■ Original article

# Evaluation of the relationship between lifestyle and body mass index in administrative employees of Bojnourd, Iran

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## Abstract

**Background and Purpose:** Lifestyle is defined as the unique behavioral patterns and habits of an individual. If lifestyle is imbalanced, risk of illnesses and burdensome events increases. Lifestyle plays a key role in the modulation of body mass index (BMI) and prevention of obesity. This study aimed to investigate the relationship between lifestyle and BMI in the administrative employees of Bojnourd, Iran in 2014.

**Materials and Methods**: This cross-sectional study was conducted on 380 government employees selected by stratified random sampling with proportional allocation in each stratum. Data were collected using prepared checklists and lifestyle questionnaires. Weight and height of subjects were measured using standardized methods. Data analysis was performed using descriptive statistics and Pearson's correlation coefficient in SPSS V.18.

**Results:** In this study, frequency of lifestyle was 4.58%, 52.48% and 42.94% in scoring scales of favorable, relatively favorable and unfavorable, respectively. Moreover, 6.6% of the subjects were underweight, 34.7% were normal, 36.1% were overweight, and 21.8% were obese. A significant correlation was observed between BMI and age (P=0.000), gender (P=0.03), physical exercise (P=0.04) and nutrition status (P=0.003) of the subjects.

**Conclusion:** According to the results of this study, lack of physical activity and improper diet are the most important causes of obesity among administrative employees. Therefore, modification of lifestyle should be mandatory in order to improve BMI and overall health of these individuals.

**Keywords:** Body Mass Index, Employees, Lifestyle

## Introduction

Lifestyle is defined as the behavioral patterns and habits of an individual, encompassing a wide variety of social values, beliefs and activities, and is considered essential in the promotion of health (1). In the modern world, most health issues, such as obesity, cardiovascular diseases, different cancers and addiction, depend on the lifestyle of the individuals in a society. Unhealthy lifestyle leads to the occurrence of chronic maladies, such as obstructive pulmonary disease, hepatic cirrhosis, peptic ulcer, acquired immune deficiency syndrome (AIDS) and cardiovascular disorders (2).

Health behaviors of an individual, such as physical exercise and proper diet, play a pivotal role in the prevention of different diseases and mortality. Today, major health nuisances are mostly resulted from chronic diseases caused by unhealthy personal behaviors (3). In January 2015, the World Health Organization (WHO) reported indiscreet lifestyle options to be the main cause of chronic diseases such

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as diabetes and some cancers, resulting in the early death of 16 million people across the world (4).

Factors such as inappropriate physical and social activities, smoking habits and unhealthy diet are directly associated with the lifestyle, which could lead to different diseases in an individual, ultimately affecting the health of a society (5). WHO defines lifestyle as the behavioral patterns, which are determined by personality traits, social relations, environmental factors and economic interactions of an individual (6).

Lifestyle has substantial effects on the physiology of an individual and is considered as the most influential factor in the occurrence of chronic diseases, such as colon cancer, obesity and the subsequent cardiovascular disorders, such as hypertension (7). In Iran, unhealthy lifestyle is known as the most important cause of life-threatening diseases and high rate of mortality (8).

Obesity is a hazardous condition, the rate of which has been alarming in different parts of the world. Obesity leads to various health consequences, including cardiovascular diseases and diabetes (9). Prevalence of obesity has been on a rising trend in the modern society due to the rapid changes in lifestyle, development of urbanization and increasing rate of administrative jobs, which involve limited physical activity. Furthermore, frequent consumption of fast foods has led to the high prevalence of obesity among people in developed countries (10).

Among other factors associated with obesity are genetic features, metabolic and psychological disorders, socioeconomic status, dietary habits and low physical activity (11). Recent studies have shown that the imbalance in calorie intake does not affect the rate of obesity as much as the dietary pattern and lifestyle (12).

