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Prevalence of Obesity in Male in Relation to Dietary Intake and Physical Activity Level

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Abstract: The present study was conducted to assess the prevalence of obesity in relation to diet and physical activity levels (PALs) in Tehsil Mardan, of the North West Frontier Province (NWFP), Pakistan. Three cities, three towns and three villages were selected from the whole Tehsil. Hundred households in each city, town and village were randomly selected. A male individual of above 30 years age from each selected household was interviewed. In this way a total of 900 male subjects were surveyed. The information collected include their height, weight, food intake for three alternate days, occupation and other activities. Prevalence of obesity was determined by Body Mass Index (BMI). The average values showed 7 and 34% prevalence of obesity (BMI = > 30) and overweight (BMI = 25-30), respectively in Tehsil Mardan. Prevalence of obesity and overweight was more in cities than towns and more in towns than villages. The average energy intake was 2522±449 kcal/day. The relative contribution of protein, fat and carbohydrate to the total energy intake was 12, 33 and 56%, respectively. The energy intake was positively correlated with BMI (r = 0.799) and their PALs were negatively correlated with BMI (r = - 0.398). The present study alarms that obesity is becoming a major health problem of concern in Tehsil Mardan. Therefore, early nutritional interventions are required.

Key words: Obesity, over-weight, prevalence, dietary intake, physical activity level

Introduction

Obesity in the traditional sense, represents an energy imbalance resulting from an excess of energy input (fuel from food) over energy output (energy requirements or expenditure (William, 1999). By definition obesity is a condition in which there is accumulation of excessive fat in the body. A person having 20% or more above age, sex and height related weight norms is said to be obese. Whereas overweight indicate 10-20 percent above the ideal body weight without any specific reference to body composition (Bennion, 1979). However, this definition of obesity seems to be inappropriate and therefore, obesity is assessed through basal metabolic index (BMI). According to this assessment individuals who falls in the 25-29.5 BMI are classed as over-weight and those having BMI 30 or above are classed as obese (WHO, 1997). There are various etiological factors attributed to the incidence of obesity. It can occur anywhere in any community. The contributing factors are hereditary (National Institute of Health, 2000; Stunkard et al., 1986), environmental and dietary factors (Weight control information network, 1988) and life style for example physical inactivity or sedentary life style (Weight control information network, 1988; Martinea-Gonzalez et al., 1999). The incidence of obesity/over-weight amongst societies, communities or countries has been reported to be at different prevailing rates. Again, this varying incidence is attributed to the above listed factors. Obesity has been studied as a cause of different diseases e.g. heart diseases, diabetes mellitus, surgical complication and infertility problems (Dawes, 1984; Negri et al., 1988; Italie, 1985; Simic, 1984; Al-Shammari et al., 1994; Khan et al., 1993). Whatever, the etiological cause may be it prevails worldwide both in developed and in developing countries (Musaiger et al., 2000; Stam-Moraga et al., 1999; Dhurandhar and Kulkarni, 1992; Laurier et al., 1992; McDonald et al., 1997). However, to the best of the knowledge of the author there is no such data available in this country. Therefore, the present study was designed to know the prevalence of obesity in relation to dietary intake and physical activity levels in the Tehsil Mardan, NWFP, Pakistan.

Materials and methods

The study was conducted in three cities, three towns and three villages of Tehsil Mardan. Hundred households were randomly selected from each city, town and village. A male individual of above 30 years of age from each household was interviewed and information about age, height, weight, occupation, usual activities and food intake were recorded in the questionnaire. In this way a total of 900 subjects were assessed from the whole Tehsil.

The obese and overweight were determined by using BMI method (Bray, 1978). From the food intake data for three alternate days of the week, the average food intake/day was calculated. For the analysis of food intake data, the volume of cups and glasses, weight of curry, rice and weight of various types of bread were determined. Protein, fat and carbohydrate of the average daily food intake of the individuals were determined by

Table 1: Prevalence of Obesity and Overweight in the Cities of Tehsil Mardan

Area	Obesity* (%)	Overweight** (%)
Hoti	11	41
Baghdada	5	32
Majid Abad	15	49
Average	10	41

* Obesity = BMI > 30, ** Overweight = BMI 25-30.

