Chapter I

Introduction
INTRODUCTION

Obesity is a state in which there is a generalised accumulation of excess adipose tissue in the body leading to more than 20 per cent of desirable weight. Obesity invites, disability, disease and premature death. Excess body weight is a hindrance, leading to breathlessness on moderate exertion and predisposes a person to disease, like atherosclerosis, high blood pressure, stroke, diabetes, gall bladder diseases and osteoarthritis of weight bearing joints and varicose veins. Usually obesity is due to positive energy balance. That is the intake of calories is more than the expenditure of calories, Srilakshmi (2005).

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health leading to reduce life expectancy, WHO (2000) and James (2005). Body mass index BMI, which compares weight and height is used to define a person as overweight (pre-obese) when their BMI is between 25 kg/m\(^2\) and 30 kg/m\(^2\) and obese when it is greater than 30 kg/m\(^2\), WHO (2000).

Obesity is associated with many diseases particularly heart disease, type II diabetes, breathing difficulties during sleep, certain types of cancer, and osteoarthritis, James (2005). Obesity is most commonly caused by a combination of excessive dietary calories, lack of physical activity, and genetic susceptibility, though a limited number of cases are
due solely to genetics, medical reasons or psychiatric illness. The World
Health Organization, in 1998 designated obesity as global epidemic, WHO

The primary treatment for obesity is dieting and physical exercise.
If this fails, anti-obesity drugs may be taken to reduce appetite or inhibit
fat absorption. In severe cases, surgery is performed or an intragastric
balloon is placed to reduce stomach volume and or bowel length, leading
to earlier satiation and reduced ability to absorb nutrients from food, Nice
(2006) and Imaz et al. (2008).

Obesity is a leading preventable cause of death worldwide, with
increasing prevalence in adults and children, and authorities view it as
one of the most serious public health problems of the 21st century,
Barness et al. (2007). Obesity is a stigmatized in the modern western
word, though it has been perceived as a symbol of wealth and fertility at
other times in history, and still is in many parts of Africa, James (2005)
and Woodhouse (2008).

It is an ironic and rather sad fact that the two major nutritional
problems that presently face the world are that 600 million people face
severe energy deficits and starvation while at the same time, 310 million
people face a problem of chronic energy surplus and obesity. In some
cases, these problems exist alongside one another but obesity is
predominantly a problem of westernized societies. In the last few years it
has become an increasing problem throughout most of the world. By
2000, the obesity problem had already grown to such an extent that the
World Health Organization declared it was the greatest health threat
facing the west. Obese people carry around excessive amount of fat,
which in the absence of more direct measures is generally estimated by combining measures of height and weight. The most common method of combining these measures is to divide body weight in kilograms (w) by the height in meters (h) multiplied by itself (i.e. w/h²). This is called the body mass index (BMI). On the BMI scale, people with an index > 25 but < 30 are said to be overweight, and people with an index > 30 are defined as obese. Although these definitions have been adopted by the WHO, there are several well-recognized problems with the index. In particular, it does not reflect body fatness changes very well when a person is also changing his or her height over time. Consequently, BMI can not be used to reliably gauge the body fatness of children. In addition, body builders and some athletes, who have developed large amounts of muscle tissue, may also be misclassified as obese. Generally, however, in most adults, BMI correlates reasonably closely to body fatness (which is measured by more sophisticated scanning and imaging devices), particularly if combined with measures such as the waist circumference, Speakman (2004).

The increasing prevalence of overweight and obesity is a critical public health problem for women of childbearing age. Obesity has been associated with both short and long-term health effects for women as well as for their offspring. Existing research supports a link between obesity and conditions that impair a woman’s ability to conceive and increase her risk for an adverse pregnancy outcome. Furthermore, this chronic condition has been linked to the development of diabetes and cardiovascular disease later in life. Clinical decision making and public health policy and education are driven in part by the prevalence of the condition in the general population, Anjel Vahratian (2009).
Compared to men, women suffer a disproportionate burden of disease attributable to overweight and obesity. Female obesity is defined as an excessive amount of body fat, keeping in mind the body mass index ratio of the women concerned. Women with body weight measuring up to 30 per cent more than that of the ideal are known as obese. The body mass index (BMI), is the most popular and effective way of calculating female obesity.

