ORIGINAL ARTICLE

# RELATIONSHIP OF LIFE STYLE CHOICES ON BODY FAT MASS IN YOUNG ADULTS

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**Background:** Healthy diets and regular, adequate physical activity are major factors in the promotion and maintenance of good health throughout entire life course. Accumulation of fat occurs whenever energy consumed by food and drinks exceeds that which can be utilised by an individual's metabolism and physical activity. The objective of this study was to estimate the effect of lifestyle characteristics of a representative segment of medical students in terms of fast food preferences and participation in physical activity with respect to Body Mass Index (BMI). **Methods:** This cross-sectional study was carried out in Physiology Department, Bahria University Medical & Dental College, Karachi on 192 students of 1st and 2nd year MBBS. Body Mass index of students was calculated. They were classified into 4 groups with BMI ≤18.5, 18.6–23, 23.1–25 and ≥25 respectively. A life style questionnaire, based on preferences for healthy/unhealthy food, dietary habits and participation in physical activity was filled. **Results:** Most of medical students (65%) had BMI less than 23. It was because of selection of healthy dietary pattern with nutritious food ($p$<0.09) and participation in outdoor games ($p$<0.03). Males who had high BMI showed a tendency to daily intake of fast food ($p$<0.03). Walking in both the sexes had a positive impact in maintaining normal BMI ($p$= Males<0.04, females<0.001). **Conclusion:** Obesity can be prevented by innovative approaches, easiest of which is to promote active life styles with intake of healthy diet and involvement in physical activity.

**Keywords**: BMI, obese, overweight

## INTRODUCTION

Healthy diets and regular, adequate physical activity are major factors in the promotion and maintenance of good health through out the entire life course.[1] Main public health recommendations and clinical guidelines therefore emphasize the importance of life styles.[2] Unhealthy diets and physical inactivity at young ages are the two main risk factors that have been associated with raised blood pressure, raised blood glucose, abnormal blood lipids, overweight/ obesity and major chronic diseases such as ischemic heart diseases, cancer, and diabetes. According to WHO, 1.6 billion adults, age 15 and above were established to be over weight in 2005.[3] This may be due to rapid urbanisation which has resulted in dietary transition from simpler to more fat, salt and sweetened rich foods, frequent eating, nibbling between meals, dinning outside together with low levels of physical activity.[4]

Diet is an important component of life style selection of which plays an important role in development or prevention of overweight and obesity.[5] On the basis of factor analysis, diet can be nutrient dense (healthy), strongly coupled with intake of fruits, vegetables and whole grains or energy dense (unhealthy), associated with intake of soft drinks, potato chips, French fries, burgers, red meat and certain desserts (doughnuts, chocolate, ice-cream). Selection of a dietary product depends on a range of external factors like price, availability, advertisement, flavour and its associated cultural values. The modern food environment provides extensive opportunities to captivate youngsters by rigorous marketing of these products. Home delivery of fast food, lack of control by the elders and provision of purchase money by the youngsters enhance ease of access to energy dense diets.[6] The youngsters do not recognize 'passive over consumption' of food which causes short-term satisfaction of their satiety and appetite followed by craving to eat again.

Accumulation of fat occurs whenever energy consumed by food and drinks exceeds that which can be utilised by an individual's metabolism and physical activity.[6] Our teenagers prefer to work on computers and watch television instead of taking part in outdoor games not knowing that physical activity is obligatory for enhancing insulin sensitivity which is essential for consumption of carbohydrate and fats. The convenient pick-and-drop of students by cars and vans on their door steps has hampered the walk and use of bicycles or in order to reach the destination. Physical activity level, physical fitness, and other modifiable lifestyle characteristics may influence the risk of chronic disease, obesity and premature death.[1] Moderately intensive activity such as fast walking for 30 minutes five days a week clearly reduces risk of cardiovascular disease and type-2 diabetes among adults. Larger periods of activity, such as 60–90 minutes of walking daily are

now proposed to combat weight gain in countries with obesogenic diets.

