

Prevalence of Noncommunicable Diseases' Risk Factors Among Secondary School Students in Eastern Iran in 2013

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Received 2015 November 02; Revised 2016 January 11; Accepted 2016 January 20.

Abstract

Background: Noncommunicable diseases (NCDs) are the main causes of mortality and disability in the world. In order for a campaign against NCDs' risk factors it is necessary to estimate the extent of their prevalence for their decrease through appropriate interventions.

Objectives: The aim of this study was to determine the prevalence of NCDs' risk factors among secondary school students in Birjand city, east of Iran.

Patients and Methods: In this cross-sectional study, 369 secondary school students aged between 15 - 20 years were selected using randomized cluster sampling in 2013. To gather data, the national health system questionnaire regarding NCDs with a stepwise approach was used. The data were derived by health trained workers through face-to-face interview, and physical assessments including height, weight, and blood pressure in every school. Finally, the obtained data were analyzed using the chi-square and Fisher's exact tests with the SPSS software version 18.

Results: From a total of 369 students in the study, 180 cases (48.8%) were boys with the mean age of 16.98 ± 1.04 years. The prevalence rates of cigarette, and hookah smoking were 2.4% and 18.4%, respectively. Overweight and obesity were diagnosed in 15.2% of the population. The prevalence of hypertension was observed in 6% of the participants. The prevalence rates of hookah smoking and hypertension in boys were significantly higher than in girls ($P < 0.05$). Moreover, it was found that low consumption rates of fruits and vegetables were 57.7% and 58.3%, respectively.

Conclusions: Generally speaking, the critical prevalence of NCDs' risk factors was observed. Regarding the more favorable effect of preventive measures on adolescents, planning for appropriate interventions to improve lifestyle to prevent various risk factors must be taken into account.

Keywords: Prevalence, Risk Factors, Chronic Disease, Adolescent, Iran

1. Background

Non-communicable diseases (NCDs) such as cardiovascular diseases, cancers, chronic respiratory diseases, psychological diseases, and diabetes are the main causes of mortality and disability in the world (1-3). Due to modernization of communities and technological advances, population density in urban regions, lifestyle changes, and inclination of people to unsuitable food and eating habits NCDs have vastly become prevalent today (4, 5).

Nowadays, NCDs cover 43% of diseases' burden over the world and it is likely that the burden reaches 60% to cause 73% of the total mortality by the year 2020 (6). A few of NCDs' risk factors including age, sex, and genetic characteristics are unchangeable but many risk factors are changeable; so that by their positive changes it is possible to reduce the occurrence of NCDs. Some mentionable items are hypertension, obesity, tobacco smoking, and inappropriate dietary habits (3, 7, 8).

Various studies have proved that preventing these risk factors has positive effects on decrease of NCDs and the mortality due to them; so that by ending specific factors in the life style over 80% of the mortality due to cardiovascular diseases and type II diabetes; and 40% of cancers mortality are preventable (9, 10). Most of NCDs' risk factors are precipitated in advance; i.e. since childhood and adolescence, and continue until adulthood. Thus, promoting the health of these age groups will be possible through preventing NCDs' risk factors in developing countries (11, 12). In order for a campaign against NCDs' risk factors it is necessary to estimate the extent of their prevalence in order to decrease them through appropriate interventions and effective steps would be taken aimed at promoting community's health.

2. Objectives

The present study was conducted to assess the prevalence of NCDs' risk factors among secondary school students in Birjand city, Iran, in 2013.

3. Patients and Methods

This cross-sectional (descriptive-analytical) study was conducted on all secondary school students, aged between 15 - 20 years who were studying in Birjand state secondary schools during autumn 2013. Through randomized cluster sampling, 369 cases were selected for the study according to the prevalence estimation formula (Equation 1) and Mohammadkhani's study results (13).

$$n = \frac{z^2 \times pq}{d^2} \quad (1)$$

The clusters were selected from 4 geographical regions (north, south, east and west) of Birjand city, which covered both boys' and girls' secondary schools. Then, considering the ratios of sex, class, and course of study, 2 secondary schools from each region (one boys' secondary school and one girls' school per region) and from each school, 3 classes were randomly selected. Before filling out the questionnaires in their own classrooms the researchers explained the aim of the study to the participants. In order to observe ethical considerations only volunteers were asked to participate in the study and, to add their trust, they were told that writing their names on the questionnaires was not obligatory. The ethics committee of Birjand University of Medical Sciences was approved the study (Ir.bums.139481).

