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Perspectives that lay persons with and without health problems show toward coronary heart disease. An integrated biopsychosocial approach

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Running head: CHD from an integrated biopsychosocial perspective

Objective: To study what patients with acute coronary heart disease (CHD) considered the three most stressful factors experienced during the month prior to testing and what they attributed their heart disease to.

Methods: Studied the occurrence and severity of physiological, psychological, and psychosocial stressors in 117 patients with acute CHD and 117 referents, not diagnosed as having CHD, matched by age, sex, and municipality. Subjects were first to select from a list of potentially stressful factors those they themselves considered stressful. They were then to select the three they regarded as most stressful and to provide situational accounts of these.

Results: The CHD patients were found to less frequently live with a partner, more frequently have a BMI higher than 30.0 and to report a greater number of stressors. The stressors best differentiating them from the referents were fatigue, shortness of breath, pain, and high blood pressure. The causal factors they most frequently named were heart problems, smoking, heredity, high workload, and poor eating habits.

Conclusions: The situational accounts the patients provided illustrate the biopsychosocial complexities involved in the various categories of stressful factors.

In coronary heart disease (CHD), conventional risk factors such as smoking, hypertension, diabetes and hyperlipidemia have been reported to explain 50-90% of the risk involved.[1,2] Recent studies have also provided substantial evidence for various psychological and psychosocial factors (e.g., stress, hostility, depression, social support, socioeconomic status) being connected with the morbidity and mortality associated with CHD.[3,4] The increased risk produced such factors produce, although reportedly more consistent for certain factors such as depression and lack of social support, has been regarded as similar in strength to that produced by the conventional risk factors.[5]

Many persons working in the biomedical area appear to regard with scepticism the evidence for there being psychological and psychosocial risk factors for the pathogenesis of CHD.[6] Several explanations for the puzzling state of the research literature have been suggested. Many studies reporting positive (or negative) results suffer from design limitations (e.g., lack of controls and small sample size), inconsistencies between the results of various studies are evident (for example, regarding the association of anger or hostility and CHD), and – due to a lack of large controlled trials – uncertainties persist regarding the therapeutic efficacy of psychological and psychosocial interventions.[3,6,7] Additional issues arise from using different conceptualizations and measures of the psychological and psychosocial variables involved (e.g., stress, depression, hostility).[3] In the literature, there is a striking overlap between what have been described both as traditional features of masculinity (such as hostility, independence, and self-confidence), and as characteristics of the coronary-prone individual.[8] Also, the quality of life-questionnaires employed generally involve use of only global measures and fail to address the problems experienced by the patients within a contextual framework defined by the patients themselves.

As several authors have pointed out, understanding lay persons' experience of their illness is important for prevention and education in CHD.[5,9-11] To explore such understanding,

the present study aimed at elucidating the occurrence and severity of physiological, psychological and psychosocial problems experienced by the patients with CHD and at studying such problems within a contextual framework defined by the patients themselves, a comparison being made with a matched control group of persons without CHD. We chose to explore these conditions from an integrated biopsychosocial perspective, taking account of what characterizes subjects' cognitive and emotional appraisals, coping intentions and coping factors implicit in their reports concerning what had currently bothered them most, the findings being related to sociodemographic and medical data. Thus, an integrated biopsychosocial approach to symptoms preceding acute CHD is a means of studying the complex pattern of somatic, psychological and social factors causing the disease. The study also aimed at elucidating what the CHD patients considered to cause their heart problems.

METHODS

Participants

The patients included in the study consisted of 149 men and 31 women admitted for acute myocardial infarction or unstable angina pectoris to the Coronary Care Unit at the University Hospital in Lund, Sweden. The patients participated in a research program, TRIANGLE, designed to study CHD from a cardiological, social, and psychological perspective. The part of the project which related to cardiological questions as seen from a purely biomedical perspective (taking of blood specimens and biochemical analyses) is not reported on here. Inclusion criteria for patients were age < 80 years, no signs of cognitive intellectual disability as well as competence to apply to the research protocol. They were recruited consecutively during four separate periods of 8 to 16 weeks, in line with the availability of personnel for administering the study. Of the patients, 46 declined to participate or were unable to

participate when the investigator was in the area, leaving 124 patients (68.9%; 102 men, 22 women).

Control individuals were selected using the population register. A nurse made a visit to the control person within 5 days of the patient's admission. The controls were matched with regard to age (±2 years), sex and residential area. In almost every case the control lived in the same residential area as the patient. For the controls, the inclusion criteria were: no history of definite or suspected coronary disease or stroke, and no operations or chemotherapy within the previous 4 weeks. A positive history of angina was deemed to be present if chest pain in any location was related to exercise and relieved by rest.

Of the 124 referents to the patients, all but seven filled in the questionnaires. The results reported are based on data from the 117 matched pairs of patients and referents, each of whom had completed the questionnaires. The patients who participated were not found to differ in terms of sex, age and type of CHD (angina or infarct) from those excluded.

Procedure

Participants were provided written and oral information regarding the study. They were requested to complete a set of questionnaires for studying health, stress and coping. It was emphasized that participation was voluntary, that confidentiality was assured, and that they could withdraw from the study at any time without this interfering with their treatment or care. The patients were to complete two questionnaires during their stay at the hospital, usually within the first two to four days. Corresponding questionnaires were administered to the referents by the visiting nurse at the time of her visit.

