Journal of
Babol University of Medical Sciences
JBUMS
e-ISSN: 2251-7170 p-ISSN: 1561-4107

Education and Control of Risk Factors for Cardiovascular Disease (CVD) in Elderly Patients with CVD in Amirkola

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Article Type

Short Communication

Received:
Jul 21st 2021
Revised:
Sep 18th 2021
Accepted:
Oct 16th 2021

ABSTRACT

Background and Objective: With increasing age, the burden of chronic diseases such as cardiovascular disease (CVD) increases. Education seems to be effective in controlling the risk factors for cardiovascular disease to prevent the disease and to control the disease after its development. The burden of cardiovascular disease and its associated risk factors is higher in people with low education. The present study was conducted to investigate the effect of education on the control of risk factors for cardiovascular disease in the elderly in Amirkola, northern Iran.

Methods: In this cross-sectional study, which is part of the Amirkola Health and Ageing Project, 356 elderly patients with confirmed CVD were studied. Risk factors for cardiovascular disease including body mass index, waist circumference, physical activity, systolic and diastolic blood pressure, blood cholesterol, blood triglycerides, HDL, LDL, smoking status and blood sugar were compared in illiterate and literate elderly.

Findings: Out of 356 elderly patients with CVD (177 males and 179 females), 223 patients (62.6%) were illiterate and 133 patients (38.4%) were literate. Patients did not differ significantly except for controlling the risk factor of low physical activity. Education was effective in controlling the risk factor of physical activity in patients with cardiovascular disease (OR=2.295, CI=1.228-4.289) and these people were more active (p=0.009). In addition, 59.87% of risk factors in the literate group and 58.33% of risk factors in the illiterate group were controlled, which did not show a significant difference.

Conclusion: The results of the study showed that except for low physical activity, other risk factors were not associated with literacy in the elderly with CVD.

Keywords: *Education, Risk Factors for Cardiovascular Disease (CVD), The Elderly*.

Cite this article: Hassanpour Jojadeh A, Ezoji Kh, Hosseini SR, Bijani A, Ghadimi R, Pourhadi S. Education and Control of Risk Factors for Cardiovascular Disease (CVD) in Elderly Patients with CVD in Amirkola. *Journal of Babol University of Medical Sciences*. 2022; 24(1): 119-26.

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Introduction

Aging is an inevitable phenomenon that begins gradually with the end of growth in all people, and as a result, the composition of the body changes and the efficiency of body decreases with age (1). According to the World Health Organization, the population over the age of 60 is growing much faster than other age groups in almost all countries (2). With increasing age, the burden of chronic diseases such as cardiovascular disease (CVD) also increases. Half of all people who experience a heart attack are over 65 years of age.

The prevalence and mortality of CVD vary according to demographic subgroup (e.g., by race or ethnicity), socioeconomic status (SES), and level of education. In people with lower education, the burden of CVD and its associated risk factors was higher (3-5). Thus, low education can become an important risk factor for death from ischemic heart disease over time (6). The effect of higher education level on prevention of CVD risk factors has been seen in adults (7) and there is evidence that lower education level has been associated with higher uncontrolled CVD risk factors (8).

Education seems to be effective in controlling the risk factors for CVD to prevent the disease and to control the disease after its development. In this study, the effect of education on controlling some behavioral and metabolic risk factors of CVD in the elderly of Amirkola was investigated.

Methods

In this cross-sectional study, which is part of the Amirkola Health and Ageing Project (9), after approval by the ethics committee of Babol University of Medical Sciences with the code IR.MUBABOL.HRI.REC.1398.133, 356 elderly people with CVD (coronary artery disease, stable angina, unstable angina) whose diagnosis was confirmed by their physician, were studied. These diagnoses included coronary artery disease, and stable and unstable angina due to coronary artery involvement, and one of these diagnoses was confirmed in the studied elderly patients.

Underlying variables such as age, gender, marital status and cardiovascular risk factors including systolic blood pressure and diastolic blood pressure, body mass index, waist circumference, physical activity, fasting blood sugar, blood cholesterol, blood triglyceride (TG), HDL (High-Density Lipoprotein), LDL (Low-Density Lipoprotein), and smoking were evaluated.

