NUTRITIONAL ADEQUACY OF DIETS CONSUMED BY WOMEN TEACHERS IN TIRUPATI (AP)

Sarada. D* and Sireesha.G**

*Professor, Department of HomeScience, Sri Padmavati Mahila Visvavidyalayam, Tirupati (AP).

**Assistant Professor, Department of HomeScience, Sri Padmavati Mahila Visvavidyalayam, Tirupati (AP).

ABSTRACT

A study on Nutritional adequacy of diets consumed by women teachers in Tirupati (AP) was carried out on 120women high school teachers in Tirupati town during September 2011.The High schools in Tirupati were under Government/ Private /Tirumala Tirupati Devasthanam management. As the work load of the teachers also varied depending on the type of management equal number (40) of sample were drawn from high schools of each management. The subjects were aged between 25 to 55 years and informed consent from the subjects was obtained. The study is an evaluation type of research intended to assess the; Dietary Nutrient Intake, Frequency of Food Intake, Nutritional Behavior, Body Mass Index and physical activity.

The women teachers are the role models for their own children and their students. The teachers need to change their food selection and consumption to include Greens every day, increase the quantity of other vegetables and avoid junk foods to keep themselves healthy. The different types of foods with in the food groups should also be included to ensure dietary diversity. A healthy diet and optimum physical activity keeps women fit and improves their productivity.

Key words: Women teachers, Nutritional behavior, Dietary intake, Frequency of food intake, Body Mass Index.

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Introduction

The entry of majority educated women in work force in India started as teachers in education sector.The Public, Private and Public Private Partnership institutions of formal education provided opportunities for employment to women in Metropolis, Cities, Towns, Rural and Tribal areas. Women teachers made successful careers contributed their best to the young generation. The women teachers have dual roles; professional and family roles like all working women. A few decades ago the teaching jobs were regarded as a less stressful, with fixed hours of work. With the advancement of technology and globalization of education more importance is being given to teachers' professional competence and accountability. Even in Government/public sectorthe workload of school teachers has increased tremendously, especially in Andhra Pradesh. Today the teachers attend to academic/ curricular, co-curricular, extracurricular activities and also work with parents.Which in turn influenced their lifestyle, nutritional nutrition behavior and nutritional status?The Dietarynutrient intake and Dietary diversity of women teachers has undergone changes contributing to overweight and micronutrient deficiencies.With this background an effort was made to study the nutritional adequacy of diets consumed by the Women High SchoolTeachers in Tirupati (AP).

Methodology: A study on Nutritional adequacy of diets consumed by women teachers in Tirupati (AP) was carried out on 120women high school teachers in Tirupati town during September 2011.The High schools in Tirupati were under Government/ Private /Tirumala Tirupati Devasthanam management.As the work load of the teachers also varied depending on the type of management equal number (40) of sample were drawn from high schools of each management. The subjects were aged between 25 to 55 years and informed consent from the subjects was obtained.

Data collection : The study is an evaluation type of research intended to assess the; Dietary Nutrient Intake, Frequency of Food Intake, Nutritional Behavior, Body Mass Index and physical activity. The tools selected and used for data collection include;

- A questionnaire was developed and used for collection of data on Demographic variables, Nutritional behavior, Frequency of Food Intake, and physical activity.
- A set of standardized vessels were used for collection of information on dietary intake of subjects using 24 hour recall method on a normal day.

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- A ready reckoner developed based on the cookedvolume, portion size and raw ingredients /equivalents using Nutritive Value of Indian Foods (ICMR, 2011).
- The dietary nutrient intake of each subject was calculated and compared with the Recommended Dietary Allowance to determine the nutritional adequacy of diets consumed by the sample.
- A Stadiometer for measuring the height(in Centimeters)and a Platform type weighing scale for measuring weight (in kilograms) of the sample were used.The Body Mass Index of each subject was calculated using the formula: BMI=Weight in kg/ Height in metres^2. The women teachers' nutritional status was categorized using the WHO criteria.

Analysis of data: The data collected was subjected to analysis using relevant Statistical techniques.

Results and Discussion: The results were tabulated, interpreted and discussed as follows.

Demographic profile of the Women High School Teachers: The independent variables related to demographic profile of the sample was collected and presented in table 1.

