Chapter V

LIFESTYLE DISEASES AND OBESITY: AN OVERVIEW OF KERALA

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The changing environments and lifestyles have tremendous impact on the new restless world of human life. WHO (2010) reports that as world’s population ages, gets richer, smokes more, eats more and drives more, non-communicable diseases will become bigger killers than the infectious ones over the next 20 years. World Health Statistics (2008) shows that AIDS, tuberculosis, neonatal tetanus and malaria will become less important causes of death. Heart diseases, cancer, stroke, diabetes and traffic accidents claim greater percentages of victims (Mcneil, 2008).

The world today is threatened not only by the traditional diseases but also by a host of new lifestyle related disorders like diabetes, obesity, asthma and cardiovascular diseases.

Lifestyle diseases are diseases that appear to become ever more widespread as countries become more and more industrialized. These diseases are different from other diseases because they are potentially preventable and can be lowered with a change in diet, lifestyle, environment etc. (www.naturalhealth perceptive.com). The onset of these
Lifestyle diseases are permanent and require long periods of excessive care and hence they are termed chronic diseases by medical practitioners, which are putting pressure on the health care system. If uncurbed, a new generation of 'diseases of comfort' (those chronic diseases caused by obesity and physical inactivity) will become a major public health problem in this and the next century (Choi et al., 2005).

Drastic changes in our diet; food intake and energy expenditure increased the level of metabolic diseases such as diabetes and obesity leading to cardiovascular diseases (Gluckman and Hanson, 2006). Chronic diseases such as heart diseases, stroke, cancer, diabetes, and chronic respiratory diseases are responsible for more than 60% of death globally and are projected to account for 47 million deaths annually in the next 25 years (Akhil TandulWadiker, 2004). India faces a double burden on the health front. Communicable diseases (CDs) such as tuberculosis and malaria are still rampant. Meanwhile, chronic lifestyle related or non-communicable diseases (NCDs) have emerged as an even bigger hazard (Mohan, 2008). Migration for business, globalization of culture and civilization, processed food consuming habits, semi-cooked and unsuitable food system etc. cause the occurrence of lifestyle diseases (Rajan M, 2012).

Lifestyle diseases are the outcome of an in inappropriate relationship of people with their environment. In the second half of the 20th century, people’s diet changed substantially with the increased consumption of meat, dairy products, vegetable oils and alcoholic
beverages and with the decreased consumption of starchy staple foods. These changes along with lifestyle changes such as large reduction of physical activities, smoking etc. have resulted in high prevalence of these diseases. The top ten lifestyle diseases are Alzheimer’s, Arteriosclerosis, Cancer, Cirrhosis, Chronic Obstructive Pulmonary Diseases (COPD), Hypertension, Diabetes, Heart Diseases, Nephritis and Stroke. The combination of four healthy lifestyle factors, mainly maintaining a healthy weight, regular exercise, healthy diet and non-smoking seem to be associated with as much as an 80 per cent reduction in the risk of deadly chronic diseases (Lekshmi, 2012).

5.1 Lifestyle Diseases in Kerala

Several population based studies and medical records in Kerala have spotted the prevalence of both non-communicable and lifestyle diseases in the state. Both of these diseases are spreading and causing death in Kerala (Malayala Manorama Daily, 2011b). Though Kerala succeeded to a great extent in reducing the vagaries of major public health diseases like small pox, filaria and malaria, the diseases like respiratory infections, acute diarrhoeal diseases etc are pausing challenges to the society and health sector. Among the chronic illnesses, hypertension, diabetes and cardio vascular diseases are emerging as serious health problems. Sedentary lifestyle, lack of physical activity and obesity increase the risk of chronic diseases (Gangadharan, 2007).

The lifestyle of the population changed a lot mostly in the 19th and 20th century. These changes are not always for the good. The unhealthy living condition along with a change from traditional dietary habits,
coupled with a sedentary lifestyle has made man vulnerable to lifestyle diseases (Padmakumar, 2007). Lifestyle diseases are increasing both in urban and rural areas. Modern consumption pattern and reduction in physical activities are the reasons behind these problems in Kerala (Johnson, 2012). Lifestyle diseases and obesity are increasing among the police (Malayala Manorama Daily 2010a). Entrance and spread of lifestyle diseases make a major challenge in the health sector of Kerala (Malayala Manorama Daily 2011c).