Target levels were defined for modifiable risk factors (10): controlled blood pressure <140/90 mmHg, controlled blood cholesterol <200 mg/dL, controlled blood triglyceride <150 mg/dL, controlled LDL <130 mg/dL, HDL greater than 40 mg/dL and controlled fasting blood sugar <126 mg/dL, desirable BMI <30 kg/m², and desirable waist circumference <95 cm (11).

PASE questionnaire (12) was used to calculate the level of physical activity. In this questionnaire, the level of physical activity of individuals has a score between zero and 400. In this questionnaire, physical activity above 150 points is considered desirable.

In this study, the risk factors of CVD in two categories of controlled and uncontrolled were compared between illiterate and literate groups of the elderly. Factors such as age and gender were also adjusted. Statistical analysis was performed using T-test and logistic regression by SPSS 17.0 (SPSS, Chicago, IL, USA) and $p<0.05$ was considered significant.

Results

In total, out of 404 elderly people in Amirkola, 356 patients with cardiovascular diseases including CHD, Stable Angina, Unstable Angina, which were approved by a doctor, were included in the study. Of these, 177 patients (49.7%) were male and 179 patients (50.3%) were female with a mean age of 68.9±6.86. These people were divided into two groups of illiterate people including 223 patients (62.6%) and literate people including 133 patients (37.4%) with primary, secondary, high school, high school diploma and higher education (Table 1). Out of 223 illiterate elderly people, 101 (45.3%) were male and out of 133 literate people, 76 (57.1%) were male (p=0.03).

Table 1. Demographic information of studied patients

Variables	n=356 Number(%)
Education	
Illiterate	223(62.6)
Primary	99(27.8)
Secondary	7(2)
High school	16(4.5)
University education	11(3.1)
Gender	
Male	177(49.7)
Female	179(50.3)
Marital status	
Married	289(81.2)
Non-married	67(18.8)

Out of 223 illiterate elderly people, 107 (48%) had controlled systolic blood pressure and out of 133 literate people, 61 (54.1%) had controlled systolic blood pressure. Considering p=0.699 and OR (Odds Ratio)=0.918 and CI (Confidence Interval) 0.597-1.413, there was no significant relationship between controlled systolic blood pressure and literacy. Moreover, all data were adjusted by age and gender and recalculated, but the relationship between these two variables was not significant (p=0.293, OR=0.782 and CI=0.495-1.236).

In the two groups of literate and illiterate people, the majority of people had controlled diastolic blood pressure, 176 (78.9%) in the illiterate elderly group and 97 (72.9%) in the literate elderly group had controlled diastolic blood pressure. However, considering p=0.196, OR=0.720 and CI=0.436-1.186, there was no significant relationship between uncontrolled diastolic blood pressure and literacy. Moreover, after adjusting the data with age and gender, the relationship between these two variables was not significant again (p=0.356, OR=0.781 and CI=0.462-1.321).

Differences between blood sugar, blood cholesterol, blood triglyceride, LDL, HDL in controlled amounts and lifetime smoking, desirable body mass index (BMI) and desirable waist size in the two groups of elderly were not statistically significant before and after adjustment with age and gender (Table 2). Out of 223 illiterate people, 25 people (11.2%) had desirable physical activity. Furthermore, out of 133 literate people, 28 people (21.1%) had desirable physical activity. Desirable physical activity in our study was

considered more than 150 points based on the PASE questionnaire. Although a high percentage of patients had undesirable physical activity, but considering p=0.12, OR=2.112 and CI=1.721-3.806, the relationship between desirable physical activity and literacy was significant. In addition, after adjusting with age and gender, this relationship is significant (p=0.009, OR=2.295 and CI=1.228-4.289) (Table 2).

Table 2. Comparison of risk factors for CVD in two groups of the elderly based on education level

