

Nutritional Need Assessment of Member Families of a Family Helper Project with Women as Indicators of Household Nutrition

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KEY WORDS Dietary Assessment. Environmental Assessment. Household. Nutrition. Indicators. Women.

ABSTRACT In developing countries programmes have been designed both by government and voluntary agencies for the upliftment of poverty with a view to improve the nutrition and health of the house-hold. Kiriya Pushpa is one such centre which has designed such programmes and is helping a total of 900 families under the scheme of family helper project. In order to make the programme more specific, a nutritional need assessment was carried out among the member families by measuring the somatic and dietary status of women as indicators of family nutrition. The somatic and dietary status of women representing 500 households indicated an overall normal body size mean [BMI] of 22 with lower mid upper arm muscle circumference [MUMAC - 90 - 70%] and increased waist to hip ratio (WHR) indicating obesity in 97 per cent of women. Men were found to be indulging in smoking and alcoholism excessively. Frequency of food use and food expenditure pattern reflected lack of diversity in the food intake, dietaries being predominantly cereals with low amounts of other foods. Nutrient intake was deficient in energy and all other nutrients, irrespective of WHR categories. However, anthropometric measurements except for height showed an increasing trend with age gradient particularly in WHR. It is probable that increased WHR may be a cumulative effect of long term malnutrition. The most pressing need is to design income generating, education and training programmes keeping in view the target groups-adolescent girls, boys and men to improve household nutrition.

INTRODUCTION

In developing countries, upliftment of poverty appears to be the pressing need to improve the food availability and thus the nutrition of the household (Gopalan, 1992). Hence, many programmes have been initiated both by the government and voluntary organizations for the overall improvement of the quality of life for the underprivileged sections of the society (Gopalan, 1992, 1994), Kiriya Pushpa meaning "little flower" family welfare centre is one such voluntary organization, which is helping nearly 900

families under the scheme of 'family helper project'. Since its inception in 1982, the family helper project has devoted itself to the overall development of lower sections of the society. The programmes are designed to help families to educate children and also to improve health and nutrition, regardless of caste. Recognizing the key role of women in improving family economy and nutrition, it has encouraged increased participation of women, particularly in education and motivation programmes. It is widely accepted that the nutritional status of Indian women belonging to the low-socio-economic group is unsatisfactory (Gopalan, 1992). It is also an established fact, that only when the basic need of the family - food, potable water, adequate fuel and preventive health care with better economic status are met, it is possible to improve the nutrition-health status of the women (Gopalan, 1993, National Perspective for Women, 1988). Therefore, women are stated to be the indicators and better reflectors of the family nutrition. General survey conducted earlier had indicated that programmes were not being directed specifically towards the basic nutritional and health needs (Revathy, 1993). In such need based programmes, it is essential to understand the problems associated with diet and nutrition. Hence, the present study was undertaken to determine the nutritional needs of member families hailing from slums and suburban areas of Mysore City, by assessing the dietary status of women as proxy for the household nutrition.

MATERIALS AND METHODS

Study Design

The target group consisted of the female heads of the families *i.e.* wife/mother generally

responsible for the household and child care activities. The assessment which was spread over a period of 6 months, included the preparatory activities, collecting general information of the project and member families etc, and the assessment proper. While secondary data gathering was used in the collection of general information, the assessment proper relied mainly on primary data gathering. A two stage sampling procedure was adopted to select the subjects. In the first stage, the somatic status of women female heads representing each of the 500 families were assessed. In the second stage, a total of 127 women sampled out of the 500 women were selected to assess the food intake. The sampling was carried out based on the presence of absence of obesity in the 500 women taking waists/hip ration (WHR) as an indicator, thus assuring equal representation of normal and obese persons. The above subjects were further categorized into (i) Abdominal obesity AO I (WHR > 0.81) and AO II > 0.91) (ii) Gluteal femoral type of obesity (GFO) > 0.71 (Beaton et al., 1988). The details are presented in table 1. In depth analysis of environment and dietary characteristics was carried out in the sub sample of 127 women and their families.

