Published in final edited form as:
Diabetes Educ. 2008 ; 34(3): 484–492. doi:10.1177/0145721708316949.

Perceptions of Coronary Heart Disease Risk in Korean Immigrants with Type 2 Diabetes

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Abstract

Purpose—The purpose of this study was to examine coronary heart disease (CHD) risk perception, risk factor status, and factors associated with CHD risk perception in Korean immigrants with type 2 diabetes mellitus.

Methods—A community sample of 143 Korean adults with type 2 diabetes, aged 30 to 80 years old, completed questionnaires and biological measures. A multiple regression analysis was conducted to evaluate the relationships between CHD knowledge, general health, smoking, medications for CHD risk factors, demographic variables (independent variables) and the perception of CHD risk (dependent variable).

Results—Participants had low perception of CHD risk, with most (76.9%) indicating their risk to be the same or lower than people of the same age and sex in the the general population. Overall, CHD risk- factor control was suboptimal according to American Diabetes Association guidelines. Only 41.3% of participants met the HbA1c goal of less than 7%. More than half (55%) had uncontrolled blood pressure, and a similar proportion (53.6%) had higher low density lipoprotein cholesterol than the target goal. CHD knowledge and self-reported general health influenced the perception of CHD risk. More CHD knowledge and poor general health were associated with higher perception of CHD risk.

Conclusions—To increase the perception of CHD risk in Korean immigrants with type 2 diabetes, diabetes educators and clinicians should educate such patients about CHD risk factors and discuss their risk status at every visit. Those who report their health to be good deserve particular attention.

Keywords

type 2 diabetes mellitus; coronary heart disease; risk factors; risk perception; immigrant; Korean Americans

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Coronary heart disease (CHD) is a major complication and the leading cause of death for people with diabetes.[1, 2] People with diabetes are 2 to 4 times more likely to have heart disease than people without diabetes.[3–5] Studies have found low perception of CHD risk among patients with diabetes, despite their increased risk.[6, 7] According to a recent survey by the American Diabetes Association (ADA) and the American College of Cardiology, the perception of personal risk of heart disease among a large group of diabetic patients was remarkably low, with more than half (52%) indicating that they did not feel at risk of a heart condition.[8]

Perceptions of personal risk for a disease may be important in preventive health behaviors. As the health belief model suggests, an individual is likely to take a recommended health action if he or she perceives himself or herself to be at risk of getting a serious disease.[9, 10] The perceived risk of coronary heart disease has been positively related to the desire to make risk-reducing behavior changes and actual behavior changes.[11, 12]

Despite evidence supporting risk perception as the first step toward desired health behavior, existing information suggests that adults often incorrectly perceive their risk of developing a disease and adopt an optimistic bias.[13–15] Underestimating disease risk has important implications for CHD risk reduction because people who do not perceive themselves as vulnerable to CHD are less likely to adopt recommended behaviors to prevent it.[16, 17] The literature suggests that several factors, such as perceptions of general health,[16, 18] knowledge of CHD risk,[13, 19, 20] and demographic variables, such as age, education, and gender [18, 21] may be related to the risk perception for CHD.

Koreans are the fifth largest group among Asian Americans and Pacific Islanders, constituting 12% of that population.[22] Although data on the prevalence of type 2 diabetes mellitus in Korean immigrants in the United States are not available, the prevalence in Korean immigrants in Hawaii is estimated to be at least twice that of the White population.[23] An epidemiological study conducted near Baltimore reported that the incidence of diabetes in elderly Korean American men was higher than in any other ethnic group, including black and Hispanic populations.[24] In Korea, diabetes, most often type 2 diabetes, affects about 7.2% of adults over 30 years of age.[25]

Despite the rising incidence of type 2 diabetes in Korean immigrants, little is known about the level of CHD risk perception and CHD risk factors in Korean immigrants with type 2 diabetes. This information, however, is critical because CHD risk perception that is not appropriate to actual risk (eg, low risk perception in diabetic patients with uncontrolled hypertension and high cholesterol) may prevent a patient from adopting and engaging in CHD risk-reduction behavior. Information on factors that influence risk perception will also help diabetes educators and clinicians design effective interventions.

