Original Article

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Health behaviors, knowledge, and attitudes toward cardiovascular disease risk factors in young Iraqi adults: a sample from Erbil, Iraq

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Background: Cardiovascular disease continues to be a leading cause of death among young people globally. This cross-sectional study was designed to assess the health behaviors, knowledge, and attitudes regarding cardiovascular disease risk factors among young adults in Erbil, Iraq.
Methods: Data were collected using the WHO STEPS Instrument for Chronic Disease Risk Factor Surveillance and the Heart Disease Fact Questions.
Results: Ninety percent of participants demonstrated moderate to high knowledge and exhibited a positive attitude. Multiple linear regression analysis revealed that while a history of smoking, a lack of knowledge, and the absence of formal education negatively impacted knowledge levels, being aged 38 to 45 years, recognizing the importance of consuming less salt, walking for at least 10 minutes on 5 or more days per week, and regularly checking blood sugar levels positively contributed to knowledge. Unwillingness to change lifestyle had the most significant negative influence on knowledge.
Conclusions: Establishing effective educational interventions may increase knowledge and promote more positive attitudes.

Keywords: Attitude; Cardiovascular diseases; Health behavior; Young Iraqi adults; Knowledge

INTRODUCTION

Cardiovascular disease (CVD) is classified as a noncommunicable disease (NCD). Approximately 90% of CVD-related deaths occur in low- and middle-income countries. Poverty, limited knowledge, inadequate health infrastructure, and unhealthy lifestyles significantly contribute to the increasing prevalence of CVD [1,2]. No universally accepted age threshold exists for defining "young" in the context of premature CVD. While some sources define "young" as ranging from 40 to 55 years [3], others suggest the age of 45 years [4]. Recently, there has been a rise in CVD incidence among young adults, attributed to an increase in obesity and diabetes, the use of tobacco and e-cigarettes, processed food consumption, and environmental factors [5,6]. Consequently, CVD is likely to become more widespread within this demographic. Furthermore, the prevention of CVD poses significant challenges, particularly as a substantial number of adults remain unaware of their risk factors [7–9].

There are also concerns about an increased rate of CVD

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among the young population in Iraq [10,11]. CVD alone accounts for approximately 30% of all deaths in the country [12]. Since the 1991 Gulf War, Iraq has experienced ongoing conflict, which has adversely affected the health and nutritional status of its population. This situation has rapidly deteriorated the overall health of the population [13]. Additionally, Iraq's exposure to westernization has led to increased consumption of fast foods and nutrient-poor products. These lifestyle and dietary changes have predisposed the Iraqi population to cardiovascular diseases, including obesity, diabetes, and hypertension [14,15].

Awareness of risk factors can influence engagement in preventive measures. Consequently, CVD is preventable through education, screening, and management of modifiable conditions [16,17]. The World Health Organization (WHO) advocates for raising awareness about modifiable behaviors as the most effective strategy for enhancing cardiovascular health [18]. Assessing the knowledge, attitudes, and current health behaviors of young adults is crucial for promoting desirable health behaviors and preventing CVD-related deaths. Additionally, evaluating people's knowledge and health behaviors aids healthcare professionals in designing educational programs. Substantial evidence supports the effectiveness of coordinated care and coaching by health professionals in reducing risk [19,20]. Understanding individuals' knowledge, health behaviors, and attitudes is essential, as CVD can often be prevented or delayed through appropriate modifications of risk factors. Further research is necessary to assess the knowledge of young people and how their health behaviors and attitudes contribute to this knowledge. The research questions were as follows: (1) What are the health behaviors of the young Iraqi population toward CVD? (2) What is the knowledge level of CVD risk factors among the young Iraqi population? (3) What are the young Iraqi population's attitudes towards CVD risk factors?

We also investigated modifiable factors related to health behaviors and attitudes that may affect knowledge.

METHODS

Ethics statement

This study was approved by the Karabük University Research Ethics Committee (No. E.11655), and institutional permission was obtained from the General Directorate of Health- Erbil. The study has been carried out in accordance with the Declaration of Helsinki. All participants gave written consent before participation. The study was prepared, implemented, and reported by the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) criteria [21].

