Original Article

Association between Dietary Inflammatory Index and Risk of Cardiovascular Diseases Among Firefighters

Abstract

Background: Diet has an important role in systemic inflammation and development of cardiovascular diseases (CVD). Dietary Inflammatory Index (DII) is a new tool for evaluating the inflammatory potential of the diet. Firefighting is one of the most important occupations with stressful situations and high rates of CVD. In this study, we aimed to investigate the association between dietary inflammatory index (DII) and risk of cardiovascular diseases (CVD) among firefighters. **Methods:** Two hundred and seventy-three male firefighters aged 18–50 years in various regions of Tehran participated in this cross-sectional study. Assessment of anthropometric, blood pressure, and biochemical parameters including glucose, total cholesterol, triglyceride, high-density lipoproteins (HDL-C), low-density lipoproteins (LDL-C), aspartate aminotransferase (AST), alanine aminotransferase (ALT), and high-sensitivity C-reactive protein (hs-CRP) was done in all firefighters. A validated semi-quantitative questionnaire (168 items) was used for assessment of DII. **Results:** HDL (P-value = 0.03) and hs-CRP (P-value = 0.05) were significantly higher in third tertile of DII scores than first. After adjustment for confounding factors, there was no significant difference in means (P-value >0.05). The association between DII and hs-CRP was not significant (P-value >0.05). **Conclusions** Participants in higher DII scores intake less polyunsaturated fatty acids (PUFAs), monounsaturated fatty acids (MUFAs), eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and some antioxidant. The association between hs-CRP and DII was not significant among firefighters.

Keywords: *Cardiovascular diseases, diet, firefighters, inflammation*

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Introduction

Cardiovascular disease (CVD) is currently a major cause of global mortality worldwide.[1] Several studies have been identified inflammation as the main cause of CVD. Inflammation is a pathophysiologic basis for many metabolic diseases. Some biomarkers such as C-reactive protein (CRP) or high sensitivity C-reactive protein (hs-CRP) determine the inflammatory status.[2-4] Inflammation results from repetitive injuries, trauma, heat, sleep disorders, and unhealthy diet.[5,6] It is estimated that having a healthy lifestyle can reduce more than 40% of early death due to CVD.[7]

Dietary Inflammatory Index (DII) is a new tool for evaluating the inflammatory potential of the diet based on the pro-inflammatory or anti-inflammatory properties of various dietary components.[8] Proinflammatory diet with high DII scores contains high intake of saturated fats (SFA) and refined carbohydrates, low consumption of polyunsaturated fatty acids (PUFA), flavonoids, and other anti-inflammatory food components, but a healthy diet with low DII scores includes vegetables, fruits, fish, olive oil, low intake of saturated fat and sugars that leads to reduce level of inflammation and risk of CVD.[9,10] In previous studies, the association between DII and some inflammatory markers such as CRP and hs-CRP, that indicate the risk of chronic diseases including metabolic syndrome and CVD, has been investigated and confirmed.[11-15]

Firefighting is one of the most important occupations with stressful situations, exposure to heat (smoke and fire) and chemical hazards, trauma, depression, and sleep disorders. Therefore, Firefighters experience more job losses and mortality due to cardiovascular diseases than people in other professions.[16,17] Food habits in firefighters are significantly different

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from other people, they usually consume fast foods with high-calorie content and intake less vegetables, fruits, nuts, and fish. Some factors such as shift work and sleep disorders affect their dietary pattern.[18]

Considering the importance of firefighting in society, special work circumstances that increase risk of CVD in firefighters, and role of diet in modulating inflammation, we aimed to investigate the association between DII and CVD risk for developing this hypothesis that occupational conditions are associated with DII.

Methods

Ethical considerations

The study protocol was confirmed by Ethics Committee of Tehran University of Medical Sciences (IR.TUMS.VCR.REC.1396.3986). Participants filled out consent form for enrolling in the study. All collected information from the subjects at each stage of investigation were confidential. Participants could quit the study any time for any reason.

Sample size and participants

Cluster sampling was used in this study and regions of Tehran were considered as clusters. A cluster was selected among them and then fire stations were randomly sampled in selected area. This type of sampling could prevent selection bias in our study. Considering type 1 error (95% confidence interval), the 20% prevalence of cardiovascular diseases in Iranian adult population,[19] and 10% drop rate, sample size was calculated 270 subjects. Male firefighters aged 18–50 years were eligible for the study. The exclusion criteria were chronic and metabolic diseases, psychological disorders, food allergy, and diet adherence.

