# **Research Article**

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20163355

# Knowledge, attitudes and practices among patients with coronary artery disease in Dhaka, Bangladesh

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Received: 24 July 2016 Accepted: 27 July 2016 Accepted: 31 August 2016

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# ABSTRACT

**Background:** Bangladesh ranks highest among other Southeast Asian countries regarding risk factors for the number one cause of death worldwide: heart disease. Low income citizens tend to have less awareness and understanding about coronary artery disease (CAD) due to a number of socioeconomic barriers. There is a need to assess knowledge and perception about CAD in order to develop baseline data for preventative programs.

**Methods:** This cross sectional survey assessed knowledge, attitudes, and health-seeking practices (KAP) toward CAD among 222 Bangladeshi patients. The 40-point KAP surveys were completed based on systematic random sampling from a government cardiovascular hospital representing a lower income population in Dhaka, Bangladesh. **Results:** The mean KAP score was  $21.45\pm5.83$  with a total possible score being 40. Only 5.86% of the sample was able to demonstrate a high level of proficiency. Men had more knowledge (t (1.962) = 1.334, P = 0.051), but women demonstrated more health-seeking behaviors with stronger statistical significance (t (-2.135) = -0.407, P = 0.034).

Several significant chi-square relationships were found between socioeconomic status (SES) and KAP scores. **Conclusions:** This study demonstrated selective lapses in CAD knowledge, attitude, and practice among Bangladeshi patients with low SES. Future preventative educational interventions would benefit by targeting the deficiencies in KAP revealed in this study.

Keywords: Cardiovascular, Public health, Education, Socioeconomics, Global health

# **INTRODUCTION**

The number one cause of death in the world is from Cardiovascular Disease (CVD). In 2012, 17.5 million people, representing 31% of deaths in the world, died from CVDs; 42% of them due to coronary artery disease (CAD). CVD deaths occur equally in men and women, and over 82% take place in developing countries where people have less access to health care services, resulting in higher health costs, and premature morbidity and mortality-the reality of poverty.<sup>1,2</sup>

The Indian subcontinent has the highest rates of CVDs globally, with an increased risk of developing CAD than European populations.<sup>3,4</sup> Contrary to the epidemiologic transition, recent evidence indicates that South Asian individuals with a lower socioeconomic status (SES) are developing a higher disease burden of CAD than higher

income individuals. Only about one-fourth of those who have CAD are aware of their disease and are seeking medical care.<sup>2</sup>

According to the latest WHO data from 2014, 17% of all deaths are due to CVDs.<sup>1</sup> Bangladeshis also rank highest among South Asians when it comes to tobacco use, physical inactivity, and poor dietary habits and suffer from premature onset, clinically aggressive and angiographically extensive heart disease.<sup>5,6</sup> Assessment of a population's knowledge, attitude, and practices (KAP) has been an effective means of providing key baseline information that help design primary and secondary prevention programs. In other countries, such surveys have proven low levels of KAP lead to poor cardiovascular outcomes.<sup>7,9</sup>

A thorough literature research uncovers limited published information regarding KAP toward CAD in the Bangladeshi population, especially in low-SES citizens who often rely on government healthcare facilities. Our study fills this knowledge gap by examining relationships between a patient's SES and their KAP regarding CAD in Bangladesh. Implementation of health programs that are tailored toward improving a population's current level of understanding, beliefs and behaviours regarding cardiovascular disease would be more successful and effective if they adhere to socioeconomic and sociocultural relevance. This study not only gives poverty a voice but further elucidates current understandings of CVD in developing countries.

# **METHODS**

# Study design and population

A cross-sectional, hospital-based study was conducted from May 20, 2013 to July 4, 2013 in Suhrawardy Cardiovascular Institute. The study population represented low-income citizens who utilized this government funded institution for primary and cardiac specialty health care.

