The impact of a twelve-week Tabata training program on selected motor fitness variables among district-level female hockey players

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ABSTRACT:

The purpose of this study was to investigate the effects of Tabata training on selected motor fitness variables among female hockey players at the district level. Thirty hockey players aged 14-17 years from Coimbatore district were randomly selected as subjects for the study. They were divided into two groups of fifteen each: Experimental Group-I, which underwent Tabata training, and a Control Group that did not receive any experimental training beyond their regular daily activities. The experimental period lasted 12 weeks. Following the training period, all thirty subjects were assessed on their motor fitness variables, with these scores serving as their post-test results. Both pre-test and post-test scores were analysed using a dependent t-test to determine the significance of mean differences, with a significance level set at 0.05 for all hypotheses tested.

Keywords: motor fitness, arm explosive power and speed

Introduction :

Tabata training is a high-intensity interval training (HIIT) regimen that follows a specific format. It was developed by Dr. Izumi Tabata and his team at the National Institute of Fitness and Sports in Tokyo, Japan. The Tabata protocol consists of:

1. **Timing**: Each exercise session is typically only 4 minutes long, which makes it a very time-efficient form of exercise.
2. **Intervals**: The 4 minutes are divided into 8 intervals of 20 seconds of intense exercise followed by 10 seconds of rest or low-intensity exercise.
3. **Exercise Choice**: The exercises can vary widely, but they are usually aerobic exercises that engage large muscle groups, such as sprints, cycling, rowing, or bodyweight exercises like squats or burpees.
4. **Intensity**: During the 20-second intervals, participants are expected to exert themselves at maximum effort, aiming to reach around 170% of their VO2 max (maximum oxygen consumption).

Tabata training is known for its ability to improve both aerobic and anaerobic capacities significantly in a short period, making it popular among athletes and fitness enthusiasts looking to enhance their cardiovascular fitness and overall endurance.

Methodology :

The purpose of this study was to examine the effects of Tabata training on selected motor fitness among female hockey players at the district level. To achieve this goal, thirty hockey players aged 14-17 years from Coimbatore district were randomly selected as subjects. They were divided into two equal groups of fifteen: Experimental Group-I and Control Group, assigned in a comparable manner. Experimental Group-I underwent Tabata training, while the Control Group maintained their regular daily activities without additional experimental training. The experimental period lasted 12 weeks. Following this period, all thirty subjects were assessed on their motor fitness variables, with these scores serving as their post-test results. Both pre-test and post-test scores were analyzed using a dependent t-test to determine the significance of mean differences, with a significance level set at 0.05 for all hypotheses tested.

Test I

Mean and Dependant 'T' – ratio for the Pre and Post Tests on Tabata training group and control Group on speed

Group	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	**Pre test**	7.66	2.16	0.18	3.76*

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	Post test	7.62	2.20		
Control group	**Pre test**	7.15	2.46	0.19	1.61
	Post test	7.14	2.22		

*Significant level 0.05 level degree of freedom (2.14, 1 and 14)

      Table I presents the computation of the 't' ratio, comparing the mean scores of pre-test and post-test speed for district-level female hockey players. The mean speed values for the experimental group were 7.66 before training and 7.62 after training, while the control group had mean values of 7.15 and 7.14 for the respective tests. The computed 't' ratio of 3.76 exceeded the critical table value of 2.14, indicating statistical significance with 1 degree of freedom and 14 participants at a 0.05 level of confidence. This outcome strongly suggests that the speed of the experimental group significantly improved due to the influence of in-and-outs Tabata training.

      In contrast, the calculated 't' ratio of 1.61 fell below the critical table value of 2.14, indicating statistical non-significance with 1 degree of freedom and 14 participants at a 0.05 level of confidence for the control group. This result unequivocally indicates that the speed of the control group did not exhibit significant improvement following the intervention.

The bar diagram illustrates the mean values of pre-tests on speed for both the control and experimental groups.

Bar diagram
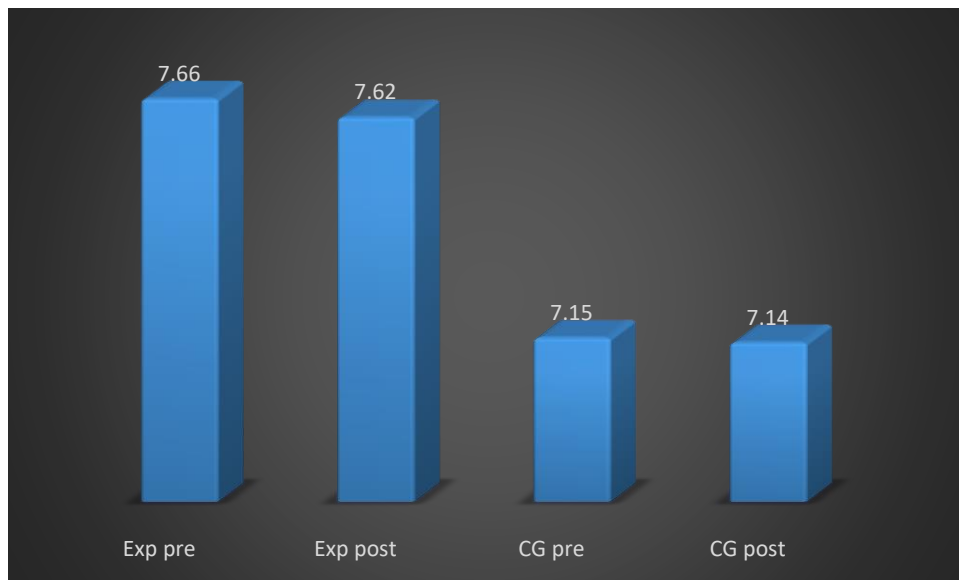
Test II

Mean and Dependant 'T' – ratio for the Pre and Post Tests on Tabata training group and control Group on Arm explosive power

