



Food Consumption, Purchasing and Dietary Pattern of Farm Women in Dharwad District, Karnataka State, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/EJNFS/2024/v16i41406

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/113436>

Original Research Article

Received: 10/01/2024
Accepted: 13/03/2024
Published: 28/03/2024

ABSTRACT

Present study was undertaken to analyze the socio-economic and nutritional status of women involved in farm activities and to know the impact of nutri-farms on food, nutrition and health security. Using 300 farm women in Chamarajanagar district. Health and nutritional status assessment, food intake, nutritional adequacy and screening for iron deficiency anaemia and KAP

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study on health and nutrition was conducted. Malnutrition is still one of the crucial problems in developing countries which is relationship between nutrition and health among a majority of the population. The objective of the study was dietary pattern of before and after intervention. This paper tries to analyze the food consumption and dietary pattern of women involved in farm activities and to know the impact of nutri-farms on food and nutrition security by using of 500 farm women in Dharwad district. A well-structured questionnaire was framed to gather the information on dietary pattern of the subjects was assessed by 24– hour diet recall method before and after intervention. The results revealed that, Among cereals, rice was consumed daily (90.4%) by all the families, where as food intake was observed that Pulses (67.67), milk and milk products (167.60), roots and tubers (67.80), GLV's (47.17), other vegetables (96.47), fruits (37.33), fats and oil (17.70) consumption is very low when compared to RDA whereas consumption of cereal was on par with the recommended dietary allowances. The mean nutrient intake of energy (1794.5 kcal), protein (36.95 g), fat (17.95 g), iron (18.98 mg) and Vitamin C(42.85 mg) were less when compared to the RDA. The results shows that all nutrients and food intake consumption was found inadequate.

Keywords: Dietary pattern; intervention; nutri-farms and food consumption.

1. INTRODUCTION

“A nation’s development depends on the health and well-being of the people who live in the country. Among the people, good health of woman is very important as women are not only the carriers of coming generation, but civilization and sustainable development rest on them. They are the best upholders of environment, ecological and social balances and because of these factors it is of great importance that women should get adequate care and attention in the matter of health, nutrition, education or matters related to their social and economic development” [1].

“Good nutrition is the cornerstone for survival, health and development for current and succeeding generation. Good nutrition or nutritional status is the outcome of many complex and interrelated determinants such as access to adequate, safe, affordable and nutritious food, care and health services. Agriculture and Food processing sector is the backbone of India’s economy in terms of income, employment generation and ensuring food and nutritional security” Tontisirin et al. [2]

There is no doubt that India has made substantial progress in human development during the post-independence period. Prior to independence, many people in the country were not even being able to dream of a square meal every day.

According to Measham and Chaterjee [3], “Green Revolution provided a breathing spell for the country by achieving a balance between human numbers and food output. The overall nutritional status has definitely improved during last few

decades. Still, more than half of Indian children under five years of age are moderately or severely malnourished, 30 percent of newborns are significantly underweight and 60 percent of Indian women are anemic and such manifestations of malnutrition are certainly unacceptable. Thus it can be well said that improvements in nutritional status have not kept pace with progress in other areas of human development, at least when homogenous distribution is taken into consideration”. In the words of Rousseau, “Where there is no mother, there can be no child. Their duties are reciprocal; and if they are badly fulfilled on one side, they will be neglected on the other”. This quotation is very appropriate to the subject of adequate nutrition for each woman.

The belief that a woman should eat better foods and more foods (farm women) is as old and has been held by both the extremes- laymen and scientists. But there has been a gap between the thought and the action [4,5]. This study aims at providing a database showing the exact picture of Dharwad district regarding food purchasing and dietary pattern. According to Swaminathan, [6], “good nutrition is a function of both economy and education. As revealed by Ronzio and Robert [7], women are usually vulnerable to malnutrition for both social and biological reasons, throughout their life cycle. As children in some parts of the world, girls are discriminated against in access to health care, to food and education and in other ways. Reproductive aged women are subject to numerous stresses affecting the health and wellbeing. Elderly women in many societies are deprived too. Thus there exists an intergenerational cycle of growth failure for women”. The present study is more

concerned about farm women background variables affecting the food consumption practice, which in turn affects the nutritional status.