This study was approved by the Institutional Review Board of the University of South Florida and the Research Ethics Review Board of Suhrawardy Cardiovascular Institute. All patients admitted to Suhrawardy Cardiovascular Institute diagnosed with at least one coronary event were eligible. Coronary events included but not limited to angina, hypertension, and history of previous myocardial infarction. Surveys were administered in three in-patient wards (general public ward, fee-based upgraded ward, and a ward restricted to women and children). Patients were approached by systematic random sampling until 222 surveys were collected (approximately 25% of the 850-bed hospital, as of 2013).<sup>12</sup> Incomplete surveys due to non-compliance were excluded. Partially incomplete surveys were still utilized; omissions were scored as incorrect.

# Study tools

The KAP study questionnaire was first piloted in both our home institution (5 patients) and in the host hospital (15 patients) where it was translated and back translated for comprehension and response consistency. The survey follows the format from the Behavioral Risk Factor Surveillance System (BRFSS) of the North Dakota Department of Health, which assessed the knowledge and behaviors regarding CVD risk factors in their population.<sup>10</sup> Survey guidelines from a WHO guide for KAP on Tuberculosis were followed and questions were taken from a Malaysian survey regarding women's KAP toward CVD.<sup>7,11</sup>

Our survey (Table 1) had 40 questions. Correct answers were scored as 'one' and incorrect as 'zero'. The initial demographic variables assessed the patient's SES. Knowledge questions assessed the level of understanding of risk factors, and signs, and symptoms of CAD. Attitude questions assessed the level of socio-behavioral perspectives and preconceived notions about CAD. Practice questions determined health-seeking behaviors and preventative behaviors.

The data was analyzed using SPSS V.17.0 (IBM, Armonk, NY, USA). Pearson Chi-square statistical tests demonstrated relationships between categorical variables such as KAP scores with socioeconomic factors such as demographics. Where one or more cells had expected frequencies of 5 or less, we used Fisher Exact Tests.

T-score analyses were also used to compare mean scores between men and women. Levene's test for equality of variances was used to demonstrate that it was safe to assume equal variances between the variables. A value of P<0.05 was considered statistically significant. In addition, 0.050<P<0.060 was considered less significant but included for discussion.

# RESULTS

The socioeconomic factors of the study population are reported in Table 2. More than half of the sample population (55%) were between the ages of 41-60, with 75% over the age of 40. Women represented 40% of the 222 survey respondents. Approximately 44% had less than a high school education.

Men had more varied employment whereas 75% of the female population described housework as their employment. A majority (63%) lived less than 10 km to the cardiovascular institute. The entire KAP survey consisted of 40 questions with several questions representing multiple points each, for a possible total of 40 points. Table 3 shows the mean and standard deviation of the KAP scores as well as a t-test for equality of means demonstrating relationships between genders. The KAP scores were also classified into 3 levels in order to

categorize survey respondents into a low, middle, and high level of proficiency regarding CAD (Table 4).

Table 5 summarizes relationships between KAP and exercise, one of the parameters for the score regarding health-seeking practices.

