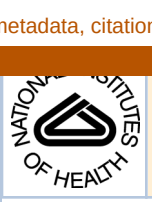

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Observed Hostility and the Risk of Incident Ischemic Heart Disease: A Prospective Population Study from the 1995 Canadian Nova Scotia Health Survey

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Abstract

OBJECTIVES—To examine the relation between hostility and incident ischemic heart disease (IHD) and to determine whether observed hostility is superior to patient-reported hostility for the prediction of IHD in a large, prospective observational study.

BACKGROUND—Some studies have found that hostile patients have an increased risk of incident IHD. However, no studies have compared methods of hostility assessment, nor considered important psychosocial and cardiovascular risk factors as confounders. Further, it is unknown whether all expressions of hostility carry equal risk, or whether certain manifestations are more cardiotoxic.

METHODS—We assessed the independent relationship between baseline observed hostility and 10-year incident IHD in 1,749 adults of the population-based Canadian Nova Scotia Health Survey.

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RESULTS—There were 149 (8.5%) incident IHD events (140 non-fatal, 9 fatal) during the 15,295 person-years of observation (9.74 events/1000 person-years). Participants with any observed hostility had a greater risk of incident IHD than those without (p=0.02); no such relation was found for patient-reported hostility. After adjusting for cardiovascular (age, sex, Framingham Risk Score) and psychosocial (depression, positive affect, patient-reported hostility, and anger) risk factors, those with any observed hostility had a significantly greater risk of incident IHD (HR 2.06, 95% CI 1.04–4.08, P=0.04).

CONCLUSIONS—The presence of any observed hostility at baseline was associated with a two-fold increased risk of incident IHD over 10 years of follow-up. Compared to patient-reported measures, observed hostility is a superior predictor of IHD.

Keywords

Observed hostility; patient-reported hostility; ischemic heart disease; depression; positive affect

INTRODUCTION

Negative emotions such as anger and hostility have been increasingly recognized as important risk factors for the development of ischemic heart disease (IHD) (1). Although many studies, including a recent meta-analysis (1) have found that hostility and anger increase the risk of incident IHD, there are studies that do not demonstrate this association (2,3). If there is a relation between hostility and IHD, it is unknown whether hostility predicts IHD in a gradient fashion. Most assessments of hostility have used patient-reported measures, such as the Cook-Medley hostility scale (4) or the Bedford-Foulds Personality Deviance Scales (5). Compared with interviewer-based measures, patient-reported scales require self-awareness of hostility and are more susceptible to reporting biases (6–8). In contrast to patient-reported scales, interviewer-based measures allow for the assessment of interpersonal cues and manifestations of hostility which self-report scales do not assess (6,9). Although a prior study recommended using different modalities for assessing hostility (7), to date no prospective study of hostility and incident IHD has compared the predictive value of patient-report versus interview-based hostility measures. The observed hostility (OHO) sub-scale of the Expanded Structured Interview (ESI) is one of the most commonly used interview-based measures of hostility (10,11). It has been referred to as “Potential for Hostility” and is defined as “the relatively stable tendency (a) to experience varying degrees and combinations of anger, irritability and related negative affects in response to common, everyday events that are likely to arouse them in individuals who are prone to react in such ways and/or (b) to react with expressions of antagonism, disagreeableness, rudeness, surliness, criticalness and uncooperativeness” (10). However, it is unclear whether the association between the results of OHO and the risk of IHD is gradient and independent of traditional IHD risk factors and other psychosocial factors that are associated with both hostility and incident IHD. To clarify these areas of uncertainty, we examined the relation between OHO and incident IHD events, and determined whether this relation is independent of cardiovascular risk factors, self-reported hostility and other psychosocial risk factors, in a prospective, population-based sample of IHD-free Nova Scotians, observed for IHD events for 10 years of follow-up.