2. MATERIALS AND METHODS

The present study was carried out to understand and analyze the food purchasing and dietary pattern of farm women involved in farm activities. The population was from lower middle class with agriculture being the major occupation. The study was conducted in dharwad district of Karnataka during the year 2021-22. Farm women aged between 20-50 years, engaged in household chores from agricultural families were selected by purposive random sampling (N=500).

2.1 Diet Survey

Baseline diet survey of the selected farm women was conducted by using 24 hour recall method for one day the sample size was 500. Standardized cups, vessels, paper discs and rubber balls were used to measure the food intake. Subjects were asked to recall the type of preparation made for breakfast, lunch, evening tea and dinner etc. for the previous day (other than feasting and fasting day). Information on amount of raw ingredients used for each preparation and also on the total cooked amount of each preparation was recorded in terms of standardized tools (standardization as per the procedure indicated by Bamji et al. [8]). The average raw ingredients in all the meals consumed by each subject per day were calculated.

The schedules were properly sorted out after verification and serially numbered. Data on food purchasing, food consumption frequency and intake of foods- cereals, pulses, vegetables etc. evaluated. Using the quantity of foods consumed per day nutrient intake for calories, protein, fat, fibre, calcium, iron, carotene and vitamin C per day was calculated. These figures were compared against the (RDA, 2020) to provide a measure of adequacy or inadequacy of food and nutrient consumption.

$$\% \text{ adequacy} = (\text{Intake of each nutrient} / \text{Recommended Dietary Allowance}) \times 100$$

3. RESULTS AND DISCUSSION

3.1 Frequency of Food Consumption

The farm women dietary pattern showed that they lacked variety in their diets. Cereals

occupied the major part of their diets, followed by pulses and then vegetables. Meat and meat products, oil seeds, sugars and jaggery were consumed daily or weekly, the quantities of their consumption was found to be very low.

Cereals: Among cereals, rice was consumed daily (90.4%) by all the families. About 8 per cent of the families were consuming cereals weekly two times and 1.60 per cent of the families were consuming three times.

Millets: In case of millets, all the subjects under study in Dharwad district were consuming jowar was consuming daily by all the families, this may be attributed to the increased availability. Moreover, it is the main staple millet after rice in rural areas.

Pulses: The pulses such as green gram and bengal gram were consumed more frequently. This may be attributed to their habituation availability of green gram. It was found that 57.4 per cent of the farm women were consuming pulses daily. Among women in Dharwad rural district the consumption of pulses, thrice in a week, twice in a week and weekly once was found to be among 0.6, 0.4, and 1.0 percent respectively.

Fats and Oils: In case of fats and oil was predominantly consumed by farm women because it's one of the major cooking oil used by farm women to prepare their every dishes daily. The quantity of oil used was around 10-15ml per day which is comparatively low. Use of fats was very poor due to high prices of oil not within the reach of the low income groups.

Sugar and Jaggery: Cent per cent of the farm women were consuming sugars and jaggery (100%) daily, according to their preference over the sugar & jaggery, this also depends upon purchasing power and locally availability.

Green leafy vegetables: Since ancient times, green leafy vegetables or greens from many plants are being used in the diet. They are nutritionally important and are also economically cheap sources of important nutrients. It was found that the consumption of green leafy vegetables were relatively less among the families under the study. About 32.4 per cent of the women are consuming GLVs daily and once in a week (37.6%) and twice in a week (29.4%).

Other vegetables: Though vegetables form an essential item of food both for rich and the poor, however in this study the commonly consumed vegetables were onion, chillies and tomato vegetables daily and consumption was found to be cent per cent. Because these are daily needed vegetables could be the main reason for daily consumption of vegetables.

Roots and Tubers: Frequency of consumption pattern of roots and tubers by the subjects is as shown in the Table 1. Among women in Dharwad rural district the consumption of roots and tubers, thrice in a week, twice in a week and weekly once was found to be among 30.8, 12.2 and 47.8 percent respectively. This may be due to the socio-economic background.