Data collection

Anthropometric data and blood pressure

The weighing scale (Omron BF511, Omron, Germany) was placed on flat surface. Participants removed heavy cloths and shoes for measuring weight. The height of participants was measured by stable stadiometer scale (Seca®, Hamburg, Germany). Body fat, abdominal fat, visceral adipose tissue, and lean body mass were measured by body analyzer (Omron BF511, Omron, Germany). For measuring blood pressure, we used Omron M3 Blood pressure monitor (Omron M3 IT, Omron, Germany).

Laboratory data

Blood samples were taken after overnight fast and frozen in –70° Celsius. Biochemical tests including glucose, total cholesterol, triglyceride, high-density lipoproteins (HDL-C), low-density lipoproteins (LDL-C), aspartate aminotransferase (AST), and alanine aminotransferase (ALT) were determined using colorimetric assay kits (Parsazmoon, Karaj, Iran) and automatic biochemistry analyzer (Biotecnica, BT1500, Rome, Italy). High sensitivity C-reactive protein (hs-CRP) was measured by turbidimetric method (used kit from Parsazmoon, Karaj, Iran). All tests were performed in laboratory of the Nutrition Faculty, Tehran University of Medical Sciences.

Cardiovascular diseases risk assessment

The risk of cardiovascular diseases in firefighters was determined using Framingham Risk Score based on age, cholesterol, HDL, systolic blood pressure, smoking, and diabetes.[20]

Dietary inflammatory index assessment

A validated semi-quantitative questionnaire (168 items) was used for assessment of Dietary inflammatory index.[21] The DII was scored for 45 food items by multiplying the overall inflammatory effect score in the amount of each food component in diet. The higher scores indicate pro-inflammatory and inflammatory food components and lower scores anti-inflammatory food components. We evaluated DII scores for 29 food items including energy, carbohydrate, fat, protein, dietary fiber, omega-3 fatty acids, omega-6 fatty acids, monounsaturated fatty acids, polyunsaturated fatty acids, saturated fatty acids, trans-fatty acids, cholesterol, vitamin A, thiamine, riboflavin, niacin, vitamin B6, folate, vitamin B12, vitamin C, vitamin D, vitamin E, beta-carotene, magnesium, Zinc, iron, selenium, onion, and garlic. Then the calculated scores were collected in each diet and divided into 100 for statistical analysis.[8]

Physical activity assessment

International Physical Activity Questionnaire - Short Form (IPAQ-SF) was used to assess physical activity. This questionnaire includes four questions about frequency and duration (minutes) of severe and moderate physical activity, walking, and sitting in last 7 days. Activities that lasted less than 10 minutes continuously were not included. The physical activity score is calculated as the metabolic equivalent (MET min/week). The duration of sitting was not calculated in physical activity score. To calculate the severity of the physical activity, multiply the average and the number of days in the exact (daily) time period, and then, in the order of 8, 4, and 3/3, respectively, to achieve the MET/min/week for each activity.

Statistical analysis

Collected data were analyzed using SPSS package version 23 (SPSS Inc, Chicago, Illinois, USA) and Food Processor Nutrition Analysis Software (DFP). Kolmogorov-Smirnov test and histogram curve were used to check the normality of variables. For comparing mean ± standard deviation of the quantitative variables based on the risk of cardiovascular disease (CVD) (comparison between subjects with CVD and without CVD), we used Independent Samples t test. One-way ANOVA was used to compare quantitative variables in participants based on DII scores. The differences of participants in DII scores was assessed by Post-hoc analyses. The analysis of qualitative variables based on the risk of CVD was done using Chi-square test. ANCOVA test was used to analyze the quantitative variables based on CVD risk factors and DII scores, which was adjusted the total energy intake. To investigate the association between DII and the risk of CVD, multiple logistic regression analysis was used in four models. The results of logistic regression analysis were reported as Odds Ratio with confidence interval (95% CI). Also, linear regression analysis was used to assess the relationship between DII scores and hs-CRP in three models. Probability value less than 0.05 was considered significant.

