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**RESEARCH PAPER**

**OPEN ACCESS**

# IMPACT OF EDUCATION PROGRAMME AMONG THE IRULA TRIBALS AT NEELAMPATHY

Mrs. C.PADMAVATHI<sup>1</sup> AND DR.V. SARADHA RAMADAS<sup>2</sup>

## ABSTRACT

The Irula tribes of Tamilnadu occupy the lower slopes and forests at the base of the Nilgiri hills. The Irula is a South Dravidian primitive aboriginal tribal community, spread over the three southern states of Tamilnadu, Kerala and Karnataka and is divided into several endogamous sub-groups mainly based on their linguistic variations. Karamadai block in Coimbatore was purposively selected for the study because maximum Irula tribes settlements were at the foot of the hills. Out of twelve settlements, Neelampathy settlement was selected for the study because of the willingness and co-operation of the tribal population and easy access. In order to organize education programme 72 families residing in Neelampathy was selected. Among these families 100 Irula tribal adult women in the age group of 21 years and above were selected to impart nutrition education. Among the tribal population nuclear family system was predominating. The female subjects were found to be 51 per cent and the rest were males. More than 54 per cent of the tribal women were illiterates and only 38 per cent completed high school education. Though they were non vegetarians, the fleshy foods were included on their diet once or twice a week. The inclusion of other vegetables and roots and tubers were not sufficient. When the mean food and nutrient intake was compared with the ICMR recommendation they were deficient. The life style diseases like heart disease, diabetes and blood pressure were observed among male tribes owing to the use of tobacco and alcohol consumption. Whereas female subjects had a problem of gastritis and diabetes. Eighty three per cent of tribal women were identified as undernourished as per body mass index and waist hip ratio. The haemoglobin estimation among 100 tribal women revealed that 43 per cent were mild anaemic, 34 were moderately anaemic and 17 were severely anaemic. More than 50 per cent had RBC count below normal. Eighty per cent were having normal plate count. In order to improve the healthy life style pattern, nutrition education was imparted to 100 women using the audio visual aids. The nutrition knowledge gained by the tribal women was improved and it was significant at one per cent level.

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### KEY WORDS:

Irula Tribes, Adult Women, Haemoglobin, Nutrition Education.

## INTRODUCTION

Tribals of Tamilnadu are concentrated mainly in the districts of Nilgiris. Of all the distinct tribes, the Kotas, the Todas, the Irulas, the Kurumbas and the Badugas form the larger groups, who mainly had a postural existence.

The Irula tribes of Tamilnadu occupy the lower slopes and forests at the base of the Nilgiri hills. The Irula is a South Dravidian primitive aboriginal tribal community, spread over the three southern states of Tamilnadu, Kerala and Karnataka and is divided into several endogamous sub-groups mainly based on their linguistic variations (Lakshminarayana, 2006).

Irulas are one of the poorest tribal communities with a population of 2.1 lakhs concentrated mainly in North Eastern Tamilnadu. They constitute the second largest group of tribes after the Badugas and are similar to the Kurumbas in many ways. They produce honey, fruits, herbs, roots, gum, dyes and trade them with the people in the plains. In the recent times the Irulas help in catching snakes and collect the snake venom ([www.indianetzone.com](http://www.indianetzone.com)).

Tribal population are particularly vulnerable to undernutrition, because of their geographical isolation, socio-economic disadvantage and inadequate health facilities. Adolescence is a significant period of growth and maturation. The nutritional status of adolescent girls, the future mothers,

contributes significantly to the nutritional status of the community (Helegson, 2006).

Irula women have minimal to no power in the decision making process and are discriminated and exploited at virtually at every level of society. They experience violence within their homes and prejudice when entering local politics or community initiatives. Many women suffer awful health conditions as a result of early marriage and child birth and a lack of trained assistance being available (Irula Tribe Women's Welfare Society, 2007). Teenage mothers are at increased risk of having pre-term deliveries, still births, maternal mortality, morbidity and neonatal deaths (Spear, 2002).

Nutrition education plays an important role in improving nutritional status of an individual or community with respect to food, health and nutrition and in convincing them to adopt desirable food habits (Begum et al., 2011). Nutrition education is the vital aspect of health care. For delivering health and nutrition messages any modern media as well as traditional media like radio, TV, folk song, drama, puppetry and story telling and printed materials like handouts, booklets, posters and pamphlets can be used (Anjali Patnaick, 2004).

