

CHAPTER -II

MATERIALS AND METHODS

This chapter deals with the methods applied for the assessment of nutritional status of Hill Korwas of Madhya Pradesh. Pretested schedules and proformas were selected for the survey. Points of investigation were as follows;

1) Selection of Samples :

Samples were selected from Korwa development blocks from Raigarh and Sarguja districts. Korwa males and females chosen for this survey were of moderate activity.

2) Socio Economic Survey :

This survey covered all the information regarding family size, type, total income, education, housing condition and sources of other income etc.

3) Clinical observation :

The subjects were assessed clinically for the presence of nutritional deficiencies.

4) Anthropometric Measurements :

The subjects were assessed using various anthropometric measurements viz., height, weight, arm circumference, BMI, skin fold thickness and relative body weight percentage.

5) Diet survey :

Diet survey was performed using 24-hour recall method.

6) Nutrition and health education :

A short-term nutrition and health education was given to the subjects and its effects were evaluated.

I. SELECTION OF SAMPLE

Two districts of Madhya Pradesh namely Sarguja and Raigarh were chosen for the study. Sarguja district has 12 development blocks and Raigarh district has 3 development blocks of Hill Korwas, under the "Pahari Korwa Vikas Abhikaran". All the blocks were compact and continuous. Kamrima village of Bagicha development block of Raigarh has the biggest Hill Korwa village followed by Ghatgaon, Sulesa, Pandrapath and Jokapath of Sarguja district.

Samples were selected from all the development blocks using random sampling method. 10% families were selected from the total Korwa families of both the districts. Out of the total 5904 Hill Korwa families of Raigarh and Sarguja 591, Hill Korwa families were selected comprising of 1965 Hill Korwa individuals. This figure consisted of infants, children, adolescents, adults and elderly people. Adult subjects were divided into three groups as suggested by Jelliffe¹⁴⁵; young adults (19-35 years), adults (36-55 years) and old adults (above 55 years). All the subjects surveyed were homogenous in character and mode of living. All the subjects had moderate level of activity.

II SOCIO ECONOMIC SURVEY:

A pretested schedule of ICMR¹⁴⁶ was used for socio economic survey.

Information on size and composition of the families, religion, caste, educational status, monthly income, per capita income and other sources of income as farming, cattle, poultry etc were recorded. Some other informations on housing, ventilation, lighting, water supply, sewage facilities, recreational and transport facilities was also recorded.

III. CLINICAL EXAMINATION

A pretested schedule of clinical signs compiled by WHO¹⁴⁷ was used with slight modification. The presence and absence of deficiency signs in eyes, face, lips, teeth, tongue, hair, skin, and nails were recorded. The subjects were also questioned regarding any other health problem.

IV. ANTHROPOMETRIC MEASUREMENTS

Anthropometric measurements consisted of height, weight and mid arm circumference. All the measurements were taken thrice and mean data was finally recorded. With the help of this recorded data, other indices were calculated namely body mass index and relative body weight percentage.

Height

Anthropometer was used to measure the height. The subjects were made to stand upright barefoot and without raising the heels from the ground. Then the horizontal bar of the anthropometer was lowered until it touched the head. The measurement was taken carefully and the bar was not allowed to press the head. The reading to the nearest half centimeter was recorded.

Weight

Platform beam balance was used for recording weight. Weighing scale was placed on plain surface and the subjects were made to stand on the centre of platform barefoot without support. Extra clothing were also removed. The same balance was used throughout the study. The reading nearest to half kg was recorded. Balance was checked time to time with known weight to determine the accuracy of the weighing machine.

MID ARM CIRCUMFERENCE

Mid arm circumference was measured in cm with non stretchable fibre glass tape. Tape was placed on halfway between the acromial process of the scapula and the olecranon process of ulna of left arm but was not allowed to press the soft tissues. During the measurements the arm was kept in a relaxed and loosely hung position. Reading nearest to 0.1 cm was measured by the tape.

BODY MASS INDEX

Body weight (kg) and height (meter) were used to determine the body mass index. Formula of body mass index suggested by Thunberg et al ¹⁴⁸ was used ;

$$\text{BMI (Kg/m}^2\text{)} = \frac{\text{Body weight}}{\text{Height}^2}$$

RELATIVE BODY WEIGHT PERCENTAGE :

Actual body weight and ideal body weight were used to calculate the relative body weight percentage. Height, weight, age, and sex were used to find out the actual and ideal body weight. Ideal body weights were taken from the tables of Life Insurance Corporation of India. ¹⁴⁹

$$\text{Relative body weight (\%)} = \frac{\text{Actual body weight}}{\text{Ideal body weight}} \times 100$$

SKIN FOLD THICKNESS

Skin fold thickness was measured by Hattain thickness caliper. Triceps skin fold measurement was taken by the calipers, half way down the left arm. A fold of skin was picked up and the calipers was applied a little below from fold and then reading was taken. The arm was kept relaxed at the side while thickness was measured. Reading closest to 0.1 mm was recorded.