Body mass index (BMI) is a statistical measurement that compares a person's weight and height. Though it does not actually measure the percentage of body fat, but it is a useful tool to estimate a healthy body weight based on a person's height. Due to ease of measurement and calculation, it is a widely used diagnostic tool to identify obesity problems within a population. However, it is not considered appropriate to use as a final indication for diagnosing individuals. BMI was invented between 1830 and 1850 by the Belgian Polymath Adolphe Quetlet during the course of developing “Social physics”. Body mass index is defined as the individual’s body weight divided by the square of his/her height.

More and more studies reveal that female obesity is fast becoming a dreaded factor in US. The prevalence of obesity among women has increased by almost 15 % in the last decade. Nearly 50 % of all Hispanic American and African American women are overweight. The link between diabetes and obesity is particularly pronounced in women, and during the past 10 years there has been 32 % increase in women with diabetes. Women suffering from obese conditions are also prone to social and psychological issues that also lead to depression.
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It is believed that female obesity has increased by 15% in the past decade and as a result, women have become prone to diseases like diabetes, high BP etc. Women who have a hereditary problem of obesity need to be very careful about their food and exercise quotient. Often women find it difficult to shed post pregnancy weight, which in turn leads to lifelong obesity for them.

Types of female obesity

Female obesity may be broadly categorized into –

- Type I obesity - BMI of 30-34.9
- Type II obesity - BMI of 35-39.9
- Type III obesity - BMI of 40 and higher.

*Type I* female obesity is mostly a result of excessive and binge eating habits apart from a lack of physical activity that should compliment one’s eating habits.

*Type II* of female obesity accounts for less than 1% of the obesity cases registered is a result of health related problems. In such cases, the patient witnesses abnormal weight gain in spite of a regulated lifestyle. These patients should be treated by doctors and dietitians. Although they appear to be in good health, they have reduced tolerance to exercise with shortness of health on exertion and they are unduly fatigued. This is due to the burden of increased weight they carry always and reduced capacity of the circulatory and respiratory systems that are handicapped by masses of internal fat and fatty infiltration of muscle, for mechanical and metabolic reasons these patients are at increased risk of diabetes,
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atherosclerosis, hypertension, fatty liver, gall bladder diseases, osteoarthritis, hernias and varicose veins. Mortality rate also increases.

*Type III* of female obesity patients are in pathetic-condition. Their day-to-day activities are restricted due to their enormous mass and more susceptible to diseases mentioned in type II. They are susceptible to atherosclerosis prone to accidents and have serious psychological disturbances—Srilakshmi (2005).

A. *Simple obesity*

This type of obesity is caused by ingesting too much heat energy, while consuming less energy and thereby, storing too much fat. Most obese people belong to this category. Simple obesity has two types.

1) *Constitutional obesity or from infancy type obesity*

This type of obesity starts from infancy continues to adulthood. Usually the person has a family history of obesity. They have a very good appetite from half a year after birth and their body fat cell number begins to increase. Their metabolism is slow and synthesis exceeds catabolism. There will be poor cure effect by limiting diet and strengthening exercise. They are not sensitive to insulin.

2) *Acquired obesity, or from adult type obesity and diet induced obesity*

This is caused by intentionally or unintentionally eating too much, called surfeit obesity. They usually begin to gain weight from early adult times and gain weight mainly on limbs.

B. *Secondary obesity*

This type of obesity usually has some primary disease associated with it. The primary diseases are Cushing’s syndrome, metabolic obesity,
hypothalamic obesity, polycystic ovary syndrome, insulin tumour etc. The primary disease must be cured before it is possible to lose weight. There are various other types of female obesity that have been identified, these are:

**Android, Gynoid and a Mixed Variety**

- Gynoid is a type of female obesity where the lower part of the body is more affected and puts on more flesh and weight in comparison to the others. Gynoid type of female obesity sees flabby abdomen, added weight in the buttocks and legs area too. The face and neck mostly give a normal appearance. In some persons, the cheeks may be drawn too. As these persons grow old the whole figure assumes a stooping posture and the spine is never erect due to the heavy hips and thighs. This vital organs affected mostly are the kidney, uterus, intestines, bladder and bowels. But, the functions of these organs some times have a direct effect on the heart. In this type of obesity, exercises or dieting will not help appreciably in reducing weight.