The purpose of this study was to describe CHD risk perception and risk-factors and to investigate the factors that are associated with personal perception of CHD risk in a sample of Korean immigrants with type 2 diabetes. The specific aims were (1) to examine CHD risk perception, (2) to describe the level of CHD risk-factor control according to ADA guidelines,[26] and (3) to evaluate the selected correlates for association with CHD risk perception in this group. For clinicians working with Korean immigrants with type 2 diabetes, the results will be useful in planning population-specific, CHD-risk-reduction strategies.

Methods

Design and Sample

This cross-sectional, correlation study investigated a convenience sample of 143 Korean immigrant men and women between 30 and 80 years of age with type 2 diabetes. Individuals in a West Coast Koreatown were recruited with flyers and posters from community sites, which included 2 health clinic waiting areas, pharmacies, and a shopping mall. Interested persons met the researcher in the reception area of the clinic or pharmacy or called to arrange an appointment. To be eligible for inclusion, individuals had to be Korean-born immigrant men or women between 30 and 80 years old, with a diagnosis of type 2 diabetes for at least a year, and able to speak, read, and write in Korean or English. The study was approved by a university institutional review board, and all participants were provided with written informed consent.

Data Collection Procedures

After participants submitted their written informed consent, the researcher distributed questionnaires at the study site. Participants chose the language version (English or Korean) they preferred and were encouraged to ask for assistance, if needed. The researcher or the registered nurse at one of the study sites administered a glycosylated hemoglobin (HbA1c) test according to standardized procedures. After data collection was completed, the participants received the results of their blood pressure tests, their blood tests, and their anthropometric measures.

Upon completing the questionnaire, each participant was assessed for clinical measures: blood pressure, cholesterol (lipid panel), and HbA1c. Blood pressure was measured with an electronic blood pressure monitor (A&D Medical Model UA-767) using standardized procedures. This device was validated against a mercury sphygmomanometer and has been reported to be as reliable as the conventional stethoscope sphygmomanometer.[27, 28] Two readings 2 minutes apart were taken after a participant had been seated for at least 5 minutes and were then averaged by the researcher. Using a finger-stick sample of whole blood, a lipid panel was analyzed with the CardioChek PA™, a cholesterol measuring device that meets the accuracy guidelines of the National Cholesterol Education Program.[29] HbA1c was measured using the same finger-stick blood sample by the Metrika A1c Now InView, which is certified by the National Glycohemoglobin Standardization Program. Both the CardioChek PA™ and A1c Now InView ™ are tests granted waived status under the Clinical Laboratory Improvement Amendments of 1988, laboratory regulations established by the US Food and Drug Administration. HbA1c levels were also obtained from those patients recruited from a health center who offered their personal HbA1c records for use in the study. Because the clinic also used the A1c Now InView and these values were written in by the clinic staff, the results provided by participants were used if they had been obtained within the preceding 3 months.

While waiting for the blood test results, participants were assessed for anthropometric measures: height and weight to assess body mass index (BMI) and waist and hip circumference to assess the waist-to-hip ratio. With participants in bare feet, height was measured in centimeters to the top of the head using a nonstretching measuring tape secured to the wall. Weight was measured in kilograms using a professional body-weight scale; participants wore only light clothing, empty of all belongings, and no shoes. BMI was calculated using the formula: (BMI = kg/m^2). Waist circumference was measured in centimeters by placing a nonstretching measuring tape in a horizontal plane around a participant's bare abdomen at the top of the iliac crest. The reading was taken after an expiration, making sure that the tape was secure but not too tight. Hip measurement was

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taken at the point of maximum circumference over the buttocks, with the measuring tape held in a horizontal plane touching the skin (the surface of light clothing in this study) but not indenting soft tissue. The waist-to-hip ratio was calculated by dividing waist measurement by hip measurement.

Measures of CHD Risk Perception: The Dependent Variable

CHD risk perception, the dependent variable, was measured by an index of perceived risk used by Becker and Levine[13] in a study of a high-risk population (siblings of people with premature CHD). Perceived risk is defined as the perception of the possibility of experiencing a premature CHD event.[13] This index comprises 4 items, using a scale of 1 to 5, with 1 indicating *no concern at all* or *very low probability estimates* for having an event and 5 indicating *very high levels of concern* and *extremely high estimates* for having an event. The items address a person's (1) frequency of concern over having a CHD event, (2) his or her estimate of the likelihood of having such an event in the next 5 years, (3) the likelihood of having such an event in his or her lifetime, and (4) his or her estimated CHD risk compared with people of similar age and sex in the general population. The fourth item offered responses of *much less*, *less*, *about the same*, *more*, and *much more* risk than people in the general population. Items are summed. The potential range of the perceived risk index is 4 to 20 points. A high score indicates a high level of perceived risk. The published internal consistency of this index using Cronbach's α was .80.[13] In this study sample, Cronbach's α was .78.