METHODS

STUDY POPULATION

The 1995 Nova Scotia Health Survey is a population-based survey implemented by Heart Health Nova Scotia and the Nova Scotia Department of Health to estimate the distributions of selected health indicators and preventive practices of Nova Scotians (12). The target

sample was based on a probability sample designed by Statistics Canada, the national statistical agency and census bureau, to be representative of the Nova Scotian population by age, sex, and geographic location. Study participants consisted of noninstitutionalized Nova Scotians aged 18 years or older and listed in the registry of Medical Services Insurance, the government-sponsored universal health insurance plan. The overall recruitment percentage (72%) is comparable to those of other large health surveys, with a final survey sample size of 3227 participants. As previously reported (13), propensity analyses revealed no meaningful response biases. Pregnant women were excluded from the survey. We further restricted our analysis sample to participants who had attended the clinic session and those without hospital discharge diagnoses of IHD in the 5 years before the baseline survey, as determined by International Classification of Diseases, Ninth Revision (ICD-9) (14) codes 410.x through 414.x (myocardial infarction, acute or chronic IHD, angina) or International Statistical Classification of Diseases, 10th Revision (ICD-10) (15) codes I21–I25 (acute myocardial infarction, complications after acute ischemic disease, acute or chronic IHD) obtained from the electronic database described below. Of the 2638 survey respondents who met the inclusion criteria, 1749 (66%; 869 male, 880 female) were included in this analysis. Survey respondents were excluded because of refusal to permit linkage to medical outcomes (N=399) or failure to complete the ESI (N=490).

NOVA SCOTIA HEALTH SURVEY

A group of 29 public health nurses were trained in standardized data collection and contacted targeted survey participants from March through November 1995. Consenting participants were interviewed and seen approximately a week after the interview for measurement of height and weight and to provide a fasting blood sample for measurement of serum lipids. During the clinic assessment, participants were asked to complete a videotaped structured interview that was subsequently reviewed for scoring. Participants provided consent to link future ischemic heart disease events with prior health care utilization and to store and use videotapes. Additional details of study procedures have been published (16,17). The study was approved by the institutional review boards of Dalhousie University, Halifax, Nova Scotia, and Columbia University, New York, NY.

OBSERVED HOSTILITY

The ESI is a 12-minute stressful interview designed to assess a number of psychosocial characteristics including hostility, anger expression, and positive affect through questioning participants about their characteristic responses to a variety of different situations (18,19). The ESI was used to assess OHO, which is a rating of the degree to which the participant expresses hostility, whether through hostile statements, vocal hostility, or a combination of both (20). As with other components of the ESI (21), OHO was observed during the interview and was also coded based on a participant's level of hostility reported to occur in day-to-day situations. There were 4 steps to the creation of observer-based scores of OHO (12,19,21). First, nurse interviewers were trained and certified to conduct the structured interview and ensure that it was delivered in a standardized fashion and properly recorded on videotape. Second, the recorded interview was viewed to ensure that the interviewer followed the script, and that only participants that passed interview quality filters were included. Third, staff were trained on how to properly code the interviews. All interviews were scored for OHO and rated as follows: 1 (no hostile statements, no hostility in voice), 2 (some hostile statements, no hostility in voice), 3 (2–3 hostile statements, some hostility in voice) 4 (3 or more hostile statements, evidence of hostility in voice) to 5 (frequent hostile statements and hostility in voice) by the certified coders (20). Fourth, coding was randomly audited and only those staff codings that passed preset reliability requirements were retained. An internal quality review was implemented and unreliable codings were recoded by reliable coders (21). Coder reliability was assessed by calculating the correlation between

each coder's ratings and the average of the other coders' ratings (corrected item-total correlation) on 30 common tapes (22). Coder reliability for OHO among pairs of coders was excellent (r=0.89). No single coder appeared to be an outlier when the corrected item-total correlations were examined.

PRIMARY OUTCOME MEASURE

The main outcome measure was the time to first event defined as incident fatal or nonfatal IHD as determined by hospital discharge codes (*ICD-9* codes 410 through 414 (14) and *ICD-10* codes I21–I25 (15)) and death certificates. In the Canadian single-payer health system physicians submit *ICD* codes upon death or discharge. A data quality committee from the Nova Scotia Department of Health then meets with health records personnel to ensure accuracy, to conduct random chart reviews, and to adjudicate discrepancies in data entry. All deaths are reported to provincial offices and subsequently to the national census bureau (Statistics Canada), which applies a previously published (21), nationally consistent process of determining the underlying cause of death. Specifically, these data were converted to the *ICD* codes by staff at Statistics Canada; and only those codes listed above qualified as fatal IHD. Data were extracted by the Population Health Unit of Dalhousie University.