Variable	Education level		Crude			Adjusted		
	Illiterate n=223	Literate n=133	OR	95% CI	p-value	OR	95% CI	p-value
	Number(%)	Number(%)						
Systolic blood pressure								
Uncontrolled	116(52)	72(54.1)	0.918	0.597-1.413	0.699	0.782	0.495-1.236	0.293
Controlled*	107(48)	61(45.9)						
Diastolic blood pressure								
Uncontrolled	47(21.1)	36(22.1)	0.720	0.436-1.186	0.196	0.781	0.462-1.321	0.356
Controlled*	176(78.9)	97(72.9)						
FBS								
Uncontrolled	68(30.5)	37(27.8)	1.138	0.708-1.829	0.593	1.141	0.694-1.875	0.603
Controlled*	155(69.5)	96(72.2)						
Chol								
Uncontrolled	80(35.9)	46(34.6)	1.058	0.675-1.659	0.806	0.901	0.553-1.468	0.676
Controlled*	143(64.1)	87(65.4)						
TG								
Uncontrolled	54(24.2)	23(17.3)	1.528	0.887-2.633	0.125	0.630	0.921-2.887	0.094
Controlled*	169(75.8)	110(82.7)						
LDL								
Uncontrolled	81(36.3)	54(40.6)	0.835	0.537-1.297	0.421	0.684	0.425-1.103	0.119
Controlled*	142(63.7)	79(59.4)						
HDL								
Uncontrolled	165(74)	89(66.9)	1.406	0.880-2.248	0.153	1.58	0.890-2.389	0.134
Controlled*	58(26)	44(33.1)						
Smoking experience								
Yes	35(15.7)	28(21.1)	0.698	0.402-1.212	0.200	0.959	0.487-1.890	0.904
No	188(84.3)	105(78.9)						
Current smokers								
Yes	9(4)	10(7.5)	0.517	0.205-1.308	0.157	0.744	0.259-2.134	0.582
No*	214(96)	123(92.5)						
BMI								
Undesirable	65(29.1)	29(21.8)	1.475	0.892-2.439	0.128	1.611	0.939-2.763	0.083
Desirable*	158(70.9)	104(78.2)						
Waist circumference								
Undesirable	139(62.3)	86(64.7)	0.904	0.578-1.414	0.659	1.079	0.671-1.737	0.753
Desirable*	84(37.7)	47(53.3)						
Physical activity								
Undesirable	198(88.8)	105(78.9)	2.112	1.172-3.806	0.012	2.295	1.228-4.289	0.009
Desirable*	25(11.2)	28(21.1)						

***Controlled blood pressure <140/90 mmHg, controlled blood cholesterol <200 mg/dL, controlled blood triglyceride <150 mg/dL, controlled LDL <130 mg/dL, HDL greater than 40 mg/dL and controlled fasting blood sugar <126 mg/dL, desirable BMI <30 kg/m², desirable waist <95 cm, desirable physical activity >150 points**

In the illiterate group, the mean value of risk factors of diastolic blood pressure (80.26±11.95 and 82.44±10.99), fasting blood sugar (125.12±48.76 and 117.48±39.40), blood cholesterol (187.85±42.70 and 187.21±52.58), triglycerides (158.71±66.20 and 148.03±55.24), LDL (117.56±38.03 and 119.70±36.51), BMI (27.64±4.28 and 27.59±4.24) were in the controlled range. Moreover, the mean value of risk factors of systolic blood pressure (142.94±22.41 and 143.82±20.38), HDL (38.34±4.66 and 38.51±3.69), physical activity (89.77±48.09 and 100.84±52.91) and waist circumference (96.78±10.06 and 96.94±9.71) were in the uncontrolled range in both groups. However, except for physical activity, the difference between the mean risk factors in the two groups was not significantly different in other risk factors (Table 3).

Table 3. Mean value of controlled risk factors and level of education in the studied patients

Variable name	Mean±SD	p-value	OR	95% CI
Systolic blood pressure				
Literate	143.82±20.38	0.710	2.375	- 3.789-5.553
Illiterate	142.94±22.41			
Diastolic blood pressure				
Literate	82.44±10.99	0.088	1.272	- 0.325-4.677
Illiterate	80.26±11.95			
Fasting blood sugar				
Literate	117.48±39.40	0.126	4.985	- 17.441-2.167
Illiterate	125.12±48.76			
Blood cholesterol				
Literate	187.21±42.58	0.890	4.673	- 9.837-8.546
Illiterate	187.85±42.70			
Blood triglycerides				
Literate	148.03±55.24	0.119	6.830	- 24.113-2.754
Illiterate	158.71±66.20			
HDL				
Literate	38.51±3.69	0.708	0.474	- 0.755-1.111
Illiterate	38.34±4.66			
LDL				
Literate	117.70±36.51	0.603	4.105	- 5.937-10.211
Illiterate	117.56±38.03			
Physical activity				
Literate	100.84±52.91	0.044	5.471	0.311-21.833
Illiterate	89.77±48.09			
BMI				
Literate	27.59±4.24	0.910	0.468	- 0.973-0.867
Illiterate	27.64±4.28			
Waist circumference				
Literate	96.94±9.71	0.889	1.088	- 1.989-2.292
Illiterate	96.78±10.06			

