

3.1 Introductory Statement

There is no alternative to truth and therefore to research. The purpose of any research work is to discover the answer to the question through the application of a scientific procedure, the main aim of the research is to find out the truth which is hidden and which has not been discovered yet. The research is one way to penetrate deep into the fact leading to knowledge. Thus, in order to organize the facts collected, proper scientific methodology must be used.

According to P.V. Young : "We may define social research as the systematic method of discovering new facts, of verifying old facts, their sequences interrelation ship, causal explanations and the natural laws which govern them."

According to Clifford Woody : "Research comprises defining and redefining problems, formulating hypothesis or suggested solution; collecting, organizing and evaluating data; making deduction and reaching conclusion; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis."

3.2 Objectives

- To assess the anthropometric measurements of adolescent girls and boys.
- To study the various health problems of adolescent girls and boys.

- To study the dietary intake of adolescent girls and boys, according to their socio - economic status and religion.
- To assess the Hemoglobin level of adolescent girls and boys.

3.3 Hypothesis

In scientific research we have to make new discoveries, but we cannot proceed in complete ignorance. We must have some ideas as to new aspects that are likely to be discovered. Then of course, we proceed to find out whether the ideas conceived are true. Those may be totally correct, as only partially correct or may be altogether false, but they do help us to get going and guide us in our study

According to G.A Lundberg, "A hypothesis is a tentative generalization, the validity of which remains to be tested in its most elementary stage. The hypothesis may be any hunch, guess imaginative ideas, which may become the basis for action or investigation."

In the present study data have been collected and conclusion has drowned under the light of following **Hypothesis:**

- There shall be no significant difference in anthropometric measurements of adolescent girls and boys.
- There shall be no significant difference in health problems of adolescent girls and boys.
- There shall be no significant difference in dietary pattern of adolescent girls and boys, according to their socioeconomic status and religion.
- There shall be no significant difference in hemoglobin level of adolescent girls and boys.

3.4 Working Definitions

- I. **Adolescence** : The term adolescence is commonly used to describe the transition stage between childhood and adulthood. Adolescence is also equated to both the terms “teenage years” and “puberty.”
- II. **Food Frequency** : food group intake was assessed in terms of frequency consumption of food on weekly, monthly and daily basis.
- III. **Dietary nutrient intake:** - Calculated for some nutrients like - Energy, Carbohydrate, Protein, Fat, Calcium & Iron consumed in a day. We have assessed Age, Weight and Energy, keeping in view that if energy intake increases, weight is directly affected.
- IV. **Physical Activity** : In present study three category of physical activity has been considered-
 - Sedentary activity
 - Moderate activity
 - Heavy activity
- V. **Exercise** : **This study includes light exercise, walk & Yoga etc.**

3.5 Research Design

Research design is a plan according to which observations are made and data assembled. It provides the empirical and logical basis for drawing conclusions and gaining knowledge. In present study, the research design has been developed systematically in following step:-

Sample Design : According to P.V Young “sample is a miniature picture of the universe.” When a small group is taken, it is called sample study. The whole group from which sample is drawn is technically known as universe or

population and the group actually selected for the study is known as sample. When the sample is representative of a population and certain things can be predicated about the population from which it was drawn, and then it is known as statistical inference. Taking this in consideration, following sample design has been propagated systematically

Sample Technique

The present study was carried out on 500 adolescent girls and boys aged 18-21 years. Samples were selected by random purposive sampling method.

Table 3.1
Sample at a glance

Demographic Variable	Population Particulars	Frequency (N=500)	Percentage %
Education	Graduate	270	54
	Diploma	230	46
	TOTAL	500	100.0
Occupation	Students	500	100.0
Category	General	145	29
	OBC	137	27.4
	SC	108	21.6
	ST	110	22
	TOTAL	500	100.0
Types of Family	Nuclear	204	40.8
	Joint	296	59.2
	Extended	0	0.0
	TOTAL	500	100.0
Socioeconomic Status	MIG 20000/- to 40000/-	250	50
	HIG 40001/- and above	250	50
	TOTAL	500	100.0

Source : currentnewsandinformation.blogspot.com/.../mhada-housing-lottery

Table 3.2

Locale of Sample:

All the samples are selected from colleges of Indore District

No. of Samples	College
500	Christian Eminent College

Table 3.3

Caste Distribution of Sample

Caste	Adolescents n=500
	No
Hindus	392
Muslim	35
Sikh	73

3.6 Tools and Techniques

Adopting proper tools and techniques for the collection of data is a foremost important step of the research design. The collection of data refers to a purposive gathering of the information relevant to the subject matter of the study from the samples under investigation. The method of collection of the data depends upon the nature, purpose and the scope of the study on one hand and the availability of resources and time on the other.