Measures of Independent Variables

CHD Knowledge, Medication Status for CHD Risk, Current Smoking, and General Health

The participants' CHD knowledge was assessed by asking them to identify factors thought to be caused by or associated with CHD. Smoking, consumption of saturated fat or high serum cholesterol, high blood pressure, family history, age, sex, sedentary lifestyle, stress, obesity, and diabetes are worth 1 point on the scale if answered yes;, arthritis and asthma are worth 1 point if answered no. There is no penalty for incorrect answers and a total score could range from 0 to 12 points. A higher score indicates a higher level of CHD knowledge. This method was modified from the one used in the study of siblings of CHD patients.[13]

Medications related to CHD risk were measured by self-report of medication use for diabetes, hypertension, and cholesterol. If a participant were taking medications for these CHD risk conditions, his or her yes response confirmed the presence of added CHD risk and the patient's awareness of his or her diagnoses. Smoking status was measured by the question, "Do you now smoke cigarettes everyday, some days, or not at all?" Responses with everyday or some days were coded as "current smoker."

General health was measured by the question, "In general, would you say your health is: Excellent, Very good, Good, Fair, or Poor?" This variable was rated from 1 to 5, with 1 indicating *excellent* and 5 indicating *poor health*; scores were later reverse coded for analyses. This single item measure came from the Medical Outcomes Study 36-Item Short Form Survey developed by Ware and Sherbourne [30] and has been shown to be a powerful predictor of later health outcomes.[31–33]

Statistical Analyses

Descriptive statistics provided information on the variables in this study. Bivariate analyses were conducted to examine the relationship between the independent variables and CHD risk perception. Independent variables were examined for collinearity. A multiple linear regression was done to examine the independent association between CHD risk perception (dependent variable) and the independent variables: CHD knowledge; self-reported general health; medication use for diabetes, hypertension, cholesterol, smoking, age, gender; and education. First, the R^2 of the complete model was examined for significance. Then, the unique contribution of each independent variable was tested to explain the variance in CHD risk perception. The Statistical Package for Social Sciences, SPSS 12.0, was used to analyze the data.

Results

Demographic and Health Characteristics

Of the 150 potential individuals who met the inclusion criteria, 7 declined participation. A total of 143 patients participated in the study. The sample characteristics are shown in Table 1. The sample was 51.7% women, and the mean age was 62.4 years (SD = 12.8; range = 30 to 80). All participants preferred and completed the Korean version of the questionnaire. Over one half lived alone or with only 1 family member, were married, and had higher than a college education. The mean duration of residence in the United States was 21.7 years (SD = 9.2), and the mean duration of diabetes was 6.8 years (SD = 6.2). The mean HbA1c level was 7.6 % (SD = 1.45; range = 5.6 to 12.5). Most participants (85.3%) were taking medication for diabetes, more than two thirds (70.6%) were taking medication for hypertension, and less than two thirds (59.4%) were taking medication for cholesterol. More than two thirds (68.5%) indicated that their general health was poor or fair, and only 6.3% reported very good health. Not one reported excellent health.

CHD Risk Perception

The mean score for CHD risk perception was 8.14 (SD = 2.56; median 8.0), indicating that the participants had low CHD risk perception overall. The distribution of the scores was positively skewed (skewness = .720, SE = .203), indicating that responses were clustered around the low end. In response to a question about frequency of concern about having a CHD event, more than half of the participants (57.3%) responded *never* or *rarely*. Nearly two thirds (61.5%) indicated that the likelihood of their having a CHD event in the next 5 years was *not likely*, and almost half (49.7%) responded similarly for their lifetime CHD risk. Most participants (76.9%) reported that their CHD risk was the same as or lower than people in the general population of similar age and sex.

