International Journal of Community Medicine and Public Health
Bakry H et al. Int J Community Med Public Health. 2024 Apr;11(4):1417-1424
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20240693

Original Research Article

Knowledge and perception of hypercholesterolemia among Princess Nourah Bint Abdulrahman University students

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Received: 25 February 2024
Revised: 16 March 2024
Accepted: 18 March 2024

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ABSTRACT

Background: Hypercholesterolemia is one of the major risk factors for cardiovascular disease, which could escalate mortality rates in Saudi Arabia. Research has shown that the prevalence of high cholesterol in Saudi Arabia is predicted to rise in the next few years. The knowledge and perception are important as this is one of the modifiable risk factors for NCDs. The aim of study is to assess the knowledge and perception regarding hypercholesterolemia among university students and to determine if there is any relation between knowledge and perception of hypercholesterolemia among university students.
Methods: A cross-sectional study using a self-administrated questionnaire measuring the knowledge and perception of hypercholesterolemia was conducted among 588 medical and non-medical students at Princess Nourah Bint Abdulrahman University.
Results: The result indicates that 54.93% of the participants had poor knowledge about hypercholesterolemia and 79.76% of them had a positive perception about it.
Conclusions: There is a gap in knowledge and perception regarding high cholesterol. Furthermore, it was found that there is a significant association between the knowledge and perception regarding hypercholesterolemia among Princess Nourah Bint Abdulrahman University students.

Keywords: Hypercholesterolemia, Knowledge, Perception, Princess Nourah Bint Abdulrahman University, Riyadh

INTRODUCTION

Hypercholesterolemia is considered as the main cause of morbidity in developed and developing countries. According to the world health organization (WHO) the number of individuals with high cholesterol was estimated to be 40% among females and 37% among males, while the total proportion of adults of 39% globally.[1] In Saudi Arabia 36.6% was the total number of people with hypercholesterolemia, 38.2% in females and 35.4% in males.[2] A study by El Bcheraoui et al, investigating the prevalence of hypercholesterolemia and its associated risk factors in Saudi Arabia revealed that over one million individuals had hypercholesterolemia, but 65.1% remained undiagnosed. This highlights the concerning prevalence of undiagnosed hypercholesterolemia in Saudi Arabia.[3]

The increased level of cholesterol contributes to building up plaques causing atherosclerosis, which blocks the artery and makes it difficult for oxygen and nutrients to reach the rest of the body leading to increase in incidence and prevalence of cardiovascular diseases such as atherosclerosis, stroke, heart attack, coronary artery disease (CAD) and ischemia that eventually might lead to death.[4] Modifiable factors such as unhealthy lifestyle is

considered the major cause of hypercholesterolemia including unhealthy food intake which plays an important role in raising the level of low-density lipoprotein (LDL) cholesterol by consuming foods that contain trans-fat that results from processing and frying foods, and saturated fats which can be exist as well in fried and processed foods, dairy products, some types of meat, baked goods and chocolate.[5] Another modifiable factor is smoking which has a negative effect on cholesterol levels, it increases the level of LDL cholesterol, while lowering the level of high-density lipoprotein (HDL) cholesterol, the chemical substance of cigarettes increases the fat level in the bloodstream which causes accumulation of lipids in the arteries.[6] In addition to that the lack of physical activity has a major negative impact on metabolization of the fat, involving rising in LDL cholesterol levels at the bloodstream. Exercises can increase the level of HDL cholesterol, which can be increased by 13% in obese patients if exercise is performed regularly by walking or running for about 9 miles a week in addition to a low-fat diet.[7]

High cholesterol is also due to several non-modifiable risk factors including genes and gender which plays an important role as a risk factor for hypercholesterolemia as males are more susceptible to develop it than women as well as some medical conditions and certain drugs.[8]

The knowledge and perception were important in terms of prevention of cardio vascular diseases. This was shown by a study conducted in Abha, Saudi Arabia among patients attending primary health care centers to determine their awareness, behavior, and practice concerning dyslipidemia, showed that 77.3% of them were lacking awareness about dyslipidemia.[9] Another study conducted in Canada aimed to investigate the Canadians perception regarding food intake and health while taking into consideration their health and beliefs, showed that the greater part of the Canadian citizens had a positive perception toward the importance of the role of nutritional intake, in order to enhance and maintain health.[10]

Yahya et al conducted a study to identify the relationship between knowledge and practice knowledge about cardiovascular disease among women in Kelantan Malysia, showed a positive relationship between knowledge and attitude towards reducing cardiovascular diseases, therefore participants' increased knowledge encouraged them to adjust their perception.[11]

The objective of this study is to assess the knowledge and perception regarding hypercholesterolemia among university students and to determine if there is any relation between them among university students.