# Table 1: The original KAP survey.

1.1 Demographics and socioeconomic variables
1. How old are you?
2. What is your gender?
3. Do you know your weight?
4. What is the highest level of education you have completed
5. What is your occupation?
6. How far do you live from the nearest health clinic or hospital?
7. Presence of current medical illness
8. First degree (close family relative) family history of:
9. Where do you usually go if you are sick, or to treat a general health problem?
10. How often do you generally seek health care at a clinic or hospital?
1.2 (K) Knowledge and awareness
11. Where did you first learn about Coronary artery disease (CAD)?
12. In your opinion, how serious a disease is CAD?
13. How serious a problem do you think CAD is in your country/region?
14. What are the signs and symptoms of CAD?
15. How can a person get CAD?
16. How can a person prevent getting CAD?
17. In your opinion, who can get CAD?
18. Can CAD be controlled?
19. How can someone with CAD be helped?
20. Do you think aspirin can reduce the chance of a heart attack or stroke?
1.3 (A) Attitudes and beliefs
21. Do you think you can get CAD?
22. What would be your reaction if you were diagnosed with CAD?
23. Who would you talk to about your illness if you had CAD?
24. Are you willing to exercise more?
25. How easily can you change your eating habits?
26. Do you feel well when you eat without restriction?
27. Do you think you can enjoy life without a healthy lifestyle?
28. Are you willing to take treatments recommended by doctor?
29. Do you do a regular medical check-up?
30. Do you prefer traditional/herbal medicine not prescribed by a licensed physician?
31. Do you think you should know the following about your health? Check all that apply.
1.4 (P) Practice and healthcare-seeking behaviors
32. What would you do if you thought you had symptoms of CAD?
33. If you think you have symptoms of CAD, at what point would you go to the health facility?
34. If you would not go to the health facility, what is the reason?
35. Do you take aspirin or any other drug daily or every other day to relieve pain?
36. If you thought someone was having a heart attack or stroke, what is the first thing you would do?
37. Do you
Exercise more than 20 min 3x/week?
Use more than 5 teaspoons salt/day?
Consume fatty foods more than 3x/week?
38. What do you do to reduce stress?
39. Do you follow your doctor's prescriptions?
40. If you Smoke, when do you plan on quitting?

# Table 2: Socioeconomic variables of patients in Suhrawardy cardiovascular institute, Dhaka, Bangladesh.

Social determinants of health	Male (n=133)	Female (n=89)	Total/(n=222 <sup>a</sup> )				
Gender	(133) 59.9%	(89) 40.1%	(222/222) 100%				
Age (years)							
Under 50	(51) 48.6%	(54) 51.4%	(105/222) 47.3%				
Over 50	(82) 70.1%	(35) 29.9%	(117/222) 52.7%				
Education							
None	(10) 29.4%	(24) 70.6%	(34/218) 15.6%				
Elementary <sup>b</sup>	(27) 42.2%	(37) 57.8%	(64/218) 29.4%				
High school	(56) 70.9%	(23) 29.1%	(79) 36.2%				
College and beyond	(38) 92.7%	(3) 7.32%	(41) 18.8%				
Occupation							
Unemployed	(5) 31.3%	(11) 68.8%	(16/219) 7.3%				
Farming	(8) 66.7%	(4) 33.3%	(12/219) 5.5%				
Daily labor	(4) 100%	(0) 0%	(4/219) 1.8%				
Services	(47) 95.9%	(2) 4.1%	(49/219) 22.4%				
Business	(47) 100%	(0) 0%	(47/219) 21.5%				
Technician	(1) 25%	(3) 75%	(4/219) 1.8%				
House work <sup>c</sup>	(4) 6%	(63) 94%	(67/219) 30.6%				
Student	(4) 57.1%	(3) 42.9%	(7/219) 3.2%				
Other <sup>d</sup>	(11) 84.6%	(2) 15.4%	(13/219) 5.9%				
Proximity to Hospital (km)							
<10	(88) 63.8%	(50) 36.2%	(138/219) 63%				
10-20	(27) 57.4%	(20) 42.6%	(47/219) 21.5%				
21-30	(7) 50%	(7) 50%	(14/219) 6.4%				
31+	(9) 45%	(11) 55%	(20/219) 9.1%				
Comorbidities							
Diabetes	(40) 61.5%	(25) 38.5%	(65/222) 29.3%				
HTN	(46) 63.9%	(26) 36.1%	(72/222) 32.4%				
CAD	(95) 59.4%	(65) 40.6%	(160) 72.1%				
HLD	(21) 60%	(14) 40%	(35/222) 15.8%				
CVA	(33) 73.3%	(12) 26.7%	(45) 20.3%				
Other <sup>e</sup>	(11) 61.1%	(7) 38.9%	(18/222) 8.1%				
Family History (FDR)							
Heart disease	(27) 47.4%	(30) 52.6%	(57/222) 25.7%				
HTN	(42) 63.6%	(24) 36.4%	(66/222) 29.7%				
DM	(39) 68.4%	(18) 31.6%	(57/222) 25.7%				
CVA	(18) 56.3%	(14) 43.8%	(32/222) 14.4%				