Table 2: Prevalence of Obesity and Overweight in the Towns of Tehsil Mardan

Area	Obesity* (%)	Overweight** (%)
Shahbaz Garhi	7	30
Katlang	9	47
Rustam	5	27
Average	7	35

* Obesity = BMI > 30, ** Overweight = BMI 25-30.

Table 3: Prevalence of Obesity and Overweight in the Villages of Tehsil Mardan

Area	Obesity* (%)	Overweight** (%)
Chamdheri	4	31
Garhi Kapoora	9	29
Qasim	1	17
Average	5	26

* Obesity = BMI > 30, ** Overweight = BMI 25-30.

Table 4: Prevalence of Obesity and Overweight in various Cities, Towns and Villages of Tehsil Mardan

Area	Obesity* (%)	Overweight** (%)
Cities	10	41
Towns	7	35
Villages	5	26
Tehsil Mardan	7	34

*Obesity = BMI > 30, ** Overweight = BMI 25-30.

using food composition tables (Whitney and Humiliation, 1984; Goplan *et al*., 1981; Khattak, 2002). The daily energy intake of the individuals was calculated by multiplying the daily average grams of protein, carbohydrate and fat intake with 4, 4 and 9 respectively. The occupations and activities of all the individuals were categorized into sedentary, light, moderate and heavy activity levels according to the available classifications (William, 1999; Krause and Mahan, 1984; The American Dietetic Association, 1996).

Statistical Analysis: The collected data was analyzed statistically, the mean and standard deviation of the mean and correlation of obesity with diet and PALs was determined by MINITAB Statistical Package (1991).

Results

Prevalence of obesity in the selected cities, towns and villages of Tehsil Mardan is given in Tables 1-4. The
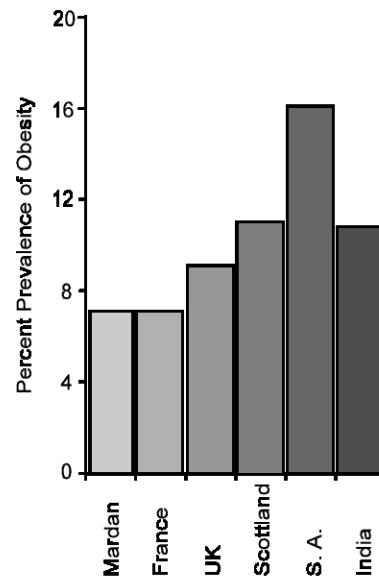

Fig. 1: Comparison of the prevalence of obesity in Mardan with western developed countries and the neighboring India. The observed range of the incidence of obesity in this study is comparable to the other countries

results showed that prevalence of obesity in the cities (Table 1) ranged from 5 to 15% with an average value of 10%. In the villages (Table 3), it ranged from 1 to 9% with an average value of 5%, which was half of the prevalence in cities. In the towns (Table 2), prevalence of obesity ranged from 5 to 9% with an average of 7%, which occurred almost in the middle of the average values of prevalence in the cities and villages. Similarly, prevalence of overweight in the cities ranged from 32 to 49% with an average value of 41% which was much higher than the prevalence in the villages ranged from 17 to 31% with an average of 26%. In the towns, prevalence of overweight ranged from 27 to 47% with an average of 35% which occurred almost in the middle of the average values of prevalence in cities and villages. The overall prevalence of obesity and overweight in Tehsil Mardan (Table 4) was 7 and 34%, respectively.

The average daily macro nutrients intakes with their energy content of all the subjects were determined and the mean values are presented in Table 5. The mean energy intake in Teshil Mardan was 2522±449 kcal/day. Protein, fat and carbohydrate provided 12, 33 and 56%, respectively of the total energy intake. A higher energy intake was noted in the cities (2593±465) than in towns (2541±457) and villages (2433±425).

The correlation analysis of the dietary intake and PALs with the incidence of obesity was carried out as well. The energy intake was significantly positively correlated with both body weight (r = 0.754 and BMI (r = 0.799). The PALs were negatively correlated with body weight (r = -0.408) and BMI (r = -0.398).

