

Article

Demographical characteristics, nutritional habits and knowledge evaluation of obese patients in Afyon, Turkey

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Abstract: The purpose of this study was to assess the obesity in correlation with the demographic characteristics, nutritional habits and knowledge among adult obese patients. We used a data collection method carried out with 500 obese adult volunteer patients Afyonkarahisar State Hospital between March and August 2011. Nutritional habits and knowledge score was measured by analysis of 22 question responses and demographic characteristics were sought by questionnaires. Most of obese patients were married (94%), female (85.4%), housewives (75.6%) and settled in province (73.2%). Moreover almost all stated to have breakfast everyday (91.4%) and to prefer vegetables (48.8%) for main meals. Increased emotional eating (71%), from birth and childhood start of weight gain (66.8%), familial story of overweight (79.6%) and no balanced (86.6%) and regular (92.8%) diet consumption were observed among obese patients. Their general knowledge in terms of nutrition was not impressive. Also, they were mostly observed to be interested in health and nutrition related issues (68.4%), nor take physical exercise (87.8%), and were accustomed to eating rapidly (55.2%). Our data also confirmed that lower education level was significantly associated with obesity. Obesity is observed to be significantly associated with some the nutritional habits, nutrition knowledge and demographic characteristics of the patients. The diet quality and physical activity must be promoted with health education programs for all segments of the population with a special focus on woman. Understanding of the complex interplay of several factors may help to increase public awareness and to establish obesity prevention strategies.

Keywords: demographic characteristics; diet; nutritional habits; nutritional knowledge; obesity

1. Introduction

As a global challenging health treat, obesity becomes epidemic for adults as well as children. There is evidence of a slowdown in increase of overweight in developed countries yet no countries had reported significant decreases in obesity in the past 33 years (Ng *et al.*, 2014). Health service costs of obesity and its associated illnesses are estimated to reach up to 6% of all total health costs in Europe (Knai *et al.*, 2007). Scientists have focused on the causes of obesity to more effectively intervene against (Jonides *et al.*, 2002). Dietary behavior is determined by myriad of environmental and individual factors. The etiology of obesity is multi factorial consisting complex interactions among the socio-economic status, knowledge in terms of nutrition and health issues and psycho-social factors. Regular monitoring of obesity and assessing the effects of factors

contributing to the obesity are essential to develop public health strategies (Chan and Woo, 2010). Obesity is reported to be responsible for decreased quality of life as being associated with Several diseases and disorders like cardiovascular disease, degenerative joint, hipertansion, hiperlipidemia, cancer and depression (Larsson *et al.*, 2002; Tsai *et al.*, 2004; Jia and Lubetkin, 2005). The two third of the population is reported to be overweight and obesis in Turkey where prevalence of obesity has been stated as 32% (Anon, 2011). Recently there is increased interest in describing socio economic impact and other related factors on the prevalence of obesity (Knai *et al.*, 2007; James *et al.*, 2001; WHO, 2000). Limited data is available on prevalence of obesity and contributing factors in Turkey. In present study we assessed the nutritional habits and knowledge as well as the demographical characteristics of obese patients in relation to obesity in Turkey.

2. Materials and Methods

This study was approved by the committee of research ethics in Afyonkarahisar State Hospital. Total of 500 voluntary obese adult patients of 20 to 65 year old, receiving outpatient treatment in Afyonkarahisar State Hospital between March and August 2011 were included in this study. Patients were asked to fill the comprehensive 72 item questionnaire from which 22 were used for this study. A survey form was prepared after a review of literature regarding dietetic recommendations and affiliation of diet and obesity. The survey form consisted of the individual characteristics (gender, age, maritalstatus, level of education, place of residence, work status, height, weight), and 22 closed ended questions regarding health problems, nutritional habits and knowledge of patients. The general nutrition knowledge levels of patients about the amounts of protein, vitamins, fat, sugar and salt content of food were determined. BMI was calculated as weight divided by the height squared (kg/m^2). Total of 500 out of 546 patients' forms were evaluated. The individual characteristics of the participants in the study, their nutritional habits and nutritional knowledge have been presented as frequency and percentage distributions. The affiliation between nutritional habits and demographic variants have been analyzed with Chi-square (χ^2) test while the affiliation between the general nutritional knowledge level of the participants and demographical variables was assessed with t-test and variance analysis. In order to ensure the necessary assumptions for the application of the analyses, integration was carried out in some groups in terms of variables. The relevant statistical methods were carried out with SPSS 18.0 for Windows program.