Table 1: Total number of women selected by WHR as indicator of obesity

Areas		Categories - WHR*			
		≤ 0.7	0.71-0.80	0.81-0.90	> 0.9
Ashokpuram	Total	3	43	51	10
	Selected	2	11	13	3
Industrial Suburb	Total	4	19	21	6
	Selected	1	4	6	1
Nachanahalli	Total	1	27	25	1
	Selected	-	6	9	-
Palya	Total	3	36	13	-
	Selected	-	9	4	-
Gandhinagar	Total	2	27	17	5
	Selected	7	5	-	-
Nazarbad	Total	1	38	21	-
	Selected	1	9	5	-
Kanakagiri	Total	2	23	14	1
	Selected	-	5	4	1
Pushpagiri	Total	1	9	12	1
	Selected	-	2	2	1
Others	Total	8	60	54	-
	Selected	-	-	-	-

*WHR-Waist to hip ratio

Development of Tools

The tools in the form of survey schedules

were developed on the information needs of the study - Information on anthropometric measurements, 24 hr food/dietary recall, food frequency, personal history, demography, socio-economic status. Dietary/health practices, food behaviour characteristics and stress were collected.

Measurements

Anthropometric measurements - height (ht), weight (wt), mid upper arm circumference (MUAC), triceps skin fold (TSF), waist and hip circumference were recorded for all the 500 women.

The dietary intake of all the 127 women was assessed by interviewing the women with the help of household measures relevant to Indian cuisine models and photographs to construct the individual women's 24 hr food intake. The reference day for the recall method on the food intake was the day immediately before the visit. Raw amounts for the cooked food items were derived by standardizing the preparatory methods of different menu items in the laboratory. In case of vegetables, market surveys were also conducted to arrive at the actual amounts consumed by the women.

Stress levels of these 127 women was measured using a specific schedule having a set of pre-determined score responses for each of the pointer indicative of stress. The responses to the set of questions were scored to arrive at the stress level.

Data Collection and Computation

While the anthropometric measurements of 500 women were taken at the project centre, all other information including food intake was obtained by home visits. The collected information was consolidated in terms of each subject and computed for the whole group using descriptive analysis. Anthropometric data was used to compute percentiles of standard (Jelliffe, 1966) and for the calculation of body mass index (BMI). Mid upper arm muscle circumference (MUAMC) and WHR. Food intake data was converted to raw amounts in terms of food groups and in turn was translated into energy and nutrients using food composition tables (Gopalan et al., 1989). The nutrient intake of the women was compared against recommended dietary intake (RDI) for ensuring the appropriateness of intake derived based on the recommended dietary allowance (RDA) Indian Council of Medical Research,

1988) for age, gender and activity. Resting metabolic energy (RME), nutritional adequacy and an index of nutritional quality were also derived. The data was subjected to appropriate statistical analysis.

RESULTS

Environmental Assessment

Demographic characteristics of the selected 127 households indicated a total population of 701, 69% belonging to nuclear type of family with a male to female ratio in the age group of > 20 - < 60 years being 135 : 154 (Table 2). Age distribution was highly skewed with 50% of population belonging to less than 20 years of age and 34% being in the school age. Household size appeared large with 58% of household reporting 5-8 persons per household, 25 and 12% household reported having 4 and more than 8 persons, respectively.

Table 2 : Demographic characteristics of the study group

Demographic Characteristic	Number	Percentage
<i>Religion</i>		
Hindu	68	54
Muslim	13	10
Christian	46	36
<i>Family Type</i>		
Joint	37	29
Nuclear	88	69
Extended	2	1
<i>Household Size (No. of Persons per Households)</i>		
< 4	6	5
4	32	25
5-8	74	58
>8	15	12
<i>Family Option</i>		
Male } 20-60	135	19
Female } Years	154	22
Preschooler	21	3
Schooler	241	34
Adolescent	92	13
Elderly	58	8

Socio-economic characteristics (Table 3) revealed a higher literary level but lower level of education among females, with better educational levels among the male head (husbands). Living conditions of the study groups were similar (Table 4). Houses were generally small, most of them (77%) being kacha-pakka. Though the living conditions of the study groups were similar (Table 4) and satisfied the minimum requirements

Table 3 : Socio-economic characteristics of the study group Household heads (no and percentage)

Socio-economic characteristics	Male		Female	
	No.	%	No.	%
<i>Formal Education</i>				
None	-	-	10	3
< 1-4 years	-	-	10	3
>4-8 years	-	-	60	47
>8 years ^a	-	-	1	0.5
<i>Occupation^b</i>				
Coolie	47	37	21	17
Domestic helper	-	-	8	6
Labourer	11	9	-	-
Auto Driver	6	5	-	-
Others ^c	32	25	40	31
None	3	2	58	46
Employment ^d	-	100	-	100
<i>Estimated Family Monthly Income [Rupees]</i>				
< 500	12	9	-	-
> 500 - 1000	55	43	-	-
> 1000	60	47	-	-
<i>Nature of income^e</i>				

a - One person reported as Graduate

b - Type of employment one months prior to interview

c - Others include selling vegetables, flowers, Watchman, etc.

d - Employment rate one week prior to interview for persons normally employed

e - 8 persons had both daily and monthly income and two had daily and weekly income.

