Chapter II

REVIEW OF LITERATURE

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Various studies have been conducted at international, national and state levels regarding various aspects of obesity which lead to many of the lifestyle diseases. All over the world, adolescent obesity and its consequences have been recognized as a public health problem. Obesity among adolescents is a major contributor of global burden of chronic diseases, morbidity and disability. The review of literature is reviewed under the following heads.

- **Lifestyle diseases and Morbidity pattern**
- **Obesity and lifestyle diseases**
- **Need for Prevention of obesity**

### 2.1 Lifestyle diseases and Morbidity pattern

Panikar and Soman (1984) observe the nutritional status of Kerala and point out that the levels of calorie and protein intake in Kerala are the lowest among the states. As far as morbidity pattern, two groups of diseases
have emerged. A) Respiratory infections, skin infections and b) diabetes, hypertension, degenerative heart diseases and cancer.

Choi et al. (2005) describe the concept, causes, prevention and control strategies of “diseases of comfort”. Diseases of comfort have emerged as a price of living in a modern society. Although technological progresses add to the comfort, convenience, or pleasure of living, they also introduce public health problems. They have unanticipated side effects. The television and computer games extend the hours of indoor sedentary entertainments. Children are hooked on to television sets and computers for long hours, instead of playing physical games in the school grounds or in local playgrounds and parks.

Hovey (2006) collected information from 43 fathers of children with chronic diseases in USA to understand the parenting concerns of fathers related to their family income. The study demonstrated that there are some interesting differences in the concerns of fathers of children with chronic condition in respect to their family income and in the coping strategies that they used. These fathers who have family income of less than $50,000 annually experienced concerns regarding earning for their families and getting enough family health information than fathers with $50,000 or more annual household incomes. Additionally, they worried about having enough health insurance, having enough money for extras and having enough money in general. Of the lower income fathers, 63 percent worried ‘quite a bit’ and a ‘great deal’ about whether they were taking care of their families in the best way, whereas only about 21 per cent of the fathers in the higher income group was concerned at those levels. The low
income fathers also expressed a desire for more knowledge about the children’s condition and worries about family finances.

Kusuma and Kalpana (2006) examine the morbidity pattern of both acute and chronic illness prevalent among the slum dwellers in Chittoor district of Andhra Pradesh in relation to their nutritional state as assessed from BMI. 240 men and 240 women in the age group of 20-45 years were chosen as sample. The study reveals that morbidity pattern has a significant association with BMI. It stresses the growing need to prevent obesity to control the morbidity and mortality among the potential age groups.

Padmakumar (2007) observes that 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 conditions along with a change from traditional dietary habits coupled with sedentary lifestyle have made man vulnerable to lifestyle diseases.

Gangadharan (2007) observes a paradox in the health sector of Kerala. It is a paradox of high morbidity and low mortality. The state performance in the health sector has been better compared to the rest of the states in India. However, Kerala outstrips all other states in the case of diseases especially chronic diseases. Among the chronic illnesses, cardiovascular disease, cancer, hypertension and diabetes are emerging as the severe health problems of the state. To him, sedentary lifestyle, lack of physical activity and obesity increase the risk of chronic illness. He warns that the paradox of high morbidity and low mortality is to be viewed very seriously in relation to high socio-economic advancement of Kerala to make health for all a reality in the near future.
Mary and Padmaja (2008) selected two blocks of Kodungallor in Trichur district and Chittur in Palaghat district to study the morbidity profile in rural areas of Kerala. The study showed a morbidity prevalence rate higher than reported by previous studies. Morbidity prevalence rate (acute and chronic) worked out to 309.6 and 352.4 per thousand in Kodungallur and Chittoor respectively.

Ratnani (2008) finds that genetic factors predispose certain people to diabetes. He suggests diet and exercise can determine whether those genetic factors actually manifest in the disease. Heredity is like a cannon and obesity pulls the trigger.

The Hindu Daily (2009) reports of a cross-sectional survey on the prevalence of lifestyle diseases, conducted at two wards in Venmony Panchayath in Alapuzha district from January to August 2007, by G. Vijayakumar and others. The number of adults participated in the study was 1990, including 1149 men and 841 women. The prevalence of hypertension was 36 per cent. About 60 per cent of those with diabetes also had hypertension, about 35 per cent of the study population was found to be obese (BMI above 25). The study also found 75 per cent of the population to be centrally obese.

