

# Saudi Women's Health Beliefs about Cardiovascular Diseases: A Cross-Sectional Study

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## Research article

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# Abstract

**Background** Cardiovascular disease (CVD), a major worldwide public health issue, is of significant concern as several studies confirm the high prevalence of CVD risk in Saudi women. However, limited has focused on how these risks are affected by health beliefs and socioeconomic variables. The Health Belief Model was used to compare Saudi women's perceived health beliefs with their calculated Framingham Risk Score (FRS) to determine their risk for a future CVD event and the influence of socio-economic variables on the prevalence of CVD risk.

**Methods** A cross-sectional study was conducted on women attending the primary care clinics in a university hospital in Riyadh, Saudi Arabia. A non-random convenience sample was selected of adult women without pre-existing CVD. Health belief and sociodemographic data were collected, and FRS calculated.

**Results** A total of 503 Saudi females participated, the majority of whom significantly underestimated their actual risk of CVD as measured by their individual FRS. 43.4% had a high CVD risk but a low perception of susceptibility. 63.5% understood the severity of CVD, while 75.2% had a low to moderate perception of the benefits of healthy behaviours. 86.7% did not know how to perform CVD risk-reducing exercises, and 65.9 % stated that they did not have access to exercise facilities. Pearson correlations suggest a weak linear relationship between the FRS and the subscales of each health belief. However, there was a significant relationship between the Framingham scores across income, marital status, education and occupational status categories ( $p \leq 0.001$ ) in Chi-Square tests. Significant differences were found when comparing perceived benefits of healthy behaviours with marital status; perceived severity and benefits with the level of education; perceived severity and benefits with occupation; and perceived severity and benefits with financial income.

**Conclusions** This study is the first in Saudi Arabia to examine the correlation between health beliefs, calculated CVD risk, and socioeconomic variables among Saudi women. Education and income were vital elements affecting their CVD risk and health beliefs, and these have implications for public health policy-making.

## Background

Cardiovascular diseases (CVDs) persist as the principal cause of deaths globally. In Saudi Arabia, in 2016, out of the 73% estimated deaths accounted to non-communicable diseases (NCDs), the proportional mortality attributed to CVDs was 37% , and the risk of premature death from NCDs in females aged between 30 to 70 was estimated at 14% [1]. The accelerating economic progress and brisk urban development of Saudi Arabia in the last three decades have been linked to the surge of the CVD

risks. These risk factors such as diabetes (DM), hypertension (HTN), smoking, obesity, hypercholesterolemia, metabolic syndrome (MetS) and physical inactivity are modifiable lifestyle-related concerns that have significant consequences to the health of Saudi women[2-5]. Three studies (two systematic and one cohort) published in the course of the development of this research confirmed and highlighted the high prevalence of these CVD risks not only for Saudi women, but also for women in other member countries of Gulf Cooperation Council (GCC)[6-8].

The Health Belief Model (HBM) is one of the most commonly used theories in health education and promotion[9, 10] . In this study, HBM was utilized to explain and predict health-related behaviours. The model consists of four sub-scales (susceptibility, severity, benefit and barrier) used to identify women's beliefs about their risks of heart diseases. Each of these perceptions, individually or in combination, can be used to explain health behavior [11, 12].

The Framingham Risk Score (FRS) is a gender specific assessment tool used for predicting an individual's risk of developing CVD within a specific amount of time and to indicate who is most likely to benefit from prevention [13]. The FRS provides a short-term (10-year) risk estimate of coronary heart disease in women, who tend to have a lower short-term CVD risk but a higher lifetime CVD risk than men, due to the complex effect of hormonal, biological and physiological factors [14]. It is helpful in determining the best preventive lifestyle, medical treatment and patient education options, which are valuable to both clinicians and patients [12]. However, FRS is known to overestimate or underestimate CVD risks [15]. In utilizing this risk assessment method, socioeconomic status (SES) is usually included in the assessment to decrease bias as health and SES are interconnected [16].

This study endeavoured to examine the health beliefs of Saudi women regarding CVD, the association of the four health belief subscales, and the impact of SES on CVD risk. It compared actual risks with perceived risks, analysed the gap between them and examined, the extent to which SES indicators may contribute to this gap.

