

Profile of Caloric Needs of Football Athletes by Position in Football School



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ABSTRACT: The purpose of writing this article is to find out and recommend calorie and energy profiles in shaping the stamina of football athletes in football schools. The search for this article uses a qualitative descriptive method through literature studies sourced from references that are willing to be studied conceptually and inferred from the results of the discussion. The results of this study show that the average calorie needs in the Defensive Lineman position requires as much as 6,100 - 6,400 kilo calories, in the Offensive Lineman position it requires as much as 6,200-6,500 kilo calories, in the Running Back position it requires as much as 5,700-6,000 kilo calories, in the Tight End position it requires as much as 6,000-6,300 kilo calories, the Linebacker needs as many as 5,900-6,200 kilo calories, and, in the Quarterback position, it needs as many as 5,200-5,400 kilo calories. Furthermore, the fulfillment of balanced nutrition for SSB football athletes that must be applied conditionally and proportionally is as follows Calories for football athletes are needed at 3542-4693 kilo calories per athlete per day, carbohydrate fulfillment for athletes as much as 531703 grams per athlete per day, protein fulfillment as much as 132-175 grams per athlete pr day, and fat fulfillment is needed at 118-156 grams per athlete per day.

KEYWORDS: Calories, nutrition, Football.

I. INTRODUCTION

One of the efforts to develop and improve achievements for athletes in the world of sports is to do training seriously and correctly and guided by a good training program. Nutritional adequacy is the most important factor in the development of the quality of human resources of sports athletes. The composition of nutritional adequacy transformed in the form of numbers greatly affects the productivity and creativity of the athlete's physical performance. The level or state of nutritional status is so urgent because it is directly proportional to the intensity of the exercise that the athlete will perform. And one of the most important factors for the fulfillment of nutritional intake is a healthy diet. According to Law Number 3 of 2005 concerning Sports Science, the national sports system is an integral part of the systematic and sustainable formulation of the sports agenda that includes education, regulation, management, training, coaching, supervision, and development to achieve the goals of national sports.

Based on a literature review of football scientific articles from various sources and studies, researchers draw correlations between football conditions applied in Indonesia. The information presented in this article is expected to be a reference source and empowered to develop the achievements of football athletes in Indonesia. The discussion in the article in the form of solutions and recommendations for structuring calorie profiles is aimed at football athletes in SSB in particular and Indonesia in general, Indonesian football coaches, stakeholders, and related parties so that they can be more advanced in this beloved country.

The game of football requires high energy so it must be accompanied by the need for a caloric profile for football athletes (A. P. Pratama et al., 2018; B. A. Pratama, 2016) The game of football is a game that takes place very quickly draining the energy of athletes within a relatively long period (Pujiyanto et al., 2020). The movements of the football game carried out by athletes are in the form of running, kicking, jumping, and short sprints with a large percentage of energy output. The dominant and distinctive movement of the football game is the dribble of the balls of the styles, clashing with each other the opponents, and jumping for the heading of the ball. The game of football requires an athlete's skills related to physical fitness, namely physical endurance, muscle strength, and agility of movement (Widodo, 2018). All aspects of the athlete's physical skills depend on how the transformation of muscle explosiveness on the physical ability to perform muscle contractions

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quickly. Speed in a football game requires physical fitness. Meanwhile, the agility of football athletes to make fast movements, both running and changing direction and position correctly requires a good balance of the body. Therefore, high-capacity muscle strength is needed by football athletes to kick the ball, run fast, throw the ball, avoid physical falls when there is an impact, and maintain the balance of the football athlete's body.

Football games are a category of sports that are included in physical activities with high activity and require high endurance (B. A. Pratama, 2016). So football athletes spend a lot of energy when the game of football takes place. The game of football is formed with a structure of players arranged through various positions, namely: (1) One of the functions of the goalkeeper is to save the goal (saving) so that goals do not occur on the team side by making various rescue attempts, be it catching, dismissing, kicking, and heading the ball. (2) The striker (forward) is divided into two, namely the center-forward (center forward) who is near the opponent's goal and is in charge of attacking until scoring a goal. In addition, the role of the right striker is to give the attacking midfielder and winger space to divert the defensive attention of the opposing team. (3) Wings-forward or wing forward is also often known as a second striker who is an attacker by being pulled back to make attacking movements. In scoring goals, the task is the same as that of the center-forward and helps attack from the wing sector or the side of the field. (4) Midfielder (midfielder) is a player who is positioned between defenders and forwards. His task in this game of football is the link between the defender and the forward. This is devoted to preventing the opponent's attack to form a strong team defense. In addition, the midfielder also has the task of dribbling the ball forward when the team is in attack mode. In general, midfielders use a lot of energy, because the tasks and mileage in the game are quite far. (5) The defender (defender) occupies a position behind with a role to help the keeper prevent goals from the opposing team.

