CHAPTER-1

INTRODUCTION

As the prevalence of overweight and obesity continues to rise worldwide, health related complications are expected to concurrently increasing as well level of physical activity is decreasing. Physical inactivity is one of the most common and persistent contributors to poor health in the world which invites various health problems. As there are numerous health benefits of physical activity, the need to increase physical activity has been stressed thoroughly. Research consistently links physical activity to numerous health improvements. The term physical activity has been used interchangeably with other words such as exercise, fitness, physical education. However, the actual and widely accepted definition of physical activity is "any bodily movement produced by skeletal muscles that result in caloric expenditure***" (Caspersen & Powell et al., 1985).*** The energy expenditure during physical activity can be indicated as metabolic equivalents (METs), which are very frequently used to measure physical activity in adults. One MET is about 3.5 ml/kg/min of oxygen, is resting energy expenditure, so if some activity requires 3 times more oxygen than resting oxygen consumption, then it would be 3 METs. Energy expenditure (MET score) of diverse activity including home activities, hobby, occupation, sport, and religious activities ***(Ainsworth et al., 2000).*** Physical activity can be assessed in four different dimensions: one type (aerobic or, and occupational, household, or leisure time activities), second is intensity (low, moderate, or vigorous activity), third is frequency (how often it is done) and fourth is duration (length of time the activity lasted) (***Mahar & Rowe, 2002).***

World Health Organization (2011) recommend that an adults aged between 18-64 years should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate - and vigorous-intensity activity to maintain health

and to gain extra health benefits adults should increase their moderate intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate and vigorous intensity activity.

Regular physical activity of moderate intensity namely walking, cycling, or playing sports is very beneficial for health. Engaging in regular physical activity is one of the best ways to improve general health. Physical activity has become the prime health indicator where it plays an essential role in enhancing physical fitness and health related behaviour that could lower the risk of morbidity and mortality from diseases ***(Sundland et al., 2008).*** According to global recommendations on physical activity for health 2010 report, participation in 150 minutes of moderate physical activity each week is estimated to reduce the risk of ischemic heart disease by approximately 30%, the risk of diabetes by 27%, and the risk of breast and colon cancer by 21–25%. Additionally, physical activity lowers the risk of stroke, hypertension and depression. Physical activity is a key determinant of energy expenditure and thus fundamental to energy balance and weight control ***(World Health Organization, 2010).***

Despite of the well-known importance of physical activity in quality of life and wellbeing, inactivity and sedentary lifestyles are prevalent throughout the global populations. It seems that less than 60% of individuals globally achieve the minimum recommendation of 30 minutes a day of moderate intensity exercise or continuous physical activity ***(World Health Organization, 2004).***

Physical inactivity has been identified as the fourth leading risk factor for global mortality (6% of deaths globally). This follows high blood pressure (13%), tobacco use (9%) and high blood glucose (6%). Overweight and obesity are responsible for 5% of global mortality. Levels of physical inactivity are rising in many countries with major implications for the general health of people worldwide and for the prevalence of non-communicable diseases (NCDs) namely cardiovascular disease, diabetes and cancer and their risk

factors such as raised blood pressure, raised blood sugar and overweight ***(World Health Organization, 2009)***

Non communicable diseases (NCDs) now account for nearly half of the overall global burden of disease. It is estimated that of every 10 deaths, 6 are attributable to non-communicable conditions. Global health is being influenced by three trends namely population-ageing, rapid unplanned urbanization, and globalization, all of which result in unhealthy environments and behaviours. As a result, the growing prevalence of non-communicable diseases (NCDs) and their risk factors has become a global issue affecting both low- and middle-income countries like India. Nearly 45% of the adult disease burden in these countries is now attributable to non-communicable diseases (NCDs). Many low- and middle-income countries are beginning to suffer the double burden of communicable and non-communicable diseases, and health systems in these countries are now having to cope with the additional costs of treating both (***World Health Organization, 2008).***

Epidemiological research of ***Bauman (2004)*** has proven that 15 to 20% of the overall risk for coronary heart disease, type 2 diabetes, colon cancer, breast cancer, musculoskeletal diseases, and psychological disorders is attributable to physical inactivity. In the 2002 World Health Report, the proportion of deaths attributable to physical inactivity in the European Region was estimated to be 5 to 10%.