<sup>a</sup>N=222, but total n may differ by question depending on specific omissions; <sup>b</sup>Elementary = includes elementary, religious schooling only, literacy classes only; <sup>c</sup>House work = household work without financial reimbursement; <sup>d</sup>Other = includes retired and disabled; <sup>e</sup>Other = comorbidity other than what is listed (includes cancer, endocrine, and congenital disease history).

# Table 3: KAP scores regarding CAD between genders.

			Independent t-test (2-tailed)				
	Gender	μ±σ	t	Mean difference	p-value	Association	
К	Total	11.61±4.99					
	М	12.14±5.03	1 062	1.334	0.051	Weakly significant	
	F	10.81±4.86	1.902				
А	Total	5.38±1.76					
	М	5.29±1.83	0.056	0.221	0.340	Non-significant	
	F	5.52±1.67	-0.930	-0.231			
	Total	4.46±1.40					
Р	М	4.30±1.48	2 125	-0.407	0.034	Significant	
	F	4.71±1.25	-2.135				
КАР	Total	21.45±5.83					
	М	21.73±6.05	0.971	0.606	0.385	Non-significant	
	F	21.03±5.49	0.671	0.070			

#### Table 4: KAP score levels of proficiency.

Poor <sup>*</sup>	Low	Moderate	High
	22.52%	53.15%	24.32%
	13.50%	56.76%	29.73%
	7.21%	75.68%	17.12%
3.15%	38.74%	52.25%	5.86%
	Poor* 3.15%	Poor*         Low           22.52%         13.50%           7.21%         3.15%	Poor*         Low         Moderate           22.52%         53.15%           13.50%         56.76%           7.21%         75.68%           3.15%         38.74%         52.25%

\*Knowledge, attitude, and practice scores were subdivided evenly to represent low, moderate, and high levels of proficiency. Since the KAP score consisted of 40 points, it was divided into 4 levels to indicate a 'poor' level of proficiency.

# Table 5: KAP regarding attitude and practice toward exercise.

	Intention (χ2)	p-value	Routine exercise (χ2)	p-value
K	5.947	0.051	5.888	0.053
А	20.790	< 0.001	13.566	< 0.001
Р	16.957	< 0.001	51.581	< 0.001
KAP	24.278	< 0.001	10.978	0.012

### DISCUSSION

### Increased disease burden and risk factors

According to WHO's strategic plan for surveillance and prevention of non-communicable diseases in Bangladesh, this patient population has an increased disease burden consisting of multiple non-communicable diseases (NCDs).<sup>12</sup> From 2006 to 2010, the prevalence of adult-onset diabetes in Bangladesh was estimated to be 13%, but was found to be more than 29% in our study.<sup>5</sup> According to a recent report, 18% of the Bangladeshi population (adults>25 years old) have hypertension, yet it was more than 32% in our sample.<sup>13</sup> The increased incidence of CAD (72%) and CVA (20%) was expected in this cardiac specialist hospital. Thus, this sample's disease burden was much higher than current epidemiological measures of the Bangladeshi population.

A higher disease burden was associated with higher levels of knowledge ( $\chi 2 = 36.194$ , p<0.001), practice ( $\chi 2 = 21.578$ , P = 0.017), and overall KAP scores ( $\chi 2 = 37.119$ , P = 0.001) regarding CAD. Similarly, having a higher family history index was associated with higher levels of knowledge ( $\chi 2=18.109$ , P = 0.011) and higher KAP scores ( $\chi 2 = 34.089$ , P = 0.001). In addition, those with a history of a previous Myocardial Infarction (MI) had a higher mean practice Score (4.62) compared to those without any previous MI (4.06), demonstrating a statistically significant difference: t (220) =2.677, P = 0.008.