According to previous studies, 60-80% of the population in most countries does not enjoy adequate physical activity proportional to their health (13). In China, prevalence of obesity among the residents of urban areas is reported to be 21.8%, while the rate of obesity caused by lack of physical activity is about 63.6% (14). According to the studies conducted in Iran, obesity due to lack of physical activity is prevalent among 62.5% of the individuals ageing

over 20 years in the city of Yazd (15). Moreover, rate of obesity and inactivity in Booshehr city has been reported to be 26.8% and 71.1%, respectively (16), and unhealthy lifestyle is the major cause of this issue.

Lifestyle has remarkable effects on health and disease prevention (17), and increasing prevalence of obesity and the subsequent chronic disorders could impose huge financial and psychological costs on a society (18). Due to the limited number of researches about the relationship between lifestyle and obesity, this study aimed to evaluate the relationship between lifestyle and body mass index (BMI) among the administrative employees engaged at the governmental departments of Bojnourd city, Iran.

## Materials and Methods

This cross-sectional study was approved by the Ethics Committee of the Research and Technology Department affiliated to Northern Khorasan University of Medical Sciences, Iran. Required sample size was estimated at 380 subjects using the results of previous studies and the following formula (8):

$$\left[ n = \frac{Z^2_{1-\alpha/2} P(1-p)}{d^2}, Z^2_{1-\alpha/2} = 3.84, P = 0.88, d^2 = 0.001 \right]$$

Study population consisted of all the individuals employed at the governmental departments of Bojnord city with minimum daily work shifts within the past three months. Informed consent was provided from all the subjects prior to participation.

In total, 60 governmental departments were identified in Bojnourd. Subjects were selected using simple random sampling, so that each department was considered as one category, and samples were selected from each of the departments. Data were collected using questionnaires consisting of demographic data and lifestyle information of the subjects. Questionnaires were composed of two parts; the first section included demographic data (e.g., age, gender, education status and marital status), and the second part focused on five aspects of lifestyle. These aspects were physical activity

and exercise, dietary patterns, smoking habits, stress management and adherence to general principles of health care and safety.

The lifestyle questionnaire was adopted from the U.S Health Institution Analysis of Lifestyle (13, 14), and the reliability and validity of the Persian version of this questionnaire has been determined by Samimi et al. In addition, validity of the lifestyle questionnaire was confirmed using qualitative content validity by a panel of experts, and the reliability was evaluated using Cronbach's alpha (0.90) (18).

Questions in the lifestyle survey were categorized into five sections, focusing on different aspects of lifestyle. Scoring was based on a four-point Likert scale, as follows: "always" (score: 4), "usually" (score: 3), "often" (score: 2), "sometimes" (score: 1), and "never" (score: 0). Level of lifestyle was calculated by summing up the total score of the questionnaire for each subject.

Lifestyle questionnaire included 9 questions about physical activity with the following score range: unfavorable (0-11), partly favorable (12-23) and favorable (24-36) (total score: 36). Additionally, 13 questions focused on dietary patterns with the following score range: unfavorable (0-17), partly favorable (18-35) and favorable (36-52) (total score: 52).

There were three questions about smoking habits

with the following score range: unfavorable (0-3), partly favorable (4-7) and favorable (8-12) (total score: 12). As for adherence to safety principles, measurement criteria were as follows: non-optimal (0-33.99%), partly optimal (34-67.99%) and optimal (68-100%). Regarding stress management, there were 11 questions with the following score range: non-optimal (0-14), partly optimal (15-28) and optimal (29-44) (total score: 44).

To measure the height and weight of subjects, a 0.1 cm accuracy ruler and Hamilton 0.01 accuracy digital scale were used, respectively. Validity of the scales was evaluated daily with 5 kg of control weight, and meter accuracy and precision were compared with a standard 100-cm ruler. Weight of the subjects was measured in comfortable clothes with no shoes (men wearing pants and shirt without jacket or overcoat, and women wearing uniform and trousers with no overcoat or any clothes on the uniform).

