



# Knowledge, Attitude, and Practice Regarding Cardiovascular Disease among Coronary Artery Disease and Premature Coronary Artery Disease Patients Referred to Imam Hossein Hospital, Tehran, Iran

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## Abstract

**Background:** Knowledge, attitudes, and practices (KAP) studies are widely used in public health. This study aimed to investigate and compare KAP among patients with coronary artery disease (CAD) and premature coronary artery disease (PCAD) regarding cardiovascular disease (CVD).

**Methods:** This cross-sectional study was conducted on 100 PCAD patients and 100 CAD patients in a general hospital in Tehran, Iran, between April and October 2022. A valid questionnaire was utilized to gather information, and descriptive analysis and logistic regression were employed for analysis using SPSS, version 23.

**Results:** This study involved 100 CAD and 100 PCAD patients with average ages of  $68.09 \pm 7.20$  and  $50.20 \pm 7.65$  years, respectively. Men accounted for 58% of the PCAD group and 73% of the CAD group. The PCAD group had a higher level of knowledge and exhibited a more positive attitude toward CVD than the CAD group ( $P=0.007$  and  $P<0.001$ , respectively). The PCAD patients and those with a family history of chronic diseases had a higher level of knowledge ( $P=0.045$  and  $P=0.27$ , respectively) and showed a more positive attitude ( $P=0.030$  and  $P<0.001$ , respectively). However, participants with a self-reported history of chronic diseases and those who were employed exhibited a less positive attitude. Occupation was associated with nutritional and smoking status ( $P=0.037$ ).

**Conclusion:** Higher levels of knowledge and more positive attitudes regarding CVD were observed; still, the study population's behaviors were unsatisfactory. Educational interventions are needed to promote positive health behaviors, emphasizing the link between knowledge and risk reduction and decreased CVD and mortality rates.

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## Introduction

Cardiovascular disease (CVD) is the leading cause of mortality worldwide in that it accounts for over 17 million deaths per year.<sup>1</sup> Coronary artery disease (CAD) is the most prevalent CVD and occurs owing to plaque accumulation in coronary arteries, reducing blood flow to the heart and likely resulting in angina, myocardial infarction, or sudden cardiac death.<sup>2</sup> CAD is responsible for over 7 million deaths globally each year and represents a significant public health burden.<sup>3</sup> In Iran, CVD is also a major cause of morbidity and mortality, with CAD estimated to be culpable for approximately 40% of all deaths.<sup>4,5</sup>

Premature coronary artery disease (PCAD), defined as CAD occurring in individuals under the age of 55 years in men and 65 years in women, is increasingly recognized as a significant public health problem. PCAD comprises up to 10% of all CAD cases and disproportionately affects developing countries, where up to half of all CAD cases occur before the age of 55 years.<sup>6</sup> According to studies, in Iran, the prevalence of PCAD is estimated at between 2% and 10%, depending on the region.<sup>7</sup>

Knowledge, attitudes, and practices (KAP) studies are widely utilized in public health research to assess a population's KAP regarding various health issues. KAP studies have been conducted in the context of CVD to provide insight into the understanding, beliefs, and behaviors of individuals vis-à-vis the risk factors, prevention, and management of CVD.<sup>8,9</sup> Such studies help identify gaps in knowledge and misconceptions and may inform the development of targeted interventions to improve patient outcomes.

Research on KAP is crucial to enhancing our understanding of and behavior toward cardiovascular health within a community. This knowledge can be instrumental for public health initiatives by facilitating the development of targeted educational programs and evaluating the effectiveness of intervention strategies. Previous investigations have examined knowledge of CVD in diverse populations, including patients or the general population.<sup>10-13</sup> Nonetheless, information is scarce regarding the knowledge level pertaining to CVD, its symptoms, and risk factors, specifically in Iran. Moreover, there is limited research into KAP concerning premature CAD in Iran. Given the high burden of PCAD in Iran and the associated risk factors, it is essential to understand the KAP of individuals regarding CVD. This information can help inform the development of effective strategies for prevention and management. Accordingly, the objective of this study was to identify

factors associated with KAP related to CVD and to compare this KAP between PCAD and CAD patients.