The rates of disease and death of physically inactive and active people in the Danish population, a change from inactivity to activity from the age of 30 to 80 would translate into a gain in life expectancy of between 2.8 and 7.8 years for men and between 4.6 and 7.3 years for women, depending on the degree of activity increase ***(Ogden, 2003).***

According to **(Global health observatory, 2014)** data on adult of 18 years above in age shows that insufficient physical activity is one of the 10 leading risk factors for global mortality. People who are insufficiently active have a

20% to 30% increased risk of death compared to those who engage in at least 150 minutes of moderate intensity physical activity per week, or equivalent, as recommended by WHO 2010. Globally, around 23% of adults aged 18 and over were not active enough in 2010 (men 20% and women 27%). The prevalence of insufficient physical activity rose according to the level of income. High income countries had more than double the prevalence as compared to low income countries for both men and women, with 41% of men and 48% of women being insufficiently physically active in high income countries as compared to 18% of men and 21% of women in low income countries. Nearly every second woman in high income countries was insufficiently physically active. The increased automation of work and life in higher income countries creates opportunities for insufficient physical activity. Globally, 81% of adolescents aged 11-17 years were insufficiently physically active in 2010. Adolescent girls were less active than adolescent boys, with 84% vs. 78% not meeting WHO recommendations. The WHO Eastern Mediterranean Region (31%) and the Region of the Americas (32%) had the highest prevalence of insufficient physical activity, while the prevalence was lowest in the South-East Asia (15%) and African (21%) Regions. Across all regions, women were less active than men, with differences in prevalence between men and women of 10% and greater in the Eastern Mediterranean Region and the Region of the Americas ***(World Health Organization, 2014).***

In India also heart disease have emerged as number one killer in both urban and rural areas due to lack of physical activity. In urban areas 33% of death occurs due to heart ailments, while this % in rural area is 23% (ICMR, 2013). These statistics gain significance as urban surveys from Indian cities have revealed low level of physical activities in 61-66% of men and 51-75% of women surveyed. In the 21st century, everyday life offers fewer opportunities for physical activity, and the resultant sedentary lifestyles have serious consequences on public health. Physical inactivity is a state of relatively complete physical rest, which does not provide sufficient stimulus for human organs to maintain their normal structures, functions, and regulations. It also

reflects poor self-esteem and a lower health-related quality of life ***(Bauman, 2004).***

In India, it was reported in the mid-1970s that regular occupational physical activity levels were high as the population was traditionally involved in agriculture. This proportion declined to 70% in the early 1990s because of rapid socioeconomic transition leading to intermittent physical activity among the rural population. Data among urban Indian populations show that moderate- and high-grade physical activity is uncommon. In the early 1990s, only 14% of subjects were reportedly involved in regular non occupational physical activity. The proportions did not change significantly over the next 10 years, which was associated with increasing obesity ***(Rastogi, 2004).*** Several environmental factors which are linked to urbanization can discourage people from becoming more active, such as fear of violence and crime in outdoor areas, high-density traffic, low air quality, pollution, lack of parks, sidewalks and sports/recreation facilities etc. Previous studies suggested that children are more sedentary, less involved in daily exercise, and spend up to six hour per day in physically inactive pursuits namely watching TV and using a computer ***(Amscher, 2002; Hale, 2004).***

Decreasing physical activity levels often correspond with a high or rising gross national product. The drop in physical activity is partly due to inactivity during leisure time and sedentary behaviour on the job and at home and increase in the use of passive modes of transportation also contributes to insufficient physical activity. Living on a highway, streets with no sidewalks, perceived lack of paths, poor access to recreational facilities, crowded sidewalks, and perceived absence of shops within walking distance has been associated physical inactivity. This proportionate spread of population is another limiting factor. Clearly putting 40% population in dire need of green space to be physically active and or socially, mentally engaged. Positive benefits in mental health have been attributed to physical activity. This may be through a combination of the physiological effects as well as participation in social activities and

engagement with others. Also, safety of walking areas becomes a determinant of physical activity. Safe and well-lit streets would support physical activity in the area. Some studies have noted that adults who perceived their neighbourhoods were safe, attractive and had interesting green walks were more likely to walk for recreation and more likely to walk at a recommended level. Another growing menace is the increasing numbers of automobiles. In the past six years, the sale of vehicles in India has nearly doubled particularly of two wheelers and passengers cars. These trends are disturbing and bring unhealthy life style. Not having access to a car for personal use has been associated both with walking more and walking for public transport. Key elements of health promoting environment include parks, and other green spaces for physical activity, perceived and actual safety, neighbourhood upkeep and residential density, the provision of facilities to segregate conflicting road users, and neighbourhood attractiveness are needed to keep morbidity away. To provide enabling or facilitating healthy physical environment and essential element is convincing, converting and motivating a range of stakeholders for making healthy behaviour plausible. A proactive approach can help develop cities, which promote health, thereby reducing multi morbidities and contain health costs for both individuals and the state. Therefore, besides watching out for calorie intake, there is need to watch out for other health determinants such as physical environment of urban conglomerates ***(The Tribune, 2014).***