Table1:Demographic profile of the sample(N=120)

S.No	Variable	Classification	Govt. (%)	Private (%)	TTD (%)	Total (%)
1	Age	25-34	2.5	17.5	13.3	33.3
		35-44	19.2	14.3	10.8	44.3
		45-54	11.6	1.6	9.2	22.4
	Total		33.3	33.4	33.3	100
2	Monthly Income	Less than Rs.10000	-	1.6	-	1.6
		Rs.10001 - 20000	-	23.4	5	28.4
		Rs.20001 - 30000	19.3	8.3	19.1	46.7

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		Greater than Rs.30001	14.1	-	9.2	23.3
		Total	33.4	33.3	33.3	100
3	Size of the family	Less than 3 members	5	3.3	0.8	9.1
		4-6 members	26.7	28.3	25.8	80.8
		7-9 members	1.7	1.7	2.5	5.9
		More than 10 members	-	-	4.2	4.2
		Total	33.4	33.3	33.3	100
4	Marital status	Un married	1.6	9.2	0.8	11.6
		Married	27.5	21.7	29.2	78.4
		Widowed / Separated	4.2	2.5	3.3	10.0
		Total	33.3	33.4	33.3	100

The dataon demographicvariables was summarized in table1, the age wise distribution of the sample indicated thata notable percent (44.3%)of the high school teachers under study were aged between 35 to 44 years. A 33.3 percent were aged between 25 to 34 years and only 22.4 percent were aged between 45 to 54 years.The data related to the monthly income of the sample showed that only 1.6 percent of the private high school teachers and none of the Government and TTD teachers had monthly income below 10000 rupees. Themonthly income of the teachers working in Government and TTD high schools were higher than the private school teachers.

The size of the family of the sample indicated that majority (80.8%) of them had a family size of 4 to 6 members, only a small percent of them had family size of less than 3members (9.1%), 7 to 9members (5.9%) and more than 10 members (4.2%). With regard to the marital status a 78.4 percent were married, followed by 11.6 percent of unmarried and a 10 percent of separated and divorced. The above data indicates that majority of the sample were in reproductive age group, having moderate family sizeand moderate income. As majority of the women were married they have the family role responsibilities to attend in addition to their professional work.

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Body Mass Index of Women Teachers:

BMI is a useful measure in identifying the nutritional status of women and men. Though it is not used to determine a person's actual percentage of body fat, it is a good indicator to categorize weight as healthy or unhealthy.The table.2 indicated the women teachers' BMI under study. Around 21.7 percent had normal or healthy weight, a 2.47 percent of the teachers were under weight, majority of the sample were overweight and obese. Most of the teachers of all the three types of schools had BMI greater than 25 indicating over weight and obesity.

Table2: Distribution of women teachers according to their BMI

S.No	Body Mass Index	Weight status*	Percentage of women teachers			Total
			Govt. (%)	Private (%)	TTD (%)	
1	Below 18.5	Underweight	-	1.7	0.8	2.5
2	18.5 – 24.9	Normal or Healthy Weight	7.5	9.2	5.0	21.7
3	25.0 – 29.9	Overweight	15.8	17.5	13.3	46.6
4	30.0 and Above	Obese	10.0	5.0	14.2	29.2
	Total		33.3	33.4	33.3	100

*National Institutes of Health ,2015

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Dietary nutrient Intake

The Government,Private and TTD high school teachers' dietary intake of different nutrients, their adequacy and their percentagedeficit were calculated. The nutritive value of the diet consumed by each teacher was calculated and was compared with the Recommended Dietary Allowance. The adequacy and deficit of each nutrient was recorded.It was found that almost all the teachers had moderate activity as they attended to food preparation, domestic work, traveled to work place, and had eight hours of occupational work and other activities related to family and self-care. Hence the RDA for moderate work was considered as appropriate for assessing the adequacy of energy intakes of the sample.

Energy intake of the sample

The main sources of energy are the dietary carbohydrates, fats and proteins. Of the total energy derived from food, nearly 50 percent is used for basal function and the other 50 percent for physical activity. An adequate and constant amount of energy must be made available to the body for cell survival and for maintaining the vital functions at optimal level (Narasinga Rao, 2011).The energy intake of the teachers were assessed from their dietary intake and presented in table.3.

Table3: Energy intake of teachers of three types of schools

S.No	Teachers	Mean Energy Intake (kcals)	RDA (kcals)	t-value	percentage of adequacy	Percentage of deficit
1	Govt.	2014 ±320	2225	-7.22**	90.51	9.49
2	Private	2067±342	2225	-5.06**	92.90	7.1
3	TTD	2043±368	2225	-5.42**	91.82	8.18

** Significant at p<0.01.

The table 3 indicates that the mean energy intake of teachers working in Government, private and TTD high schools were slightly lower than the RDA with a percentage adequacy of 90.51 to 92.82 and a percentage deficit of 7.11 to 9.49.Student t-test was conducted. The mean energy intake of all women groups was significantly lower(p<0.01) than the RDA.The standards used to

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express energy needs, called estimated energy requirements , refers to the average needs based on height, age, gender , activity level to promote weight maintenance in adults (Bueche,2009).