Milk and Milk Products: Milk is the wholesome food available in nature for good health and promotion of growth. About 98.8 per cent of the women were consuming milk in the form of tea and coffee daily and 61.4 per cent were consuming milk in the form of curd daily. Half of the respondents were consuming milk and milk products.

Meat: Meat is rich in protein and it contains all the amino acids that are required by man. Because of high cost of meat, the consumption was found to be low in the farm women. Among the farm women, 44.2 per cent of the farm women consuming once in a week. Habitual diet which is more based on vegetarian food ingredients and higher cost of non-vegetarian foods may be the reasons for their limited usage in study area.

Fish and sea products: About 35.4 per cent of the farm women consuming once in a week. The

fresh fish consumption by the farm women was high because of their availability.

Eggs: Eggs have an excellent nutritive value. The egg protein can be easily digested and their quality is comparable to that of meat. But, the consumption of egg was also low because the village under study is located in an area in which the availability of eggs is low, in addition to their high cost. Among all the farm women only 42.2 per cent were consuming egg weekly once and 24.6 per cent twice in a week.

Fruits: Fruits are good sources of vitamins and minerals. The consumption of the fruits depends on the seasonal availability. The farm women were consuming only those fruits which were grown along-side in their fields. The fruits that were consumed once in a week (69.0%) and sometimes include apple, grapes and mangoes whereas frequently consumed daily or once in a week include banana and lemon.

Oil Seeds: Coconut (fresh or dry) was consumed by almost all the subjects in Dharwad. About 94.6 per cent of the subjects are consuming oil seeds daily. Whereas Niger and mustard seed was commonly consumed by Dharwad women this may be due to traditional habitual diet practice in study area.

Dry fruits: Most of the subjects consumed dry fruits rarely, 5.8 and 3.2 per cent of subject were consuming once in a week and twice in a week respectively. Subjects dry fruits are used rarely due to less affordability and availability and less purchasing power.

The Distribution of women according to their food purchasing pattern is as shown in Table 2.

Table 1. Distribution of women according to their Food consumption pattern

Sl. No	Food items	Daily	Weekly		
			1	2	3
1.	Millets	500 (100)	0	0	0
2.	Cereals	452 (90.4)	-	40 (8.0)	8 (1.60)
3.	Pulses	287 (57.4)	6 (1.2)	91 (18.2)	116 (23.2)
4.	Fats & Oil	500 (100)	-	-	-
5.	Sugar and Jaggery	500 (100)	-	-	-
6.	Green leafy vegetables	164 (32.4)	188 (37.6)	147 (29.4)	1 (0.2)
7.	Other Vegetables	500 (100)	-	-	-
8.	Roots and tubers	-	239 (47.8)	61 (12.2)	154 (30.8)
9.	Milk	494 (98.8)	-	-	-
10.	Curd and butter	307 (61.4)	50 (1.0)	126 (25.2)	-
11.	Milk products	254 (50.8)	168 (33.6)	46 (9.2)	-
12.	Meat	-	221 (44.2)	2 (0.4)	-
13.	Fish and sea products	-	177 (35.4)	9 (1.8)	-
14.	Egg	17 (3.4)	211 (42.2)	123 (24.6)	15 (3.00)
15.	Fruits	21 (4.2)	345 (69.00)	6 (1.2)	6 (1.2)
16.	Oil seeds	473 (94.6)	11 (2.2)	6 (1.2)	10 (2.0)
17.	Dry fruits	-	29 (5.8)	16 (3.2)	-