At present time the environment and lifestyle of people has changed. Convenient transport, different occupations, and entertainments such as TV, computer, and electronic gadgets have lead to an increase in sedentary behaviors and thereby affect the balance of energy intake and energy expenditure. Decreased physical activity over a long period results in an imbalance of energy with excess energy being stored as fat in adipose tissue ***(Tuomilehto et al., 2004).*** This stored fat becomes a reason for obesity. Obesity a state of abnormal or excessive fat accumulation (mainly in the form of triglycerides) in subcutaneous and/or visceral adipose tissue, usually resulting from a sustained positive energy balance (energy intake > energy

expenditure) due to biological, behavioural, socioeconomic, psychological and environmental factors to the extent that health and quality of life may be impaired ***(WHO, 2000).*** There is a rapidly escalating epidemic of obesity all over the world. In the developed countries the epidemic attracts much attention, but there is little realization of a similar and perhaps more serious epidemic in the developing countries like India. Obesity is increasing rapidly as overall nutrition is improving and physical activity is decreasing ***(Prentice, 2001).***

Obesity is now well recognized as a disease in its own, one which is largely preventable through changes in life style. This fact together with its association with the leading causes of illness and death has made obesity a high priority problem in the world ***(Sekar, 2008).*** Obesity prevalent among all the age groups and is on the rise among adults especially among the adolescents. The problem is of a larger magnitude in the developing countries like India where a significant population belongs to a younger age group. According to center for disease control (CDC) in 2000, 15.2 million college students were obese. The center for disease control also reports that it had increased from 14.4% in 1991 to 20.7% in the year 2000 ***(Bradignan, 2002).*** It has been proved that increased consumption of more energy dense, nutrient poor foods with high levels of sugar and saturated fats have led to three fold rise in obesity rates. The obesity rates were not only restricted to industrialized societies, were often faster in developed countries also. The rising epidemic reflects the profound changes in society and in behavioral pattern of communities over recent decades. To make it clear the societal changes and worldwide nutrition transition are driving the obesity epidemic ***(Puska, 2010).***

The major causes attributing to obesity may be frequently changing diets and lifestyles. In countries like India, which are typically known for high prevalence of under nutrition, significant proportions of overweight and obese now coexist with the undernourished ***(Agarwal, 2004).*** Obesity is associated with five out of 10 leading causes of death as well as disability. It is estimated that 300,000 people die each year due to illness related to obesity, which is

indeed more than the number of people killed by pneumonia, motor vehicle accident or airline crashes ***(Sidik, 2009).***

Obesity at global level

According to the Global Burden of Disease Study (2013) US topped the list with 13 per cent of the obese people worldwide in 2013, while China and India together accounted for 15 per cent of the world's obese population, with 46 million and 30 million obese people, respectively. According to the study, number of overweight and obese people globally increased from 857 million in 1980 to 2.1 billion in 2013. This is one-third of the world's population. According to world health organization, in 2005 there were 1.6 billion overweight adults aged 15 years and above and 400 million adults who were obese worldwide. The National Health and Nutritional Survey of the year 2005-2006 reported that 32.7% of adults aged 20 years and above were overweight; 34.3% were obese and 5.9% were extremely obese in U.S. ***(Hodge, 2009).*** India too is similar in the trend of obesity. In 2010 one in five men and over one in six women are overweight. This rate is even higher, up to 40% in urban areas ***(Sinha, 2010).***

According to a ***(Global health observatory data, 2014),*** 39% of adults aged 18+ were overweight (BMI ≥ 25 kg/m2) (39% of men and 40% of women) and 13% were obese (BMI ≥30 kg/m2) (11% of men and 15% of women). Thus, nearly 2 billion adults worldwide are overweight and, of these, more than half a billion are obese. The prevalence of overweight and obesity were highest in the WHO Regions of the Americas (61% for overweight in both sexes, and 27% for obesity) and lowest in the WHO Region for South East Asia (22% overweight in both sexes and 5% for obesity). In the WHO Region of the Americas and European and Eastern Mediterranean Regions over 50% of women were overweight. In all three of these regions, roughly half of overweight women are obese (25% in Europe, 24% in the Eastern Mediterranean, 30% in the Americas). In all WHO regions women were more likely to be obese than men. In the WHO African, Eastern Mediterranean and

