RESEARCH ARTICLE

RELATIONSHIP BETWEEN DIETARY FAT AND PHYSICAL FITNESS AMONG PAKISTAN'S NATIONAL ATHLETES

1. *Football Coach/Physical Education Expert, Pakistan Sports Board. Islamabad Pakistan.*
2. *Senior Lecturer. College of Physical Therapy. Northwest Institute of Health Sciences. Peshawar. Pakistan*
3. *Physical Education Expert. Pakistan Sports Board. Islamabad Pakistan*
4. *Assistant Director Sports. International Islamic University, Islamabad. Pakistan*

Correspondence
Asadullah.Football Coach/Physical Education Expert, Pakistan Sports Board. Islamabad Pakistan
E-mail: psbpasban@gmail.com

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Asadullah[1]: Conception, collection, analysis & interpretation of data, writing; revised and accountable for all aspects
Syed Alamdar Hussain[2]: Interpretation of data, writing; Revised and accountable for all aspects
Musa Haseeb[3]: Conception, Revised and accountable for all aspects
Ausaf Chaudhry[4]: Interpretation of data, writing; Revised and accountable for all aspects
Muhammad Ashraf[3]: Collection of data, manuscript writing; revised and accountable for all aspects

ABSTRACT

Objective: to evaluate the relationship between dietary fats and physical fitness in young athlete of Pakistan. **Methodology:** An correlational study conducted in Pakistan Sports Board (PSB) in 2018, after the approval of Director Admin of Pakistan Sports Board (PSB), a total sample size of n=130 elite athletes (both male and females) were recruited from the camp for National games held in PSB through convenience sampling technique. The data was collected about the age, gender, BMI and physical fitness. Physical fitness was measured through following tests; back ward throw with 3kg medicine ball, 30 meter Speed Test, Single-leg hope three step test, Agility T test and 800 meter Endurance test. The pre camp dietary fat intake was calculated through online software Self Nutrition Data by entering the meal recipe and Nutrition Facts label was generated according to the nutrition labelling standard maintained by the FDA. The results were presented in terms of n (%), mean±SD and to determine association Pearson product-moment correlation coefficient was used. **Results:** The mean age of participants was 23.63±5.30 years. The results showed positive correlation of agility T test (sec) with saturated fat (r=0.180, *p=0.040*), mono unsaturated fat (r=0.199, *p=0.023*), poly unsaturated fat (r=0.187, *p=0.033*), Omega 3 fatty acids (r=0.187, *p=0.033*) and total fat intake(r=0.202, *p=0.021)*. The 800 M endurance test was positively correlated with polyunsaturated fat (r=0.187, *p=0.033*), omega 6 fatty acids (r=0.182, *p=0.038*) and total fat intake (r=0.181, *p=0.039*). While leg strength test was found to be negatively correlated with monounsaturated fats (r=-0.174, *p=0.048*) and polyunsaturated (r=-0.175, *p=0.047*). **Conclusion:** Nutrition rich in dietary fats results in decreases performance and ability of athletes involved in agility and endurance training, while for those involved in strength training dietary fats may enhance their performance.

Keywords: Physical performance, fat, athlete, physical fitness.

INTRODUCTION

Nutrition plays a very significant role in physical fitness of an athlete [1]. It is defined as supply of food for living, scientifically consumption and utilization of food is known as nutrition [2]. Simply, the food is a fuel, which has calories and these calories should be burned by an individual's body to power ones all body's functions [3]. Inadequate nutrients in an athletic diet would rapidly result in an easily exhausted athlete, as it is an important factor for muscular rebuild [4]. Without it an athlete is not able to perform at his/her maximal potential [5]. Literature supports a variety of dietary strategies in enhancing physical fitness of an athlete [6].