Most important determinants of the women's nutrition knowledge were educational level, age and their kind of occupation. Women who had better knowledge of nutrition also exhibited better dietary behavior, thus underlying the importance of nutrition education for improving dietary behavior.

Thus, nutrition education offers a great opportunity to individuals to learn about the essentials of nutrition for health and to take steps to improve the quality of their diets, thus their well being and have a healthy life (Robinson, ., 2003).

The incidence of the disease is on the rise among the tribal population. Comparatively, the literacy rate has increased but the traditional food practices and lifestyle of tribes are changing slowly and gradually. Thus, there is an urgent need to educate and enlighten these tribes on importance of proper nutritional aspects and to retain the traditional foods and food habits and thereby keep them in good health.

In view of this, imparting nutrition education to reduce the incidence of life style diseases is planned to avoid any ill health and to stress that the greatest panacea is indeed prevention.

## **METHODOLOGY**

### **SELECTION OF AREA**

Irulas are one of the poorest tribal communities with a population of 2.1 lakhs, concentrated mainly in North Eastern, Tamil Nadu (Irula Tribe Women's Welfare Society, 2007). The Irulas are found mainly in the Southern and Eastern slopes of the Nilgiri hills. They are generally considered to have drifted to the Nilgiris from the hilly terrain of Attappadi and Siruvani valleys in Kerala and the adjoining Anaikatti and Karamadai area in Coimbatore ([www.indianfowels.com](http://www.indianfowels.com)).

Karamadai block in Coimbatore was purposively selected for the study because

maximum Irula tribes settlements were at the foot of the hills. Thus for the sample to be adequate and homogenous, Karamadai block was the natural choice. Out of twelve settlements, Neelampathy settlement was selected for the study because of the willingness and co-operation of the tribal population and easy access.

### **SELECTION OF SAMPLE**

In order to organize education programme 72 families residing in Neelampathy settlement situated in Karamadai Taluk of Coimbatore district was selected. Among these families 100 Irula tribal adult women in the age group of 21 years and above were selected to impart nutrition education.

### **COLLECTION OF DATA ON SOCIO-ECONOMIC BACKGROUND, DIETARY PATTERN AND LIFESTYLE DISEASES**

Details on the type of family, education and occupational status of the head of the family, total monthly income, monthly food expenditure, type of diet consumed, skipping of breakfast, type of snacks consumed, selection of snacks and type of food consumed on illness were collected from 100 adult women using a specially designed well structured interview schedule.

### **ASSESSMENT OF NUTRITIONAL STATUS**

Nutritional assessment includes the assessment of anthropometric, dietary, clinical and biochemical estimation. Measures of nutritional status are usually valuable as much as they may be predictive of health outcomes (Powers et al., 2005).

### **Anthropometric Measurements**

The nutritional status of the 100 selected samples were determined using height and weight, skin fold thickness, waist and hip circumference and found out body mass index (BMI), body fat and waist hip ratio.

### **Clinical examination**

The 100 tribal women were screened for clinical manifestations. In order to detect the presence of any clinical symptoms that is related to deficiency of one or more nutrients, physical examinations of hair, lips, tongue, glands, skin and gums were carried out with the help of a physician using a clinical schedule.

### **Biochemical examination**

In order to identify the anaemic status, haemoglobin level was estimated for which 5ml of the blood sample was drawn from all the subjects. Blood haemoglobin level was estimated by the cyanmethaemoglobin method and compared with the WHO standards and noted the anaemic status of the selected women. Besides this, for 50 women out of 100 who cooperated, their blood was drawn to find out their red blood corpuscles count, mean cell volume, mean cell haemoglobin, mean cells haemoglobin concentration and platelet count by Sysmah auto haem procedure.

### **Dietary weight survey**

Precise weight method which include weight of both raw and cooked food for the whole family was conducted for three consecutive days for a sub-sample of 30 tribal women in the age group of 30-50 years. From this the mean daily food intake of the individual female subject was calculated and the day's mean nutrient intake was

computed and compared with the ICMR recommended dietary allowances (2010) to note the adequacy of diet.

