CHAPTER – II

PROBLEMS AND HYPOTHESES

2.1 Statement of the Problems

2.2 Variables of Interest : Their Specification

2.2 Hypotheses : Their Formulations
In the vast ocean of knowledge, a “Problem” must strike the mind of a research fellow, trying to study any event. In any field of study, without a problem in view, no research can make its beginning. Hence the formulation of a problem must be the first step of any research. It may so happen that the problem is of very general nature having multi dimensions and cross linking. But as the research goes on, the problem gets its proper dimension and becomes more and more precise. It has therefore been maintained that “a large part of the solution of a problem lies in knowing what it is one is trying to do” (Kerlinger 1973). A problem always strikes the mind of a research fellow in the state of ignorance and doubt. While posing a problem, the research has to keep in view that the problem is such that it can be amenable to empirical testing. By testability it is meant that it is possible to make a probability statement about the answer, that is, to determine empirically a certain degree of probability about its being true or false (Mc Guigan, 1960).
A problem is an interrogative statement that asks the question regarding the relationship between two or more variables. A problem always has two or more variables. One being the dependent variable and the other are the independent variables. In order to arrive at a conclusion answer to the problem, the research has to accept a hypothetical answer and then empirically test its correctness. “A researcher observes an event, wonders about it, formulates some tentative ideas, about it and set out to test the accuracy of these ideas” (Bachrach, 1972). Keep in view, the purpose of the present study; the following problems have been set forth in an interrogative form, to seek their scientific solutions.

2:1 STATEMENT OF PROBLEMS:-

1. Is socioeconomic status responsible for the problem of obesity among school going children?
2. Is food habit capable of generalizing the obesity among school children?

3. Can physical activity be held responsible for obesity among school going children?

4. Is obesity among school going children susceptible to the joint action influence of socioeconomic status, food habits and physical activity?

Considering the above mentioned statements of problem, it is clear that there exists one dependent variable, i.e., obesity and three independent variables namely, socioeconomic status, eating habits and physical activity.

Several research methodologists and behavioral scientists like Kerlinger (1978, 86), Goode and Hatt (1981) and many others have pointed out that the best way to obtain a scientific solution for a research worthy problem is to formulate coherent research worthy hypothesis, where the variables concerned with the problem should be operationally specified through a logical deduction system. Hence, in the following steps, an attempt has been made to operationally
specify the nature of variables involved in the present study, as far as possible.

### 2:3 VARIABLES OF INTEREST : THEIR SPECIFICATION:-

Variable are characteristic of the participants or a situation in a given study that has different values or levels. Before arriving at the research worthy hypotheses it is better to understand the operational characteristic and properties of the dependent
and independent variables involved in the present investigation.

(A) **Dependent Variable:**

A dependent variable reflects any effect associated with the manipulation of the independent variable (s). The selection of an appropriate dependent variable should be based on theoretical and practical considerations, which is determined by a consideration of the possible dependent variable. The dependent variable should be reliable and maximally sensitive to the phenomenon under investigation because behavioral researches generally involve a single investment in time and material resources. Thus the selection of a dependent variable that possesses these two characteristic may minimize the amount of research effort required to investigate a research hypothesis. Generally, in most of the researches one dependent variable (univariate procedure) is used because it is generally impossible to measure more than a limited number of dependent variables and those that can be measured are found to be highly correlated. In selecting a dependent variable, it should also be noted that the observations within each treatment level (or combination of treatment levels) are
normally distributed (Kirk, 1969). Here, in the present piece of work obesity is a dependent variable.

**Obesity:-**

Obesity is the only dependent variable in the present study. Obesity can be defined as “a diseases in which excess body fat has accumulated such that health may be adversely affected” (Kopelman, 2000). Obesity is a complex multi factorial chronic disease developing from interactive influences of numerous factors- social, behavioral, psychological, metabolic, cellular and molecular (genetic). Clinically, it’s defined for adult as body mass index (BMI) >=30 (WHO, 2000).

Determining whether growing children are obese is difficult. Some excess weight may be gained at either end of the childhood spectrum; the 1-year-old toddler and the prepubescent child may weight more for developmental and physical reasons, but this extra weight is often not permanent. Only considering height and weight when determining whether a child’s weight is appropriate dose note take in to account children with significant muscle mass. BMI, a useful clinical tool for assessing weight in comparison to height, has limitations in determining obesity because of variability
related to sex, race and maturation stage (Daniels et al, 1997). However, CDC (Center for Disease Control and Prevention) developed growth charts for children, 2-20 years, taking into account age and gender, so children can be monitored frequently and prevention or intervention provided at a young age.

Now a day, obesity is a major serious public health problem and a big challenge, since its prevalence is accelerating rapidly not only in developed but also in developing countries (Khader et al, 2008). Obesity may develop at any age in either sex. Several factors may contribute to the development of obesity. Obesity develops overtime and, once it develops, is difficult to treat. Obesity should not be regarded simply as a cosmetic problem affecting certain individuals, but a crisis that threatens global well being (WHO, 2000).