METHODS

A cross sectional study was conducted among Princess Nourah Bint Abdulrahman University students in Riyadh, Saudi Arabia from January 2020 up to June 2020. Participants were recruited through probability multi-stage sampling techniques. First, Princess Nourah Bint Abdulrahman University was divided into two strata: health colleges and non-health colleges. Through simple randomization the nursing colleges from health college and art college from non-health colleges were selected. Finally, three clusters were randomly selected from art college and one from nursing college was taken, total of four clusters. Inclusion all Princess Nourah Bint Abdulrahman students and no exclusions were made

Sample size was calculated to be 577 based on prevalence of the factor understudy was 50%, design effect was set to be 1.5 and the desired margin of error was 0.05. The calculation of the sample size was conducted by using n4studies application.[12] The collected sample was 588. The number of participants from each stratum was drawn by using proportional allocation, in nursing college the participants were 47 and in the art college the participants were 530.

Data was collected by a structured self-administered Arabic questionnaire which was designed by the researchers and guided by previous literature.[9,11,13] The questionnaire consisted of three sections. The first section determined the characteristics of participants, the second section consisted of 26 questions to assess the knowledge of the participant and the answers were presented as multiple-choice questions, the third section consisted of 7 questions to assess the perception of the participants toward hypercholesterolemia, the answers were presented as 5-point Likert scale.

Each question in the knowledge section was scored as 2 points for the correct answer, and 0 for the wrong answer, with a total score of 52. Cutoff point for knowledge: ≤50% considered to be poor, >50% to 75% considered to be fair and more than 75% considered to be good knowledge. The perception section was measured in 5 points Likert scale (strongly agree =5, strongly disagree =1) except for the sixth sentence it was negatively quoted (strongly agree =1, strongly disagree =5) with a total score 35. Cutoff point for perception: ≤50% considered to be negative, >50% to 75% considered to be neutral and more than 75% considered to be positive.

Validity and reliability

The self-administered questionnaire was revised by 3 independent experts and the average congruency percentage was 100%. A pilot study was conducted before the data collection among Princess Nourah Bint Abdulrahman University students in both health colleges and non-health colleges, and Cronbach's alpha was calculated to be 0.66 for the knowledge and 0.77 for the perception.

Data management

The statistical software that was used was JMP version 14.2.[14] The significant level was set at 0.05. The data was presented by descriptive tables. Association between knowledge and perception was tested using chi-squared test.

Ethical consideration

Data collection started after obtaining the approval from the Princess Nouran Bint Abdulrahman Institutional Review Board (IRB). IRB log number: 20-0027. The participation was voluntary, and anonymity was preserved. All participants were informed about the purpose of the study, and their right to withdraw at any time and they were assured about confidentiality of the data.

RESULTS

Table 1 indicates the participants' demographic characteristics. Almost ninety percent (90.48%) of the participants from art college 38.44% of them were history and civilization students, while 9.52% were specialized in nursing. About half of participants were aged between 18 and 20 years, were between the ages of 24 and above (49.49% and 11.22% respectively). Half of the participants knew someone with high cholesterol. About one third of the participants have first degree relatives who have high cholesterol. The majority of the participants have heard about high cholesterol before. Almost three thirds (63.44%) of the participants were junior students. The participants who had a first degree relative with high cholesterol were 35.4%. While 1.5% of the participants had a friend with high cholesterol.

Table 1: Demographic characteristics of the participants.