An increased co-morbidity index as well as extensive family history may have increased one's awareness of their morbidity. This is similar to the Strong Heart Study that was conducted with Native American populations in which having more CVD risk factors were associated with higher levels of CVD knowledge and health literacy.<sup>14</sup>

### The impact of SES on CAD knowledge

Our study correlated with findings from the WHO: inequities in the social determinants of health lead to decreased KAP regarding CVD.<sup>15,16</sup> Those with higher levels of education in our sample were better able to identify hallmark symptoms of CAD ( $\chi 2 = 6.053$ , P = 0.014). Younger age was associated with decreased ability to identify CAD prevention strategies ( $\chi 2 = 5.986$ , P = 0.014); the opposite occurred in a Canadian study.<sup>17</sup> Low understanding of CAD, its traits, risk factors and prevention strategies, may be explained by the knowledge gap hypothesis: low SES puts people at risk of having limited access to resources compared to those with high SES. This results in a social divide in regards to knowledge.<sup>18</sup>

Question 14 (Table 1.2) asked the respondent to identify signs and symptoms of CAD, earning up to 8 points if recognizing 8 listed symptoms. Symptoms include pain or discomfort in the chest, arms, left shoulder, elbows, jaw, or back in addition to shortness of breath, lightheadedness, and cold sweats.<sup>1</sup> Whereas 91% of this survey population was able to recognize chest pain as a hallmark symptom, nausea (30%), dizziness (35%), arm (35%), and jaw pain (20%) were less often recognized. This is in stark contrast to other populations: 60% of Vietnamese Americans mentioned chest pain as an unprompted response, 22% of Nepalese recognized chest pain as a CAD symptom, and 60% of Pakistanis could not identify even one hallmark symptom of a heart attack.<sup>8,19,20</sup> Nevertheless, a majority of our sample (71%) were not able to demonstrate an appropriate level of proficiency by recognizing more than 5 symptoms.

Question 15 (Table 1.2) asked the patient to recognize similar CAD risk factors researched in the Framingham study.<sup>21</sup> More than half of this survey recognized hypertension (51.4%), hyperlipidemia (51.4%), fatty diet (62.6%), and smoking (52.7%) as possible risk factors for CAD. However, fewer patients recognized physical inactivity (28.4%) or family history (30.6%) as possible risk factors for CAD. In a Taiwanese study, more patients identified unhealthy diet, obesity, and family history as risk factors of CAD.<sup>22</sup> By identifying less than 4 risk factors out of the 6 listed in question 15, a majority of women (72.4%) were not able to demonstrate high proficiency, with a significant relationship present between gender ( $\chi 2 = 7.468$ , P = 0.006).

Question 16 (Table 1.2) asked the patient to recognize the different ways to prevent CAD. Despite 78% of patients believing avoiding fatty foods and 63% believing smoking cessation were effective ways to prevent CAD, only 22% believed that living an active lifestyle could prevent CAD. Only 27% of this sample believed praying could prevent CAD which, although lower than expected from a South Asian country with strong religious

identities, remains a noticeable knowledge gap.<sup>23</sup> Recognizing at least 3 out of the 4 listed prevention strategies was considered a proficient level of knowledge regarding CAD prevention. Patients of younger age demonstrated less proficiency when divided into two age groups ( $\chi 2 = 5.99 \text{ P} = 0.014$ ). Men demonstrated more proficiency (68%) than women (32%) with relatively statistical significance ( $\chi 2 = 3.80 \text{ P} = 0.051$ ).