Ekbal (2009) makes a comparative study of the incidence of lifestyle diseases of Kerala and other states by analyzing various issues of Economic Reviews. Both infectious diseases like dengue fever, leptospirosis etc. and the so called lifestyle diseases are both prevalent in Kerala. Moreover, the incidence of many lifestyles diseases is more than the national average.
Joshua (2009) reports the speech of Ghulam Nabi Azad, held at the SAARC Diabetes Conference, New Delhi. According to him, diabetes is linked to lifestyles and dietary habits. He stressed the need to generate awareness about good eating habits and healthy lifestyle practices including yoga and exercise.

Leather (2009) tries to throw light on chronic illness and its effects on adolescents. Chronic illness may lead the adolescent to experience a loss of personal control, increased dependency and lack of autonomy, just at the time when these are becoming developmentally important.

Winter De et al. (2009) examined the prevalence of cardio vascular risk factors in older adults with intellectual disability. He conducted a cross-sectional study with 50 to 90 year old clients (N= 470) of three Dutch intellectual disability care providing organizations and found that healthy behaviour was low, with 98.8 per cent of the participants having an unhealthy diet and 68.3 per cent a lack of exercise. Smoking (13.6%) and alcohol abuse (0.3%) were relatively minor problems. Abdominal overweight (70.4%), diabetes (8.7%), hyper tension (36.8%) and hypercholesterolemia (31.8%) were highly prevalent.

Malyala Manorama Daily (2009a) reports the results of a study among 400 workers at Pala municipality, Kottayam district of Kerala. The study finds that lifestyle diseases are increasing among the workers. Diabetes, high blood pressure, and cholesterol are the diseases found in most of the workers.

Malayala Manorama Daily (2009b) reports the inaugural address at Mims Hospital, Malappuram by Dr. A.P.J. Abdul Kalam. He remarked that
people should follow healthy lifestyle to control diseases. A better lifestyle
can prevent even heart diseases.

To Hazra (2010), physical activity is declining along with growing
affluence. Fast food becomes more prevalent in urban areas. Changing
lifestyle causes an increase in the number of cases of coronary heart
diseases. Ageing of the population in any case is giving rise to a steep
increase in the incidence of many chronic diseases, some of which are
triggered by an adverse lifestyle.

2.2 Obesity and lifestyle diseases

Bloom (1982) is of the opinion that most of the carbohydrate food
in modern times have been processed and refined so that we do not receive
them in their natural state. He identifies three types of food. Carbohydrate
is the commonest food, the least expensive which provides energy most
readily. Protein is necessary for the nourishment and replacement of cells
and tissue of the body. Fat provides the body’s reserve source of energy
and in fact represents the most compact type of fuel available. Most diet
today contains proportions of each of these types of food but proportions
may vary considerably with such factors as climate availability and racial
habits. In cold countries the proportions of fat is higher because of its heat
giving quality. In poor countries the diet is largely carbohydrates because
this is cheaper and more readily available than protein.

Katz (1996) suggests that combining diet and exercise is a
successful way to loose and maintain desired weight. Through her study
she identifies the organic compounds that make up food are divided into
two major groups. The first group makes up the bulk of food that is
ingested and is called the macro-nutrients. The major functions are to supply energy compounds that fuel muscles and maintain body temperatures. This group is also called energy nutrients. The second group of organic chemicals that food contains, but in small quantities is the micro-nutrients.

Sooryamoorthy (1997) offers three clear themes to lament in the wake of modernization and globalization. First the claims that consumerism creates a mind which motivates one to convince one’s own interests as the almost exclusive object of life. Human relationship comes to be subordinated to a thing – a car, a video player and money. Secondly, the consumption pattern leads to changing preferences. Consumption of durable goods in rural Kerala recorded more than thousand fold increase over 13 year period since 1970s. Durable goods, including modern home appliances, have taken a major share in the expenditure of urban people in Kerala. This upward expenditure has been due to disposable income, partly coming from remittances from the Gulf regions. Thirdly, the evils associated with consumerism are the fastidious advertising and marketing. The Western concept of self service shop, one-stop shop and credit facilities has gained ground in Kerala.

