INTRODUCTION
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‘Part of the secret of a success in life is to eat what you like, and let the food fight it out inside’

- Mark Twain

According to World Health Organisation’s (WHO) world health report of 2003 in all the continents except Africa, more people die of Non Communicable Diseases (NCDs) than communicable diseases. WHO estimates that by 2020, 73 percent of all deaths will be caused by NCDs namely Diabetes, Hypertension and Cardio Vascular Diseases and Cancer. Around one billion adults in the world are over weight and around 300 million of them are obese. Diabetes and hypertension are more likely to affect them.

Urbanisation has spawned a whole new crop of diseases that we now term, “Life Style Diseases” namely Diabetes, Obesity, Blood Pressure and Heart disease. Therefore there is an urgent need to understand the disease, develop strategies to prevent it and minimize its complications by effective and timely management (Deshpande, 2007).

A growing menace in India

A. Diabetes mellitus

A new epidemic seems to have taken over Southeast Asia, and India in particular. This epidemic of Diabetes mellitus that has engulfed the nation is a matter of grave silent killer. The latest statistics suggest that the majority of people with diabetes live in developing countries. It is estimated that there are 35 million people with diabetes in India. This number is expected to rise to more than 73 million by 2025 (Deshpande, 2007).

The prevalence of diabetes for all age groups worldwide was estimated to be 2.8 per cent in 2000 and 4.4 per cent in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030 (Wild et al., 2004).
The WHO has predicted that the major burden will occur in the developing countries. There will be a 42 per cent increase, from 51 to 72 million in the developed countries and 170 per cent increase from 84 to 228 million in the developing countries. The countries with the largest number of diabetic people by 2025 are India, China and United States.

In India it was estimated that this deadly disease affected 19.4 million individuals, which is likely to go up to 57.2 million by the year 2025 (Pradeepa et al., 2002).

The World Health Organization has defended its prediction of a high level of diabetes in India and claimed that the only complaint that can probably be levelled against it is “under estimation,” not over estimation (Unwin, 2004).

There were other countries, which had a higher prevalence in the general population, but India’s one-billion population swelled the number. Therefore even with a lower prevalence, the total number of people living with diabetes in India would be higher than in most nations, making it the “Diabetes Capital” of the world. China, which also has one billion population, came a close second (Unwin, 2004). A global baseline assessment in the year 1995 and projections until 2025 based on the United Nations’ population estimates suggest that India would be the diabetes capital of the world in 20 years (King et al., 1998).

With urbanization occurring rapidly there is an increased risk of diabetes in the younger age group. It is observed that India and other countries in Asia have also been experiencing an increase in the prevalence of Type II Diabetes and cardiovascular disease. In the seventies migrant Asians living in different parts of the world had shown a higher prevalence of diabetes than other ethnic groups living in the same countries. This was attributed to the changes in the environmental factors such as increased affluence that may unmask a genetic or racial tendency for diabetes (RamaGhandran et al., 2005).

Prevalence of Diabetes mellitus and impaired fasting glucose were reported to be highly variable among rural and urban population in India. Numbers of epidemiological studies with varying sample sizes had reported the prevalence of diabetes at different geographical area ranging from 1.6 per cent to 12.4 per cent (Sadikot et al., 2004).
Studies in India in the last decade had highlighted that not only is the prevalence of Type II Diabetes is high, but it is also increasing within the urban population (Ramachandran et al., 1999). Estimates of diabetes prevalence in urban India ranges from 16-20 per cent and rural estimates are about four per cent (Bhattacharjee, 2004).

The prevalence of Type II Diabetes mellitus in urban Indian adults had increased from less than three per cent in 1970s to more than 12 per cent by 2000 (Wild et al., 2004).

A recent national survey of diabetes conducted in six major cities in India showed that the prevalence of diabetes in urban adults was 12.1 percent. Prevalence of impaired glucose tolerance was also as high as 14.0 per cent (Ramachandran et al., 2001).

