Original Article

Estimation of Cardiovascular Disease Risk Factors in the Undefined Participants of Campaign in Isfahan in 2017

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Abstract

Background: The cardiovascular mortality rate in Iran has been reported 65% of all death recently. Despite the high prevalence of cardiovascular diseases (CVD) risk factors and its burden in developing countries, public awareness of CVD symptoms and its risk factors are very low, leading to poor control of these risk factors. **Methods:** Our study is a cross-sectional study that was conducted in an undefined sample of 163 individuals who participated in a public health campaign. We used a validated questionnaire containing demographic, cardiovascular history, family history, lifestyle (exercise, smoking, alcohol, and environment), stress, sleep, bowel toxicity, blood sugar, inflammation/pain, and diet parts for estimating total cardiovascular risk factor. **Results:** 52.7% of our participants were male. The mean age of our participants was 42.6 ± 47.27 years. Half of our participants (50.3%) were between 30 and 60 years. 12.3% of the participants were diagnosed with CVD. 12.8% were smokers and 25.8% were passive smokers. 73% of our participants had a high level of stress in their individual and work life. 35.5% of participants sleep less than 6 h per night. Half of them complained of initial or intermittent insomnia. 51.5% of our participants were at high or very high risk for CVD with three or more relative risks. There was a significant association between total cardiovascular risk and blood pressure, weight, sleep, and lifestyle in our population. **Conclusions:** More than half of our participants were on high or very high risk for CVD. The most common risk of CVD events in our participants is attributed to hypertension. Weight, sleep, and lifestyle were other modifiable risks that had a significant association with CVD in our study.

Keywords: *Cardiovascular diseases, risk factors, hypertension, life style, abdominal obesity*

Introduction

Cardiovascular disease (CVD) is one of the leading causes of death in developing and developed countries.[1] The cardiovascular mortality rate in Iran has been reported 65% of all death recently.[2] Similar to other developing regions of the world, the burden of disease in the eastern Mediterranean region (EMR) has changed from infectious diseases to noncommunicable diseases, including CVD.[3] There has been a dramatic increase in the risk of CVD in the EMR in the last three decades. The increased global cardiovascular risk could have some causes including dyslipidemia, diabetes mellitus, hypertension (HTN), higher body mass index (BMI), higher waist to hip ratio, or impaired physical fitness.[4] Significant risk factors in EMR include tobacco consumption, physical inactivity, depression, obesity, HTN, and diabetes. Many people in EMR are not aware of cardiovascular risk factors, and despite being threatened, they are not well-controlled.[3] Despite the high prevalence of CVD risk factors and its burden in developing countries such as the EMR, public awareness of CVD symptoms and its risk factors are very low, leading to poor control of these risk factors. The dramatic changes in lifestyle and the increase in cardiovascular risk factors require rapid interventions through public health management. Considering the increasing rate of CVD, we designed this study to assess the prevalence of cardiovascular risk factors and its associated total cardiovascular risk in the participants of "be kind with your heart" campaign (a heart health campaign) in Isfahan in 2017.

Methods

This cross-sectional study was conducted in May 2017 in a representative sample of 163 individuals, participated in "Be kind with your heart" campaign. All the participants