### Attitude toward CAD

The patients in this study had a higher proficiency in attitude than knowledge and practice (Table 4). While some patients admitted it was their first time seeing a doctor, 52.3% had routine medical check-ups; a parameter of medical compliance that was higher than many countries but still lower than Japan where annual checkups are required by law.<sup>24,25</sup>

Patients who had routine medical checkups had better levels of attitude ( $\chi 2=27.541$ , p<0.001), practice ( $\chi 2=15.670$ , p<0.001), and overall KAP scores ( $\chi 2$  = 11.241, P = 0.010). Interestingly, those being treated in government clinics were more likely to have higher levels of attitude ( $\chi 2=11.334$ , P = 0.003). Despite overcrowded wards, low quality care, and short patient visits (average 3.8 minutes per patient), 83.8% of the sample believed CAD was a non-discriminatory disease and 85.8% believed it could be controlled and treated, compared to only 25% of patients in Taiwan.<sup>22,26</sup> However, such optimism does not always translate into better outcomes—it may lead to underestimation of CVD risk.<sup>27,28</sup>

### An ounce of prevention

Certain health behaviors may explain the SES differences in health and mortality.<sup>29</sup> Around 30% of our sample were smokers; the rest included historical non-smokers and recent abstainers since admission to the hospital. According to the WHO, 24% of the Bangladeshi population smoke. This is more than others in the subcontinent (15% of Indians and 20% of Pakistanis). Though 52.7% knew smoking as a risk factor and 62.6% knew tobacco cessation could prevent CAD, smoking in our study was not less than national levels.<sup>30</sup>

Our sample showed greater levels of physical inactivity with only about 33% exercising more than 20 minutes three times a week and around 43% of the sample engaged in less or no physical activity. The American Heart Association (AHA) recommendation of vigorous aerobic activity for 25 minutes thrice weekly does not translate well with a low SES south Asian population busy with employment.<sup>31,32</sup>

A majority of our sample not only failed to make time for dedicated exercise, but only 22% believed an active lifestyle could prevent CAD compared to 63% of a sample of older Americans.<sup>33</sup> Nevertheless, there were

higher KAP scores among those that actually engaged in dedicated exercise (20 minutes thrice weekly) or even had the intention or belief in the importance of exercise (Table 5).

Nearly 47% of the sample believed food consumption required no restriction; a belief possibly perpetuated by inexpensive unhealthy foods being more accessible to persistently poor populations.<sup>34</sup> Excess salt in food is concerning in South Asian culture, given its prevalence and cardiovascular impact.<sup>35</sup> Official salt recommendations vary. Though the AHA recommends a limit of 3.75 grams of salt per day, the average American consumes more than 8.5.<sup>36</sup>

Nearly 80% of our sample denied consuming more than 3 teaspoons of per day, which is equivalent to 17 grams of salt and considered the average daily intake among Bangladeshis in 2010.<sup>37</sup> This may reflect the difference between cardiac patients and average Bangladeshis who have higher salt intakes.<sup>38</sup> Furthermore, our sample's lower salt ( $\chi 2 = 12.518$ , P = 0.002) and fatty food ( $\chi 2 = 25.100$ , p<0.001) intake was significantly associated with increased health seeking behaviors.

Only 35% of our sample believed aspirin reduced CVD morbidity and 51% stated they did not know despite being told its role as a blood thinner. Only 32% of our sample reported routine aspirin use for CAD prophylaxis similar to the 32.8% reported in American Ambulatory Care but less than King County, Washington, where 40% reported routine aspirin use.<sup>35,39</sup> These low levels of aspirin prophylaxis are concerning: the United States Preventative Services Task Force advises all men age 45 to 79 and women age 55 to 79 use routine aspirin to reduce cardiovascular and cerebrovascular morbidity.<sup>40</sup> In those that endorsed routine aspirin prophylaxis, higher levels of knowledge ( $\chi 2$ =8.592, P = 0.014) and overall KAP scores ( $\chi 2$  =12.820, P = 0.005) were reported in our sample.

