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Assessment of Nutritional Status of Female Athletes.

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ABSTRACT

A well balanced diet is important for good health. The assessment of nutritional status plays vital role. It is well established that nutritional status is a major determinant of the health and well being of female athletes. The psychological and physiological changes have impact on food intake and food choices. Present investigations were to evaluate the nutritional status of female athletes with the help of dietary intake pattern, anthropometric measurements, clinical assessment of nutritional deficiencies, to determine the adequacy of food and nutrient intake of female athletes. An investigation on the "Nutritional status of female athletes" was carried out in Karad city of Karad Tehsil in Maharashtra state. The investigation was performed on 50 female athletes in the age group of 18 to 20years. The anthropometric measurements shows that the mean body weight and body mass index and skeletal muscle is lower than normal, the mean % of body fat, the mean of waist and hip circumference and W: H is above the normal range. This revels that the female athletes are underweight. The nutritional status of female athletes was found to be poor. The consumption of fruits and green leafy vegetables was very less. The use of oil for cooking was high. It was found that the time of intervals for taking food were irregular.

Keywords: nutritional, BDA, athletes.

ABBREVIATION

BDA	-	Balanced Dietary allowance
BMI	-	Body Mass Index
BPL	-	Below Poverty Line
CED	-	Chronic Energy Deficiency
ICMR	-	Indian Council of Medical Research
MUAC	-	Mid Upper Arm Circumference
NFHS	-	National Family and Health Survey
NIN	-	National Institute of Nutrition
NNMB	-	National Nutritional Monitoring Bureau
RDA	-	Recommended Dietary Allowance
SD	-	Standard Deviation
WHO	-	World Health Organization
WHR	-	Waist Hip Ratio

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INTRODUCTION

Athletics is an exclusive collection of sporting events that involve competitive running jumping, throwing, and walking. The most common types of athletics competitions are track and field, road running, cross country running, and race walking. Few formal studies have properly assessed nutritional status of athletes despite the fact that optimal nutrition enhances physical activity, athletic performance and recovery form exercise [1-4]. Therefore, it is not clear if endurance athletes are maintaining adequate diets.

Nutrition plays a very important role in attaining high level of achievements in sports (Kraider et al.2009). Nutritional status has a direct bearing on the level of physical performance, that's why sports nutrition is considered as an integral part of sports medicine (Kerksick et al.2008)nutritional upplements are widely used by athletes for the enhancement of performance in international competitions(Hoffman et al 2009). [2]

The most widely studied method for the assessment of nutritional status in athlete players is BMI (Nekesa 2011) Previous research of the nutritional practices of female soccer players is limited but have reported daily energy intakes ranging from 1778±715 to 2290±310 kcal. Day1 (Clerk et al., 2003; Scott et al.2003.) [5]

Anthropometric dimensions and morphological characteristics play an important role in determining the success of an athlete (Koley et al 2011). Anthropometric measurements are used to provide a basis for assessment of nutritional status (Kaur & Koley 2010) [6]

METHODOLOGY

Methodology is categorized into following subheadings,

1. Research Setting
2. Research Design
3. Subjects
4. Method of Data Collection

Research Setting:

The karad city is the southernmost city of Maharashtra. The geographical area of the Karad is 7685 sq. km. The population density of the district is 457 persons per square kilometers. The urban density is 1804 and the rural density is 327. The population of Karad city was 741,355 as per the 2011 census. The population of Karad tehsil was 16,30,272 as per the 2001 census. The study was undertaken in Karad city . The area of the study was selected by using the purposive random design method.

Research Design:

This was descriptive study. A questionnaire was structured and modified after testing in pilot study. Techniques of investigation and tools were used as per given procedures. The statistical procedures were decided to analyse the obtained data for testing their significance.

Subjects:

Sampling Procedure:

Purposive sampling techniques were used to select the respondents for the study.

Selection of Sample

The investigation was performed on 50 female athletes, of which all are willing to participate in the study, were taken from Karad city.

Method of Data Collection:

Field data was collected with the help of direct observation and questionnaire method. The self structured questionnaire was devised to evaluate the nutritional status of female athletes. The questionnaire was prepared in English medium and then translated to local language to fit into the understanding level of respondents. Then the questionnaires were filled up by asking questions to respondents and by observing them.