CARDIOVASCULAR COVARIATES

At baseline, each component of the Framingham Risk Score (FRS) (23) was recorded, including sex, age, total and HDL cholesterol levels, blood pressure, and history of diabetes and cigarette smoking. Weight and height were measured twice, averaged, and used to calculate BMI (calculated as weight in kilograms divided by height in meters squared). History of diabetes was ascertained by self-report. Registered nurses used manual sphygmomanometers to measure SBP and DBP; 2 readings from home and 2 from clinic (approximately 1 week later) were averaged for resting values of each. Total and HDL cholesterol levels were assayed from plasma samples by the Lipid Research Laboratory, University of Toronto, Toronto, Ontario (24). As per the FRS calculation (23), those who reported smoking currently or in the past year were considered smokers; all others were considered nonsmokers.

PSYCHOSOCIAL COVARIATES

To test if observed hostility was independently associated with a risk of incident ischemic heart disease, 3 measures of negative affect (patient-reported depressive symptoms and hostility and observed destructive anger justification) (19,25,26) and one potentially protective measure of observed positive affect (21) were considered as covariates.

Patient-reported depression—Depressive symptoms were assessed with the Centers for Epidemiological Studies Depression scale (CES-D) scale (27), a 20-item self-report instrument designed for use in epidemiological studies as a measure of depressive symptoms. Higher scores reflect increased depressive symptoms.

Patient-reported hostility—Patient-reported hostility was assessed with the Cook-Medley Hostility scale (CMHS) (28), 50 true-false items used to assess patient-reported hostility which has been widely used in prior studies of psychosocial variables and health outcomes (4,29,30). We also secondarily examined four CMHS subscales: three from the 27-item Barefoot hostility inventory (cynical, aggressive responding and hostile affect) (4,31), and the Finnish cynical distrust subscale (32).

Destructive anger justification—Destructive anger justification was measured with a previously published observed rating scale (12) of the ESI, described directly above.

Observed Positive affect—Positive affect was assessed from the ESI using previously published ratings (21) and is the degree to which participants express positive emotions.

Statistical Analysis

When a limited number of items of a scale or index were missing for either the CES-D or FRS, we used a previously published regression-based approach to determine the best linear-predicted score based on the nonmissing items (19,21,33,34). The criterion for imputation from the available items was an R-squared ≥ 75%, which was equivalent to 6 non-missing items from the CES-D; no participant was missing more than 2 items of the FRS. We compared demographic, psychosocial, and cardiovascular characteristics of the sample across categories of OHO. We examined 2-tailed Pearson correlation coefficients among psychosocial covariates. The primary aim was to investigate the association between OHO and incident IHD. To examine the nature of this association, we first examined the number of events in each of the 5 OHO categories. In the analysis sample (N=1749), OHO category 5 had very few persons (n=65) and was therefore combined with OHO category 4 (n=490). We then examined the relationship of the 4-category OHO scale with time to first IHD event using the Cox proportional hazards regression model adjusted for age, sex, and FRS (23) (Figure 1). The relation between OHO and IHD was monotonic, but non-linear: given the minimal differences among OHO categories “2–4”, these were combined into a category of “any observed hostility” (N=1572). We evaluated the association between binary OHO and risk of first incident IHD using the Cox proportional hazards regression model adjusted for age, sex, and FRS. We then tested the association between binary OHO and incident IHD in a fully adjusted Cox proportional hazards regression model, adjusting for cardiovascular (age, sex, and FRS) and psychosocial (depression, self-reported hostility, positive affect, and destructive anger justification) risk factors. Additional analyses were conducted using the Barefoot and Finnish CMHS subscales (4,31,32).

RESULTS

BASELINE CHARACTERISTICS

Table 1 presents the baseline characteristics of the 1749 participants included in the analysis by OHO hostility group (Any Observed Hostility, a rating of 2–5; n=1572 or No Observed Hostility, a rating of 1; n=177). Participants with any observed hostility were younger (P = 0.002), were more likely to be active smokers (P = 0.02), had higher levels of self-reported depressive symptoms (P = 0.02), and had more destructive anger justification (P < 0.001). They were also somewhat more likely to be male, and to have higher patient-reported hostility.