South-East Asia Regions, women had roughly double the obesity prevalence of men. The prevalence of raised body mass index increases with the income level of countries. The prevalence of overweight in high income countries was more than double that of low and lower middle income countries. For obesity, the overall prevalence is over four times higher in high income countries as compared to low income countries. Women's obesity was markedly higher than men's, with the exception of high income countries where it was similar. In low and lower middle income countries, obesity among women was more than double that among men ***(World Health Organization, 2014).***

Obesity in India

Obesity is emerging as an important public health problem in India, particularly coexisting with malnutrition. Twenty two million Indians are obese, especially abdominally obese. The rising prevalence of obesity in India had direct correlation with increasing prevalence of obesity related co morbidities ***(Muruganathan, 2009).***

In India, prevalence of obesity is 12.6% in women and 9.3% in men. During the last three-four decades, the greatest increase in obesity has been observed in populations that have been undergoing demographic transition, nutrition transition and socioeconomic transition. India, especially Punjab is a unique example of these transitions because it has undergone changes at a much faster rate than the other states of India. It is most likely, that the high consumption of food rich in fat and calories and sedentary lifestyle have played an important role in the rise of obesity ***(Bhalwar, 2009).***

Reddy et. al. (***2002)*** found than 28% of adult males and 47% of adult females in urban Delhi were overweight by WHO standards, whereas in a neighboring Haryana rural area overweight were 7% in males and 9% in females. Conversely, 38% of males and 36% of females in the rural area were actually 'underweight' by BMI standards ***(Chadha et. al., 1997).***

National Family Health Survey (NFHS- 2, 1999) reported that 5.8 % obese women with BMI 30 or more and 17.7 % overweight women with BMI between 25-30 were found in urban India. Because of urbanization and modernization, people were becoming more sedentary and less physically active than it was before. The prevalence of obesity in Indian women has elevated from 10.6% to 12.6%. The prevalence is more profound in women in the age between 40-49 years i.e. is 23.7%; residing in cities 23.5%; of having high qualification 23.8% and households in the highest wealth quintiles 30.5%.Moreover, additional concern has to be given to the dramatic rise in overweight and obesity in childhood and adolescence.

According to National Family Health Survey (NFHS)-3 the problem of overweight and obesity in women of the age between 15-49 years increasing from 11 percent in NFHS-2 to 15 percent in NFHS-3. Overweight and obesity have become substantial problems among older women who are living in urban areas in India. Based on the NFHS (2007) survey about 37.5% females are obese in Punjab, making Punjab the heaviest state of India. In many developing countries, with increasing urbanization, mechanization of jobs and transportation, availability of processed and fast foods, and dependence on television for leisure, people are fast adopting less physically active lifestyles and consuming more "energy-dense, nutrient-poor" diets ***(WHO, 2003; Popkin*** & ***Drewnowski, 1997)***. As a result, overweight and obesity is increasing day by day which is associated with chronic physical health problems, such as diabetes, hypertension, Breast cancer, and gall bladder disease, osteoarthritis, cardiovascular abnormalities like dyslipidaemia, hypertension, glucose intolerance, inflammatory markers, obstructive sleep apnoea/hypoventilation and musculoskeletal disorders ***(*Sharon, *2011).*** Physical inactivity has also been found associated with mental and emotional health problems such as stress, anxiety, tension and depression.

Engaging in regular physical activity is one of the best ways to improve general health, including physical, psychological, and emotional health. In other words,

while physical activity can indirectly improve subjective well-being and life quality by keeping disease and premature death at bay, there has recently been an increasing interest in its direct role in the prevention and treatment of mental health problems as well such as better stress management, reduce the anxiety and depression level of a person. Physical Activity also plays an important role in enhancing the emotional health of individuals. A study conducted in Taiwan found that university students who attained the recommended physical activity level have better emotional intelligence score and composite subscale scores for interpersonal, intrapersonal, stress management, general mood, and adaptability. Emotions are an integral and significant aspect of human nature and the motivation for behaviour **(*Li et al., 2009).***

According to Goleman (1995) being able to monitor and regulate one's own feelings, understand the feelings of others and use that "emotion" or "feeling" knowledge to guide thoughts and actions is known as emotional intelligence. Emotional intelligence is the ability to perceive, integrate, understand, and manage emotions which are concerned with understanding oneself and others, relating to people, and adapting to and coping more successfully with environmental demands ***(Baron, 2002).***