3. Results

In this obese patient derived study, a range of independent questionnaires were used to evaluate the affects of possible variables on obesity. The overall response rate to questionnaire among patients were 72.8%. Table 1 summarizes the distribution of the individual characteristics of the patients found to be associated with obesity. Of the 500 obese patients, 85.4% were female where 88.52% of the females were house wives (data not shown). In respect to age, 91.8% of the patients were at the age of over 25 y and 66.8% had the height below 160 cm and 70.6% had weight above 85 kg (data not shown). The highest proportion of the participants (94%) were married and almost three quarters of the study population lived in province (73.2%), were housewives (75.6%) and had BMI above 33 (79.6%). Education level of almost half of the patients were at elementary school and below (46.4%). Table 2 shows the results of the questionnaire on the health problems, nutritional habits and nutritional knowledge, to be associated with the obesity. Accordingly, 59% of the patients participating in this study had previously been diagnosed with hypertension, diabetes, high levels of cholesterol and heart disease. The highest proportion of the patients had overweight family members (79.6%) and started to gain weight since early life times (from birth and childhood) (66.8%). Insufficient and unbalanced nutrition status (86.6%), irregular dieting (92.8%) having no physical activity (87.8%) and fast consumption of food (55.2%) were evident among the patients besides 68,4% claimed that they had no interest in health and nutrition related issues. All of the patients claimed to have snacks between meals and most stated to have breakfast in everyday of the week (91.4%). Almost half of the patients were observed to prefer vegetables (48.8%) for main meals. More than half of the subjects (51.6%) preferred sherbet type (High sugar concentrated desert sauce) pastries as deserts. Daily water consumption was below 1800 ml in 68.4% of patients and 43.8% tended to prefer fast food restaurants. Increased food intake under the influence of emotional alterations was declared by 71% of patients. The knowledge status of patients concerning the protein, vitamin, fat, sugar and salt content of the food was not impressive (Table 2). The significance of demographical characteristics in respect to the nutritional knowledge and nutritional habits in obese patients are presented in Table 3. Gender was associated with all nutritional habits and knowledge variables among the study subjects. Women were more likely to be interested in nutrition, have regular diet, increased food intake under

emotional conditions while men had more physical activity declared to eat fast ($p < 0,05$). No significant correlation was observed between the marital status and the mentioned variables ($p > 0,05$). Education level was positively related to the interest on nutrition and health related issues. Physical activity and fast eating habit also indicated to have strong association with education level. Statistical interactions of age in association to nutritional knowledge and habits pointed out the fact that 26-35 age group have more interest on nutrition than the other age groups. The pattern indicated strong association between the settlement area that patients living in village tend to have less interest on nutrition and increased food intake under emotional alterations. Being employed was positively associated with food consumption speed and eating more under emotional alterations whereas inversely associated with physical activity.

In other words, low physical activity and fast eating habits were significantly higher in the employed group compared to other groups. Statistically significant correlation was observed between the BMI of the patients and all concerned variables listed in Table 3.

Table 1. The individual characteristics of the obese patients.