Group	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	**Pre test**	1.51	0.03	0.45	21.00*
	Post test	1.62	0.04		
Control group	**Pre test**	1.50	0.02	0.06	1.37
	Post test	1.51	0.03		

*Significant level 0.05 level degree of freedom (2.14, 1 and 14)

      Table II presents the computation of the 't' ratio, comparing the pre-test and post-test mean scores of Arm explosive power among district-level female hockey players. The mean values for the experimental group were 1.51 before training and 1.62 after training, while the control group had mean values of 1.50 and 1.51 for the respective tests. The calculated 't' ratio of 21.00 exceeded the critical table value of 2.14, indicating statistical significance with 1 degree of freedom and 14 participants at a 0.05 level of confidence. This finding strongly suggests that the arm explosive power of the experimental group significantly improved due to the influence of in-and-outs Tabata training. In contrast, the computed 't' ratio of 1.37 fell below the critical table value of 2.14, indicating statistical non-significance with 1 degree of freedom and 14 participants at a 0.05 level of confidence for the control group. This result clearly shows that the arm explosive power of the control group did not significantly improve following the intervention.

      The bar diagram illustrates the mean values of pre-tests on arm explosive power for both the control and experimental groups.

Bar diagram
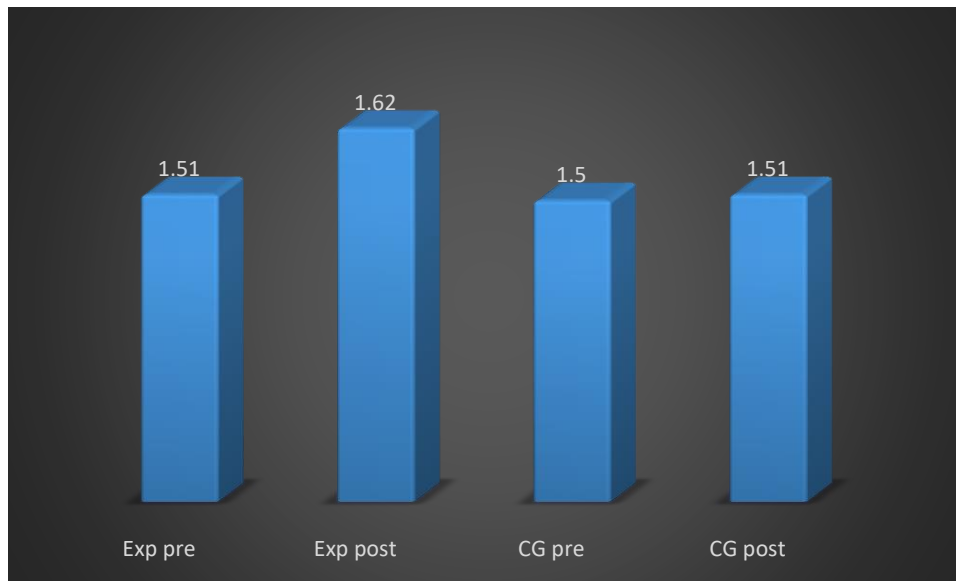
Discussion on Finding

The study's findings highlight a significant improvement in selected variables—speed and arm explosive power—among the experimental group, which underwent Tabata training, compared to the control group. Furthermore, the study suggests that the improvements achieved by the Tabata training group are notably superior to those observed in the control group. For further insights on this topic, refer to the research conducted by Tabata, I. (2019) titled "Tabata training: one of the most energetically effective high-intensity intermittent training methods" in The Journal of Physiological Sciences, 69(4), 559-572.

Conclusions :

From the analysis of the data the following conclusions are

1. The experimental group, comprising individuals who engaged in a Tabata training program, exhibited a notably significant improvement in physical fitness variables, specifically speed and leg explosive power, among district-level female hockey player.
2. In contrast, the control group demonstrated negligible improvement in physical fitness variables, including speed and leg explosive power, among district-level female hockey player.

REFERENCE :

1. Tabata, I. (2019). Tabata training: one of the most energetically effective high-intensity intermittent training methods. The Journal of Physiological Sciences, 69(4), 559-572.
2. Emberts, T., Porcari, J., Dobers-Tein, S., Steffen, J., & Foster, C. (2013). Exercise intensity and energy expenditure of a tabata workout. Journal of sports science & medicine, 12(3), 612.
3. Afyon, Y. A., Mülazimoğlu, O., Celikbilek, S., & Kalafat, Ç. (2021). The effect of Tabata training program on physical and motoric characteristics of soccer players. Progress in Nutrition, 23(S2), e2021255-e2021255.
4. Viana, R. B., de Lira, C. A. B., Naves, J. P. A., Coswig, V. S., Del Vecchio, F. B., & Gentil, P. (2019). Tabata protocol: a review of its application, variations and outcomes. Clinical physiology and functional imaging, 39(1), 1-8.
5. Imanudin, I., & Sultoni, K. (2017, March). Tabata training for increasing aerobic capacity. In IOP Conference Series: Materials Science and Engineering (Vol. 180, No. 1, p. 012205). IOP Publishing.