## **Methods**

### **Study design and sample recruitment**

A descriptive, cross-sectional study was conducted among adult Saudi women attending PCCs in a university hospital in Riyadh, Saudi Arabia, from January to June 2016. The sample size was calculated using the FluidSurveys© (2014) software (Sample Size Calculator, 2017), with a CI of 95% with an error margin of 0.05 [17]. A non-random convenience sample of 503 women was selected from 600 women who attended the PCCs for a regular appointment and who qualified for the study. The questionnaire

used sequential steps, starting with a survey, followed by physical measurements, biochemical measurements, and a CVD score calculation using FRS.

### **Data collection instrument and process**

A survey was conducted utilizing face-to-face interviews using a structured questionnaire, and individual medical records were reviewed, after appropriate hospital permission was obtained.

The questionnaire consisted of 40 questions divided into 4 parts: socio-demographic profile; healthy behaviour; history of CVDs; and socio-cultural factors.

The socio-demographic information included age, level of education, marital status, occupation, income, and behavioral habits, including tobacco use, fruit and vegetable (FV) consumption and physical activity (PA).

Data extracted from each participant's medical record included cardiovascular risk factor details and prescribed medication for blood pressure or cholesterol. A recent lipid profile was obtained and medical parameters such as blood pressure, height, weight, hip and waist ratio (WHR), body mass index (BMI) and HbA1c were gathered. The participants' 10-year estimated risk was calculated based on the assumptions underlying the FRS[18].

Pictures were provided in the questionnaire, specifically in the FV question, to enrich the quality of the interviews by prompting the memory and reducing misunderstandings [19].

The Health Belief Related to CVD (HBCVD) Scale is a 25-item self-reported scale. Each item includes five response options (strongly agree, agree, neutral, disagree, and strongly disagree) to measure the perceptions of susceptibility, severity, benefits and barriers. Item-response-weighted scores indicate the following: 0=neutral, 1=strongly disagree, 2=disagree, 3=agree and 4=strongly agree; higher scores indicate a higher level of perception.

A cross-cultural translation and adaptation process was used to translate the HBCVD questionnaire into Arabic and underwent back-translation to ensure the accuracy of the translation [20].

### **Inclusion/exclusion criteria and ethical considerations:**

The inclusion criteria were the following: (1) Saudi women, (2) aged 15 and above (3) attending the primary health care clinics (4) with regularly updated medical records (5) who expressed interest in participating in the study. Women with pre-existing CVD were excluded. Ethical approval was obtained from the Institutional Review Board (IRB) of the university hospital. The participants signed an informed consent form and agreed to participate in the study. All information taken from the subjects was coded and kept confidential.

### **Data management and statistical analysis**

Descriptive and inferential statistical data analyses were conducted using SPSS, version 25. Missing data were transcribed or excluded from the analysis. The study results were checked for normality of distribution and were found to be a symmetrical bell-shaped curve. Skewness was within the range of  $\pm 2$  and kurtosis within the range of  $\pm 7$ . The Chi-Square test was used for categorical data, and Pearson's correlation and ANOVA were used for continuous data such as the mean of Framingham scores. A Pearson correlation test was run to gauge the association between the mean FRS and the four subscales of health beliefs [20]. Descriptive statistics, one sample T-test, measures of central tendency, frequencies, and standard multiple regression were used for statistical analyses.

Cohorts were sub-divided according to their Framingham scores into three categories: low-risk (<10%), intermediate (10–20%) and high-risk (>20%) [21]. Health beliefs about CVD were measured by 25 health belief questions divided into four subscales: perceived susceptibility (5 items), perceived severity (5 items), perceived benefits (6 items), and perceived barriers (9 items). The responses to the questions in the HBM subscales were combined into three groupings: Disagree (a combination of Strongly Disagree and Disagree), Neutral, and Agree (a combination of Agree and Strongly Agree) to determine the overall intensity of the pattern of responses. Perceived susceptibility measured participants' beliefs about their susceptibility to CVD; the higher the score, the greater the tendency to see themselves as susceptible to CVD. Perceived severity measured participants' beliefs about the seriousness of developing CVD; the higher the score, the greater the tendency to perceive CVD as serious. The perceived benefit scale measured participants' beliefs about the benefits of healthy behaviours to prevent CVD; the higher the score, the greater the tendency to perceive benefits in preventing CVD. Perceived barriers measured participants' beliefs about the barriers to health-promoting behaviours preventing CVD; the higher the score, the higher the barriers.