Questionnaire:

The structured questionnaire is divided into two parameters i.e. general information and specific information.

General Information:

The study was conducted by collecting data through questionnaire method. The general information was collected on following aspects.

a) Age:
b) Types of Family:
c) Family size:
d) Educational Status:
e) Economic Status:
   Classification of socio economic status according to ration card
f) Occupation:

Specific Information:

The specific information related to the evaluation of nutritional status of female servants was collected by using different tools and techniques.

a) Dietary Intake Pattern:
b) Food Frequency Pattern:

Tools and Techniques:

a) 24 hours dietary recall:

The 24 hours dietary recall is commonly used method in large nutritional surveys to collect dietary intake data of individuals.

In the method, the individuals were asked to recall in as much detail as possible. The food intake for the 24 hours was recorded in the structured questionnaire. The type of food consumed, amount of food type of food preparation method used, time of food consumption and other details related to food intake were asked and recorded. However, while conducting the survey, both the respondent and the housewife (or the person who cooks the food for the whole family) was contacted. The dietary intakes were assessed in terms of cooked food with the help of standardized cup measures appropriate for the local conditions. These standardized cups, spoons etc. were used to help the respondent to easily recall the quantities of food consumed. Thus for the purpose of calculation, individual cooked intakes were converted into raw amounts of each food item by standardized recipe method. The 24 hours dietary recall was taken for subsequent three days and means of each ingredient was taken as 24 hours dietary recall.

From the raw ingredients amounts, the nutritive value of each food item was calculated by using the nutritive values given by Gopalan et al. (2007). It was compared with recommended Dietary Allowances (R. D.

A.) of nutrients for those of specific age groups. Along with nutritive value amount of each food group was calculated and recorded and compared with Balanced Dietary Allowance (B.D.A.).

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b) Anthropometric Measurements:

Anthropometry is an important tool in the study and understanding of human biological variability, including, of course morphological variations as a universally applicable non-invasive and inexpensive methods (WHO, 1995). Anthropometric data have varied uses in public health including the assessment of nutritional status. Anthropometric measurements such as

1. weight (kg):
2. height (cm):
3. body mass index (b.m.i.):
4. source: who (1995)
5. waist circumference:
6. hip circumference:
7. waist/hip ratio:
8. body age:
9. body fat percentage:
10. visceral fat:
11. subcutaneous fat:

were recorded which were indicators of nutritional status by using standard formulas given by **Jelliffe (1966).**

RESULT AND DISCUSSION

The present research was designed to evaluate the nutritional status of female athletes in the Karad city of Maharashtra state. The information regarding socioeconomic status, nutritional and health status, food intake pattern among selected female house maids were assessed. The collected data of the present study is classified into following subcategories.

1. Socioeconomic status of the selected female athletes.
2. Anthropometric measurements of the selected female athletes.
3. Clinical examination of the selected female athletes.
4. Dietary intake pattern of the selected female athletes.

Socioeconomic status of the selected female athletes:

Age:

Table: Distribution of study population according to age

Sr. No	Age (in years)	Frequency	Per cent (%)
1	18	9	18
2	19	11	22
3	20	30	60
	Total	50	100

It revealed that, out of total 50 study population, 18% are 18 years old remaining 22% arel9 years old and 60% are 20 years old.

Type of Family:

Type of family i.e. nuclear, joint or extended also affects on the health and nutritional status of the family.

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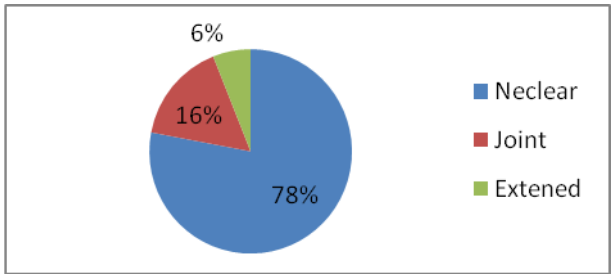
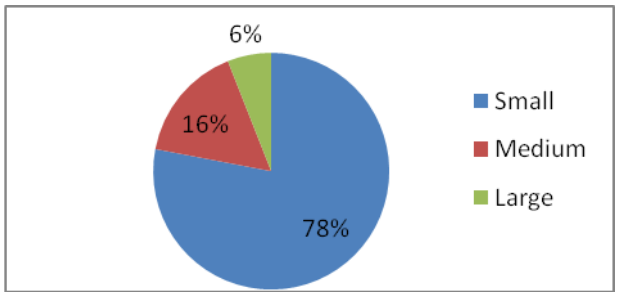