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live in Isfahan, the second-largest city in Iran and were not tourists or passengers. This campaign was held on "Tuesdays without cars" in Charbagh-e Abbasi (a walkway in Isfahan). We utilized a questionnaire[5] containing demographic, cardiovascular history, family history, lifestyle (exercise, smoking, alcohol, and environment), stress, sleep, bowel toxicity, blood sugar, inflammation/pain, and diet. Forward translation, backward translation, face validity, content validity, and calculating for Cronbach alpha were done under the supervision of experts. Each part of this questionnaire includes some questions with specified scores (negative or positive). Tables 1 and 2 show all of the data extracted from all parts of the questionnaire distinctly. Each risk factor got scores and categorizes in low, medium, and high risk [Table 3]. Tables 1 and 2 show all of the data extracted from all parts of the questionnaire distinctly. According to our questionnaire, the total CVD risk score is derived from the sum of all risk factors scores for each participant. Then, total cardiovascular score (−88 to 351 and above) categorize in low (−88–100 scores), moderate (101–220 scores), high (221–350 scores), and very high-risk (351 scores and above) groups. Negative scores show protective behaviors in participants. According to four categories on this questionnaire, those with low, moderate, high, and very high total cardiovascular risk have shown to have less than 1, 1–3, 3–5, and more than 5 relative risks, respectively. The clinical examination included waist circumference (WC) and blood pressure (BP), all taken by standard methods. In order to reduce the potential for variability in measurements, we hold a workshop before campaign trained our team (medical students who fill the questionnaire) and completing the questionnaire and measurements had done according to the checklists as the same. All instruments used for anthropometric measurements were standardized and calibrated before the examination. WC was measured to the nearest centimeter with the elastic-band meter in the standing position with arms extended and aligned with the body around the direct line that connects the lower costal margin and anterior–superior iliac spine at the end of normal expiration. BP was taken with a cuff size suitable for each subject on the right arm, on support, and in parallel with the heart of the participants, who had been asked to sit for 5 min and not smoked or consumed food for 20 min before the measurement. Systolic BP and diastolic BP were measured in mm Hg with a digital sphygmomanometer. The study project was approved by the ethics committee of Isfahan University of Medical Sciences, Isfahan, Iran (ethical number: IR.MUI.MED.REC.397164), and written informed consent was obtained from the participants. The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in *a priori* approval by the institution's human research committee. Initially, after obtaining written consent form from the individuals, questionnaires were completed by all subjects. Statistical analyses were performed using SPSS, version 20; for adjusting of confounders, we used models by univariate and multivariate logistic regression. In all analyses, statistical significance was considered under 0.05.

Results

52.7% of our participants were male. The mean age of our participants was 42.6 ± 47.27 years. Half of our participants (50.3%) were between 30 and 60 years. 12.3% of participants were diagnosed with CVD, atherosclerosis, previous heart attack, and/or previous stroke and 17.8% of them had angina within the last 3 months. 24.5%, 9.2%, and 26.4% of participants had a mother with CVD at less than 65 years of age, a father with CVD at less than 55 years of age, and parents with type II diabetes, respectively. 36.1% of our participants had a sedentary life (exercise less than once a week). 12.8% were smokers and 25.8% were passive smokers. Almost all (97.5%) reported an average of 0 drinks of alcohol daily and only 2.5% consumed an average of 1 or more drinks daily or 7 units per week. 19.6%

Table 1: Distribution of lifestyle and diet in our population

Variable	Categories	Frequency	Percentage
	Lifestyle		
Exercise	Sedentary moderate exercise less than once a week	59	36.1
	Moderate exercise (average once or more)	104	63.9
Smoking	Current smoker less than 20 cigarettes/day	18	11
	Current smoker more than 20 cigarettes/day	3	1.8
	Passive smoking	42	25.8
Alcohol	Average 0 drinks daily	159	97.5
	Average 1 or more drink daily or 7 units per week	4	2.5
Environment	Live on the main road	32	19.6
	Live in an industrial area with gas emissions	25	15.3
	Work with chemicals, cleaners, pesticides, petrochemicals, paints, exhausts	25	15.3
	Diet		
Diet	Low risk	102	62.6
	Medium risk	42	25.8
	High risk	19	11.6