## Methods

The current cross-sectional study, carried out in the Iranian capital, Tehran, between April and October 2022, included patients undergoing coronary angiography or angioplasty at Imam Hossein Hospital. The study population consisted of 100 CAD and 100 PCAD patients. A CAD patient was defined as an individual presenting to this hospital with the first clinical manifestation of CVD with significant stenosis (>50%) in at least 1 major coronary artery as confirmed by angiography. PCAD was defined as CAD (at least single-vessel involvement with >50% stenosis) in men and women younger than 55 and 65 years, respectively. All patients were selected by convenience sampling.

The sample size was calculated to be 100 patients in each group of CAD and PCAD based on a comparison of 2 means and according to an effect size of 0.4, an  $\alpha$  of 0.05, and a  $\beta$  of 0.2.<sup>14</sup> The study protocol was approved by the Research Ethics Committee of the Vice-Chancellorship for Research and Technology, Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1401.024). Written consent was obtained from all the participants.

Before hospital discharge, a standard questionnaire consisting of 29 questions related to KAP regarding CVD (CVD-KAP29) was given to the patients by a trained CCU nurse to obtain information based on face-to-face interviews. Basic information, including demographic characteristics, body mass index, family history (a history of CVD at least in a first-degree relative [father, mother, brother, or sister]), smoking status, and comorbidities (hypertension, diabetes, and dyslipidemia), was extracted from the registration system entitled "Coronary Angiography and Angioplasty Registry [CAAR]," which contains a single-center prospective follow-up of patients undergoing coronary angiography or angioplasty at Imam Hossein Hospital in Tehran. The protocol of this registration system was registered at Shahid Beheshti University of Medical Sciences, Vice-Chancellorship for Research and Technology and approved by the institutional ethics committee (IR.SBMU.RETECH.REC.1400.256).

A KAP questionnaire evaluates a community's comprehension, viewpoint, and actions regarding a particular subject, for instance, CVD. The questions assess the community's understanding of CVD and its risk factors and symptoms. Attitudes are considered the community's



learned predispositions, beliefs, and emotions vis-à-vis the subject, while practice pertains to its actions and use of preventive measures in relation to the topic.

The CVD-KAP29 questionnaire was developed and validated in Iranian CVD patients based on literature reviews and expert opinions in 2021. Further details regarding the reliability and validity of this questionnaire are available in the reference number.<sup>15</sup> To investigate the internal consistency of this questionnaire in our population, we checked the Cronbach  $\alpha$  coefficients. The coefficients for the subscales of knowledge, attitudes, physical activity-related behaviors, and nutritional and smoking status were 0.808, 0.900, 0.751, and 0.700, respectively. The results suggested good internal consistency within each subscale.

The CVD-KAP29 questionnaire is divided into 4 sections. The first part consists of 12 three-point Likert scale questions assessing respondents' knowledge of CVD risk factors, symptoms, and prevention with minimum and maximum scores of 0 and 24, respectively. The questions are presented in a format where participants can respond with "yes," "no," or "I don't know." The second section features 10 five-point Likert scale questions to evaluate subjects' attitudes toward the risk factors, preventive measures, and symptoms of CVD. This section includes 10 five-point Likert scale questions, where participants can respond with "strongly disagree," "disagree," "neutral," "agree," or "strongly agree." The minimum and maximum scores for this section are 10 and 50, respectively. The third portion has 2 questions about physical activity behaviors, while the fourth section contains 5 questions about nutritional and smoking status. The questions for both sections are 3-point Likert scale questions, where participants can respond with "yes, more than 3 days a week," "yes, less than 3 days a week," or "no." The minimum and maximum scores for this section are 0 and 4 for physical activity and 0 and 10 for nutritional and smoking status, respectively. All scores are converted to a range of 0 to 100.<sup>13</sup>