Development of the personality of the individual is the main perspective of modern education. Personality is not only the external behaviour or interaction with other individuals in his immediate environment. It consists of the inner beauty of an individual. A person has two aspects: external and internal. A well balanced personality means a person should be physically fit, mentally alert, emotionally balanced and socially adjusted. At present all efforts are being directed towards the development of cognitive skills not on emotional and social skills. According to the latest thinking it is not the intelligent quotient which matters, but it is the EQ (Emotional Quotient) which help an individual to be successful in life. It means that the person should be emotionally matured and balanced if he/she wants to be successful and happy in life. To get a good job in life, a higher level of Intelligent Quotient is very

important. But to be successful in one's profession, it is the Emotional Quotient which helps get excellence and seek happiness and job satisfaction. According to the exponents of emotional intelligence, a person's emotional make up largely determines his or her professional success. Emotional quotient (E.Q.) is the most important determinant of professional and personal success in life. It is recognized that intelligent quotient may account only for 20% of a person's success in life, while the remaining depends largely on emotional intelligence ***(Goleman, 1995).***

Emotional quotient refers to person's level of emotional intelligence. Emotional intelligence encompasses social intelligence and emphasizes the effect of emotions on individuals abilities to view situations objectively and thus to understand ourselves and other people. It is the ability to sense, understand, and effectively apply the power of emotions, appropriately channeled as a source of energy, creatively and influence. Emotional intelligence refers to emotional awareness and emotional management skills which enable one balance emotions and reason so as to maximize long term happiness. It includes qualities such as self-awareness, ability to manage moods, motivation, empathy, and social skills like cooperation and leadership. Emotional intelligence comprises many personality traits such as empathy, motivation, persistence, warmth and social skills.

According to ***Mayer & Salovey (1997)*** being able to tell differences in capabilities to recognize/perceived, understand, manage and use emotions in both intrapersonal and interpersonal contexts is known as emotional intelligence.

The term emotional intelligence encompasses the following five characteristics and abilities of self-awareness, mood management, self-motivation, empathy and managing relations ***(Goleman, 1995).***

Self-Awareness is the ability to make intelligent decision using a healthy balance of emotions and reason. The ability to recognize and understand

personal moods and emotions and drives, as well as their effect on others. People with high emotional intelligence are usually very self-aware. Self-awareness include self-confidence, realistic self-assessment, and a self-deprecating sense of humor. Self-awareness depend on one's ability to monitor one's own emotion state and to correctly identify and name one's emotions. Self-Regulation is the ability to control or redirect disruptive impulses and moods, and the propensity to suspend judgment and to think before acting. It include trustworthiness and integrity; comfort with ambiguity; and openness to change. People with a high degree of emotional intelligence are usually found self-motivated. People with self-motivation are more responsible, better able to focus on task at hand and pay attention, less impulsive and more self-controlled. They are highly productive, love a challenge, and are very effective in whatever they do. Empathy is the ability to understand the emotional makeup of other people and is also the ability to identify with and understand the wants, needs, and viewpoints of those around you. Empathetic people are usually excellent at managing relationships, listening, and relating to others. They avoid stereotyping and judging too quickly and they live their lives in a very open, honest way. Managing relationship is an ability to find common ground and build rapport. Characteristics of social skills include effectiveness in leading change, persuasiveness, expertise building and leading teams, more popular and outgoing, more concerned, more sharing, cooperative and helpful. Rather than focus on their own success first, they help others. They can manage disputes, are excellent communicators, and are masters at building and maintaining relationships ***(Goleman, 1995).***

Self-awareness, empathy, self-motivation, emotional stability, managing relations, Integrity, self-development, value orientation, commitment and altruistic behaviour are the main factors which constitute emotional intelligence ***(Hyde, Pethe &Dhar, 2002),*** which is an emerging concept for understanding mental health and human behaviors. However, the importance of emotional intelligence for health promotion cannot be overlooked. As uncontrolled emotions towards situations can lead to stress and can result in certain

physiological change namely hypertension and can also bring uncontrolled eating habits.

Emotions and eating have become linked in the expression, 'emotional eating'. Emotional eating in general describes food consumption in response to emotions and feelings, in contrast to eating in response to true physiological hunger. This eating behavior generated by emotions has become a great concern and focus in the healthcare industry, especially to the field of nutrition and dietetics. In order to resolve the current obesity epidemic, it is very important for healthcare professionals, especially the nutrition experts, to first realize how emotions affect eating behaviors. When eating becomes the main strategy for managing emotions and dealing with stress, it can develop into an unhealthy and uncontrollable food “addiction”. Like all eating disorders, binge eating too is a serious problem that can lead to a wide variety of physical, emotional, and social complications ***(Help Guide Organization, 2008).*** The physical effects associated with binge eating disorder are very similar to the symptoms one would expect to see in someone who is overweight.