The demographic and health transition in Kerala have been remarkable and follow a pattern similar to the advanced countries. But the transition from traditional illness pattern to modern neo-plastic diseases has substantially increased the public health care burden (Asokan, 2009).

The prevalence of lifestyle diseases among children is increasing at an alarming rate and the physical fitness of these children deteriorated in Kerala (Joseph et al. 2011).

Report of the Indian Council for Medical Science and Technology (2010) revealed that the percentage of diabetes, hypertension, overweight and cholesterol among the population of Kerala are 16.2%, 32.7%, 30.8% and 56.8% respectively. High prevalence of lifestyle diseases forced the government of Kerala to implement some measures to control these diseases. Adoor Prakash, Minister for Health, declared that lifestyle diseases clinics would be held every week at the primary health centres and services of specialists would be made available once in a month. Medicines would be supplied free of charge to those with high blood pressure and diabetes (The Hindu Daily, 2012).
In spite of significant achievements in the health sector, the prevalence of acute diseases and the emergence of the diseases of affluence even in rural areas create doubts whether changes in the health sector of Kerala have been quantitative rather than qualitative (Joseph and Padmaja, 2008).

The health situation in Kerala has improved quite a lot. Contagious infectious diseases have gone down with a few exceptions of epidemics which could be corrected by better surveillance strategies. Lifestyle diseases that are coming in a big way should be handled with diligence and tolerance without negating individual rights (Soman, 2007).

The prevalence of diabetes in urban regions of Kerala such as Thiruvanathapuram is as high as 16% almost twice the rate of that in European countries or the United States where body mass index is several fold higher than in Kerala (Soman et al., 2000).

The increased consumption of high calorie foods and lack of physical activity among Keralites has taken its toll on public health, especially among the elderly, in the form of many chronic diseases, including diabetes mellitus and related metabolic and cardiovascular disorders (Sreekumaran, 2007). The state of Kerala has the highest prevalence of coronary artery disease (CAD) among all Indian States with a rural prevalence of 7.5% and urban prevalence of 12%. In a single medical college hospital in Kerala there was more than 20-fold increase in admissions for acute myocardial infarction during the period 1966 to 1988. This is mainly because of the large number of patients with diabetes, hypertension and hyper lipidemia in Kerala (Venugopal, 2007).
Many cancers are related to the diet. Predominant among them are cancers of the upper aero-digestive tract, oesophagus stomach, large intestine and breast cancer in women. The role of diet takes special importance in a state like Kerala which is fast moving towards urbanization and westernization. We had a predominantly plant based diet and with the advent of western lifestyle, are moving towards a diet rich in animal proteins. This coupled with other habits like smoking and alcohol will lead to an increase in chronic disease burden especially cancer and cardiovascular diseases (Varghese et al., 2007).

Community based studies have indicated that there is an increasing trend in the prevalence of hypertension and type -2 diabetes in Kerala. The prevalence of hypertension ranges from 36.7% to 54.5% and there is no gender disparity in prevalence, awareness, treatment and control of hypertension (Zachariah et al., 2003).

The key health achievements in Kerala can be summarized as the shift in the demographic profile, good life expectancy, low infant mortality and low fertility rates. Social equity and minimal urban rural difference is prevailing in the state.

At the same time, the transition in positive energy balance has simultaneously reflected on the increasing prevalence of all the cardiovascular diseases and risk factors like hypertension, diabetes, dislipidemia and metabolic syndrome in Kerala (Thankappan et al., 2006).

Most of the modern fast food items contain dangerous trans fats. By including fast foods and junk foods in the diet, Keralites invite lifestyle
diseases like obesity, high blood pressure and diabetes (Deepika Daily, 2012).