## **Methodological considerations**

The results of this study need to be considered in light of various strengths and limitations. This quantitative study used a cross-sectional, descriptive and correlational survey design. Although it is difficult to derive causal relationships from cross-sectional analysis, it allows the research investigators to measure the outcome and the exposures in the study participants at the same time. In addition, it is an instrument that saves time and money and is useful for public health planning, monitoring and evaluation [22].

This study was conducted in only one of the primary care centres in the capital, and most of the participants were older than 45 years of age, which can limit the generalizability of the findings. The study sample was a non-randomized convenience sample, resulting in the risk of selection bias. The main limitation of the study is the recall bias that could have occurred, especially in measuring behaviours like FV consumption. Many responses depended on the participant's memory. Nevertheless, responder bias can be unintentional due to poor or incomplete memory recall. Last but not least, this study is questionnaire based.

## **Results**

### **Demographics**

Of the 503 participants, 480 were eligible to have their FRS calculated due to the availability of the information in their records. 62% of them were above the age of 45. Almost 74% were married, 66% had not reached high school, and approximately 75% were housewives.

Participants had a mean systolic blood pressure of 130mmHg (SD  $\pm$ 17) and mean diastolic blood pressure of 75mmHg (SD  $\pm$  9.6). BMI and WHR results indicated that 64% were obese, with a mean BMI and WHR of 33 kg/m<sup>2</sup> SD $\pm$  6.7 and 0.948 SD $\pm$  0.063, respectively.

### **Self-reported CVD risk behaviour**

More than 60% were physically inactive, and only 13.1 % declared that they exercised more than three times per week. Only 7.6% engaged in daily exercise; 23.7% exercised one to two times a week; 5.6% three to four times; and 3.6 % once a month. However, 61% of the participants strongly disagreed that being able to drive on their own would motivate them to attend a gym or health club.

Almost all the participants reported that they had never smoked, while 0.6% were current smokers or ex-smokers. 97% of the participants reported eating 1-3 servings of FV daily. Just over 1% reported having 3-5 or more servings of FV per day. Half the participants reported that they watched TV for one hour or less, while the others watched TV for an average of three to five hours or more per day. The majority disclosed that there was no family history of DM (33.9%), HTN (41%) or hyperlipidemia (74.6%).

## **Framingham Risk Scoring**

Nearly 53% of the study participants had either intermediate or high

FRS. Table 1 and Table 2 show the respondents' baseline characteristics and medical parameters.

## **General health beliefs of Saudi women regarding CVD**

Overall, the lowest mean was on the perceived susceptibility subscale (12.5%), while the highest was on the perceived benefit subscale (65.8%).

The grand mean score on the perceived susceptibility subscale was 1.7 with an SD of 0.93; 79 % of women did not feel they were susceptible to CVD.

The perceived severity grand mean score was 2.5 with an SD of 1.4. Almost 65% of the participants either agreed or strongly agreed that they would die within ten years if they had a heart attack or stroke.

The overall grand mean score on the perceived benefit scale was 3.5, and the standard deviation was 0.9. This was the highest among all the subscales.

The mean score of the perceived barrier subscale was 2.6, and the standard deviation was 1.1. From the individual subscale barrier questions, the majority of the women (86.7%) agreed or strongly agreed that they did not know the appropriate exercises to perform to reduce the risk of CVD. Also, 65.9 % of participants disagreed or strongly disagreed that they had access to exercise facilities and equipment. Interestingly, slightly over two-thirds of the participants, 66.8%, agreed or strongly agreed that they could not afford to buy healthy foods.