Categorical variables were represented as frequencies and percentages, while KAP scores were summarized using medians and interquartile ranges (IQRs). To further classify these scores, we employed a quintile system, where scores falling below 20 were deemed "highly insufficient," scores within the range of 21 to 40 were classified as "insufficient," scores between 41 and 60 were labeled as "sufficient," scores ranging from 61 to 80 were considered "satisfactory," and scores above 80 were categorized as "highly satisfactory." This approach provides a more objective means of evaluating participants' overall level of knowledge, attitudes, physical fitness, and nutritional and smoking status.<sup>9</sup>

The KAP scores of PCAD and CAD patients were compared using the Mann-Whitney test. Next, utilizing univariate logistic regression, we explored the relationship between independent variables and KAP scores related to

CVD. Further, we performed a multiple logistic regression analysis, including all variables with a P value of less than 0.2 in the univariate analysis. This analysis helped identify factors independently associated with CVD KAP scores. These logistic analyses were performed separately on knowledge, attitudes, physical activity, and nutritional and smoking status as response variables. In each model, the response options for the dependent variable were categorized into groups of "highly insufficient," "insufficient," "sufficient," or "satisfactory" in comparison with "highly satisfactory." A P value of less than 0.05 was considered statistically significant. The Statistical Package for Social Sciences (IBM Corp, released in 2012, IBM SPSS Statistics for Windows, version 21.0. Armonk, NY: IBM Corp) was used for data analysis.

## Results

The present study assessed 100 CAD and 100 PCAD patients with an average age of  $68.09 \pm 7.20$  (range=56–86) and  $50.20 \pm 7.65$  years (range=22–63), respectively.

As presented in Table 1, the majority of the participants were married (80.0% and 69.0% in the PCAD and CAD groups, respectively). Men accounted for 58 patients (58.0%) in the PCAD group and 73 (73.0%) in the CAD group. Regarding education, 56.0% and 80.0% of the PCAD and CAD groups, respectively, had primary levels of education or were illiterate, and most of them were unemployed (54.0% and 75.0% in the PCAD and CAD groups, respectively). In terms of medical history, 68.0% and 56.0% of the PCAD and CAD groups, respectively, reported a family history of chronic diseases, such as CVD, hypertension, diabetes, and dyslipidemia, while 80.0% and 83.0% of the PCAD and CAD groups, respectively, had a personal history of chronic diseases.

Quintile scores are used in Table 2 to display the median (IQR) and percentage distribution of respondents' levels of KAP regarding CVD. The median (IQR) score for knowledge about CVD was 87.5 (11.4) and 83.3 (16.6) in the PCAD and CAD groups, respectively, with a significant difference between the groups according to the level of knowledge scores ( $P=0.007$ ). Around 78.0% and 62.0% of the PCAD and CAD groups, respectively, had a highly satisfactory awareness level of CVD.

Table 2 shows that 64.0% and 37.0% in the PCAD and CAD groups, respectively, had a highly satisfactory attitude toward CVD with a median (IQR) score of 86 (15.5) and 80 (9.5), respectively. A significant difference existed between the PCAD and CAD groups concerning the level of attitude scores ( $P<0.001$ ). However, only 9.0% and 5.0% of the PCAD and CAD groups, respectively, exhibited highly satisfactory physical activity behaviors, and 18.0% and 11.0% of the PCAD and CAD groups, respectively, had

Table 1. Baseline Characteristics of the Participants (CAD Patients=100 and PCAD Patients=100)\*

Variable	CAD (n=100)	PCAD (n=100)	Total (n=200)
Sex			
Male	73 (73.0)	58 (58.0)	131 (65.5)
Female	27 (27.0)	42 (42.0)	69 (34.5)
Age	68.08±7.20	50.20±7.65	59.14±11.63
Body mass index	27.21±4.27	28.14±4.06	27.68±4.18
Marital Status			
Married	69 (69.0)	80 (80.0)	149 (74.5)
Single/Widow	31 (31.0)	20 (20.0)	51 (25.5)
Educational Level			
Illiterate and primary	79 (79.0)	57 (57.0)	136 (68.0)
Higher than diploma	21 (21.0)	43 (43.0)	64 (32.0)
Residence			
Tehran, the Iranian capital	71 (71.0)	66 (66.0)	137 (68.5)
Others	29 (29.0)	34 (34.0)	63 (31.5)
Occupational Status			
Employed	25 (25.0)	46 (46.0)	71 (35.5)
Unemployed (including retirees and housewives)	75 (75.0)	54 (54.0)	129 (64.5)
Family History of Chronic Diseases			
Yes	56 (56.0)	68 (68.0)	124 (62.0)
No	44 (44.0)	32 (32.0)	76 (38.0)
Self-Reported History of Chronic Diseases			
Yes	83 (83.0)	80 (80.0)	163 (81.5)
No	17 (17.0)	20 (20.0)	37 (18.5)

\*Data are presented as mean±SD or No. (%).

