Original article

Risk Factors of Coronary Heart Disease Among People Under 50 Years of Age in Tripoli, Libya

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Abstract
Coronary heart disease (CHD) remains a significant global cause of morbidity and mortality, particularly among younger populations. This study aimed to clarify the risk factors contributing to CHD among individuals under 50 years of age in Tripoli, Libya. Data were collected through a questionnaire distributed to 85 patients from three hospitals in Tripoli: Metiga Hospital, Tajura Heart Hospital, and Tripoli University Hospital. Results revealed that, the highest affected age group was 46–50 years (51%), CHD was more prevalent among males (68%), and the most significant risk factors were physical inactivity (70%), psychological stress (56%), smoking (52%), and hypertension (47%), additionally, dietary habits had a substantial impact. These findings underscore the growing public health concern of CHD among younger individuals and the need for focused prevention strategies.
Keywords: *Coronary Heart Disease, Risk Factors, Tripoli, Hospitals.*

Introduction

Coronary heart disease (CHD) and its complications remain the leading cause of death around the world [1, 2]. According to the World Health Organization (WHO), most deaths globally caused by cardiovascular diseases are due to Acute Myocardial Infarction (AMI), which was estimated to affect 17.9 million people in 2019. In the past, the percentage of young and middle-aged inpatients increased from 27% in 1995–1999 to 32% in 2010–2014 in the United States. Additionally, this is becoming increasingly important in large countries like China, where young AMI patients are reported to constitute 27.1% to 46.7% of all AMI patients [3]. On the other hand, many epidemiological and clinical studies have been conducted on older individuals. While aging is the primary risk factor, it holds less relevance in younger patients. Therefore, analyzing risk factors among the younger population can significantly contribute to disease prevention [4]. The differences between younger and older patient profiles should be taken into consideration when identifying primary and secondary prevention strategies [1].

CHD occurs when the main blood vessels responsible for supplying the heart with blood and oxygen become blocked or damaged due to plaque buildup, which obstructs blood flow [5]. Although there is a relatively low prevalence of AMI in young individuals, the possibility of death and long-term disability makes acute MI a highly significant problem [6].
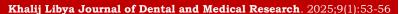
In the United States, more than 30,000 women younger than 55 years are hospitalized with a diagnosis of MI yearly [7]. According to a recent update from the American Heart Association, cardiovascular disease (CVD) is still prevalent in almost the entire U.S. population over 20 years of age, and in 25% of young individuals aged between 20 and 39 years [8]. CHD mainly affects older people more than younger ones, with a significant increase in MI incidence in the older age group. However, recent studies have shown a rise in MI cases among young adults. The challenge lies in identifying and treating cardiovascular risk in young adults, particularly those under 50 years old [1].

The understanding of the risk factors for the development of AMI is limited in younger age groups. Additionally, there is insufficient knowledge about the clinical characteristics and angiographic results in young patients with AMI [6]. This lack of characterization hinders the ability to effectively identify and treat individuals at risk [9]. When acute myocardial infarction occurs in young individuals, it is considered extremely destructive. Hence, the study of the disease occurrence and treatment options appears to be incredibly important in young patients with acute MI [10]. This study aims to identify and analyze the risk factors contributing to CHD among individuals under the age of 50 years in Tripoli, Libya.

Methods

Study design

This study was a cross-sectional observational analysis conducted between February 3 and April 1, 2024, in three hospitals in Tripoli: Metiga Hospital, Tajura Heart Hospital, and Tripoli University Hospital. The study included 85 participants, all under 50 years of age and diagnosed with coronary heart disease (CHD).

Data collection

Data were collected using a structured questionnaire distributed to patients under 50 years of age who were diagnosed with CHD, admitted to the intensive care unit, awaiting catheterization, or scheduled for open-heart surgery, and identified from hospital records or outpatient visits.

The questionnaire, which was comprised of 34 questions, was administered. It covered four main domains: General demographic information, health status before diagnosis, lifestyle factors (e.g., smoking, physical activity), and dietary habits before CHD diagnosis.

Ethical considerations

Participants were informed about the study's purpose and their right to withdraw at any time. Confidentiality was ensured, and data were anonymized to protect participant identities. Ethical approval was obtained from the relevant institutional review board.

Statistical analysis

Data were analyzed using descriptive and inferential statistics. Chi-square tests were conducted to identify significant associations between risk factors and CHD. A p-value of <0.05 was considered statistically significant.