CORRELATIONS AMONG PSYCHOSOCIAL MEASURES

The correlations between psychosocial measures indicated that OHO was moderately correlated with patient-reported depression and hostility, and observed destructive anger justification. The observed measures of anger and positive affect were also moderately but negatively correlated (Table 2). The Cronbach α was 0.88 and 0.84 for patient-reported depression and hostility, respectively, and 0.86 for observed destructive anger justification.

RELATION BETWEEN HOSTILITY AND INCIDENT IHD EVENTS

There were 149 participants (8.5%) with incident IHD events (140 nonfatal, 9 fatal) during the 15,295 person-years of observation (incidence rate, 9.74 events/1000 person-years).

There were 9 (5.1%) events, 45 (8.6%) events, 46 (9.3%) events and 49 (8.8%) events in OHO categories 1 (N=177), 2 (N=522), 3 (N=495), and 4–5 (N=555), respectively.

In the Cox proportional hazards regression model adjusted for age, sex, and FRS (Figure 1), the test for a trend relationship between OHO and IHD was statistically significant (P = 0.013), with hazard ratios of 1.96 for OHO rating 2 (P = 0.07), 2.21 for OHO rating 3 (P = 0.03), and 2.42 for OHO ratings 4 and 5 (P = 0.02) compared to those with no observed hostility (OHO category 1). However, the differences among OHO categories 2 through 4 were not significant (df=2, P = 0.61). When these categories were combined, those with any observed hostility had a significantly greater risk of incident IHD than those with no observed hostility (HR=2.18, p=0.02). Table 3 presents the fully adjusted Cox proportional hazards regression model of binary OHO (any observed hostility vs no observed hostility) and incident IHD. When the model was fully adjusted for cardiovascular and psychosocial covariates, participants with any observed hostility had a twofold increased risk of incident IHD (hazard ratio, 2.06; 95% confidence interval, 1.04–4.08; P = 0.04) compared to those with no observed hostility. Importantly, one of the psychosocial covariates was patient-reported hostility. Figure 2 presents the predicted incident-free survival for those with any vs. no observed hostility, based on the fully adjusted Cox proportional hazards regression model (Model 2). There were no significant relationships between any of the Barefoot hostility subscales (cynical hostility, aggressive responding and hostile affect), nor between the Finnish cynical distrust subscale, and incident IHD (Table 4).

DISCUSSION

In this large, representative population study, the presence of any observed hostility was associated with a twofold increased risk of incident IHD, after adjusting for several known cardiovascular and psychosocial risk factors, including depressive symptoms, patient-reported hostility, destructive anger and positive affect. This is the first large prospective study to demonstrate that observed, rather than patient-reported, hostility is a superior marker of IHD risk, and that this association remains significant when controlling for several other possible psychosocial explanatory factors.

Our results suggest that although observed hostility appears to predict incident IHD in a graded fashion, this relationship is mostly due to the difference between any vs. no observed hostility. Prior studies using patient-reported assessments (29) and interview-based measures (7) of hostility have also suggested that the relation between hostility and IHD may be nonlinear (35,36). In a CARDIA sub-study, Iribarren et. al. evaluated patient-reported hostility both categorically (high vs. low) and continuously (29). Independent of cardiovascular covariates, both methods of scaling hostility were associated with coronary artery calcification, a subclinical measure of IHD; however, this study did not control for known psychosocial covariates such as depression. Although we observed a gradient relation between OHO and incident IHD, our data indicate that once hostility is apparent, increasing severity of hostility increases the risk of IHD very little. Therefore, hostility may be a phenotype wherein its presence (rather than its severity) is associated with increased risk of IHD. Our analysis identified 177 participants (10.1% of 1749) with no observed hostility and a lower risk of IHD. In a study of interviewer-based hostility and IHD death, Mathews et. al. (7) also described a similar percentage (10.2%) with no hostility and low risk of IHD death.