Based on the abstraction of the position and role of the athlete's team from the football game above, it is determined from the training method and calorie intake that football athletes receive to achieve achievements. And based on this position as well, it becomes common knowledge that football athletes have such a high level of physical activity and need a caloric profile in supporting the input of energy spent by athletes when doing training until the games are held.

Quoting the opinion of (Syafuruddin, 2011) about the best achievement of athletes is determined by two factors (1) Internal factors, as a strength that comes from within the athlete with all the potential and intelligence that is natural, be it the talent, technique, tactics, skills, and talent of the athlete himself. (2) External factors, as a driving force for achievement for athletes who come from outside the athlete with various factors, namely motivation, coaches, interests, nutrition, training methods, facilities and infrastructure, organizations, families, and so on.

Often in a competition, athletes fail to display their best achievements. They are not supported by qualified coaches, and the influence of climate and weather is not conducive because they compete in a cold temperature country. In addition, many athletes experience failure in competitions due to the disruption of food menu factors (nutrition) that are not by the tastes of athletes, both before and during the competition (Syafuruddin, 2011).

From various literature studies conducted by researchers, Indonesia has not had a serious commitment and consistency from the central government to local governments or related policyholders from the club management in allocating funds proportionally to meet the nutritional needs of football athletes appropriately. Especially in the Tabbing Football School, the nutrition fulfillment empowerment program does not yet exist, and the level of caloric needs of football athletes by position there has never been a study that analyzes their needs so far the study only describes it in general in this study will be described in more detail and specifics.

Based on observations that have been made by researchers and also supported by experts who are experts in their fields, researchers argue that the energy intake (calories) of football athletes is still not paid attention to in football schools so that athletes experience fatigue or run out of energy while the game is still going on, the focus is disturbed so that passing is not accurate and the athlete's performance is not optimal. Therefore, this article was completed to provide recommendations for profiling the caloric needs of football athletes based on their position in the Football School and then providing joint knowledge regarding the basic principles of balanced nutrition. The purpose of writing this review literature article is to find out the profile of the caloric needs of football athletes based on position.

II. MATERIAL AND METHODS

This research uses a qualitative descriptive research model that is a literature study that uses various literature studies in strengthening research analysis. This research begins with collecting some literature, then reviewing several important terms in the research, then collecting literature of relevant research results, then conducting an analysis based on all the literature that has been obtained by compiling discussions, then compiling conclusions based on the results that have been analyzed and submitting suggestions based on the conclusions obtained.

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The data used in this study was to use secondary data. The source of the data obtained is in the form of original scientific reports derived from published scientific articles and journals that have been accredited and indexed, both in print and in print which are interrelated in the profile of the caloric needs of football athletes.

The data collection method used in this study is the documentation method. The documentation method is a method of collecting data by digging and searching for data from the literature related to what is in the formulation of the problem. The data that has been obtained from various literature is then collected as a unified document that will be used in answering the problems that have been formulated.

The technique of searching for articles in this study is through web access Mendeley, google scholar, and science direct as well as in journal search access in the form of other forms with keywords that profile the caloric needs of football athletes based on position. Articles or journals that match the criteria are then taken for further analysis and a journal summary is made including the name of the researcher, the year of publication of the journal, the study design, research objectives, samples, instruments, and a summary of the results or findings. This review literature uses literature that can be accessed in full text in pdf and scholarly (peer-reviewed Journal) formats. To further clarify the abstract and full-text journals are read and scrutinized. The summary of the journal is carried out an analysis of the content contained in the research objectives and research results/findings. The analysis method used is the analysis of the contents of the journal.