A survey covering 12 out of 250 households in Alapuzha by C.V. Gopalakrishnan (2002) revealed that the middle class and the rich have turned over to cornflakes, cookies and other easy to make fibreless food products which the study regards as ‘junk foods’. The advent of preserved and junk food into the daily diets of locally available nutritious items may have far reaching consequences on the health of the younger
generation. The demonstration effect of such practices may soon affect the dietary habits of poor households too.

Schmidhuber (2003) observes that urbanization not only affects changes in dietary patterns within a country, but also promotes changes and convergence across borders. Foreign distribution channels bring foreign diets which are more processed, with more sugar and fat content, and in general energy rich food.

The two primary culprits of obesity problem according to Gulati (2003) are the changes in technology that have greatly advanced methods of agricultural production and altered lifestyles and an increased valuation of time. These changes have led to an economic transition, a nutrition transition and an epidemiological transition. To him, technology has altered our food landscape. With modern technology, many foods that used to take hours to prepare at home are now easily prepared in mass quantities. The foods most affected by technological advancement are those rich in sugar and fat. Snack foods such as potato chips are available around the corner. Technological progress has also increased the opportunity cost of physical activity. The second factor responsible for rise in obesity rates is the increased value of time especially for working mothers. They have less time to spend on preparing food and an increased demand for unsupervised after-school activities of adolescents.

In his inaugural address of 17th Annual Conference of Indian Society of Agricultural Marketing, Pingali and Khwaja (2004) mentions two distinct stages of diet transition associated with the period of economic growth. During the first stage of income-induced diet diversification, consumers move away from inferior goods to superior foods and substitute
some traditional staples especially rice. In the second stage of diet globalization, the influences of globalization are much more marked with increased consumption of proteins, sugar and fats.

Seiders and Petty (2004) examine four market failures related to food choice and food marketing practices. They argue that most important remedial measure to relieve the obesity epidemic might be appropriate public policy. They propose a remedy framework that incorporates both indirect (education, information) and direct (financial incentives, restrictions on certain marketing practices) remedies and that reflects the challenge of balancing the public and private costs of reducing obesity with related medical costs.

Morrill and Chinn (2004) observe that obesity results from an energy imbalance- calorie intake in excess of calories expended by physical activity and metabolic processes. Behavioural factors include sedentary lifestyles and consumption of excess calories and reflect environmental factors that influence behaviours and thus energy intake and energy output. The built in environment (e.g. side walks and transportation system) can encourage or discourage physical activity and the food environment (e.g. food availability and marketing) can encourage or discourage consumption. Insufficient physical activity is not limited to adults. Despite many mandated state physical education programmes, only about one half of the children participate in some form of vigorous physical activity. Watching television contributes to overweight in children. Both the authors observe that in addition to physical activity, overall calories consumption plays a pivotal role in the epidemic. Between 1971-1974 and 1999-2000, average daily energy intake increased from 2,450 kilo calories to 2,618 kilo calories.
for men and from 1542 kilo calories to 1,877 kilo calories for women. Increase in consumption of “junk food” with minimal nutritional value especially soft drinks is thought to contribute substantially to the epidemic among children. Children and adolescents are eating more food away from home, drinking more soft drink and snacking more frequently. Fast food is ubiquitous and has reshaped diets in the United States.

Bowman et al. (2004) examined the association between fast food consumption and measure of dietary quality. The study included 6212 children between 4 to 19 years in the United States. The aim of the study was to assess the hypothesis that fast food consumption adversely affects dietary factors linked to obesity risk. On a typical day, 30.3% of the total sample reported consuming fast food. Children who ate fast food, compared with those who did not, consumed more total energy, carbohydrates, added sugars; more sugar sweetened beverages, less milk and fewer fruits and non-starchy vegetables. They conclude that consumption of fast food among children in the United States seems to have an adverse effect on dietary quality in ways that plausibly could increase the risk for obesity.

Bray (2004) observes that childhood obesity is linked to serious health concerns including type–2 diabetes, cardiovascular diseases and sleep problems.

Stein and Colditz (2004) through an empirical study note that fuelled by the increasing popularity of fast food, soft drink and sedentary activities, childhood obesity has become an epidemic in recent years.
Impact of household fast food expenditure and children’s television viewing on children’s dietary quality are examined by You and Nagya (2005). Results indicate that both factors have statistically significant and negative effect and that effects of these two factors differ between children younger than 11 years old and children at least 11 years old.