## Association of mean FRS and the four subscales of health beliefs

A significant relationship was found between FRS and perceived susceptibility scores (Chi-Square ( $\chi^2$ ) = 11.777,  $p=0.05$ ). Women with a high FRS were more likely to report low perceived susceptibility scores than women with a low or intermediate FRS. Meanwhile, in perceived severity, no significant results were found ( $p=0.12$ ). Similarly, when examining the relationship between FRS and perceived benefits, the study result indicated that women with a high FRS reported moderate perceived benefits of diet and/or exercise (Chi-Square ( $\chi^2$ ) = 11.202,  $p=0.05$ ). However, no significant difference was found between the FRS and the perceived barrier ( $p=0.23$ ) (Table 3).

The difference between the mean of each health belief subscale and personal socioeconomic variables was also examined. There was a statistically significant difference between the mean of the groups' perceived severity and perceived benefits. The highly educated women reported a higher mean of perceived severity ( $p$ -value  $<0.001$ ), while low-income women reported a lower mean on both perceived severity and perceived benefits, with statistical significance ( $p$  values 0.02 & 0.01, respectively). There were no statistically significant differences between mean scores of perceived susceptibility, perceived barriers and socioeconomic variables. Women with high levels of education and income reported higher perceived severity and perceived benefits. Housewives reported the lowest severity score from the occupation category (Table 4).

Most of the participants did not feel susceptible to CVD and did not perceive the severity of the disease. Moreover, most of the participants knew about the benefits of eating healthily, along with the advantage of participating in exercise to prevent CVD. Responses to the perceived benefit subscale indicate that participants did not know the appropriate exercises to perform to reduce the risk of developing CVD, which was a significant barrier for this population. Most of the participants had more than one risk factor for developing CVD. Women who had healthy behaviours and adhered to PA perceived more severity, benefit and barriers, but not susceptibility, than women who did not ( $p=0.05$ ). Additionally, they had a lower CVD risk.

## Discussion

Saudi women are the most vulnerable population as the rate of CVD in Saudi Arabia increases. The results of this study indicated that 79% of the participating women did not feel themselves susceptible to CVD. This is in line with the study conducted by Aldohaian et al., which showed that Saudi women perceived themselves to have a low susceptibility to cervical cancer [23]. This may be influenced by cultural factors arising from religious beliefs and practices. A study conducted on Arab Muslims' health

beliefs and priorities for health care highlighted important misinterpretations of the concept of predestination, suggesting that some would not participate in health prevention activities because they believed that they could not prevent something from happening if God had preordained it, and illness causation misconceptions such as the belief in the notion of “the evil eye” impacting the occurrence of disease [24, 25]. Recognizing these misconceptions and integrating this knowledge into future health promotion campaigns are crucial in achieving successful health outcomes. However, this is in contrast to a study from Jordan, where female patients who had a history of myocardial infarction had high mean scores for susceptibility [26]. This may imply that after a first heart attack, there is a more continuous perception of susceptibility and a greater willingness to take preventive measures.

In terms of perceived severity, 65% of women affirmed that heart disease would have a negative impact on their lives and conceded that they would die from CVD within ten years if they had a heart attack or stroke. This is in congruence with other published studies on HTN and DM that show a significant relationship between perceived severity and adopting healthy behaviours in diabetic and hypertensive patients; the anxiety of associated consequences drives them to control their blood pressure and blood sugar, respectively, on a regular basis [27, 28].

The current study found that 89% of the participants knew that eating healthily and exercising regularly were beneficial in preventing the development of CVD, yet they were not actively participating in healthy behaviours, such as increased FV consumption and regular physical exercise. However, most of the women stated that they felt good when they exercised and ate healthily. Other authors exploring the association of CVD risks have been faced with this type of contradictory finding. It could be due to the seriousness of heart disease that may inhibit or block the person from responding appropriately, particularly patients who have already had some sort of CVD [26]. For example, patients who exercised regularly before having a heart attack might then conclude that they cannot prevent or control heart disease.

In terms of perceived barriers, almost 90% of the women participants affirmed that they did not know the appropriate exercises to perform to reduce the risk of CVD, and more than half confirmed that they had no or no easy “access to exercise facilities and equipment”. This is an important element in determining behaviour. Several studies concluded that perceived barriers were among the most prominent factors concerning self-care behaviours [29, 30].