- Android type of female obesity is likened to the shape of an apple. The shoulders, face, arms, neck, chest and upper portion of the abdomen are bloated. The stomach gives stiff appearance, as well as the arms, shoulders and breasts. The back seems to be erect but the neck is compressed and there will be a protruding chest because of the bulk in the stomach. The lower portion of the body the hips, thighs and legs are thinner beyond proportion in comparison with the upper part. In these persons the vital organs affected will be mostly the heart, liver, kidney and lungs. Though this type of
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obesity is found more in males, it is common in females too. Those females, who are under hormone treatment for their menstrual abnormalities or after childbirth, are more prone to this type of obesity. It occurs in females around menopause too due to thyroid gland’s functional disturbance. In this type, the excess flesh is less likely to reduce especially in female than males. Android type of obesity is a major risk for heart damage and heart disease due to high cholesterol.

V The third type of female obesity is a mixed bag of the other types. There are some people who do not fit into any of the above types of obesity. In this type of female obesity, their whole body from head to toe look like a barrel and movement is restricted. Their gait is more to rolling rather than walking. The fat tissues in their body hinder the movement of all the internal organs and consequently affect their brisk functioning. For them any exercise is different due to the enormous size of body. So, such person should follow a strict diet and do plenty of exercise.

Causes of obesity

When food energy intake exceeds energy expenditure, fat cells (and also to some extent muscle and liver cells) throughout the body take in the energy and store it as fat. So when the energy consumption exceeds the requirement, it causes obesity.

Additional factors causing obesity

- Genetic disorders
- Underlying illness (such as hypothyroidism)
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- Eating disorders (Such as Binge eating disorder)
- Certain medications (Such as anti psychotics)
- Sedentary life style
- A high glycemic diet
- Insufficient sleep
- Stress
- Sudden smoking cessation
- Weight cycling-repeated attempts to do dieting to lose weight.

Genetic factors play an important role in determining the traits of obesity. Some genes play the role to telling the body how to metabolize food and to use extra calories or stored fat. Obesity runs in families as generally families eat similar foods, have similar lifestyle, habits and thinking patterns, such as that children should eat more to become big and healthy.

Certain illness like thyroid gland problems or genetic run in families. Some eating disorder like Binge eating disorder affect a person's diet as he eats more and repeatedly often in binges. These people generally lack the developed eating patterns learned in childhood.

It is also to be remembered that obesity is not the result of momentary overeating. It is a long-term phenomenon because people tend to overeat over long periods of time.

Emotions can fuel obesity, as people tend to eat more when they are upset, anxious, sad, stressed or even bored. Afterwards they feel bad about eating more, and later to relieve this stress, they may eat even more.
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Sedentary lifestyle is another important factor as people tend to eat more when they are doing nothing and just sitting idly watching TV or video games. Cars dominate our life and we seldom walk or exercise. There is less time to cook healthy food and we often tend to eat fast foods.

Research shows that female obesity is result of several factors culminated together. Most of the time weight is gained by intake of more calories than what the body actually needs. Obesity is a chronic disease with a strong genetic component. Fast food also causes obesity, and American obesity has been linked scientifically to the typical American diet that is high in fats, salt and sugar, and is dominated by over-sized portions.

In addition to an unhealthy diet, other factors leading to obesity are:

- Low levels of physical activity, either in the form of exercise or day to day activities may also lead to obesity.

- Factors like the body composition of the women or even genetic factors like other family members having obesity, may contribute to developing one.

- Aging and other socio-economic factors, aligned with the mental state of a persons mind are important in causing female obesity.

- Endocrine factors often contribute to excess weight in the body. it has been observed that the fat content accumulated in women is twice the amount found in men of the same age.
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- It has been observed that factors like changes in the body of the women also often lead to female obesity. Body and mental changes during pregnancy, puberty, or menopause can often lead to female obesity.