5.2 Obesity and its Consequences

Overweight and obese individuals are at an increased risk of hypertension, hypercholesterolemia, type 2 diabetes, coronary artery diseases, congestive heart failure, stroke, gallstones, gout, osteoarthristis, obstructive sleep apnea and other respiratory problems, pregnancy complications, poor reproductive health and psychological disorders (Morrill and Chinn, 2004). In developed countries more people become ill from being overweight and eating rich diet (Ash, 2008). Obesity is the most common nutritional disorder in the western world. There is no magic cure for obesity but you can achieve a lower healthier weight by increasing your level of physical activity and reducing your intake of calories (Mcwhirter and Clasen, 1996). The only region of the world where obesity is not common is sub Saharan Africa (Haslam and James 2005). WHO reports that obesity is increasing world-wide. There are around 50 crores people who are overweight world-wide. This problem is spreading from developed nations to developing nations like tsunami. 10% of total medical expenditure is spent for treating obesity related problems world wide (Malayala Manorama Daily, 2011). U.S health secretary declares that the country is spending $15000 crores per year to solve the problem of overweight and obesity and that one third of adults are overweight there (Malayala Manorama Daily, 2009).

Obesity increases the diseases burden. The morbidity associated with obesity is given in the following table.
Table 5.1
Morbidity Related to Obesity

<table>
<thead>
<tr>
<th>Disease</th>
<th>Proportion (%)</th>
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<tr>
<td>Hypertension</td>
<td>24</td>
</tr>
<tr>
<td>Myocardial Infraction</td>
<td>14</td>
</tr>
<tr>
<td>Angina Pectoris</td>
<td>21</td>
</tr>
<tr>
<td>Stroke</td>
<td>26</td>
</tr>
<tr>
<td>Venous Thrombosis</td>
<td>8</td>
</tr>
<tr>
<td>Type II Diabetes</td>
<td>24</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>08</td>
</tr>
<tr>
<td>Gout</td>
<td>20</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>12</td>
</tr>
<tr>
<td>Gall bladder disease</td>
<td>14</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>05</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>03</td>
</tr>
<tr>
<td>Hip fracture</td>
<td>04</td>
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Obesity results from the interaction of economic and non-economic factors. The following chart highlights the theoretical factors that affect the incidence of obesity and its potential impact on chronic diseases.
Obesity: Incidence and Impact


Technological progress, international trade agreements and urbanization etc have altered income levels and the relative prices of different food items. As income changes, consumers may switch from the
consumption of cereals and staples towards energy dense food items such as oils, fats, sugar and other salty processed food items. Globalization and urbanization also affect the consumption style and physical activities of households. The impact of these factors on the incidence of obesity depends on the nature of individuals and households: education, risk taking behaviour, cultural and religious factors etc. Obesity constitutes a major risk factor for chronic diseases and may affect the health of individuals with huge subsequent direct and indirect costs.

The obese people are discriminated at home, in education, employment, social circle and are considered as lazy, gluttonous, adamant and wicked (Sharan, 2009). Weight control is a very important aspect of heart disease prevention as it prevents high blood pressure, elevated blood fat levels and diabetes (Padmavati, 1990). A health survey conducted by Indian Defence Ministry and Indian Council of Medical Research revealed that 30 per cent of Indian soldiers are overweight. Majority of them are suffering from obesity, high blood pressure and cholesterol (*Rashtra Deepika Daily*, 2011).

### 5.3 Childhood and Adolescent Obesity

Traditionally, an overweight child was considered attractive and often referred to as a healthy child. However, the adverse and serious health consequences of childhood and adolescent obesity are now proven beyond doubt. An epidemic of childhood obesity is sweeping both the developed and developing countries, with US leading all nations.

According to the World Health Organization, globally, 10% of school children between 5 and 17 year are overweight or obese
In the USA, 25% of children aged 10 to 16 years are affected by overweight (Janssen, 2005). In Europe, the prevalence of overweight and obesity in children aged 7 to 11 years ranges from 10% to 35% (Lobstern and Frelult, 2003).

Childhood obesity is not an immediately lethal disease itself but has significant risk factors associated with a range of serious non-communicable diseases in adolescents and childhood (Chandla et al., 2009). Childhood obesity is a significant public health problem that causes a wide range of serious complication and increase the risk of pre-mature illness and death later in life (Onis, 2009). Obesity in children appears to increase the risk of subsequence morbidity, whether or not obesity persists into adulthood (Must et al. 1992). Obesity is a major health issue in the United States and around the world impacting both children and adults (Odgen et al., 2008). Logically, increasing childhood obesity leads to increasing adult obesity. Obese children are much more likely than normal weight children to become obese adults. Obesity even in very young children is correlated with higher rates of obesity in adulthood (Anderson and Butcher, 2006).

