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Nutritional intake practices of Ethiopian runners

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Abstract
The aim of this study was to determine and assess nutritional intake practices of senior Ethiopian runners of division one club athletes and a cross sectional descriptive survey design were employed. A total of 825 athlete's took in division one and among these 300 samples were selected by using simple random sampling techniques, from this 165 were male and 135 were female athletes. Further standardised questionnaires, 24 hours recall methods, food frequency questionnaires (FFQ), and BMI were employed to collect the data. The collected data were analysed through SPSS version 20.1 and ESHA version 8.1 software. The results showed that their intakes were below RDA in energy, CHO, fat, fibre, phosphorus, calcium, and iron and independent t test showed their difference is significant (2-tailed) at 95% confidence intervals. FFQ results showed that the majority were very poor diversification intakes and also their BMI showed that majority (74.1%) of female athletes were in underweight categories. this shows that Ethiopian senior runners are very poor in their nutritional intake practices. Therefore, nutritional support is required by professionals in order to improve their intakes.

Keywords: sport specific nutrition, dietary intakes, nutritional practices, senior runners

1. Introduction
Ethiopian runners are excellent in middle and long distance events in the world next to Kenya. In 1960 Ethiopia won marathon, its first gold medal was won by Abebe Bikila in Rome Olympic by his bare foot. Notably, middle- and long-distance runners are from Ethiopia and Kenya and hold over 90% of both all-time world records as well as the current top-10 positions in the world event rankings (International, association, athletics federation Organization home of world athletics). Possible explanations have been proposed including genetic factors [9, 8] environmental conditions [6] and near optimal dietary practices [5].

According to the International Olympic Committee of sport medicine (IOC, 2000), the human body requires more than 50 essential nutrients on a daily basis. A variety of different foods must be consumed on a regular basis in order to obtain these essential nutrients. In general, for a healthy athlete diet should conform to the basic dietary guidelines, and balanced diet developed by national health department for the general population with some adjustment (increases) for total energy supply, carbohydrates, proteins, and fluids.

Thus, nutrition is an important component of any physical fitness program. The main dietary goal for active individuals is to obtain adequate nutrition to optimize health and fitness or sports performance [2]. This is not only important to help to improve performance but also to promote healthy dietary practices in the long term [14]. So, a reasonable strength and condition program and a well-balanced diet must be presented as a sensible alternative to a riskier, shortcut mind-set [13].

An International Olympic Committee consensus statement on sports nutrition (IOC, 2010) stated that: The amount, composition and timing of food intake can profoundly affect sports performance. Good nutritional practice will help athletes train hard, recover quickly and adapt more effectively with less risk of illness and injury. Dietary Attitudes of athlete have been found to significantly affect their performance and wellbeing, during training and competition. The right foods contribute not only to success in sport, but also to enjoyment of life."

2. Methods
The study sample includes senior runners in division one clubs, from Addis Ababa cities clubs by using simple random sampling techniques, and the sample size were (N= 300). In this cross sectional descriptive survey study, standardized closed-ended questionnaire was administered to assess the nutritional practices of Ethiopian senior runners, 24 hours recall methods, were done by two working day and one weekend day, then converted in to 100gm by using Ethiopian food composition tables, after that used ESHA 8.1 software for actual figures of athletes intakes then subtracting from RDN (recommended dietary nutrient) to get differences on each type of the nutrients. Independent sample t test also used in order to check the significant level through SPSS version 20.1.Then the researcher used food frequency questionnaires (FFQ) from the nine food group categories: which is Cereals, Legumes, Milk & milk products, Vegetables & Fruits, Meats, Eggs, Sweets, Alcohols, Hot drinks and Water within a month range intake frequency. In addition to that BMI were used in order to know their intake status, the researcher used all athletes were weighed and measured, the height and weight were used to determine the BMI, weight (kg) divided by

height (cm) squared, and then data were categorised according to WHO standards.