Physical activity: The physical activity of teachers showed that only 10 percent of Govt. 17 percent of Private and 15 percent of TTD High school teachers did walking regularly. This shows that the physical activity in the form of an exercise was low among the sample. The sample was actively engaged in eight hours of occupational activity, in addition to their domestic work and family responsibilities. Hence their physical activity level was considered as moderate.

Kyriacou (2001) also reported that the main sources of teachers stress are teaching students who lack motivation, maintaining discipline in the classroom, confronting general time pressures and workload demands, being exposed to a large amount of change, being evaluated by others, having challenging relationships with colleagues, administration, and management, and being exposed to generally poor working conditions prospects, unsatisfactory working conditions, ambiguity of the teacher's role, poor relationships with colleagues, pupils, and administrators, and job insecurity.

Dietary protein intake: The protein requirement for adult normal woman is 0.8g -1.0g /kg body weight. In the present study the RDA given for reference woman was considered for assessing the dietary adequacy of protein intake irrespective of the weight of women under study. With regard to the protein quality is more important than the quality. Food proteins that are able to provide all essential amino acids in proportions meeting human proteins are called complete proteins or high biological value proteins (Medeiros and Wildman,2012).Among the sample 46 percent were vegetarians, followed by 13 percent of ovo –vegetarians and 41 percent were non vegetarians.

Table4: Protein intake of teachers of three types of schools

S.No	Teachers	Mean Protein Intake (g)	RDA (g)	percentage of adequacy	Percentage of deficit
1	Govt.	44.33± 10.25	50	88.66	11.34
2	Private	46.76± 15.30	50	93.52	6.48
3	TTD	48.04± 13.12	50	96.08	3.92

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The table 4 shows thedietary protein intake of women high school teachers, which indicates that the percentage of adequacy of proteins in the diets consumed was 88.66 to 96.08 and the percentage of deficit of proteins in the diets of the sample was 3.92 to 11.34.Though the percentage of deficit in protein intake of sample is low, it needs to corrected to avoid prolonged lower intakes and improve the quality of proteins consumed.

Dietary fat intake

The dietary fat intake should be limited to meet the body needs and on the level of physical activity and physiological status. The vegetableoils rich in essential fatty acids (Linoleic and Lenolenic acid) and fish oils are to be consumed.

Table5: Dietary fat intake of womenteachers

S.No	Teachers	Mean fat Intake (g)	RDA (g)	percentage of adequacy	Percentage of deficit
1	Govt.	34.45± 16.23	20	172.25	-
2	Private	31.89± 19.64	20	159.45	-
3	TTD	39.48± 18.46	20	197.4	-

The dietary fat intake of the sample showed (table.5) that all the three groups of high school teachers' mean fat intakes were greater than the RDA. Several studies indicated that the fat intake in Indian families has increased contributing to obesity and related health problems among women, adolescents and young children.

Dietary intake of calcium, iron and folic acid: Calcium is the most abundant mineral in our body with varied functions and its dietary deficiency leads to osteoporosis, besides playing a significant role in the pathogenesis of other diseases. As the structural component, calcium is required for the formation and maintenance of skeleton and teeth.The richest source of calcium among animal foods is milk and among the vegetable sources are green leafy vegetables. The table 6 shows that the women teachers of all three types of schools in Tirupati consumed diets with a percentage of adequacies of 85.5 to 96.75 percent.

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Table 6: Dietary intake of calcium, iron and folic acid

S.No	Nutrients	Teachers	Mean Intake (g)	RDA	percentage of adequacy	Percentage of deficit
1	Calcium (mg/d)	Govt.	342±21.2	400	85.5	14.5
2		Private	387±19.3	400	96.75	3.25
3		TTD	361± 17.4	400	90.25	9.75
1	Iron (mg/d)	Govt.	27± 14.6	30	90	10
2		Private	29± 16.3	30	96.67	3.33
3		TTD	27± 17.2	30	90	10
1	Free Folic acid (μg/d)	Govt.	44± 10.5	100	44	56
2		Private	39±11.3	100	39	61
3		TTD	43±17.6	100	43	57

The dietary iron intake adequacy of the sample was found to be 90 to 96.67 percentages. Since there is limited capacity to absorb dietary iron, diet should contain 10-25 fold iron required daily. In considering iron requirements, availability of iron from the composite diet is more important than from the individual foods because of profound interaction between foods in influencing iron absorption (Gopalan et al., 2011).Folate and folic acid are forms of a water-soluble B vitamin. Folate occurs naturally in food, and folic acid is the synthetic form of this vitamin. Folic acid is used for preventing and treating low blood levels of Folate (Folate deficiency), as well as its complications, including "tired blood" (anemia) and the inability of the bowel to absorb nutrients properly. Folic acid is also used for other conditions commonly associated with Folate deficiency, including ulcerative colitis, liver disease, alcoholism, and kidney dialysis(MedlinePlus,2016). The dietary intake of the sample showed that thepercentage nutritional adequacy of diets consumed by the women teachers was between 39 to 44 percent and the percentage deficit of dietary Folate was 56 to 61 percent. The dietary intake of foods rich in Folatehas to be increased. Though the sample consumed Green leafy vegetables the quantity of consumption seems to be very low that is around 150 to 200 grams for the whole family.