In present study the collection of data was done mainly by following methods.

Questionnaire Method : In this study, a structured questionnaire was used regarding demographic trends (education, income status, age, occupation,

sex, religion, cast) life style pattern (Physical activity, Food Pattern, Exercise) Health status (age of menarche, Age at adolescent, health problems like Blood pressure, hemoglobin status, Obesity, menstrual problem, underweight, heart disease, Anemia)

Diet Survey : For the collection of data regarding consumption of different food items, a 24-hour dietary recall method has been conducted through questionnaire method. The food list was used to collect information about the quantity of various food consumed by respondents, during the period of survey (one day). For this a questionnaire containing a list of foods was prepared .The quantities consumed by the samples were entered carefully on the sheet. Some points were particularly considered while taking information regarding the dietary intakes which were as follows:

- Sizes and volumes of some foods like size of chapatti, minimum amount of dal and katori size, consistency of dal, amount of sugar in tea etc.
- Information regarding use of oil or fat in vegetables.
- Food items consumed outside were recorded.

The nutrients were calculated by especially designed computer software based on nutritive value of Indian foods by **C.Gopalan (1996)** and consumed nutrients were checked against recommended dietary allowances (**ICMR 1989**) for the assessment of nutrient intake status.

Anthropometric measurements

Nutritional anthropometry is measurement of human body at various ages and levels of nutritional status. It is based on the concept that an appropriate measurement should reflect any morphologically variation occurring due to significant functional physiological changes.

For example, a significant reduction in fat fold measurement reflects a shift in the individual's energy balance.”

“The pattern of growth and the physical state of the body through genetically determined are profoundly influenced by diet and nutrition hence anthropometric measurements are useful criteria for assessing nutritional status”(Swaminathan - 1998)

Following procedures were adopted for it :

Age : The age of the subjects was taken up by asking date of birth.

Weight : The weight of the subjects was measured in kg. on a spring weight machine. The subject was wearing minimum clothing and no shoes.

Height: - The measurement of height was done by asking the person to stand on a plain surface and rating her back on fixed support. The height was measured using non stretchable tailoring tape. The subjects were not wearing shoes. The measurement of Height and Weight was done by taking full precaution, which are as following:

- The zero error of the weighing scale was checked before taking the weight and was corrected as and when required.
- In the measurement of height, the subject was allowed to stand erect, looking straight and leveled surface, without shoes, with heels together and toes apart.
- In the measurement of weight. The person was wearing minimum clothing and was without shoes.

BMI : After the cessation of linear growth around 21 years weight for height indicates muscles fat mass in the adult body the ratio of weight (in kg) height(m²) is referred to as body mass index (BMI). It provides a reasonable

indication of the nutritional status of adults. The BMI has good correlation with fitness. It may also be used as an indicator of health risk. Body mass index of subject was determined by using formula -

$$\text{BMI} = \text{Weight in kg} / \text{Height in m}^2$$

Waist to Hip Ratio: The predominant distribution of fat in an obese person, whether in upper part or the lower part of the body may determine the disease pattern. Abdominal obesity does not always go hand with overweight or obesity.

$$\text{The normal of ratio } \frac{\text{Waist}}{\text{Hip}} = 0.7$$

Clinical Assessment

Clinical examination is the most essential part of all nutritional surveys, since the ultimate objective is to assess levels of health of individuals and population groups as influenced by the diet they consume. The assessments of clinical manifestations were done as per ICMR Clinical Examination Performa. (**Appendix 6**)

Biochemical Method

Blood Hemoglobin level, serum calcium level were estimated biochemically by following procedures:

Estimation of Hemoglobin

Sahli's Method

Apparatus

It consists of a square tube with markings of Hb% on one side and percentage on the other side; 100%=14.5gm% Comparator has a flat surface

of a standard brown colour. Hb pipette has mark of 0.02ml (20cumm).A dropper is used to put N/10 HCl and distilled water into the square tube. Hb meter with square tube flat comparator surface is preferable to round tube.

Principle

Blood is added to N/10 HCl, which converts Hb into acid Hematin. Brown colour of acid hematin is matched against the brown colour of the comparator.

Technique

- Add N/10 HCl with a dropper into the Hb meter tube up to the mark 3gm%.
- Fill the Hb pipette with 0.02ml of blood and wipe off the excess blood at nozzle of the pipette with moistened cotton. Blood may be taken from an EDTA vial or from a finger prick.
- Blow off the blood in the pipette into the Hb meter tube. Rinse the pipette by drawing in and discharging the blood-acid solution at least twice.
- Withdraw the pipette from the solution and rinse it with 2-3 drops of HCl so that Hb acid solution sticking to the pipette goes into the tube. Withdraw the pipette. Allow the acid to act on the RBC's for 10 minutes to lyses the red cells and convert Hb to acid hematin.
- Mix acid hematin with a glass rod provided with the Hb meter set.
- Match colour of the solution with that of the comparator in the natural light. If it is draker, add distilled water with a dropper and stir the

solution with a glass rod. This process is continued till the colour of the solution matches the comparator colour.

