance of body. Also, it improves breathing, coordination, balance and strengthens the core muscles.¹ Pilates trainings progresses with the 5 basics such as breathing, cervical alignment, rib and scapular stabilization, pelvic mobility and utilizing the transverses abdominis.¹¹ The Pilates Technique is comprised of a group of functional movements, using the individual's own body weight and later prolonged with the assistance of some equipment.^{12,13} Control and concentration are the basic principles in the execution of Pilates, this makes an athlete more aware of how the mind controls their bodily movement.¹⁴ A player's core need to be strong, stretchy and unrestricted in its drive in order to attain utmost performance.¹⁵

Previous literature gained much light on the relationship between core stability and athletic performance. Number of research studies has also been completed that underline the benefits of core stability training on injury prevention or

performance. Although several studies have investigated core stability benefits in athletes but there are very limited studies that presented the role of Pilate training in increasing the core strength and stability of cricket players in order to maximize their performance related to cricket. This study aimed to determine the effects of Pilate training on physical performance in cricket players.

METHODOLOGY

A study with Pre-test-Post-test Comparison Design (NCT04787016) was conducted on domestic cricketers at La Fitness Reseau (18active Gym) after approval from the Chief Operating officer (CEO). The study was also approved from research and ethics committee (REC/FR&AHS/Letter-0758), Riphah International University. The duration of the

study was nine months from June 2020 to March 2021. The male participants who were active cricketer for at least for 2 years were included in the study. The cricketers with history of fracture or injury due to which cricketer stops playing for at least for one month were excluded from the study. The sampling was collected through non probability convenience sampling technique. A total of n=20 participants was randomly divided in to Conventional Training (CT) and Pilates Training (PiIT) groups the sealed envelope method. (Figure 1). Each participant received, 4 weeks of conventional training (CT) for 30 minutes session five days in a week. Each exercise was performed 3 sets with 10 repetitions. The second group additional received Pilates training (PiIT). (Table 1)