One of the important underlying factors for understanding obesity is knowledge of eating behaviors. Dietary behavior such as eating frequency, eating across the day, breakfast skipping, and the frequency of meals, eaten away from home, desire to lose weight, frequently irregular meals, excessive energy intake, together referred to as "eating patterns," may influence body weight. This type of eating habits may lead to nutritional deficiency during adolescence. This may have long term consequences such as eating disorder.

According to the World Health Organization (2012) eating disorders are mental disorders involving physiological and psychological effects associated with a preoccupation with food and body image. The primary types of eating disorders are anorexia nervosa, bulimia nervosa, and binge eating disorder.

The National Institute of Mental Health (NIMH 2009) discusses the characteristics, signs and symptoms of anorexia nervosa, bulimia nervosa, and binge-eating disorder:

Anorexia Nervosa is characterized by the NIMH as extreme thinness (emaciation), a relentless pursuit of thinness and unwillingness to maintain a normal or healthy weight, intense fear of gaining weight, distorted body image (a self-esteem that is heavily influenced by perceptions of body weight and shape, or a denial of the seriousness of low body weight), lack of menstruation among girls and women, and extremely restricted eating. The fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, 1994) defines following two subtypes of anorexia nervosa-

1. **Restricting Type** that is characterized by strict dieting, fasting, or excessive exercise but without binge eating.

2. **Binge-Eating Type or Purging Type** is marked by the use of laxatives or enemas and by the episodes of compulsive eating with or without self-induced vomiting ***(Medical Encyclopedia, 2009).***

Similarly, Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) has also given some characteristics to identify and diagnose Anorexia nervosa as refusal to maintain body weight at the minimum normal weight for a person's age and height. Body weight is maintained at least 15% below that expected (either lost or never achieved) or body mass index is 17.5 or less. There is intense fear of gaining weight or becoming fat, even though underweight.

Bulimia Nervosa is characterized by the recurrent and frequent episodes of eating unusually large amounts of food and feeling a lack of control over these episodes. This binge-eating is followed by behavior that compensates for the overeating such as forced vomiting, excessive use of laxatives or diuretics, fasting, excessive exercise, or a combination of the behaviors.

1. **Purging** bulimia is characterized by the use of self-induce vomiting, laxatives enemas, or diuretics to rapidly remove food from the body before it can be digested.

2. **Non-purging** bulimics (approximately 6%-8% of cases) that exercise or fast excessively after a binge to offset the caloric intake after eating. However, purging-type bulimics may also exercise or fast, but as a secondary form of weight control ***(Barlow & Durand, 2004).***

Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, 2009) depicts the key Characteristics of Bulimia Nervosa:

1. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

i. Eating, in a fixed period of time (e.g. within any 2 hrs. period), an amount of food that is definitely larger than most people would eat under similar circumstances.

ii. A lack of control over eating during the episode: a feeling that one cannot stop eating or control what or how much one is eating.

2. Bulimics adopt recurrent inappropriate compensatory behavior to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, or other medications; fasting; excessive exercise.

3. Self-evaluation of the bulimics is unduly influenced by body shape and weight.

With binge-eating disorder a person loses control over his or her eating. Unlike bulimia nervosa, periods of binge-eating are not followed by purging, excessive exercise, or fasting. As a result, people with binge eating disorder often are over-weight or obese. People with binge-eating disorder who are obese are at higher risk for developing cardiovascular disease and high blood pressure. They also experience guilt, shame, and distress about their binge-eating, which can lead to more binge eating.

Binge eating is the repeated eating of unusually large amounts of food in very short periods of time ***(Mayo clinic, 2008).*** A person who binge eats can take in 20,000 calories during a binge, while most normal people only eat 1,500 –

2,500 calories a day ***(Mirror-Mirror Organization, 2009)***. Diagnostic and statistical manual (DSM-IV) states some of the characteristics for binge eating disorder including:

1. Recurrent episodes of binge eating, including eating an abnormally large amount of food and feeling a lack of control over eating
2. Binge eating is associated with at least three of these factors: eating rapidly; eating until you're uncomfortably full; eating large amounts when not hungry; eating alone out of embarrassment; or feeling disgusted, depressed or guilty after eating
3. The sufferer Distress about binge eating
4. Binge eating occurs at least twice a week for at least six months
5. Binge eating is not associated with inappropriate methods to compensate for overeating, such as self-induced vomiting.

Eating Disorders Not Otherwise Specified (EDNOS) is a term used when a person shows signs of disordered eating but does not meet all of the diagnostic criteria for one of the three Diagnostic Statistical Manual (DSM) recognized eating disorders namely Anorexia Nervosa, Bulimia Nervosa or Binge Eating Disorder.