Forsner et al. (2005) conducted a study to illuminate the experience of being ill between the ages of 11 to 18 years. Four girls and one boy who were suffering illness were interviewed in Sweden. The study revealed that illness disrupted their daily lives and made things unrecognizable. Being ill at the age of 11-18 years seemed to imply being lost, hurt and in need of comfort for themselves and others.

Christodoulous et al. (2006) conducted a study among 178 elementary school children in Greece. The study examined obesity and other parameters of physical fitness. Results showed significant physical fitness improvements during the school year, with little or no change in the summer holidays. Children who reported higher than 30 minutes of daily participation in physical activity demonstrated lower prevalence rates for overweight and obesity as well as superior fitness performance. The detrimental effect of the summer break on the progress of physical fitness was less in children who did participate in physical activity than in those who did not. Longitudinal modeling using generalized estimating equations demonstrated that physical inactivity is a major contributing factor for obesity. The study concluded that pre-adolescent children advance in physical fitness mainly during the school year, with physical activity being a beneficial counter measure for the development of obesity.
Ulijaszek and Lofink (2006) observe that increasing rates of obesity across the world are broadly attributed to environments that are obesogenic, against an evolutionary heritage that is maladaptive in the new contexts. Extensive emergence and rise of obesity among most of the world’s populations indicate that the ability to become obese is universal whereas great variations in obesity rates across geographical regions indicate possible population differences in genetic susceptibility to obesity. Human genetics are likely to have undergone selection for traits that promote energy intake and energy storage and that minimize energy expenditure, and there are a great many obesity related genotypes. It is almost inevitable that obesity should have emerged as a major human biological phenomenon in the environments that have been constructed in industrialised nations over the past 60 years and that have been transferred across the world with modernization since. Present obesity patterns are outcomes of associated forces: a) a continuing economic development with comparatively few serious setbacks b) an increased food security for much of the world’s populations c) the penetration of the world food system into the remotest parts of the world d) declining price of energy dense foods e) progressive mechanization of the vast majority of labour intensive tasks. f) Urbanization and sedentization of work in the form of service oriented jobs as replacements for labour intensive production jobs g) mechanization of transport and h) sedentization of leisure time activities.

Anderson and Butcher (2006) have documented trends in children’s obesity and examine the possible underlying causes of obesity epidemic. Energy intake of children is affected by increasing availability of energy dense, high calorie foods and drinks through schools. Changes in the family
structure, particularly an increase in dual career or single parent working families, may also have increased demand for food away from home or pre-prepared foods. A host of factors also have contributed to reduction in energy expenditure. Nowadays, children seem less likely to walk to school and to be travelling more in cars than they were doing in the early 1970s, perhaps because of changes in the built in environment. Finally, children spend more time viewing television and using computers.

Sekhar Rout (2007) examines the effects of income and education of the household on health expenditure based on primary data collected from Cuttack and Bhubaneswar Municipal Corporations (for urban area) and Jaipur district (for rural area) of Orissa, India. Both in rural and urban areas, income of the household has significant influence on its health expenditure whereas the effect of education is insignificant. Health is a function, not only of medical care but also of the overall integrated development of socio-cultural, economic, educational and political factors.

Radha and Ratnakumari (2007) made an investigation about the T.V viewing habits of children of 6-12 years of age. The sample comprised of 360 respondents. The study which relied on a sample of 360 respondents revealed that viewing T.V negatively affects the children’s eye sight, health, food habits, study hours, academic performance and recreational activities.

Ohleyer et al. (2007) made a remarkable study in Florida among 72 children and adolescents who were overweight. The overweight students and their parents were examined. The study examined disease-related parental stress, general parenting stress, parental and child anxiety and children’s behavioural and psychological maladjustment. The study found
that parent’s disease related stress may contribute in part to child behaviour or emotional problems.