Size of Family:

Distribution of family according to the size of family



Education Level:

The information regarding status of female athletes subjects is described as below

Table: Distribution of family according to their education level

Sr. No.	Education level	Frequency	Percentage (%)
1	Post graduate	-	-
2	Graduate	1	2
3	Higher secondary	4	8
4	High school	27	54
5	Primary	6	12
6	Illiterate	12	24
	Total	50	100

Economic Status:

The data about economic status of study population is presented below:

Table: Distribution of study population according to their economic status

Sr. No	Annual Income (Rs.)	Frequency	Per cent %
1	Below Poverty Line (< Rs 15,000)	-	-
2	Above Poverty Line (Rs 15,000 to 1 Lack)	31	62
3	High Income Group (> Rs 1 Lack)	19	38
	Total	50	100

Anthropometric measurements of the selected female athletes

Sr. No	Anthropometry	Mean
1	Weight (kg)	44.99
2	Height (cm)	157.92

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3	Body Mass Index(kg/m^2)	21.96
4	MUAC	25.07
5	Waist circumference	70.65
6	Hip circumference	43.32
7	W:H ratio	0.90
8	Body fat	28.45
9	Skeletal muscles	26.85

Clinical examination of the selected female athletes

Menstrual History:

Table: Distribution of study population according to their menstrual history

Sr. No.	Type	Frequency	Percentage
1	Regular	42	84
2	Irregular	8	16
3	Painful	22	44
4	Painless	28	56

Health Problem:

Table: Distribution of study population according to their health problem

Health problems	Frequency	Percentage (%)
Lethargy	14	28
Tiredness	15	30
Anxiety	15	30
Muscle cramps	19	38
Joint pain	14	28
Frequent headaches	9	18
Breathlessness	3	6
Giddiness	2	4
Weakness	12	24
Bowl and bladder disturbances	0	0
Brittle nails	0	0
Frequent infection	7	14
Sleep disturbances	6	12
Diminished work performance	6	12
Irritability	18	36
Exertional fatigue	10	20
Paleness of skin and conjunctiva	5	10
Palpitation	2	4
Spoon shaped nails	0	0

Dietary intake pattern of the selected female athletes

Dietary Pattern:

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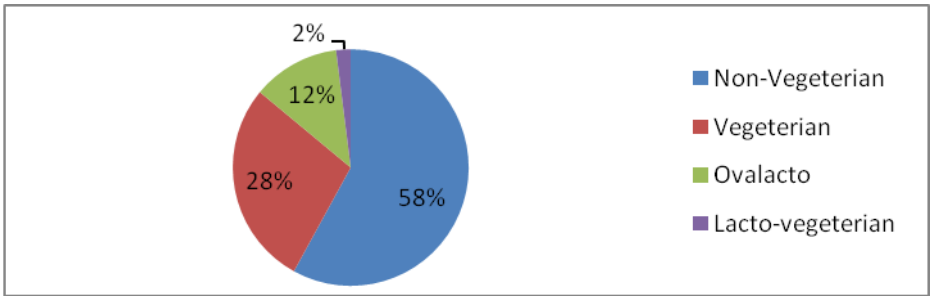
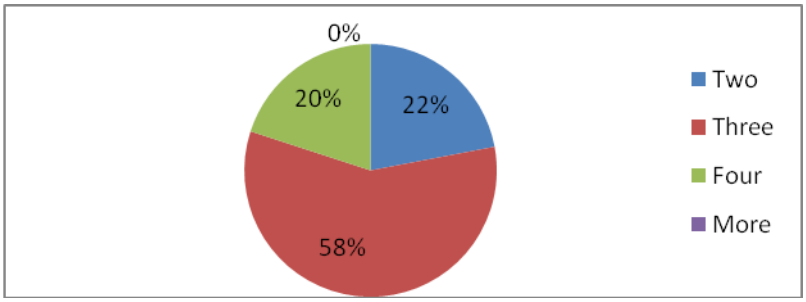