CHD Risk Factors

Less than half of the participants (41.3%) achieved the ADA’s goal of HbA1c levels less than 7%, and only 23.1% reached the American Association of Clinical Endocrinologists’ goal of less than 6.5%. Overall, more than one third had either a systolic BP (42.7%) or a diastolic BP (35.7%) higher than the recommended control level. More than half (53.6%) had low density lipoprotein cholesterol levels above recommended treatment goal, and less than half (47.3%) of those individuals were taking cholesterol-lowering medication. Most participants (81.1%) exceeded the overweight parameter of BMI (23 kg/m^2) recommended by the World Health Organization for Asians.[34] Similarly, most men (82.6%) and women (85.1%) exceeded the Asia-Pacific criteria for waist circumference, 90 cm and 80 cm respectively.[35]Table 2 shows the status of CHD risk factor control in Korean immigrants with type 2 diabetes according to the ADA’s recommended goals.

CHD Knowledge

The mean total CHD knowledge score was 8.82 (SD = 1.81; range = 3–12), indicating that participants had a high level of knowledge on risk factors associated with CHD. Most identified being overweight or obesity (88.8%), dietary fat or high cholesterol (81.8%), hypertension (87.4%), and stress (89.5%) as factors associated with or thought to cause CHD. Slightly lower proportions indicated smoking (76.9%), diabetes (74.1%), a sedentary lifestyle (75.5%), and family history (72.7%) to be risk factors. About two thirds (66.4%) thought age was a risk factor for CHD, although just a third (30.1%) thought gender played a role as a risk factor.

Bivariate and Multivariate Analyses for CHD Risk Perception

The results of bivariate analyses are presented in Table 3. Significant positive correlations were found for CHD knowledge and hypertension medication, although significant negative correlations were discovered for education and general health status.

On multivariate analyses, the linear combination of the predictors in the model was significantly related to the level of CHD risk perception. The R^2 was 0.219, indicating that the model explained roughly 22% of the variance in CHD risk perception ($R^2 = 0.219$; $F [9,133] = 4.149$; $P < .0001$). Self-reported general health status and CHD knowledge were significant predictors of CHD risk perception. A higher level of CHD knowledge was associated with a higher level of risk perception, although better self-reported general health status was associated with lower levels of CHD risk perception. Table 4 presents the results of the regression analyses.

Discussion and Conclusions

The purpose of this study was to investigate the level of CHD risk perception, risk factor control, and factors influencing CHD risk perception among Korean immigrants with type 2 diabetes. Participants had low perception of CHD risks and their control of CHD risk factors was suboptimal. The study suggests that CHD knowledge and general health are important in determining CHD risk perception in this group.

The low perception of CHD risks in this study is consistent with previous studies of CHD risk perception in high-risk populations.[6, 13, 17] However, when compared with a recent national study of individuals with type 2 diabetes,[7] the proportion of those who indicated their CHD risk to be the same or lower than like individuals in the general population was much higher in this study (77% vs 52%). Such a high rate in patients with diabetes is a concern because a low perception of CHD risks may negatively affect their decision to adopt and to maintain risk reduction behaviors. This finding indicates the need to increase risk perception to a level commensurate with the high risk present in diabetic Korean immigrants.

In this study, the control of diabetes and CHD risk factors were suboptimal, according to ADA goals. Although the control was better than the U. S. national data on adults with diabetes [36] (HbA1c [42% vs 37%], blood pressure [45% vs 36%], and total cholesterol [66 % vs 48%] respectively), the findings show the need to improve risk factor management in Korean immigrants with type 2 diabetes. Similar research is needed in other Korean or Asian immigrants with diabetes to compare these findings. Studies are also needed to determine if the suboptimal control of CHD risk factors is related to the failure of educators or clinicians to educate patients about the relationship between type 2 diabetes and CHD or to patients simply misunderstanding these two as separate problems. As a recent study suggests [7], most diabetes educators and clinicians may consider the lowering of blood glucose to be their highest priority in reducing CHD events in patients with diabetes, leading patients to think that controlling other risk factors are not as important. No definitive data from clinical trials, however, show that intensified glycemic control significantly reduces the risk of CHD in patients with type 2 diabetes; control of blood pressure, control of lipids, and smoking cessation are thought to be more important in reducing premature deaths from CHD.[37]

The results of this study show that knowledge of CHD and general health significantly influence CHD risk perception. More knowledge was associated with increased risk perception, although high scores of CHD knowledge in this sample were not reflected in the level of risk perception. The finding indicates that education may be beneficial in increasing a person's risk perception and helping the patient connect their risk of CHD with their diabetes. Educational programs on CHD and risk factor control, specifically designed for diabetic patients, should be part of each patient's visit with diabetes educators and clinicians.