N=500

Table 2. Distribution of women according to their Food purchasing pattern

N=500

Food Groups	Daily	Weekly			Monthly			Yearly		Others (own field)
		1	2	3	1	2	3	1	2	
Cereals										
Rice	-	-	-	-	477 (95.4)	-	-	-	-	33 (6.6)
Wheat	-	-	-	-	352 (70.4)	-	-	145 (29.00)	3 (0.6)	-
Jowar	-	-	-	-	-	-	-	69 (13.8)	431 (86.2)	-
Millets	-	-	-	-	45 (9.00)	30 (6.00)	-	25 (5.00)	376 (75.2)	-
Pulses	-	-	-	-	500 (100.00)	-	-	-	-	-
Milk & Milk Products	472 (94.4)	-	-	-	-	-	-	-	-	28 (5.60)
Oil & Sugars	-	-	-	-	500 (100.00)	-	-	-	-	-
Fruits	61 (12.4)	322 (64.2)	3 (0.4)	-	114 (22.8)	-	-	-	-	-
Vegetables	157 (31.4)	343 (68.6)	-	-	-	-	-	-	-	-
Meat Products	179 (35.8)	8 (1.60)	-	104 (20.8)	37 (7.4)	-	-	-	-	-

Table 3. Distribution of women according to their place of Food purchasing pattern

N=500

Food groups	Quantity	Own	PDS	Street	Kirani shop	Local market	Wholesale
Cereals							
Rice	20-70 Kg	7 (1.40)	465 (93.00)	-	28 (5.60)	-	-
Jowar	15-20 Kg	22 (4.40)	-	-	78 (15.6)	-	400 (80.00)
Wheat	2-25 kg	7 (1.40)	65 (13.00)	-	28 (5.60)	298 (59.60)	102 (20.40)
Millets							
Navane	1-2 kg	-	-	-	-	500 (100)	-
Sajje	1-2 kg	-	-	-	-	500 (100)	-
Ragi	1-2 kg	-	-	-	-	392 (78.4)	-
Pulses	1-5 kg	-	-	-	-	350 (70.00)	150 (30.00)
Oil	5-6 ltr	-	-	-	-	478 (95.60)	22 (4.40)
Sugar & Jaggary	1-5 kg	-	-	-	-	322 (64.4)	178 (35.60)
GLVs	2-25 bundles	-	-	326 (65.2)	-	174 (34.8)	-
Other veg	15-30 kg	-	-	282 (56.4)	-	218 (43.6)	-
Roots & tubers	2-4 kg	-	-	226 (45.2)	-	274 (54.8)	-
Milk	15-30 ltr	190 (38.0)	-	-	310 (62.00)	-	-
Curd & butter milk	1-15 ltr	381 (76.2)	-	12 (2.40)	97 (19.40)	-	-
Butter & ghee	250-1000g	381 (76.2)	-	12 (2.40)	97 (19.40)	-	-
Meat	2-5 kg	-	-	-	-	334 (66.8)	-
Fish	10 kg	-	-	-	-	334 (66.80)	-
Egg	1-2 dozen	50 (10.00)	-	-	48 (9.60)	280 (56.00)	-
Fruits	1-3 kg	-	-	100 (10.00)	-	400 (80.00)	-

Most of the farm women cereals such as rice (95.4%) and wheat (70.4%) were purchased monthly once, followed by pulses cent per cent of the subjects were purchased monthly once, whereas milk and milk products 94.4 per cent of the subjects were purchased daily. In case of fruits were purchased daily, once in a week, twice in a week and monthly once was found to be 12.4, 64.2 and 22.8 per cent respectively. Followed by vegetables were purchased by farm women daily (31.4%) and weekly once (68.6%).

It is revealed from the Table 3 that the majority of women purchasing of rice (93.0%), and wheat (13%) preferred to buy in PDS, followed by farm women were preferred to local Kirani shop to purchase like vegetables (43.6%), fruits (80%), cereals (59.60%), millets (78.4%), pulses (70%), meat (66.8), fish (66.80%) and milk (62.00). The consumers uniformly, desire to have quality of the products at reasonable price and tend to rely more on the advice of the retailers.

3.2 Nutrient Intake

“The nutrients are chemical substances which are present in the food we eat daily. The nutrients include energy, protein, fat, vitamins and minerals. The diet consumed by the farm women was obtained by using 24 hour recall method, as this method was found to be suitable for obtaining the mean nutrient intake of a group when large number of farm women was used.

