The correlation between educational levels and central obesity in the north of Iran: An epidemiologic study

Gholamreza Veghari[(1)], **Mehdi Sedaghat**[(2)], **Siavash Maghsodlo**[(2)], **Samieh Banihashem**[(2)], **Pooneh Moharloei**[(2)], **Abdolhamid Angizeh**[(2)], **Ebrahim Tazik**[(2)], **Abbas Moghaddami**[(2)]

Abstract

Original Article

BACKGROUND: The main aim of this study was to evaluate the association between educational levels and central obesity in northern Iran in 2010.

METHODS: This was a cross-sectional study carried out on 2428 subjects (1227 men and 1201 women) of 15-65 years of age who were chosen by cluster and stratified sampling methods. Subjects were randomly selected from 125 clusters and each cluster included 20 cases. Interviewers recorded the data using a multidimensional questionnaire comprising socio-demographic indexes.

RESULTS: Central obesity was seen in 34.8% of all subjects (15.9% male and 56.7% female) and in 15% of uneducated people. In the uneducated group, it was 20.0% and 31.1% higher than in the 1-9 years of schooling and high school or college educated groups, respectively (P = 0.001). The risk of central obesity increased in uneducated people (OR = 4.214, P = 0.001) and in people with 1-9 years of schooling (OR = 2.283, P = 0.001) compared with high school or college educated people. The risk of central obesity was higher in urban areas than in rural area (OR = 1.481, P = 0.001), in women than men (OR = 7.039, P = 0.001), in 40-65 year olds than 15-40 year olds (OR = 3.090, P = 0.001), and in the wealthy economic group than poor economic group (OR = 1.360, P = 0.013). The risk of central obesity increased in urban areas (OR = 2.266, P = 0.001) and the wealthy economic group (OR = 1.732, P = 0.001) after it was adjusted for education.

CONCLUSION: Central obesity as a health problem in northern Iran has been supported in this study, and it had an inverse correlation with educational levels. Public health programs that aim to reduce central obesity should mainly focus on the illiterate and low educated people.

Keywords: Education, Northern Iran, Adults, Central Obesity

Introduction

The World Health Organization has reported a rise in obesity worldwide reported by World Health Organization.[1] Moreover, it is known that central obesity is a major health problem in Iran, and in northern Iran.[2,3] The rate of central obesity was 9.7%-12.9% and 54.5%-63.7% among Iranian men and women, respectively.[4,5]

Waist circumference (WC) is used for central obesity classification and is associated with cardiovascular disease, stroke, and type 2 diabetes.[6,7]

Education is a multifaceted concept; some social and cognitive skills are learned through formal educational processes; reading and numeracy.[8] Some studies showed a significant correlation between socio-demographic factors and central obesity.[9-12] Some other studies approved the role of literacy skills in health education.[13,14]

Golestan province is located in the north of Iran (south east of the Caspian Sea). There are three ethnic groups of Fars-native, Turkman, and Sisstani in this area. Of the 1.6 million residents of this area, 66.39% are 15-64 years old, and 43.9% and 56.1% are living in urban and rural areas, respectively. Agriculture is the main occupation in rural areas of Golestan.[15]

Since, to our knowledge, no study has been conducted on the correlation between education and central obesity in northern Iran, this study was

1- Assistant Professor, Metabolic Disorders Research Center AND Department of Biochemistry and Nutrition, School of Medicine, Golestan University of Medical Sciences, Gorgan, Iran
2- Deputy of Health, Golestan University of Medical Sciences, Gorgan, Iran
Correspondence to: Gholamreza Veghari, Email: grveghari@yahoo.com

designed and established in this area. The main aim of this study was to evaluate the correlation between educational levels and central obesity in adults in northern Iran in 2010.

Materials and Methods

This was a cross-sectional study established on 2428 participants (1227 men and 1201 women) of 15-65 years of age who were chosen by cluster sampling. Subjects were randomly chosen from 125 clusters, each comprised of 20 cases. Family code of primary health center in villages, and postal code in towns were used to classify the subjects with equal proportion of age and sex. From each district, one team had been trained to complete the questionnaire and measure waist circumference. Interviewers recorded the data using a multidimensional questionnaire including socio-demographic indexes. Pregnant women and unwilling subjects were excluded from this study. This study was approved by the Ethical Research Committee and written consent forms were received from all participants.