Table 4 : Living conditions of the study group

Living Condition	Number	Percentage
<i>Structure of House</i>		
Kacha	22	17
Kacha-pakka	98	77
Pakka	7	8
<i>Number of Rooms</i>		
One	46	36
Two	40	31
Three	60	47
More	11	9
<i>Water Source</i>		
Borewell	66	52
Corporation	1	-
Others (Cauvery)	61	48
<i>Fuel Used</i>		
Waste/Dung cake	2	1.6
Coal	-	-
Fire wood	3.7	29
Kerosene	85	67
<i>Toilet facility</i>		
Separate	43	34
Common	73	57
Open field	11	9
<i>Electricity^a</i>	108	85
<i>Animal possession^b</i>		

a - 85% had electricity and only 15% did not possess

b - 9 people had poultry, 3 had milch cattle and the rest had none

in terms of lighting, ventilation, water and sewage facilities, the total space within the house for the family size was limited with lack of open space for home garden or for maintaining poultry or cattle.

Health related practices of the study groups as presented in table 5 indicated that though the women were aware of hygienic practices, *i.e.*, bathing etc., they were unable to practice due to the non-availability of water and to limit the expenditure on fuel and cleaning agents. Both smoking and 'toddy' consumption by the male members was found to be excessive. It appeared that the jobs the women and men engaged in allowed very little time for any leisure time for education.

Table 5 : Health related practices of the women and their husbands of the study group

Habit	Male		Female	
	No.	%	No.	%
<i>Chewing</i>				
Betel	60	46	78	60
Tobacco	8	6	14	11
<i>Smoking</i>				
Beedi	72	56	-	-
Cigarette	29	23	-	-
<i>Drinking</i>				
Tea	87	66	101	80
Coffee	83	64	97	76
Toddy	71	56	4	2
Alcohol	17	13	1	-
<i>Sleeping Habits</i>				
Good	85	66	86	67
Moderate	17	67	17	13
No sleep	11	9	24	18
<i>Exercise</i>				
Household work	-	-	121	95
Others ^a	-	-	70	5
Walking	95	75	45	35
Cycling	45	35	-	-
<i>Recreation</i>				
Watching TV	15	12	110	87
Movie	50	4	15	12

a - Others include fetching water from outside

A review of women's reproductive history revealed a mean age of attaining menarche of 14 years and with age of marriage ranging between 15-18 years. The first pregnancy occurred at a relatively young age of 16-18 years. The fertility rate was high with 53 and 17% of women having 3-5 and 6-8 pregnancies, respectively.

However, all the women had adopted family planning methods-tubectomy being the most preferred method accounting for 76.2% of all responses.

Dietary Assessment

The meal and menu pattern consisted of 2 (36%) to 3 (61%) meals. Diets were predominantly vegetarian with eggs and fleshy foods being consumed over a week (47%). The food expenditure pattern indicated that major part of the income (70%) was being spent on cereals, followed by pulses, milk and milk products. Amount spent on vegetables was very meagre.

The estimated mean food and nutrient intake of the women are presented in table 6. As seen in the food expenditure pattern and frequency of food use, cereals were the major items of food consumed followed by pulses, milk and milk products. The mean intake of all food items except cereals were found to be low when compared to the desirable dietary pattern (DDP). The food intake by WHR categories was similar. However, while consumption of cereal showed an increasing trend with higher WHR (0.90), intake of milk decreased.

The lower intake of food reflected in the deficient intake of most of the nutrients. Though cereal intake was high, (being > 90% of the DDP), it failed to meet the energy intake of these women, though it met the RME. All the women irrespective of WHR categories failed to meet the ICMR (Indian Council of Medical Research, 1988) recommended levels for Indians in all the nutrients except calcium and thiamine. It was interesting to note that energy consumed including RME per kg body weight decreased as BMI and/or WHR increased along with age gradient. Nutrients as proportions of energy were nearly adequate with respect to protein and calcium, but fell short in all nutrients.