Our results suggest that an interviewer-based measure of hostility is a superior predictor of IHD compared with patient-reported hostility. This finding corroborates earlier results (7,37) and supports the use of interviewer-based measures of hostility for the assessment of future IHD risk. Only one study to date has examined the relationship of both patient-reported and

observed measures of hostility to incident IHD, and these measures were not modeled simultaneously (38). In contrast to the findings from a recent meta-analysis (1), the relationship between patient-reported hostility and incident IHD in our single study was small and not statistically significant. With the exception of the aggressive-responding subscale, our point estimates for risk were elevated for increased levels of patient-reported hostility, and they fell within the 95% confidence interval of the recent meta-analysis (a range of 1.05 – 1.35) (1) only when compared by 1 SD increase or by highest and lowest quartiles. In our study we controlled for standard cardiovascular risks, whereas many of the studies included in the meta-analysis did not. It is therefore possible that patient-reported hostility loses its association to IHD risk once full adjustment for cardiovascular risk is completed. Finally, as it had been suggested (39) that anger and hostility are distinct psychosocial constructs, our analysis included a measure of anger previously found to be predictive of IHD (19). In the presence of observed hostility the association of anger and IHD was reduced, suggesting that the relation between anger and IHD may be either confounded by or mediated through hostility.

LIMITATIONS AND STRENGTHS

There are limitations to our study. First, we had measures of cardiovascular risk factors only at baseline and, therefore, were unable to control for changes in these factors during the follow-up period. Similarly, hostility was observed only at baseline and may have changed over the nearly 10 years of follow-up. However, the results of prior studies suggest that personality characteristics such as hostility and positive affect are stable over time (21,40). As this is an observational study there is the possibility of confounding by unmeasured variables, such as interpersonal stress and social isolation. Hostility is associated with interpersonal stress and social isolation, which are both associated with cardiovascular risk. Thus it is possible that these psychosocial factors may have partially explained the link between observed hostility and incident IHD. Future research should investigate the interrelationship of these factors with IHD risk.

If those who did not complete the ESI and were excluded from our analysis differed significantly in both their cardiovascular risk factors and in their levels of observed hostility, it is possible that our results may in part be explained by selection biases. Additionally, it is possible that the mode of interviewer-assessed hostility may not have been sensitive to differences in hostility severity, which may be associated with higher levels of IHD risk. Finally, although the relative difference in risk of IHD events between those with and without observed hostility was substantial, the absolute difference in risk was small (3.8%).

The strengths of our study include the relatively large, population-based sample, the use of a structured interview with standardized assessments of hostility, the inclusion of several psychosocial and cardiovascular risk factors as covariates, and the ascertainment of IHD outcomes based on a centralized, medical registry.

Confirmatory studies are needed before hostility should be routinely assessed in clinical practice. Although there is evidence to support psychological interventions for the management of hostility in the prevention of future IHD events (41), further research is needed on the efficacy of psychological interventions to reduce cardiovascular risk. The results of our study suggest that observed, interviewer-based measures of hostility may be preferred to patient-reported measures.

CONCLUSIONS

We found that the presence of any observed hostility was associated with a two-fold elevated risk of IHD over 10 years of follow-up, independent of other psychosocial and

cardiovascular risk factors. Moreover, our findings suggest that observed hostility does not predict IHD in a strictly linear fashion; rather, the presence of any hostility confers the majority of the IHD risk. Future studies should better characterize this relation, and describe subtypes of hostility assessed by interview that may be associated with IHD risk.

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ABBREVIATIONS

OHO	observed hostility
ESI	Expanded Structured Interview
IHD	ischemic heart disease
ICD	International Classification of Diseases
FRS	Framingham risk score
CMHS	Cook-Medley hostility scale
SBP	systolic blood pressure
DBP	diastolic blood pressure
HDL	high density lipoprotein
BMI	body mass index
ANOVA	analysis of variance

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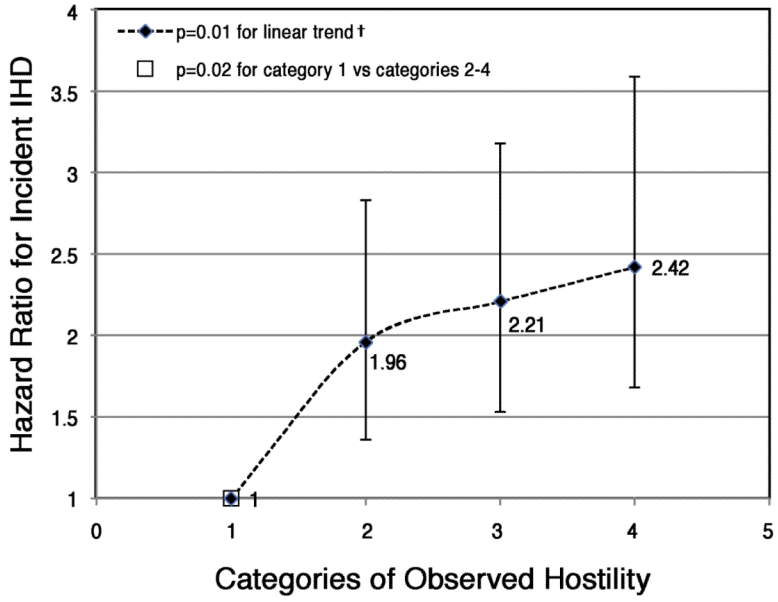