## **ASSESSMENT OF NUTRITION KNOWLEDGE AND IMPACT OF NUTRITION EDUCATION PROGRAMME**

### **Selection of Target Group**

From the tribal population of 261 subjects in 72 families, 100 adult women were selected by purposive sampling method as the target group to impart nutrition education.

### **Development of Nutrition Education Materials**

Nutrition education materials such as pamphlets, charts, leaflets, flash cards, emphasizing Gandhian Satvik foods, importance of iron in human nutrition in relation to anaemia, the dietary sources of iron and vitamin C, personal hygiene, kitchen garden, causes and ill effects of protein calorie malnutrition, low cost recipes, methods of cooking and storage of foods were developed.

### **Mode of Nutrition Education**

Audio visual aids were used to impart nutrition education. The pamphlets were prepared and distributed to the adult women. The charts were displayed on the walls and in the prominent places of the villages. Folk methods such as street play, villupattu, skits, mime and dance were shown and demonstration of inexpensive but nutritious recipes using the locally available ingredients were undertaken to impart nutrition education. The nutrition and health education was given to 100 women twice in a week for a period of four months.

## EFFECTIVENESS OF NUTRITION EDUCATION ON THE TARGET GROUP

### Assessment of KAP before and after nutrition education

The impact of nutrition education on the knowledge, attitude and practice of women were assessed by eliciting specific behavioural changes in what they feel (attitude) and what they know (knowledge) and what they do (practice) before and after the nutrition education using a specially designed proforma. The number of subjects giving the correct answers before and after the study period were determined to assess the impact of nutrition education.

## ANALYSIS OF DATA

The collected data was edited, tabulated, analysed and interpreted using appropriate statistical methods.

## RESULTS

### SOCIO-ECONOMIC BACKGROUND OF THE TRIBAL POPULATION

The socio-economic background including the composition of the family, type of the family, sex, marital status, age, educational status, monthly income and monthly expenditure pattern of the 72 tribal families are discussed below:

Due to urbanization and industrialization, there was an increase in nuclear family units as against joint family units. Therefore a general trend of predominance of nuclear families (94%) was evident among the tribal population compared to that of joint families (6%). Among the total population

five and six per cent were adolescent boys and girls and 35 and 38 per cent were adult male and female respectively. It is evident that the female population was predominated by 51 per cent and followed by 49 per cent of male population.

It is seen that majority of 54% of the tribal women were illiterates and only 38 per cent had finished their high school followed by five per cent who had education upto high school. About three per cent had higher secondary school education.

### Monthly Income of the Tribal Family

The majority of 39 per cent were in the income range of Rs.3001-4000. Only seven per cent were in the income range Rs.3001-4000. Thus majority of tribes live under poverty line which tunes with the studies conducted by Rao et al. (2006).

### Monthly Expenditure Pattern of the Family

Maximum of 52-55 per cent of income was spent on food which was followed by the expense on tobacco ranging between 23-24 per cent.

## DIETARY PATTERN

The type of diet, meal pattern, frequency of food consumption, type and quantity of the fat and sugar consumed per day, consumption of snacks, food likes and dislikes and food beliefs of tribal families are as follows:

Among the 72 families, 78 per cent of them were non-vegetarians followed by ova-vegetarian with 19 per cent and three per cent were vegetarians. A majority of 82 per cent followed 3-4 meals pattern and it was

surprising to note that 16 per cent of the tribal families followed less than two meal pattern and the remaining one per cent each followed one and more than four meals per day.

About 29 per cent of the tribals consumed coffee once or twice in a day and majority of the population (55%) had less than 2 cups of tea. Only meager percentage had 2-4 cups of coffee (5%) and tea (10%). None of them had snacks in the evening time.

“Moving forward to the addition of tea and coffee which most of Indians have, Gandhi implies that this is not necessary for life. In India, the custom of taking tea is of recent origin and it was originated in India”.

Coconut and groundnut oils were used by all the tribal groups. Gingelly oil, ghee and sunflower oil were not used by the tribals due to unavailability. Majority of the subjects irrespective of the income did not use more than 2.5 litres of oil per month.