- Some other noted causes of obesity are neurological problems leading to weight gain, depression, intake of oral contraceptives, steroids, phenothiazines and insulin too.

Objective of the study

The objectives of the study are as follows:

1. To find out the effect of income on overweight and obesity.

2. To study the effect of age on overweight and obesity.

3. To study the effect of number of parity and marital status on overweight and obesity.

4. To study the influence of eating habit and type of food consumed on overweight and obesity.

5. To find out the effect or working mode on overweight and obesity.

6. To design simple nutrition education packages on low calorie diet.

7. To implement the nutrition education packages.

8. To evaluate the effect of package for recording feedback.

Hypothesis

In view of the aforesaid objectives following hypotheses were framed. On the basis of the findings of the present study, the hypothesis will be accepted or by providing proper justification for the same.
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1. Income has no significant effect on the prevalence of overweight and obesity.
2. Prevalence of overweight and obesity increases with the advancement of age of the subjects.
3. Number of parity in the females is responsible to enhance the prevalence of overweight and obesity.
4. The marital status has no positive role to effect overweight and obesity.
5. Eating habit significantly influences the prevalence of overweight and obesity.
6. Consumption of extra energy by the irresponsible to cause overweight and obesity.
7. Working mode or physical activity has significant impact on overweight and obesity.
8. Nutrition education has significant impact on physical exercise, food habits, and knowledge of nutrients.

Rational of the study

Overweight and obesity are form of malnutrition arising due to excess fat deposition. Today these are increasing public health problem of global significance. It is a major focus of attention in India. Improved health facilities, increase in income and availability of food and decrease in physical activity have contributed to this epidemic form of overweight and obesity especially in urban areas of the country. It is a key factor in the natural history of chronic non-communicable diseases such as
diabetes mellitus, coronary heart disease, hypertension, arthritis and gallstone.

It is an already known fact that obesity is more prevalent in well affluent societies but in case of females, overweight and obesity are public health problems in both lower income group and high income group. Though the rate of prevalence may vary because studies have shown that in case of females factors other than eating habits and physical inactiveness such as hormonal changes, parity etc. are also responsible for obesity.

Hathras being a newly constructed city, various information regarding health parameters and health services are not available. Till date no survey has been conducted to acquire these information's in order to administer them for the better lives of the beneficiaries. In this respect the present work is an attempt to dig out some of the root causes responsible for occurring overweight and obesity in the females.

So the present study “A comparative study on prevalence of overweight and obesity in various income group females of Hathras City” will throw light on prevalence rate of overweight and obesity in various groups as well as on different causal factors of the same. Since, in this study, nutrition education packages will be provided to the clients and the effect of the packages will be evaluated, this study would be useful for society for overcoming obesity, which is root cause of many health problems. Again, this study would be more useful for lower income group females who are unaware of the causes, ill effects and management of overweight and obesity, also unable to join any health club or fitness centers. So there is a great need of such projects which can focus on the different dimensions of obesity, either it is biological, psychological or
social and can be useful for treatment of obesity in effective and economic way. The present study is a little step towards the solutions of this universal public health problem.

Further the findings received from the study will work as a guideline for the future research, academic activities and implementing public health programmes in the beneficiaries.

Limitations of the study

1) In the present study carried out in lower middle and higher income group females. Generalisations can be made about the city as a whole. In fact it was an attempt to have selective screening of obesity among females of the lower, middle and higher income group females, the section of society suspected to be affected most by the problem.

2) The study did not include males, because

(a) available literature suggests that the prevalence of obesity is higher in females, thus giving a better yield of cases necessary for studying the determining factors,

(b) being a field study the possibility of males remaining outdoors during study visits was very high,

(c) it would have been inconvenient for the female researcher to examine and measure the items like skinfold thickness at different sites among male subjects.

3) The present study has used 24-hour food recall methods of one day diet survey only for studying daily nutrient intakes. The 7-days diet
survey would have given more representative picture about diet, by covering day-to-day variations in the family menu.

4) Some obese women who were conscious about their problem were already on reduced dietary intake, thus causing bias in examining the dietary factors. Such problems are inherent in a cross-sectional study design.

5) The study did include an intervention package for weight reduction among those who were found to be obese.