FIGURE 1. Incident Ischemic Heart Disease by Category of Observed Hostility

*Hazard ratios based on a Cox proportional hazards regression model adjusted for age, sex, and Framingham Risk Score. Error bars indicate +/− 1 SE.

† Interpolated line

Abbreviations: IHD, ischemic heart disease. FRS, Framingham Risk Score

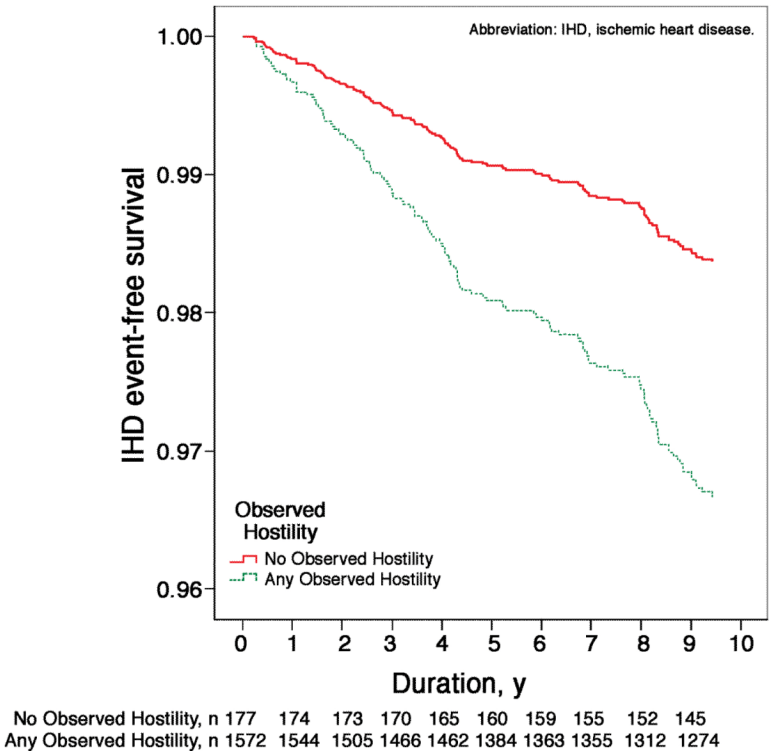

FIGURE 2. Predicted Event-free Survival in 1749 Participants

Observed Hostility:

Solid red line = No observed hostility

Dotted blue line = Any observed hostility

Abbreviation: IHD, ischemic heart disease

Table 1

Nova Scotia Health Survey 1995 baseline characteristics by Observed Hostility[*†]

Variable	Total N=1749	No Observed Hostility, n=177	Any Observed Hostility, n=1572	P-value
Age, y	46.5 ± 17.9	50.4 ± 19.2	46.0 ± 17.7	0.002
Male, No. (%)	869 (49.7)	79 (44.6)	790 (50.3)	0.09
Active smoking, No. (%)	459 (26.2)	35 (19.8)	412 (27.0)	0.02
Body mass index, kg/m2	27.1 ± 5.6	27.2 ± 5.1	27.1 ± 5.6	0.94
Diabetes mellitus, No. (%)	66 (3.8)	6 (3.4)	60 (3.8)	0.49
Total cholesterol mmol/L	5.3 ± 1.1	5.4 ± 1.1	5.3 ± 1.1	0.55
Low density lipids mmol/L	3.2 ± 0.9	3.3 ± 0.9	3.2 ± 0.9	0.44
High density lipids mmol/L	1.3 ± 0.3	1.3 ± 0.3	1.3 ± 0.3	0.41
Systolic blood pressure mm Hg	124.8 ± 17.0	125.4 ± 15.5	124.8 ± 17.1	0.68
Diastolic blood pressure mm Hg	77.0 ± 9.7	77.4 ± 9.2	77.0 ± 9.8	0.57
Depressive symptoms	7.3 ± 8.0	6.0 ± 6.8	7.5 ± 8.1	0.02
Patient-reported hostility	18.9 ± 8.1	17.8 ± 7.7	19.1 ± 8.2	0.06
Destructive anger justification	10.2 ± 3.5	8.7 ± 3.0	10.3 ± 3.5	<0.001
Positive affect	2.5 ± 0.9	2.5 ± 0.9	2.5 ± 0.9	0.77