In this study, BMI of the subjects (i.e., weight in kilograms divided by the square of the height in meters) was calculated retrospectively and categorized using WHO cut-off points, as follows: normal (18.5-24.9), overweight (25-29.9) and obese ($\geq$30.0) (10). Before beginning the study, objectives of the research were explained to the participants. Data analysis was performed using descriptive statistics and Pearson's correlation coefficient in SPSS V.18.

## Results

In this study, the sample size consisted of 380 administrative employees (265 male, 115 female) within the age range of 23-62 years (mean age: 34.01±8.11 years). Demographic characteristics of the subjects are presented in Table 1. Obesity was observed in 22.4% of the subjects (Table 2). In addition, 6.8% of the subjects had smoking habits,

**Table 1.** Demographic Characteristics of Administrative Employees of Bojnord in 2014 (N=380)

|  |  | Mean | SD |
|---|---|---|---|
| Age (Year) |  | 34.01 | 8.11 |
| Height (M) |  | 1.66 | 0.08 |
| Weight (Kg) |  | 69.96 | 1.54 |
|  | Type | N | (%) |
| Gender | Female | 115 | 30.3 |
|  | Male | 265 | 69.7 |
| Marital Status | Single | 64 | 16.8 |
|  | Married | 316 | 83.2 |
| Education Status | Undergraduate | 82 | 21.6 |
|  | Under B.Sc. | 57 | 15 |
|  | B.Sc. | 187 | 49.2 |
|  | Post-graduate | 54 | 14.2 |
| Family Members | Under 3 | 213 | 56.1 |
|  | Up to 3 | 167 | 43.9 |
| Chronic Diseases | With Disease | 29 | 7.6 |
|  | Without Disease | 351 | 92.4 |

**Table 2**. Body Mass Index (BMI) of Administrative Employees of Bojnord in 2014 (N=380)

| BMI | Type | N | % |
|---|---|---|---|
| 18.5< | Underweight | 25 | 6.6 |
| 18.5-24.9 | Normal | 132 | 34.7 |
| 25-29.9 | Overweight | 137 | 36.1 |
| >30 | Obese | 86 | 22.6 |

**Table 3.** Prevalence and Score of Lifestyle Aspects in Administrative Employees of Bojnord in 2014 (N=380)

| Lifestyle Aspect | Optimal | Partly Optimal | Non-optimal |
| --- | --- | --- | --- |
| | Mean±SD | N (%) | N (%) | N (%) |
| Exercise | 11.93±1.29 | 75 (19.7) | 214 (56.3) | 91 (23.9) |
| Safety Principles | 26.17±5.05 | 1 (0.3) | 88 (23.2) | 291 (76.6) |
| Nutrition Status | 1.7±0.09 | 4 (1.1) | 215 (56.6) | 161 (42.4) |
| Stress Management | 75.71±1.49 | 6 (1.6) | 163 (42.9) | 211 (55.5) |
| Smoking Habits | 35.39±9.22 | 0 (0) | 317 (83.4) | 62 (16.3) |

93.2% consumed large portions of salt in their regimen, and 22.9% used animal fat in their diet.

On the other hand, 57.1% of the subjects had physical exercise for at least 15-30 minutes per week. Correspondingly, frequency of lifestyle was estimated to be 4.58% optimal, 52.48% partly optimal and 42.94% non-optimal, respectively (Table 3). Moreover, there was a statistically significant correlation between BMI and age (P=0.000, r=+0.85), gender (P=0.03), physical exercise (P=0.04, r=-0.3) and nutrition status (P=0.003, r=+0.43) of the subjects.