A cross-sectional study, utilizing the Eating Attitudes Test-40, found the prevalence of eating disorders among a group of female college students to be an alarming 13.8%. Prior research has suggested prevalence ranging from 6.6% to 13.4% among female college students in the U.S. Overall, it is estimated that 95% of all eating disorders affect individuals between the ages of 12 and 25 ***(Tozun, 2009).***

It is suggested that girls between the ages of 15 to 24 are the most vulnerable population for development of anorexia nervosa; the prevalence among students is higher than that of the general population ***(Makino, 2004).*** While eating disorders in general have been found to be more prevalent among

females, an increasing prevalence has been seen among males in recent research. In studies done among adolescents, girls are more likely to report body dissatisfaction; however, the more relevant issue here is that 5%- 20% of boys reported restrained eating, vomiting, laxative abuse, or smoking cigarettes for weight control ***(O'Dea, 2002).***

The college environment has been suggested as a risk factor for the onset or exacerbation of disordered eating. Many factors related to college, such as high levels of stress, achievement orientation, and role and identity changes are also correlates of disordered eating. College presents new environmental, social, and academic shifts for students; thus causing challenges that may manifest themselves in disordered eating patterns which have the potential to develop into full-fledge eating disorders. It is reported that 80% of women diet and 50% binge eat during their first year of college; this, without a doubt, contributes in the development of eating disorders. However, the rates of disordered eating patterns as well as body dissatisfaction remained relatively similar to previous studies indicating that there may still be a significant amount of disordered eating at the college level ***(Vohs, 2001).***

In India, adolescents (from 10 to 19 years) accounted for 22.8% of the population and they face a series of serious nutritional challenges that are affecting not only their growth and development but also their livelihood as adults. On the other hand, presently Indians are experiencing nutritional and lifestyle transition due to globalization. ***Mishra & Mukhopadhyay (2010)*** found that adolescent girls modify their normal dietary pattern and follow disturbed eating behaviours and these also affect their nutritional status. They also reported that girls often opted for skipping of meals to control their body weight. Some of them reported the habit of snacking between main meals. ***Chugh & Puri (2001)*** revealed that girls who remained dissatisfied with their body weight were more inclined to diet. In Delhi, weight concern and dissatisfaction over body weight were prevalent among underweight as well as

overweight adolescent girls. Eating behavior like skipping meals, eating out, and snacking were common among these adolescent girls. Although girls had enough knowledge regarding nutritional deficiency, yet they did not/could not follow normal eating behaviours.

Srinivasan et al. (1998) showed that very few adolescents 11% developed a milder form of eating disorder with the fear of fatness. ***Augustine & Poojara (2003)*** reported that more than half of the adolescent girls residing in Ernakulum wanted to lose body weight. Results showed that the weight loss plans among the study groups included exercise (21%), followed by meal skipping (20%), starvation (16%), binge eating (6%), and consumption of diet pills (2%), and the most commonly skipped meal was breakfast. ***Latha et al. (2006)*** reported that more than 80% of the college girls wanted to become slim because they remain too much busy on thinking about their appearance, body weight, and shape. Most of the female adolescents showed high scores on anxiety, somatic symptoms, and social dysfunction subscales which indicates that adolescence is the phase of confusion, uncertainties, and instability.

In addition to anorexia nervosa and bulimia nervosa, another frequently diagnosed eating disorder is the Binge Eating Disorder (BED). Binge Eating Disorder actually appears more common than both anorexia nervosa and bulimia nervosa, exhibits substantial co morbidity with other psychiatric disorders, and is, in many cases, linked to severe obesity **(*Hudson, 2007).*** These factors establish a significant association between eating disorders and obesity. As we see a strong correlation between obesity and psychological disorders, individuals who are overweight or obese have similar features with those who develop eating disorders; this includes a link between concerns and self-esteem based on physical appearance ***(Tozun, 2009).*** As society has developed a great amount of anxiety about obtaining a smaller size through the

use of diet and exercise, coincidently the rate of obesity has significantly increased ***(Kater, 2010).***

The obesity has reached epidemic in many countries. However many factors like eating habits, low physical activity level, emotional status contributing to obesity. Researcher under took this study to find out the possible reasons of overweight/obesity in college women as none of such type of study was done on college going women of Chandigarh, and also to look for other contributing factors aggravating this problem. The present study is an attempt to compare the emotional intelligence, physical activity level, eating behaviour among obese & non obese college women.