Dietary and lifestyle behaviours at young ages have been associated with the development of obesity and ultimately chronic diseases and metabolic disturbances which impairs economic development and damage psychosocial health. Active lifestyle characteristics comprise selection of healthy foods as well as participation in physical activities for wellbeing of an individual.[2]

The potential threat from the rising trends of obesity in terms of morbidity and mortality can thus be curtailed by knowledge of causative factors, measuring overweight and obesity and development of effective strategies to promote active life styles. The knowledge of importance of healthy diet and physical activity in protection from rising trends of obesity may help in student's orientation towards life style modification and initiation of effective wellness programs in medical schools.

## MATERIAL AND METHODS

The cross-sectional study was conducted on a sample of 192 male and female medical students aged 18–24 years of Bahria University Medical and Dental College. BMI was calculated as body weight in Kg divided by the square of the body height in meters ($m^2$). Subjects were weighed on a digital weighing scale in kilogram with an accuracy of ±100 g in their normal clothing without shoes. Standing body height (BH) was measured without shoes to the nearest 0.5 cm with the help of height scale (floor type ZT-120) with the shoulders in relaxed position and arms hanging freely.

On the basis of BMI students were divided into four groups according to WHO recommendations for Asian populations; group I, underweight (BMI≤18.5), group II, normal weight (BMI 18.6–23), group III overweight (BMI 23–25), and group IV obese (BMI ≥25). A questionnaire on student demographics, food preferences and their physical activity was distributed. The survey compared students of all groups with different BMI on the basis of their selection of diet and participation in physical activity.

Data gained from food frequency and extent of physical activity was analyzed in groups assigned on the basis of BMI. Comparisons of variables with food factor were done by application of chi square test in SPSS version 15. Values were presented as mean±SD; SE of mean calculated to be significant at $p$-value<0.05.

## RESULTS

In the present study, 192 students with mean age 19±1 year were surveyed out of which 104 (54%) were females and 88 (46%) were males. Nineteen percent students were underweight with BMI <18.5, while 65% were in group II with normal weight, 15% in group III (overweight BMI 23–25) and 1% in group IV (BMI >25). The interpretation of relationship with BMI was done on the summation of physical activity and dietary habits analysis as well as response to individual queries in both the sexes. It was found that students with normal BMI (Group II) had 65.06% healthy dietary habits and 69.03% were involved in exercise. Physical activity was found to be stronger predictor of a normal BMI, ($p$<0.03) as compared to dietary patterns ($p$<0.09). In Group I, 19.26% had healthy food while physical activity was performed by 15.81%. In over weight (Group III), 14.31% had healthy food and 13.52% preferred exercise. Obese students (group IV) demonstrated unhealthy food intake in 98.63% students and physical inactivity was shown in 98.26%. In males daily intake of fast food was associated with enhanced BMI in group III $p$-value <0.03. Involvement of males in out door games for at least 20 minutes was significant predictor of normal BMI with $p$-value <0.04. Climbing upstairs and walking, ($p$-value <0.05) was associated to be significant in BMI 18.5–23. The females in group II preferred to spend 20 min for walking ($p$<0.001). Females involved in aerobics and dancing had a body mass index <23, ($p$ <0.04).

## DISCUSSION

Ancient golden principles for health are; to breathe fresh air, eat proper foods, drink the right beverages, take regular exercise and get the proper amount of sleep. Analysis of dietary patterns is an approach to search for links between diet and diseases occurring due to obesity.[7] Dietary patterns are defined by factor analysis models in which types of food together with eating patterns are meant to identify healthy/unhealthy food.[8] The two major dietary patterns; adopted in our study were the healthy dietary pattern rich in fruit, vegetables, low fat dairy products and poultry while unhealthy diet was determined by use of processed meats, soft drinks, sweets, burger, French fries, butter and cold drinks. Dietary patterns identified in this study are similar to those found in survey done on dietary patterns in women of Iran[8], America[9] and Sweden[10]. It was observed in our study that 65.06% students who were on healthy nutritious diet had normal BMI. These students were conscious of presence of diabetes, hypertension and hyper-cholesterolemia in their families. Knowledge of increased BMI association with early commencement of these familial diseases motivated them to implement active life styles. A positive correlation in this group was seen with healthy dietary pattern; low sugar and