Waist circumference was measured to the nearest 0.5 cm at the superior border of the iliac crest. Central obesity was defined based on the WHO classification; WC ≥ 102 cm and WC ≥ 88 cm in men and women, respectively.[16] The subjects were classified, based on their educational level, into three groups; uneducated, 1-9 years of schooling, and high school or college educated.

With regard to the Iranian social-economic circumstances, economic status was categorized based on the six facilities of separate bathroom, separate kitchen, vacuum cleaner, computer, separate freezer, and washing machine. The subjects gained one score for each facility. According to this list, the scoring of the economic status of the subjects in this study was as follows: poor ≤ 2 scores, moderate = 3-4 scores, and wealthy ≥ 5 scores.

Some confounder factors such as location of living, gender, age, and economic status were considered in this study.

SPSS for Windows (version 16; SPSS Inc., Chicago, IL., USA) was used for the statistical analysis, and chi-square was used to compare the frequencies. Logistic regression was applied to estimate the odds ratio (OR) of central obesity considering the educational level at 95% significant level. A P-value of less than 0.05 was considered as statistically significant.

Results

Mean and standard deviation of age and waist circumference were 39.21 ± 14.3 years and 88.7 ± 14.8 cm, respectively.

The characteristics of subjects and waist circumference distributions based on socio-demographic factors are presented in table 1. One in three of the subjects were in the uneducated group, 46.5% were living in urban areas, and 53.7% had a moderate economic status. Central obesity was seen in 34.8% of subjects (15.9% male and 56.7% female) (P = 0.001).

Central obesity was shown in half of the uneducated subjects and in one in three of those with 1-9 years of schooling. In the uneducated group, it was 20.0% and 31.1% higher than in the 1-9 years of schooling and high school or college educated groups, respectively (P = 0.001).

Central obesity had a higher prevalence in urban areas than rural areas (40.9% vs 31.9%) (P = 0.001), in 40-65 year olds than 15-40 year olds (23.6% vs 51%) (P = 0.001), and in the wealthy than other economic groups; while statistical differences were not significant (P = 0.214).

Among the uneducated subjects, the prevalence of central obesity in 40-65 year olds was 13.8% higher than in 15-40 year olds (P = 0.004). Compared with the uneducated group, the prevalence of central obesity was higher in the high school or college educated group (70.2% vs 32.8%). The prevalence of central obesity was higher in men than women in the uneducated group (16.6% vs 12.6%).

There was a direct and significant correlation between central obesity and the three economic status in the uneducated (P = 0.03) and 1-9 years of schooling groups (P = 0.001). However, this correlation was not significant in the high school or college educated group.

Results of logistic regression showed that in comparison with high school or college educated people, the risk of central obesity was higher in uneducated people (OR = 4.214, P = 0.001), and in people with 1-9 years of schooling (OR = 2.283, P = 0.001). The risk of central obesity was higher in urban areas than in rural areas (OR = 1.481, P = 0.001), in women than in men (OR = 7.039, P = 0.001), in 40-65 year olds than in 15-40 year olds (OR = 3.090, P = 0.001), and in the wealthy economic group than the poor economic group (OR = 1.360, P = 0.013). After adjusting education, the risk of central obesity increased in the urban area (OR = 2.266, P = 0.001) and in wealthy economic group (OR = 1.732, P = 0.001) compared with rural area and poor economic group, respectively (Table 2).

Table 1. Comparison of central obesity among three educational levels based on socio-demographic factors