Dietary fat is a significant part of an athletic eating regimen, providing basic fatty acids and upgrading ingestion and absorption of fat-solvent nutrients [7]. Dietary fat is additionally significant for guaranteeing satisfactory caloric admission to meet the rise in consumption which happens with physical activity [8]. Triacylglycerol is the primary part of dietary fat, comprising of a glycerol particle esterified to three fatty acid molecules [9,10]. The 2015–2020 Dietary Guidelines for Americans no longer focuses on a cut off for total fat intake yet at the same time prescribes restricting saturated fat to 10% of calories or less prevent rise of low-density lipoprotein (LDL) cholesterol [11]. Academy of Nutrition and Dietetics & American College of Sports Medicine suggest that dietary fat give 20%–35% of complete calories, which is the current satisfactory macronutrient circulation range [12]. The attention on fatty acid sort has brought about advancement of more prominent admission of omega-3 polyunsaturated fatty acids and decreased admission of saturated fatty acids and Trans fats, unsaturated fats. [13]. fat give most of the energy required for muscle withdrawal in endurance practice [14]. Fat is the dominating fuel for moderate-intensity work out, with maximal fat oxidation being reached at roughly 59%–64% of VO2max in endurance-prepared competitors and 47%–52% of VO2max in undeveloped people [15]. As intensity rises, starch usage increments, with glycogen as the primary source of this fuel [16].

There was paucity in the literature regarding different types of fat and their association with physical fitness. Hence the objective of the study was to evaluate the association between dietary fat and physical fitness in Pakistani athlete.

METHODOLOGY

This was an analytical study design conducted in the time duration of 6 months from Pakistan Sports Board (PSB). A total sample size of n=130 elite athletes (both male & female) were recruited after the approval of Director Admin PSB. Players of at least national level were included in the study through convenience sampling from the camp for National games held in PSB during July – September 2018. The data was collected about the age, gender, BMI and physical fitness. Physical fitness was measured through following tests; back ward throw with 3kg medicine ball, 30 meter Speed Test, Single-leg hope three steps test, Agility T test and 800 meter Endurance test. The pre camp dietary fat intake was calculated through online software Self Nutrition Data by entering the meal recipe and Nutrition Facts label was generated according to the nutrition labelling standard maintained by the FDA. The results were presented in terms of n(%), mean±SD and to determine association Pearson product-moment correlation coefficient was used in SPSS version 21.

RESULT

A total of n=117 male and n=13 female participated in this study. The mean age of study participant was 23.63±5.30 years. The mean BMI was 22.53±3.09, ranged from 14.4 to 32.20. The frequency distribution according to game can be seen in figure 1.

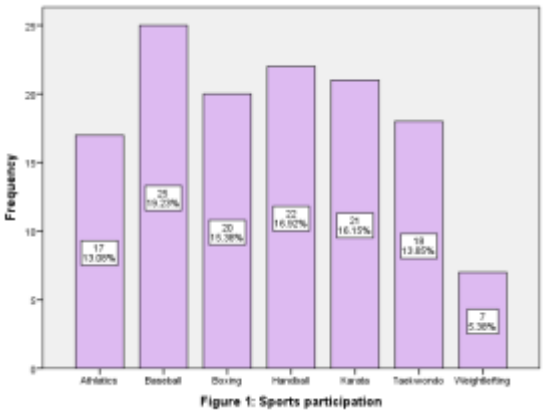

Figure 1: Sports participation

The results showed positive correlation of agility T test (sec) with saturated fat (r=0.180, *p=0.040*), mono unsaturated fat (r=0.199, *p=0.023*), poly unsaturated fat (r=0.187, *p=0.033*), Omega 3 fatty acids (r=0.187, *p=0.033*) and total fat intake(r=0.202, *p=0.021)*. The 800 M endurance test was positively correlated with polyunsaturated fat (r=0.187, *p=0.033*), omega 6 fatty acids (r=0.182, *p=0.038*) and total fat intake (r=0.181, *p=0.039*). While leg strength test was found to be negatively correlated with monounsaturated fats (r=-0.174, *p=0.048*) and polyunsaturated (r=-0.175, *p=0.047*).(Table 1)

Table 1: Association between Dietary Fat and Physical Fitness

			Backward Throw With 3kg Medicine Ball (m)	Speed Test 30 Meter (sec)	Leg Strength Test (m)	Agility T Test (sec)	800 M Endurance Test (sec)
	Mean±SD		10.27±2.43	4.58±0.46	6.39±0.91	11.20±1.02	3.18±0.63
Saturated Fat (gm)	56.29±37.14	R	-.078	.053	-.146	.180	.164
		p-value	.378	.549	.098	.040*	.062
Mono unsaturated Fat (gm)	41.32±28.15	R	-.107	.043	-.174	.199	.168
		p-value	.226	.629	.048*	.023*	.056
Poly unsaturated Fat (gm)	14.04±3.76	R	-.160	.017	-.175	.187	.187
		p-value	.070	.848	.047*	.033*	.033*
Omega 3 fatty acids (mg)	1827.25±842.09	R	-.080	.058	-.139	.187	.167
		p-value	.367	.513	.115	.033*	.057
Omega 6 fatty acids (mg)	12163.14±3037.90	R	-.160	.007	-.159	.168	.182
		p-value	.068	.934	.071	.056	.038*
Total Fat (gm)	138.82±70.97	R	-.105	.054	-.165	.202	.181
		p-value	.233	.544	.061	.021*	.039*