fat intake with abstinence from cold drinks and fast food ($p$<0.09). A study done on dietary pattern has documented this protective effect of high fibre diet, low glycaemic index, small energy density and little fat consumption.[11] Dietary habits especially tendency to eat between meals, buying street food, eating while watching television or working on computer is a frequent observation in overweight and obese individuals.[4] Analysis of individual questions in our research demarcated intake of daily fast food highly correlated with increased BMI in males ($p$<0.03). Fast-food consumption has strong positive associations with weight gain and insulin resistance, suggesting that fast food increases the risk of obesity and type 2 diabetes.[12]

Physical activity is defined as any bodily movement produced by skeletal muscles which require energy expenditure. Walking briskly, water aerobics, ballroom dancing and general gardening are examples of moderate intensity aerobic activities. Vigorous intensity aerobic activities include cycling, race walking, jogging or running, swimming, jumping rope and hiking uphill or with a heavy backpack. Regular physical activity develops and maintains healthy bones, muscles, and joints. It can increase basal metabolic rate and has an influence in reducing appetite, resting heart rate and body fat. Physical inactivity overall is estimated to cause 1.9 million deaths globally. It is considered to be an independent primary risk factor for chronic diseases, high blood pressure, cardiovascular disease, osteoporosis and diabetes in adults.[13] The physical activity by students was assessed by a questionnaire before which they were briefed about the difference in moderate and vigorous anaerobic physical activity then extent and duration of time spent by them was noted down.

Partaking in physical activity was associated with a significant influence ($p$<0.03) in maintaining normal BMI of young adults. These students consciously controlled their weight to hold up inception of inherited metabolic disturbances. The results coincide with the effects of aerobic training that improved insulin sensitivity in overweight and obese girls and reduced circulating concentrations of adiponectin, IL-6, CRP, and other inflammatory markers.[14] The importance in our study is highlighted by a significant ($p$<0.05) found in women who preferred to climb upstairs. BMI was normal in women who preferred to spend 20 minutes daily in walking ($p$<0.001). Aerobics and dance performance turned out to have a negative association with development of overweight ($p$<0.04).

Weight is gained as result of imbalance between energy expenditure on work and consumption of calories in diet.[15] In our study, normal BMI was an outcome of greater involvement of youngsters in physical fitness activities ($p$<0.03) as compared to intake of balanced diet ($p$<0.09). This shows that physical activity is much more significant in maintaining muscle mass as compared to maintenance of healthy diets. This might be the reason that individuals who are used to burn their calories with vigorous physical activity, can seldom afford to have energy dense diet in contrast to ones with sedentary life styles. Consumption of optimal calories and its best utilisation helps not only in weight loss but also its maintenance. In this era of modernisation, rising availability of energy dense and nutrient poor food, tendency to sit and eat while working on a computer and refusal to take part in outdoor activity are expected to be prime drivers of obesity epidemic. Educational institutions are an excellent setting for lifestyle modification where message 'look good' and 'feel good', can be propagated by awareness of nourishing diet, good eating habits and engagement in at least 30 minutes of moderate physical activity every day.

## CONCLUSION

Overweight and obesity caused by lifestyle changes associated with economic expansion and urbanisation in developing countries are serious public health challenge of 21st century. This study suggests that awareness of impact of life style preferences and promotion of active lifestyles by adopting healthy diet and physical activity can be helpful in eradication of this epidemic.