Mikhailovich and Morrison (2007) identify a complex range of factors which could influence parental emotional responses to a child’s overweight and the quality of the communication encounter between health care providers and parents. Four key findings have been identified which may be of assistance when communicating news of child’s overweight to parents by health care workers. Firstly, health care providers should expect a wide range of parental responses at the outset when communicating such information. These may range from relief, disinterest, denial or anger. Secondly, parents of children who are overweight may be fearful of their child being stigmatized. Thirdly, they are also likely to be highly sensitive to the attitudes and languages of health care providers, which may be perceived as blaming. Fourthly, the communication methods of health care workers must be proper. Rich conversations may provide opportunities for addressing the problem in a more sophisticated, helpful and less blame – oriented manner.

Draheim et al. (2007) observed 325 adults (178 men and 147 women) to examine their dietary intake. Participants were selected from two North Western States, one Midwestern state and one Eastern Canadian Province. Participants were categorized into one of three residential settings (group home, with family members, semi-independent). Group homes were defined as residential settings providing 24 hours supervision (with overweight care staff). Individuals who lived with a parent or sibling without mental retardation were categorized as living with family members. Semi-independent residential settings were defined as residents where there
was less than 24 hours supervision and no overweight care staff. Results suggest that regardless of residential settings, men and women do not consume enough fruits and vegetables and consume too much dietary fat. In this study, men reported consuming fewer fruits and vegetables than did women, which may put them at a greater risk for developing obesity, cancer and other health conditions.

Kamtsios and Digelidis (2008) examined the attitude of children with different Body Mass Index (BMI) towards exercise, self-perception and lesson satisfaction in physical education and participation in physical activity. Seven hundred and seventy five people living in sub-urban and urban areas of Greece aged 11-12 years participated in the study. The results showed that when compared to students with normal Body Mass Index (BMI), the obese and overweight students had lower scores in lesson satisfaction, negative views of their body and reduced levels of physical activity. Also, the results showed that obese and overweight students adopted more sedentary daily habits, such as many hours of television watching and personal computer usage. The result of the study implies the need for necessary school intervention in order to encourage healthier behaviour and habits.

Riemenschneider (2008) conducted a structured review of literature to summarize cost estimates and compare costs attributable to obesity across different European countries. Out of 797 publications that met their research criteria, 13 studies investigating 10 Western European countries were recognised to be relevant and included in their review. They found that obesity related health care burden was very high; relative economic burden ranged from 0.09% to 0.61% of each country’s GDP. They also
recommended prospective and standardized studies to provide more accurate costs for all European countries.

Bharati et al. (2008) analyse the various factors leading to overweight and obesity among school going children of Wardha city in the state of Maharashtra in India. A cross sectional study was carried out among 2555 children of 5\textsuperscript{th} to 10\textsuperscript{th} standard. Overweight and obesity was found to be 3.1% and 1.2% respectively. The study showed that urban residence, father or mother involved in service or business, child playing outdoor games for less than 30 minutes and English medium school students were significantly associated with overweight and obesity.

Consumerism in rural India and various factors leading to it were studied by Kapoor (2008). Because of certain socio-economic changes, the rural consumers have become aware about their standard of living. The rural market accounts for around 70 per cent of toilet soap users and 38 per cent of all two wheeler purchased; villagers who used to crack upon peanuts are now demanding chocolates. Consumerism and globalization are penetrating through parts of rural India and the villages which were once inconsequential dots on maps, are now getting the attention of global marketing and media planners.


According to Philip (2008) obesity and overweight lead to metabolic syndrome that includes high blood pressure, diabetes and
cholesterol. Obesity creates many health problems especially among adolescents and women.

Sharan (2009) observes that society shows some kind of discrimination and stigmatization towards obese women which leads to low self-esteem. One of the reasons pointed out is the outcome of the fashion industry which is obsessed with slimness. What is more disturbing is the commercial stigmatization and exploitation by various enterprises as can be seen in many advertisements. The stigmatization only leads to isolation, frustration and eating disorder in the obese. The most important thing is to promote positive psychological and social attitudes towards the obese in society.

Lall (2009) observes that a glass of fizzy soft drink is harmful to the body. Within 10 minutes of drinking a cola, a huge dose of sugar hits our system. Within 20 minutes, sugar is promptly converted to fat. Within 40 minutes, all the caffeine from the cola dilates the pupils, raises blood pressure and the liver dumps more sugar into the blood. The high sugar and caffeine in our blood gives us a ‘high feel’. Slowly, blood sugar begins to crash giving way to tiredness, lethargy and fatigue.