3. Results

The dietary intake results

The dietary intake of the athletes (N=50) was analysed and discussed. The assessment was done using 24 hour recall. The 24hour recall data used with independent t test for differences of recommended intakes (RDN) and actual intakes, which is denoted by diffenergy, diffprotein, diff CHO, difffat, difffibre, diffphosphorus, diffiron, diffcalcium, diffthiamine, diffriboflavin, and diffniacin. The mean nutrient intakes of energy, carbohydrates, fat, fibre and calcium were below the RDN for each nutrient. Then the difference is significance (2-tailed) at 95% confidence intervals. (See table 1.)

Table 1: Recommended dietary nutrient compare with 24 (independent t test)

	Sex	Mean	T	Df	Sig. (2-Tailed)
Diff energy	Male	1706.7320	11.725	48	.000*
	Female	764.4786			
Diff protein	Male	-16.4930	.908	48	.369
	Female	-19.7488			
Diff fat	Male	62.2867	5.216	48	.000*
	Female	21.1266			
Diff CHO	Male	117.5326	7.119	48	.000*
	Female	3.6217			
Diff fibre	Male	90.3485	6.037	48	.000*
	Female	56.5050			
Diff calcium	Male	601.1061	-2.415	48	.020*
	Female	719.0391			
Diff phosphorus	Male	-954.0468	-3.435	48	.001*
	Female	-600.7300			
Diff iron	Male	-58.3595	-2.940	48	.005*
	Female	-41.3680			
Diff thiamine	Male	-.3131	.425	48	.673
	Female	-.3458			
Diff reboflavin	Male	-7.5913	-1.463	48	.150
	Female	1.8795			
Diff niacin	Male	-1.4788	.633	48	.480
	Female	-.5848			

(***Source*:** survey data, 2017)
Note: diff means (difference)

Observed intake difference in energy is compared with recommended intakes RDN and the results shows in thiamine, riboflavin, niacin and protein did not show any significance difference among male and female participants as compared to the standard RDN.

Food frequency questionnaire for nine food groups: This study assessed athlete's(N=300) their intakes through nine food group's frequency questionnaire, those food groups are: cereals, legumes, milk and milk products, fruits and vegetables, flesh or organ meats, eggs, sweets, hot drinks and alcohols, using descriptive statistics. The results showed that, Ethiopian athlete's dietary intakes were poor diversifications they focused only on some groups of foods.

Table 2: Food frequency Questionnaire (FFQ)

Food group	Examples	Never or less than per month	1-3 per month	Once per week	2-4 per week	Once per day	2 times per day
Cereals	Teff	-	2(.8)	3(1.2)	14(5.4)	132(51.4)	73(28.4
	maize	140(54.5)	96(37.4)	5(1.9)	4(1.6)	3(1.2)	2(.8)
	Rice		2(.8)	3(1.2)	162(63.0)	3(1.2)	3(1.2)
	Wheat	3(1.2)	3(1.2)	-	2(.8)	4(1.6)	144(56.0)
Legumes,	beans	232(90.3)	4(1.6)	4(1.6)	4(1.6)	3(1.2)	3(1.2)
	Peas	2(.8)	3(1.2)	4(1.6)	230(89.5)	4(1.6)	4(1.6)
	Lentils	2(.8)	3(1.2)	101(39.3)	137(53.3)	3(1.2)	3(1.2)
Milk & milk products	Milk	2(.8)	3(1.2)	112(43.6)	129(50.2)	3(1.2)	3(1.2)
	Yogurt	120(46.7)	2(.8)	71(27.6)	51(19.8)	2(.8)	3(1.2)
Vegetables	Tomato	2(.8)	3(1.2)	3(1.2)	3(1.2)	130(50.6)	111(43.2)
	potato	2(.8)	2(.8)	119(46.3)	126(49.0)	2(.8)	2(.8)
	Onion	-	2(.8)	2(.8)	2(.8)	72(28.0)	-
Fruits	Orange	223(86.8)	11(4.3)	8(3.1)	4(1.6)	3(1.2)	2(.8)
	banana	-	3(1.2)	3(1.2)	3(1.2)	3(1.2)	234(91.1)