Education level	Characters	Waist circumference (Cm) Mean ± SD	Central obesity (%)	P
Uneducated	Urban (238)	95.5 ± 14.9	153 (64.3)	0.001
	Rural (507)	91.5 ± 13.8	231 (45.6)	
1-9 years of schooling	Urban (396)	93.1 ± 15.3	194 (49.0)	0.001
	Rural (549)	85.6 ± 14.1	150 (27.3)	
High school and college	Urban (495)	86.4 ± 14.1	115 (23.2)	0.001
	Rural (243)	80.5 ± 12.6	33 (13.6)	
Uneducated	Men (259)	88.1 ± 12.5	43 (16.6)	0.001
	Women (486)	95.3 ± 14.5	341 (70.2)	
1-9 years of schooling	Men (501)	87.9 ± 14.5	93 (18.6)	0.001
	Women (444)	89.7 ± 15.7	251 (56.5)	
High school and college	Men (467)	85.8 ± 13.4	59 (12.6)	0.001
	Women (271)	82.3 ± 14.5	89 (32.8)	
Uneducated	15-40 Y (120)	89.4 ± 14.3	48 (40.0)	0.004
	40-65 Y (625)	93.4 ± 14.2	336 (53.8)	
1-9 years of schooling	15-40 Y (570)	84.8 ± 14.7	163 (28.6)	0.001
	40-65 Y (375)	95.0 ± 13.6	181 (48.3)	
High school and college	15-40 Y (547)	81.8 ± 12.7	81 (14.8)	0.001
	40-65 Y (191)	92.6 ± 14.2	67 (35.1)	
Uneducated	Poor (194)	92.1 ± 14.5	93 (43.9)	
	Moderate (429)	92.0 ± 14.3	215 (50.1)	0.030
	Wealthy (122)	96.4 ± 13.3	76 (62.3)	
1-9 years of schooling	Poor (230)	84.8 ± 13.9	65 (28.3)	
	Moderate (505)	89.3 ± 15.2	181 (35.8)	0.001
	Wealthy (210)	91.9 ± 15.2	98 (46.7)	
High school and college	Poor (141)	84.1 ± 14.3	32 (22.7)	
	Moderate (370)	83.1 ± 13.5	62 (16.8)	0.078
	Wealthy (277)	87.0 ± 13.9	54 (23.8)	
Uneducated (745)		92.8 ± 14.3	373 (50.1)	
1-9 years of schooling (945)		88.8 ± 15.1	332 (35.1)	0.001
High school and college (738)		84.5 ± 13.9	140 (19.0)	
Total (2428)		88.7 ± 14.8	845 (34.8)	

Table 2. Odds ratio (OR) of central obesity for educational levels with different socio-demographic factors using logistic regression (CI 95%)

| Variables	Crude OR (95% CI)	Education level adjusted OR (95% CI)
Educational level		
High school and college	Ref (1)	-
1-9 years of schooling	2.283 (1.828-2.850)	-
Uneducated	4.214 (3.352-5.269)	-
Location		
Rural	Ref (1)	Ref (1)
Urban	1.481 (1.256-1.747)	2.266 (1.883-2.727)
Gender		
Male	Ref (1)	Ref (1)
Female	7.039 (5.823-8.509)	6.239 (5.144-7.568)
Age groups (Year)		
15-40	Ref (1)	Ref (1)
40-65	3.090 (2.602-3.670)	2.249 (1.857-2.716)
Economic status		
Poor	Ref (1)	Ref (1)
Moderate	1.068 (0.868-1.316)	1.112 (0.896-1.380)
Wealthy	1.360 (1.067-1.733)	1.732 (1.342-2.236)

Ref: Reference
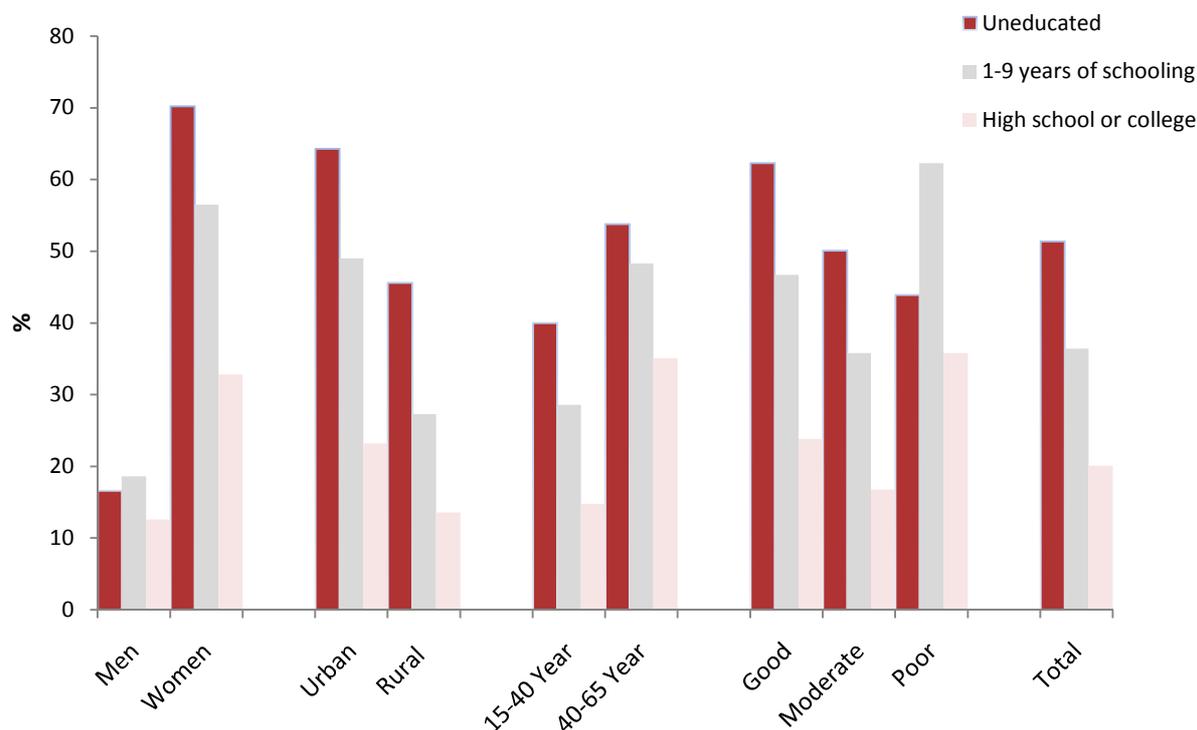
Figure 1. The comparison of central obesity based on three educational levels in adults in Northern Iran