Design, participants, and settings

This cross-sectional study was conducted in Erbil, Iraq, from April 2020 to April 2021. Erbil has an estimated population of 932,800 as of 2021 [22]. Of this population, 35% are under 18 years old, 61% are within the active age groups, and 4% are aged 65 or above [23]. There are 605,800 people aged 20 years and above in Erbil. The minimum sample size required for the study was calculated using an online sample size calculator [24]. With a population of 605,800, a confidence level of 95%, and a margin of error of 0.03, the calculator suggested a minimum sample size of 800. Ultimately, 1,100 adult participants who were willing to participate were recruited. The inclusion criteria were as follows: (1) age between 18 and 45 years; (2) any sex; (3) ability to read and write; and (4) not being medical staff or healthcare professionals.

Data collection and measurements

Data were collected using a self-designed questionnaire at Family Mall, the largest shopping center in Erbil, Iraq. This mall attracts people of all ages and from various socioeconomic backgrounds, including low, middle, and high. The questionnaires were translated from English to Arabic and Kurdish by two specialists, who also performed back-translations into English. The first researcher administered the questionnaire through face-to-face interviews. A pilot study was conducted with 10 participants; however, the results of this study were excluded from the data analysis. On average, data collection took approximately 25 minutes per participant.

The survey was developed using the World Health Organization (WHO) STEPwise approach to NCD risk factor surveillance (STEPS) questionnaire as a foundation. WHO STEPS provides a standardized framework for collecting, analyzing, and disseminating data on essential NCD risk

factors. Pilot testing commenced in 2002, subsequent to a series of regional workshops. Numerous countries conducted surveys to gather data between 2002 and 2003. This tool is particularly beneficial for the development of underdeveloped countries [25–27]. Iraq is one of the countries where this survey has been implemented [1]. The survey instrument addresses both key behavioral and significant biological risk factors. The information from STEPS can be utilized by all countries not only to monitor trends within their borders but also to compare data internationally [25]. The questionnaire is divided into four sections:

(1) Section 1 (15 items) aimed to collect information on descriptive characteristics such as age, sex, marital status, education, work status, body mass index, and the presence of chronic diseases, utilizing the WHO STEPS Instrument for Chronic Disease Risk Factor Surveillance (step 1).
(2) Section 2 (27 items) was designed to assess behavior-related questions derived from step 1. This section covered topics such as tobacco and alcohol use, diet, physical activity, and histories of elevated blood pressure, diabetes, and cholesterol [25].
(3) Section 3 included the Heart Disease Fact Questionnaire (HDFQ) to assess the knowledge of CVD among young Iraqi adults. Developed by Wagner et al. [28] in 2005, the HDFQ demonstrated good content and face validity, satisfactory internal consistency, and strong item-total correlations. This questionnaire has been previously utilized in developing countries [29–32]. We recorded a Cronbach α coefficient of 0.87. Responses were categorized as "true," "false," or "I don't know." Six of the statements required reverse scoring. Each correct response earned a score of 1, while an incorrect response or an "I don't know" received a score of 0. The total score ranged from 0 to 100. Scores of ≤50, 51–70, and >70 were classified as poor, moderate, and good, respectively [30,31].
(4) Section 4 was designed to assess attitudes toward CVD, consistent with the findings in the literature [27,33]. Responses in this section were measured using a 3-point Likert scale (agree, 1; I don't know, 2; disagree, 3).

Statistical analysis

All data were organized using Microsoft Excel (Microsoft Corp) and analyzed with the IBM SPSS ver. 23 (IBM Corp). Descriptive statistics were used to assess the distribution of participants' sociodemographic characteristics, health behaviors, and attitudes. These factors were treated as independent variables in the multiple linear regression analysis. The threshold for statistical significance was set at 0.05 for all analyses.