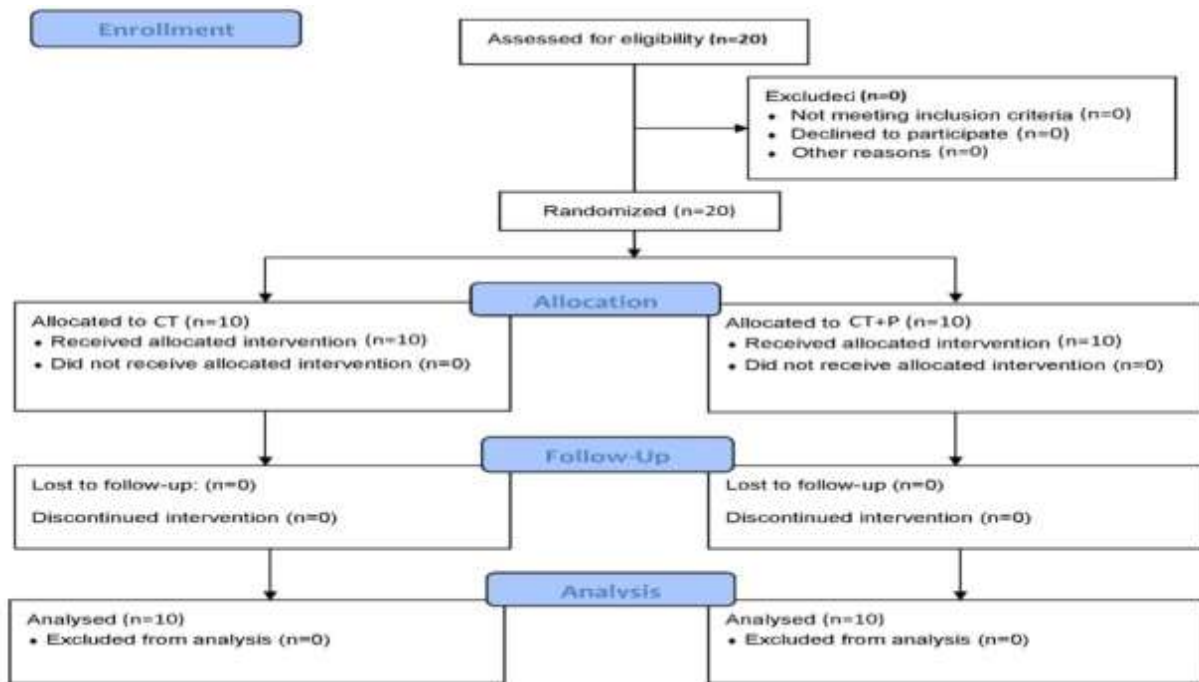


Figure 1: CONSORT diagram

Table 1: Intervention protocol

Weeks	Pilate Training	Conventional Training
Week 1	On Matt: 3 sets of 10 repetitions each of the following exercises; Leg Circle, The one hundred, Single Leg stretch, Criss-cross, Double leg stretch, Scissor kick, Teaser, Plank Rock	3 sets of 10 repetitions each of the following exercises with minimum weight; Romanian Dead lift, Cook Hip Lift, Single Leg Squats, Press Up, Standing Overhead Press
Week 2	On Reformer: 3 sets of 15 repetitions each of the following exercises; Leg Circle, The one hundred, Single Leg stretch, Criss-cross, Double leg stretch, Scissor kick, Plank, Mountain climber	3 sets of 10 repetitions each of the following exercises with minimum weight; Bent Over Row, Squats, Single Leg Squats, Chin Up, Medicine Ball Throw, Hang Pull
Week 3	On Cadillac: 5 sets of 10 repetitions each of the following exercises; Leg Circle, The one hundred, Single Leg stretch, Criss-cross, Double leg stretch, Scissor kick, Pendulum, Mountain climber	3 sets of 15 repetitions each of the following exercises with medium weights; Romanian Dead lift, Cook Hip Lift, Single Leg Squats, Press Up, Standing Overhead Press
Week 4	On Spring Wall Pushups, The one hundred, Single Leg stretch, Criss-cross, Double leg stretch, Scissor kick, Teaser, Plank Rock	3 sets of 15 repetitions each of the following exercises with maximum weight; Bent Over Row, Squats, Single Leg Squats, Chin Up, Medicine Ball Throw, Hang Pull

The data was collected at the baseline and after 4th week intervention. The information of age, and BMI was obtained before the intervention. The physical performance tests for cricketers including The 30 feet agility shuttle run test, core strength test, endurance test, underarm throw accuracy test, throw-length test and ground fielding test, were administered before and after intervention. . The BMI and pre-test scores were included in the analysis as a confounding variable. So the MANCOVA was applied to data after ensuring the assumptions. Data was analysed using SPSS version 20.

RESULTS

The mean age was 23.95 ± 2.7 years, while average BMI of the participating was 22.4 ± 3.79 . A total of $n=16$ cricketers were in healthy BMI, while $n=3$ were overweight and $n=1$ was obese. (Figure 2).

After running MANCOVA test on combine dependent variables, while controlling BMI and pretest score, statistically significant difference $F(6, 12) = 12.95, p < 0.001, \eta^2 = .866$ between groups was observed. So the between the group comparison can be seen table 1, that showed all variables except endurance fitness ($p=0.217$), showed significant improvement in cricketer receiving combined conventional training (CT) and Pilates training (PiIT) ($p < 0.05$).