Mean anthropometric measurements of 500 women except for height showed an increasing trend with advancing year, though the mean BMI (22.0) remained the same. However, WHR indicated a significant abdominal obesity with 43.6 and 46.8% of the women showing lower (GFO) and upper (AO), respectively. In order to examine the relationship between diet and body size, the data on the somatic status of 127 women alone is presented in table 7. BMI of the women

Table 6: Mean \pm SD dietary (Food and nutrients) intake of the selected women vis-a-vis desirable dietary pattern and recommended dietary intake

Food items g/ml	Actual Intake	DDP*	Nutrients	Actual Intake	RDI**
Cereals	227 \pm 31.0	240	Energy (Cals)	1160 \pm 162	1875 \pm 148
Pulses	25 \pm 8.2	60	Carbohydrates	210 \pm 32	-
Green leafy Vegetables	2 \pm 2.6	100	Protein (g)	24.8 \pm 4.0	54 \pm 3.4
Other vegetables	31 \pm 8.0	50	Fat (g)	25.4 \pm 6.2	-
Roots and tubers	25 \pm 8.3	50	Dietary fiber (g)	32.0 \pm 8.0	-
Milk and Milk	75 \pm 3.8	150	Calcium (mg)	420 \pm 125	400
Sugar and Jaggery	20 \pm 10.0	30	Iron (mg)	8.7 \pm 1.4	30
Fats and oils	20 \pm 10.0	30	Retinol (μ g)	24.8 \pm 4.0	600
Fruits	-	100	Thiamine (mg)	148 \pm 0.10	0.94
			Riboflavin (mg)	0.48 \pm 0.10	1.03
			Niacin (mg)	6.3 \pm 1.03	12.4
			Vitamin C (mg)	6.0 \pm 3.0	40

*DDP - Desirable dietary pattern, computed based on the RDA of ICMR (17) for adult women with ideal body weight (IBW) to give 1900 calories and 60 g protein/day

**RDI - Values are mean of RDI computed using ICMR (17) recommendations for each women based on ideal body weight

Table 7: Mean \pm SD anthropometric measurements of the selected women

Measurement	WHR				\pm SE _n (124df)
	> 0.7	0.71 - 0.80	0.81 - 0.9	> 0.9	
Height (cm)	^b 154.7 \pm 6.4	^a 151.0 \pm 7.6	^a 152.8 \pm 6.1	^a 150 \pm 4.1	0.74
Weight (kg)	^a 4.6 \pm 5.1	^b 46.7 \pm 10.1	^b 51.4 \pm 9.6	^b 60.3 \pm 7.4	1.04
BMI	^a 17.0 \pm 1.4	^b 20.4 \pm 3.2	^b 22.3 \pm 3.6	^b 26.3 \pm 3.4	0.41
MUAC (cm)	^a 22.1 \pm 0.9	^b 25.0 \pm 3.2	^b 26.8 \pm 3.6	^b 60.3 \pm 7.4	0.33
TSF (mm)	^a 15.0 \pm 3.3	^b 17.3 \pm 5.0	^b 18.9 \pm 5.0	^b 60.3 \pm 7.4	0.54
MUAMC (cm)	^a 17.4 \pm 6.4	^b 19.5 \pm 7.6	^b 20.8 \pm 6.1	^b 60.3 \pm 7.4	0.26
Waist (cm)	^a 57.3 \pm 3.4	^b 67.2 \pm 8.5	^b 78.3 \pm 7.6	^b 60.3 \pm 7.4	0.85
Hip (cm)	^a 82.6 \pm 5.0	^b 87.6 \pm 9.6	^b 91.4 \pm 8.7	^b 60.3 \pm 7.4	0.96
WHR (cm)	^a 0.69 \pm 0.01	^b 0.77 \pm 0.03	^b 0.86 \pm 0.02	^b 60.3 \pm 7.4	0.002
Age (years)	^a 32.0 \pm 5	^a 33 \pm 6	^a 36 \pm 6	^a 60.3 \pm 7.4	0.74
Stress (scores)	^a 41 \pm 0	^b 38 \pm 6	^b 51.4 \pm 6.4	^b 60.3 \pm 7.4	0.66
Total η	8	60	54	5	

SE_n (df) - Standard error of means (Degrees of freedom)

Any two means in rows carrying different superscripts a, b differ significantly

remained within the normal range upto levels of 0.81-0.9, WHR. Higher BMI greater than 25 was associated with WHR > 0.9 indicating overweight and obesity. Higher proportion of women were having lower MUAC and MUMAC respectively. Mean stress scores (Table 7) ranged between 36-45. Compared to the standard levels they were in the 'moderately stress' range. As these women were on a nutrient deficit diet, it is expected that malnutritional status imposes a stress on the physiological process of the body (Srikantia, 1969). However, it was seen that mean stress scores fell with increasing WHR implying that high WHR may be an expression of induced adaptive mechanism to stress (Anon et al., 1994).

