



Research Article

Factors Responsible FOR High Body Mass Index (BMI) In the Local Population of Malakand Pakistan

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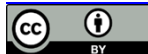
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Citation

Ahmad R, Zahid M, Islam M, Khan S, Ahmad H, Ali B, Sajid M, Ullah I, Ishaq M. (2025). Factors responsible for high body mass index (BMI) in the local population of Malakand Pakistan. Health Sciences Journal, 25-29

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ABSTRACT:

Objective: The purpose of this paper was to determine the factors responsible for the development of overweight and obesity among human population.

Methods: This study was done among the people of District Malakand, Khyber Pakhtunkhwa, Pakistan. A total of 210 individuals were studied which were either overweight or obese. The body height and body weight of each subject was measured to obtain Body Mass index (BMI). A questionnaire was also designed for each subject. The data was statistically evaluated through SPSS software (version 16.0). **Results:** BMI was remarkably high (P. value = 0.020) in females compared to males. It was observed that the overweight and obesity are associated with lifetime and the highest in the age group 40-54 (P. value = 0.021). Overweight and obesity were significantly associated (P. value = 0.039) with daily use of rice in dinner. There was a significant difference (P. value = 0.038) between subjects with history of obesity in the family and those with no history of obesity in the family. BMI was significantly higher (P. value = 0.000) among subjects which have high socio-economic status. **Conclusion:** BMI was found to be markedly correlated with gender, age, family history of obesity, food habit and economic status.

Keywords

BMI, Family history of obesity, Food Habit, Overweight, Obesity, Malakand

1 | INTRODUCTION

The condition of obesity is defined as excessive or abnormal fat accumulation in adipose tissue of the body to the extent that health may be affected [1]. Both in developing and developed countries excess weight is a major health issue. Two main factors that play key role in the occurrence of overweight and obesity are lack of exercise and eating of food having high calories [2]. The conditions of overweight and obesity occur when intake of energy is higher than the energy used in the body and excess amount of energy is accumulate in the form of fats [3]. Obesity and genetics of obesity have strong relations. Studies have shown that a person with family history of obesity has two to three times more risk of becoming obese [4]. Researchers have recorded higher rate of obesity in females as compared to males [5] Absence of exercise and sedentary lifestyle are the principal causes of childhood obesity [6]. Sedentary lifestyles and no exercise also increase the rate of non-transmissible chronic health issues that include hypertension, high sugar level in the blood, cardiovascular diseases, and increase mortality rate throughout the world [7]. Genetics of obesity, environmental factors, behavioral factors, aging, number of pregnancies, type and times of food, socio-economic status, and no physical activity are some major determinants that contribute to overweight and obesity [8]. Throughout the world the rate of excess body weight is increasing ceaselessly. Overweight and obesity affect people of different age groups, with different socioeconomic status irrespective of the ethnicity [9]. High prevalence of excess body weight was recorded in the individuals of developing countries due to which the rate of health issues linked with overweight and obesity are also increasing especially in African countries [10]. The national health survey of Pakistan investigated that the prevalence of high body weight is becoming double in the country [11]. The number of overweight and obese people in Europe is growing by 1.3 million annually [12].

The ratio of overweight and obesity among kids was swiftly increasing in Australia from 1985 to 1995. There was 9.3% rise of overweight and obesity among guys, and 9.7% among young women [13]. Low intake of food and regular exercise are the two main factors which are used for the avoidance of overweight and obesity. An overall drop in the number of calories is required for weight loss.

1.1 | Aims of the Present Study

- To identify the causes of overweight and obesity related to lifestyle of an individual in general human population of District Malakand, KP, Pakistan.
- To find out the measures for the control of high BMI and to create awareness among the people to prevent overweight and obesity.