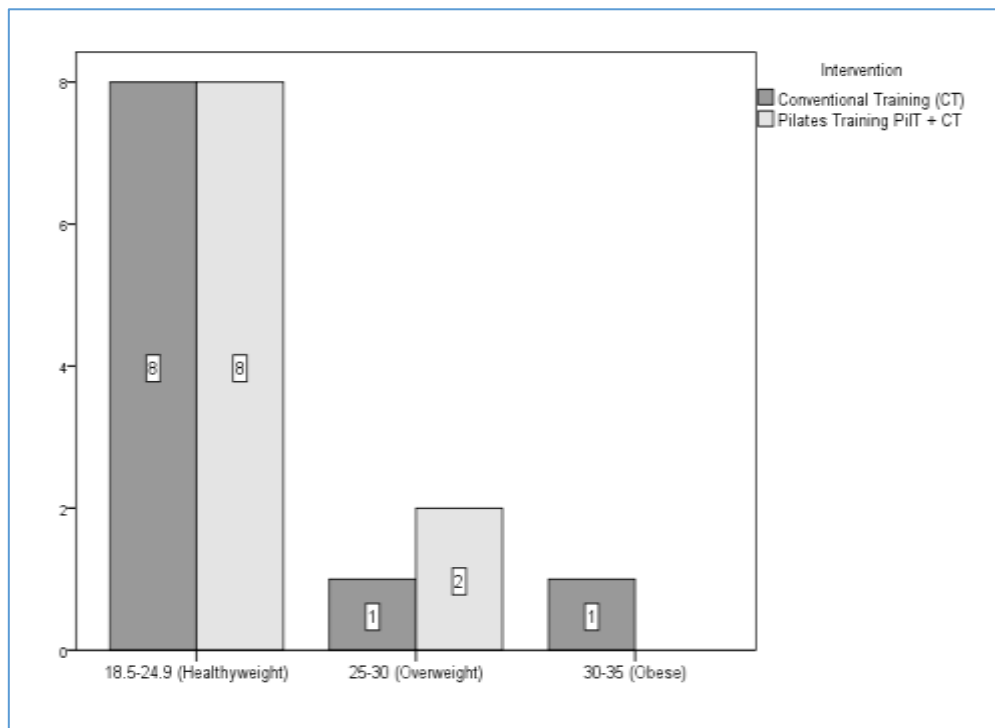


Figure 2: BMI category

Table 1: comparison between groups while controlling BMI & pretest score

	Intervention	Mean	SD	F(df)	p-value	η^2
Agility 30-Ft Agility Shuttle Run Test (sec)	CT	2.41	0.82	6.36(1,17)	0.02*	0.27
	CT+PiIT	1.73	0.34			
Core Strength Test	CT	1.97	1.15	16.67(1,17)	0.001**	0.49
	CT+PiIT	3.60	0.67			
Endurance fitness Yo-Yo Test	CT	1067.5	457.65	1.64(1,17)	0.21	0.08
	CT+PiIT	1222	146.93			
Explosive power fitness test Cricket Ball Throw Length	CT	152.1	25.70	4.7(1,17)	0.04*	0.21
	CT+PiIT	169.7	14.86			
Under Arm Throw Accuracy	CT	4.9	2.13	18.18(1,17)	0.001**	0.51
	CT+PiIT	10.5	3.89			
Ground Fielding Test	CT	4.8	1.93	24.06(1,17)	0.00***	0.58
	CT+PiIT	8.2	0.91			

Significance level: $< 0.05^*$, $< 0.01^{**}$ & $< 0.001^{***}$

DISCUSSION

The aim of the study was to determine the effectiveness of Pilates with conventional training on physical performance of cricketers. According to the results of the study, after 4 weeks of training of Pilates with conventional exercises, significant improvement was observed in agility, core strength, ball throw length, under-arm throw accuracy, and ground fielding.

The results of this study are in accordance to the previous study in which Pilates improved core strength and enhance the physical performance of cricketers.¹ And the good core strength improved agility and speed in athlete.¹⁶ In another study significant improvement was observed in agility and speed of running in male cricket players which is in coherence with the results of recent study in which agility and ground fielding improved significantly.¹⁷ Furthermore, the outcome of current study supports the previous literature, the cricket players with well-built core muscles have significantly better bowling speed, length and accuracy.¹⁸ It might be due to greater core stability, which provides greater upper and lower extremity force.^{19,20} Core stability is attained through strength and endurance of core muscles. And players with good core stability shows good performance on field.¹⁸ A study by Willson et al., determined the decreased core stability increases the risk of injury however proper training may reduce injury. Core stability not just enhance the performance of cricketers but also reduced the prevalence of injury.²¹

A study conducted by El-Sayed et al., determined the effectiveness of Pilate training in improving muscle ability, biological capacity and jump height which might be due to the kinetic chain activities. It was found that Pilates improves strength of trunk muscles which improves motor coordination of limbs and thus enhances motor performance. Breathing control is one of the mechanisms of Pilates and good breathing control during play also enhances performance of athletes by increasing oxygen uptake to lungs and muscles.²²

Furthermore, mind and body coordination is also an important aspect of athletic performance. Therefore, Pilate exercises improve the mind and body coordination by reducing anxiety and thus

enhance the performance. Regular uses of Pilates strengthen the abdominal, core musculature, flexibility of trunk muscles, and improved the biological capacity efficiency through good breathing control.²³

The major limitation of this study was Small sample size and single-centre also affected the significance of the study. Future studies should incorporate on larger sample size and multi-cantered.

CONCLUSION

Pilates with conventional training significantly improved core strengthening, agility, ball throw length, underarm throw accuracy and ground fielding. All these components enhance physical performance of cricket players. It is also recommended in to determine the effects of Pilates training individually on physical performance in cricketers.

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