Frequency of meals:



Type of Non-vegetarian Food:

Sr. No.	Type of meat	Frequency	Percentage
1	Red Meat		
	a)Mutton	22	44
	b)Beef	-	-
2	Lean Meat		
	a)Chicken	27	54
	b)Fish	18	36

Food Frequency:

Table: Food Frequency

Sr. no	Food groups	Daily	Alternate	Twice a week	Once a week	Once in 15 days	Once in month
1.	Cereal & grain product	50(100%)					
2.	Wheat	48(96%)		2(4%)			
3.	Jowar	14(28%)	6(12%)	8(16%)	5(10%)	2(4%)	2(4%)
4.	Rice	48(96%)	1(2%)	1(2%)			
5.	Ragi	–	–				1(2%)
6.	Pulses	47(96%)	3(6%)				
7.	Leafy vegetables	17(34%)	13(26%)	16(32%)	2(4%)	2(4%)	
8.	Other vegetable	40(80%)	10(20%)				

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9.	Roots & tubers	14(28%)	8(16%)	12(24%)	8(16%)	4(8%)	4(8%)
10.	Fruits	11(22%)	9(18%)	12(24%)	11(22%)	5(10%)	2(4%)
11.	Milk & milk products	48(96%)	1(2%)		1(2%)		
12.	Meat		1(2%)	7(14%)	12(24%)	6(12%)	3(6%)
13.	Eggs	7(14%)	2(4%)	5(10%)	7(14%)	8(16%)	5(10%)
14.	Fish			1(2%)	2(4%)	8(16%)	7(14%)
15.	Nuts & oil seeds.		5(10%)	3(6%)	2(4%)		
16.	Sugar & jaggery	50(100%)					
17.	Ghee	4(8%)	1(2%)	1(2%)	3(6%)	4(8%)	11(22%)
18.	Cooking oil	50(100%)					

Food Intake Pattern:

Table: Food Intake Pattern

Sr. No	Food Groups	Mean intake	BDA	%of BDA
1.	Cereals	172.5	220	78.40
2.	Pulses	48	50	96
3.	Leafy Vegetable	42.8	100	42.8
4.	Other Vegetable	88.7	75	118,2
5.	Roots & Tubers	49	50	98
6.	Fruits	26.5	100	26.5
7.	Milk & Milk products	247.3	400	61.8
8.	Sugar and Jaggery	16.6	30	55.3
9.	Fats and oils	30.3	35	86.5
10.	Meat / Fish/Poultry	15.4	100	15.4
11.	Eggs	11	60	18.3

Nutrient Intake Pattern:

The body requires a continuous supply of nutrients for the proper functioning of body and to maintain health. The data of nutrient intake pattern of subjects was recorded, calculated and compared with R.D.A. given for the moderate active women (Gopalan et.al.2007). The data regarding nutrient intake pattern of selected subjects is presented in the table 4.4.8

Nutrients obtained to the body depend upon the food supplied during a day. Nutrients supplied to the subjects were calculated and presented in above table.

The data of nutrient intake pattern of subjects was recorded, calculated and compared with RDA given for moderate working women. (Gopalan et al. 2011)

The mean energy (kcal) intake of subjects was 1937.6 kcal which was 103.3% of RDA. The mean protein (gm) intake was 48gm which was 96% of RDA. The mean fat (gm) intake was 48.7gm which was 115.9% of RDA. The mean vitamin B1 (mg) intake was 1.04 which was 115.5% of RDA. The mean vitamin B2 (mg) intake was 1.3mg which was 118.8% of RDA. The mean vitamin B3 (mg) intake was 10.2mg which was 85% of RDA. The mean vitamin C (mg) intake was 12.08 which was 30.2% of RDA. The mean p carotene (pg) intake was 312.2pg which was 13% of RDA. The mean iron (mg) intake was 30mg which was 12.06% of RDA. The mean calcium (mg) was 414.4mg which was 103.6% of RDA.The mean dietary fiberwas 24.2 (gm), which was 96.8%.