Data collection was done by trained health workers through live interview and physical measurement at school using the national care system of NCDs questionnaire suggested by WHO, which dealt with risk factors by means of a stepwise approach. The first step covered demographic features of the subjects and the other steps included questions concerning dietary habits and tobacco smoking. Validity and reliability of the questionnaire, after matching with other studies (5, 6), gained an acceptable Cronbach's alpha.

A section of the questionnaire regarded physical measurements including height, weight, and blood pressure. These measurements were performed using the standard and the same means including a German Seca portable digital scale having a graded vertical bar to measure weight and height, and a German Riester mercury blood pressure kit. The weight of each subject was measured while he/she was bare-footed and had light clothes, taking a probable 100 g error. The height of each one was measured while the

subject was in an upright position and bare-footed, letting for a one centimeter error. Also, the blood pressure was measured while the subject was relaxed for 10 minutes using his/her right arm and the average of 2 measurements, made at intervals of 5 minutes, was used for analysis.

Body mass index (BMI) was calculated as weight in kilograms divided by the square of height in meters and classified according to the BMI percentile charts for age and sex from the world health organization (WHO, 2007) reference as underweight ($BMI < 5^{\text{th}}$ percentile), normal weight ($5^{\text{th}} \leq BMI < 85^{\text{th}}$ percentile), overweight ($85^{\text{th}} \leq BMI < 95^{\text{th}}$ percentile) and obese ($BMI \geq 95^{\text{th}}$ percentile) (14). The students were classified as hypertensive if their systolic or diastolic blood pressures were higher than the 95th percentile for age, sex and height from the national high blood pressure education program working group on high blood pressure in children and adolescents (15). Moreover, low consumption of fruits and vegetables was defined as intake of less than five servings of fruit or vegetable daily according to the WHO guidelines.

Finally, the obtained data were analyzed using descriptive statistics, and chi-square and Fisher's exact tests with SPSS version 18. P value < 0.05 was considered statistically significant.

4. Results

From a total of 369 participants in the study, 180 students (48.8%) were boys and 189 (51.2%) were girls. The students' mean age was 16.98 ± 1.04 years. Regarding the education level of their parents, most of their fathers (33.5%) and mothers (34%) had diplomas. As far as job is concerned, most fathers (41.2%) had nongovernmental jobs and a lot of mothers (79.4%) were housewives.

As for the students' nutrition, their mean consumption values for various foodstuffs, in a typical week, were as follows: fruits 6.7 ± 2.1 days, vegetables 5.4 ± 1.9 days, fish 1.1 ± 0.9 days, dairy products 6.3 ± 1.9 days, synthetic beverages 3.8 ± 2.1 days, and fast foods 1.7 ± 1.1 days. Their low consumption rates of fruits and vegetables, according to the WHO guidelines, were 57.7% and 58.3%, respectively.

The results showed that in 54.4% of the students' families unsaturated vegetable oil and frying oil were the main cookery oil but in 30.9% and 14.9% of the families saturated vegetable oil and other cookery oils were respectively the main ones.

Prevalence of cigarette smoking among the students was 2.4%, and according to Fisher's exact test, no significant difference was found between the two sexes ($P = 0.327$). Moreover, the prevalence of hookah smoking among the students was 18.4%; the chi-square results revealed that the

prevalence of smoking was significantly higher in boys than in girls ($P = 0.035$) (Table 1).

Table 1. Comparison of the Cigarette and Hookah Smoking Prevalence Rates Regarding Sex in the Students

| Variable | Gender ^a | | P Value |
|--------------------------|---------------------|------------|--------------------|
| | Boy | Girl | |
| Cigarette smoking | | | 0.327 ^b |
| Yes | 6 (3.3) | 3 (1.6) | |
| No | 174 (96.7) | 186 (98.4) | |
| Hookah smoking | | | 0.035 ^c |
| Yes | 41 (22.8) | 27 (14.3) | |
| No | 139 (77.2) | 162 (85.7) | |

^aThe values are expressed as No. (%).

^bFisher's exact.

^c $\chi^2 = 4.4$, degree of freedom = 1.

The mean BMI of the subjects was 20.9 ± 3.9 according to which 41.5% were underweight, 43.4% were normal weight, 10.3% were overweight, and 4.9% were obese. The results showed no significant difference in the mean BMI between the two sexes ($P = 0.371$) (Table 2). Mean systolic and diastolic blood pressure (BP) of the students were 110.5 ± 11.3 and 74 ± 8.1 mmHg, respectively. Hypertension prevalence was 6%, although the results of the current study showed that it was significantly higher in boys than in girls ($P < 0.001$) (Table 2).