Demographic	N	%
College		
College of nursing	56	9.52
College of art	532	90.48
Age (years)		
18 to <21	291	49.49
21 to <24	231	39.29
24 and above	66	11.22
Specialty		
Nursing	56	9.52
History and civilization	226	38.44
Islamic studies	175	29.76
Libraries	131	22.28
Educational level		
Junior student	373	63.44
Senior student	215	36.56
Have relative with high cholesterol		
Second degree	208	35.5
First degree	117	19.9
Friend	9	1.5
None	168	28.6
I don't know	86	14.6
Total	588	100%

Table 2 indicates the knowledge of the participants about hypercholesterolemia. The participants answered incorrectly about if cholesterol patients should avoid all fat, men being more susceptible to high cholesterol than women, the function of cholesterol, the function of good cholesterol, the main dietary reason for high cholesterol, the food that can lower cholesterol level and the appropriate amount of saturated fat for high cholesterol patients by (52.72%, 72.79%, 86%, 56.29%, 69.56%, 55.44% and 90.41%) respectively. Furthermore, the participants answered correctly about if the cholesterol level can be controlled, the normal amount of good cholesterol level in the bloodstream and the suitable meat for a low cholesterol diet by (76.70%, 24.49% and 62.24%) respectively

Table 3 indicates the total knowledge of the participants about hypercholesterolemia. 54.93% of the participants had poor knowledge about hypercholesterolemia. 44.05% of the participants had fair knowledge about hypercholesterolemia. On the other hand, 1.02% had good knowledge about hypercholesterolemia

Table 4 demonstrates perception of the participants about hypercholesterolemia. The participants had a positive perception about the seriousness of the disease,

monitoring cholesterol levels regularly, the possibility of high cholesterol being linked to other diseases and the ability of controlling cholesterol level by following a healthy diet by (82.14%, 86.22%, 76.19% and 84.69%) respectively. While the negative perception of the participants was about the ability of lowering cholesterol level after being diagnosed with high cholesterol, the importance of knowing the cholesterol level in the food and the ability of controlling cholesterol level by medication only by (5.61%, 6.63% and 22.45%) respectively.

Table 2: Detailed knowledge of the participants about hypercholesterolemia.

Variables	True		False	
	N	%	N	%
Q1: Does cholesterol have types?	267	45.41	321	54.59
Q2: Does cholesterol exist naturally in the body?	401	68.20	187	31.80
Q3: Can cholesterol level be controlled?	451	76.70	137	23.30
Q4: If a patient is diagnosed with high cholesterol, should they avoid all fats?	278	47.28	310	52.72
Q5: Are thin people exposed to high cholesterol?	317	53.91	271	46.09
Q6: Are men more susceptible to high cholesterol than women?	160	27.21	428	72.79
Q7: Do fruits and vegetables cause high cholesterol?	328	55.78	260	44.22
Q8: Does the amount of salt affect patients with high cholesterol?	325	55.27	263	44.73
Q9: What is the function of cholesterol?	77	13.10	511	86.90
Q10: What is the normal amount of good cholesterol level in the body?	144	24.49	444	75.51
Q11: Cholesterol is commonly checked by doing:	394	67.01	194	32.99
Q12: What is the good cholesterol function?	257	43.71	331	56.29
Q13: High cholesterol in the blood leads to:	347	59.01	241	40.99
Q14: Which of the following could increase the possibility of having high cholesterol?	381	64.80	207	35.20
Q15: What are the best lifestyle changes to control cholesterol?	170	28.91	418	71.09
Q16: What is the main dietary reason for high cholesterol?	179	30.44	409	69.56
Q17: When buying any food product, what are the most important elements that a patient with high cholesterol must make sure that they do not exist in the nutritional contents of the product?	250	42.52	338	57.48
Q18: Which of the following foods can lower your cholesterol level?	262	44.56	326	55.44
Q19: What foods contain high cholesterol?	460	78.23	128	21.77
Q20: Which of the following oils can be used to avoid high cholesterol in cooking?	433	73.64	155	26.36
Q21: Which of the following meat is suitable for a low-cholesterol diet?	366	62.24	222	37.76
Q22: What is the healthy way to cook fish for high cholesterol patients?	237	40.31	351	59.69
Q23: Which of the following dairy products is suitable for a low-cholesterol diet?	422	71.77	128	21.77
Q24: Which of the following starches is suitable for a low-cholesterol diet?	407	69.22	181	30.78
Q25: Which of the following is suitable for a low-cholesterol diet?	264	44.9	324	55.10
Q26: When looking at the nutrient contents, what is the appropriate amount of saturated fat for high cholesterol patients?	58	9.86	530	90.41

Table 3: Total knowledge of the participants about hypercholesterolemia.