PCAD, Premature coronary artery disease; CAD, Coronary artery disease

Table 2. Distribution of the Level of Knowledge, Attitudes, and Practices Regarding Cardiovascular Disease Based on the Quintile Scores

Score	Knowledge	P	Attitudes	P	Physical Ac-tivity Behav-ior	P	Nutrition and Smoking Status	P
Total Score*								
CAD	83.33 (16.67)	0.007***	80 (9.5)	<0.001***	25 (50)	0.090	60 (30)	0.256
PCAD	87.5 (11.46)		86 (15.5)		25 (50)		60 (30)	
Quartile Score**								
Highly Insufficient								
CAD	0 (0)		0 (0)		37 (37)		4 (4)	
PCAD	0 (0)		1 (1)		21 (21)		4 (4)	
Insufficient								
CAD	0 (0)		1 (1)		24 (24)		15 (15)	
PCAD	0 (0)		0 (0)		37 (37)		14 (14)	
Sufficient								
CAD	1 (1)		0 (0)		27 (27)		34 (34)	
PCAD	0 (0)		1 (1)		20 (20)		33 (33)	
P value		0.036***		0.001		0.025***		0.715
Satisfactory								
CAD	37 (37)		62 (62)		7 (7)		34 (34)	
PCAD	22 (22)		34 (34)		13 (13)		31 (31)	
Highly satisfactory								
CAD	62 (62)		37 (37)		5 (5)		11 (11)	
PCAD	78 (78)		64 (64)		9 (9)		18 (18)	

\* Values are expressed as medians (IQR).

\*\* Values are expressed as No. (%)

\*\*\*Significant P values

PCAD, Premature coronary artery disease; CAD, Coronary artery disease



highly satisfactory nutritional and smoking status. There were no significant differences in these scores between the groups ( $P=0.090$  for physical activity and  $P=0.256$  for nutritional and smoking status). More details of all quantiles are shown in Table 2.

Table 3 shows that the most recognized symptom (97.5%) among the patients was related to heart attacks (chest pain, pressure, or burning sensation). Furthermore, smoking status was the primary risk factor (92.0%), followed by obesity (79.5%) and hypertension (75.5%). Notably, there were

statistically significant differences between the CAD and PCAD groups in knowledge regarding physical activities, positive family history, and hypertension. The complete results concerning the knowledge of the study population are presented in Table 3.

Table 4 provides the findings of the multivariate logistic regression model examining the characteristics of the participants associated with a highly satisfactory KAP regarding CVD.

In the univariate analysis, having a family history of

Table 3. Participants' Knowledge of CVD and its Risk Factors and Symptoms

Variable	CAD (n=100)	PCAD (n=100)	Total (n=200)	P
<b>CVD and its Risk Factors</b>				
CVD is the leading cause of death in Iran	65 (65.0)	79 (79.0)	144 (72.0)	0.066
Physical inactivity	64 (64.0)	85 (85.0)	149 (74.5)	0.003**
Unhealthy diet	70 (70.0)	79 (79.0)	149 (74.5)	0.322
Positive family history	46 (46.0)	59 (59.0)	105 (52.5)	0.039**
Obesity	75 (75.0)	84 (84.0)	159 (79.5)	0.097
Smoking	92 (92.0)	92 (92.0)	184 (92.0)	0.587
Diabetes	48 (48.0)	54 (54.0)	102 (51.0)	0.395
Hypertension	67 (67.0)	84 (84.0)	151 (75.5)	0.005**
<b>Heart Attack Symptoms</b>				
Chest pain, pressure, or burning sensation	99 (99.0)	96 (96.0)	195 (97.5)	0.369
Pain or discomfort in arms, shoulders, jaw, neck, or back	62 (62.0)	47 (47.0)	109 (54.5)	0.098
<b>Stroke Symptoms</b>				
Sudden numbness or weakness of the face, arm, or leg	71 (71.0)	66 (66.0)	137 (68.5)	0.720

\*Data are presented as n (%).