Healthcare-seeking behavior was also assessed by evaluating intended actions given emergent situations. Given an acute setting of a heart attack, 92.1% of the sample stated they would go to a health facility (clinic or hospital), while 77% stated they would go immediately and 17% after self-treatment failed. This is in stark contrast to the two-thirds of Pakistani heart attack patients that would delay their arrival at a hospital because they were not sure of the hallmark symptoms of CAD.<sup>8</sup> If someone else was having a heart attack, 80.4% of our sample stated they would take them to the hospital similar to the 85% of Vietnamese Americans and more than the 75% of Nepalese patients (though one-fifth of their sample opted for traditional healing).<sup>19,41</sup>

### Gender associations

More	men	(68%)	comp	ared	to	women	(32%)
demons	strated	profici	iency	with	id	entifying	CAD

prevention strategies ( $\chi 2 = 3.80 \text{ P} = 0.051$ ). Although men scored higher in the knowledge category, with significance (t (220) =1.962, P = 0.051), women scored higher in the practice category, with stronger significance (t (220) = -2.135, P = 0.034). Thus, women were more practical than men, despite having less knowledge about CAD. A Nepalese KAP study on CVD had similar results: men had more knowledge but attitude was similar between the genders.<sup>41</sup>

Even so, several studies show women being more knowledgeable in the identification of CAD risk factors.<sup>42</sup> This finding translates appropriately to the current occurrence in Bangladesh where successful focused health interventions are often women-centered and gender-equity oriented.<sup>43</sup> Nonetheless, the overall KAP score between the genders had no statistically significant difference (Table 3).

### Strengths and limitations

Although the study differentiated how certain factors affect levels of KAP in this population, the sample size was relatively small. Longer surveys and more survey respondents would increase the statistical power. In addition, different conclusions can be drawn from prompted versus unprompted responses.<sup>11,14,19,20,22,44,45</sup> Prompted responses (i.e. multiple choice) often result in more knowledge than unprompted responses (i.e. recall).<sup>46</sup> Though recognizing prompted answers may falsely increase the knowledge score, this survey indirectly became a teaching tool. According to health behavior models, KAP is only a part of the story when it comes to human behavior and social change toward health.<sup>28</sup>

# CONCLUSION

This survey revealed specific lapses in knowledge, attitude, and practice behaviors in regards to CVD. Women, poor, uneducated and young individuals were less proficient in knowledge about CVD. A poor understanding of diet and exercise in reducing CVD and the association of tobacco smoking with CVD mortality was demonstrated.

Future preventative programs encouraging regular exercise and healthy dietary habits may be more effective if they empower women. Tobacco cessation campaigns and aspirin prophylaxis are needed as they are underestimated and undervalued in this population. CVD is a largely preventable disease but many interventions regarding primary and preventative healthcare services are not feasible due to limited infrastructure and constrained funding in developing countries.<sup>47</sup> Yet, our survey demonstrates future programs can be more effective if led by government hospitals and local doctors. An effective health educational intervention is a key solution to the CVD epidemic in this region.

### ACKNOWLEDGEMENTS

This research was supported in part by the Scholarly Concentrations Program (SCP) at the Morsani College of Medicine and the College of Public Health at the University of South Florida. The authors do not declare any connections with supporting companies or any conflicts of interest. This study was approved by the Institutional Review Board (IRB) of the University of South Florida as well as the Hospital Biomedical Ethics Committee of the Suhrawardy Cardiovascular Institute

Funding: No funding sources Conflict of interest: None declared Ethical approval: University of South Florida IRB

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**Cite this article as:** Mirza A, Aslam S, Perrin K, Curtis T, Stenback J, Gipson J, Alrabaa S. Knowledge, attitudes and practices among patients with coronary artery disease in Dhaka, Bangladesh. Int J Community Med Public Health 2016;3:2740-8.