III. RESULTS AND DISCUSSION

Results

This review of literature review was conducted to determine the profile of the caloric needs of football athletes by position. Some of the literature that has been obtained is as follows:

1. (Spendlove et al., 2012) from the results of the research they have done state that "nutritional intake must be balanced with accuracy". Moving on from the study of athletes which has several limitations regarding the methodological formation and measuring instruments of calorie levels that athletes need. This is reinforced by an article from the (Gizi, 2011) that "nutrition has an important role to maintain maximum health for athletes to be able to train and compete well".

In this case, of course, the fulfillment of nutritional intake for athletes must be given based on the needs and type of exercise that the athlete is engaged in. The real implications of fulfilling energy inputs that correspond to the routine of physical exercise are simultaneously able to produce the athlete's achievements well. The rationalization is that the energy spent in the game of football must be balanced with the energy input of the food received by the athlete. However, attention to setting and adjusting the calorie intake profile for football athletes is less of serious concern in football schools so that athletes experience fatigue or run out of energy during the game, the focus is disturbed so that the passing is inaccurate and the athlete's performance is not optimal.

(Chandradewi & Irianto, 2018) explain two factors that affect the lack of nutritional intake for athletes, namely:

- 1) Inconsistency between the implementation of food fulfillment to the needs of athletes.
- 2) The presence of bad habits in the regulation of athletes' meals.

As it should be, every football athlete must have a high level of physical fitness and good processing of resources as the basic capital in carrying out physical activity efficiently for a long period without being accompanied by fatigue for athletes after the game is over. This means that every athlete can still enjoy free time after the game has gone well. In this case, it becomes rational that the fulfillment of calories (energy) for football athletes greatly supports their physical fitness to carry out their routine (physical training).

2. The results of research from Bloomfield in Echoes of (Yustika, 2018) on the frequency of ball activities carried out by players from various positions. As follows:

Figure 1. Frequency of Ball Activity from Football Players

Variable	Position				H2	p
	Assailant (n=19)	Quarterback (n=18)	Defender (n=18)	Total (n=55)		
Long pass(right foot)	1.3(2.5)	7.0(6.9)	9.7(6.9)	5.9(6.7)	15.6	<.001
Short header pass	8.8(9.2)	5.0(6.6)	7.0(6.9)	7.0(7.7)	2.2	.325
Flattened short bait	13.9(9.6)	27.3(28.8)	9.0(7.8)	16.7(19.3)	6.1	.046
Receiving (right foot)	14.8(11.2)	22.7(20.4)	12.1(11.7)	16.4(15.5)	4.3	.118
Receiving (left foot)	6.3(7.6)	11.0(10.3)	5.0(8.)	7.4(8.9)	5.6	.061

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Dribble	18.0(13.4)	22.7(24.3)	12.5(12.0)	17.6(17.7)	3.6	.152
Total	102.3(51.1)	111.1(139.7)	47.6(90.3)	110.6(76.9)	2.9	.234

Source: (Yustika, 2018)

Following up on the results of Blomfield's research above, researchers cited the opinions of (Ramadhani & Murbawani, 2012) who stated the importance of the method of coaching football athletes using the athlete's quarantine system (dormitory), the goal is to produce achievements that can provide a well-systemic exercise program and accompanied by a well-monitored calorie intake regulation for football athletes. The important thing researchers emphasize from the reference above is that the Tabbung Football School should understand the pattern above. Then, (Alfitasari et al., 2019) gave an understanding that for football athletes, the right calorie consumption regulation must be applied to the needs of the athlete concerned (proportional), both coaching athletes using dormitories and not dormitories. Furthermore, the balanced nutritional profile for football athletes that Alfitasari intended was as follows:

1. Calories for football athletes are needed at 3542-4693 kilo calories per athlete per day, Fulfillment of carbohydrates for athletes as much as 531703 grams per athlete per day,
2. Fulfillment of protein as much as 132-175 grams per athlete per day, and
3. Fulfillment of fat is required at 118-156 grams per athlete per day.

Determination of energy requirements for football players is based The determination of energy requirements for football players is based on various factors, including the physical characteristics and position of players in a football team.