V. DIET SURVEY

Diet survey was carried out using a pretested schedule as directed by ICMR.¹⁵⁰ Food intake for three consecutive days was recorded on the basis of oral questionnaire (24 hour recall) using standard measures. NIN standard cups were used to determine the food consumption of the subjects.

Raw food weighment was taken for three days in each household, and food consumed by the guest was also recorded. Average consumption of food was finally analysed from food intake. ICMR (1981, 1990)¹⁵¹

CALCULATION OF CONSUMPTION UNIT

The intake in terms of per consumption unit or per person per day may be expressed as follows

$$\text{Intake per consumption unit /day} = \frac{\text{Total raw amount of each food stuff}}{\text{Total consumption units of the family} \times \text{Total number of days of survey}}$$

$$\text{Intake per person /day} = \frac{\text{Total raw quantity of each food stuff}}{\text{Total number of members in the family who par take the meal} \times \text{Total number of days of survey}}$$

CALCULATION OF NUTRITIVE VALUE

Collected data was converted in terms of weight and tabulated. The food consumption of the subjects was computed from standard tables (ICMR, 1990)¹⁵² and compared with recommended allowances.

VI. NUTRITION AND HEALTH EDUCATION

The knowledge of individuals regarding nutrition and health was assessed using a questionnaire which was based on a pretested schedule (Palta A)⁴⁹. This questionnaire covered all the areas which could assess the nutrition and health concept of the individuals. The covered areas were :

- a) Basics of health and nutrition
- b) Nutrition for vulnerable section
- c) Cooking practices and food beliefs
- d) Immunization
- e) Hygiene and health
- f) Environmental sanitation

After this a short duration nutrition and health education was given to the subjects through posters, charts and group discussions method. After a few weeks, the subjects were again interviewed on the same questionnaire. The questions included in the schedule were of yes /no /don't know type. The changes in score "before" and "after" the education showed their improved awareness.

The aspects of nutrition and health education covered in this survey were :

- 1) Balanced diet

- 2) Diet during illness
- 3) Nutritional care of vulnerable groups
- 4) Concept of mixed diet
- 5) Importance of seasonal fruits and green leafy vegetables
- 6) Cooking practices
- 7) Importance of immunization
- 8) Importance of personal hygiene and sanitation
- 9) Food taboos and food beliefs
- 10) Importance of environmental sanitation

VII STATISTICAL ANALYSIS :

A statistical analysis of the data in the study were done by using standard formulas. Standard deviation calculation of all groups of females and males were combined separately using Garret's formula :

$$\sigma_{\text{comb}} = \sqrt{\frac{N_1(\sigma_1^2 + d_1^2) + N_2(\sigma_2^2 + d_2^2) + \dots}{N}}$$

Where σ_1 = SD of distribution 1

σ_2 = SD of distribution 2

d_1 = (M_1 - M comb)

d_2 = (M_2 - M comb)

$N = N_1 + N_2$

N_1 = Number of cases in distribution - 1

N_2 = Number of Cases in distribution - 2

Combined mean values were calculated employing formula

$$M \text{ Comb} = \frac{N_1 M_1 + N_2 M_2 + N_3 M_3}{N_1 + N_2 + N_3}$$

Where N_1 , N_2 and N_3 are the number of cases on component distribution 1, 2 and 3, respectively and M_1 , M_2 and M_3 are the respective means of sub group 1, 2 and 3. Correlation coefficients, were determined by the product moment method, applying the formula -

$$r = \frac{\sum xy}{N \sigma_x \sigma_y}$$

Where x and y are the deviations from the actual means and $\sum xy$ is the sum of the deviations, 'N' is the number of cases, σ_x and σ_y are the standard deviation for x and y .

ANALYSIS OF VARIANCE.

Fisher's ²²⁴ formula was used for 2 way and 3 way analysis of variance. F ratio was calculated from mean square.

$$F = \frac{Ms \text{ effect}}{Ms \text{ error}}$$

$$F_a = Ms_e / Ms \text{ error}$$

$$Ms \text{ effect} = \frac{SS \text{ effect}}{df}$$

$$Ms \text{ error} = \frac{SS \text{ error}}{df}$$

$$SS \text{ effect} = \frac{\sum x^2_{a_1} + \sum x^2_{a_2} + \dots + \sum x^2_{a_m}}{N} - \text{Correction}$$

$$SS \text{ error} = \sum X a_1^2 - \frac{(\sum X a_1)^2}{N} + \sum X a_2^2 - \frac{(\sum X a_2)^2}{N} + \dots + \sum X a_m^2 - \frac{(\sum X a_m)^2}{N}$$

$$\text{Correction} = \frac{(\sum \sum x)^2}{N}$$

Where

- x = Raw score
- a = Main effect (sources)
- df = Total frequency
- m = number of cases
- Ms = Mean Square
- Ss = Sum of Square