*Level of significance: <0.05**

DISCUSSION

The main aim of this study was to evaluate the association of dietary fat and physical fitness in

young Pakistani athletes, though this study was successfully conducted and outlaid results showed significant correlation of agility, strength and endurance with different dietary fats (saturated, monounsaturated, polyunsaturated, omega 3 and 6 fatty acids and total fat intake). The monounsaturated fats showed positive correlation with agility test and negative correlation with leg strength test. The total fat intake was found to be positively correlated with agility and endurance. Another astonishing thing found was that the poly unsaturated fat intake showed positive correlation with agility and endurance, while it was found to be negatively correlated with leg strength. Whereas, backward throw was found to have insignificantly negative correlation with dietary fats and speed test showed no correlation at all with that of dietary fats intake.

The agility test was found to have positive correlation with saturated, monounsaturated, polyunsaturated, omega 3 fatty acid and total fat intake which indicates that increase of these mentioned dietary fats intake increases the time taken to accomplish the agility test. A study was conducted in Greece to evaluate the low-fat, high carbohydrate & high-fat, low carbohydrate diet's effect, which in result showed that diet rich with dietary fat had a converse effect on Athlete's performance by decreasing his speed and distance covered and resulting in losing a match [17]. In this connection, above studies indicate that diet rich in fats (<20-35%) calories would decrease athletic performance. Team sports are considered to be an extended low-to moderate-intensity effort, with repetitive high-intensity spurts that might approach maximal exertion, with little recovery times [18,19]. Assumed to be the worldwide status of soccer, research concerning team competition has attention primarily on this specific sport. Though average oxygen consumption all over a soccer game play has been likely at 70%–80% VO_2max [20,21] prominent to substantial glycogen depletion [22] and glycogen depletion all through a soccer match has remained associated with the reduction in speed and the distance covered [23].

Dietary fat restriction might result in trouble meeting energy requirements for an athlete, particularly those involved in endurance trials. Consuming a sufficient amount of calories is precarious to improve performance and must be a thing of attention for athletes [5]. Energy restraint that might occur from decreasing fat intake can upset endocrine function in females [24-26], lessen strength and endurance, and can compromise immune function [27] similarly a study conducted in United States aimed to assess the performance level in middle distance runners by restricting fat from their diet for 7 days; despite the fact, energy intake for those athletes with high carbohydrate and low fat diet was adequate but there performance was negatively affected, effecting there exhaustion time [28] in this connection, present study concluded the result by positively correlating dietary fats, specifying the poly-unsaturated fat, omega-6 fatty acid and total fat intake, to have negative impact on endurance test performed on young Pakistani athlete. Pons et al. reported in their study that caloric restriction in athletes lead to decrease lean and fat body mass, which in turn decreases the expenditure of energy thus enhancing the athletic performance[29].

Perhaps, for a lot of strength athletes follow low-carbohydrate and high-fat diet yet sparse in research in this area is fount at this point. A study conducted in United States aimed to evaluate the effect of high-fat, carbohydrate-restricted diet for strength training in men. The study found that the same diet, as mentioned, helped in increasing the lean body mass feasibly increasing their strength gains [30], similarly the current literature also describes the negative correlation, as shown between strength (evaluated by leg strength test) and the dietary fat specifically presenting the mono-unsaturated and poly-unsaturated fat intake, which plays the key role in enhancing the performance of an athlete in leg strength test.

Henceforth, the present study showed no significant correlation of dietary fat with that of speed test and backward throws. This might be due to the reason that the use of dietary fat before and after exercise has no such impact evident by literature on athletic performance.

CONCLUSION

The present study concluded that the increase in different type of dietary fat can result in variety of effect on physical fitness among Pakistani elite athletes. Although it has much concerning negative impact in decreasing the agility and endurance component of the physical fitness of Pakistani elite

athletes, but it has positive effect in enhancing the strength of an athlete

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