Results

Two hundred and seventy-three male firefighters aged 19–74 years old participated in the study. The mean age of participant was 33.99 ± 6.34. As shown in Table 1, the means for BMI, Abdominal fat, and Lean body mass were 25.94 ± 2.92, 8.57 ± 3.28, 38.12 ± 4.4, respectively. Baseline laboratory parameters were reported in Table 1. Baseline systolic and diastolic blood pressure were 119.82 ± 11.77 and 78.1 ± 9.96, respectively [Table 1]. Quantitative and qualitative variables of subjects were analyzed for CVD risk [Table 2]. There was significant association between age, weight, body mass index, body fat, abdominal fat, diastolic blood pressure, lean body mass, blood glucose, total cholesterol, triglyceride, and CVD risk. Analysis of qualitative variables showed that marital status (married) had significant relationship with CVD risk (*P*-value = 0.001). Macro and micronutrients from FFQ were categorized in DII tertiles and analyzed by ANOVA and ANCOVA tests. The scores range for DII was from –2.3 to 4.1. According to the results, subjects in third tertile of DII scores in comparison to first tertile had lower intake of fat (*P*-value = 0.03) and higher carbohydrate (*P*-value = 0.03). This difference was observed after adjustment for energy intake more significantly ($P < 0.001$). The results of fatty acids intake showed that SFA (*P*-value = 0.05) and PUFA (*P*-value = 0.004) in third tertile was significantly lower than other tertiles. However, after adjustment for calorie intake, MUFA, EPA, and DHA was significantly lower in third tertile of DII [Table 3]. As shown in Table 3, Vitamin A (*P* value = 0.0001), vitamin K (*P*-value = 0.001), vitamin E (*P*-value = 0.02), vitamin B2 (*P*-value = 0.05), vitamin B9 (*P*-value <0.0001), and vitamin C (*P*-value <0.0001) in the third tertile of DII score were significantly lower than other tertiles. vitamin B1 (*P*-value = 0.001), vitamin B3 (*P*-value = 0.001), and vitamin B6 (*P*-value = 0.007) in the third tertile of DII score compared to other tertiles were significantly higher. After adjustment for energy intake, ANCOVA test showed that the intake of vitamins D and B12 was significantly lower in third tertile of DII in comparison to other tertiles. Calcium (*P*-value = 0.03), phosphorus (*P*-value = 0.002), magnesium (*P* = 0.001), iron (*P* value = 0.006), zinc (*P*-value = 0.001), and copper (*P*-value <0.001) in third tertile of DII scores were lower than other tertiles.

These results, after adjustment for total energy intake were statistically significant ($P < 0.05$) based on ANCOVA test except for iron intake [Table 3B]. The difference in means of anthropometric data, blood pressure, and laboratory tests were investigated based on DII tertiles using ANOVA [Table 4]. There was no significant difference in age, height, weight, BMI, physical activity, calorie intake, weight, fat mass, lean mass, visceral fat, systolic, and diastolic blood pressure based on DII tertiles ($P > 0.05$). Biochemical variables including blood glucose, total cholesterol, triglyceride, LDL, AST, and ALT were not significantly different in means based on DII scores (*P*-value >0.05). HDL (*P*-value = 0.03) and hs-CRP (*P*-value = 0.05) were significantly higher in third tertile of DII scores than first. After adjustment for confounding factors, there was no significant difference in means (*P*-value >0.05). Logistic regression analysis was used to assess the relationship between DII score and risk of cardiovascular disease (CVD). As shown in Table 5, there was no significant relationship between DII scores and risk of CVD in four models (*P*-value <0.05). The association between DII and hs-CRP was evaluated using linear regression in three models []). The results

Table 1: Baseline characteristics of subjects

Variables	Mean±SD	Variables	Mean±SD
Age, years	33.99±6.34	Triglycerides, mg/dl	129.46±70.81
Height, cm	178/37±5.22	HDL-C, mg/dl	43.73±8.6
Weight, kg	82.49±14.62	LDL-C, mg/dl	105.12±24.49
BMI	25.94±2.92	AST, IU/l	25.11±4.11
Body fat, %	20.85±5.6	ALT, IU/l	18.5±13.6
Abdominal fat, %	8.57±3.28	Systolic blood pressure, mmHg	119.82±11.77
Lean body mass, %	38.12±4.4	Diastolic blood pressure, mmHg	78.1±9.96
Glucose, mg/dl	91.08±18.2	hs-CRP, mg/dl	1.73±3.62
Total cholesterol, mg/dl	193.16±38.83	Physical activity, MET	3769±288.27