In rural population, diabetes prevalence rate in adults vary from 1.6 per cent (Andhra Pradesh) to 2.2 per cent (Bangalore), 2.4 per cent (Tamil Nadu) and 2.5 per cent (Kerala). Among urban subjects a very high prevalence of diabetes had been reported in various Indian studies and a recent review reported, diabetes prevalence of 11.6 per cent in urban locations, 5.9 per cent in semi urban locations and 2.4 per cent in rural locations (Ramachandran, et al., 2002). On the study of prevalence of Diabetes mellitus and impaired fasting glucose in a rural population in Karnataka showed a prevalence of 3.77 per cent and impaired fasting glucose prevalence of 2.8 per cent (Basavanagowdappa et al., 2005).

A recent survey in a rural area in 2003 showed indications of transition in the life style of rural population and striking increase on the rate of prevalence of diabetes was noted as 6.3 per cent (Sadikot et al., 2004).

The Chennai Urban Population Study (CUPS) is a population-based study involving two residential areas representing the lower and middle-income group in Chennai, in South India. The prevalence rates of diabetes and impaired glucose tolerance were significantly higher in the middle-income group compared to the low-income group. Overall 12 per cent of the total population had diabetes. There was a marked increase in the prevalence rates of
components of the metabolic syndrome, particularly diabetes and impaired glucose tolerance (Mohan et al., 2001).

Today diabetes is no more confined to the wealthy and affluent classes. It has cut across all such barriers and is seen to affect all types of social and economic classes (Deshpande, 2007).

B. Heart disease

Second half of the twentieth century has witnessed a global spread of the Coronary Artery Disease (CAD) epidemic. Cardiovascular disease contributed 15.3 million deaths in 1996, accounting for 30 per cent of the global death toll that year. Even as CAD mortality rates are declining in industrialized countries CAD epidemics are emerging or accelerating in most developing countries, including India.

A major health care center had reported that the population with CAD rose from four per cent to 33 per cent. Population surveys had consistently revealed a marked difference between urban and rural areas in the prevalence of CAD and hypertension (Kumar, 2000).

Coronary artery disease rated in urban areas in India is now four fold higher than in the United States. Both overseas and resident Indians have the highest rate of CAD, although almost half of them are life long vegetarians. When compared to Whites, Hispanics and other Asians, CAD rates among Indians worldwide are two to four times higher at all ages and five to ten times higher in those less than 40 years of age. Although CAD is a fatal disease with no known cure, it is also highly predictable, preventable and treatable. During the past 30 years CAD rates halved in the United States, Australia, Canada, France, Japan and Finland. These vast reductions in CAD mortality are attributed to nation wide changes in specific risk factors rather than extensive use of expensive technology. Reductions in risk factors explain most of the decline with modern contributions from advances in treatment. Ironically the CAD rates doubled in India during the same period, primarily due to dietary changes associated with epidemiological transition from a rural sustenance economy to an urban market oriented economy. The impact of such changes
appears to be greater in Indians than in other populations due to genetic predisposition. Significant decline of CAD is readily achievable in India, by adopting a combined population wide and high-risk primary prevention strategy (Enas, 2000).

C. Obesity

Obesity is a state in which there is a generalized accumulation of excess adipose tissue in the body leading to more than 20 per cent of the desirable weight (Srilakshmi, 2000).

Obesity is an excess of body fat frequently resulting in a significant impairment of health. Obesity results when the size or number of fat cells in a person's body increases. A normal sized person has between 30 and 35 billion fat cells. When a person gains weight these fat cells increase in size and later in number. Obesity is basically a disease of energy imbalance (Mahajan, 2002). Obesity is not only the oldest metabolic problem recognized but also described as global epidemic, increasing not only in developed countries but world wide (Hariharan, 2000). Obesity, a disorder rampant in developed countries till recent years has emerged as a epidemic in some lower income and transitional countries. Obesity represents one of the leading cause of preventable death all over the world and there is an increasing occurrence of obesity virtually among all ethnic, racial and socio economic populations and all age groups (Rippe, 1998).

