

Role of Diet and Lifestyle on Individual Health: A Global Public Health Concern

Saptarshi Chatterjee¹, Mousumi Das², Payal Varsani³, Shreya Savaliya³

¹Department of Microbiology, School of Life Science & Biotechnology, Adamas University, Kolkata, West Bengal; ²Assistant Professor, ³Student, M.Sc., Department of Microbiology, Shree M & N Virani Science College (Autonomous), Rajkot, Gujarat, India

ABSTRACT

Diet and Lifestyle disorders have been a major public health threat in the present world. In contrast to the advancement in scientific and technological sphere, the diet and lifestyle of individual has witnessed a drastic anomaly, compromising the requisites of good health. The fast paced society has often provoked unhealthy lifestyle (i.e. smoking, drinking etc) and more often skipping the habits for remaining fit (i.e. physical activity). Simultaneously, there is an increase in uptake of junk food that has led to the global problem of obesity. Sufficiency of sleep and sound mental health can curb the menace to a certain level. The choice of food habits vary between age groups and improper consumption has added to the problem. It is also strongly related to the socio economic status of individual. However, there are several indicators like BMI, skin fold, waist circumference etc. that can aid the process of monitoring individual health in terms of being obese. Several diseases including cardiovascular, metabolic or reproductive are directly or indirectly related to obesity that is influenced by lifestyle and diet. Thus, the present life style and diet is under threat for well being of individual and public health as well.

Keywords: Life style, diet, obesity, diseases, food habit, Obesity Indicators, Physical activity

Introduction

Obesity, a complex health issue has reached epidemic levels and has become major public health concerns. It results from a combination of causes and factors, including individual, behavior and genetics. BMI, waist circumference etc. are promising indicator to obesity. Diet and Lifestyle habits have predominant influence on the obesity. Moreover, food habits, consumption of junk foods and socio-economic status have also influence obesity, to a great extent. This review attempts to elucidate the role of diet and lifestyle on individual health along with public health concerns.

Diet and Life-style: Diet is an individual concept that significantly influences health outcomes despite wide range of variation because of diversity of cultural groups and population. An unhealthy lifestyle is a serious and unnoticed problem¹. The impacts on unhealthy outcomes like overweight, obesity or some other metabolic disorder are still controversial in children and adolescents². College years are the most crucial in development of healthy and unhealthy habits³. This problem is inadvertently present is selected populations especially those staying away from home³ or even during holiday season⁴. Watching television⁵, usage of mobile and lack of exercise are major lifestyle irregularities that possess effect on diet and subsequently the health of individual. Jobs requiring rotating shifts also influence the health of an individual⁶.

Life style habits: Lifestyle of individual plays an important role in the health especially in terms of health issues related to obesity. Fig 1 demonstrates a list of factors of life-style in human that influences obesity and related disorders.

Corresponding Author:

Saptarshi Chatterjee
Assistant Professor, Department of Microbiology,
Shree M & N Virani Science College (Autonomous), Rajkot
Email: saptarshi_gcc07@yahoo.co.in
schatterjee@vsc.edu.in