The percentage of adequacy and deficit were also calculated” [9].

The quantity of nutrient intake was consumed by the farm women were recorded during study period and the mean nutrient intake was compared with recommended dietary allowances of farm women as depicted in Table 4. The mean nutrient intake of energy (1794.5 kcal), protein (36.95 g), fat (17.95 g), iron (18.98 mg), calcium (757.45 mg) and Vitamin C (42.85 mg) were less when compared to the RDA. Average vitamin C intake in farm women was found to be 42.85 mg which was low compared to RDA. This may be due to the less consumption of fruits especially citrus fruits. The findings are in line with study of Ravi Y et al. [9]. The mean nutrient intake of energy (1809 kcal), protein (42.71 g), fat (20.84 g), fibre(15.28 g), iron (17.12 mg), Carotene (1345 µg) and vitamin C (23.32 mg) were less when compared to the RDA except for calcium (757.45 mg).

3.3 Food Intake

The mean consumption of different food stuffs from farm women are depicted in Table 5. Here it showed that cereals (258.87), pulses (67.67), milk and milk products (167.60), roots and tubers (67.80), GLV's (47.17), other vegetables (96.47), fruits (37.33), oil seeds and nuts (27.80) and fats & oils (17.70) consumption is very low when compared to RDA [10].

Table 4. Impact of intervention on nutrient intake of farm women-500

Nutrients	RDA#	Mean ± SD	% adequacy
Energy (Kcal)	2085	1794.5 ± 232.27	86.06
Protein (g)	46.0	36.95 ± 8.89	80.32
Visible Fat (g)	20.0	17.95 ± 4.03	89.75
Calcium (mg)	1000	457.46 ± 169.46	45.74
Iron (mg)	29	18.98 ± 6.99	65.44
Zinc (mg)	13.2	8.12 ± 3.56	61.51
Vitamin C (mg)	65	42.85 ± 10.65	65.92

Source: National Institute of Nutrition (NIN) dietary guidelines for Indians (2020)

Table 5. Mean per cent adequacy of food intake of the farm women after establishment of nutri-farm

Food groups	RDA#	Mean ± SD	% adequacy
Cereals & Millets	280 (g)	258.87 ± 56.88	92.45
Pulses & Beans/ flesh foods	95(g)	67.67± 12.04	71.23
GLV	100	47.17± 21.36	47.17
Other vegetables	200(g)	96.47± 19.43	48.23
Roots and Tubers	100 (g)	67.80 ± 12.85	67.80
Fruits	100 (g)	37.33 ± 7.70	37.33
Milk and Milk products	300 (ml)	167.60 ± 16.51	55.86
Fat & oils	25(g)	17.70 ± 5.06	70.8
Oil seeds & Nuts	40(g)	27.80 ± 6.39	69.5

Source: National Institute of Nutrition (NIN) dietary guidelines for Indians (2020)

Farm women were consuming more cereals when compared to all other food groups and it was near to RDA. The consumption of pulses, green leafy vegetables and other vegetable was fair. Milk consumption was very less when compared to RDA and also with fruits and flesh foods. This trend may be due to the socio economic condition of the farm women as cereals are available at cheaperrate compared to other commodities so leads to more consumption of the same. "The probable reason for the inadequate intake of quantity and quality of pulses, milk and milk products, roots and tubers, fruits and vegetables, sugar, fats and oil was due to lack of nutrition knowledge, low purchasing power and non-availability of required food article at the living place [9].

4. CONCLUSION

The farm women food consumption showed that they lacked variety in their diets. Cereals occupied the major part of their diets, followed by pulses and then vegetables. Oil seeds, vegetables, sugars and jaggery were consumed daily or weekly, the quantities of their consumption was found to be very low. With respect to dietary pattern of farm women results shows that pulses, milk and milk products, roots and tubers, GLV's, other vegetables, fruits, sugar and fat consumption is very low when compared to RDA whereas consumption of cereal is on par with the recommended dietary allowances,

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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The peer review history for this paper can be accessed here:
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