Table 2: Distribution of psychological characteristics and health status

Variable	Categories	Frequency	Percentage
	Psychological characteristics		
Stress	Low risk	22	13.5
	Medium	22	13.5
	High	119	73
Participation in activities more than 1 h a week	Medication/prayer	90	55.2
	Yoga/stretching/relaxation exercise	17	10.4
	Community events/social activities/sports	60	36.8
	Play with pets	15	9.2
Anxiety	Weekly or more	118	72.4
Depression	Weekly or more	98	60.1
Irritability	Weekly or more	108	66.3
Sleep	Duration		
	0-6 h per night	58	35.5
	7 or more h per night	105	64.4
	quality		
	Snoring	56	34.4
	Obstructive sleep apnea	29	17.8
	Insomnia, difficulty falling asleep or interrupted sleep	82	50.3
	Health status		
Bowel toxicity	Gastrointestinal presentation (lower abdominal pain, gas, bloating, diarrhea, constipation, straining …)	68	41.7
	Time on antibiotics more than 2 months in the last year	7	4.3
	Taking the oral contraceptive pill for more than 6 months in the last year (in females)	5	6.49
Blood sugar	Dropping energy level within an hour of eating and/or craving for sweets and chocolate and/or headache or inability to concentrate which is relieved by eating	80	49.1
	Diabetes	16	9.8
SBP	130 or more	36	22.1
Waist circumference	Waist <94 cm in men or <80 in women	67	41.1
	Waist 95-101 cm in men or 81-88 in women	46	28.2
	Waist >102 cm in men or >88 in women	50	30.7

and 15.3% lived on the main road and in an industrial area with gas emissions. 15.3% worked with chemicals, cleaners, pesticides, petrochemicals, paints, and exhausts. 55.2% participated in medication/prayer activities; 10.4% participated in yoga/stretching/relaxation exercise; 36.2% participated in community events/social activities/sports, and 9.2% play with pets more than 1 h a week. [Table 1] 73% of our participants had a high level of stress in their individual and work life. 72.4%, 60.1%, and 66.3% perceived anxiety, depression, and irritability more than once a week, respectively. 35.5% of participants sleep less than 6 h per night. 34.4% and 17.8% had snoring and obstructive sleep apnea during sleep. Half of them complained of initial or intermittent insomnia. 41.7% of participants have gastrointestinal (GI) presentations (lower abdominal pain, gas, bloating, diarrhea, constipation, straining, etc.). 9.8% of participants had diabetes (it is self-reported). 22.1% had high systolic BP and 30.7% had WC more than 102 cm in men or 88 cm in women [Table 2]. 51.5% of our participants were at high or very high risk for CVD with three or more relative risks [Figure 1]. There was a significant association between total cardiovascular risk and BP, weight, sleep, and lifestyle in our population [Table 3].

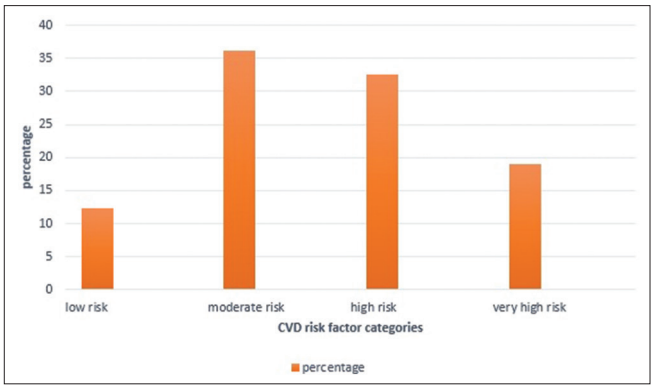

Figure 1: Distribution of total cardiovascular risk in our population

Discussion

Our study showed that the risk of CVD was pretty high in our society, although our samples were not randomly selected, the similarity of characteristics of samples with the general population shows that conclusions can be generalized. In our study, SBP >130 was the most significant risk factor associated with CVD risk. 22.1% of our participants had high systolic BP. This result agrees

Table 3: Association between categories of cardiovascular risk factor and total cardiovascular risk factor