Deaton and Dreze (2009) through their study on nutrition are of the view that per capita consumption of calories, proteins and many other nutrients have declined in India during the last 25 years. However, fat consumption has increased steadily in both rural and urban areas during these periods.

Malayala Manorama Daily (2009) reports the results of a study by American Heart Association. The main reason for overweight and obesity
is the ‘fructose’ content which is seen in most of the soft drink and junk food. Fructose corn syrup is used to increase sweetness in processed and tin food. The study also warns that there is a high tendency of getting lifestyle diseases to persons who regularly use soft drinks and junk food.

Lawrence (2009) reports the first official recommendations of the United Kingdom for a diet that is both healthy and good for the environment. The recommendations are likely to be seen as an assault on the current food system. To fight climate change and tackle the growing crisis of diet related diseases such as diabetes, heart diseases, and cancer, British consumer must cut down on meat and diary produce, reduce their intake of processed food and curb waste. The study acknowledges that cutting processed food and reducing consumption of intensively produced meat and dairy foods could lead to shrinking of the U.K’s food and drink industry.

Ramaswamy et al. (2010) conducted a study in the United States to evaluate the association between BMI and classroom efforts. A sample of 45 boys and girls in the age from seven to twelve years, attending grades 3-5 participated in the study. The data were collected for the two academic years of 2005-06 and 2006-07. Teachers, completely unaware of the study at the time of their class room evaluation, provided reports of their academic performance. Height, weight and percentage of body fat were evaluated. A multiple regression model controlling for ethnicity, gender and age revealed that increasing BMI scores had little association with academic performance but efforts score decreased significantly as BMI increased.
Tracing the reasons for lifestyle diseases, Kumar et al. (2010) find that eating fast food and leading a sedentary lifestyle lead to obesity which results in other complications like increase in the cholesterol level, blocking of the arteries, increased risk of coronary diseases, in addition to the general physical discomfort posed by extra weight.

Malayala Manorama Daily (2010) reports the results of a study of Archives of Pediatrics and Adolescent Medicine in Mondryal University. A study in Canada among 1314 adolescents who spent a lot of time in front of TV during the period 1997-98 reports that students who spent more time for TV watching became less efficient in lesson learning and have overweight. Main reasons for these defects are the overeating and snacking habits during the time of T.V watching.

2.3 Need for Preventing of obesity

Huenemann (1968) is of the opinion that treatment of obesity is difficult and not often effective. Therefore we should emphasize on prevention. Preventive measures must recognize present ways of living, such as snacks and convenience foods which are prepared outside the home for the most part, and ways of energy expenditure, compatible with modern life. There is indication that certain persons and members of groups are particularly vulnerable to obesity. Special efforts should be directed towards identifying and working with the general population towards a cultural change to decrease energy intake and to increase energy expenditure.

Padmavati (1990) stresses that weight control plays a very important role in preventing heart disease as it prevents high blood pressure, elevated blood fat levels and diabetes. A prudent diet beginning
preferably from childhood, abstinence from smoking, regular exercise and the maintenance of physical fitness throughout life are essential according to her to prevent heart attacks and to maintain a healthy life.

Mcwhirter and Clasen (1996) consider obesity as 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 the intake of calories – particularly those that are derived from fat. One of the advantages of cooking at home is that the home cook can be sure not only of the quality of ingredients, but can also choose to cook them in the healthiest ways without the loss of some important nutrients particularly Vitamin A and Vitamin C. Overweight people have a chance of developing high blood pressure, diabetes, gallbladder problems etc. Obesity is normally caused by a combination of affluent consumption and lack of exercise. According to the authors, women are more prone to obesity than men because their bodies are more efficient at storing fat. According to Department of Health Statistics, between 1980 and 1993 the number of overweight British men rose from 33% to 43% and overweight women from 24% to 30%.

