

Sport Nutrition Practice and Performance of Short Distance Runners: The Case of Oromia Athletics Clubs

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Abstract

The study was aimed to assess the impact of sport nutrition practice on performance of sprinters of Oromia selected athletics club. The athlete's diet affects his or her performance directly. Competitive athletes must eat a balanced diet containing all four food groups, and eating a variety of foods within each group is essential. However, no studies conducted on the impact of nutrition on Oromia short distance runners. A cross-sectional research design was employed. Out of eight (N=8) athletics clubs Oromia athletics club, five (n=5) of them were selected as target population namely; Adama, Nekemte, Asella, Dukam and Laga-Tafo Laga Dadhi athletics clubs. The clubs were selected by using a simple random sampling technique. The total population of athletes in selected clubs was (N=175) and sampled athletes were 120 Adama (23), Nekemte, (24) Asella, Dukam (26) and Laga-Tafo-Laga Dadhi (24) athletics) were selected using a stratified sampling technique. While coaches (N=5) were selected using census sampling techniques. Data collection instrument such as questionnaire, document analysis, interviews and observation were used. Analysis was performed using SPSS 25.0 (SPSS Inc., Chicago, IL) software. Frequency percentage and Simple regression was used quantitative data. Qualitative analysis was used to supplement the quantitative analysis. The result of this study shows that inadequate sprinters nutritional practice affects sprinters performance at $p < 0.05$. The finding of this study reveals that the majority of sprinters confirmed that sprinters did not get balanced sprinters diet due to this the sprinters performance was poor. As a recommendation, Oromia athletics club should plan for sport nutrition education and allocate enough budgets. Sprinters better extra meal apart from their clubs.

Keywords: athlete; performance; practice; sport nutrition; sprinters

Introduction

According to Abebe (2015), the exact time when athletics started in Ethiopian cannot be retraced back accurately, it is widely believed that the sport was widely practiced in schools and military camps before 1897. Improving athlete performance requires the integrated combination of many intrinsic (genetic, biological, etc.), and extrinsic factors (exposure to the stimulus, environment, nutrition, technical- tactical training techniques, sport specialization, competition, socio-cultural and financial aspects, motivation, career management, scientific support, etc). From intrinsic factors nutrition is crucial by providing energy required to overcome exercise loads [2]. Large amounts of energy that our athletes used to overcome external and internal resistance is derived from carbohydrates, fats and protein which we consume. If an athlete does not consume enough of these macronutrients from their diet, they will not be able

to perform at a peak level of performance [3]. Even if the requirement of nutrition is these much important, the scholars were not dealt with the nutritional practice of Oromia athletics clubs regarding with performance of sprinters and previous studies was focused only long-distance elite athletes of Ethiopia rather than short distance sprinters [4]. Therefore, the current study is unique and our own original work which was aimed to assess the impact nutritional practice on sprinters performance; in case of Oromia athletics clubs.

Methods and Materials

Description of the study area

The study was conducted in Adama, Nekemte, Dukam, Asella and Laga-Tafo Laga Dadhi city administration. Adama city is located in Oromia National Regional State, East Shewa Zone at a

distance of 100 km from Addis Ababa, and located in Oromia regional state.

The research designs

The study was conducted by using cross-sectional study design, which combined both quantitative and qualitative research approaches to collect and analyze the data.

Sources of data

To achieve the objective of this study primary data were used. The data were collected through questionnaires, interviews and observation from coaches and athletes or trainers.

Population of the study

The study population was Oromia athletics clubs. In 2022 there were (N = 18) registered Oromia athletics clubs. These (N = 18) Oromia athletics clubs was considered as the total population of the study. The target population were representative clubs found in different area of Oromia (N = 8). From these target population representative sample (n = 5) was selected which was found to be more than 50% of the study target population.

Therefore, the target population was a short distance runner total of 175 athletes from one event. And 5 coaches were selected from 5 clubs. Since the study was expected to investigate the above- mentioned topic, assume that it is quite appropriate to get the relevant data directly from trainer or athlete, and from coaches respectively.