Variables	Categories	Low or medium cardiovascular risk	High cardiovascular risk	*P* value	Odds ratio [CI 95%]
Lifestyle	Low or moderate risk (Ref**)	51 (54.8%)	42 (46.2%)	0.012*	3.16 (1.28-7.80)
	High or very high risk	28 (40%)	42 (60%)		
Stress	Low or moderate risk (Ref)	27 (61.4%)	17 (38.6%)	0.070	2.59 (0.924-7.306)
	High or very high risk	52 (43.7%)	67 (56.3%)		
Sleep	Low or moderate risk (Ref)	74 (54.4%)	62 (45.6%)	0.015*	5.004 (1.367-18.315)
	High or very high risk	5 (18.5%)	22 (81.5%)		
Bowel toxicity	Low or moderate risk (Ref)	73 (51%)	70 (49%)	0.078	2.43 (0.88-6.68)
	High or very high risk	6 (30%)	14 (70%)		
Diet	Low or moderate risk (Ref)	69 (48.6%)	73 (51.4%)	0.595	0.701 (0.18-2.59)
	High or very high risk	10 (47.6%)	11 (52.4%)		
Blood pressure	Low or moderate risk (Ref)	76 (54.2%)	63 (45.8%)	0.002*	9.647 (2.32-39.95)
	High or very high risk	3 (13%)	20 (87%)		
Weight	Low or moderate risk (Ref)	65 (57.5%)	48 (42.5%)	0.000*	7.320 (3.027-17.70)
	High or very high risk	14 (28%)	36 (72%)		

*$P<0.05$ is significant. **Ref: Reference

with the result of a national study among 69,722 Iranian adults aged 25–65 years that reported the prevalence of HTN was 19.8% in men and 26.9% in women.[6] As a recent review that evaluated CVD in Iran in the last 40 years, the highest risk of CVD events is attributed to HTN.[6,7] This result is inconsistent with our findings. More important is the challenge of a lack of awareness and uncontrolled high BP in Iran. One of two Iranian hypertensive patients is not aware of their HTN. All of these results indicate the importance of controlling high BP as a key factor in reducing the CVD risk in the Iranian population. Our finding demonstrated that abdominal obesity is the best predictor for assessing CVD risk after BP. Although we did not measure our participants' BMI, it seems that WC, alone, is a reliable indicator to predict CVD risk. Some studies, also believe that the risk for HTN and CVD might be better identified by obesity defined by a higher WC than a higher BMI.[8,9] In our study, insomnia was the most prevalent sleep problem (50.3%). In previous studies, the prevalence was reported in a range from 25.1% to 42%.[10,11] This may be due to differences in the definitions of insomnia, sex, and the age range of the participants across the studies. Our findings indicated that short sleep and poor quality of sleep are associated with CVD risk. Other studies also have reported associations between sleep disturbance and CVD risks.[8] Everding *et al*. reported that poor sleep quality was associated with worsened mental health but not with an increased risk for CVD.[12] However, short sleep duration and poor sleep quality were associated with higher incidences of CVD and coronary heart disease in civilian cohorts.[13] Most of the recent studies agreed with the association of sleep quality and quantity. Further study is needed to identify the mechanism and pathway of this association. Inconsistent with recent findings in other studies, there was a significant association between lifestyle and CVD risk factor in our study A recent prospective cohort study found a negative association between a healthy lifestyle score include traditional indicators of lifestyle habits (never smoking, physical activity, Mediterranean diet, BMI <22, and moderate alcohol consumption) with other factors not typically included in cardiovascular risk scores (television exposure <2 h/day, no binge drinking, taking a short afternoon nap, meeting up with friends more than 1 h/day, and working at least 40 h/week, and CVD risk.).[14] Also, not smoking, performing physical activity, and having a healthy diet are habits proposed by the American Heart Association to improve cardiovascular health.[15] There is no significant association between stress and CVD risk factors in our study. However, the prevalence of psychological disorders (anxiety, depression, and irritability) in our population was more than 50%. Chilunga *et al*. indicated that stress at work and the home was not associated with a high estimated CVD risk in either migrant or nonmigrant group in Ghanaians livings in Europe and Africa, while recent negative life events and perceived discrimination were associated with a high estimated CVD risk in nonmigrants and migrants, respectively.[16] These results are in contrast with other studies that imply mechanisms by which psychosocial factors increase the risk of myocardial infarction.[17,18] In other studies, depression and anxiety had been related to CVD, while, the association between depression, anxiety, and CVD was complex, and the mechanisms linking them had not been fully elucidated.[19] It seems that further research is needed to identify associations between psychological characteristics and CVD risk.