Self-reported general health was found to be negatively associated with CHD risk perception, as shown in previous studies,[18, 20, 38] suggesting that diabetic individuals who report their general health to be good may incorrectly perceive their CHD risk to be low. Although it is not surprising that people who believe they are in good health feel less vulnerable to getting any illness, including CHD, diabetes educators and clinicians must emphasize to diabetic patients, particularly those who feel healthy, that they are still at risk for CHD. Future studies need to investigate effective ways to communicate CHD risk to people with diabetes so that these individuals understand their risk of CHD and adopt risk reduction behavior.

This study also found that more than two thirds of the participants rated their health as *fair* or *poor* (68.5%). This figure is similar to that in recent studies of the general population of Korean Americans over 65 years old (69%).[39, 40] Based on this comparison, it is unclear if having a chronic disease, such as diabetes influences the general heath status ratings in Korean immigrants. The literature indicates that Asian Americans are more likely than non-Hispanic Whites to report fair or poor health in response to the general health question, even though they are often described as having fewer chronic diseases than other US populations.[41] Future studies comparing the general health status of diabetic and nondiabetic individuals from different groups of Korean immigrants and other ethnic Asian groups may explain the small difference noted in the current study. And they may also suggest a different way of measuring general health in Asian immigrants, such as using culture-specific languages and expressions in questionnaires.

Previous literature also suggests that demographic variables, such as age, sex, and education, are related to an increased risk perception for certain conditions, such as heart attack. [38, 42] These variables, however, were not found to be significant determinants of CHD risk perception in this study. And, taking medications for diabetes, high blood pressure, high cholesterol, or smoking did not influence a patient's perception of CHD risk. This finding concurs with that of Frijling et al,[38] who found that diabetes, a history of high blood pressure, and a history of high cholesterol did not relate to patient estimates of CHD risk. Although participants taking medications for these risk factor conditions may have felt that their CHD risk factors were also being addressed and thus did not consider themselves at further risk, research is needed to better understand these findings.

This study has several limitations. First, because it used a convenience sample from community sites in a West Coast Koreatown, the results may not be generalizable to Korean immigrants living in other geographic areas. Second, the sample comprised first generation immigrants only. Thus, generalizing the results to Koreans born in the United States may not be appropriate. Third, nonfasting cholesterol levels were obtained in 9 participants who could not return for a fasting measure, although this probably did not affect the data significantly. Finally, the measure of CHD knowledge was limited to the recognition of risk factors and may not have fully reflected the participants' understanding of CHD risk (eg, why these are risk factors). Future studies should be conducted using more representative samples and multidimensional measures of CHD knowledge. Measures specific to populations with diabetes that are culturally appropriate may need to be developed for this purpose.

In conclusion, this study provides useful information to improve the care of Korean immigrants with type 2 diabetes. No comparable clinical or risk factor data are available for this group of patients, despite the increasing incidence of type 2 diabetes within the Korean immigrant community. However, if patients have suboptimal control of their diabetes and CHD risk factors, a low perception of CHD risks may inhibit appropriate actions to prevent CHD.

This study's findings have important implications for diabetes educators who provide care to Korean immigrants with type 2 diabetes. The importance of CHD knowledge suggests that diabetes educators and other health care providers should educate individuals with diabetes about their high CHD risk. The CHD knowledge acquired from such education may increase risk perception and lead to appropriate actions to reduce the risk of CHD. Those with low CHD knowledge and those reporting good general health deserve special attention because these individuals tend to have a low perception of CHD risk and an unrealistically optimistic view of their CHD risk.

Acknowledgments

Supported in part by: National Institute of Nursing Research, 5 F31 NR009329, Sigma Theta Tau Research Award, Alpha Eta Chapter

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Table 1

Characteristics of the Study Sample (N = 143)