RESULTS

Sociodemographic characteristics and health measurements

More than half of the participants (52.3%) were aged between 18 and 27 years, with a mean age of 29.13±9.31 years. The majority (59.5%) were male, and nearly half (46.6%) had graduated from university. Among the participants, 14.6% were smokers, 6.0% had consumed alcohol, and 43.3% reported consuming fruits 3 to 4 days a week. Many respondents recognized the importance of reducing salt intake, with 70.9% considering it vital and 88.1% believing that excessive salt consumption leads to health problems. A minority of participants (5.4%) had elevated blood sugar or diabetes, and 8.8% had high blood pressure or hypertension (Table 1).

Table 1. Participants' sociodemographic characteristics and behavioral measurements (n=1,100)

Characteristic	No. of participants (%)[a]
Age (yr)	29.13±9.31[b]
18–27	575 (52.3)
28–37	325 (29.5)
38–45	200 (18.2)
Sex	
Male	655 (59.5)
Female	445 (40.5)
Marital status	
Married	646 (58.7)
Single	454 (41.3)
Education	
No formal education	79 (7.2)
Primary	232 (21.1)
High school	276 (25.1)
University or above	513 (46.6)

(Continued on the next page)

Table 1. (Continued)

Characteristic	No. of participants (%)[a]
Health behavior	
Tobacco use (yes)	161 (14.6)
Alcohol consumption (yes)	66 (6.0)
Diet	
Fruit consumption (days per week)	
1–2	164 (14.9)
3–4	476 (43.3)
≥5	334 (30.4)
Don't know	126 (11.5)
Vegetable consumption (days per week)	
1–2	180 (16.4)
3–4	419 (38.1)
≥5	363 (33.0)
Don't know	138 (12.5)
Using salt in cooking or preparing foods in the household	
Always	1,069 (97.2)
Sometimes	31 (2.8)
Importance of low salt intake in the diet	
Very important	1,002 (91.1)
Not important	98 (8.9)
Too much salt in a diet could cause a health problem	969 (88.1)
Physical activity	
Walking or using a bicycle for at least 10 min regularly	620 (56.4)
Walking for at least 10 min (days per week)	
0–2	184 (16.7)
3–4	249 (22.6)
≥5	667 (60.6)
Sports and fitness activities (days per week)	
0–2	675 (61.4)
3–4	256 (23.3)
≥5	169 (15.4)
History related to blood pressure	
Blood pressure measurement by a doctor or other health worker	604 (54.9)
Elevated blood pressure or hypertension	97 (8.8)
History related to blood glucose	
Blood sugar measurement by a doctor or other health worker	429 (39.0)
Elevated blood sugar or diabetes	59 (5.4)
History related to blood lipids	
Cholesterol level measurement by a doctor or other health worker	270 (24.5)
Elevated cholesterol level	106 (9.6)

[a]Unless otherwise indicated. Percentages may not total 100 due to rounding. [b]Mean±standard deviation.

Adults' knowledge of CVD risk factors and predictors

The HDFQ results are presented in Table 2. Among the participants, 40 (3.6%) demonstrated low knowledge levels (score, <50), 561 (51.0%) exhibited moderate knowledge levels (score, 51–70), and 499 (45.4%) showed high knowledge levels (score, >70). Participants generally had adequate knowledge of certain CVD risk factors, including smoking (79.4%), high blood pressure (81.0%), being overweight (89.4%), and high cholesterol levels (81.5%). However, fewer participants correctly identified diabetes (54.4%) and walking and gardening (50.7%) as risk factors. Awareness was also lower for high- and low-density lipoproteins, recognized by only 37.3% and 51.5% of participants, respectively.

A multiple linear regression analysis was used to predict adults' knowledge and yielded statistically significant results (F=1.990, P=0.009). The model, incorporating all independent variables, accounted for 24% of the variance in knowledge. Statistically significant predictors of knowledge included age, education, access to information, smoking history, awareness of the benefits of a low-salt diet, engaging in at least 10 minutes of walking on 5 or more days per week, and regular blood sugar monitoring (P<0.05). While a history of smoking, lack of knowledge, and absence of formal education negatively impacted knowledge, factors such as being aged 38 to 45 years, awareness of the benefits of a low-salt diet, regular walking, and blood sugar checks positively influenced knowledge. Age and education were the most influential predictors, each having approximately twice the impact of the other variables (Table 3).

