Food Intake, Percent Body Fat, and Nutritional Status at Football Academy in Pati Regency

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Abstract. The performance of youth football athletes in the field is related to food intake, body fat percentage, and nutritional status. To achieve maximum performance and achievement and support growth, an athlete needs to have a good body fat composition and nutritional status. The purpose of this study was to determine the relationship between food intake, percent body fat, and nutritional status of adolescent football athletes at football academy in Pati Regency. The research was conducted by analytical observation with a cross sectional design. Data collected through recall 3x24 hours (food intake), and anthropometry measurements (BMI, body fat percentage) using weight scale, microtoice, and BIA. A sample of 111 athletes with a total sampling method. The research population was all youth football athletes in Football Academy at Pati Regency, aged 13-20 years. Samples were taken using simple random sampling technique. The independent variables of this study were food intake and physical activity. While the dependent variable is the percent body fat and nutritional status of athletes. The analysis was carried out univariately to describe the characteristics of each variable, and bivariate to determine the correlation between variables using the Spearman correlation test. Based on the results of the analysis, data showed that there was a significant relationship between fat and protein intake with BMI ($p<0.05$), there was no significant relationship between energy and carbohydrate intake with BMI ($p\geq0.05$), and there was no significant relationship between calorie, carbohydrate, protein, and fat intake with percent body fat ($p\geq0.05$).

Keywords: Food intake, physical activity, body fat, nutritional status, football.

1 Introduction

Football is a sport that is played by 265 million people worldwide and is the most popular game in the world today [1]. Over the last few years, this sport has evolved into a game of faster intensity and more aggressiveness than ever before [2]. A soccer athlete needs to be skilled in agility and agility to be able to perform technical movements such as turning, jumping kicking, and tackling as an effort to attack and defend. Explosive power and good fitness are also needed by athletes because they have to sprint every 90 seconds for a minimum of 90 minutes of competition [3].

The performance of a football player is closely related to a number of factors, such as the level of fitness, psychology, technique, and tactics [2]. A decrease in athlete performance can occur if the athlete receives high physical exercise, resulting in dehydration and hypoglycemia. However, this condition can be prevented if athletes get the right nutritional intake. In its development, nutrition is increasingly recognized as a component in optimizing sports performance through the contribution of knowledge and practice [4].

Fulfillment of nutritional intake is important for every athlete to pay attention to, especially in terms of the balance between energy intake and expenditure. With adequate nutritional intake, an athlete can train optimally and improve his performance, so that it can support athletes to get their best performance. Trained techniques and tactics cannot be practiced properly if there is not enough energy available in an athlete's body [5].

The balance of nutrients is needed to create maximum performance in sports. If the fulfillment of nutrients through food is less than the need, it will result in a Negative Energy Balance (KEN) and will make the nutritional status less. In adolescent athletes, poor nutritional status not only has an impact on performance decline but also hampers body development and growth [6]. On the other hand, if the fulfillment of nutritional intake exceeds the need, it will result in more nutritional status and increase fat reserves. Excessive nutritional status will lead to a lack of performance in the field and limited ability to perform at their best [7].

The balance of the daily energy intake of an athlete needs to be considered to be able to provide energy used during exercise, while maintaining and achieving ideal body weight and body composition [8]. Monitoring of body weight and body composition needs to be carried out on an athlete because it will affect the exercise design, the nutrition program provided, and monitor the development of an athlete [9]. A person's body fat percentage can reflect his body composition. If a person's body fat percentage is higher than the normal number, it means that his body fat mass is also excess.

Body fat percentage can be influenced by several things, namely nutritional intake, physical activity, and lifestyle. This is in line with research by Anwar et al., (2016) [10], that there is a significant relationship between intake of carbohydrate, fat, and fiber intake with percent body fat. Other studies have also shown that fat consumption is associated with BMI and body composition [11]. The percentage of body fat affects the performance of athletes. Excess fat can lead to obesity, arteriosclerosis, increased blood pressure, stroke, and heart attack. While the lack of body fat can result in reduced muscle tissue which will affect the performance of athletes.

A football athlete, especially a teenager who is still in his growing age, requires adequate food and nutrition to support his body's growth and development. However, athletes in this age range often do not realize the importance of balanced nutrition for themselves. With a good diet, he will have a normal nutritional status and a proportional body composition. A preliminary survey conducted at the football academy in Pati Regency showed that the athlete's food intake was still less than the requirement. This is in line with previous research which stated that the intake of adolescent soccer athletes had not met the recommended needs [12].

Based on the description above, the researcher is interested in analyzing the relationship between food intake, body fat percentage, and nutritional status in adolescent soccer athletes at the Pati Regency football academy.