Obesity in adolescents results in a reduced health-related quality of life, similar to that of those diagnosed with cancer (Schwimmer et al., 2003). Obesity also entails co-morbidities that were previously thought to be reserved for adults, including sleep-associated breathing disorders, occurring in more than 90 per cent of obese adolescents; fatty liver diseases and non-alcoholic steatohepatitis in up to 53 per cent of obese adolescents, potentially progressing to necrosis and cirrhosis or hepatocellular
carcinoma: metabolic syndrome with insulin resistance, hypertension, hyperlipidaemia (43%) and type II diabetes (29%); and many orthopedic problems caused by the excess weight (Wess et al., 2004). The severe co-morbidities and complications result in obese adolescents suffering severely increased rate of premature death in early adulthood (Bjorge et al., 2008).

Childhood and adolescent obesity is not limited to developed countries. It is seen in developing nations too (Popkin and Doak, 1998). In India urbanization and modernisation has been associated with adolescent obesity (Yadav and Krishnan, 2008).

Children nowadays have no time for sports and games. All their time is taken up by academics. They spend their free time in front of the TV or computer. With the easy availability of calorie-rich junk foods, food habits also have gone from bad to worse. No wonder childhood obesity is increasing in prevalence, and along with it, childhood type 2- diabetes (Unnikrishnan and Mohanan, 2008).

Childhood obesity is a major worldwide epidemic. The consequences of overweight and obesity among children will be the development of type 2 diabetes in children. Overweight in children and adolescents are generally caused by lack of physical activity and healthy eating patterns (Rao and Viswanathan, 2008).

5.4 Obesity in Kerala

The increased purchasing power and affluence among the people of Kerala during the last few decades have tremendously influenced their food habits. Rapid westernization, change in the lifestyle of people, dramatic
change in the dietary patterns and decline in physical activities of the Keralites have thrown Kerala into the epidemic of obesity and overweight. From the mid thirties of age to the early fifties of age, significant populations have their BMI rising towards 25. This clearly brings the onset of obesity even in rural population in Kerala. This has serious bearing on the public health sector; productivity will decrease and more and more people are likely to develop lifestyle diseases like diabetes, hypertension and coronary artery diseases at an early age (Varghese and Vijayakumar, 2008).

A study conducted in Thiruvananthapuram reveals that overweight and obesity is 18.3% among children (Ramesh, 2010). The proportion of overweight children increased considerably in Ernakulam district, Kerala during the period from 2003 to 2005 (Manuraj et al., 2007). Indian Academy of Pediatrics, Kottayam suggested that people should understand the dangers of overweight and obesity and should make necessary changes in their lifestyle to keep away the epidemic of obesity (*Malayala Manorama Daily*, 2012). Childhood obesity is the gateway to many lifestyle diseases like diabetes, heart diseases, cancer, high cholesterol etc (Grishma, 2011). Moreover a survey conducted in 2005 revealed that people above the age of 35 in Kerala suffer from many lifestyle diseases and overweight. Around 34% to 54% of the people in the above age group suffer from the problem of overweight (Johnson, 2012a). While analysing the causes of obesity, Sivasankaran focused on the impacts of three aspects of the dietary pattern on the health of Keralites. The traditional Kerala diet has transformed into energy dense, refined and civilized multi-cuisine delicacy. The nutrition of Keralites is now that of over nutrition in terms of
significant positive energy balance. Thirdly, the response of Keralites is one of maladaptation, many becoming obese, while others remain as metabolically obese individuals with weight in the normal range (Sivasankaran, 2007).

5.5 Causes of Childhood and Adolescent Obesity

The increase in childhood obesity has gained full attention of health care professionals, health policy experts and parents. All are concerned that today’s overweight and obese children will turn into tomorrow’s overweight and obese adults, destined to suffer from all the health problems and health care costs associated with obesity. There are several contributing factors to the development of obesity in childhood and adulthood including poor nutrition, lack of physical activity, home and peer influences as well as socio economic factors (Raspa et al., 2010). In India, under nutrition attracted the focus of health workers, as childhood obesity was rarely seen. But over the past few years childhood obesity is increasingly being observed with the changing lifestyle of families (Singh and Sharma, 2005). Parental lifestyle including time spent with children and work commitments have a strong influence on dietary intake and children’s weight (Jackson et al. 2005).