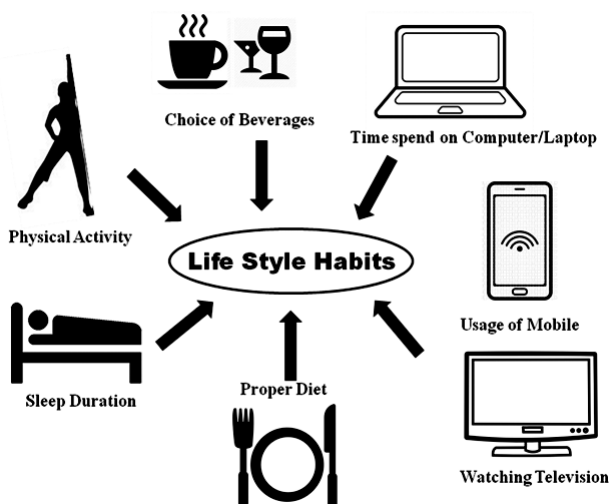


Fig. 1: A few life style habits influencing obesity

Physical Activity: Physical activity is strongly related to obesity⁷. Physical inactivity is inversely correlated with the risk of obesity for children and the adolescents⁸. With the advent of time, the daily energy expenditure has declined upto 100 kcal approx because of reduced physical activity⁹. Physical activity also varies with occupation¹⁰. According to Hill *et al.*¹¹ a threshold for physical activity exists above which people are in their

‘regulated zone’ being able to strike a balance between energy intake and energy expenditure. While, below the threshold, lies the ‘unregulated zone’ having imbalance leading to obesity⁹ Effect of physical activity on children¹² youth¹³ and young adults¹⁴ have been widely studied where the balance between energy intake and energy expenditure plays a crucial role¹⁵

Preference of Beverages: Preference of beverage primarily depends on the geographic location and its climatic condition. Table 1 shows a list of preferred beverages and its calorific value. Consumption of sugar sweetened beverages particularly carbohydrates soft drinks may be a key contributor of overweight and obesity¹⁶. A dietary guideline on selection of beverage for moderate intake of sugar represents the role of beverage in sugar intake and subsequent obesity¹⁷. Alcohol, which is another world-wide choice of beverage, has a controversial impact of obesity. Though its relation with the enhancement of coronary heart disease is well established¹⁸, yet several epidemiologic studies relating alcohol consumption to obesity do not agree and suggests that alcohol consumption did not increase the risk of obesity¹⁹.

Table 1: List of beverages and their approximate calorific value

Beverages		
Alcoholic (1.5Oz)	Non alcoholic (250 mL)	
	Hot	Cold
Vodka (96 cal)	Hot Chocolate (237 cal)	Coca cola (139 cal)
Beer (100 cal)	Coffee (2 cal)	Lassi (260 cal)
Champagne (85 cal)	Milk whole (149 cal)	Milkshake (23 cal)
Rum (96 cal)	Tea (2 cal)	Apple juice (117 cal)
Whiskey (105 cal)	Milk No fat(86 cal)	Cappuccino (74 cal)
Wine(100 cal)		

Sleep: Sleep is an important modulator of neuroendocrine function and glucose metabolism²⁰. The role of sleep duration in the regulation of glucose metabolism, appetite²¹ and cardio-metabolic risk²² is well understood. Despite of relationship, the sleep duration and obesity are associated with numerous factors and may vary with age to a great extent²³ showed the relationship between short sleep duration and weight gain, while the association of long sleep duration and risk of obesity also persists²⁴.

Food habits:

Veg vs Non-veg: Vegetarian diets may play a beneficial role in promoting health and preventing obesity. A study has indicated that BMI increases when a wider spectrum of animal products are eaten. Some experimental data

suggests that vegetarian diets may carry metabolic advantages for prevention of type 2 diabetes²⁵. The lower prevalence of diabetes in vegetarian than semi or non-vegetarians²⁵ was found while; processed meat consumption was a risk factor for diabetes²⁶. Vegetarian diet is however associated with an elevated prevalence of mental disorders²⁷.

Junk Food: Junk food has been considered a major source of obesity and associated health problems. This not only increased daily calories, but sugar, saturated fat and sodium intakes as well²⁸ More frequent use of fast food like burger and French fries was associated with higher risk of overweight and obesity²⁹. The association between fast food consumption and BMI could be due

to other specific dietary factors like higher fat intake, greater consumption of sugary drinks, fewer fruits and non-starchy vegetables. There is no association between higher fast food consumption and BMI in adolescents while the relation exists for children³⁰.