Knowledge	N	%
Poor	232	54.93
Fair	259	44.05
Good	6	1.02
Total	588	100%

Table 5 indicates the total perception of the participants about hypercholesterolemia. 79.76% of the participants had positive perception about hypercholesterolemia where 19.73% of the participants had neutral perception about hypercholesterolemia while 0.51% had negative perceptions about hypercholesterolemia.

Table 6 demonstrates the association between knowledge and socio demographic characteristics of the participants. There were significant associations between the knowledge and the participants' college, specialty and their educational level since the p value is less than 0.05

(p=0.0001, 0.0001 and 0.0095) respectively. There was a significant association between the knowledge and if they heard about high cholesterol before since the p value is less than 0.05 (p=0.0151) respectively.

Table 4: Perception of the participants about hypercholesterolemia.

Variables	Negative perception		Neutral perception		Positive perception	
	N	%	N	%	N	%
Q1: I think high cholesterol is a dangerous disease	21	3.57	83	14.29	483	82.14
Q2: I think cholesterol can be lowered after a person is diagnosed with it	33	5.61	106	18.03	449	76.36
Q3: I think high cholesterol requires regular checks to monitor its level	20	3.40	61	10.37	507	86.22
Q4: I think high cholesterol may be linked to other diseases	42	7.14	98	16.67	448	76.19
Q5: I think it is important to know the cholesterol level in the food	39	6.63	97	16.50	452	76.87
Q6: I think cholesterol level can only be controlled with medication only	132	22.45	133	22.62	323	54.93
Q7: I think cholesterol level can be controlled by following a healthy diet	26	4.42	64	10.88	498	84.69

Table 5: Average perception of the participants about hypercholesterolemia.

Perception	N	%
Negative	3	0.51
Neutral	116	19.73
Positive	469	79.76
Total	588	100

Table 6: Association between knowledge and sociodemographic characteristics of the participants.

Variables	Knowledge			Test of significance χ^2	P value
	Poor (%)	Fair (%)	Good (%)		
Age (years)					
18-20	187 (64.26)	100 (34.36)	4 (1.38)		
21-23	146 (63.203)	84 (36.364)	1 (0.433)	χ^2=5.078	0.2794
24 and above	34 (51.51)	31 (46.97)	1 (1.52)		
College					
Nursing	16 (28.57)	38 (67.86)	2 (3.57)	χ^2= 31.882	0.0001*
Art	351 (65.98)	177 (33.27)	4 (0.75)		
Educational level					
Junior student	250 (67.024)	120 (32.172)	3 (0.804)	χ^2=9.323	0.0095*
Senior student	117 (54.42)	95 (44.19)	3 (1.39)		
Knowing someone with high cholesterol					
Yes	202 (61.4)	122 (37.1)	5 (1.5)		
No	97 (62.2)	59 (37.8)	0 (0.00)	χ^2=3.116	0.5386
I don’t know	68 (66)	34 (33)	1 (1)		
How close the person with high cholesterol is					
First degree relative	128 (61.54)	77 (37.02)	3 (1.44)		
Second degree relative	69 (58.97)	46 (39.32)	2 (1.71)		
Friends	9 (100)	0 (0.00)	0 (0.00)	χ^2=8.677	0.3703
None	106 (63.1)	62 (36.9)	0 (0.00)		
I don’t know	55 (63.9)	30 (34.9)	1 (1.2)		
Hearing about high cholesterol before					
Yes	318 (60.46)	202 (38.40)	6 (1.14)	χ^2=8.385	0.0151*
No	49 (79.03)	13 (20.97)	0 (0.00)		

*p≤0.05.