3. The results of a study by (Berning, 2015) which exposes the estimated kilocalorie intake for football players based on their position and body composition, are as follows:

Position	RMR* (RMR = 500 + 22) LBM kg)	PA Factor**	Thermic Effect of Foot (TEF)	Estimated Range Kilocalories
Defensive Lineman (DL)	2,777	2.0 – 2.1	1.1	6,100 – 6,400
Offensive Lineman (OL)	2,839	2.0 – 2.1	1.1	6,200 – 6,500
Running Back (RB)	2,478	2.1 – 2.2	1.1	5,700 – 6,000
Tight End (TE)	2,632	2.1 – 2.2	1.1	6,000 – 6,300
Linebacker (LB)	2,542	2.1 – 2.2	1.1	5,900 – 6,200
Quarterback (QB)	2,352	2.0 – 2.1	1.1	5,200 – 5,400

Figure 2. Kilocalorie Intake for Football Players Based on Position and Body Composition

Source: (Berning, 2015)

DISCUSSION

Based on the results of the literature study of the review article that has been previously stated, there are several related and mutually continuous discussions, namely several factors that affect the caloric needs of football. This condition refers back to Alfitasari's research, he emphasized that football athletes who are socialized need to be considered by coaches about the number of nutrients in their consumption settings through increased portions with proportional menus. Likewise, football athletes who do not use dormitory facilities need to be educated about the importance of breakfast to match the concept of balanced nutrition and proper energy fulfillment. And for both, it is mandatory to implement periodic evaluation and monitoring of the nutritional status of athletes so that there are no problems of malnutrition or double nutrition for football athletes (under fat and overfat). Monitoring and evaluating nutritional status is a fundamental, in-depth, and comprehensive reference to the profile of the energy needs of football athletes. In addition, as one of the coaching football athletes, SSB needs to apply community-based physical fitness formation patterns and local wisdom in managing athlete consumption.

The mechanism of presenting calorie consumption for athletes is also very important in supporting athletes' activities (Nikolaou et al., 2013). conducted a study in New York City and found the results that "providing information about the caloric value on foods prepared at the point of choice can guide students to consume fewer calories and help prevent accidental weight gain". The calorie range given is adjusted for each level of athlete classification is threefold, namely:

1. Starting dish 18-462 kcal.
2. Main course 206-952 kcal.

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3. Dessert 169-682 kcal.

The above adjustments the researchers make important considerations and rationalizations of the level of protein consumption will be considered high. Calorie and protein intake for athletes is considered from the absolute amount of protein to be consumed, the proportion of the total energy intake of protein, or the amount relative to the body weight of each athlete.

The literature review that researchers conducted from the results of research by (Palacín-Arce et al., 2013) on the caloric profile of athletes is very important to the pattern of water consumption supply. Where Palacin et al., state that water is a non-caloric nutrient that is important for life and has rous with its function of dissolving, transporting, regulating body temperature, and muscle lubricant. The description of the research carried out includes:

1. About 60-70% of humans by weight and fluid intake are responsible for 60% of this amount. The rest consists of food intake at 30% and cell metabolism at 10%.
2. A close balance is required between water intake (drinks and food) and excretion (sweat, urine, feces, respiration).

In physical activity, the heat released when the process of muscle contraction must be eliminated through sweat, generating electrolytes and water loss, which is greater in intense and prolonged exercise. Dehydration harms the health and physical performance of football athletes, reducing their capacity to exert high-intensity efforts.

Based on previous studies, losing 2%-5% of body weight due to dehydration is claimed to reduce the capacity for aerobic efforts by 20%-30%. Sweat loss during intense exercise reaches a figure that ranges from 0.5 to 2.0 L / hour, depending on the ambient temperature, body size, and metabolic rhythm. One solution is the consumption of carbohydrates that can improve the performance of athletes. Performance by ensuring a sufficient amount of fuel for energy needs and by supplying fluids in carrying out the rehydration process. Adequate carbohydrate intake is essential to maintain balance and increase athlete energy. MHST. (Penggali et al., 2017) also assert the importance of "fluid fulfillment for football athletes as a return to dehydration status as a result of fluid loss during training and football games". Rehydration becomes an important key to normalizing systole blood pressure. The more often the athlete exercises, the more energy the athlete spends so that it is prone to exposure to dehydration conditions that are directly proportional to the increase in systole blood pressure. Therefore it is necessary to apply calorie consumption and rehydration for SSB football athletes.

The calorie profile that athletes need from a variety of drinks to suit their needs of athletes, researchers recommend consuming fruit juices, tap water, bottled water, carbonated drinks, and isotonic drinks which comprise 96% of the total water intake.