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Frequency of Food Intake

Nutritional behavior encompasses food habits, food habits, food likes and dislikes, food selection and choices, eating pattern. Nutritional behavior is a learned behavior, mostly from home, school and community. These behaviors become rigid and difficult to change as an individual grows, the Frequency of Food Intake of women teachers understudy was collected ,

Table7: Distribution of sample according to their FFI

S.No	Food Items	Food Group	Frequency of Food Intake(%)		
			Daily	Weekly	Monthly
1	Rice ,boiled rice, broken rice, flakes, puffed rice &products made with rice	Cereals	100	-	-
2	Wheat, Broken wheat, & products made with wheat	Cereals	32	68	-
3	Maize/Corn, Ragi, Bajra, Jowar,Sorghum, Oats & their products	Millets	5	47	48
4	Pulses(Red, Green, Black, Bengal & Horse gram - whole, Dhal &their products	Pulses	57	43	-
5	Beans &Peas-Double beans, Chick pea, Cow pea, Rajmah, Soya, Field beans, Peas	Pulses	-	100	-
6	Nuts &Oilseeds- Ground nut, Coconut, Cashew nut, Almond, Walnut & their Products	Nuts &oilseeds	-	100	-
7	Green Leafy Vegetables	Vegetables	-	100	-
8	Other vegetables-Ladies fingers, Ridge gourd, Bottle gourd, Bitter gourd, Cucumber, Cabbage etc.,	Vegetables	100	-	-
9	Roots & Tubers-Potato, Sweet potato, Yam, Colacasia, Arrow root, Carrot etc.,	Vegetables	-	100	-
10	Fruits-Banana, Orange,	Fruits	52	48	-

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	Sweet lime, Mangoes, Apple, Custard apple etc.,				
11	Milk- Whole, Skimmed, Powder, & their products.	Milk & Milk products	100	-	-
12	Meat, Egg, Poultry, Game & their products	Fleshy foods	-	54	-
13	Fish, Prawn, Shrimp, Crab, Oysters and their products	Sea foods	-	41	-
14	Vegetable oils –Soya, Mustard, Safflower, Sunflower, Sesame , Rape seed oil	Fats & Oils	100	-	-
16	Butter, Ghee, Dalda	Fats & Oils	-	100	-
17	Sugar, Jaggery. Honey	Sugars	93	7	
18	Asafetida, Cumin, chillies , Fenugreek, Black Pepper, Ginger, Garlic, Turmeric, Coriander etc..,	Spices & Condiments	100	-	-
20	Bread, Bun, Biscuits	Processed foods	100	-	-
21	Junk foods- Snacks, Sweets, Ice creams, Confectionary items, Pizzas, Burgers , Fries, Carbonated beverages etc.,	Junk foods	69	31	-

The table7 indicates that all the women consumed rice and rice products every day, the wheat and wheat products were eaten daily by 32 percent and weekly by 68 percent, Millets were consumed by 5 percent daily percent 47 weekly and 48 percent monthly though Tirupati is known for Ragi and other millet production and consumption. Pulses in the form of dhal and whole gram were consumed daily by 57 percent and weekly by 43 percent of teachers. The other types of pulses, nuts and oil seeds, green leafy vegetables and roots and tubers were consumed by the sample weekly. The other vegetables which are low calorie were consumed daily the women teachers but the quantity of consumption in the form of a curry was found to be around 100g per day. Fruits were consumed daily by 52 percent and weekly by 48 percent of women. Milk, vegetable oils, spices and biscuits/ bread were consumed by almost all the sample daily.

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The meat and poultry was consumed weeklyby 54 percent and fish and other sea foods were consumed by 41 percent as others were vegetarians.Around 93 percent were taking sugar, Jaggery and honey daily and a 7 percent were diabetic . Almost all the women teachers consumed junk foods either daily (69%) or weekly (31%).

Conclusion

The women teachers are the role models for their own children and their students. The teachers need to change their food selection and consumption to include Greens every day, increase the quantity of other vegetables and fish and avoid junk foods to keep themselves healthy. The different types of foods with in the food groups should also be included to ensure dietary diversity. A healthy diet and optimum physical activity keeps women fit and improves their productivity.

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