[*] Data are presented as mean ± SD unless indicated otherwise. *P* for group difference was calculated using χ^2 for dichotomous and *t* tests for continuous variables.

[†] Any Observed Hostility = observed hostility (OHO) score of 2–5; No Observed Hostility = OHO score of 1

Table 2

Correlations among Psychosocial Measures in the Nova Scotia Health Survey 1995

Variable	Observed Hostility	Depressive symptoms	Self-reported hostility	Destructive anger justification	Positive affect
Observed Hostility‡	1.00	…	…	…	…
Depressive symptoms	0.11*	1.00	…	…	…
Patient-reported hostility	0.12*	0.39*	1.00	…	…
Destructive anger justification‡	0.26*	−0.07*	0.12*	1.00	…
Positive affect‡	−0.09*	−0.05†	−0.12*	−0.06†	1.00

*P ≤ 0.01, 2-tailed

†P ≤ 0.05, 2-tailed

‡Interview-based measure

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Table 3

Hazard ratios for incident IHD by psychosocial measures

Psychosocial Measure	Model 1* HR (95% CI)	P	Model 2* HR (95% CI)	P
Observed Hostility†	**2.18 (1.11–4.29)**	**0.02**	**2.06 (1.04–4.08)**	**0.04**
Patient-reported hostility‡	1.01 (0.96–1.27)	0.19	0.99 (0.83–1.18)	0.94
Depressive symptoms‡,§	**1.28 (1.11–1.48)**	**<0.01**	**1.24 (1.04–1.48)**	**0.01**
Destructive anger justification†,‡,§	1.11 (0.95–1.31)	0.20	1.05 (0.89–1.25)	0.55
Positive affect†,‡,§	**0.78 (0.66–0.93)**	**<0.01**	**0.82 (0.68–0.97)**	**0.02**

Predictors with significant P values are in bold type.

Abbreviations: IHD, ischemic heart disease. CI, confidence interval. HR, hazard ratio

Model 2 was adjusted for variables in model 1 and all psychosocial predictors listed (all continuous). An observed hostility score of 2 or greater was considered hostile.

*Model 1 was adjusted for sex, age at baseline (continuous), and Framingham risk score (continuous) in a separate analysis for each psychosocial measure.

†Interview-based measures.

‡Hazard ratio in Model 1 and Model 2 per 1 SD increase

§Previously published psychosocial predictors (19,21,25) were used as covariates in Model 2 to demonstrate that observed hostility is associated with IHD when controlling for these psychosocial measures.

Table 4

Cook-Medley Subscales and Incident IHD

Cook-Medley Subscale Measure	Model* HR (95% CI)	P
Barefoot Cynical Hostility		
Per 1 SD increase	1.06 (0.91–1.24)	0.44
Quartile 4 vs. Quartile 1	1.12 (0.70–1.82)	0.63
Barefoot Hostile Affect		
Per 1 SD increase	1.09 (0.93–1.27)	0.31
Quartile 4 vs. Quartile 1	1.60 (0.95–2.71)	0.08
Barefoot Aggressive Responding		
Per 1 SD increase	0.94 (0.79–1.10)	0.41
Quartile 4 vs. Quartile 1	0.79 (0.49–1.26)	0.32
Finnish Cynical Distrust		
Per 1 SD increase	1.06 (0.91–1.23)	0.45
Quartile 4 vs. Quartile 1	1.24 (0.79–1.95)	0.35

Abbreviations: IHD, ischemic heart disease. CI, confidence interval. HR, hazard ratio. SD, standard deviation.

*Age, sex and Framingham Risk Score adjusted.