## Discussion

According to the results of this study, lifestyle of the majority of the studied subjects (52.48%) was at an average level. Regarding the relationship between BMI and lifestyle dimensions, our findings were indicative of a statistically significant relationship between physical exercise, dietary patterns and BMI. This is consistent with the findings of Najjar et al. (10) and Reiner (19), while the results obtained by Tonstad (20) and Goulart (21) are inconsistent with the findings of the present study. This discrepancy could be due to the differences in the age range and gender of subjects. In the aforementioned studies, subjects had high education status, and female subjects had more physical activity on a daily basis, while our study population consisted of office employees, regardless of their gender and educational status.

In the present study, no significant correlations were observed between BMI and smoking habits, stress management and adherence to safety principles, which is compatible with the findings of previous studies (10, 17); this could be attributed

to the age range of the studied subjects. However, our results were inconsistent with the findings of Borhani (22) regarding the correlation between BMI and smoking habits. This could be due to the age range of the subjects in the study by Borhani (adolescents over 18 years), and the findings could be a warning about the outbreak of smoking habits among adolescents. Therefore, authorities should be aware of this issue and the subsequent physical and social damages.

In the current study, evaluation of BMI indicated that 6.6% of the subjects were underweight, 34.7% were normal, 36.1% were overweight and 21.8% were obese. In general, it could be stated that the prevalence of obesity is rising steadily among the administrative employees engaged at the governmental departments of Bojnord city. In this study, lifestyle was reported to be fairly optimal in the majority of study subjects. Furthermore, analysis of the personal traits and lifestyle aspects of the subjects revealed a significant correlation between age, educational status and lifestyle. As such, individuals with higher education levels tended to avoid smoking and adhere to safety principles more than other people. This finding was consistent with the results obtained by Fallahi (17), Borhani (22) and Hearty (12). Therefore, it could be concluded that education status has a significant effect on the lifestyle of individuals.

In the present study, a significant relationship was observed between gender and lifestyle, which is in line with the findings of Bahrami (23), and indicates that women pay more attention to lifestyle principles and its dimensions compared to men. This could be due to the lower workload and social activities in women. On the other hand, we observed a

statistically significant correlation between lifestyle dimensions and occurrence of chronic diseases (e.g., hypertension). This finding is consistent with the results obtained by Farmanbar (24) and Bond (25); accordingly, smoking habits, lack of physical activity and inappropriate dietary patterns could lead to hypertension and other chronic diseases.

In the current study, a high percentage of the subjects were overweight or obese, and specific measures are required for eradicating this problem. According to the studies performed within the past 20 years in Iran, BMI and mean weight of the population have been increasing gradually. In other studies conducted until 2007, approximately 13.3-24.8% of the people have been reported to be overweight, while 7.7-8% suffer from obesity in different regions of the world.

In the present research, BMI had a statistically significant relationship with education status and gender of the subjects, which is compatible with the findings of Borhani (22), Hearty (12) and Kenford (26). Therefore, by furthering educational motivations, improving students' function and their recognition of the debilitating outcomes of unhealthy lifestyle, we could direct the BMI of different populations towards the normal index.

Unlike men, women tend to pay more attention to their physical condition through exercise and specific diets, which eventually maintain BMI at the ideal level. To some extent, this finding is compatible with different sources (27) that consider obesity (BMI≥30 kg.m²) as a critical factor behind the occurrence of secondary hypertension.

In general, pursuit of daily and ongoing exercises, especially at workplace, and following suitable diets by consuming less fat are the key elements in the prevention of overweight and obesity in different populations.

## Conclusion

In conclusion, it could be stated that healthy lifestyle results in better BMI; therefore, appropriate measures should be taken as to develop a healthy lifestyle in order to promote the well-being of a society through maintaining the optimal weight. The results of the current research can help health care providers and managerial departments to focus on the importance of lifestyle and plan for decreasing the prevalence of chronic diseases associated with unhealthy lifestyle.

## Conflicts of interest

There were no conflicts of interest in this study.

## Author's contributions

All authors participated in writing the scientific proposal, data collection and writing the manuscript. All authors read and approved the final manuscript.

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