Results and discussions

Out of 100 distributed questionnaires, 85 completed responses were received, yielding an 85% response rate. Hospital records were also reviewed to supplement self-reported data.

This study included 85 participants with coronary heart disease who were less than 50 years of age. The mean age was 49.05 ± 7.79 years. The largest age group was 46–50 years (51%), followed by 36–45 years (34%). The Chi-square test showed a statistically significant relationship between age and CHD (p = 0.001, where p < 0.05). These findings suggest that CHD prevalence is notable among younger individuals. Previous studies often use 40–45 years as a cutoff to identify young acute myocardial infarction patients, indicating that young adults may face challenges in early diagnosis [6].

CHD was more prevalent among males (68%). The Chi-square test for gender also showed statistical significance (p = 0.001). This aligns with studies showing CHD is generally more common in men [1, 6, 11]. However, recent data indicate an increasing incidence of MI among younger women [1, 9]. Differences in risk factors and presentation between genders highlight the importance of tailored prevention strategies.

CHD prevalence was high among overweight (BMI 25–30; 37%) and obese individuals (BMI >30; 39%). Despite this, the Chi-square test for BMI did not show statistical significance (p = 0.999, where p > 0.05). This contrasts with studies highlighting obesity as a risk factor for CHD [6, 12]. Regional variations in lifestyle and healthcare access may explain this discrepancy.

Regarding health status, 47% of participants had hypertension. A significant association was observed between hypertension and CHD (p = 0.001). Hypertension is a major CHD risk factor for both men and women worldwide [9, 11, 13]. About 36% of participants had diabetes mellitus. The chi-square test confirmed a significant relationship between diabetes and CHD (p = 0.001). This finding supports previous studies linking diabetes to increased CHD risk [1, 9]. 44% of participants had high cholesterol levels, a statistically significant risk factor (p = 0.001). Hypercholesteremia had a stronger association in young men [9]. Moreover, about 39% of participants had high triglycerides, with a significant relationship to CHD (p = 0.001). This aligns with findings emphasizing the role of dyslipidemia in younger MI patients [1, 6, 11].

Psychological stress was reported by 56% of participants and showed a significant association with CHD (p = 0.001). Depression was also a significant risk factor, affecting 30% of participants. Psychological factors, such as stressful life conditions and depression, exhibited strong associations with the development of AMI in young individuals [6, 9]. These findings underscore the importance of addressing mental health in CHD prevention.

A family history of heart disease was present in 21% of participants. The chi-square test showed statistical significance (p = 0.001), confirming its role as a risk factor for CHD. Family history of CHD (Table.1) is strongly associated with an increased risk of AMI in young adults [6, 9]. Furthermore, it is still difficult to identify risk factors associated with genetics in young adults, particularly those aged under 45 [1].

Table 1. The type of family history of heart diseases

The type of family history disease	N	%	X²	df.	P
Unknown diagnosis	75	88.2%			
Cardiomyopathy	2	2.4%			
Strokes	3	3.5%			
vascular occlusion	1	1.2%	379.882	6	0.001
Heart valve issues	2	2.4%			
Tachycardia	1	1.2%			
Congenital heart defects	1	1.2%			

The family history of chronic disease was examined in the study participants, focusing on its association with coronary heart disease (CHD). 38% of cases had a family history of chronic diseases and the diseases shown in Table 2.

Table 2. The type of family history of chronic disease

The type of chronic diseases	N	%	X²	df	P
No chronic diseases	53	62%			
Diabetes Mellitus	13	15%			
Hypertension	5	5%	137.282	5	0.001
Diabetes Mellitus & Hypertension	12	14%			
Cancers	1	2%			
Asthma	1	2%			

About 44% of participants had three meals daily, while 32% consumed more than three meals daily. The chi-square test demonstrated a statistically significant relationship between the number of daily meals and CHD (p = 0.001). These findings suggest that meal frequency is associated with CHD risk factors. A total of 47% of participants slept fewer than six hours per day. The chi-square test revealed a statistically significant relationship between sleep duration and CHD (p = 0.001). Sleep deprivation is strongly associated with CHD risk factors, aligning with previous studies identifying inadequate sleep as a prominent risk factor for AMI [6].