Take out the stirrer from the solution but keep it in the upper inside of the tube and take the reading from the upper meniscus in gm%.

Blood Hemoglobin

Requirements

1. Drabnkin's Reagent

It contains in 1000 ml of distilled water.

- (a) Potassium ferricyanide : 400 mg
- (b) Potassium dihydrogen phosphate : 250 mg
- (c) Potassium cyanide : 100 mg
- (d) Nonidet : 1 ml

This reagent is stable in polythene contains at 2.80 c.

- 2. Cyanmet hemoglobin (HICN) standard (Hb standard) is commercially available. This standard is directly pipette in a cuvette and optical density is measured at 540 nm (green filter): The reading obtained correspondence to 15 g/dl. Hemoglobin (the international committee for standardization in hematology has defined specification on the basis of a molecular weight of 64458 and a millmolar coefficient extinction of 44.0 solution of HICN contain 550, 850 mg. Hb per liter and the exact concentrations indicated on the label.
- 3. Hb – pipette. (20 μ l calibrated)
- 4. Test tube (15 x 125 mm)
- 5. Photometer or spectrophotometer

Procedure

Pipette in the tubes labeled as follows:-

Table 3.4

Preparation of reagents in test tube for hemoglobin estimation

Reagents	Test	Blank
1. Drabnkin's reagent, ml	5.0	5.0
2. Blood, ml	0.02	--

Mix the contents in the tube labeled as test thoroughly and wait for 5 minutes. (1) Read absorbance of test by setting blank to 100% T at 540 nm (green filter). If reading of blank is equal to distilled water, it is not necessary to keep a blank. (2) Read a absorbance of standard (15 g/dl) by pipetting it directly in a cuvette.

Calculations

$$\text{Hemoglobin (g/dl)} = \frac{\text{O.D. TEST} \times 15}{\text{O.D.STD}}$$

Requirements

1. **Drabnkin's reagent**
2. **Cyanmet hemoglobin (Hb standard) standard** : 15g/dl (O.D. of this standard at 540 nm (green filter) corresponds to 15g/dl. hemoglobin.

Pipette in the tubes labeled as follows:-

Table 3.5

Reagent contents of blank and standard solution

Sr.	Reagents	Std.5	Std.10	Std.15	Blank
1	Drabnkin's reagent, ml	3.34	1.67	0.0	5.0
2	Hb Standard, ml	1.66	3.33	5.0	0.0

Mix well and read intensities of these standards by setting blank to 100% T at 540 nm (green filter). Prepare a green by plotting O.D. readings on Y-axis and concentrations of hemoglobin standards, i.e. 5.0g, 10.0g and 15.0g on X-axis.

Precautions

1. The reagent is poisonous, handle it carefully.
2. Mix anticoagulant blood by swirling properly before pipetting. Adjust carefully the blood column up to the graduations mark and use dry cotton to wipe excess blood on the pipette.
3. Do not discard Drabkin's reagent in the sink. Poisonous cyanide (HCN) Gas is released if the sink has an acidic solution. Flush the sink with water and then discard the Drabkin's reagent and continue to flush water for some time.
4. If capillary bloods are used, keep the Drabkin's reagent ready in a test tube. Collect the free flowing blood in to Hb-pipette (Sahli pipette) wipe the excess blood and dispense in the reagent. Mix immediately to avoid clotting of the blood.
5. Turbidity may develop due to HbS or HbC or due to lipaemic blood. In that cases if it is due to abnormal hemoglobin add 0.1 g of potassium carbonate, centrifuge and read absorbance of the supernatant solution. In the case of a lipaemic blood specimen use 20 µl of serum or plasma, mix with 5ml of Drabkin's reagent and use it as a blank. Read test reading against this blank.

3.7 Variables Used:

Following variables like socioeconomic status, religion, education level etc were assessed.

3.8 Statistical Analysis

The Data was entered into the computer database. The responses of frequencies were calculated and analyzed by using statistical software SPSS version 11.0. Prevalence of an outcome variable along with 95% confidence interval was calculated. The descriptive statistics like mean and standard deviation for different study variables were calculated. Significance of difference in frequency distribution of studied sample have been found out using Chi square and difference in mean has been found out using 'Z' test.