High-Risk Influential Factors for Cardiovascular Diseases among Young Adults

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ABSTRACT
The aim of this study was to compare high-risk influential factors for cardiovascular diseases among different young adults. It was a retrospective study carried out from January 2020 to 2022. A total of 700 young adults who underwent a physical examination or were hospitalised at the Baoding No.1 Central Hospital, Baoding, Hebei, P. R. China. The participants were divided into three groups: Young social health examinees (n = 300), who underwent physical examinations in January 2020; young medical workers (n = 300), young hospital employees who underwent physical examinations in January 2020; and young myocardial infarction patients (n = 100), who were hospitalised with myocardial infarction from January 2019 to 2021. Analysis was performed on the cardiovascular high-risk influential factors of different young adults. The proportions of males, smoking history, drinking history, hypertension history, lack of exercise, high stress, obesity, fatty liver levels of serum uric acid (UA), body mass index (BMI), diastolic blood pressure (DBP), systolic blood pressure (SBP), and weight in the young myocardial infarction patient group were higher than the other two groups while the HDL levels were lower than those of the latter two groups (p <0.05). The proportions of drinking history, hypertension history, lack of exercise, and high stress levels of UA, DBP, and SBP in the young medical worker group were higher than those in the young social health examinee group (p <0.05). Multivariate analysis revealed that males, high stress, obesity, high DBP and SBP levels were independent risk factors for cardiovascular diseases in young adults (p <0.05). High-risk influential factors of cardiovascular diseases in young adults include males, high stress, obesity, high blood pressure, etc.

Key Words: *Young people, Cardiovascular system, Medical workers, High-risk influential factors.*

According to a previous epidemiological study, rising incidence of cardiovascular diseases has been noticed with an obvious increasing trend in young adults.[1] Among them, myocardial infarction is particularly important due to its serious damage to the affected patients.[2,3] It has been documented in prior researches that there is a high detection rate of high-risk factors for cardiovascular diseases in young patients with myocardial infarction. Due to differences in work, lifestyle, and other factors, young people have different levels of understanding about myocardial infarction. As for young healthcare workers in China, their workload is high, work pressure is high, and economic income is low. Therefore, young healthcare workers were grouped separately in this study. There is still a lack of comparative research on risk factors for cardiovascular diseases among the young general population, young medical workers, and young patients with myocardial infarction.

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The aim of this study was to compare the known risk factors of the young general population (aged 18 to 45), young medical workers, and young patients with myocardial infarction. It was expected to improve the awareness of high-risk factors for cardiovascular diseases and provide more evidence for clinical practice.

This study retrospectively analysed 700 young adults, undergoing a physical examination and those who were hospitalised in Baoding No.1 Central Hospital from January 2020 to 2022. The enrolled subjects, aged 18 - 45 years, were divided into three groups: Young social health examinees (300 social health examinees, who underwent physical examinations in the hospital in January 2021), young medical workers (300 employees in the hospital, who underwent physical examinations in January 2021), and myocardial infarction patients (100 patients with myocardial infarction who were hospitalised at the study place from January 2020 to 2022). The general data of the three groups are shown in Table I. The study was conducted after approval from the Hospital Ethical Committee and written informed consent was obtained from all participants. Patients who met the criteria for determining myocardial infarction according to the "Guidelines for the Diagnosis and Treatment of Acute Myocardial Infarction" and aged 18 - 45 years were included.[4] Patients combined with other serious illnesses such as tumours, infections, etc. were excluded.

Table I: Analysis of high-risk influential factors for cardiovascular diseases in different young adults.

Variables	β	SE	Wald/χ^2	p-value	OR	95% CI
Males	-2.258	0.828	7.443	0.006	0.105	0.021 ~ 0.529
With drinking history	-0.372	0.412	0.817	0.366	0.689	0.308 ~ 1.545
With hypertension history	0.136	0.503	0.073	0.787	1.145	0.428 ~ 3.067
Lack of exercise	0.343	0.424	0.657	0.418	1.410	0.615 ~ 3.233
High stress	-1.069	0.496	4.645	0.031	0.343	0.130 ~ 0.908
Obesity	-1.086	0.524	4.293	0.038	0.338	0.121 ~ 0.943
High UA level	-0.647	0.406	2.533	0.111	0.524	0.236 ~ 1.161
High DBP level	-1.093	0.381	8.238	0.004	0.335	0.159 ~ 0.707
High SBP level	-1.533	0.409	14.022	<0.001	0.216	0.097 ~ 0.482
Low HDL level	-0.723	0.415	3.033	0.082	0.485	0.215 ~ 1.095
Smoking history	-0.101	0.457	0.049	0.824	0.904	0.369 ~ 2.215
Fatty liver	-0.432	0.551	0.614	0.433	0.650	0.221 ~ 1.911
High BMI level	-0.224	0.443	0.255	0.614	0.800	0.335 ~ 1.906
High body weight level	0.722	0.448	2.591	0.107	2.058	0.855 ~ 4.956