Data are expressed as mean±SD. BMI: Body mass index, MET: Metabolic equivalent, HDL: high-density lipoproteins, LDL: Low-density lipoprotein, AST: Aspartate transaminase, ALT: Alanine transaminase, hs-CRP: high sensitivity C-reactive protein

Table 2: Energy, macro and micronutrients in tertiles of dietary inflammatory index

Variable	Tertile 1 0.65> *n*=85	Tertile 2 0.661.32 *n*=126	Tertile 3 1.32< *n*=62	*P**	*P***
Energy, kcal	3267.64±1353.26	2918.95±1158.07	3472±1527.17	0.062	
Carbohydrates, g	539.64±243.81	474.39±160.91[a]	611.85±268.59[a]	0.03	0.001
Fat, g	87.14±44.77[b]	72.71±41.87	67.76±40.29[b]	0.0.2	0.0001>
Protein, g	111.17±48.67	96.8±43.14	114.47±53.25	0.08	0.5
Fatty acids					
PUFA, g	21.5±12.78[c]	16.65±12.78	14.36±10.66[c]	0.004	0.0001>
MUFA, g	23.77±16.78	20.23±18.84	18.84±11.68	0.06	0.0001>
EPA, g	0.03±0.06	0.023±0.03	0.02±0.03	0.06	0.04
DHA, g	0.96±0.15	0.059±0.08	0.053±0.08	0.06	0.0001>
SFA, g	24.69±14.77[d]	21.04±13.16	19.06±12.15[d]	0.05	0.0001>
Vitamins					
Vitamin D, IU	2.26±2.79	1.79±2.5	1.47±1.63	0.16	0.01
Vitamin A, IU	2209.34±1704.24	1017.14±495.12	872.44±514.19	0.0001	0.0001>
Vitamin K, mg	168.34±105.79	111.67±56.99	100.69±73.43	0.001	0.0001>
Vitamin E, mg	8.14±9.44[a]	5.48±3.44[a]	5.59±4.87	0.02	0.04
Vitamin B1, mg	2.97±1.33[b]	2.69±1.04	3.58±1.61[b]	0.001	0.0001>
Vitamin B2, mg	2.26±1.09	1.86±0.94	1.68±1.2	0.05	0.0001>
Vitamin B3, mg	33.54±15.22[c]	29.44±11.8	37.35±18.54[c]	0.01	0.02
Vitamin B6, mg	2.18±1.13	1.67±0.75	1.88±16.77	0.007	0.0001>
Vitamin B9, mg	426.75±214.09	294.31±136.16	256.23±159.94	0.0001>	0.0001>
Vitamin B12, mg	6.12±5.41	4.74±3.05	4.76±4.49	0.12	0.02
Vitamin C, mg	241.84±195.24	145.44±63.38	129.62±107.9	0.0001>	0.0001>
Minerals					
Ca, mg	1313.5±748.94	1067.31±588.84	1065.05±543.66	0.03	0.0001>
P, mg	1723.46±889.02	1326.82±761.1	1250.55±802.6	0.002	0.0001>
Mg, mg	397.66±192.69	286.32±172.12	277.46±180.54	0.001	0.0001>
Fe, mg	24.46±11.13	20.52±7.45	16.68±9.25	0.006	0.9
Zn, mg	10.95±5.37	8.58±4.57	8.32±5.33	0.001	0.0001>
Cu, mg	2.33±1.35	1.7±0.99	1.6±1.07	0.001>	0.0001>

[a]Same letter was used to indicate significant difference in DII tertiles based on *Post Hoc* (LSD) analysis. **P*-values are based on analysis of variance (ANOVA). ***P*-values indicate analysis of covariance (ANCOVA) after adjustment for calorie intake. PUFA : Polyunsaturated fatty acids, MUFA: Monounsaturated Fatty Acid, EPA: Eicosapentaenoic acid, DHA: Docosahexaenoic acid, SFA: Saturated fatty acids

of analysis showed that there was no significant relationship between DII and hs-CRP in linear regression models (*P*-value >0.05).