Target population

From the total population of Oromia athletics clubs (N = 18), the target populations of this study were (N = 8). The target population of the study includes Oromia Forest athletics club, Burayu athletics club, Oromia Road construction athletics club, Adama, Asalla, Nekemte, Laga-Tafo Laga-Dadhi, and Dukam athletics clubs, with both male and female athletes. The target population of the study was athletes 175 athletes and among them purposively 120 of five clubs' athletes were taken.

Sample size and Sampling techniques

In order to select the sample from the total population, simple random sampling technique was applied to select athletics clubs namely: Adama, Asalla, Nekemte, Laga-Tafo and Dukam athletics clubs and stratified random sampling (SRS) techniques. To determine sample size 5 the formula stated below in equation as follows:

$$n = \frac{no}{1 + \frac{no}{N}}$$

$$\text{Where, } no = \frac{(Z^2 \alpha / 2 P(1-P)) / d^2}{d^2}$$

n = total sample size

d = margin of error

N = total number of the population

P = proportion of population

α = level of significance

$$d = 0.05, P = 0.5 \text{ and } \alpha = 0.05, N = 175$$

$$no = \frac{(1.96)^2 (0.5) (1 - 0.5)}{(0.05)^2}$$

So, the sample size is determined by: $n = 384 \frac{384}{1 + \frac{384}{175}}$

From 120 total sample sizes, each club sample size was presented according to the following formula. By Using Saifuddin A.2009 formula the sample size was decided as the following:

$$\text{Stratified random sampling for each AC} = \frac{\text{Total sample size} \times \text{population of sub - group}}{\text{Entire Population}}$$

$$\text{Adama male sprinters AC} = \frac{120 \times 28}{175} = 19$$

$$\text{Asalla male sprinters AC} = \frac{120 \times 28}{175} = 19$$

$$\text{Laga Tafo Laga Dadhi male sprinters AC} = \frac{120 \times 31}{175} = 21$$

$$\text{Dukem male sprinters AC} = \frac{120 \times 31}{175} = 21$$

$$\text{Nekemte male sprinters AC} = \frac{120 \times 28}{175} = 19$$

$$\text{Adama female sprinters AC} = \frac{120 \times 28}{175} = 4$$

$$\text{Asalla female sprinters AC} = \frac{120 \times 28}{175} = 4$$

$$\text{Laga Tafo Laga Dadhi female sprinters AC} = \frac{120 \times 5}{175} = 3$$

$$\text{Dukem female sprinters AC} = \frac{120 \times 7}{175} = 5$$

$$\text{Nekemte female sprinters AC} = \frac{120 \times 7}{175} = 5$$

Table 1: Sample of athletics club

S. No	Clubs' name	Population		Sample		Remarks
		Male	Female	Male	Female	
1	Adama AC	28	6	19	4	
2	Nekemte AC	28	7	19	5	
3	Asella AC	28	6	19	4	
4	Dukam AC	31	7	21	5	
5	Laga-Tafo Laga-Dadhi AC	31	5	21	3	
Total		146	29	99	21	

Table 1 shows the number of athletes included as study subjects for selected Oromia athletics clubs.

Study variables

The data on sex, age, marital status, and educational level, year of experience, event, nutritional knowledge, attitude, and dietary practices were treating as study variables.

Dependent variables

Performance

In this study, the researcher uses athletes' best time to measure it, based on current international, national and regional best performance of runner athletes, due to the fact that it was found to be able to compare with the best part of prior works, availability of data on such measures and the researchers' preference for the chosen measure.

Independent variables

Sport nutrition practices

In this study athlete dietary practice was taken as an independent variable. Sports nutrition is a very highly regarded field of modern sports medicine, which helps athletes to keep their bodies in good condition before, after and during exercise, so as to achieve the optimal performance (Thomas. Et al 2016). Oromia surrounding athletes' dietary practice was assessed by dietary practice questionnaires developed by 6. Data was collected on the number of meals consumed daily, meal patterns, snacking habits, drink water, and food frequency consumed in the week. Questionnaire's item (n=14) was rated on the scale of 1(Never: Does not occur at all), 2(Sometimes: 1-2 days per week), 3(Often: 3-4 days per week), and 4(Always: 5-7 days per week).

