INTRODUCTION
1. **INTRODUCTION:**

Obesity is multifactorial origin, and is reaching epidemic proportions. Even at low levels it has evil effects on health and is associated with a decrease in life expectancy. It may be defined by body mass index (BMI) and further evaluated in terms of fat distribution via the waist–hip ratio. BMI is closely related to both total body fat and percentage body fat. Morbid obesity is a more serious condition, which is correlated with a weight 170% greater than the ideal weight, or BMI greater than 40 kg/m². Adverse clinical consequences of obesity are so harmful that a 20% increase above the ideal weight is associated with a 20% increase in the mortality rate.

The World Health Organization (WHO) predicts that overweight and obesity may soon replace traditional public health concerns such as under nutrition and infectious diseases as the most significant cause of poor health. Because of its costs, prevalence and health effects obesity is a public health and policy problem.

The prevalence of obesity involves multiple interactions among social, genetic, behavior, metabolic, cellular and molecular factors, followed by changes in the energetic balance. The increase, at a global level, of the obesity and overweight prevalence is due, on the one hand, to an increase of the energy intake, especially with high caloric food, rich in sugar and fat and on the other hand, to a decrease of the physical activity as a consequence of an increase in sedentarism.

At an individual level, a combination of lack of physical activity and excessive food energy intake is thought to explain most cases of obesity. Limited number of cases are due primarily to genetics, psychiatric illness or medical reasons. In contrast, increasing obesity rates at a societal level are felt to be due to an accessible and palatable diet, increased reliance on mechanized manufacturing and cars.

A 2006 review identified ten other possible contributors to the recent increase of obesity: 1. Insufficient sleep, 2. Endocrine disruptors (environmental pollutants those interfere with lipid metabolism), 3. Decreased variability in ambient temperature, 4. Decreased rates of smoking, 5. Increased use of medications which can cause weight gain (e.g.,
atypical antipsychotics), 6. Proportional increases in ethnic and age groups that tend to be heavier, 7. Pregnancy at a later age (which may cause susceptibility to obesity in children), 8. Epigenetic risk factors passed on generationally, 9. Natural selection for higher BMI, and 10. Assortative mating\(^5\).

Obesity is associated with various diseases, including cardiovascular disorders, type 2 diabetes, stroke, certain types of cancer\(^6\), and osteoarthritis. Strength of the link between obesity and specific conditions varies, but strongest is the link with type 2 diabetes. Excess body fat is associated with 64% of cases of diabetes in men and 77% of cases in women. Losing body weight even 5 to 10 percent can delay or prevent some of these diseases.

Obesity because of its array of associated diseases necessitates careful clinical assessment to identify underlying factors and to allow coherent management. Permanent changes in dietary quality, energy intake, and activity will be effective in long term weight loss.

Calorie-rich foods and relatively inactive lifestyle lead to long-term imbalance between energy intake and expenditure, which leads to adipocyte hypertrophy and subsequently hyperplasia. Excessive adipose tissue functions as an endocrine organ, producing bioactive molecules such as PAF-1, IL-6 and TNF-alpha which are implicated in many disease states including diabetes and atherosclerosis. It also produces the peptide hormone leptin which transmits a satiety signal to the hypothalamus and acts as a negative feedback loop of the lipostat\(^7\). Leptin effects on food intake and neuroendocrine functions involve intermediate hypothalamic neuropeptides such as proopiomelanocortin (POMC) and neuropeptide-Y (NPY) in the hypothalamus which regulate appetite, energy expenditure, and sympathetic outflow. In obesity, high leptin levels are not connected with appetite suppression, which gives the concept of central leptin resistance or insensitivity\(^8,9\). This resistance may be caused by mutations affecting transport of leptin, receptor affinity, or signal transduction. Majority of cases, however, probably reflect physiological desensitization caused by excessive adipose tissue and leptin levels.
Obesity can be induced in experimental animals by variety of methods, eg; neuroendocrine, dietary or genetic changes. These models have shown that it is the central nervous system that regulates food intake and energy expenditure, and it has also identified interrelationships among glucocorticoids, dietary behavior and the autonomic nervous system in the development of obesity \(^{(10,11)}\).

The great similarity and homology between the genomes of rodents and humans make these animal models a major tool to study obesity. Animals enable us to obtain answers in a short period of time, since 10 days in the life of a rat are approximately equivalent to 1 year of human life \(^{(12)}\). Some obesity-induction models in rats are found in the literature and among them, the main ones are 1) Genetic manipulation 2) Lesion of the ventromedial hypothalamic nucleus (VMH) \(^{(13,14)}\), 3) Oophorectomy \(^{(15)}\), 4) Feeding on hypercaloric diets \(^{(16,17)}\).

There is shortage of effective & safe drugs available for treatment of obesity in modern medicine. In traditional medicine various herbal extracts have been found useful in management of obesity; but they have not been evaluated scientifically.

*Caralluma fimbriata* is a herb reported to be useful in treatment of obesity in traditional system of medicine and hence we have selected it for present study. The anti-obesity effect of *Caralluma fimbriata* extract of the whole plant is evaluated by studying the effect on appetite, body-weight & lipid profile in rats fed with hyper-calorie/cafeteria diet.