Characteristic	Mean ± SD
Age	62.4 ± 12.8
Years in the US	21.7 ± 9.2
Years with diabetes	6.8 ± 6.2
HbA1c	7.6 ± 1.5
Characteristic	**N (%)**
Gender	
Female	74 (51.7)
Male	69 (48.3)
Marital Status	
Married	88 (61.5)
Living with partner	5 (3.5)
Divorced or separated	16 (11.2)
Widowed	26 (18.2)
Never married	8 (5.6)
Household status	
Lives alone	31 (21.7)
Lives with spouse or partner	71 (49.7)
Lives with spouse or partner and children	20 (14.0)
Lives with married children and grandchildren	21 (14.7)
Educational level	
Elementary school or less (0–6 grades)	20 (14.0)
High school (7–12 grades)	42 (29.4)
College/university	71 (49.7)
Graduate school or more	10 (7.0)
Annual household income	
Less than $20,000	75 (52.4)
$20,000 – $39,999	16 (11.2)
$40,000 – $59,999	16 (11.2)
$60,000 – $79,999	16 (11.2)
$80,000 or more	20 (14.0)
On diabetes medication	122 (85.3)
On hypertension medication	101 (70.6)
On cholesterol medication	85 (59.4)
Self-reported general health	
Poor	44 (30.8)
Fair	54 (37.8)
Good	36 (25.2)
Very good	9 (6.3)

Characteristic	Mean ± SD
Excellent	0 (0.0)

HbA1c = glycosylated hemoglobin.

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Table 2

Participants Failing Treatment Goals for Coronary Heart Disease Risk Factors*

Variable	N = 143 (%)
SBP ≥ 130 mm Hg	61 (42.7)
DBP ≥ 80 mm Hg	51 (35.7)
Total Cholesterol ≥ 200 mg/dL	48 (33.6)
TG ≥ 150 mg/dL	68 (47.6)
LDL ≥ 100 mg/dL†	74 (53.6)
HDL, mg/dL	M: 37 (53.6)
(≤ 40 men, ≤ 50 women)	W: 45 (60.8)
Waist circumference‡	M: 57 (82.6)
(> 90 cm men, >80 cm women)	W: 63 (85.1)
Waist to hip ratio	M: 52 (75.4)
(> 0.9 men, > 0.85 women)	W: 47 (63.5)
BMI ≥ 23 kg/m^2§	116 (81.1)
HbA1c ≥ 7%	84 (58.7)
Smoking	23 (16.1)

Abbreviations: SBP, systolic blood pressure; DBP, diastolic blood pressure; TG, Triglyceride; LDL, low density lipoprotein; HDL, high density lipoprotein; BMI, body mass index; HbA1c, glycosylated hemoglobin; M, men; W, women.

*Adapted from: American Diabetes Association, Clinical Practice Recommendations. *Diabetes Care*. 2006; 29(suppl 1): S4–42.

†Sample size for this variable was 138 due to 5 missing values (3 men and 2 women). When TG is above 400, LDL cannot be calculated.

‡World Health Organization Asia-Pacific Criteria, 2000.

§World Health Organization recommendation for Asians, 2002.

Table 3

Correlations Among the Main Independent Variables

Variables	1	2	3	4	5	6	7	8	9	10
CHD Risk perception	–									
Age	.05	–								
Gender	.16	.17*	–							
Education	–.20*	–.30**	–.43**	–						
General Health	–.36**	.04	–.14	.18*	–					
Current Smoking	.01	–.29**	–.19*	.10	.01	–				
CHD knowledge	.21*	–.22*	–.01	.20*	–.04	.13	–			
Diabetes medication	.05	.09	.07	–.09	–.14	–.09	–.09	–		
Hypertension medication	.19*	.43**	.15	–.14	–.17*	–.26**	–.06	.21*	–	
Cholesterol medication	.04	.33**	.00	–.11	–.05	–.07	–.03	.14	.34**	–

Abbreviation: CHD, coronary heart disease.

* $P < .05$ (two-tailed)

** $P < .01$ (two-tailed)

Table 4

Multiple Regression Analyses of CHD Risk Perception

Source	R^2	beta	sr^2	df	F	p
Overall	.219			9,133	4.15	.000
Age		.022	.000	1,133	0.06	.815
Gender		.041	.001	1,133	0.22	.643
Education		–.154	.017	1,133	2.88	.092
Current smoking		.039	.001	1,133	0.22	.637
General health status		–.304	.084	1,133	14.19	.000**
CHD knowledge		.231	.048	1,133	8.26	.005**
Diabetes medication		–.017	.000	1,133	0.05	.829
Hypertension medication		.134	.013	1,133	2.15	.145
Cholesterol medication		–.033	.001	1,133	0.15	.699

* $P < .05$ (two-tailed)

** $P < .01$ (two-tailed).