Obesity was more prevalent in the age group of 18-29 years particularly in those with higher education (Kuman, 2002). Prevalence of obesity increased from five per cent to 11 per cent among adolescents of 12-19 years within a span of four years (Tyagi, 2001). Popkin and Doak (1998) pointed out that there was very little grade II and above obesity in Asia. In India there were roughly 40 to 50 million overweight subjects belonging to the upper middle class (Gopalan, 1998). The rate of obesity in the age group of 12-19 years was 15 per cent (NHAES, 2000). According to a study by Mushtari, (2003) females between 18-23 years of age were found to be more obese. According to Clarice, (2000) more than one half of the adult population were overweight or
obese. Increases were seen in both sexes and in all socioeconomic classes, with the greatest increase seen in 18-29 years old (Kale, 2000). Obesity is a serious epidemic plaguing the world today and some experts believe that it has become a major health risk. In fact, obesity has become so common that it is beginning to replace under nutrition and infectious diseases as the most significant contributor to ill health.

According to the World Health Organization (WHO, 2004) there are more than one billion overweight adults in the world today, at least 300 million of whom are obese, a condition that can lead to heart disease, stroke, arthritis, cancer and female infertility.

In developing countries, 115 million people now suffer from obesity related health problems. Obesity not only erodes health, it kills many people prematurely. The WHO warns that diseases such as heart disease, diabetes and cancer now account for about 60 percent of death worldwide a figure that is expected to rise to 73 percent by 2020 (Health, with the New Indian Express, 2004).

In Asian countries like India and China, the number of obesity cases are increasing rapidly, with it increases the number of people affected with obesity related problems like heart attacks, Type II Diabetes and many more.

In the developing countries where malnutrition and anemia are still the underlying causes of most diseases and starvation deaths hit headlines every other month, it seems a cruel joke to list obesity among public health problems. A national survey carried out in 2000 showed that 25 per cent of Indian males and 36 per cent of females above 20 years were overweight.

More choices of food, more brands of soft drinks, more cable channels and video compact discs to watch particularly at risk are the young who easily succumb to sugary and fatty foods. The lifestyle we are gifting our generations are forcing them to fight a lifelong battle with chronic ill health, processed food, aerated drinks, sugar rich confectionaries, couch bound leisure and long hours of study, the ideal cocktail for brewing diabetes and obesity and coronary artery disease.
With the information technology era drastically changing the lifestyle of young people around the world, Indians with their strong information technology capability and genetic susceptibility to Type II Diabetes are more prone to developing this disorder below 30 years and even below the age of 15 years. Obesity, wrong food habits and lack of exercise play a major role in the causation of Type II Diabetes in the young (Krishnaswami, 2004). The increased prevalence of diabetes, cardiovascular diseases and obesity reflects the damage in lifestyle, excessive calorie intake and reduced physical activity, which accompany economic development. The potent cocktail of multifactorial environmental insults acts on genetic susceptibility. The problem that has been identified, must be tackled before it gets worse, using a broad-based approach (Sridhar, 2002). Prevention programmes are needed to check the rising epidemic of diabetes, obesity and its complications like cardiovascular diseases. Among them public health care and education are the most important.

Considering that Indians are insulin resistant, it would be prudent to advise a healthy lifestyle across different geographic regions and age groups (Narayan et al., 2002). Certain cultural factors in India may facilitate changes for better health related behaviour, bad dietary and lifestyle habits in India which are of easy origin and may be easily correctable (Pella et al., 2003). Diet modifications can be effective, such as eating adequate whole grains, seasonal vegetables and vegetable oils with a proper mix of omega three fatty acids. The tightly knit social structure could help in the dissemination of health information (Nishtar, 2002).

In the present era of preventive medicine lifestyle diseases has been recognized as one of the preventable diseases. The prevention of lifestyle diseases has become an important clinical and health policy issue around the globe because of increasing rates of these conditions in developed and developing countries. Finnish Diabetes prevention study (Tumomilehto et al., 2001) a randomized prevention study, concluded that the reduction of diabetes was the highest in the group with the largest change in lifestyle. The Diabetes Prevention Program Research Group also demonstrated that the treatment with
metformin and modifications of life style were two highly effective means of delaying or preventing Type II Diabetes mellitus.