**Table-1: Relation ship of physical activity with BMI**

| | Group I | | Group II | | Group III | | Group IV | |
|---|---|---|---|---|---|---|---|---|
| **Physical activity** | **Yes** | **No** | **Yes** | **No** | **Yes** | **No** | **Yes** | **No** |
| Go for Outdoor games | 21 | 7 | 96 | 29 | 17 | 7 | 2 | 0 |
| Spend 20 minutes in outdoor games | 6 | 22 | 48 | 77 | 3 | 21 | 1 | 1 |
| Go for daily brisk walk | 11 | 17 | 50 | 75 | 9 | 15 | 0 | 2 |
| Spend 20 minutes in walking | 12 | 16 | 80 | 45 | 13 | 11 | 0 | 2 |
| Use car for short distances | 13 | 14 | 80 | 45 | 15 | 9 | 2 | 0 |
| Walk for short distances | 19 | 9 | 88 | 37 | 19 | 5 | 0 | 2 |
| Jogging | 5 | 23 | 32 | 93 | 3 | 21 | 0 | 2 |
| Swimming | 3 | 25 | 23 | 102 | 4 | 20 | 1 | 1 |
| Aerobics/Dance | 3 | 25 | 32 | 93 | 6 | 18 | 0 | 2 |
| Climbing upstairs | 20 | 7 | 88 | 37 | 16 | 8 | 0 | 2 |
| Deep breath before climbing upstairs | 19 | 18 | 39 | 86 | 16 | 18 | 0 | 2 |

**Table-2: Relationship of dietary habits with BMI**

| Healthy habits | <18.5 | | 18.5–23 | | 23–25 | | >25 | |
|---|---|---|---|---|---|---|---|---|
| | Yes | No | Yes | No | Yes | No | Yes | No |
| Prefer fast food | 16 | 12 | 83 | 42 | 17 | 7 | 1 | 1 |
| Take it two to four times a week | 15 | 13 | 65 | 60 | 12 | 12 | 0 | 2 |
| Take it daily | 22 | 6 | 91 | 34 | 18 | 6 | 1 | 1 |
| Take fresh vegetables regularly | 14 | 14 | 65 | 60 | 15 | 9 | 1 | 1 |
| Take fruits regularly | 19 | 19 | 59 | 66 | 14 | 10 | 1 | 1 |
| Prefer aerated drinks | 19 | 9 | 81 | 43 | 6 | 18 | 2 | 0 |
| Take them once in a week | 9 | 19 | 44 | 80 | 6 | 18 | 1 | 1 |
| Take them daily | 6 | 22 | 23 | 101 | 2 | 22 | 0 | 2 |
| Take 6 to 8 glasses of water daily | 18 | 9 | -- | -- | -- | -- | 2 | 0 |
| Prefer to take food watching TV or on computer | 20 | 3 | 74 | 50 | 14 | 10 | 2 | 0 |

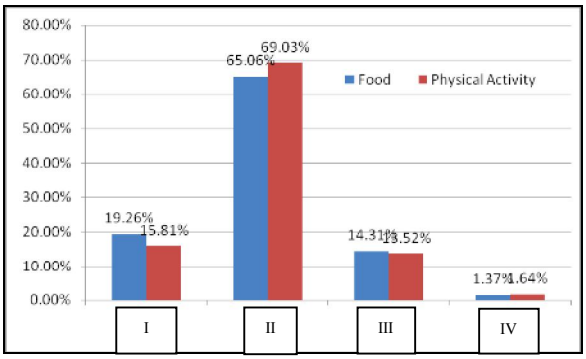


**Figure-1: Comparison of BMI with dietary habits and physical activity**

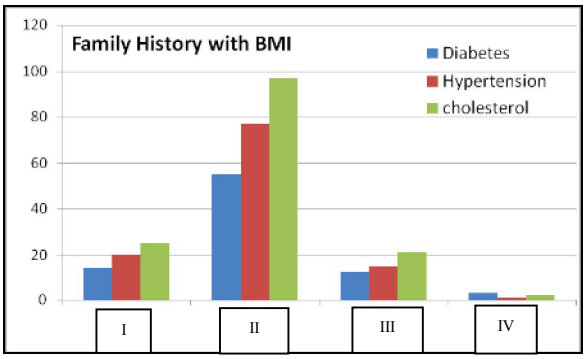


**Figure-2: Family history of risk factors in all groups**

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