In general, 59.87% of the risk factors were controlled in the literate group and 58.33% of the risk factors were controlled in the illiterate group, indicating no significant relationship. Moreover, considering the higher percentage of literate men, risk factors were significantly more controlled in men compared to women (men 62.14 and women 55.71) (p=0.000).

Discussion

According to the results of this study, in 356 elderly patients with CVD participating in the first phase of Amirkola Health and Ageing Project, among the risk factors for cardiovascular diseases including cytological blood pressure, diastolic blood pressure, blood sugar level, blood cholesterol level, triglyceride level, LDL, HDL, BMI, smoking status, waist circumference and physical activity, except for physical activity level, there was no significant relationship between controlled risk factors, being desirable and being literate in other risk factors and there was no significant difference between the percentage of controlled risk factors in literate and illiterate people. There was a direct and significant relationship between the level of physical activity and the level of education in other studies, i.e., people with higher levels of education had higher levels of physical activity, which remained significant after adjusting age and gender (13).

One of the noteworthy results of this study was that the mean value of risk factors of diastolic blood pressure, fasting blood sugar, blood cholesterol, triglyceride, LDL, BMI were in the controlled range in both the illiterate and literate groups. Moreover, the mean value of risk factors of systolic blood pressure, HDL, physical activity and waist circumference were in the uncontrolled range in both groups. It seems that the elderly with CVD, probably because of their knowledge of the lethality of CVD and perhaps because of the proper training of their treating physicians, paid attention to controlling some risk factors regardless of having or not having education. Another result of this study also confirms this. The percentage of controlled risk factors in the two groups of literate and illiterate elderly was almost equal, and about 60% of risk factors were examined in both groups, which shows that the performance of the elderly with CVD in controlling the risk factors of this disease had nothing to do with literacy. In the present study, the number of smokers in both groups is generally low among the study population due to socio-cultural reasons and there was no significant relationship between smoking and education level.

A study by Dégano et al. (14) evaluated the relationship between education level and the incidence of CVD among individuals older than 35 to 74 years in three groups of primary education, high school education and university education within 6 years of study. Modifiable risk factors (diabetes, dyslipidemia, hypertension, smoking, body mass index and physical activity) were evaluated and it was concluded that education only affected the risk factors of hypertension, BMI and diabetes among CVD risk factors. This conclusion about the effect of education in controlling these three risk factors is consistent with our study. In another study conducted on adults in two groups with a low level of education (generally less than 9 years of education) and a high level of education (generally more than 9 years of education), patients with lower levels of education had higher uncontrolled risk factors, indicating significant differences in blood pressure control between the two groups (13). In another study among women with a mean age of 53 years in three levels of education, education was effective in controlling behavioral risk factors for CVD such as smoking, low physical activity, and body mass index (15). It seems that differences in categorization of people based on the level of education as well as age groups have led to differences in some cases compared to these studies.

According to the results of this study, risk factors were significantly controlled better in men compared with women. In addition to the impact of higher number of literate men in our subjects, some studies had similar findings (13).

One of the limitations of our study is not evaluating the effect of different levels of education based on years of study on the control of CVD risk factors. In addition, only the risk factors studied in the cohort study of the health of older people in Amirkola were included in this study. It is suggested that in future studies, the level of knowledge of these elderly people about the risk factors of CVD and other common non-communicable diseases, as well as the lifestyle of the elderly based on the level of education be evaluated.

According to our study, more than half of the cardiovascular risk factors were controlled in both groups of the elderly with CVD, and only the level of physical activity was significantly different between the literate and illiterate groups. It can be understood that people, regardless of their level of education, try to control the relevant risk factors after the onset of a serious disease such as CVD.

Acknowledgment

Hereby, we would like to thank the Vice Chancellor for Research and Technology of Babol University of Medical Sciences and the cooperation of all elderly people participating in this study.

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