2 | MATERIAL AND METHODS

A cross-sectional study was done over six-month period, starting from June ,2022 to December 2022. The sample size was determined by using Raosoft online sample size calculator with 95% confidence interval, 5% margin of error and a population size of 452291 (1998 census) resulting a sample size of 210. A total of 210 overweight and obese subjects were studied from different localities of District Malakand, Khyber Pakhtunkhwa, Pakistan using consecutive sampling techniques. The study was multi-centric, sampling collected at homes, schools, private medical centers, colleges, hospitals and private clinics. Data was collected from participants apparently seems obese and overweight. Before collecting the data, an informed written accord was received from participants. The objective and purpose of this survey was to explain to study participants. A self-made and interviewer administered questionnaire was used for collection of the data. The reliability of the questionnaire was checked by a Ph.D. subject expert. The reliability of the questionnaire was determined by conducting a pilot test on 21 participants (10% of the sample). A Cronbach's alpha of 0.819 was obtained showing high internal reliability. Before collecting the data, formal ethical approval was gained from institutional, bioethical committee of Islamia College Peshawar university, Khyber Pakhtunkhwa to ensure study's participants safety. The questionnaire that was administered by the investigator contain gender, education, body weight, intake of meat height, age, health problems, water source, twins pregnancy, socio economic status, exercise habit, marital status, occupation, marriage type, level of cholesterol, heart rate, exercise time, food intake frequency, family history of obesity, food choice, smoking habit, frequency urine, sedentary behaviors, location, sleep time, habit of overeating harmful effects of obesity on the body, and what do think about your health,. The body height and body weight of each subject were measured to obtain BMI. BMI used in the study was according to the guidelines of WHO 2000. BMI was recorded to find out whether the individual is overweight or obese. A weighing scale was used for calculating each person's body weight in the present research sample (excluding weight of the wearing). A tape measure was used to find the body height of each subject. Such data was later used in determination of BMI, which was calculated as a ratio of weight in (kg) kilograms and height in square meters.

2.1 | Statistical Analysis

Data was arranged in tabulated form for the sake of convenience and generalization. For descriptive statistics such as prevalence, data displayed in percentages, while for inferential statistics such as association chi square test was applied. The data was statistically analyzed using SPSS (version 16.0). For each factor Chi-square value, P. value and degree of freedom (df) were determined.

3 | RESULTS

In the present study 210 subjects were studied which were either overweight or obese. Body mass index (BMI) was recorded to find out whether the individual is overweight or obese. Age and sex wise prevalence recorded in the current study showed that both overweight and obesity conditions were high in females (57.1%) as compared to males (42.9%). BMI was high (P. value = 0.020) in females compared to males. Age based rate of overweight and obesity was high (33.3%) in age group 40-54 and significantly associated with age (P. value = 0.021) (Table 1). The association of BMI with food habits and daily rice at dinner was also recorded in the study that showed that both overweight and obesity were high (86.2%) among the subjects that have three or more times intake of food per day. BMI was significantly different (P. value = 0.016) in subjects two times or more intake of food per day. BMI was high (64.8%) in subjects having habit of eating rice at dinner daily as compared to those having no habit of eating rice at dinner regularly. The study showed that overweight and obesity are significantly related (P. value = 0.039) with daily rice intake at dinner (Table 2). The relationship between the overweight and obesity was also correlated with the family history of the individual for obesity and overweight. The percentage of overweight was high (54.5%) in peoples with no history of obesity in family while obesity rate was high (51.9%) in peoples

with family history of obesity. There was significant difference (P. value = 0.038) between subjects having obesity history in family and those with no obesity history in the family. Overweight and obesity were found higher (48.1%) in subjects of high socio-economic status (48.1%) than subjects of low and middle status. BMI was found to be significantly higher (P. value =0.000) among subjects which have high socio-economic status (Table 3).

Table 1 Gender and Age Based Overweight and Obesity

Factors	Body Mass Index (BMI)		Total n (%)	Chi-Square	P-value	Df
	Overweight n (%)	Obese n (%)				
* Gender						
Males	38 (49.4)	52 (39.1)	90 (42.9)	2.093	0.020	1
Females	39 (50.6)	81 (60.9)	120 (57.1)			
Total	77 (100)	133 (100)	210 (100)			
Age Groups						
10-24	27 (35.1)	22 (16.5)	49 (23.3)	19.199	0.021	4
25-39	6 (7.8)	34 (25.6)	40 (19.1)			
40-54	23 (29.9)	47 (35.3)	70 (33.3)			
55-69	15 (19.5)	27 (20.3)	42 (20.0)			
≥70	6 (7.8)	3 (2.3)	9 (4.3)			
Total	77 (100)	133 (100)	210 (100)			

Table 2 Relation of Food habit, Daily rice at dinner with Body Mass Index (BMI)