Discussion

Inflammation is the pathophysiological mechanism of many chronic diseases including CVD.[22] It is very important to care about the factors that alleviate stress, inflammation, and the risk of cardiovascular diseases in people with special occupation like firefighters.[23] Healthy lifestyle, especially having a healthy diet can control the inflammation and stressful conditions.[23] The results of our study showed that DII score had no significant relationship with CVD risk. Also, the association between hs-CRP, as an inflammatory marker of cardiovascular risk, with DII scores was not statistically significant. To the best of our knowledge, this is the first study that investigate the association between DII scores and CVD risk in a group of firefighters. Wirth *et al*. reported, based on cross-sectional data from the Buffalo Cardio-Metabolic Occupational Police Stress study, that higher DII scores in a group of police officers was associated with increased CRP level and glucose intolerance component of metabolic syndrome.[13] Also, Ramallal *et al*., in the SUN Cohort study (n = 18,794), investigated the association between DII scores and cardiovascular diseases including myocardial infarction, stroke, angina, and CVD mortality. The results showed that a pro-inflammatory diet with higher DII scores was associated with a significantly higher risk for cardiovascular events.[10] One possible explanation for the differences in our findings with previous studies is DII scores that in our study were categorized in tertiles (<0.65–1.32<), which did not show strong dispersion. Indeed, most of the studied population stand in 2th tertile (more than 50%) and have scores around the mean value. However, Wirth *et al*., categorized DII scores between <−1.26 to ≥ 2.50, or in SUN Cohort study, this range was between a maximum anti-inflammatory value of –5.14 to a maximum pro-inflammatory value of + 3.97, that indicates participants in DII quartiles have high diversity. The association between DII scores and cardio-metabolic risk factors, has been studied in 17,689

Table 3: Anthropometric data, blood pressure, and laboratory tests in tertiles of dietary inflammatory index

Variable	Tertile 1 >0.65 *n*=85	Tertile 2 0.66-1.33 *n*=126	Tertile 3 1.32< *n*=62	*P**	*P***
Age, years	35.08±6.08	35.73±5.77	34.18±6.99	0.24	
Height, cm	178.95±6.52	177.78±4.86	175.22±25.51	0.37	0.81
BMI	25.97±3.07	25.46±4.46	26.38±3.13	0.1	0.23
Physical activity, MET	3618.21±2658.54[a]	3668.58±2253.66	4103.47±2057.01[a]	0.58	0.12
Calorie intake	3267.64±689.54	2918.95±567.66	3472.32±840.54	0.06	0.32
Weight, kg	83.49±16.78	79.03±8.2	84.79±16.52	0.1	0.32
Body fat, %	20.65±5.61	20.23±6.52	21.63±5.57	0.37	0.69
Lean body mass, %	38.17±4.58	38.9±3.44	37.33±4.97	0.15	0.78
VAT, %	8.6±3.38	8.1±2.85	8.9±3.57	0.33	0.36
Systolic blood pressure, mmHg	117.3±9.93	116.51±22.9	136.14±19.24	0.17	0.3
Diastolic blood pressure, mmHg	76.39±13.64	77.78±10.04	77.26±11.48	0.8	0.25
Glucose, mg/dl	93.69±23.68	89.14±9.62	90.44±18.54	0.33	0.61
Total cholesterol, mg/dl	192.29±43.16	190.24±29.16	196.94±42.87	0.6	0.67
Triglycerides, mg/dl	190.72±12.23	152.3±58.47	184.39±28.48	0.29	0.97
HDL-C, mg/dl	42.25±8.24[b]	45.89±9.48	43.03±7.68[b]	0.03	0.18
LDL-C, mg/dl	103.55±25.17	104.35±21	107.44±28.34	0.64	0.65
AST, IU/l	25.88±14.44	25.85±18.48	23.61±7.15	0.57	0.53
ALT, IU/l	18.94±12.9	19.88±17.38	16.68±9.25	0.38	0.1
hs-CRP, mg/dl	1.27±0.86	4.97±2.24	3.53±2.11	0.05	0.14

[a]Same letter was used to indicate significant difference in DII tertiles based on *Post Hoc* (LSD) analysis. **P*-values are based on analysis of variance (ANOVA). ***P*-values are based on analysis of covariance (ANCOVA) after adjustment for age, body mass index, physical activity, supplementation, smoking, marital status, education, and family members. BMI: body mass index, MET: Metabolic equivalent, VAT: Visceral Adipose Tissue, HDL: high-density lipoproteins, LDL: Low-density lipoprotein, AST: Aspartate transaminase, ALT: Alanine transaminase, hs-CRP: high sensitive C-reactive protein