Food behaviour characteristics indicated

that for the women, major constraint for obtaining adequate diet was their low economic status aggravated by the indulgence of male members in alcoholism. Most of the women (90%) expressed preference for a variety of foods like eggs, vegetables, fruits, etc. although all of them expressed their inability to use them due to limited income. Insufficient income due to large household size and undesirable habits of male members appears to be the major factor in the difference observed between women's reported preferences and frequency of food used lacking both in quantity and quality.

DISCUSSION

The results of the study are indicative of the

fact that there is no substantial improvement in the nutritional status of the member households. Though the housing conditions, awareness of the study groups were somewhat better compared to that observed in urban slums or rural counterparts, the overall quality of life, household size, dietary intake was similar to the reports available on Indian women (Gopalan, 1993). Considering the fact that all the women were practising family planning, though belatedly, the choice of large/small families in the future rests with the younger generation. Though literacy rates were high, the years of formal education were low. Research findings indicate a positive correlation between health and nutrition and the levels of formal education (Gopalan, 1993). Employment stability, sufficient take-home pay and reducing indulgence of male members on undesirable habits are the other factors influencing the income and thus the family nutrition. Food intake was insufficient to meet the nutrient intake of the women, it is probable that it may be insufficient for the entire family. The family diet appeared to be lacking in most of the protective foods, viz., pulses, vegetables, milk, etc. Hence it is expected that the families may be at risk of malnutrition being deficient in most of the nutrients.

RECOMMENDATIONS

Income generating projects need to be initiated particularly for women along with training.

Adolescent boys and girls should be the target groups for family and nutritional health education.

It is important to stress the importance of formal education to all children, particularly the girls.

Programmes must be designed to reach the men, particularly to correct the undesirable practices and bring about awareness of family welfare.

Need based health and nutritional education need to be organized on a regular basis including both women and men.

Motivation programmes for women need to be organized more regularly along with a built-in evaluation component in order to improve the decision making power of the women.

REFERENCES

- Anon : Tighten your belt! Five insidiously easier ways to flatten the spare tyre. *Health and Nutrition*, 6 : 28-31 (1994).
- Beaton C., Vansard, G., Westrate, J.A. and Deurenberg, P. : Resting metabolic rate and diet induced thermogenesis in abdominal and gluteal femoral obese women before and after weight reduction *Am. J. Clin. Nutr.*, 47: 840-847 (1988).
- Gopalan, C., Shastri, B.V. and Balasubramanian, S.C. *Nutritive Value of Indian Foods* ICMR, Hyderabad (1989).
- Gopalan C : Nutrition in developmental transition in South-East Asia, *Regional Health Paper, SEARO No. 21*. WHO New Delhi, (1992).
- Gopalan, C. : Women and Nutrition in India - Some practical considerations In : *Problem and Policies* Gopalan, C. and Haravider Kaur (Eds). Nutritional Foundation of India, Special publication series 9, 47, (1993).
- Gopalan, C. : Nutrition Research in South-East Asia - The merging agenda of the future : *Regional Publication, SEARO No. 23* WHO New Delhi, (1994).
- Indian Council of Medical Research (ICMR) : *Report of an Expert Committee on Recommended dietary allowances for Indian UCMR*, New Delhi (1988).
- Jelliffe, D.B. : *The Assessment of the Nutritional Status of the Community* WHO, Geneva (1966).
- National Perspective for Women 1988-2000 AD*. Department of Women and Child Development, Ministry of Human Resources development, Government of India, (1988).
- Revathy M.S. : *Dietary pattern and food habits of the beneficiary families of the project* M.Sc. dissertation University of Mysore, Mysore (1993).
- Srikantia, S.G. : Protein calorie nutrition in children *Ind. J. Med. Res.*, 58 (8) : 36 : 52 (1969).
- Throne, M.J., Thompson, U.L. and Jenkins, D.J.A. : Factors affecting starch digestibility and the glycemic response with special reference to legumes. *Am. J. Clin. Nutr.*, 38 : 481-488 (1983).
- Turner, W.D. : Diet and epidemic coronary heart disease. In : *Nutrition and Killer Diseases*. John Rose (Ed.). Noyse Publications, USA (1982).
- Welch, R.W. : Diet components in the management of diabetics. *Proc. Nutr. Soc.*, 50 : 631-639 (1991).