As the tribes are non-vegetarians, all of them consumed fleshy foods once or twice a week. Green leafy vegetables were consumed daily by all the tribes irrespective of disease condition. Other vegetables were consumed almost weekly once by all the tribes. The common tubers included were potato, yam, onion, carrot, sweet potato, radish and tapioca.

#### **Mean intake of foods by the subjects**

The mean intake of foods by the subjects is shown in Table I.

It is found out that except fats and oils all the subjects had a deficit intake of all the foods as against Recommended daily allowances of ICMR. It is very disheartening that more than

60 per cent deficit of food intake was observed for milk and milk products and other vegetables. The lesser intake of energy giving foods led to be malnourishment resulted in underweight based on BMI and WHR.

#### **Mean Intake of Nutrients by the Subjects**

The mean intake of nutrients of the subjects is shown in Table II.

In case of tribal women the intake of nutrients was found to be less than the RDA of the adult women. As the food intake was lower than the ICMR recommendations it reflected in the nutrient intake also.

### **LIFE-STYLE DISEASES AMONG THE TRIBAL ADULTS**

The life style disease conditions of the tribals is projected in Figure 1.

From the above Figure I, it is evident that 52 per cent of male tribals had heart disease and 29 per cent had diabetes and 14 per cent had blood pressure. About six per cent of female were suffering from heart disease, 13 per cent from diabetes and eight per cent with blood pressure. Around 23 per cent of female and 19 per cent of male tribals were not affected by any disease. Majority of the females were free of diseases especially of heart disease particularly because they are devoid of smoking which may be attributed to one of the major factors for heart diseases in males.

### **ASSESSMENT OF NUTRITIONAL STATUS OF THE TRIBALS**

#### **Height of the tribal women**

It can be seen that 89 per cent female had a height measurement in the range of 140-150



cm, whereas 11 per cent of female had the range of 151-160cm. Thus all the females were below the standard value of 163.7cm (National Centre for Health Statistics, 2005).

### Weight of the tribal women

The body weight of 78 per cent of female tribals were ranged from 30-40kg, while 22 per cent of female had the range of 41-50kg. The weight of the women were below the reference body weight of 55kg as per the Indian Council of Medical Research (ICMR, 2010).

### Body Mass Index

Body Mass Index (BMI) was calculated using the standard formula and the details are tabulated in Table III.

According to NIN (2005), 18.5–20 is underweight and 20-25 is a normal or ideal body weight, 25-30 is overweight and above 30 is obesity.

From the above table, it is evident that 83 per cent of the tribal women were almost underweight and the rest 12 per cent belonged to normal range.

### Waist Hip Ratio

The WHR of the tribal women was calculated and presented in Table IV.

From the above table, it is clear that 88 per cent of female were in the range of 0.7 – 0.8 indicating that they were identified as underweight.

### Skin fold thickness of the tribal women

The mean skin fold thickness measurements of the selected women were 16.9mm. Thus on the basis of skin fold measurements the

tribal women were below the normal value indicating lower body fat.

### Biochemical examinations

Haemoglobin level of 100 women and other biochemical parameters for 50 women were estimated and the details are shown below:

### Haemoglobin level

Haemoglobin level of the selected tribal women is shown in Figure II.

It is noted that only six per cent of the adult women had normal haemoglobin level whereas majority of 43 per cent had mild anaemia. Among the rest 34 per cent were moderately anaemic while 17 per cent were severely anaemic. Figure 2 shows the prevalence of anaemia at varying degrees among adult women population.

With regard to RBC count 46 per cent of adult women had below normal count and the rest had normal RBC count.

A reduction in mean cell volume occurs when anaemia starts to develop. Seventy four percent of tribal women had mean cell volume level below the normal. It is observed that only four per cent and 24 per cent had above the normal value and normal mean cell volume respectively.

Mean cell haemoglobin, another supporting parameter to assess iron deficiency was estimated. It is clear that 90 per cent were below the normal value and two per cent was above normal value. Only eight per cent were having normal value.

Mean cell haemoglobin concentration values less than 30 per cent are considered to be

indicative of hypochromic microcytic anaemia. Fifty eight per cent were having below normal level and only 42 per cent were having normal mean cell haemoglobin concentration.

Eighty per cent were having normal platelet count. Only four per cent were having below normal and 16 per cent were having platelet count above normal.