Salmeron et al., (2001) reported that a similar inverse association between diabetes risk and intake of vegetable fat and Poly Unsaturated Fatty Acids (PUFAs) was observed. It was also noted in this study that transfatty acid intake was associated with increased diabetic risk.

An intensive life style change programme incorporating increased physical activity and a low calorie, low fat and increased unrefined carbohydrate eating pattern resulted in cardiovascular risk reduction including reduced triglyceride (Kinzel et al., 2004).

In a study by Raji et al., (2002) patients' with poor glycemic control had a significant improvement in Glycosylated Haemoglobin after receiving an educational intervention. Intensive or passive methods of delivering patient education seemed to have similar effect in improving glycemic control.

Large-scale studies had clearly defined that the life style changes including weight management and physical activity can reverse the progression from pre diabetes to diabetes. Patients who lost weight in an intensive behavioural programme with low calorie or moderately restricted diet, physical activity, more vegetables and fruits have their BMI dropped, decline in average total cholesterol/HDL ratio, triglycerides, systolic blood pressure, diastolic blood pressure and fasting blood glucose (Weithman et al., 2004).

Educating the young people of our country on good traditional nutrition, regular physical exercise and healthy games is therefore of utmost important and should start at the pre school and school levels as a National Programme.

According to Krishnaswami, (2004) education about life style diseases and its management are not achieved through advertisements causing panic in the minds of public. It should be done by neutral organizations with no ulterior motive or vested interests, giving facts and encouragement through information for positive living with life style diseases.

According to Unwin, (2004) studies proved that a healthy lifestyle and diet could prevent the onset of Type II Diabetes, cardio vascular disease and obesity up to 60 per cent. Maintaining normal blood glucose levels, blood
pressure control and ensuring foot care can have huge benefits. Organizing medical care systems, training general practitioners and educating the public would have to be taken care of.

STATEMENT OF THE PROBLEM

Kanyakumari district is the southern most district in Tamil Nadu with a long and beautiful coastal area which invites tourists from all over the country and from abroad. This is the district where coconut and tapioca, a tuber is cultivated to a greater extent when compared to other districts of Tamil Nadu. Hence the availability and consumption of coconut and tapioca is high among the population of Kanyakumari district. Since this district is along the coast of the Arabian Sea and the Indian Ocean the availability and consumption of fish is also high among the population. Just like other regions this district also has a high incidence of diabetes, its complication of heart disease and obesity among the adult population. In addition to the modern style of living, sedentary lifestyle, stress and poor dietary practice, elevated blood sugar level and poor blood pressure control, contribute to the incidence of diabetes, heart disease and obesity.

Kanyakumari is a district with the highest female literacy level compared to other districts in Tamil Nadu. Though the literacy level is high the adult population lack the nutritional knowledge about the relation of diet and disease. Hence the investigator was interested to bring about a nutritional awareness among the adult population for better control and prevention of life style diseases among the adult population of Kanyakumari district. Hence the present study on "Impact of Diet Counseling and Supplementation of a Health Mix on Selected Life Style Diseases" has been carried out with the following specific objectives:

1. To study the socio economic background of the selected diabetics, heart patients and obese subjects in Kanyakumari district.
2. To study the nutritional and health profile of the selected diabetics, heart patients and obese subjects.
3. To study the meal pattern and dietary practices of selected diabetics, heart patients and obese subjects.
4. To study the food and nutrient intake of the selected diabetics, heart patients and obese subjects.
5. To find out the relation between the intake of fish and the triglyceride level of diabetics, heart patients and obese subjects.
6. To find out the relation between the intake of coconut and the Low Density Lipoprotein level of diabetics, heart patients and obese subjects.
7. To assess their knowledge regarding diet and lifestyle diseases.
8. To create nutritional awareness among the selected diabetics, heart patients and obese subjects through diet counseling.
9. To study the impact of supplementation of a health mix on the selected subjects with diabetes, heart disease and obese subjects through specific relevant biochemical parameters.