The inverse correlation between central obesity and levels of education was significant (P = 0.001), but this correlation was not significant in men and poor economic status group. The lowest prevalence of central obesity was in the high school or college educated people in all cases (Figure 1).

Discussion

In the current study, central obesity was identified as a health problem in northern Iran, and its risk was higher in uneducated individuals than other groups.

We observed central obesity in 34.8% of adults. The prevalence of central obesity in Gorgan (north of Iran) was 39.1%, and in Ahvaz (south of Iran) 21.2%.[17,18] In the whole of Iran central obesity was reported in 12.9% and 54.5% of adult men and women, respectively.[4] The prevalence of central obesity was 36% in Spanish adults, 24.1% in Egypt, 35% in Canadian adults, and 31.5% and 64.4% in Omanian males and females, respectively.[16,19-21] Compared with other regions, the prevalence of central obesity in our study was high and should be considered as a serious health problem.

In the present study, decrease in the level of education was associated with an increasing

prevalence of central obesity. By adjusting confounder factors such as location, gender, age, and economic status this trend remained, except in men and in the wealthy economic status. The correlation between central obesity and socio-economic status was shown in some studies.[9-12] Inverse correlation between educational level and central obesity has been approved in many other studies.[4,22-24] Researchers believed that educational level has a greater effect on central obesity in women than men.[25-30]

In northern Iran, it was not clear why the effect of education on central obesity in men and women was not alike. It is known that northern women are mostly housewives and men, especially the uneducated, are farmers. Therefore, in men physical activity more than education increases abdominal circumference and it is necessary to be considered in further studies. Contrary to the high school or college group, the correlation between central obesity and economic status was significant in uneducated and low educated people. Health knowledge was strongly correlated to the level of education, and cardiovascular disease was controlled well in high educated subjects.[14,31,32] It seems,

literacy and knowledge have a major role in prevention and control of central obesity in adults in northern Iran, and illiteracy is a great risk factor for central obesity.

Iran as a developing country in the Middle East Region is considered to be in the nutrition transition phase.[33] Iran's socio-demographic factors have rapidly changed in the last decade. Non-communicable diseases, especially cardiovascular disease, are the major cause of death in Iran.[34] It is necessary to design a preventive program to control central obesity, especially in uneducated and wealthy people in urban areas in northern Iran.

A limitation of the present study is that we did not evaluate the influence of many socio-demographic factors on the correlation between education and central obesity; including religion, ethnicity, occupation, background disease, physical activity, and food behaviors. Other limitations were that we did not have an exact classification for economic status and educational levels.

Conclusion

This study showed that central obesity is a health problem in adults in northern Iran with an illiteracy risk factor, especially in wealthy families, and women. Public health programs should reduce central obesity by mainly focusing on low educated people.

Acknowledgments

Conflict of Interests

Authors have no conflict of interests.

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