About 52% of participants were smokers, 28% were non-smokers, and 20% were exposed to second-hand smoke. The chi-square test confirmed a significant relationship between smoking and CHD (p = 0.001). Smoking was identified as the strongest predictor of CHD, consistent with earlier findings [1, 8, 11]. Moreover, 70% of participants were physically inactive. The chi-square test showed a statistically significant association between physical inactivity and CHD (p = 0.001). This finding is consistent with studies that highlight the protective role of regular physical activity against CHD [1, 5, 14].

Table 3 examined dietary patterns. Patients were drinking water and soft drinks and eating salt, sugar, and fats in moderate amounts (41%, 32%, 38%, 36%, and 34%, respectively). On the other hand, they were eating starches, carbohydrates, red meat, and fast food a lot (54%, 51%, 35%, and 31% respectively), while intake of fiber and vitamins was between low and moderate (40%). The chi-square test demonstrated that most dietary factors, except fat, soft drink, and fast-food consumption, had statistically significant associations with CHD risk factors ($p < 0.05$). These findings suggest that diet significantly influences CHD development, emphasizing the need for healthier eating habits [9].

Table 3. The diet before the CHD diagnosis

Questions of diet	No		A Little		Moderate		A Lot		X²	df	P-Value
	N	%	N	%	N	%	N	%			
The rate of drinking water per day	4	5%	33	39%	35	41%	13	15%	32.600	3	0.001
Average salt consumption per day	18	21%	22	26%	32	38%	13	15%	9.165	3	0.027
Average sugar consumption per day	15	18%	24	28%	31	36%	15	18%	8.506	3	0.037
The rate of fat consumption per day	14	16%	21	25%	29	34%	21	25%	5.306	3	0.151
Drink soft drinks	19	22%	17	20%	27	32%	22	26%	2.671	3	0.445

Does your lunch contain starches (rice and pasta)?	5	6%	9	11%	25	29%	46	54%	48.976	3	0.001
Does your lunch contain carbohydrates (bread and pastries)?	8	9%	7	8%	27	32%	43	51%	72.471	4	0.001
Do you eat proteins (red meat)?	6	7%	21	25%	28	33%	30	35%	16.694	3	0.001
Do you eat fast food?	19	22%	12	14%	28	33%	26	31%	7.471	3	0.058
Do you eat a meal containing fibers and vitamins (fruits and vegetables)?	7	8%	34	40%	34	40%	10	12%	30.812	3	0.001

This study has limitations, including a small sample size and self-reported data, which may introduce recall bias. The cross-sectional design limits causality establishment. Future studies should focus on longitudinal designs and the impact of socioeconomic and cultural factors on CHD risk in younger populations.

Conclusion

CHD is a significant public health concern, increasingly affecting younger adults. Key risk factors identified in this study include sex, hypertension, diabetes mellitus, dyslipidemia, psychological stress, family history of heart diseases, sleep deprivation, smoking, physical inactivity, and dietary habits. Effective prevention strategies should address these modifiable risk factors.

Conflict of interest

There are no conflicts of interest to this research.

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المستخلص

تظل أمراض القلب التاجية سببًا عالميًا مهمًا للمرض والوفيات، وخاصة بين السكان الأصغر سنًا. تهدف هذه الدراسة إلى توضيح عوامل الخطر التي تساهم في الإصابة بأمراض القلب التاجية بين الأفراد الذين تقل أعمارهم عن 50 عامًا في طرابلس، ليبيا. تم جمع البيانات من خلال استبيان تم توزيعه على 85 مريضًا من ثلاثة مستشفيات في طرابلس: مستشفى معيتيقة، ومستشفى تاجوراء للقلب، ومستشفى جامعة طرابلس. كشفت النتائج أن الفئة العمرية الأكثر تضررًا كانت من 46 إلى 50 عامًا (51٪)، وكان مرض القلب التاجي أكثر انتشارًا بين الذكور (68٪)، وكانت عوامل الخطر الأكثر أهمية هي الخمول البدني (70٪)، والإجهاد النفسي (56٪)، والتدخين (52٪)، وارتفاع ضغط الدم (47٪)، بالإضافة إلى ذلك، كان للعادات الغذائية تأثير كبير. تؤكد هذه النتائج على القلق المتزايد بشأن الصحة العامة فيما يتعلق بأمراض القلب التاجية بين الأفراد الأصغر سنًا والحاجة إلى استراتيجيات وقائية مركزة.

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