Obesity is basically due to a positive energy balance of the body resulting from excessive energy intake and low activity level. If the energy balance is positive, the size of adipocytes (body fat cells) gradually increases [Hypertrophy]. However if the energy intake continues to be high, adipocyte
proliferation (multiplication) occurs and the cell number begins to increase [Hyperplasia]. Once the fat cells are increased, their number seems to remain fixed and cannot be lost even if weight is reduced i.e. the number of fat cells formed remains fixed, it is only the fat cell size which decreases with weight reduction (Khanna et al, 1997).

Obesity is the mother of all diseases. Hence the important of treating obesity to prevent increased occurrence of type II Diabetes, CAD (metabolic syndrome) in India needs greater attention from all concerns.

Kopelman (2000) suggests that obesity is now so common within the world’s population that it is beginning to replace under nutrition and infectious diseases as the most significant contributor to ill health.

(B) **Independent Variables and their levels:-**

The selection of an appropriate independent variable and its levels should be based on results of previous experiment, concerned research literature and on theoretical and designing considerations. In some research areas, it may be helpful to carry out a small pilot study to select treatments level prior to the main experiment. If the independent variable is
quantitative in nature, its treatment levels should be chosen so as to cover a sufficiently wide range to detect effects of the independent variable if real effect exist and the number and spacing of the levels should be sufficient to define the shape of the function relating the independent and dependent variable. In the present study three independent variables, namely, socioeconomic status, eating habits and physical activity.

**Socioeconomic status:-**

Socio-economic status is the first independent variable in the present study. SES is the non-nutritional causal factors, which greatly influence the nutritional status of a community. The socioeconomic situation is largely determined by residence, per capital income, family sizes, educational level of parents, and the spread of modernization and urbanization. All these variables are behind the increase in the prevalence of obesity all over the world. Livings in urban areas promote overweight. Educational level is inversely proportional to obesity *(Kopleman, 2007)*. Family income is inversely proportional in developed countries and directly proportional in developing ones *(WHO, 2000)*.
George et al (1991) suggest a large role for socio-cultural factors in the patterning of body fat distribution. Socioeconomic status and behavioral factors are important determinants of weight gain and overweight (Rissanen et al; 1991).

Recent epidemiological trends in obesity indicate the primary cause of the global obesity problem lies in environmental and behavioral changes. The world wide obesity problem can be viewed as a consequence of the substantial economic, social and cultural problems now confronting developing and newly industrialized countries. There is an inverse relationship between socioeconomic status and prevalence of obesity, type II diabetes and CVD.

A recent review has revealed that India is also characterized by the development and nutritional transition that may contribute to the risk of overweight and obesity, especially in urban areas (Shetty, 2002). Visweswara rao et al (1995) reported that the prevalence of overweight among adults in urban colonies of Hyderabad. It was also observed that the prevalence of overweight and obesity was higher in the higher income groups for both males and females.
A study conducted in urban Delhi by the Nutrition Foundation of India also revealed that the prevalence of overweight among the “middle class” increased from low-to high-income groups, showing that about 32.2% of males and 50.0% of females in the high-income group suffered from overweight (Gopalan, 1998). Both these studies indicated that the prevalence of overweight and obesity was higher in high income group.

The increasing urbanization, changes in standards of living, dietary patterns and occupational work patterns are key factors to risks of the epidemic of obesity and associated morbidity and mortality.

**Eating habits:-**

Eating habits is the second independent variable of the present study. Increase in energy intake will lead to overweight and/or obesity. The eating patterns include eating outside homes, drinking sweetened beverages and fresh juice, eating large quantities and taking frequent meals and snacks. All these patterns interact with each other, and contribute to the increase of energy intake, which, by time accumulate. Thus

Dietary pattern also play an important role in increasing obesity. The plenty and variety of manufactured food with different palatable tastes, highly rich in fat, sugar, salt all the time, in addition to the spread of restaurants, have changed people’s trend to food. There has also been a consumption increase as these high dense fat-sugar foods affect satiety signals to become weak, and give pleasurable mouth feel so the individual has the appetite to eat and drink more (Canoy and Buchan, 2007; Rolls, 2007; Jebb, 2007).

Factors contributing to excess energy intake for the younger generation include the proliferation of eating and food establishments, eating tied to leisure activities (many of which are sedentary), children making more food and eating decisions, larger portion sizes, and inactivity (French et al, 2001).

**Physical activity:**

Physical activity is the third independent variable of the present study. Physical activity is defined as "any bodily movement produced by skeletal muscles that result in a
substantial increase over the resting energy expenditure” (WHO, 2000; Krebs et al, 2007).

An important function of physical activity is to help maintain energy balance. Weight gain occurs when energy intake (calories consumed) exceeds total daily energy expenditure for a prolonged period (DHHS 1996). Total energy expenditure represents the sum of three factors:

1. Resting energy expenditure to maintain basic body function (approximately 60% of total energy requirements);
2. Processing of food, which includes the thermic effect of digestion, absorption, transport and deposition of nutrients (about 10% of the total energy requirement); and
3. Non resting energy expenditure, primarily in the form of physical activity (about 30% of total energy requirements) (Leibel et al, 1995 in DHHS 1996).