In our study, GI presentation was reported in 41.7% of our participants, and the participants reported using antibiotics more than 2 months a year was 4.3%, but there was no significant association between bowel toxicity (include GI presentation and antibiotic or oral contraceptive pill use) and CVD risk. Recent studies showed that

cardiovascular complications of gastrointestinal diseases are more prevalent than thought before. The association of gastroesophageal reflux disease and atrial fibrillation, primary gastrointestinal infections, and cardiovascular involvement, inflammatory bowel disease, coronary artery disease, cirrhosis, and cardiomyopathy had shown in recent studies.[20] Also, Heianza *et al*. examining the antibiotic use in different life stages showed that longer duration of exposure to antibiotics in the middle and older adulthood was related to an increased risk of future CVD events among elderly women.[21] It might be because of the gender or age variation between studies and the small sample size of our study, even though more studies are still needed to determine this association. Despite the strong association between diet and CVD risk in previous studies,[22,23] there was no significant association between diet and CVD in our study. It might be because of the healthy and low-risk diet for CVD in 62.6% of our participants. We had some limitations in reporting the association of inflammation and pain and blood sugar with CVD because of the small sample size. We had no positive reported data in these categories. First and foremost, among the limitations of this study was its use of self-report measures. We had no information about laboratory-based risk factors in our study. Also, the small sample size is another drawback of note. Second, this study is restricted to the participants of a public health campaign, which limits the generalization of the results to the general population. This restriction may underestimate risk factors. Third, most participants were aware of their health and voluntarily participated and mostly had a regular exercise in their individual schedules.

Conclusions

In conclusion, the highest risk of CVD events in our participants is attributed to HTN. Weight, sleep, and lifestyle were other modifiable risks that had a significant association with CVD in our study. Therefore, planning and implementing strategies for prevention and control of these modifiable risk factors should get on the top of the ministry of health agenda more than before, in the future. Health promotion strategies to prevent and control CVD risk factors, especially those mentioned above, early detection of disease and making people aware of their health are essential elements for reducing the burden of CVD in Isfahan.

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Conflicts of interest

There are no conflicts of interest.