Remarkably, almost one-third of the women were in the intermediate FRS risk category and nearly a quarter were in the high-risk category, yet they did not perceive themselves susceptible to CVD. A low

perception of susceptibility has been reported not only in this study but among women with multiple risk factors, and most individuals tend to underestimate their susceptibility to heart disease [31]. In a study conducted in 26 Danish PCCs, researchers found that most of the patients who perceived themselves at low risk of cardiac disease were actually estimated to be at high risk by their physicians [32]. Likewise, a study conducted among black women in the USA reported that even with multiple CVD risk factors, they still considered themselves to be at low or no risk for heart disease [33]. This observation raises important issues for both the women at risk and for public policymakers, who need to consider creating effective health awareness, intervention, and related communications materials and messaging themes.

In this study, there is no association between different socio-demographic variables and the perceived susceptibility score. This is similar to published studies investigating health beliefs in Saudi Arabia for breast cancer, cervical cancer and osteoporosis, and in the UAE for awareness of heart disease, that showed a very low perceived susceptibility among women regardless of their socio-demographic variations [23, 34, 35]. A possible conclusion is that misconceptions and lack of knowledge influence peoples' behaviour.

There was a significant difference in the odds ratio between the age groups. Women aged between 15 and 54 perceived more severity than those aged 55 and older. This was contrary to a study from Nepal that showed that older participants perceived more severity than younger age groups [36]. The difference may lie in the educational level as low literacy rates were more common among the older Saudi population. Women with higher education have a better level of severity perception. Thus, there is a need for innovative educational strategies to increase knowledge about risk factors and awareness levels among at-risk individuals, especially among women over age 40. Likewise, this study found that women who engage in PA have a higher mean perceived severity score than women not engaged in PA ( $p=0.005$ ). This is comparable to another study that reports that higher perceived CVD severity was associated with a greater level of PA [37].

Moreover, there was a statistically significant result in perceived benefits ( $P= 0.01$ ) among Saudi women who engaged in PA compared to those who did not partake in it. This indicates that those who were physically active had a higher level of perception of benefit. However, despite knowing the benefits of a healthy diet, their FV consumption was still below the minimum WHO requirement, with less than 1% consuming more than five servings/day. Likewise, the majority of these women did not know what was considered a healthy diet for CVD prevention. This suggests that addressing the knowledge gap regarding FV daily consumption may contribute positively to an adequate intake of FV for the prevention of CVD. Research participants involved in an interventional study reported that they had benefited from the intensive education program with resulting improvements in blood sugar, PA and healthy behaviours [38].

Furthermore, in this study, participants with elementary or basic education were less likely to report access to exercise facilities as a PA barrier. It suggests that women with higher education may identify the barriers more effectively due to cognitive skills that are acquired through academic study [39]. Nevertheless, the older generation may not care as much due to upholding their customs and preserving their traditional way of life. It is vital for policymakers to propose interventions targeting women aged 40 and over that could help them to be physically active. These interventions should reflect their preferences and cultural values, with the provision of childcare and social support strategies.

Saudi women between the ages of 35 and 54 were more likely to report that not being able to drive represented a barrier to access exercise facilities. This is due to the driving restrictions in the past; however, the ban was lifted in June 2018. This recent change will provide more access to transportation, and they will now be able to access venues for PA. Moreover, affordable and accessible facilities should be provided, especially for older women with lower SES.

## **Conclusion**

In examining the relationship between HB and CVD risks among Saudi women, it was found that beliefs about cardiovascular risk factors and perceived barriers were real and deep-rooted and therefore could not be eliminated overnight. There is an urgent need to increase awareness of CVD risk factors due to the perceived susceptibility gap and for creating public policy specific to women. This evidence needs to be translated into a successful public health policy that will demonstrate a reduction in the population burden of CVDs among Saudi women.

## **Abbreviations**

HBM-Health Belief Model, CVD-Cardiovascular disease; FRS- Framingham Risk Scoring; PA-Physical Activity; Fruit and Vegetables, USA-United States of America; BMI- Body Mass Index; SES-socio-economic status, HB-health belief, UAE-United Arab Emirates, HTN- hypertension, DM-diabetes mellitus

## **Declarations**

### **Acknowledgement**

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### **Availability of data and materials**

The datasets used and analysed during this study along with all study materials are available and can be requested from the corresponding author if warranted.