Although there is realistic relationship between physical activities –the major modifiable component in energy equation- and well being for people at all levels and ages. Since it is plays a major role in preventing many NCDs, mainly
obesity, it declines all over the industrialized societies (Ulijaszek, 2007). On the other hand, the increasing information communication technology, such as TV, video, and computer, as well as, living in apartments, coupled with motorized transportation, and modern conveniences in homes, with broken relationships on family/community levels all have led to increase in sedentary life style, making people less active all over the world (Boyce, 2007; Rey-Lopez et al, 2008).

Boyce reviewed the relationship between media and obesity. These research found that the effect of media in increasing sedentary, increasing consumption of unhealthy food either because of advertisements for different kinds of food, or because of the increasing consumption of snacks that are high in energy, fat, salt, sweetener, and carbonated beverages while watching TV.

2:3 HYPOTHESES: THEIR FORMULATIONS:-

After the selection of a research problem, researcher formulates the testable propositions to obtain a tentative
solution of the problem, which is technically known as hypothesis. According to *Mc Guigan (1990)*, “A hypothesis is a testable statement of a potential relationship between two or more variables”. It is a conjectural statement of the relation between two or more variables in declarative sentence form and relates either generally or specifically variables (*Kerlinger, 1986*). A good research hypothesis should be conceptually clear, testable, parsimonious, logical, comprehensive, general and related to the existing body of theory and facts. It should provide maximum deductions and should be related to available scientific tests and apparatuses.

Keeping in mind the above characteristic of the research hypothesis, researchers have suggested to frame a hypothesis in logically derived manner which is based on the previous findings obtained by researchers and is directly or indirectly related to the present research problem. The premises stated below contain list of theoretical and empirical features of the variables of the present investigation.

**PREMISES:**

a) **Obesity**: - Obesity is an excessively high amount of fat or adipose tissue in relation to lean body mass. Overweight refers
to increased body weight in relation to weight, when compared to the same standard of acceptable or desirable weight.

b) **Socioeconomic status:** - The socioeconomic status (a) of families determines their social values and standard of living in the society. On the basis of obtaining median socioeconomic score two groups i.e. *High socioeconomic status group* (a₁) and *low socioeconomic status group* (a₂).

c) **Eating habits:** - Eating habits (b) include certain general patterns of food selection categories the diet of a person, associated with love, affection warmth, self image and social prestige influence by urban or rural living, income, family size, age, sex, family tradition cultural background and availability of food in a geographical area. On the basis of obtaining median of frequently food consumption habit score, two groups i.e. *excess food consumption* (b₁) and *less food consumption* (b₂).

d) **Physical activity:** - Physical activity (c) over energy expenditure. It including not only exercise (undertaken with the deliberate intent of improving health or physical performance) and sport, but also transportation, occupational
activities; such as walking or cycling for transportation, occupational activities, domestic chores, leisure activities etc. On the basis of obtaining median of physical activity score two group i.e. *physically inactive (c₁) and physically active (c₂).*

Keeping in view the specification of above premises the following hypothesis were framed for putting to test, under two heads: differential and interactional.

**(a) DIFFERENTIAL HYPOTHESES:**

(1) Using premises a₁ and a₂ as the base it has been hypothesized that the group of children who belongs to high socioeconomic status (a₁) would be significantly higher percentage of obesity than the group of children who belongs to low socioeconomic status (a₂).

(2) Using premises b₁ and b₂ it has been hypothesized that the group of children who consume excess food (b₁) would be significantly higher percentage of obesity than the group of children who consume less food (b₂).
(3) Taking premises $c_1$ and $c_2$ it has been hypothesized that the group of children who belongs to physically inactive ($c_1$) would be significantly higher percentage of obesity than the group of children who belongs to physically active ($c_2$).

**INTERACTIONAL HYPOTHESES:-**

**(b)(I) TWO FACTOR INTERACTION:-**

(1) Using premises $a_1$ $a_2$ and $b_1$ $b_2$ it has been hypothesized that the group of children who belongs to high socio-economic status and who consume excess food ($a_1b_1$) would be significantly higher percentage of obesity than the group of children who belongs to low socioeconomic status and who consume less food ($a_2b_2$).

(2) Using premises $a_1a_2$ and $c_1c_2$ it has been hypothesized that the group of children who belong to high socioeconomic status and physically inactive ($a_1c_1$) would be significantly higher percentage of obesity than the group of children who belongs to low socioeconomic status and physically active ($a_2c_2$).

(3) Using premises $b_1b_2$ and $c_1c_2$ it has been hypothesized that the group of children who belong to excess food consumption and physical inactive ($b_1c_1$) would be significantly higher
percentage of obesity than the group of children who belongs to less food consumption and physically active (b₂c₂).

(b)(II) THREE FACTOR INTERACTION:-

(1) Using premises a₁a₂, b₁b₂ and c₁c₂ it has been hypothesized that the group of children who belongs to high socioeconomic status, excess food consumption as well as physical inactive (a₁b₁c₁) would be significantly higher percentage of obesity than the group of those children who belongs to low socioeconomic status, less food consumption as well as physically active (a₂b₂c₂).