Factors	Body Mass Index (BMI)		Total n (%)	Chi-Square	P- value	Df
	Overweight n (%)	Obese n (%)				
Food Habit						
2 times	15 (19.5)	14 (10.5)	29 (13.8)	3.285	0.016	1
3 times & above	62 (80.5)	119 (89.5)	181 (86.2)			
Total	77 (100)	133 (100)	210 (100)			
Rice						
Daily at dinner	53 (68.8)	83 (62.4)	136 (64.8)	.882	0.039	1
No daily at dinner	24 (31.2)	50 (37.6)	74 (35.2)			
Total	77 (100)	133 (100)	210 (100)			

Table 3 Relation Body Mass Index (BMI) with obesity and Socio-economic status

Factors	Body Mass Index (BMI)		Total n (%)	Chi-square	P- value	Df
	Overweight n (%)	Obese n (%)				
Obesity in family						
Yes	35 (45.5)	69 (51.9)	104 (49.5)	.805	0.038	1
No	42 (54.5)	64 (48.1)	106 (50.5)			
Total	77 (100)	133 (100)	210 (100)			
SES						
Lower	24 (31.2)	10 (7.5)	34 (16.2)	25.602	.000	2
Middle	30 (39.0)	45 (33.8)	75 (35.7)			
Higher	23 (29.8)	78 (58.7)	101 (48.1)			
Total	77 (100)	133 (100)	210 (100)			

4 | DISCUSSION

Overweight and obesity are caused by many factors including metabolism, environment and lifestyle [15]. Factors related to metabolism are low metabolic rate, eating carbohydrate rich food, and resistance to insulin. Factors related to metabolism are not measured and factors related to lifestyle have more close relation to gaining higher weight. According to some researchers sitting in fronts of various screens (T.V, Computers, etc.) is the main cause of obesity [16]. In the current research it was recorded that both overweight and obesity prevalence was higher in females as compared to males and BMI was significantly associated (P. value = 0.020) with sex. The findings of the study are almost like the results found in population of Northern Nigeria that also showed significantly higher cases of overweight and obesity in women as compared to men.

($P < 0.001$) [17] and to the study conducted in Urban Kanpur that BMI is significantly different (P . value < 0.05) between males and females [1]. The reason of high rate of overweight and obesity in female in the study area is since females are restricted to houses and having a sedentary lifestyle. The association between BMI and age showed that BMI was significantly related with age (P . value = 0.021). Results of the study were like previous studies that showed significant relation (P . value < 0.05) with age [1,18]. The rate of overweight and obesity rises with age due to fat deposition in the body. BMI was significantly different (P . value = 0.016) in subjects that have 2-3 times or more food intake daily. This observation is almost like the study which was conducted in KP, Pakistan that found higher overweight and obesity among the subjects having high intake of food daily [19]. The results also showed similarities to previous study reporting that BMI and food intake frequency have close relation [20]. In the study area it is generally common in some houses that rice is served daily in dinner. It was observed that both overweight and obesity were significantly related (P . value = 0.039) with daily rice at dinner. The results of the present study show similarity with some previous study in Pakistan, that recorded high overweight and obesity in the subjects who had high intake of rice as compared to low intake of rice [21]. A significant difference (P . value = 0.038) between subjects which have family history of obesity and those which have no history of obesity in the family was observed. Our findings are almost like previous studies that found high overweight and obesity in subjects which have family history of obesity [19,22]. In the present study BMI was significantly higher (P . value = 0.000) among subjects which have high socio-economic status. The results of this study are like previously reported study that noted a close association of BMI and economic status [19,23].

5 | CONCLUSION

Based on the present work it can be find out that overweight and obesity are more common in females due to their sedentary lifestyle, a paramount risk factor for overweight and obesity. The BMI increases with age due to fat deposition in the body. There is close relation between BMI and food intake habits. Moreover, family history of obesity and high socio-economic status also plays vital role in the improvement of overweight and obesity.

6 | LIMITATION OF THE STUDY

One of the limitations of the present work is the use of self-made questionnaires, which questioned the validity and reliability that lead to biases. The second limitation includes cross-sectional design, although relation of obesity and obesity is overweight with demographic variables and different factors have been established, but the design does not establish causal relationships. The use of non-probability sampling technique is another limitation of the study.

Conflict of Interest statement: All authors declare no conflict of interest

Data Availability Statement: Data will be available from the corresponding author and will be provided on special request

Authors' Contribution: All authors equally contributed to writing, reviewing and finalizing the draft

Funding: Not Applicable

Informed consent: Not Applicable

Ethical Approval: Not Applicable

Acknowledgement: Authors are very highly thankful to the subjects who participated in the study.

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