| Variable | Group | Number (f) | Percentage (%) |
|---|--|------------|----------------|
| Gender | Male | 73 | 14.6 |
| | Female | 427 | 85.4 |
| Age | 25 and under | 41 | 8.2 |
| | 26 – 35 | 180 | 36.0 |
| | 36 – 45 | 127 | 25.4 |
| | 46 – 55 | 118 | 23.6 |
| | 55 and over | 34 | 6.8 |
| Marital Status | Married | 470 | 94.0 |
| | Single | 30 | 6.0 |
| Educational level | Elementary school and below | 232 | 46.4 |
| | Secondary school | 79 | 15.8 |
| | High school | 123 | 24.6 |
| | University | 66 | 13.2 |
| Settlement area | Village | 23 | 4.6 |
| | Town | 21 | 4.2 |
| | District | 90 | 18.0 |
| | City | 366 | 73.2 |
| Employment status | Employed | 83 | 16.6 |
| | Housewife | 378 | 75.6 |
| | Other (unemployed, retired, student, etc.) | 39 | 7.8 |
| Height (cm) | 150 and below | 47 | 9.4 |
| | 151 – 160 | 287 | 57.4 |
| | 161 – 170 | 142 | 28.4 |
| | 171 and over | 24 | 4.8 |
| Weight (kg) | 85 and below | 147 | 29.4 |
| | 85,1 – 95 | 145 | 29.0 |
| | 95,1 – 105 | 133 | 26.6 |
| | 105,1 – 115 | 50 | 10.0 |
| | 115,1 and over | 25 | 5.0 |
| Body Mass Index (BMI) (kg/m ²) | 33 and below | 102 | 20.4 |
| | 33,01 - 35 | 87 | 17.4 |
| | 35,01 - 37 | 96 | 19.2 |
| | 37,01 - 39 | 81 | 16.2 |
| | 39,01 and over | 134 | 26.8 |
| Total | | 500 | 100.0 |

Table 2. Association of the health problems, nutritional habits and nutritional knowledge with the obesity.

| Question | Answer | Number (f) | Percentage (%) |
|---|---|------------|----------------|
| Whether a health problem has been diagnosed by a doctor | None | 205 | 41.0 |
| | Yes (<i>hypertension, diabetes, high cholesterol, heart disease, etc.</i>) | 295 | 59.0 |
| Are there overweight family members | Yes | 398 | 79.6 |
| | No | 102 | 20.4 |
| When did the weight gain start | Since childhood | 181 | 36.2 |
| | Since birth | 153 | 30.6 |
| | Since marriage | 71 | 14.2 |
| | After quitting smoking | 30 | 6.0 |
| | Other (<i>menopause, use of drugs, hormone disorder, etc.</i>) | 65 | 13.0 |
| Sufficient and balanced nutrition status | No | 433 | 86.6 |
| | Yes | 67 | 13.4 |
| Interest in health or nutrition related issues | No | 342 | 68.4 |
| | Yes (<i>newspaper, TV, internet, dietician, etc.</i>) | 158 | 31.6 |
| Status and reason for regular dieting | No | 464 | 92.8 |
| | Yes (16 persons were dieting to lose weight and 20 persons were dieting because of cholesterol, diabetes, hypertension, etc.) | 36 | 7.2 |
| Physical activity status | No | 439 | 87.8 |
| | Yes | 61 | 12.2 |
| Food consumption speed | Fast | 276 | 55.2 |
| | Normal | 209 | 41.8 |
| | slow | 15 | 3.0 |
| Number of snacks between meals | 2 and less | 253 | 50.6 |
| | 3 | 144 | 28.8 |
| | More than 3 | 103 | 20.6 |
| Frequency of having breakfast | Every day of the week | 457 | 91.4 |
| | Between 3-6 per week | 21 | 4.2 |
| | 2 or less per week | 22 | 4.4 |
| Type of food for breakfast | Cheese, olives, tomatoes, cucumbers, bread | 480 | 96.0 |
| | Other (<i>soup, pastry, pretzel, Turkish bagel, etc.</i>) | 20 | 4.0 |
| General type of food for main meals | Vegetables | 244 | 48.8 |
| | White meat | 103 | 20.6 |
| | Red meat | 83 | 16.6 |
| | Other (<i>dry legumes, pastry, etc.</i>) | 70 | 14.0 |
| Consumed type of desert | No sweets | 27 | 5.4 |
| | Pastries with sherbet | 258 | 51.6 |
| | Chocolate and wafers | 120 | 24.0 |
| | Milk puddings | 95 | 19.0 |
| Consumed bread type | White bread | 212 | 42.4 |
| | Flatbread, rolled dough bread, home baked bread | 212 | 42.4 |
| | Grain, rye, dark, whole wheat bread | 76 | 16.0 |
| | 1000 ml and below | 125 | 25.0 |
| Daily consumption of water | 1001 – 1800 ml | 217 | 43.4 |
| | 1801 ml and over | 158 | 31.6 |
| | Meat/fish restaurant | 252 | 50.4 |
| Preferred type of restaurant | Fast-food restaurant | 219 | 43.8 |
| | Restaurants with home cooking | 29 | 5.8 |