The rise in overweight and obesity rates across the globe has been so rapid that it can not be attributed to genetic factors alone (Gulati, 2003). Diet is what we eat and nutrition is what the body absorbs but the outcome depends on how the body reacts. The traditional eating habits with good physical activity are ideal. But modern unhealthy eating habits and
sedentary lifestyle provide positive energy balance which is the main reason of obesity especially obesity among children & adolescents.

5.5.1 Positive Energy Balance

The primary cause of childhood obesity must be due to changes in energy balance. Weight is gained when energy intake exceeds energy expenditure (Anderson and Butcher, 2006a). Physiologically, obesity can only develop if food consumption is high and energy expenditure is low, resulting in positive energy balance across months or years. A positive energy balance of 10% can lead to approximately a 13.5 kg increase in body weight within a year (Bray, 1987). The two important components of energy balance are energy intake (Consumption) and energy expenditure.

5.5.1.1 Energy intake or Consumption pattern

Deviations from traditional micro-nutrient rich food is one of the reasons responsible for over nutrition leading to obesity. Traditional dietary patterns got easily contaminated by the refined energy dense, oily products which are poor in micro-nutrients and dietary fiber (Sivasakaran, 2007a). Children’s dietary habits have shifted away from healthy food (such as fruits, vegetables, whole grains etc.) to a much greater reliance on fast food, processed food, snacks and sugary drink. Children who regularly consume more calories than they use will gain weight. Consumption of just 100 calories above daily requirement will typically result in a 10 pound weight gain over one year (Lakshmipathy, 2010). Most of the carbohydrate food in modern times have been processed and refined so that we do not receive them in their natural state (Bloom, 1982). Man is now forced to take food not because he is hungry but because food is available or it is part of
socialization. Now every event is centered around food. The deep frying technique and reuse of oil and reheating of foods stored in refrigerator will increase oxidative stress and will lead to early ageing and unmasking of metabolic syndrome. Increased supply of cheap, palatable energy dense foods coupled with better distribution and marketing had led to passive over consumption (Walker, 2011). Our irrational eating habits and overeating invites obesity on the one side and micronutrient malnutrition on the other.

One of the important causes of positive energy balance among children is fast food consumption. Cross-sectional studies have established that individuals consuming fast food meals have higher energy intake with lower nutritional values than those not consuming fast food (Sahasporn, 2003). Today, over one billion adults world-wide and almost 18 million children under the age of 5 are overweight indicating a trend linked to fast food consumption (Jeffery et al., 2006). There is a possible mechanistic link between fast foods, energy density and obesity (Jebb, 2003). 

Prevalence of overweight and obesity is high among the children of working mothers. The main reason for this problem is that children of working mothers eat more fast food than the children of non-working mothers (Malayala Manorama Daily, 2011a). Padmavathi suggests that the government should regulate fast food culture, which, she says is one of the prime reasons for many lifestyle problems (The Hindu Daily, 2009).

Another frequently studied source of energy is soft drinks. As with fast food, studies generally establish that drinking these beverages results in higher overall energy intake. Buying a 600 ml bottle of cola on the way
from school has become routine for children. Research has proved that a glass of fizzy soft drink is nothing less than a killer assault on the body (Lall, 2009). There is a positive link between overweight and soft drink consumption (Ludwig et al., 2001).

Another much studied source of energy intake is snacks. Snack foods such as potato chips are available around the corner, in a variety of flavors and sizes to suit everyone’s palate and pocket (Gulati, 2003a). Snack foods are often densely caloric, prepared, processed and packaged foods (Nielsen et al., 2002). A significant and positive relationship between Energy Dense Snack (EDS) food consumption and television viewing is found to exist among 8 to 12 year old girls (Phillips et al., 2004).

**5.5.1.2 Energy Expenditure**

The other equally important side of energy balance is energy expenditure both through physical activity and through dietary thermogenesis and the Basal Metabolic Rate (BMR). Dietary thermogenesis refers to the energy required to digest meals, and the basal metabolic rate refers to the energy required to maintain the resting body’s functions. Several studies examine the link between physical activity and BMI. Increased hours of sedentary activities such as television viewing have been linked positively with childhood overweight (Gable and Lutz, 2000). 19% of children who spend more than two hours a day in front of a screen are overweight, compared to 15% of those children who do so for less than one hour per day (Fisher et al. 2006). The Report of Cardiological Society of India revealed that obesity, unhealthy eating habits and modern
Lifestyle increase the risk of heart problems in India (Malayala Manorama Daily, 2009a).