Table 4. Association between DII tertiles and risk of CVD

	OR	95% CI	*P*
Model 1[a]			
1	1	1	
2	0.8	0.4-1.6	0.54
3	1.16	0.58-2.31	0.66
Model 2[b]			
1	1	1	
2	1.5	0.65-3.43	0.33
3	1.75	0.77-3.96	0.18
Model 3[c]			
1	1	1	
2	1.65	0.59-4.58	0.41
3	1.62	0.63-4.59	0.32

Values are estimated through multivariate logistic regression and adjusted for potential confounding factors. DII: Dietary inflammatory index, CVD: Cardiovascular diseases, CI: Confidence interval. [a]Model 1 is not adjusted. [b]Model 2 is adjusted for age. [c]Model 3 is adjusted for age, body mass index, physical activity, supplementation, smoking, marital status, education, and family members

participants from the US National Health and Nutrition Examination Survey. It has been shown that along with the increased risk of metabolic syndrome and its components, elevated hs-CRP increased across increasing quartiles of DII ($P < 0.001$).[24] Bodén *et al*. examined the association between the DII and the risk of first myocardial infarction in a case-control study. A pro-inflammatory diet was associated with an elevated risk of first myocardial infarction in men. Also, there is an association between the most pro-inflammatory DII scores (quartile 4) and higher hs-CRP.[11] Another explanation for differences, is the nutritional assessment tool, which can affect the estimation of dietary intakes as well as the calculation of DII scores. In our study, Food Frequency Questionnaire was used for collecting nutritional information, but in some previous studies, 24-hour dietary recall has been used to estimate dietary intakes of participants. Also, demographic characteristics of participants including lifestyle and food culture have led to the differences in dietary patterns, intakes, DII scores and ranges, and dispersion of population based on scoring system with other studies. Our study focused on a specific population group, the firefighters, that may have different dietary patterns, inflammatory status, and the risk of cardiovascular disease. In addition, the study design was different because other studies have been derived from a cohort. The cross-sectional design of our study impacted on the findings and causal relationship. Although we did not find a significant relationship between DII and the risk of cardiovascular diseases, but the results of our study showed that participants in higher DII scores intake more fat, saturated fat, and less PUFA, MUFA, EPA, and DHA. Also, the intakes of some antioxidant vitamins and minerals, including A, E, K, B1, B2, B3, B6, B9, C, magnesium, zinc, and calcium were lower in people with higher DII scores. Previous studies have shown that high intakes of saturated fatty acids increase inflammation and the risk of CVD and consumption of unsaturated fatty

Table 5. Association between DII score and hs-CRP

	β*	Standard error	β**	CI	*P*
Model 1[a]	- 0.049	0.316	-0.011	(0.489-0.575)	0.87
Model 2[b]	- 0.095	0.339	-0.021	(-0.763-0.574)	0.78
Model 3[c]	- 0.117	0.394	-0.029	(-0.903-0.668)	0.74

Vales are estimated through linear regression. DII: dietary inflammatory index, CI: confidence interval. *Unstandardized beta coefficient. **Standardized beta coefficient. [a]Model 1 is not adjusted. [b]Model 2 is adjusted for age. [c]Model 3 is adjusted for age, body mass index, physical activity, supplementation, smoking, education, marital status, and family members

acids, vitamins, and minerals with antioxidant properties is associated with CVD risk reduction.

As a result, diet with lower DII scores is expected to be appropriate for controlling inflammation and reducing the risk of CVD especially in firefighters with stressful conditions. Healthy dietary patterns with low DII such as DASH or Mediterranean diet can help people to reduce inflammation and CVD. Considering the occupational conditions of firefighters that may be exposed to toxic and chemical hazards, have more stress and anxiety, irregular sleep patterns, as well as high prevalence of cardiovascular and respiratory diseases, we suggest to conduct studies with large sample sizes, different demographic, cultural features, and clinical trials with dietary approaches especially DII as an effective part of healthy lifestyle.

The main strength of our study was investigating of association between DII and CVD among firefighters for the first time. The limitations were low dispersion of DII scores and specific studied population group with similar diet.

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Conflict of interest

There are no conflicts of interest.

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