Socio-economic status: Family: Low family income and socioeconomic status were significantly associated with childhood depression through stressful life events, family environment and neighborhood characteristics³¹. Socio economic status shows a stronger bond with obesity and lack of recreational physical activity in women than in any other subgroup^{32, 33}. The relationship between SES and obesity differs in developed and developing societies³⁴.

Occupation: Individual countries suggest that socio-economic status and weight are positively associated in lower income countries and negatively associated in higher income countries³⁵. The global epidemic of obesity continues to worsen and the ready availability of cheap energy-dense foods and increasing sedentary lifestyle are considered likely causes. There have also been changes in the types of occupation in which workers are employed - from 'high activity' to 'low activity' occupations and the work environment that contemporary workers experience within a given occupation may now involve more sedentary times than previously³⁶.

Obesity and its Indicators:

BMI: The BMI was invented by Belgian polymath Adolphe Quetelet in the 1800s, and consequently is sometimes known as the Quetelet index. Body Mass Index (BMI) is a mathematical expression used as an indicator to monitor under nutrition and overweight related to health outcome³⁷ (WHO, 1995) in which weight and height are measured and calculated. According to CDC, it is expressed as weight in kg divided by square of height in meters (kg/m^2). The simplicity, noninvasiveness and inexpensive nature have popularized the technique of BMI calculation. However, the method is not beyond question since BMI indicates body fatness rather than the excess body fat³⁸ or location of fat deposition³⁹. The universal standard for BMI⁴⁰ varies to that of Asians. BMI is utilized as an indicator for several epidemiological studies and its impact on parameters like age⁴¹, location⁴², disease⁴³ have been widely studied.

Waist Circumference: It is a measurement taken around the abdomen at the level of the umbilicus i.e. belly button. The waist measurement follows the gender specific standard exceeding which it increases the risk for weight related health problems. A protruding belly or high waist circumference is the accumulation of fat in visceral and posterior subcutaneous adipose tissue compartments⁴⁴. It is also associated with diabetes⁴⁵. Apart from food habit, stress hormone cortisol also promotes visceral fat deposition⁴⁶. Thresholds for waist circumference have been recommended for various populations and its impact on sex, age, ethnicity and disease is stated by the World Health Organization as their recent research findings⁴⁷. Though Waist circumference has been used as a standalone indicator like BMI in determining obesity, yet waist circumference/height ratio is considered as more applicable⁴⁸.

Skin Fold: The measurement of skin fold is an old and common method for assessing body fat percentage⁴⁹ besides BMI⁵⁰. The sum of skinfold thickness is related to total body density⁵¹. Apart from efficiency of the measurement method i.e. accuracy of the calipers, age and gender of the individual also affect on this measurement a subsequent interpretation⁵². Various sites of measurements are used in performing skin fold based experiment as shown in Fig 2. Multiple site based measurement can be relied over a single site measurement of skin fold⁵¹.

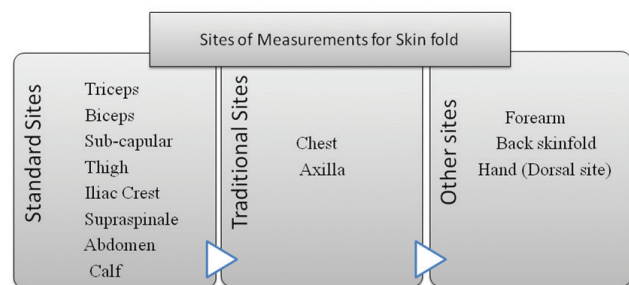


Fig. 2: Various sites of skin fold measurement as an indicator of BMI

Blood Pressure: The relationship between obesity and hypertension is well established fact. Blood pressure is an easy and accurate measure of hypertension which is a complex phenomenon, coordinated by several systems of the body. In the cardiovascular system renin-angiotensin system (RAS) plays a major role which is associated with controlling energy balance and metabolic rate thereby influencing obesity^{53,54}. Activation of the sympathetic nervous system has been considered to have an important function in the pathogenesis of

obesity-related hypertension⁵⁵. However, age affects the blood pressure to a great extent while height affects considerably less. Therefore, high blood pressure of hypertension emerges as a major risk factor related to obesity and other diseases⁵⁶.