Self-reported attitudes and association between knowledge and attitudes

Positive attitudes included a willingness to change lifestyle (n=554, 50.6%), belief in the necessity of regular medical checkups for CVD (n=790, 71.8%), belief that one's health is not ultimately determined by God (n=806, 73.3%), and belief in not using herbal or traditional remedies for CVD prevention (n=819, 74.4%) (Table 4). Participants' attitudes were associated with their knowledge of CVD risk factors (F=1.990, P=0.009). Those unwilling to change their lifestyle (β=–0.279, P<0.05), who believed that a healthy lifestyle is unnecessary for preventing CVD (β=–0.147, P<0.05), and who felt that health is ultimately determined by God (β=–

Table 2. Knowledge of cardiovascular disease risk factors (n=1,100)

Heart Disease Fact Questionnaire	No. of participants (%)[a]		
	Yes	No	Don't know
1. A person always knows when they have HD (F)	589 (53.5)	278 (25.3)[b]	233 (21.2)
2. If you have a family history of HD, you are at risk for developing HD (T)	540 (49.1)[b]	355 (32.3)	205 (18.6)
3. Elderly people are at a higher risk for developing HD (T)	847 (77.0)[b]	113 (10.3)	140 (12.7)
4. Smoking is a risk factor for heart disease (T)	873 (79.4)[b]	81 (7.4)	146 (13.3)
5. A person who stops smoking will lower their risk of developing HD (T)	863 (78.5)[b]	67 (6.1)	170 (15.5)
6. High blood pressure is a risk factor for HD (T)	891 (81.0)[b]	60 (5.5)	149 (13.5)
7. Blood pressure control reduces the risk of HD (T)	874 (79.5)[b]	57 (5.2)	169 (15.4)
8. High cholesterol is a risk factor for HD (T)	897 (81.5)[b]	48 (4.4)	155 (14.1)
9. Fatty meals do not increase the cholesterol level in the blood (F)	252 (22.9)	687 (62.5)[b]	161 (14.6)
10. If your good cholesterol (HDL) is high, you are at risk for HD (F)	242 (22.0)	410 (37.3)[b]	448 (40.7)
11. If your bad cholesterol (LDL) is high, you are at risk for HD (T)	566 (51.5)[b]	77 (7.0)	457 (41.5)
12. Being overweight increases a person's risk for HD(T)	983 (89.4)[b]	51 (4.6)	66 (6.0)
13. Regular physical activity will lower a person's chance of getting HD (T)	997 (90.6)[b]	40 (3.6)	63 (5.7)
14. Only exercising at a gym will help lower a person's chance of developing HD (F)	284 (25.8)	705 (64.1)[b]	111 (10.1)
15. Walking and gardening are considered exercises that will help lower a person's chance of developing HD (T)	558 (50.7)[b]	423 (38.5)	119 (10.8)
16. Diabetes is a risk factor for HD (T)	598 (54.4)[b]	245 (22.3)	257 (23.4)
17. High blood sugar puts a strain on the heart (T)	664 (60.4)[b]	124 (11.3)	312 (28.4)
18. If your blood sugar is high over several months, it can cause your cholesterol level to go up and increase the risk of HD (T)	391 (35.5)[b]	495 (45.0)	214 (19.5)
19. A person who has diabetes can reduce their risk of developing HD if they keep their blood sugar levels under control (T)	694 (63.1)[b]	94 (8.5)	312 (28.4)
20. People with diabetes rarely have high cholesterol (T)	627 (57.0)[b]	212 (19.3)	261 (23.7)
21. If a person has diabetes, keeping their cholesterol under control will help to lower their chance of developing HD (T)	583 (53.0)[b]	51 (4.6)	466 (42.4)
22. People with diabetes tend to have low HDL (good) cholesterol (F)	391 (35.5)	495 (45.0)[b]	214 (19.5)
23. Person who has diabetes can reduce their risk of developing HD if they keep their blood pressure under control (T)	674 (61.3)[b]	57 (5.2)	369 (33.5)
24. A person who has diabetes can reduce their risk of developing HD if they keep their weight under control (T)	813 (73.9)[b]	80 (7.3)	207 (18.8)
25. Men with diabetes have a higher risk of HD than women with diabetes (F)	993 (90.3)	30 (2.7)b)	77 (7.0)

HD, heart disease; F, false; T, true; HDL, high-density lipoprotein; LDL, low-density lipoprotein.
[a]Percentages may not total 100 due to rounding. [b]Correct response.