### **Authors' contributions**

The corresponding author MKA, was responsible for designing the study, data collection, data analysis and writing the manuscript. JPB was responsible for reviewing and revising the manuscript. SR reviewed and contributed to the content of the final manuscript. All authors have read and approved the manuscript.

### **Ethics approval and consent to participate**

The Institutional Review Board of the College of Medicine, King Saud University, approved the project proposal prior to the commencement of the study. Written informed consent was obtained from the research participants as well as from a parent or guardian for participants under 16 years old.

### **Consent for publication**

Not applicable.

### **Competing interests**

The authors declare that they have no competing interests.

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## Tables

Table 1. Participant's Baseline Characteristics (n=503)

<b>Variables</b>	<b>n</b>	<b>%</b>
<b>Age</b>		
<b>15-34</b>	54	10.7
<b>35-54</b>	214	42.4
<b>55 +</b>	235	46.5
<b>Marital status</b>		
<b>Married</b>	371	73.5
<b>Never married</b>	32	6.3
<b>Separated/Divorced/Widowed</b>	100	19.9
<b>Education level</b>		
<b>Elementary or less</b>	251	49.8
<b>Intermediate/ High School</b>	129	25.6
<b>Diploma/College Degree or Postgraduate</b>	123	24.4
<b>Employment condition</b>		
<b>Government, Semi Government, Private</b>	88	17.4
<b>Student, Retired, Not Working</b>	59	11.7
<b>Housewife</b>	356	70.5
<b>Monthly Income</b>		
<b>&lt;2,000 - 4,999 SR</b>	174	34.5
<b>5,000 - 9,999</b>	161	31.9
<b>10,000 - 17,999</b>	120	23.8
<b>18,000 and above</b>	48	9.5
<b>Reported chronic disease status</b>		
<b>Hypertension</b>	191	37.9
<b>DM</b>	275	54.6
<b>150 minutes/week of moderate PA or at least 75 minutes/week</b>		
<b>YES</b>	185	36.7
<b>NO</b>	318	63.1
<b>Smoking status</b>		
<b>Never smoked</b>	497	98.6
<b>Ex-smoker</b>	1	0.2
<b>Current smoker</b>	2	0.4
<b>Daily servings of FV</b>		
<b>None</b>	5	1
<b>1-3 servings</b>	489	97
<b>+3-5 servings</b>	5	1
<b>more than 5 servings</b>	2	0.4
<b>Daily hours spent watching TV</b>		
<b>1 hour or less</b>	246	48.8
<b>1-3 hours</b>	145	28.8
<b>&gt;3 to 5 hours</b>	35	6.9
<b>more than 5 hours</b>	74	14.7
<b>BMI</b>		
<b>Underweight/Normal</b>	38	7.5
<b>Overweight</b>	138	27.4
<b>Obese</b>	308	61.1
<b>Waist-to-hip ratio (WHR)</b>		

<b>&lt; 0.8</b>	7	1.4
<b>&gt; 0.8</b>	497	98.6
<b>Family history of DM</b>		
<b>Yes</b>	170	33.7
<b>No</b>	332	65.9
<b>Family history of HTN</b>		
<b>Yes</b>	269	58.8
<b>No</b>	206	40.9
<b>Framingham risk score classification</b>		
<b>Low</b>	217	43.0
<b>intermediate</b>	153	30.3
<b>High</b>	113	22.4

**Legend:**

DM: diabetes mellitus, HTN: hypertension, BMI: Body Mass Index, FV: Fruit & Vegetables

Table 2. Respondents' medical parameters

Variables	N	Mean	±SD
Systolic BP	492	130.86	17.393
Diastolic BP	492	72.54	9.64
Weight	486	80.3165	17.50634
Height	484	155.595	7.49296
Waist	503	111.5	14.872
Hip	503	117.51	13.539
HgbA1c	502	7.7227	2.07057
HDL	500	1.5294	5.36448
TG	503	1.4513	0.85446
LDL	500	2.9115	0.93284
BMI	484	33.2022	6.77417