Statement of problem

The problem is entitled as **"Emotional intelligence, metabolic equivalent of task, and eating behaviour among obese and non-obese college women."**

Objectives of the study

The following objectives were formulated

1. To find out the emotional intelligence among obese and non-obese college women.
2. To find out the metabolic equivalent of task (MET) or physical activity level among obese and non-obese college women.
3. To find out the eating behaviour among obese and non-obese college women.
4. To find out the relationship between emotional intelligence and eating behaviour of college women.
5. To find out the relationship between emotional intelligence and metabolic equivalent of task of college women.
6. To find out the relationship between eating behaviour and metabolic equivalent of task of college women.

Hypotheses of the study

The following hypotheses were tested

1. Obese and non-obese college women would not differ on emotional intelligence.
2. There would be no difference between obese and non-obese college women on metabolic equivalent of task or physical activity status.
3. Eating behavior would not differ among obese and non-obese college women.
4. There would be no significant relationship between emotional intelligence and eating behaviour of college women.
5. There would be no significant relationship between emotional intelligence and metabolic equivalent of task of college women.
6. There would be no significant relationship between eating behaviour and metabolic equivalent of task of college women.

Delimitations of the study

1. The study was delimited to the Union Territory of Chandigarh only.
2. The study was delimited to college going women students only,
3. The age of subjects was ranged from 18 to 25 years.
4. The study was delimited to the body mass index category of lean weight or underweight, normal weight, overweight and obese subjects.
5. The study was delimited to the variables of emotional intelligence, metabolic equivalent of task and eating behaviour.

Limitations of the study

1. Factors such as physical environment, genetic makeup, metabolically factors etc. were beyond the control of the researcher, which were considered as limitation of study.

2. No special technique was used during the administration of tests.

Definitions and explanations of terms

Obesity

Obesity is an excess of adipose tissue that results from a consistently greater energy intake than expenditure ***(Grilo, 2006).***

Metabolic equivalent of task (MET)

MET or the standard metabolic equivalent is a unit used to estimate the amount of oxygen used by the body during physical activity ***(Ainsworth et al., 2000).***

Emotional intelligence

Emotional Intelligence is a type of social intelligence that involves the ability to monitor one's own and other's emotions to discriminate among them and to use the information to guide one's own thinking and action ***(Mayer & Salovey, 1993).***

Eating disorder

Eating disorders are serious disturbances related to eating behavior, such as extreme and unhealthy reduction of food intake or severe overeating, as well as are usually accompanied by feelings of extreme concern or distress about body shape and weight ***(Spearing, 2001).***

Anorexia nervosa

Anorexia nervosa ("an"-without, "orexia" -appetite, desire) is characterized by the refusal to maintain a body weight at the minimum normal weight for a person's age and height coupled with an intense fear of weight gain and distorted body image ***(Vogler, 1993).***

Bulimia nervosa

Bulimia nervosa is an eating disorder characterized by cyclic and recurrent pattern of binge eating, followed by guilt, self-recrimination and compensatory

behaviors such as self-induced vomiting, fasting, diuretics, laxatives abuse or excessive exercising to prevent weight gain ***(Wikipedia Encyclopedia, 2009).***

Binge eating

Binge eating disorder (BED) is characterized by a loss of control over eating behaviors. The binge eater consumes unnaturally large amounts of food in a short time period, but unlike a bulimic, does not regularly engage in any inappropriate weight-reducing behaviors (excessive exercise, vomiting, taking laxatives) following the binge episodes ***(Christine, 2009)***

Eating disorder not otherwise specified (EDNOS)

EDNOS is defined as a "category of disorders of eating that do not meet the criteria for any specific eating disorder (anorexia and bulimia) ***(Rafael, 2009).***

Body mass index

The body mass index (BMI) is defined as the body mass divided by the square of the body height, and is expressed in units of kg/m^2, resulting from weight in kilograms and height in meters ***(BMI, Encyclopedia Wikipedia Online, 2009).***

Significance of the study

The findings of the study would be helpful to know the present status of college women on their emotional status, eating habits, and to know that how much they are physically active. The study classify the students on the basis of their obesity keeping in view the differences shown by obese and non-obese college women on emotional intelligence, physical activity and eating behaviour variables. In addition, this study investigates different health behaviours and obesity, including the relationships between physical activity and emotional intelligence, as well as between physical activity and eating behaviour, eating behaviour and emotional intelligence. Information of all these investigating facts would help the people to manage the level of emotional intelligence, physical activity and eating behaviour to maintain healthy and disease free life.

The information about the relationship among emotional intelligence, metabolic equivalent of task and eating behaviour would provide an alignment to the life of an individual.