Table 3. Factors associated with knowledge

Factor	B (95% CI)	SE	β	R^2	Δ R^2
Model	-	-	-	0.241	0.120
Constant	14.479 (7.393 to 21.565)	3.584	-	-	-
Age (38–45 yr)	1.277 (1.400 to 9.130)	0.477	0.304	-	-
Education (no formal education)	–6.191 (–9.368 to –3.014)	1.607	–0.331	-	-
Information about CVDs (no)	–1.316 (–2.677 to 0.046)	0.689	–0.156	-	-
Personal history of smoking (yes)	–1.796 (–2.765 to 1.174)	0.996	–0.068	-	-
Being aware of the importance of consuming less salt in the diet (yes)	0.934 (1.650 to 3.910)	0.219	0.203	-	-
Walking for at least 10 min (≥5 days/wk)	0.283 (1.030 to 1.690)	0.124	0.287	-	-
Checking blood sugar regularly (yes)	0.347 (1.020 to 1.940)	0.105	0.167	-	-

Dependent variable, Heart Disease Fact Questionnaire. R=0.491, R^2=0.241, F=1.990, P=0.009, Durbin Watson=1.25.
CI, confidence interval; SE, standard error; Δ, difference; CVD, cardiovascular disease.

Table 4. Attitudes toward cardiovascular disease (n=1,100)

Attitude	No. of participants (%)[a]		
	Agree	Don't know	Disagree
Believing oneself to be at risk for cardiovascular disease	449 (40.8)	364 (33.1)	287 (26.1)
Willing to change lifestyle	554 (50.6)	84 (7.6)	462 (41.8)
Willing to change eating habits	326 (29.7)	97 (8.8)	677 (61.5)
Willing to maintain normal weight	543 (49.4)	128 (11.6)	429 (39.0)
Believing a healthy lifestyle is not essential	207 (18.8)	82 (7.5)	811 (73.7)
Believing regular medical checkups are necessary	790 (71.8)	57 (5.2)	253 (23.0)
Believing that one's health is ultimately determined by God	171 (15.5)	123 (11.2)	806 (73.3)
Believing taking herbal or traditional remedies for the prevention	36 (3.3)	245 (22.3)	819 (74.4)

[a]Percentages may not total 100 due to rounding.

Table 5. Association between knowledge and attitudes

Factor	B (95% CI)	SE	β	R^2	Δ R^2
Model	-	-	-	0.086	0.073
Constant	2.07 (1.75 to 2.39)	0.163	-	-	-
Willing to change lifestyle (disagree)	−0.32 (0.07 to 0.57)	0.130	−0.279	-	-
Believing in a healthy lifestyle is not essential (don't know)	−0.42 (−0.58 to −0.05)	0.140	−0.147	-	-
Believing that one's health is ultimately determined by God				-	-
Don't know	−0.15 (−0.26 to 0.04)	0.060	−0.085		
Disagree	0.08 (0.01 to 0.15)	0.040	0.084		
Believing in taking herbal or traditional remedies for prevention (disagree)	0.09 (0.08 to 0.67)	0.050	0.070	-	-

Dependent variable, Heart Disease Fact Questionnaire. R=0.293, R^2=0.086, F=6.772, P<0.001, Durbin Watson=1.14.
CI, confidence interval; SE, standard error; Δ, difference.

0.085, P<0.05), demonstrated less knowledge about CVD. Conversely, participants who disagreed with the notion that health is predetermined by God (β=0.084, P<0.05), and those who rejected the use of herbal or traditional remedies for preventing CVD (β=0.070, P<0.05) showed greater knowledge. The reluctance to change lifestyle had the strongest influence on knowledge levels (Table 5).