Data collection instrument

Data was collected through questionnaires, interviews, observation, and document analysis, focusing on demographics, dietary practices, coaches,

and onsite observations to understand and triangulate the data.

Pilot test

The researcher modified a standard questionnaire to pilot on Oromia Forest Athletics clubs to assess data collection, consistency, and clarity. Eight athletes were selected using simple random sampling techniques to ensure accurate and clear instruments.

Table 2: Pilot test of Sport Dietary practice questionnaire

S. no	Questionnaire	Cronbach's alpha level
1	Sport Dietary practice questionnaire	0.81

Table 2 Pilot test of Sport Dietary practice questionnaire shows Cronbach's alpha level was ($\alpha=0.81$). This indicates that the questionnaire was acceptable. Then it was possible to distribute to sprinters.

Methods of data analysis

The data was analysed using Statistical Package for Social Science (SPSS) version 25. Therefore, percentage and frequency were used to summarize the selected Oromia Athletics club short distance runners' performance and to determine sport nutrition intake before, during and after training by selected Oromia Athletics club short distance runners. Linear regression was used to assess the influence of sport nutrition practice on performance of short distance runners in the case of Oromia selected athletic club significant at p value <0.05 .

Results and Discussions

Demographic variables of sprinters

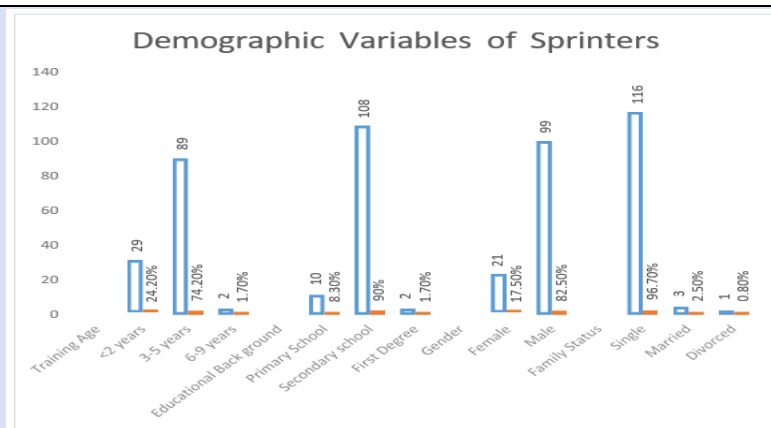


Figure 1: Athlete Demography

Figure 1 exhibited as the majority (91(75.8%) of sprinters are included in the interval age of twenty to twenty-five years and large numbers 89(%) of them have the training age of three to five years and 108(90.0%) have secondary school certificate. The large number of sprinters was male and few sprinters were female. This shows that as the female athlete participation was very few when compared to male athlete.

Sprinters nutritional Practices

Table 3, item I shows that how often athletes eat breakfast in the morning, accordingly majority or 90(75.0%) of sprinters eat breakfast often (3-4days/week). In second item it was shown as majority 85(78.83%) are skipping at least one meal per day for (3-4 days/week). Table 4 Item I show that majority or 80(66.7%) of Oromia sprinters drink beverages 3-4days/week which categorized as often. In second item of the above result, it was shown as the majority 91(75.8%) of Oromia athletes are practice balanced diet food 3-4days/week when compared to others. and always (5-7days/week. Also, Oromia sprinters were asked for what frequency they eat carbohydrate rich food like pasta, potatoes, breads, cereals, or rice, and majority (74.2%) of them among subjects are replied as they are eating these foods for 3-4days/week. In Item IV of the table shows how often an athlete consumes dapples, bananas and citrus fruits, while majority (62.5%) are consumed these foods for three to four days per week. Item V of the above result shows that how often athletes eat vegetable, such as broccoli, tomatoes, carrots or salads, often (3-4days/week) were replied by majority (33.3%) of Oromia athletes. Item VII of the above result shows that how often do athletes eat complete sources of protein such as beef, chicken, turkey, eggs, and fish, majority or 90(75.0%) of Oromia sprinters

were replied as they often (3- 4days/week) eat complete source of protein derived from mentioned animals. Summary of the practice of sport nutrition shows that does not occur at all 15 (13%), sometime 16 (13%), often 73 (62%), always 15 (13%) respectively. This indicates that athletes had taken sport nutrition often.