The reductions in television viewing could have a positive effect on physical activity, which in turn could possibly increase the likelihood of decreasing childhood obesity (You and Nayga, 2005). Watching TV is sedentary, and reduces available playtime. Moreover, each year it exposes child viewers to an average of 40,000 advertisements, many promoting junk food and fast food. In short, the more watching of television by children, more likely they are to be overweight (www.kff.org/entmedia/7030.cfm). It is found that an additional hour to television per day increased the prevalence of obesity by 2 per cent (Dietz and Gortmaker, 1985). They note that television viewing may affect weight in several ways. First, it may squeeze out physical activity. Second, television advertisements may increase children’s desire for, and ultimately their consumption of energy dense snack foods. Third, watching television may go hand in hand with snacking, leading to higher energy intake among children watching television. Video games also are more likely to make one obese (Manuraj, 2008). Unsafe neighborhoods and limited access to recreation areas in some urban environment discourage leisure time physical activities (Pucher and Dijkstra, 2003). Breast feeding is not only good for children but also for mothers. It reduces 500 calories of feeding mothers daily. It also prevents the onset of type-2 diabetes (Malayala Manorama Daily, 2010).

Modern marketing strategies also do not adhere to the principles of social responsibility and marketing ethics. The young and ambitious
advertising executives resort to striking campaigns to increase the sale of their unhealthy products without considering their negative impact on the consumers. Unfortunately, some school officials rely on food marketing in schools for revenue for school programs. Concern about food marketing tactics and pressure they exert on decision making of children about food purchases are highlighted in many studies (Dixon et al., 2006).

Another factor responsible for obesity is the increased value of time especially for working mothers. More women are entering the formal labour force; they have less time to spend for preparing food and as a result there is an increased substitution of convenience foods; also there is an increased demand for unsupervised after school activities for adolescents. It changed the leisure time activities of adolescents and children (often, with an increased number of hours spent watching TV and playing video games neither of which require much or any physical exertion).

In short, the major factors which have contributed to positive energy balance of children and adolescents are: (a) Deviations from traditional micro-nutrient rich and home made food. (b) Over consumption of calorie-rich junk food, fast foods, fried items, soft drinks and snack foods. (c) Deep frying technique, re use of oil and reheating of foods stored in refrigerator. (d) Inadequate level of physical activity, lack of exercise and low aerobic fitness. (e) Availability of Television from 1982 as source of cheap indoor entertainment dramatically reduced the recreational energy expenditure. (f) The technological revolution, urbanization, the economic boom and liberalizations have brought down the transport energy expenditure of children in modern times. Moreover, due to unsafe roads,
children are discouraged from walking or cycling to school. (g) Increased focus on academic excellence reduced physical education hours and drill periods at school. The intense competition for admission to schools and colleges with flourishing tuition classes right from nursery classes force the children to forgo their play time for additional studies. (h) Unsafe neighborhoods and improper urban and town planning discourage leisure time physical activities.

5.5.2 Genetics or Heredity

Heredity has recently been shown to influence fatness, regional fat distribution and response to over feeding. Genetics also plays a big role in developing obesity. Recent studies have concluded that about 25 to 40 percent of BMI is heritable (Anderson and Butcher, 2006b). A child with an obese parent, brother or sister is more likely to become obese (Rao et al., 2010). The result of several studies suggests that the very fact of a women being obese during pregnancy may predispose her children to obesity (Judson, 2008).

5.5.3 Medical, Social and Emotional Factors

Obesity may follow due to damage to the hypothalamus after head injury because it is not able to regulate appetite. Endocrine factors may also contribute to obesity. Obesity is common at puberty, pregnancy and menopause. Several studies have shown an association between depression in children and development of obesity (Chandla et al., 2009a).

Prevention of obesity from childhood and adolescents and appropriate early intervention is a simple and feasible solution for obesity that is creeping up in global pandemic proportions.
References


Chapter V - Lifestyle Diseases and Obesity: An Overview of Kerala