DISCUSSION

Health measurements

One way to control risk factors and decrease the incidence of CVD is through primary prevention, early diagnosis, and good health habits [15]. The results indicated that most participants engaged in healthy behaviors, including low rates of smoking and alcohol consumption. Iraq has one of the lowest rates of alcohol consumption compared to non-Muslim countries, largely because alcohol is officially banned and difficult to access due to religious and cultural factors [33]. This prohibition, influenced by the predominant Muslim culture, likely contributes to the reduced alcohol use. Similarly, the smoking rate among our young population was relatively low at 14.6%, ranking it among Eastern Mediterranean region countries, where rates ranged from 11.8% in Iran in 2009 to 38.5% in Lebanon in 2008 [26]. For adults, Iraq's smoking rates are in the mid-range compared to other Eastern Mediterranean regional countries. The literature suggests that smoking rates tend to decline with age, particularly between the age groups of 18 to 39 years and 40 to 59 years, compared to older adults. Thus, while Iraq shows higher rates of smoking among adolescents in the Middle East, this concern is specific to adolescents and was not included in our study.

About 98% of respondents reported using salt daily in cooking and food preparation, while 91.1% acknowledged the importance of a low salt intake, and 88.1% recognized that excessive salt consumption could lead to health issues.

A previous study focusing on youth revealed that only 4.3% consistently added salt to their food before eating, and 56.4% never added extra salt. Fewer than half of the participants believed that reducing salt intake was not important at all. Additionally, more than one-third indicated that excessive dietary salt could pose health risks [15]. In Egypt, 46.6% of individuals considered reducing salt intake to be completely unimportant [34]. These rates are significantly higher than those reported by our study participants.

Our results showed that 56.4% of Iraqi adults regularly walked or used a bicycle for at least 10 minutes, 60.6% walked for at least 10 minutes on 5 or more days per week, and 61.4% engaged in sports and fitness activities between 0 and 2 days per week. Agha and Rasheed [15] reported that walking or biking for at least 150 minutes per week was the most prevalent form of physical activity among young Iraqi adults. However, it was noted that many adults did not adhere to the current WHO physical activity guidelines, underscoring the need for effective policies and programs to enhance activity levels and improve the health of younger generations [35]. In accordance with these findings, while the health behaviors of Iraqi adults are commendable, there remains a need for healthcare-led lifestyle counseling to increase awareness [36].

Dyslipidemia, hypertension, and diabetes mellitus (DM) have been identified as more significant risk factors for CVD in younger patients compared to older individuals [11,37]. The Middle Eastern region experiences a high prevalence of CVD, attributed to lifestyle changes and urbanization. Here, the burden of dyslipidemia is twice as high as that of hypertension and DM. Patients with CVD in this region tend to be younger, exhibit a higher prevalence of risk factors, and suffer from more severe complications of CVD [38,39]. Studies have indicated that in Kuwait and the United Arab Emirates, hypertension is the most prevalent health issue, followed by dyslipidemia and DM [40,41]. In contrast, a study conducted in Iraq revealed that the most common risk factor was hypertension (55.3%), followed by dyslipidemia (42.7%), and DM (29%); however, the rates in our study were lower.

Knowledge of CVD risk factors and associated factors

We utilized the HDFQ to assess participants' knowledge of CVD, revealing that 3.6% of participants demonstrated low knowledge (score, <50), 51.0% exhibited moderate knowledge (score, 51–70), and 45.4% displayed high knowledge (score, >70). Previous research from Iraq indicated average or poor knowledge of CVD risk factors among Iraqi populations [42,43]. Similarly, studies from India, Nepal, Kuwait, and Oman have reported comparable results [26,28,29,40]. In contrast, a study from the United Arab Emirates found that the Arab Muslim population possessed higher levels of knowledge compared to those reported in previous studies [41], which supports our findings. Additionally, a systematic review suggested that knowledge of CVDs and their risk factors might be influenced by factors such as population characteristics, residency, the tools used in the study, and the level of information available about CVDs [44].