Current 100m sprinters Performance

Table 5 shows performance of male and female 100m sprinters, and male performance mean time is $11:58 \pm 00:54$; while female performance mean time is $12:33 \pm 00:35$ which shows under performance when compared to international record. The influence of sport nutrition practice on performance of short distance runners, Table 6 provides the R and R² values. The R value represents the simple correlation and is 0.76 (the "R" Column), which indicates a high degree of correlation. The R² value (the "R Square" column) indicates how much of the total variation in the dependent variable, performance of short distance runners, can be explained by the independent variable, sport nutrition practice. In this case, 57% can be explained, which is very large.

Table 6: Model Summary of regression model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.76 ^a	.57	.53	00:29.95

This table 6 is the regression table, which reports how well the regression equation fits the data (i.e., predicts the dependent variable) and is shown below an it indicates that independent variable Nutrition practice and athlete performance has significant effect on each other since they have <0.05 significance value:

Interview analysis

Interview with selected short distance runners revealed coaches with diverse educational backgrounds, including athletics coaching, business management, law, and diplomas. They hold 2nd and 3rd coaching licenses, demonstrating their ability to coach short distance runners. Coaches suggest that short distance runners should consume light, easily digestible foods like spaghetti, soft drinks, and breads before, during, and after training and competition. They should also focus on water as the most important nutrient. They should also consume carbohydrates rich in nutrients and protein to rebuild and repair their bodies, replacing energy lost during training and competition. Oromia athletics clubs compete in both the Oromia and Ethiopian championships, with short distance runners representing Ethiopia in international athletics. However, their best time is low compared to world-class sprinters. Performance improvement should involve training, sport nutrition, payment, education, training, and equipment. Oromia athletics clubs struggle to afford sprinters' sport nutrition due to market fluctuations. A balanced diet should be provided to athletes.

Observational analysis

The observational analysis shows that athletes' daily nutrition requirements and training energy intake remain consistent, but dietary intake varies during competitions due to location and activity level. Athletes need to replace calories burned daily, with a recommended carbohydrate intake of 6-10 g/kg body weight and [1]. 2-1.4 grams of protein per kilogram of body weight. In this study, the researcher observation shows that athlete's dietary intake before, during and after training below the recommended guideline. As a result, the researcher suggests that it is better if athletes take 1-1.2 grams of carbohydrates per kilogram of body weight per hour for the first four hours after exercise. Refueling may be enhanced by consuming small amounts of carbohydrate more frequently (every 15-30 minutes) for up to four hours.

Ethical Consideration

Ethical clearance letter was obtained from Ethical Review Committee of Jimma University Sport Academy and Oromia athletics federation. Athlete was informed for each information collected from them. The clearance was approved by Ethical committee of Jimma University and Oromia Athletics federation.

Discussion

This study shows that both male and female sprinters of selected Oromia athletics club nutritional intake were below recommended nutritional practice. In agreement with this study insufficient dietary intake can result in delayed growth, disturbed muscle development, alter the normal pattern of pubertal development and can affect the overall athlete's athletic performance [4]. The finding of this study shows that sprinters performance Oromia athletics club was very low. As compared to world class sprinters, Oromia athletics club sprinters performance was far distant from world class sprinters. In contrary to this finding, international sprinting performance at the time of the London 2012 Olympics (where Bolt won Gold in a time of 9.63s), the 100m world record stood at 9.58s. This was set at the Berlin World Championships in 2009 [7]. The relative running velocities (%) of Estonian and world best sprinters in different sections of 100m race (0- 30m, 30-60m, 60-80m and 80-100m) were calculated taking the average velocity of the whole distance as 100%. The both finals were run in similar good weather conditions with a tail wind: The both finals were run in similar good weather conditions with a tail wind: +0.6m/s in Estonian Championships and +0.9m/s in World Championships. +0.6m/s in Estonian Championships and +0.9m/s in World Championships [8].