| Question | Answer | Number (f) | Percentage (%) |
|---|---------------------------------------|------------|----------------|
| Impact of emotional alteration on nutritional habits | No change | 92 | 18.4 |
| | I eat more than usually | 355 | 71.0 |
| | I do not eat or eat less than usually | 53 | 10.6 |
| Status of knowledge on the amount of protein contained by food | No | 380 | 76.0 |
| | Yes | 120 | 24.0 |
| Status of knowledge on the amount of vitamins contained by food | No | 385 | 77.0 |
| | Yes | 115 | 23.0 |
| Status of knowledge on the amount of fats contained by food | No | 412 | 82.4 |
| | Yes | 88 | 17.6 |
| Status of knowledge on the amount of sugar contained by food | No | 400 | 80.0 |
| | Yes | 100 | 20.0 |
| Status of knowledge on the amount of salt contained by food | No | 378 | 75.6 |
| | Yes | 122 | 24.4 |

Table 3. Descriptive statistics of demographical characteristics in association with the nutritional knowledge and nutritional habits in obese patients.

| Variables | | Interest in healtynutrition | | Regular diet | | Physical activity | | Food consumption speed | | Eating status during emotional alterations | | Nutritional knowledge $\bar{X} \pm SH$ |
|---------------------|--------------------------------------|-------------------------------------|----------------------------------|-----------------------------------|-------------------------------------|------------------------------------|-----------------------------------|-------------------------------------|--------------------------------------|--|--------------------------------------|---|
| | | Yes | No | Yes | No | Yes | No | Fast | Normal | Normal and less | More | |
| Gender | Male (%) | 20.5 | 79.5 | 1.4 | 98.6 | 23.3 | 76.7 | 69.9 | 30.1 | 61.6 | 38.4 | 1.91±0.28 |
| | Female (%) | 33.5 | 66.5 | 8.2 | 91.8 | 10.3 | 89.7 | 52.7 | 47.3 | 23.4 | 76.6 | 2.00±0.15 |
| | <i>Significance</i> | $\chi^2=4.832$ p=0.028* | | $\chi^2=4.349$ p=0.037* | | $\chi^2=9.811$ p=0.002** | | $\chi^2=7.432$ p=0.006** | | $\chi^2=44.240$ p=0.000*** | | t=2.295 p=0.022* |
| Marital status | Married(%) | 31.5 | 68.5 | 7.2 | 92.8 | 12.8 | 87.2 | 54.7 | 45.3 | 28.5 | 71.5 | 1.99±0.28 |
| | Single(%) | 33.3 | 66.7 | 6.7 | 93.3 | 3.3 | 96.7 | 63.3 | 36.7 | 36.7 | 63.3 | 1.92±0.15 |
| | <i>Significance</i> | $\chi^2=0.044$ p=0.833 | | $\chi^2=0.014$ p=0.907 | | $\chi^2=2.342$ p=0.126 | | $\chi^2=0.854$ p=0.356 | | $\chi^2=0.911$ p=0.340 | | t=1.206 p=0.228 |
| Educational level | Elementary school and under | 21.1 | 78.9 | 7.3 | 92.7 | 9.9 | 90.1 | 55.2 | 44.8 | 25.0 | 75.0 | 1.78±0.12 |
| | Secondary school | 13.9 | 86.1 | 6.3 | 93.7 | 13.9 | 86.1 | 45.6 | 54.4 | 26.6 | 73.4 | 2.05±0.11 |