Data were retrieved from the hospital information and management system. Various information of all patients were collected which included gender, smoking history, age, drinking history (drink 50ml of alcohol three or more times a week), BMI (body mass index), weight, height, family history, history of hypertension, lack of exercise (less than 150 minutes of physical exercise per week), high stress (pressure index greater than 90), obesity, fatty liver status (ultrasound confirmation), LDL (low-density lipoprotein) >3.37 mmol/l, UA (serum uric acid), TG (triglyceride) ≥1.70 mmol/l, HDL (high-density lipoprotein) <1.04 mmol/l, TC (Serum total cholesterol) ≥5.18 mmol/l, FPG (fasting plasma glucose) ≥7.0 mmol/l, DBP (diastolic blood pressure) ≥90 mmHg, and SBP (systolic blood pressure) ≥140 mmHg. The differences between the three groups were compared. Enumerated data were expressed *via* n (%). The measurement data were presented as ($\bar{x}$±s). Collected data were analysed using the analysis of variance, Chi-square test, and repeated measurement variance test, and the influencing factors were analysed using logistic regression analysis by SPSS 23.0. A value of p <0.05 was considered significant.

There was no statistically significant difference in the general information of age, family history, the level of LDL, TG, TC, FPG, and height among the three groups (p >0.05). The results of single factor analysis show that the proportions of males, smoking history, drinking history, hypertension history, lack of exercise, high stress, obesity, and fatty liver in the young myocardial infarction patient group were higher than in the young social health examinee group and medical worker group. The proportions of drinking history, hypertension history, lack of exercise, and high stress in the young medical worker group were higher than social health examinee group. The difference was statistically significant (p <0.05). The levels of UA, BMI, DBP, SBP, and weight of the young myocardial infarction patient group were higher than those of the other two groups, while the HDL levels were lower than those of the latter two groups. Besides, the levels of UA, DBP, and SBP in the young medical worker group were higher than those in the social health examinee group, with statistically significant differences (p <0.05). Statistically significant independent variables were included in the multivariate regression analysis,

and the results showed that male gender, high stress, obesity, high DBP level, and high SBP level were independent risk factors for cardiovascular diseases in young adults of myocardial infarction (OR = 1.642, 1.537, 1.369, 1.636, and 4.655, p <0.05) as shown in Table I.

Cardiovascular diseases have gradually become a major disease type, threatening the quality of life of patients. Attention should also be paid to the prevention and control of cardiovascular diseases for young people, besides for the middle-aged and the elderly.[5] Traditional cardiovascular risk factors recognised internationally include multiple factors and primary prevention is of great significance in reducing the incidence of cardiovascular diseases.

In this study, the occurrence of myocardial infarction in young adults may be related to patients' gender, drinking history, hypertension history, lack of exercise, high stress, obesity, UA, DBP, SBP, FPG, and HDL levels. Among them, young patients with myocardial infarction had the highest risk of cardiovascular diseases due to their low cognition level of disease severity and cardiovascular diseases. Simultaneously, due to their lack of exercise, high psychological stress, and other occupational factors, the risk of developing cardiovascular diseases in young medical workers can still not be ignored despite their high level of cognition of cardiovascular diseases and related high-risk factors.[6]

Logistic regression analysis revealed that male gender, high stress, obesity, and high DBP, and SBP levels were independent risk factors for cardiovascular disease in young adults. It can be explained that young males have a higher proportion of drinking and smoking which results in their high risks of developing cardiovascular diseases. Young patients with myocardial infarction often bear more economic burden and psychosocial stress. In terms of obesity, young adults may develop hyperlipidaemia, hypertension, and coronary heart disease owing to excessive nutrition, improper diet, and lack of exercise, thereby forming a vicious cycle. In addition, elevated DBP and SBP levels can cause damage to the arterial endothelium that may increase vascular fragility and cause thinning of the vascular wall, leading to arteriosclerosis and an increased

risk of cardiovascular diseases. Therefore, it is important to apply targeted treatment and intervention to young males, as well as young adults with high stress, obesity, and high blood pressure and strengthen clinical education to raise their awareness of the dangers of high-risk factors for cardiovascular diseases, so as to realise early intervention and to reduce the incidence.[7] Nevertheless, this study has some shortcomings, such as the small number of samples. In response to this, the inclusion and exclusion criteria is suggested to be improved in future studies, and the number of samples should be further expanded to make the research results more scientific.

In conclusion, independent risk factors of cardiovascular diseases in young adults include male gender, high stress, obesity, high blood pressure, etc. Targeted prevention and intervention measures can be taken clinically to reduce the incidence rate of cardiovascular disease in young people.

PATIENTS' CONSENT:
Written informed consent was obtained from all participants.

COMPETING INTEREST:
The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:
XW: Idea conception, sampling, and manuscript preparation.
TY: Patient history, examination, analysis of data, and contribution towards manuscript preparation.
JL: Contribution towards manuscript writing.
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