\*\*Significant P values

CVD, Cardiovascular disease; PCAD, Premature coronary artery disease; CAD, Coronary artery disease

Table 4. Associations between the Participants' Knowledge, Attitudes, Physical Activity, and Nutrition and Smoking Status Regarding CVD and Participants' Characteristics (n=200)

Variable	OR for Knowledge (95%CI)	P	OR for Attitudes (95%CI)	P	OR for Physical Activity Behaviors (95%CI)	P	OR for Nutrition and Smoking Status (95%CI)	P
<b>Sex</b>								
Male	-	-	-	-	-	-	-	-
Female	-	-	-	-	0.13 (0.01-1.040)	0.055	-	-
<b>Family History of Chronic Diseases</b>								
No	-	-	-	-	-	-	-	-
Yes	1.90 (1.01-3.550)	0.045*	1.97 (1.-6-3.65)	0.030*	-	-	-	-
<b>PCAD</b>								
No	-	-	-	-	-	-	-	-
Yes	2.03 (1.08-3.82)	0.027*	2.82 (1.56-5.12)	<0.001*	-	-	2.17 (0.96-5.01)	0.067
<b>Occupational Status</b>								
Unemployed	-	-	-	-	-	-	-	-
Employed	-	-	0.52 (0.27-1.00)	0.05*	-	-	0.35 (0.13-0.93)	0.037*
<b>Self-Reported History of Chronic Diseases</b>								
No	-	-	-	-	-	-	-	-
Yes	-	-	0.44 (0.20-0.97)	0.044*	-	-	-	-
<b>Residence</b>								
Others	-	-	-	-	-	-	-	-
Tehran, the Iranian capital	-	-	1.84 (1.06-3.65)	0.030*	-	-	-	-

\*Significant P values

CVD, Cardiovascular disease; PCAD, Premature coronary artery disease; CAD, Coronary artery disease



chronic diseases ( $P=0.022$ ) and being a PCAD patient ( $P=0.014$ ) were significantly associated with knowledge about CVD. Factors significantly associated with a more positive attitude toward CVD included education level ( $P=0.043$ ) and family history of chronic diseases ( $P=0.015$ ). Sex was the only factor significantly associated with physical activity, with men exhibiting higher levels than women ( $P=0.026$ ). No factors showed significant associations with nutritional and smoking status in the univariate analysis.

These statistically significant factors, along with factors with a  $P$  value of less than 0.2 in the univariate analysis, were included in the multivariate logistic regression model for each response option. The results revealed that knowledge about CVD was significantly higher in the PCAD group (younger patients) ( $P=0.045$ ) and those with a family history of chronic diseases ( $P=0.027$ ). The participants with a family history of chronic diseases and those with PCAD also exhibited significantly more positive attitudes toward CVD than the ones without these factors ( $P=0.030$  and  $P<0.001$ , respectively). Nevertheless, the participants with a self-reported history of chronic diseases ( $P=0.044$ ) and those who were employed ( $P=0.050$ ) exhibited a less positive attitude than the ones without a reported history of chronic diseases and the unemployed subjects, respectively. Although there were no significant variables related to physical activity, it appeared that this factor had a higher level among men than women ( $P=0.055$ ). Furthermore, occupation was the only factor independently associated with nutritional and smoking status. The unemployed participants reported better nutritional and smoking status ( $P=0.037$ ).

## Discussion

In the present study, we found a significant difference concerning knowledge and attitudes related to CVD and its risk factors and symptoms. Still, our results revealed no meaningful difference between the groups in terms of practice. To our knowledge, ours is the only study to date to compare PCAD and CAD groups regarding KAP. The differences in knowledge and attitudes could result from the fact that PCAD patients are younger and more educated and, as a result, have higher levels of knowledge and more positive attitudes.