DISCUSSION

The nutritional status of Athletes was assessed with the help of dietary intake pattern, anthropometric measurements and clinical signs and symptoms. The observations and findings of this research are discussed under following subheads.

Socioeconomic status:

Table shows that majority of subjects included in the study were from 18 to 21 years of age. Figure shows that majority of the families included in present study were belonging to nuclear family.

Table shows that the majority of the subjects included studied upto high school.

Anthropometric measurements:

Table shows the mean body weight and body mass index and skeletal muscle is lower than normal, the mean % of body fat, the mean of waist and hip circumference and W:H is above the normal range. This revels that the female athletes are underweight.

Clinical Examination:

Table gives an idea about the clinical examination of Athletes The menstrual history shows that majority of house maids had regular menses.

Figure shows that majority of the subjects had greater prevalence weakness, hyperacidity, lethargy and stress.

Dietary intake pattern:

Figure shows that the majority of study population was non-vegetarian. Figure shows that the most of the study population had two meals pattern. Table shows that majority of the subjects preferred mutton.

Food frequency:

Table shows consumption of cereal and cereal products i.e. wheat, jowar, rice, semolina etc, pulses and legumes, leafy vegetables, other vegetables, roots and tubers, fruits, nuts and oil seeds, milk and milk products, sugar and cooking oil etc. It was observed that majority of house maids preferred wheat in their daily diet as compared to jowar. Rice consumption was also present in daily diet. Ragi consumption was very rare. Most of the subjects preferred eating leafy vegetables twice in a week. Consumption of other vegetables was daily or alternate. In case of roots and tubers majority of subjects preferred them daily The fruit consumption was once in 15 days or once in a month. Milk and milk product consumption was daily. The meat and fish consumption was once in a month. The egg consumption was twice a week or once in a week.

Food intake pattern:

The food intake pattern of Athletes was assessed by calculating the average values of BDA given for the specific age group by Gopalan 2002.

Table shows that the cereal, green leafy vegetables, other vegetables and roots and tubers, meat/fish/egg, fruits consumption was less than BDA for female. The consumption of legumes and pulses, sugar, jaggery and oil was as same as BDA. Milk and milk products consumption was Jiigher than BDA.

Nutrient intake pattern:

Nutrients obtained to the body depend on the food supplied during a day. Nutrients supplied among subjects were calculated and presented in table along with the percentage of adequacy. The energy, protein, vitamin B2, B3, vitamin C, p carotene and iron consumption was below the RDA whereas; mean fat consumption of study population was twice the RDA. The consumption of vitamin B1 and calcium was near to the RDA.

SUMMARY AND CONCLUSION

The present research study entitled "Assessment of nutritional status of female athletes" was carried out in Karad city of Karad tehsil of Maharashtra state. The primary objective of the study was to evaluate the nutritional status of female athletes with the help of dietary intake pattern, anthropometric measurements and clinical assessment of nutritional deficiencies and also to determine the adequacy of food and nutrient intake.

The study was conducted; the subjects were interviewed for general information. The data was collected using self structured pre tested questionnaire cum interview method. The subjects were selected by purposive sampling method in Karad city of Maharashtra state.

The statistical measures such as percentage, mean score analysis and frequency were used to analyze the data. The findings of the study were tabulated in tables and presented in graphs also.

For this study total 50 subjects were evaluated. The subjects belonged to the age group of 18 to 20 years. The clinical assessment showed greater prevalence of muscle cramp, joint pain, anxiety, lethargy, irritability and tirdness. Dietary assessment showed that most of the subjects were non-vegetarian. The dfereal, pulses, leafy vegetables, fruits, milk, sugar, meat and egg consumption was less than BDA for female. The consumption of legumes and pulses, other vegetables, root and tubers and oil was as same as BDA.

The protein, vitamin C, p carotene and iron consumption was below the RDA whereas; The consumption of energy, fat, vitamin B1, vitamin B2, and calcium was near to the RDA.

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