2 Methods

The data in this study are primary data obtained from the Safin Pati Football Academy, October, 2021. This study used an observational technique with a cross-sectional research design. The sample in this study were all members of the population (total sampling) which amounted to 111 people. Data analysis was carried out univariately to describe each variable, and bivariate analysis to test the correlation using the Pearson correlation test.

3 Results

Tabel 1. Screening data

Variable	N = 30	%
Gender		
Male	30	100
Female	0	0
Team based on age		
U13	10	33,3
U14	4	13,3
U16	6	20
U18	6	20
U20	4	13,3

Based on Table 1, can be known that there are 30 male subject that parcitipated in this research, wich all of the gender was male. The age range of the subject was between 12-20 years old. The anthropometrical measurements are done to all pf the subject wich measure their height by microtoice and then body weight, body fat percentages, and BMI by using BIA. The subject's BMI and body fat percentages data was obtained after the measuremeants are done. Based from the BMI data known that there are 7 subjects (23,3%) categorized underweight, 22 subjects (73,3%) categorized normal, and 1 subject (3,3%) categorized overweight. Body fat percentage data of the subject was categorized based on the standard fat percentage by age from New body fat reference curves for children by Jebb S(2004) . Based on subject's body fat percentage data known that 11 subject (36,7%) categorized underfat, 19 subjects (63,3%) categorized normal, and 0 subjects categorized overfat.

Table 2. Intake, BMI, and Body Fat Percetage Category Profile

Category	Component	n (%)
BMI	Underweight (<18,5)	7 (23,3)
	Normal (18,5 – 22,9)	22 (73,3)
	Overweight (>23)	1 (3,3)
Body Fat %	Underfat	11 (36,7)
(Based on age)	Normal	19 (63,3)
	Overfat	0
Calories Intake	Overintake (>120%)	0
	Normal (90% - 119%)	0
	Mild Deficiency (80% - 89%)	2 (6,7)
	Medium Deficiency (70% - 79%)	1 (3,3)
	Severe Deficiency (<70%)	27 (90)

Carbohydrate Intake	Overintake (>120%)	0
	Normal (90% - 119%)	0
	Mild Deficiency (80% - 89%)	0
	Medium Deficiency (70% - 79%)	1 (3,3)
	Severe Deficiency (<70%)	29 (96,7)
Protein Intake	Overintake (>120%)	1 (3,3)
	Normal (90% - 119%)	1 (3,3)
	Mild Deficiency (80% - 89%)	2 (6,7)
	Medium Deficiency (70% - 79%)	3 (10,0)
	Severe Deficiency (<70%)	23 (76,7)
Fat Intake	Overintake (>120%)	4 (13,3)
	Normal (90% - 119%)	8 (26,7)
	Mild Deficiency (80% - 89%)	4 (13,3)
	Medium Deficiency (70% - 79%)	6 (20,0)
	Severe Deficiency (<70%)	8 (26,7)

From the Food Recall 3x24 hours data can be obtained the subject's calorie, carbohydrate, protein, and fat intake. The average intake then being compared to the subects individuals needs, and after that can be categorized by its percentage fulfilment. The cut off point category is based on Depkes RI 1996. Based on the calorie intake data 2 subjects (6,7%) have mild calorie deficiency, 1 subject (3,3%) have medium calorie deficiency, and 27 subjects (90%) have severe calorie deficiency. Based on the carbohydrate intake 1 subject (3,3%) have medium carbohydrate deficiency, and 29 subjects (96,7%) have severe carbohydrate deficiency. Based on the protein intake data 1 subject (3,3%) have protein overintake, 1 subject (3,3%) have normal protein intake, 2 subjects (6,7%) have mild protein deficiency, 3 subjects (10%) have medium protein deficency, and 23 subjects (76,7%) have severe protein deficiency. Based on fat intkae 4 subject (13,3%) have fat over intake, 8 subjects (26,7) have normal fat intake, 4 subject (13,3%) have mild fat deficency, 6 subject (20%) have medium fat deficiency, and 8 subejcts (26,7%) have severe fat deficiency.

Table 3. Score of Mean, SD, Minimum, and Maximum

Variable	Minimum	Maximum	Mean±SD
BMI	15,6	24,0	19,6±1,93
Body fat %	6,6	19,1	13,1±3,12
Intake profile			
Calorie Intake	1444,1	3108,0	1992,2±446,44
Carbohydraye intake	154,1	450,5	268,0±69,57
Protein intake	121,2	157,3	135,6±9,58

Fat intake	71,8	93,2	80,4±5,67

Based from the anthropometric measuremeant known that the subject's BMI range are between 15,6 and 24,0 with the average BMU 19,6±1,93 and body fat percetage data range are between 6,6% and 19,1% with the average body fat13,1%±3,12. Based from the Food Recall data, subject's calorie, carbohydrate, protein, and fat intake was obtained. The subject's calorie intake range was between 1444,1 kkal and 3108,0 kkal with the average intake 1992,2 kkal±446,44, carbohydrate intake range between 154,1 gr and 450 gr with the average intake 268,0 gr±69,57, protein intake range between 121,2 gr and 157,3 gr with the average intake 135,6 gr±9,58, and fat intake range between 71,8 gr and 93,2 gr with the average intake 80,4 gr±5,67.