5. Discussion

It was found that the prevalence of cigarette smoking among the students was 2.4%, which matched with Namakin et al. study (16) of boy secondary students in Birjand; however, it was less than that of cigarette smoking in most of the countrywide studies (13, 17). According to the studies on Pakistani (9) and Turkish (18) adolescents prevalence of cigarette smoking in them was more than that in ours. However, those studies concluded that cigarette smoking was significantly more prevalent in boys. The present study found no significant difference in the prevalence of cigarette smoking regarding sex.

Prevalence of hookah smoking among the students was notorious. This was due to the simple-minded attitude of their families and the community about this addiction and their lack of necessary knowledge about hookah smoking being more harmful than cigarette smoking. This phenomenon has led to adolescents' more bias in hookah smoking compared to the other.

Results of the current study showed that 6% of the students had hypertension which was at about the country-

wide average level, but it was higher than Moradmam et al. finding in their study (19), and lower than Azizi's result in his study (11.4%) (7). In fact, it was in accordance with the Hazreen et al. finding in Malaysia (20). Some studies on Turkish (21) and Brazilian (22) adolescents have respectively reported hypertension prevalence as 4.4% and 21.3%.

Various factors such as dietary differences, cultural habits, hormonal and psychological changes and genetics determine hypertension in different communities. Since hypertension during teenage predisposes individuals to the disorder during adulthood, periodic assessments to find hypertensive in order to make requisite interventions are necessary.

The present study revealed that hypertension in boys was significantly more; however, previous studies had reported various results (7, 20-22). More prevalence of hypertension during teenage may be due to anxiety, stress, and also hormonal changes resulting from puberty.

The prevalence of overweight and obesity in the subjects was 15.2%, which was similar to the results of Shahbazi et al. study (23) on secondary students in Yazd. Considering the results of Taheri et al. study (24) on secondary students in Birjand city, the prevalence of overweight and obesity has had a growing trend. The current study found that obesity, in comparison with countrywide studies, was less than Azizi's (7) finding, but more than that of Khodaveisi et al. (11).

Studies done on Brazilian (22), Malaysian (20), and Yemeni (25) adolescents have reported more prevalence of overweight and obesity in the first two but less prevalence in the third. Since the prevalence of overweight and obesity are the outcome of environmental and ecological factors, dietary habits, and economical status, the desert condition of the area and the relative low economical level can cause less prevalence of overweight and obesity. However, the growing trend of this disorder, as a notorious risk factor of NCDs, is worrying and demands planning and suitable intervention.

The current study found that, compared to dietary standards and various countrywide and foreign studies (4, 12, 23), consumption of dairy products, fish, fruits, and vegetables by the students was at a low level. Because of dietary factors have a significant role in the occurrence of NCDs, it is necessary to adopt various policies and make different interventions to improve students' dietary habits.

The most important limitations of the present study were its design which is cross-sectional, lack of cooperation on the part of a few students, and possibility of receiving unreal answers because of self-report questionnaires. Thus, it is suggested that future studies should be done on students in the other areas of the world together with paraclinical tests.

Table 2. Comparison of the Hypertension and Overweight/Obesity Prevalence Rates Regarding Sex in the Students

| Variable | Gender ^a | | Test Result | | |
|---------------------|---------------------|------------|-------------|----|---------|
| | Boy | Girl | χ^2 | df | P Value |
| Hypertension | | | 16.6 | 1 | < 0.001 |
| Yes | 20 (11.1) | 2 (1.1) | | | |
| No | 160 (88.9) | 187 (98.9) | | | |
| BMI status | | | 2 | 2 | 0.371 |
| Thin | 81 (45) | 72 (38.1) | | | |
| Normal | 72 (40) | 88 (46.6) | | | |
| Overweight/obese | 27 (15) | 29 (15.3) | | | |

^aThe values are expressed as No. (%).

Abbreviations: BMI, body mass index; df, degree of freedom.

Generally speaking, critical prevalence of NCDs' risk factors in the secondary school students was observable. Regarding the more favorable effects of preventive measures for adolescents, planning for necessary interventions to increase their knowledge aimed at their changing of behavior leading to a healthy life-style to prevent the risk factors must be taken into account.

Acknowledgments

We would like to express our sincere thanks to the research deputy of Birjand University of Medical Sciences, Birjand education office authorities, and all those kind ones who cooperated with us in the present study.

Footnotes

Authors' Contribution: Elaheh Yari and Amir Tiyuri designed the research. All authors contributed in data gathering, data analysis and preparing the manuscript.

Funding/Support: The present study was registered under the proposal coded 57.92 approved by research office of Birjand University of Medical Sciences, Birjand, IR Iran.

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