Blood Glucose Level: Fasting blood glucose has been related to Fat mass (FM) and percent body fat (PBF) and thus used a biochemical or metabolic indicator to obesity⁵⁷. High blood glucose level is a significant concern for Type 2 diabetes which is associated with BMI. The association is strong for high BMI on having increased risk of type 2 diabetes⁵⁸.

Role of Age and Gender: Obesity is an emerging and serious health crisis and threat for public health. The curse of obesity is dependent of age, as one of the factors. However slower metabolism or basal metabolic rate (BMR) is the principle behind the process despite of several other factors being cumulatively involved. Several studies reveal the dynamic relationship of age and sex on obesity^{59, 60}.

Obesity and Mental State: Weight gain is shown to induced by antipsychotic drugs (AP) under chronic administration⁶¹.

Depressive symptoms in both genders are prominent in obese patients⁶². The relationship between mood and mental disorder is also governed by social or cultural factors⁶³. Building self esteem along with treatment of obesity should be a route of treatment for such cases⁶⁴.

Disease Associated: There are several reports of occurrence of diseases that are linked to obesity. However not all of them are directly related, yet correlation between disease and obesity is strong. In many of the cases, obesity acts as an indicator or influences the occurrence of certain diseases as a risk factor. The following Figure 3 shows a few of the diseases that are connected with obesity.

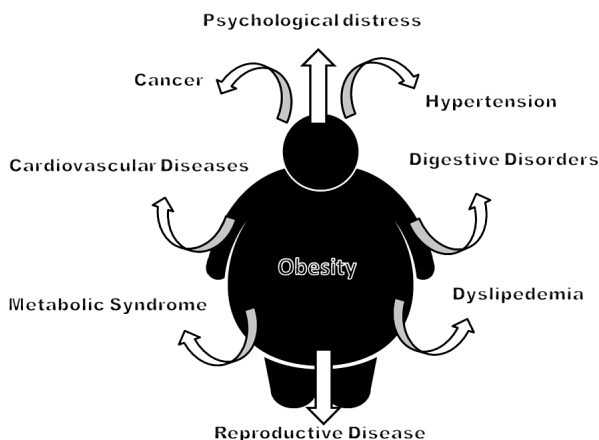


Fig. 3: Diseases associated with obesity⁶⁵



Fig. 4: The status of obesity and position of India (source: World obesity)⁶⁶

Public health concern: India is one of the countries burdened with the issue of obesity. The prevalence of obesity has doubled in adults and children and tripled in adolescents over the past 2 decades⁶⁷. Fig 4 shows the burden of obesity across the rural and urban population of India (source: World obesity). A population based strategy based on demographics and the prevailing scenario of that particular region can be of importance to minimize or eradicate the further spread of obesity. Identification and understanding of determinant factors is important in designing public health strategies to combat obesity⁶⁸. Obesity policy action framework has been illustrated by⁶⁹Sacks et al. while,⁷⁰ Khan et al has put forward a recommended community strategies and measurements to prevent obesity in the United States. Mexico has also initiated a public health strategy against overweight and obesity as National Agreement for Nutritional Health⁷¹.

Conclusions

There is a popular proverb in English, ‘Health is Wealth’. However, the present fast-paced lifestyle has left almost no time for individual to care for personal health. The diet has altered significantly and homemade cooked foods have replaced junk and ready to eat fast food in meeting the demand for daily life. This alteration of lifestyle and diet has significant effect on individual health. The problem has exceeded from a problem of an individual to a common problem posing global threat on public health. Therefore, adequate knowledge regarding life style and diet can render serious preventive measure before the issue becomes a severe curse.

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Ethical Clearance: Not needed

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