Table 7: Association between perception and sociodemographic characteristics of the participants.

Variables	Perception			Test of significance χ^2	P value
	Negative (%)	Neutral (%)	Positive (%)		
Age (years)					
18-20	2 (0.69)	55 (18.90)	234 (80.41)	χ^2=1.089	0.8960
21-23	1 (0.4)	49 (21.2)	181 (78.4)		
24 and above	0 (0.00)	12 (18.2)	54 (81.8)		
College					
Nursing	0 (0.00)	5 (8.9)	51 (91.1)	χ^2=4.967	0.0834
Art	3 (0.6)	111 (20.0)	418 (78.5)		
Educational level					
Junior student	2 (0.54)	82 (21.98)	289 (77.48)	χ^2=3.311	0.1910
Senior student	1 (0.47)	34 (15.81)	180 (83.72)		
Knowing someone with high cholesterol					
Yes	0 (0.00)	54 (16.41)	275 (83.59)	χ^2=9.632	0.0471*
No	2 (1.28)	36 (23.08)	118 (75.64)		
I don't know	1 (0.97)	26 (25.24)	76 (73.79)		
How close the person with high cholesterol is					
First Degree relative.	0 (0.00)	33 (15.87)	175 (84.13)	χ^2=10.542	0.2290
Second Degree relative.	0 (0.00)	20 (17.1)	97 (82.9)		
Friends.	0 (0.00)	3 (33.3)	6 (66.7)		
None.	2 (1.2)	38 (22.6)	128 (76.2)		
I don't know.	1 (1.16)	22 (25.58)	63 (73.26)		
Hearing about high cholesterol before					
Yes	2 (0.4)	99 (18.8)	425 (80.8)	χ^2=4.402	0.1107
No	1 (1.6)	17 (27.4)	44 (71)		

*p≤0.05.

Table 8: Association between knowledge and perception.

Variables	Knowledge			Test of significance χ^2	P value
	Poor	Fair	Good		
Negative perception	3 (100)	0 (0.00)	0 (0.00)	χ^2=60.687	0.0001*
Neutral perception	108 (93.1)	8 (6.9)	0 (0.00)		
Positive perception	256 (54.6)	207 (44.1)	6 (1.3)		

*p≤0.05.

Table 7 demonstrates the association between perception and sociodemographic characteristics of the participants. Among all ages 79.76% of the participants had a positive perception towards hypercholesterolemia. None of the nursing students had a negative perception towards hypercholesterolemia. 29.42% of history and civilization students had a positive perception towards hypercholesterolemia. Furthermore, 29.42% of the participants were junior students who had a positive perception towards hypercholesterolemia. There was no significant association between the perception and sociodemographic characteristics of the participants.

There was a significant association between the perception and if they knew someone with high cholesterol since the p value is less than 0.05 (p=0.0471).

Table 8 demonstrates the association between knowledge and perception of the participants. There was a significant association between knowledge and perception of the participants since the p value is less than 0.05 (p=0.0001).

DISCUSSION

This study aimed to assess the association between knowledge and perception about hypercholesterolemia among Princess Norah Bint Abdulrahman University students. Over half of the participants were considered to have poor knowledge regarding hypercholesterolemia. This similar to Singaporean study where the knowledge of their participants was poor.[15] This lack of awareness suggests a potential deficiency in public health campaigns aimed at educating the population about hypercholesterolemia. The majority of participants answered incorrectly about men being more susceptible to high cholesterol than women. Individuals may think women are more likely to have high cholesterol than men due to the prevalence of obesity where it is higher in women, which leads to misinterpretation that women are

more susceptible to high cholesterol than men. According to a study conducted in Saudi Arabia (2017), reported that the prevalence of obesity is more among women than men.[16]

The majority of the participants answered incorrectly about the main dietary reason for high cholesterol and more than half of them answered incorrectly about the food that can lower cholesterol level, this could be explained in the light of a study carried out in seven Arab countries found that there is a lack of healthy nutritional information among young adults.[17] This could be explained by the unhealthy traditional eating habits that Arab cultures adopt due to the lack of nutritional knowledge that can lead to high cholesterol.