| | High school | 52.8 | 47.2 | 8.1 | 91.9 | 8.1 | 91.9 | 53.7 | 46.3 | 33.3 | 66.7 | 2.20±0.09 |
| | University | 50.0 | 50.0 | 6.1 | 93.9 | 25.8 | 74.2 | 69.7 | 30.3 | 37.9 | 62.1 | 2.26±0.06 |
| <i>Significance</i> | $\chi^2=59.231$ p=0.000*** | | $\chi^2=0.383$ p=0.944 | | $\chi^2=14.579$ p=0.002** | | $\chi^2=8.690$ p=0.034* | | $\chi^2=5.676$ p=0.128 | | F=122.18 p=0.000*** | |
| Age | 25 and under | 29.3 | 70.7 | 12.2 | 87.8 | 2.4 | 97.6 | 61.0 | 39.0 | 24.4 | 75.6 | 2.08±0.39 |
| | 26 - 35 | 42.2 | 57.8 | 5.6 | 94.4 | 13.9 | 86.1 | 55.0 | 45.0 | 28.3 | 71.7 | 2.02±0.29 |
| | 36 - 45 | 28.3 | 71.7 | 7.1 | 92.9 | 14.2 | 85.8 | 54.3 | 45.7 | 32.3 | 67.7 | 1.97±0.31 |
| | 46 - 55 | 21.2 | 78.8 | 7.6 | 92.4 | 11.9 | 88.1 | 51.7 | 48.3 | 24.6 | 75.4 | 1.94±0.31 |
| | 56 and over | 26.5 | 73.5 | 8.8 | 91.2 | 8.8 | 91.2 | 64.7 | 35.3 | 41.2 | 58.8 | 1.96±0.27 |
| <i>Significance</i> | $\chi^2=16.456$ p=0.002** | | $\chi^2=2.428$ p=0.658 | | $\chi^2=4.962$ p=0.291 | | $\chi^2=2.423$ p=0.658 | | $\chi^2=4.697$ p=0.320 | | F=2.238 p=0.064 | |
| Settlement area | Village | 4.3 | 95.7 | 8.7 | 91.3 | 2.0 | 98.0 | 43.5 | 56.5 | 8.7 | 91.3 | 1.83±0.05 |
| | Town | 38.1 | 61.9 | 14.3 | 85.7 | 4.8 | 95.2 | 61.9 | 38.1 | 33.3 | 66.7 | 1.91±0.08 |
| | District | 20.0 | 80.0 | 3.3 | 96.7 | 8.9 | 91.1 | 55.6 | 44.4 | 22.2 | 77.8 | 1.95±0.06 |
| | City | 35.8 | 64.2 | 7.7 | 92.3 | 14.2 | 85.8 | 55.5 | 44.5 | 31.7 | 68.3 | 2.07±0.07 |
| <i>Significance</i> | $\chi^2=16.892$ p=0.001** | | $\chi^2=3.780$ p=0.286 | | $\chi^2=6.579$ p=0.087 | | $\chi^2=1.675$ p=0.643 | | $\chi^2=8.095$ p=0.044* | | F=82.18 p=0.000*** | |
| Employment status | Employed | 37.3 | 62.7 | 6.0 | 94.0 | 22.9 | 77.1 | 67.5 | 32.5 | 48.2 | 51.8 | 1.96±0.06 |
| | Housewife | 30.4 | 69.6 | 8.2 | 91.8 | 9.8 | 90.2 | 51.9 | 48.1 | 24.1 | 75.9 | 1.99±0.09 |
| | Other | 30.8 | 69.2 | 2.0 | 98.0 | 12.8 | 87.2 | 61.5 | 38.5 | 35.9 | 64.1 | 2.09±0.12 |
| <i>Significance</i> | $\chi^2=1.524$ p=0.467 | | $\chi^2=3.765$ p=0.152 | | $\chi^2=10.924$ p=0.004** | | $\chi^2=7.400$ p=0.025* | | $\chi^2=20.205$ p=0.000*** | | F=1.754 p=0.174 | |
| BMI | 35 and below | 40.2 | 59.8 | 11.6 | 88.4 | 18.0 | 82.0 | 43.4 | 56.6 | 36.0 | 64.0 | 2.10±0.03 |
| | 35.01 - 39 | 24.3 | 75.7 | 4.5 | 95.5 | 9.0 | 91.0 | 56.5 | 43.5 | 28.8 | 71.2 | 1.93±0.02 |
| | 39.01 and over | 29.1 | 70.9 | 6.0 | 94.0 | 8.2 | 91.8 | 59.7 | 40.3 | 19.4 | 80.6 | 1.91±0.04 |
| | <i>Significance</i> | $\chi^2=11.242$ p=0.004** | | $\chi^2=7.292$ p=0.026* | | $\chi^2=9.557$ p=0.008** | | $\chi^2=10.212$ p=0.006** | | $\chi^2=20.205$ p=0.000*** | | F=18.564 p=0.000*** |