### **EVALUATION OF NUTRITION EDUCATION ON SELECTED FEMALE TRIBES**

Nutrition education is delivered through multiple venues and involves activities at the individual, community and policy levels. Keeping this in view, with the help of audio-visual aids nutrition education was imparted to selected 100 women. The nutrition knowledge was assessed by using mean score and applied 't' test to find out the significant difference and the results are shown below.

#### **Assessment of nutritional knowledge of selected adult tribal women before and after education**

The impact of nutritional knowledge among 100 selected tribal women was carried out before and after imparting education and the scores is presented in Table V.

From the above table, it is evident that nutrition knowledge of the women were considerably improved after imparting nutrition education and is statistically significant at one per cent level.

### **SUMMARY AND CONCLUSION**

Among the tribal population nuclear family system was predominating. The female

subjects were found to be 51 per cent and the rest were males. More than 54 per cent of the tribal women were illiterates and only 38 per cent completed high school education. Though they were non vegetarians, the fleshy foods were included on their diet once or twice a week. The inclusion of other vegetables and roots and tubers were not sufficient. When the mean food and nutrient intake was compared with the ICMR recommendation they were deficient. The life style diseases like heart disease, diabetes and blood pressure were observed among male tribes owing to the use of tobacco and alcohol consumption. Whereas female subjects had a problem of gastritis and diabetes. Eighty three per cent of tribal women were identified as undernourished as per body mass index and waist hip ratio. The haemoglobin estimation among 100 tribal women revealed that 43 per cent were mild anaemic, 34 were moderately anaemic and 17 were severely anaemic. More than 50 per cent had RBC count below normal. Eighty per cent were having normal plate count. In order to improve the healthy life style pattern, nutrition education was imparted to 100 women using the audio visual aids. The tribal women gained nutrition knowledge and the improvement in nutritional knowledge was significant at one per cent level.

### **REFERENCES**

- ♦ Anjali Patnaik (2004). Nutritional Education, Chairman Enterprises, P.26.
- ♦ Begum, S.S., Begum, M.J., Munishanappa, H.V. and Devi. R.G. (2011). Impact of Nutrition Counselling on Knowledge, Attitude and Practice (KAP) scores, International Conference on Food and Nutraceuticals

- for Nutrition and Health: Technology and Delivery, Pp.145-146.
- ◆ Helegson, (2006). Psychology of Gender 2nd Edition, New Delhi, Dorling.
  - ◆ Irula Tribe Women's Welfare Society (2007). Thursday, January 13, 2011.
  - ◆ Lakshminaryana, G. (2006). Drauidian Studies (A Quarterly Research Journal), Drauidian University, Kuppam, Vol. IV, No.1-4. Pp.6-9.
  - ◆ Powers, H.J., Bates, C.J., Prentice, A.M., Lamb, W.H., Jepson, H. and Bowman, H. (2005). The Relative Effectiveness in Connecting a Microcytic Anaemia in Men and children in Rural Grabia, Human Nutrition, Clinical Nutrition, P.37.
  - ◆ Rao, K.M., Kumar, K.H., Venkaiah, K. and Brahman, G.N.V. (2006), Nutritional Status of Saharia – A Primitive Tribe of Rajasthan, J.Hum.Ecol., Vol.19, No.2, Pp.116-120.
  - ◆ Robinson, C.H., Lawla, M.R., Chenoweth, W.L. and Garwick, A.K. (2003). Normal and Therapeutic Nutrition”, 20th Edition, Macmillan Publishing Company, Pp.355-358.
  - ◆ Spear, B.A. (2002). Adolescent Growth and Development, J.Am.Diet Assoc., Vol.102, P.23.