More than half of the participants answered incorrectly when asked about the most important elements that a patient with high cholesterol must make sure that they do not exist in the labeling of the product and almost all of the participants answered incorrectly about the appropriate amount of saturated fat for high cholesterol patients. According to a study among consumers that took place in Bahrain in 2018, revealed the use of labeling was discovered to be minimal as well their lack of knowledge of the labels.[18] This could be attributed to their lack of food label usage, not knowing the correct amount needed for the human body, and the elements that could raise the cholesterol level.

Almost two third of the participants answered correctly about the items that could increase the possibility of having high cholesterol, this might be due to TV programs and advertisements, whether in the media or television, which highlight foods that increase the level of cholesterol. Almost the majority of the nursing participants had fair knowledge, and more than half of the art college participants had poor knowledge. This may have been attributed to the nurse’s medical background. All the participants who had good knowledge had heard about high cholesterol before, this can be explained by hearing about it from a reliable source which provides them with information about hypercholesterolemia. The majority of the participants who didn't hear about high cholesterol before had poor knowledge, this might be due to the participants not knowing about high cholesterol which prevented them from searching or asking for information.

Regarding perception, the majority of the participants had a positive perception of the seriousness of hypercholesterolemia and over three quarters of the participants had a positive perception towards the possibility of high cholesterol being linked to other diseases. This could be attributed to the cardiovascular campaigns that were established in many public places which mention high cholesterol as one of its risk factors.

Both of the negative and neutral participants' perceptions were similar towards the ability of controlling cholesterol level by medication only. While the majority of the participants had a positive perception towards the ability to control cholesterol level by following a healthy diet. This might be because of the people's belief in home remedies before seeking health care services, and the common concept in our culture which states that if natural treatments did not benefit them it would not harm them.

Out of all the participants almost none of them had a negative perception about whether they knew someone with high cholesterol or not, while almost half of the participants who knew someone with high cholesterol had a positive perception, this may be attributed to the participants may receive the perception of hypercholesterolemia from the patient that they know. Fifth of the participants who did not know someone with high cholesterol had a positive perception, this could be explained by the association of high cholesterol with many diseases.

Our study revealed a notable disconnect between knowledge and perception regarding hypercholesterolemia. Nearly half of the participants with a positive perception of the condition demonstrated poor knowledge. This finding suggests that existing public health campaigns might be raising awareness of hypercholesterolemia as a risk factor for cardiovascular disease but may not be effectively conveying deeper understanding of the condition itself. This aligns with the possibility that campaigns might be focusing solely on mentioning hypercholesterolemia as a risk factor without providing sufficient details about its causes, consequences, and management options. It is important to acknowledge that our findings differ from previous studies, such as the study conducted by Tran et al to assess knowledge, perception, and risk of cardiovascular diseases, which reported no significant association between knowledge and perceptions of cardiovascular risk factors.[19] This discrepancy highlights the need for further research to explore the complex interplay between knowledge, perception, and various contextual factors influencing individual understanding of health issues.

CONCLUSION

Our study identified a significant association between poor knowledge of hypercholesterolemia and a positive perception of the condition among students. This finding suggests that current awareness campaigns might be raising awareness but not effectively translating into deeper understanding. Additionally, factors like college affiliation, educational level, prior exposure to information about high cholesterol, and knowing someone with the condition were also associated with knowledge and perception.

Recommendations

Prioritizing hypercholesterolemia in public health campaigns: campaigns should go beyond simply

mentioning it as a risk factor and delve into its causes, consequences, and management strategies. Integrating health education into curriculums: including information about nutrition, exercise, and local risk factors related to cholesterol can empower students to make informed choices. Conducting further research: investigating the link between healthy lifestyle practices and cholesterol levels, along with interventional studies to improve knowledge about hypercholesterolemia, are crucial for developing effective preventive strategies.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Bakry H, Alharbi BK, Zaini RH, Araki RH, Alshammari ST, Abusalih H. Knowledge and perception of hypercholesterolemia among Princess Nourah Bint Abdulrahman University students. Int J Community Med Public Health 2024;11:1417-24.