We also observed that most of our study population (both PCAD and CAD groups) had a highly satisfactory level of knowledge and positive attitudes vis-à-vis CVD. These results chime with a prior study in Iran.<sup>11</sup> In contrast, our results showed a low level of KAP compared with that reported in a previous study on the general population of Tehran.<sup>13</sup> The discrepancy may have stemmed from the fact that we conducted our study at a general hospital east of Tehran, where most patients come from almost low-income

families.

In this study, respondents' knowledge regarding the warning symptoms of heart attack and stroke was better than that of CVD risk factors, which is different from other studies that showed higher levels of knowledge about CVD risk factors.<sup>9, 16</sup> We also found that 96% of the PCAD group and 99.0% of the CAD group knew that chest pain, pressure, and burning sensation were heart attack symptoms. These rates were high compared with those reported in Australia, Canada, and Kuwait.<sup>16-18</sup>

With respect to risk factors, smoking (92% in both PCAD and CAD groups), followed by physical inactivity (85.0% and 64.0% for the PCAD and CAD groups, respectively), obesity (84.0% and 75.0% for the PCAD and CAD groups, respectively), unhealthy diet (79.0% and 70.0% for the PCAD and CAD groups, respectively), positive family history (59.0% and 46.0% for the PCAD and CAD groups, respectively) and diabetes (54.0% and 48.0% for the PCAD and CAD groups, respectively) were the most frequently identified risk factors of CVD. Our results differ from other studies that have shown hypertension as the most frequently identified risk factor of CVD, followed by smoking.<sup>9, 11, 19</sup> Our multivariate logistic models showed that individuals with a positive family history of chronic diseases exhibited a significantly higher level of knowledge and a more positive attitude than those without this factor. However, participants with a history of diabetes, hypertension, and dyslipidemia did not achieve a higher KAP score than those without this factor. This finding aligns with a study conducted by Awad and Al-Nafisi.<sup>16</sup>

Further, our study revealed that individuals with PCAD exhibited a higher level of knowledge and a more positive attitude regarding CVD than those without PCAD. This finding could be attributed to the fact that younger patients are more likely to have received education and regular medical care and to exhibit greater intention to stay informed about their health. Previous studies have also investigated age and found no significant disparities in CVD knowledge across various age groups.<sup>20, 21</sup>

Although both PCAD and CAD groups had a high level of knowledge and a more positive attitude regarding CVD, almost fewer than one-third of them exercised more than 3 times a week. Approximately, 33.0% of our study population adhered to a healthy diet that included an adequate intake of fruits and vegetables. However, our participants' approach to the use of oil was more desirable insofar as nearly 63.0% used appropriate or healthy cooking oils. On the other hand, 32% of our patients were smokers.

These results are consistent with a review study concluding that not only did the Middle East have one of the poorest physical activity profiles worldwide, but also physical inactivity, particularly among women, and an unhealthy diet were the most common metabolic risk factors in nearly all countries within this region.<sup>22</sup> In contrast, our study revealed



no significant difference in CVD KAP between females and males, in line with similar studies conducted on different populations.<sup>9, 20, 21</sup> Nonetheless, this finding contradicts some previous studies indicating a significant correlation between sex and CVD knowledge.<sup>9, 16, 19</sup>

The salient strength of the current study is its use of a validated questionnaire. Be that as it may, a crucial drawback is that the participants were exclusively selected from a single hospital, limiting the generalizability of the findings. Therefore, further research involving diverse populations in Iran is necessary to broaden the applicability of the study's conclusions.

## Conclusion

This study presented findings on the existing knowledge, attitude, and behavior related to CVD, its risk factors, and symptoms among two groups of patients: those with PCAD and CAD. While over 50.0% of participants in this study demonstrated a high-level knowledge and positive attitude towards CVD, their practical behaviors were not good enough. Consequently, there is a need for more impactful educational interventions that focus on fostering positive health behaviors. It crucial to emphasize to the public that bridging the gap between knowledge and action in reducing risk factors is directly linked to decreased incidence of CVD and mortality rates.

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