Our study identified a knowledge gap in certain modifiable risk factors, including good and bad cholesterol, DM, and various activities. Previous research in Middle Eastern Muslim countries such as Iraq, Kuwait, and Oman have shown that participants generally possess a high level of awareness regarding these risk factors [28,31,40,42]. Our findings indicate that young Iraqi adults require education that encompasses a detailed understanding of these risk factors. This information is crucial for quantitatively assessing CVD knowledge and pinpointing specific knowledge gaps. These insights will aid in the development of educational programs tailored for Iraqi adults residing in Erbil.

In this study, smokers had less knowledge than nonsmokers, and participants who were aware of consuming less salt and aged between 38 to 45 years displayed higher knowledge. Previous research in Middle Eastern and other developing countries has shown that high educational attainment, being middle-aged, nonsmoking status, and awareness of CVD risk factors are significant predictors of adequate knowledge [28,41,45].

Attitudes and associated factors

Many Iraqi adults exhibited positive attitudes towards health, including a willingness to change their lifestyle, a belief in the importance of regular medical examinations, a view that health is not solely determined by God, and a preference for not using herbal or traditional treatments to prevent CVD. Attitudes can influence both positive and negative health behaviors, potentially affecting an individual's willingness to adopt preventive measures or their adherence to them [12]. Previous studies have shown that

participants in neighboring countries such as the United Arab Emirates and Iran [41,46], as well as in other countries like India and Nepal [26,45], also demonstrated satisfactory attitudes. In our study, the results indicated that many individuals were open to adopting healthier lifestyle patterns. The high level of education among the Iraqi population may contribute to these positive attitudes.

We found that a minority of participants exhibited a negative attitude towards their health, including a belief that they were not at risk for CVD and a reluctance to change their dietary habits. An unhealthy diet is recognized globally as one of the risk factors for CVD [47]. In recent years, the Middle East has seen a shift from traditional to industrialized foods, driven by urbanization and modernization. This dietary transition has contributed to an unprecedented rise in CVD prevalence [38,39]. Additionally, race/ethnicity and culture may influence health outcomes [17]. This adverse trend could be attributed to changes in lifestyle due to globalization, urbanization, or specific cultural aspects of the Middle East. Clinicians, educators, and researchers should be adaptable in identifying both positive and negative attitudes that could influence the incidence of CVD in their communities, aiming to address these factors to enhance the overall quality of life.

Limitations

This study has several limitations. Firstly, it relies on a self-administered survey, which means the results are dependent on the accuracy of the information provided by participants and may be subject to bias. Additionally, comparing knowledge and attitudes about CVD across different populations is challenging due to variations in study designs and measurement tools. Furthermore, this study did not explore the underlying causes of unhealthy lifestyles and negative attitudes among Iraqi adults. Despite these limitations, the study's strength lies in its comprehensive evaluation of health behavior, knowledge, and attitudes among young adults in Iraq. It includes a larger sample size and encompasses data from participants residing in Erbil, Iraq. However, the findings cannot be generalized to all regions of Iraq or other countries.

Conclusions

Our study revealed that a significant majority of participants (90%) possessed moderate to high knowledge about the subject. While participants generally exhibited positive attitudes, there was a noticeable lack of awareness regarding certain modifiable risk factors. The level of knowledge correlated with various factors including age, education level, smoking status, existing knowledge, recognition of the importance of reducing dietary salt, regular monitoring of blood sugar levels, and a reluctance to modify lifestyle habits. Further research should include young adults from diverse educational and socioeconomic backgrounds. Additionally, we suggest that health authorities in Iraq, particularly in Erbil, implement health training programs to enhance awareness of CVD risk factors.

ARTICLE INFORMATION

Author contributions

Conceptualization: all authors; Data curation: HAS; Formal analysis: HAS; Methodology: all authors; Supervision: IIA; Writing–original draft: all authors; Writing–review & editing: all authors. All authors read and approved the final manuscript.

Conflicts of interest

The authors have no conflicts of interest to declare.

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