4. Discussion

The results of this study contributed to the literature on evaluating the obesity in relation to the demographical characteristics, nutritional knowledge and habits among obese patients in Turkey. Our findings reveal that gender and marital status are significantly related to obesity among obese patients that 85.6% and 94% were female and married respectively. Conversely, the marital role has shown to be influencing fatness and obesity among men but not women in a study (Sobal *et al.*, 1992). Marriage is reported to give rise to a more regular life-style and energy intake (Kopelman and Stock, 2000; Gortmaker *et al.*, 2008). Among the obese patients, 91.8% were at the age of over 25 y. According to the Turkish Health Ministry report; BMI of ≥ 30 kg/m² has been defined as obesity whilst one quarter of Turkish men over 30 years of age (25.2%) and almost half of the women (44.2%) have been determined as obese (Anon, 2013). Association between obesity and age could in part be explained by various pregnancy related conditions considering the fact that most of patients to be female in this study. The hormonal and physiological changes incurring during pregnancy and tendency to gain weight as a result of lowered metabolic activity during menopause could be considered for woman (Martinez-Ros *et al.*, 2001). In addition, girls are reported to be more prone to get fat during adolescence than boys (Gortmaker *et al.*, 2008). This relation could also be explained by decrease in physical activity by age both in men and woman (Martinez *et al.*, 2001). Our data confirms the previous results (Delibasi *et al.*, 2007; Gültekin *et al.*, 2009; Ersoy and Imamoglu, 2006), on the higher prevalence of obesity among females compared to men in Turkey. As men have an inclination for physical activity they store excess energy as protein with positive energy balance and active muscle tissue metabolisms have a restrictive impact on gaining excess weight (Philip and Jones, 2010). Of note, among the female obesity, 88.5% were house wives in this study as also indicated by Ersoy and Imamoglu. Employed woman usually have higher educational level which affect their lifestyles, consumption choices and eating habits (Ersoy and Imamoglu, 2006). House wives seem to be inevitably under the risk of obesity as they live traditionally without regular physical activity. The level of education and low socio-economic status have been pointed out as risk factors in the development of obesity particularly for women (Martinez-Ros *et al.*, 2001; Ersoy and Imamoglu, 2006; Jacoby *et al.*, 2003; Fouad *et al.*, 2006). Significant inverse association was observed between employment status and obesity in this study that only 16.6% of obese patients were noted to be employed and 86.6% of participants claimed to get no sufficient and balanced nutrition. The economic accessibility is one of the most important factor influencing the food intake (Stefanikova *et al.*, 2006). Obesity is reported to be more prevalent in people of lower socio-economic groups who consume unbalanced, low-cost fast foods, that are low in essential nutrients and rich in fats, sugars and preservatives (Pinhas *et al.*, 2003). Education level less than university (86.8%) remained directly associated with the obesity in our study. Nevertheless, Sundquist and Johansson, (1998) (Sundquist and Johansson, 1998) stated that there is graded relationship between male educational status and BMI whereas only low educated woman were associated with higher BMI. With regard to physical activity, high prevalence of obese patients (87.8%) declared that they had no physical activity and this result is in keeping with those reported in another study indicating that physical activity of 2 h per week constitutes significant difference for man however more than 2 h per week for woman is inversely associated with obesity (Martinez-Ros *et al.*, 2001). A sedentary lifestyle is reported to be major factors for the development of obesity (Hills and McCutcheon, 1984). Most of obese patients declare that their weight gain started since birth and childhood suggesting that obesity is related to familial behaviors and habits which could serve as role models for healthy eating behavior of children. Parents have the critical role for shaping the family eating environment and constituting a model for child's early eating experience (Birch and Fisher, 1998). Children of less educated mothers and fathers tend to have higher BMI scores (Dubois and Girard, 2006). Besides, it is verified in a study that obese children are more likely to have impaired school performance (Mo-suwan *et al.*, 1999) which may be due to the chronic disease related to obesity. Almost half of the obese patients (48.8%) declared that they prefer vegetables for their main meals. This result may be contrasted with others reporting positive correlation between dietary patterns of high intake of fiber, fruit and vegetable and negative change in BMI (Newby *et al.*, 2004; Sa'nchez-Villegas *et al.*, 2006). However this unexpected association between the vegetable intake and obesity found in this study was also reported by Nyholm *et al.*, (2013) and might partly be attributed to the unhealthy type of cooking and use of different high fat dressings and sauces with vegetables. When level of water consumption is considered, an inverse relation was observed between the water consumption and obesity in this study that more than two third of patients (68.4%) stated to consume water below 1800 ml. It is considered that plain water should be promoted as the main source of fluids as no conclusive evidence is available for the effects of beverage consumption on obesity (Agostoni *et al.*, 2011). In this study, more than half of the obese patients (50.6%) stated to eat 2 or less