Furthermore, (Bendtsen et al., 2013) describe calorie consumption for athletes derived from milk protein. Line Q. Bendtsen divides them into two main classes of proteins:

1. *Casein* (80%)

Casein is a phosphoprotein that precipitates raw milk by acidification.

2. *Whey* (20%)

The data shows that whey is more satisfactory in the short term and casein is more satisfactory in the long term.

This means that intake containing Casein and Whey is needed for SSB football athletes with level adjustments. Because both of them can stimulate the secretion of incretin hormones such as peptides-glucagon and insulinotropic polypeptides.

In the same study posited the existence of "another aspect of the reasons for high protein intake and muscle hypertrophy derived from the impact of exercise on muscle protein"(Tipton, 2011). Kevin further stated that "resistance training, particularly with strong eccentric components can cause muscle damage and impaired myofibres". It is directly proportional to the increase in muscle protein rupture after resistance exercise to degrade this damaged protein. Likewise, amino acids from proteins can be reused in increasing muscle protein synthesis and the transport of amino acids from blood to the muscle.

However, (Desiplia et al., 2018) said something different from other studies that researchers felt was also rational to apply to the SSB. Namely "not only the intake of energy is sufficient for football athletes, but the provision of supplement consumption is very influential to maintain endurance, starting from the provision of minerals and vitamins.

In this article, vitamins intended as special needs for football athletes are B-complex vitamins that play a role in the formation of energy, vitamins (A, C, and E) as a counterweight and normalization of the physical and metabolic needs of athletes, and vitamin D as a form of high strength to the bones of football athletes so as not to be easily injured. (Juliana et al., 2018) stated that "poor sleep quality can affect the level of anxiety of football athletes which affects oxidative stress changes". The explanation lies in providing calorie consumption for athletes to minimize high levels of MDA and low levels of antioxidants (through the fulfillment of vitamin C and vitamin E) so that it is consequential to poor sleep quality for athletes.

Criticized the suboptimal fulfillment of calories for football athletes at Ragunan High School Jakarta, namely "junior football athletes at Ragunan High School, South Jakarta with a level of fulfillment of vitamins and minerals showed poor

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conditions with a level of vitamin C provision of 45.5% still less than optimal for these football athletes (Halimah et al., 2014). That is, provision alone is not enough, it must be accompanied by consistency and its adjustment based on the needs of the athlete in proportion (not equalized). No less interesting are the results of the research of (Mahfida et al., 2015) on "the intake of vitamin C that can prevent muscle damage due to apoptosis and protect cells from oxidative stress".

Found the results of a previous study "the significance of the correlation of athletes' age with energy, protein, and carbohydrate intake has implications for the level of physical fitness of athletes (VO₂Max)" (Muthmainnah et al., 2019). Findings were also strengthened by (Maulana & Faruk, 2021) which stated that VO₂Max is a condition and power of the respiratory organs of athletes in the procession to breathe as much oxygen as possible when doing physical activity. VO₂Max / minute or (aerobic capacity and aerobic power) which is the amount of oxygen is an adjustment to the needs of athletes for one minute for each weight during training and football games. This is because football matches are carried out in a short period and require good physical endurance (endurance) through movements that drain a lot of energy.

IV. CONCLUSION

Based on the findings of literature research in the previous article, it can be concluded that there are problems found in fulfilling calories, nutrition, carbohydrates, and proteins for football athletes. The fulfillment of balanced nutrition for football athletes that must be applied conditionally and proportionally is as follows: 1) Calories for football athletes are needed at 3542-4693 kilo calories per athlete per day, 2) Fulfillment of carbohydrates for athletes as much as 531703 grams per athlete per day, 3) Fulfillment of protein as much as 132-175 grams per athlete pr day, and 4) Fulfillment of fat is needed at 118-156 grams per athlete per day. Meanwhile, the nutritional needs for football players based on team position are: 1) Defensive Lineman needs as much as 6,100 - 6,400 kilo calories. 2) Offensive Lineman needs as many as 6,200-6,500 kilo calories, 3) Running Back requires as much as 5,700-6,000 kilo calories, 4) Tight End requires as much as 6,000-6,300 kilo calories, 5) Linebacker needs as many as 5,900-6,200 kilo calories, and 6) Quarterback needs as many as 5,200-5,400 kilo calories.

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