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References

1. Ingaramo RA. Obesity, diabetes, and other cardiovascular risk factors in native populations of South America. Curr Hypertens Rep 2016;18:9.
2. Rallidis LS, Lekakis J, Kolomvotsou A, Zampelas A, Vamvakou G, Efstathiou S, *et al*. Close adherence to a Mediterranean diet improves endothelial function in subjects with abdominal obesity. Am J Clin Nutr 2009;90:263-8.
3. Turk-Adawi K, Sarrafzadegan N, Fadhil I, Taubert K, Sadeghi M, Wenger NK, *et al*. Cardiovascular disease in the Eastern Mediterranean region: Epidemiology and risk factor burden. Nat Rev Cardiol 2018;15:106-19.
4. Kazemi T, Hajihosseini M, Moossavi M, Hemmati M, Ziaee M. Cardiovascular risk factors and atherogenic indices in an Iranian population: Birjand East of Iran. Clin Med Insights Cardiol 2018;12:1179546818759286.
5. Clinic SN, Life S. Cardiovascular Risk Assessment Questionnaire. 2015.
6. Sarrafzadegan N, Mohammadifard N. Cardiovascular disease in Iran in the last 40 years: Prevalence, mortality, morbidity, challenges and strategies for cardiovascular prevention. Arch Iran Med 2019;22:204-10.
7. Sarrafzadegan N, Talaei M, Sadeghi M, Kelishadi R, Oveisgharan S, Mohammadifard N, *et al*. The Isfahan cohort study: Rationale, methods and main findings. J Hum Hypertens 2011;25:545.
8. Ham OK, Kim J, Lee BG, Choi E. Behavioral characteristics and cardiovascular disease risks associated with insomnia and sleep quality among middle-aged women in South Korea. Res Nurs Health 2017;40:206-17.
9. Sadeghi M, Talaei M, Gharipour M, Oveisgharan S, Nezafati P, Sarrafzadegan N. Anthropometric indices predicting incident hypertension in an Iranian population: The Isfahan cohort study. Anatol J Cardiol 2019;22:33-43.
10. Cho HS. Study on female's sleeping pattern and the sleeping disorder factors. Unpublished master's thesis, Ewha Womans University, Seoul. 2002.
11. Cuadros JL, Fernández-Alonso AM, Cuadros-Celorrio ÁM, Fernández-Luzón N, Guadix-Peinado MJ, del Cid-Martín N, *et al*. Perceived stress, insomnia and related factors in women around the menopause. Maturitas 2012;72:367-72.
12. Everding B, Hallam JE, Kohut ML, Lee DC, Anderson AA, Franke WD. Association of sleep quality with cardiovascular disease risk and mental health in law enforcement officers. J Occup Environ Med 2016;58:e281-6.
13. Hoevenaar-Blom MP, Spijkerman AM, Kromhout D, van den Berg JF, Verschuren W. Sleep duration and sleep quality in relation to 12-year cardiovascular disease incidence: The MORGEN study. Sleep 2011;34:1487-92.
14. Díaz-Gutiérrez J, Ruiz-Canela M, Gea A, Fernández-Montero A, Martínez-González MÁ. Association between a healthy lifestyle score and the risk of cardiovascular disease in the SUN Cohort. Rev Esp Cardiol (Engl Ed) 2018;71:1001-9.
15. Goff DC, Lloyd-Jones DM, Bennett G, Coady S, D'Agostino RB, Gibbons R, *et al*. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: A report of the American college of cardiology/American heart association task force on practice guidelines. J Am Coll Cardiol 2014;63:2935-59.
16. Chilunga FP, Boateng D, Henneman P, Beune E, Requena-Méndez A, Meeks K, *et al*. Perceived discrimination and stressful life events are associated with cardiovascular risk score in migrant and non-migrant populations: The RODAM study. Int J Cardiol 2019;286:169-74.

17. Kaplan JR, Pettersson K, Manuck S, Olsson G. Role of sympathoadrenal medullary activation in the initiation and progression of atherosclerosis. Circulation 1991;84 (6 Suppl):VI23-32.
18. von Känel R, Mills PJ, Fainman C, Dimsdale JE. Effects of psychological stress and psychiatric disorders on blood coagulation and fibrinolysis: A biobehavioral pathway to coronary artery disease? Psychosom Med 2001;63:531-44.
19. Yuenyongchaiwat K, Baker IS, Sheffield D. Symptoms of anxiety and depression are related to cardiovascular responses to active, but not passive, coping tasks. Braz J Psychiatry 2017;39:110-7.
20. Martins JC, Mendes LS, Durães SR. Cardiovascular complications of gastrointestinal diseases. CCCM 2015;102:1-4.
21. Heianza Y, Zheng Y, Ma W, Rimm EB, Albert CM, Hu FB, *et al*. Duration and life-stage of antibiotic use and risk of cardiovascular events in women. Eur Heart J 2019;40:3838-45.
22. Dahm CC, Chomistek AK, Jakobsen MU, Mukamal KJ, Eliassen AH, Sesso HD, *et al*. Adolescent diet quality and cardiovascular disease risk factors and incident cardiovascular disease in middle-aged women. J Am Heart Assoc 2016;5:e003583.
23. Whitton C, Rebello SA, Lee J, Tai ES, van Dam RM. A healthy Asian a posteriori dietary pattern correlates with *a priori* dietary patterns and is associated with cardiovascular disease risk factors in a multiethnic Asian population. Nutr J 2018;148:616-23.