Molarius (2003) conducted a population based study in Sweden to investigate whether and to what extent the association between socio-economic status and obesity can be explained by lifestyle factors among men and women. Using a postal survey questionnaire he collected data from a random sample of the adult population aged 18-79 years in Varmland country in Western Sweden between 21 March and 19 May 2000. BMI was calculated from self-reported weight and height. Educational level was obtained through record linkage from a national
education register. Data on lifestyle factors were obtained from the respondents. The results showed that obesity was relatively common in the study population; 12 per cent of men and 14 per cent of women were obese. Obesity increased with age, except among men in the oldest age group. About one fifth of the population was physically inactive and physical inactivity was most common among young (25-44 years) men. Women were more often smokers than men, except among the elderly (65-74 years). Obesity was more common among subjects with low education than among subjects with high education. Also lifestyle habits differed considerably between the educational levels. Physical inactivity and alcohol use were positively associated with obesity. Physical inactivity was even more strongly associated with obesity in women than in men. Although many lifestyle factors were related to obesity and socio-economic status in men and women, only a part of the association between educational level and obesity could be explained by the measured lifestyle factors.

Asfaw (2006) examines the impact of obesity on the prevalence of four doctor-diagnosed chronic diseases in South Africa and in Senegal. The results reveal that the obese respondents were 4.7, 2.8 and 4.8% more likely to face the risks of arthritis, diabetes, and heart diseases respectively in South Africa and 6.5 and 7.4% more likely to face the risks of heart disease and asthma respectively in Senegal than their lean counterparts. Obesity imposes a real and substantial danger, affecting the prevalence of chronic diseases. Unchecked, it can be a major public health problem, imposes a serious challenge to the health sector and can jeopardize future developments.
Mathew (2006) brings out a close association between diet and heart attack. A balanced diet which avoids excess of saturated fats, refined white sugar products, and processed starches-white bread and white rice-items with low fibre content is advised by doctors to keep heart disease at bay. Excessive consumption of food containing saturated fat and sugar adds to the body weight and also increases blood cholesterol. It is important to inculcate the habit of eating a balanced diet from childhood. The diet should have adequate calories, protein, fats, carbohydrates, minerals and vitamins. The correct diet started from school-going age and continued all through adult life goes a long way in preventing heart diseases.

Raj et al. (2007) examine trends in childhood obesity in a representative sample of school children from Ernakulam District, Kerala and highlights the relationship of obesity and blood pressure. They adopted a stratified cluster random sampling method to select the sample units. Anthropometric data were collected from 24842 students of 5-16 years of age, during 2003-2004. Overweight and obesity were defined by BMI for gender and age. Gender, age and height were considered for determining hypertension. The study showed that the proportion overweight children increased from 4.94 per cent of the total students in 2003 to 6.57% in 2005. The increase was significant in both boys and girls. The proportion of overweight children was significantly higher in urban regions and private school. Systolic and diastolic incident hypertension was found in 17.34 per cent of overweight children versus 10.1 per cent of the remaining students. Childhood obesity showed an increasing trend in a short period of two years. Hypertension was common in overweight children. The results
suggest the need for greater public awareness and prevention programmes on childhood obesity and hypertension.

In order to understand the prevalence of obesity in developing countries, Laxmaiah et al. (2007) conducted a study on adolescents of both sexes from Hyderabad. The study revealed that the prevalence of overweight among adolescents studying in private schools was significantly higher than among those studying in government schools. It also found a positive association between the consumption of junk food and obesity.

Varghese and Vijayakumar (2008) made a study at Chemmaruthy Panchayath in Varkala to examine the prevalence of obesity in relation to their age. According to the study, 18 per cent of those in age group 20-29 years were obese or overweight which rose to 41.7 per cent of those in 40-49 age group and 41.9 per cent of those in 50-59 years. The rising prevalence of overweight and obesity in the younger age group needs to be tackled. Educating the younger age group especially those in their 20s or even students about the adverse effect of obesity and its complications, will delay the onset of obesity by at least 10 years.

Population based studies done by Mohan (2008) in Chennai have shown that nearly one in five of all patients with diabetes has one or more complications arising from the disease. According to him, prevention of diabetes can be undertaken at four levels. Primordial prevention refers to reduction of risk factors such as obesity, physical inactivity and stress, thereby reducing the risk. Primary prevention refers to postponement in those in a pre-diabetic stage such as impaired glucose tolerance. Secondary prevention refers to prevention of complications in those who have developed diabetes. Tertiary prevention is used to describe limiting
physical disability and preventing progression to end stage complications in those who have developed diabetic complications.

After considering food and physical activity environments, Story (2009) discusses the role of schools in obesity prevention efforts. His article is organized around four key areas 1) School environments and policies 2) School physical activity environments and policies 3) School body mass index measurements and 4) School wellness policies. They suggest that stronger policies are needed to provide healthier meals to students at schools limit their access to low nutrient, energy dense foods during the school day and increase the frequency, intensity and duration of physical activity at schools.