**Table 1: Mean Intake of Food by the subjects**

Food Stuffs	RDA (g)	Mean intake (g)	per cent of difference
Cereals	360	276	-22.7
Pulses	75	61	-20.7
Milk and milk products	300	112	-63.04
Roots and tubers	100	91	-9
Green leafy vegetables	100	5	-95
Other vegetables	100	26	-74
Fruits	100	91	-9
Sugar	25	10	-60
Fats and oil	30	30	0

N: 30 subjects

**Table 2: Mean Intake of Nutrient by the Subjects**

Food Stuffs	RDA (g)	Mean intake by the subjects	per cent of difference
Energy (kcal)	1875	1830	-45
Protein (g)	50	35.2	-14.8
Fat (g)	20	16	-4
Calcium (mg)	400	158	-242
Iron (mg)	30	12	-18
Carotene (µg)	2400	1742	-658
Retinol (µg)	600	340	-260
Thiamine (mg)	0.9	0.4	-0.5
Riboflavin (mg)	1.1	0.7	-0.4
Niacin (mg)	12	8	-4
Folic acid (mg)	100	48	-52
Vitamin C (mg)	40	20	-20

N: 30 subjects

**Table 3: Body mass index of the tribal women**

BMI	Number	%	% of Excess/ Deficit
18.5 – 20	83	83	-22.7
20 – 25	17	17	-20.7
25 – 30	–	–	-63.04

N: 100 subjects

**Table 4: WHR of the tribal women**

WHR	Number	%
0.7 – 0.8	88	88
0.8 – 0.9	12	12
0.9 – 1.0	–	–

\* Adult female = 0.8

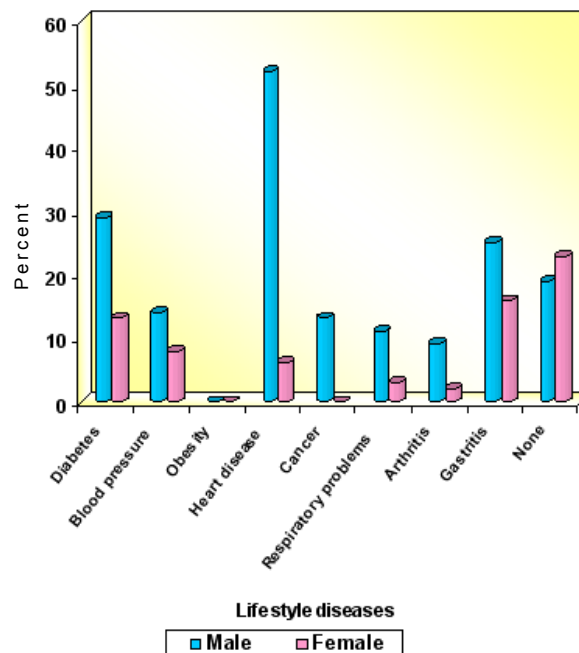
**Table 5: Mean scores of nutritional knowledge of selected tribal women before and after nutrition education**

Nutrition Education	Mean score	SD	t value	Difference
Before	15.28	4.28	39.26	124
After	20.82	3.99		

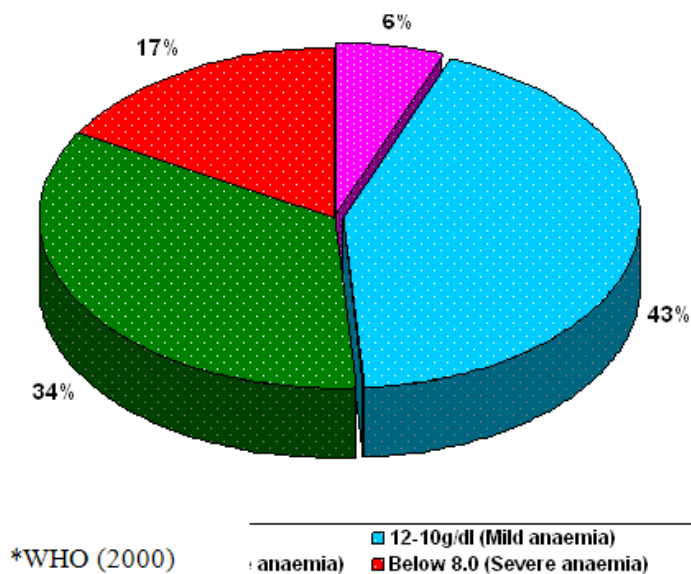
N: 100

\* Adult female = 0.8

**Figure 1: Life Style Diseases among the Tribals**



**Figure 2: Haemoglobin level of the selected tribal women**



\*WHO (2000)

12-10g/dl (Mild anaemia)  
10-12g/dl (Moderate anaemia) Below 8.0 (Severe anaemia)