The other similar research output depicts that the energy intake of female soccer players from UK was found to be lower than the recommended intakes 9. Similarly, the mean daily intake of energy in female synchronized skaters from 2002 US National Synchronized Skating Teams was found to be less than the recommended intake for 11-18 years of female athletes exercising for 10-20 h/week (Ziegler and Jonnalagadda, 2006). Low daily energy intakes might result in weight loss, disruption of endocrine function, loss of strength and endurance, compromised immune system, menstrual dysfunction, failure to gain bone density and may increase the risk of fatigue, injury and illness [10]. In disagreement with this finding, nutrition knowledge and attitudes have an effect on eating habits and inadequate nutritional knowledge may contribute to poor dietary behavior [11]. Very limited information is available from Arabian Gulf region, in particular from Oman regarding the nutritional knowledge, dietary habits and type of physical training of athletes [12].

Conclusions

The study found that most sprinters in Oromia Athletics Club lack experience, knowledge, and budget to effectively manage their sport nutrition. Their performance is low compared to world-class sprinters, and their intake of sport nutrition is often insufficient. To improve performance, the researcher recommends identifying and feeding different types of nutrition, allocating sport nutrition expenses to sprinters, providing extra meals, and increasing intake of fish, vegetable oils, whole-grain breads, carbohydrates, and vitamins.

Abbreviations

AC: Athletics Clubs.

Declarations

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Availability of data and materials

The data sets used and analysed in this study are available and interested person may request anytime from the corresponding author on reasonable request.

Authors' contributions

GW, LM and TD were writing the main Paper and BT, DA and TF collect data, work of analysis and develop manuscript. All authors read and approved the final version of the manuscript.

Ethics approval and consent to participate

All procedures performed in current study involving human participants were in accordance with the ethical standards of institutional and national research committee. Ethical clearance letter was obtained from Ethical Review Committee of Jimma University Sport Academy and Oromia athletics federation. Athlete was informed about risk and benefit for each information collected from them and any biological data were not collected from them. The clearance was approved by Ethical committee of Jimma University and Oromia Athletics federation.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Supplementary Files

Table 3: Sprinters nutritional Practices regularity

S. no	Items	Never		Sometimes		Often		Always	
		F	%	F	%	F	%	F	%
1.	How often do you eat breakfast in the morning?	5	4.17	15	12.5	90	75	10	8.33
2.	Based on three meals per day, how often do you skip at least one meal per day	5	4.17	15	12.5	85	78.83	15	12.5

Table 4: Sprinters nutritional practice as of their type Per week

S. no	Items	Never		Sometimes		Often		Always	
		F	%	F	%	F	%	F	%
1.	How often do beverages? You drink sweetened	10	8.33	25	20.8	80	66.67	5	4.17
2.	How often are you on a "diet"?	10	8.33	10	8.33	91	75.83	9	7.5
3.	How often do pasta, potatoes, you eat breads, cereals, or rice?	15	12.5	11	9.75	89	74.17	5	4.17
4.	How often do apples, bananas, you eat fruits, such as or oranges?	15	12.5	11	9.75	89	74.17	5	4.17
5.	How often do you eat vegetables, such as broccoli, tomatoes, carrots, or salad?	20	16.67	15	12.5	75	62.5	10	8.33
6.	How often you do eat complete sources of protein such as beef, chicken, turkey, eggs, and fish?	30	25	30	25	40	33.3	20	16.7
7.	How often do you eat berry jams, cookies, candies, or other sweets?	5	4.17	15	12.5	90	75	10	8.33
Summary of the result		15	13	16	13	73	62	15	13

Table 5: Current 100m sprinters Performance

S. no	Sprinters	Frequency	Mean	Std.
1	Male	99	11:58	00:54
2	Female	21	12:33	00:35

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