To highlight contemporary growth curves for Indian children from 5-18 years for height, weight and BMI, Khadilkar et al. (2009) conducted a study in 10 affluent schools from five major geographical regions of India. The data collection lasted from June 2007 to January 2008. Data were analyzed on 18666 children (10496 boys and 8170 girls). The study confirms the alarming trend of increased childhood obesity in urban upper socio-economic classes.

Laxmaiah and Brahmam (2009) conducted a survey in Andhra Pradesh to study the diet and nutrition status and prevalence of obesity and hypertension among adult women and men. It was found that inadequate intake of food and nutrients are the major etiological factors for most of the nutritional problems in the country. While the consumption of cereals and roots and tubers was satisfactory, the average consumption of most protective and income elastic food such as pulses, milk, fruits and green leafy vegetables was found to be inadequate. The prevalence of
hypertension was observed to be as high as 25 per cent among rural adults and a positive association was observed between prevalence of hypertension and obesity.

Narasimhan (2009) observes through his surveys that prevalence of asthma was more among urban children than their rural counterparts. This is probably because there are fewer junk food outlets in rural areas. Also, their diet is richer in vitamins and minerals since they rely more on natural foods like fresh vegetables, milk, butter milk and fruits. It is the responsibility of parents, teachers and physicians to ensure that children learn to enjoy fresh vegetables and fruits so that they do not get addicted to fast food.

Chandla et al. (2009) observe the report of National Health Examination Surveys of 2002 and finds that the prevalence of overweight is higher in boys (32.7%) than girls (27.8%). In adolescents, overweight prevalence is same for females (30.2%) and males (30.5%).

The Hindu Daily (2009a) reports on a Continuing Medical Education Programme on obesity held at the Sunrise Hospital in Kochi on 11th July 2009. Recent studies have shown that obesity is the major preventable cause of deaths world wide. Lack of interest and paucity of knowledge seems to be the major drawback. Kerala holds the second place in the country for incidence of obesity. There are scientific methods to successfully reduce weight that will help prevent diseases like cancer, hypertension, diabetes, stroke and heart diseases. Obesity prevention and treatment should be given top priority in health care and awareness against the diseases should be spread through the educational network.
A sample of 737 students was selected by Kukulu et al. (2010) from Antalya, a city located in the south western part of Turkey, to compare dietary habits of children living in metropolitan and non-metropolitan areas. Their physical characteristics, socio-economic milieu and educational level were identified. Questionnaires were used to collect data regarding dietary habits of participants. Furthermore, their BMI was calculated. During the study, while 4.3 per cent of students living in the non-metropolitan area were found obese, this figure was 8.4 per cent in the metropolitan area. A big majority of non-metropolitan students have breakfast and lunch at home. Metropolitan students usually take lunch from restaurants and school canteens and generally consume more snacks. The obesity risk of these students participating in the study was found to be high. The study highlighted the need for intervention programs to inform the students about the importance of healthy nutrition and lead them to change their current consumption behaviour.

A cross-section analysis of 595 women (330 premenstrual and 265 post menopausal of Jalandhar district in Punjab by Khokhar et al. (2010) shows that prevalence of obesity was more in post-menopausal women as compared to the premenstrual women according to BMI, Waist Circumference as well as Waist-Hip-Ratio. According to BMI, the prevalence of obesity was 70.30 per cent and 75.09 per cent in pre and post menopausal women respectively.

Padmakumar (2010) in a remarkable study conducted in Alapuzha district of Kerala among 559 police men showed the depth of lifestyle diseases and overweight. The study found that 72 per cent of the
policemen are suffering from overweight and related problems mainly because of the lack of exercise and unhealthy eating habits.

2.4 Conclusion

An overview of available studies reveals various aspects related to obesity, its causes, consequences and challenges to the health sector. However, the influence of socio-economic background and consumption pattern on adolescent obesity in Kerala has not formed the subject matter of any investigation so far. Therefore, the present study is undertaken to provide information to fill this gap. It is hoped that such a study will enable to prevent the onset of lifestyle diseases among the adolescents.
Chapter II - Review of Literature

References


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