Table 4. Correlation between food intake and BMI

		Intake			
		Calorie	**Carbohydrate**	**Protein**	**Fat**
BMI	r	0,077	0,105	0,427	0,427
	p	0,685	0,580	**0,019**	**0,019**

The data correlation test was conducted to all of the obtained data. The correlation between nutritional intake with BMI, and nutritional intake with body fat percentage was conducted by using spearman correlation test with $p<0,05$. Correlation test between calorie intake and BMI resulting $r = 0,077$ and $p = 0,658$ ($p>0,05$), based on the result can be concluded that ther is no significant correration between the subject's calorie intake and BMI. Correlation test between carbohydrate intake and BMI resulting $r = 0,105$ and $p = 0,580$ ($p>0,05$), based on the result can be concluded that ther is no significant correlartion between the subject's carbohydrate intake and BMI. Correlation test between protein intake and BMI resulting $r = 0,427$ and $p = 0,019$ ($p<0,05$), based on the result can be concluded that there is a significant positive yet verry weak between the subject's protein intake and BMI. Correlation test between fat intake and BMI resulting $r = 0,427$ and $p = 0,019$ ($p<0,05$), based on the result can be concluded that there is a significant positive yet verry weak between the subject's fat intake and BMI.

Table 5. Correlation Between food intkae and body fat %

		Intake			
		Calorie	**Carbohydrate**	**Protein**	**Fat**
Body Fat %	r	-0,025	0,073	-0,078	-0,080
	p	0,895	0,703	0,681	0,675

Correlation test between calorie intake and body fat percentage resulting $r = -0,025$ and $p = 0,895$ ($p>0,05$), based on the result can be conluded that there is no significant correlation between the subject's calorie intake and body fat percentage. Correlation test between carbohydrate intake and body fat percentage resulting $r = 0,073$ and $p = 0,703$ ($p>0,05$), based on the result can be conluded that there is no significant correlation between the subject's carbohydrate intake and body fat percentage. Correlation test between protein intake and body fat percentage resulting $r = -0,078$ and $p = 0,681$ ($p>0,05$), based on the result can be conluded that there is no significant correlation between the subject's protein intake and body fat percentage. Correlation test between fat intake and body fat percentage resulting $r = -0,080$ and

p = 0,675 (p>0,05), based on the result can be conluded that there is no significant correlation between the subject's fat intake and body fat percentage.

4 Discussion

A football athlete especially a teenager football athlete requires at least an adequate food and nutrition intake to support his body's growth, development, and performances. For an athlete performance is really important because it can directly affected the achievment of the team. Based on a study by [13] about the correlation between nutritioal status and lifestyle of youth soccer athlete performance describe that nutritional factors found to be have the greatest impact on youth athlete performance. But in reality a lot of teenage athlete not realizing the importance of balanced nutrition because they didn't know what power can a balanced nutrition can do to their performance on the field.

This study aims is to determine the correlation between nutritional intake with BMI and nutritional intake with body fat percentage. Nutritional intake that consist calorie intake, carbohydrate intkae, protein intake, and fat intake was investigated then correlation test conducter between eac nutritional intake with BMI and body fat percentages. Based on the result of the correlation test can be concluded that there is significant correlation yet verry weak between protein intake and fat intake with BMI of the subject in Safin pati Football Academy. Besides that there is no significant correlation between nutritional intake with body fat percentage on subjects in Safin Pati Football Academy.

The results are slightly not in line with the previous studies conducted by [13] about correlation between dietary intake with anthropometry profile on youth football athlete in Indonesia that describe that calorie intake, carbohydrate intake, and fat intake have significant effect on BMI. Besides that it also described from the same study that fat and carbohydrates affect the somatotype components.

5 Conclusion

Protein and fats intake can affect BMI athlete in Safin Pati Football academy. But further research needs to be done by expanding the range of the respondents in order to be more representative.

Balanced nutrition intake is important for football athlete especially youth football athlete. Based on the nutritional intake data obtained at Safin Pati Football Academy, it is reccommended to do an intervene, monitor, and evaluate ehe nutritional intake on the atlete on a regular basis.

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