	Apple	239(93.0)	4(1.6)	3(1.2)	3(1.2)	2(.8)	1(.4)
Flesh meat or organ meat	Beef	73(28.4)	129(50.2)	45(17.5)	2(.8)	1(.4)	1(.4)
	Fish	238(92.6)	3(1.2)	2(.8)	3(1.2)	2(.8)	3(1.2
	Sheep	3(1.2)	4(1.6)	116(45.1)	119(46.3)	3(1.2)	3(1.2)
Eggs	Eggs	4(1.6)	4(1.6)	4(1.6)	228(88.7)	3(1.2)	4(1.6)
Sweets	Sugar	5(1.9)	3(1.2)	3(1.2)	4(1.6)	26(10.1)	162(63.0)
	Honey	229(89.1)	4(1.6)	4(1.6)	4(1.6)	3(1.2)	4(1.6)
Alcohol	Bear	220(85.6)	5(1.9)	4(1.6)	4(1.6)	7(2.7)	5(1.9)
Hot drinks	Coffee	21(8.2)	3(1.2)	76(29.6)	4(1.6)	139(54.1)	3(1.2)
	Tea	3(1.2)	3(1.2)	3(1.2)	3(1.2)	195(75.9)	40(15.6)
	water	-	-	-	-	-	37(14.4)

(***Source*:** survey data, 2017)

Anthropometric Assessment

This section contains results of the athlete's nutritional status measured as BMI in terms of sever thinness (less than 16), moderate thinness (from 16-16.99) mild thinness (from17-18.49), underweight(less than 18.5 normal range (from 18.5-24.99), over weight (greater or equal to 25.0). therefore majority of (74.1%) female runners were under-weight this indicates that their dietary intake practice were poor.

Table 3: Nutritional Status of the Athletes as BMI

Nutritional status as BMI(kg/cm^2)		women	%	Men	%	Total
Severe Thinness	<16	21	25.0%	8	4.7%	29
Moderate Thinness	16-16.99	17	20.2%	22	12.9%	39
Mild Thinness	17-18.49	25	29.4%	74	43.0%	99
Under Weight	<18.5	62	74.1	103	59.77	165
Normal Range	18.5-24.99	22	26.2%	68	39.8%	90
Over Weight	>25.0	Nil	Nil	Nil	Nil	Nil
Total		85	100.0%	172	100.0%	257

(***Source***: survey data, 2017)

4. Discussion

The findings of this study indicated that Ethiopian runners had poor dietary intake practices. Similar studies showed in Oman, male handball athletes by (Mostafa *et al*., 2013), that eating habits indicated that 55% had <3 meals/day, 51% had lunch as the principal meal. Additional studies in east London by [12], on club level cyclists in both sexes, showed there is a poor nutritional strategies for their intakes. Other findings of Hail University by (Rafia *et al*., 2013) [15] on a comparative study on nutrition and non-nutrition students showed that, skipping of breakfast was more common among the non-nutrition girls 25% as against only 7% of their nutrition counterparts. Their nutritional status especially for the female athlete was worrying as only 26.1% of the total number had normal nutritional status (18.5). The other 74.1% had poor nutritional status under weight (<18.5). From the information received from the key informants the female athlete may run very well during training and have a good record time but prior to major competitions the speed, stamina and endurance slows down. This study also similar to the Kenyan athletes [11]. They skipped meals more often than the male athletes. The female endurance athletes reported experiencing amenorrhea due to heavy training. Although it might be widely prevalent among some athletic groups, it is clearly not a healthy or desirable state. Sports medicine experts have described the syndrome as the "female athlete triad". This describes the common presentation of disordered eating, menstrual dysfunction, and reduced bone health among distance and track female athletes in Washington DC [10] which could also be the case with the female Ethiopian athletes. Nevertheless, the female athlete triad has drawn the attention of doctors, nutritionists, coaches, and athletes towards the importance of early intervention and management of any symptom in other countries like the USA, South Africa, Australia, Canada and Scandinavian athletes.

5. Conclusion

Ethiopian senior runner's dietary intake practices were poor; particularly they missed the most important nutrients for good health benefits, endurance and stamina. A deficiency in energy requirement manifests itself in the poor nutritional status of the athletes. This is caused by the rampant loss of appetite reported for the female athletes and the frequent skipping of meals. The researcher found that the females were many more times likely to be under weight than the males due to the fact that their dietary practices were poorer. Therefore the concerned bodies, coaches should give support for their athletes particularly for female athletes it helps to improve their health and to boost their performances too.

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