snacks between meals which is in same line with recent studies (Koletzko and Toschke, 2010; Lioret *et al.*, 2008) indicating that eating occasions between 4 and 6 times per day were negatively associated with BMI score. Fast eating was very common among the obese patients (55.2%) as also underlined in other studies indicating that eating fast increases the BMI (Spiegel *et al.*, 1991; Shigeta *et al.*, 2001 Sasaki *et al.*, 2003; Sugimori *et al.*, 2004). Very large part of the study group (92.8%) stated that they were not applying a regular diet under the supervision of a dietician. Besides we found unexpectedly positive correlation between obesity and having regular breakfast which is in contrast with the studies reporting that skipping breakfast to be the risk factor for obesity. It is stated that people who skip breakfast tend to have increased appetite and to prefer food higher in fat and energy density (Moreno *et al.*, 2010; Rampersaud *et al.*, 2005). Furthermore we observed that women versus men, urban dwellers versus those live in other areas, high school and university graduates versus those with a lower level of education and those with body mass indexes (BMI) of 35 and less had a higher general knowledge level regarding nutrition than the other groups. In addition high level of obese patients were living in urban areas compared to other settlements in this study in contrast to that found by Martinez-Ros *et al.*, (2001). Modernisation and economic growth can help improve standards of living and provide greater access to services, but may also contribute to deteriorating dietary patterns with a corresponding increase in the risk of diet-related diseases such as obesity (Knai *et al.*, 2007).

Emotional alterations seem to be effective on nutritional habits of patients that 71% of which declared to be eating more than usual. It was evident that housewives were more prone to increasing their food intake due to emotional alterations in comparison with the other professional groups in this study. Individuals who can not regulate their mood behaviorally (to do something they like etc.) were reported to more likely to eat when angry or depressed as a response to negative affects (Spence and Courbasson, 2012).

5. Conclusions

Obesity display rising trends in both developed and developing countries, and seems to continue to rise if not addressed. There is considerable health risks and costs related to obesity. Comparative national surveys should be carried out periodically to trace the actual food intake trend of population and to develop obesity prevention strategies. More complex measurement strategies must be taken into account at population level to monitor and control the obesity. Large scale surveys would increase the public and government awareness concerning the extend of the problem and would help to translate the knowledge into obesity control programmes. Obesity management policies should be focused on education of woman as they are the key figures to alter the nutritional status of the populations. Lowered energy intake and physical activity should be promoted by the national obesity control programs. Based on the risk factors, the relationships are complex and more research is needed to understand their overall influence on development of obesity.

Conflict of interest

None to declare.

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