Table 5: Mean Macro nutrients Intake and their Energy Content in the various Cities/Towns/Villages of Tehsil Mardan†

Area	Macro nutrients Intake*			Energy * intake (Kcal)	Relative Contribution of Macro nutrients to the Energy Intake		
	Protein (g)	Fat (g)	Carbohydrate (g)		Protein(%)	Fat(%)	Carbohydrate (%)
Cities							
Hoti	76	93	365	2602±477	12	32	56
Baghdada	74	92	356	2546±463	12	32	56
Majid Abad	79	95	364	2630±456	12	32	56
Mean	77	93	362	2593±465	12	32	56
Towns							
Shahbaz Garhi	73	93	353	2545±466	12	33	56
Katlang	74	94	360	2589±459	12	33	56
Rustam	71	93	343	2490±446	12	33	56
Mean	73	93	352	2541±457	12	33	56
Villages							
Chamdheri	69	88	342	2439±428	11	32	56
Garhi Kapoora	72	90	358	2533±449	32	56	56
Qasim	65	85	326	2326±398	11	32	56
Mean	69	88	342	2433±425	11	32	56
Tehsil Mardan	73	92	352	2522±449	12	33	56

† n = 900, * Mean ± S.D

Discussion

The present study indicates that obesity is becoming a problem of concern in Pakistan. The reason(s) could be habitual and unscheduled eating and no care for the estimates of eating or nutritional requirements or with no regular exercise. Their profession usually stands for their exercise status. Therefore, they are more prone to gain weight. The observed 7-34 percent prevalence of obesity and overweight in this particular area is considerably high, but still lower than the prevalence in many other countries. However, it is comparable to some of the countries for example, France, U.K., USA and India (Fig. 1). In communities, like French, British, American, Scottish and Indian has been reported to be 7, 9, 16 and 11 (Laurier *et al*., 1992; Bolton-Smith and Woodward, 1994; Kreitzman, 1989). Whereas in the neighboring India the prevalence of obesity has been reported to be 10.7% in students and 53.1% in male medical doctors (Dhurandhar and Kulkarni, 1992).

The data presented in the aforementioned Tables indicates that prevalence of obesity and overweight is more common in cities than in towns and villages. Similarly, it is yet more prevalent/common in the towns than in the villages. This is indicative of the reason that peoples with higher socio-economic status reside in cities. In the cities people opt for more fried and fatty foods and probably delicious foods. Furthermore, people residing in cities have easy access to bakery and confectionery products and take these products with tea more often than in villages. In cities, the frequency of intake of tea is higher and *Parata* (bread fried in fat) is a common item in breakfast. On the other hand, these people are either involved in profession e.g. office work or business. These professions are categorized as low PALs or sedentary professions. The overall energy consumption was within the recommended range of RDAs but the difference in energy intake in cities, towns and villages was not significantly higher but the difference signifies itself in the form of higher obesity. The data in Table 3 indicates that the food intake in terms of fat and carbohydrates was balance but protein intake was at the minimum recommended level. The correlation analysis advocates the difference in the prevalence of obesity that it might be due to the high-energy intake. This argument is further strengthening, when the correlation analysis for PALs with BMIs or obesity which is showing the negative relationship. This indicates that the respondents having the sedentary lifestyle were obese and those who were having active lifestyle were not obese. Studies carried-out on obesity recommends different control measures for obesity. The control of weight with regular exercise because exercise decreases the body fat and increases muscle mass (Bennion 1979; Kreitzman, 1989; Young, 1975). One of the best approaches of avoiding the obesity is the Islamic way of eating. It has been reported that Islamic fasting and Islamic way of eating reduce the chances of becoming overweight/obese (Khan *et al*., 1993). Therefore, one should include routine exercise e.g. walking or games or other physical works in the lifestyle. Early, preventive measures are desirable to lower the prevalence of overweight or obesity. Therefore, the overweight is required to fix the eating schedule and be conscious for nutrients and energy requirements.

Conclusion: The present study alarms that obesity is

becoming a major health problem of concern. Therefore, early nutritional interventions are required.

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