**Legend:**

BP- Blood Pressure, HgbA1c- Hemoglobin A1c, HDL- high-density Lipoprotein, LDL- Low-density Lipoprotein, TG- Triglycerides, BMI- Body Mass Index

**Table 3: The association between Health Belief Subscales and Framingham Risk Scores**

Variables	Framingham Risk Scores						d.f.	$\chi^2$	p-value
	Low		Intermediate		High				
	(N = 217) N	%	(N = 153) N	%	(N = 113) N	%			
<b>Perceived Susceptibility</b>									
Low	77	35.5	52	34.0	49	43.4	4	11.78	.019*
Intermediate	108	49.8	63	41.2	38	33.6			
High	32	14.7	38	24.8	26	23.0			
<b>Perceived Severity</b>									
Low	67	30.9	58	37.9	51	45.1	4	7.13	0.12
Intermediate	92	42.4	57	37.3	35	31.0			
High	58	26.7	38	24.8	27	23.9			
<b>Perceived Benefits</b>									
Low	21	9.7	24	15.7	15	13.3	4	11.20	0.02*
Intermediate	107	49.3	73	47.7	70	61.9			
High	89	41.0	56	36.6	28	24.8			
<b>Perceived Barrier</b>									
Low	83	38.2	50	32.7	33	29.2	4	5.3	0.25
Intermediate	70	32.3	54	35.5	34	30.1			
High	63	29.5	49	32.0	46	40.7			

Chi-Square test, d.f.- degrees of freedom,

Table 4: The difference in the mean of each health belief construct and

sociodemographic variables

Variables		Perceived susceptibility	Perceived Severity	Perceived Benefits	Perceived Barriers
		Mean score (±SD)	Mean score (±SD)	Mean score (±SD)	Mean score (±SD)
Marital status	Married (N=371)	8.49 (±4.70)	12.58 (±6.84)	19.63 (±4.92)	30.18 (±6.72)
	Never married (N=32)	8.17 (±4.32)	13.17 (±6.95)	18.70 (±5.07)	29.18 (±6.62)
	Widow/divorced/separated (N=100)	7.94 (± 4.71)	11.06 (±7.99)	16.63 (±7.38)	31.41 (±5.09)
	<b>p value</b>	0.63	0.182	0.0001*	0.146
Level of education	Elementary or less (N=251)	8.30 (±4.97)	11.32 (±7.60)	17.93 (±6.36)	30.18 (±6.82)
	Intermediate /High School (N=129)	8.45 (±4.15)	13.06 (±6.7)	20.01 (±4.34)	31.88 (±5.54)
	Diploma, Degree, Post Graduate (N=118)	8.42 (±4.52)	14.03 (±5.76)	20.47 (±3.77)	30.1(±6.78)
	<b>p value</b>	0.951	0.001*	0.0001*	0.173
Occupation	Gov., Semi Gov., Private (N=84)	8.29 (±4.22)	14.35 (±5.46)	20.3 (±3.94)	24.21 (±7.92)
	Student, Retired, Not Working (N=58)	9.55 (±4.64)	14.31 (±5.31)	19.16 (±5.06)	30.70 (±7.11)
	Housewife (N=346)	8.19 (±4.74)	11.66 (±7.49)	18.78 (±5.79)	30.43 (±6.92)
	<b>p value</b>	0.117	0.001*	0.073	0.30
Monthly income	<2,000-4,999 SR (N=174)	8.44 (±4.75)	11.42 (±7.74)	17.79 (±6.72)	30.63 (±6.33)
	5,000-9,999 (N=161)	8.72 (±4.65)	13.62 (±6.58)	19.95 (±3.91)	30.41 (±7.04)
	10,000-17,999 above (N=168)	7.79 (±4.77)	12.36 (±6.73)	19.62 (±4.99)	30.04 (±6.57)
	<b>p value</b>	0.442	0.02*	0.01*	0.69

ANOVA Test , \*p ≤ 0.05, % are within the Framingham risk group Gov. = Government