Measures

The one questionnaire included questions concerning standard demographic and background characteristics. The patients were also asked to indicate what they regarded as causing their heart problems. The other questionnaire, developed by the first author (SIA) for studying the frequency and severity of various biopsychosocial stressors and for examining situational patterns of appraising and coping with stressful episodes,[12-16] included a list of 95 items representing either predominantly biological/somatic (e.g., heart problems, shortness of breath) or predominantly psychological/psychosocial (e.g., anxiety and uneasiness, dejection) stressors. Prior to the main study the instruments employed had been successfully tested on a small group (n=14) of CHD patients. Subjects were to indicate for each of the stressors involved whether it had occurred (yes/no) during the past month and were given the possibility of listing and evaluating additional stressors deemed to be lacking in the original set. The questionnaire also involved the subjects' selecting what were adjudged to be the three most stressful factors and to indicate for each the extent to which it was experienced as stressful (on a 0 to 100 scale on which 0 = not stressful at all and 100 = extremely stressful). Finally, subjects were asked to describe for each of the three most stressful factors a typical situation in which this factor (stressor) was involved and what they tended to feel (*emotional appraisal*), think (*cognitive appraisal*), attempt to do (*intention*) and actually do (*coping*) under such circumstances.

Statistical data analysis

Statistical analysis included descriptive statistics, paired t-tests, chi square analysis, and conditional logistic regression analysis. Statistical significance was set at .05.

RESULTS

Study participants

Descriptive statistics for the measures of the demographic and background variables of the patients and the referents are given in Table I. Of the 117 patients, 45 (9 women, 36 men) were diagnosed as having unstable angina and 72 (11 women, 61 men) were diagnosed as having an infarct. Separate conditional logistic regression analyses for matched-pair data indicated the CHD patients to be less likely than their referents to live with a partner (Odds Ratio (OR) = 0.44; 95 % Confidence Interval (CI) = 0.22 – 0.88, p = .02) and to be more likely to have a Body Mass Index (BMI) > 30.0 (OR = 3.83; 95% CI = 1.56 – 9.41, p = .003). Neither education nor measures of smoking (ever a smoker, presently a smoker) were significantly associated with CHD.

Representations of causality

Table II lists the various types of causes the CHD patients cited. Forty of the 117 patients gave no answer or indicated that they did not know. Stress was regarded as the most frequent cause, followed by smoking, heredity, high workload, and eating habits, in that order. Generally, patients referred to more than one cause of their problems. In only a few cases was a single cause mentioned. It was noted that all references to eating habits, overweight and too little physical exercise were given by men, by 12, 7 and 7 men respectively, and that references to smoking and to hard work were given by 22 and 16 men, respectively and by 1 woman each.

Stressors and Being a Patient or a Referent: Quantitative Findings

The mean number of stressors for the patients and the referents were 13.4 (sd = 11.6,

range 0 – 68) and 5.5 (sd = 7.0, range 0 – 41), respectively. Mean values and frequencies (%) for the stress-scale items reported by 20% or more of the patients are given in Table III, the corresponding values for the referents also being listed there. None of the 95 items included in the questionnaire were reported by 20% or more of the referents. There were a small number of problems not included in the questionnaire that were listed as being additional ones and were evaluated in the same way. All of these could be classified as problems contained in the original set. Of the negative emotional states listed in the questionnaire, only "anxiety and uneasiness" and "dejection" were reported by 20% or more of the patients. Although anger was reported by 8.5% of the patients and only 3.4% of the referents, the difference did not reach significance.

Fourteen of the 18 items listed in Table III showed significant associations ($p < .05$) with CHD. Stepwise conditional logistic regression analyses were employed for studying the relationship between being a patient or a referent and the set of significant ($p < .05$) variables listed in Table III, for each variable the difference between the values for the patient and the referent being shown. The final model, which excluded "heart problems" because of redundancy, contained four variables (fatigue", "shortness of breath", "pain" and "high blood pressure"), meeting the .05 significance level for entry (Table IV).

The set of significant variables ($p < .05$) listed in Table III ("heart problems" being excluded) was also employed in stepwise logistic analysis for investigating patient-referent differences with regard to sex (women = 1; men = 2), diagnosis (1 = angina; 2 = infarct), and age (1 = < 65 years; 2 = 65 years or older). Both pain ($\beta = -.30$; $p = .005$) and shortness of breath ($\beta = -.24$; $p = .01$) were more frequent stressors in male than in female patients. Regarding diagnosis, patients with infarct were found to report fatigue more frequently than those with angina ($\beta = -.20$; $p = .02$). No variables meeting the < .05 significance level for entry were found for age.

Situational accounts of frequent stressors

The referents reported a total number of 172 situational descriptions, 84 of which concerned the stressors reported in Table III. A total of 166 descriptions of stressors with a stressfulness value of 50 – 100 on the 0 – 100 point scale (0 = not stressful at all; 100 = extremely stressful) were reported for the patient group and 68 for the referents, corresponding to 70.9% and 44.1% of the total number of descriptions provided by the patients and referents, respectively ($\chi^2 = 34.6$, $p < .0001$). To concentrate on common stressors and avoid less common ones in the presentation below, the examples will concern only the seven types of stressors the patients referred to most frequently.

Heart problems. Heart problems were reported by 36 patients (31 men, 5 women), the situations in question involving physical effort, such as walking, bicycling, gardening, and household work. Shortness of breath, pain (chest pain, radiating pain), fatigue, anxiety, uneasiness, fright and panic were often mentioned in such contexts. Most frequently, patients described their coping in terms of "taking it easy" or "calming down", "resting and taking a deep breath" and taking their medication.

Example: Man, aged 72. Education: 7 years. Married. Former businessman, retired. Number of stressors: 21. Stressfulness score for heart problems: 75.

> Situation: *If I gobble down a lot of junk food, ride my bicycle fast, or carry more than 10 kg for a distance of 100 meters.*
>
> Feeling: *Chest pain and shortness of breath.*
>
> Thinking: *I need to rest and calm down.*
>
> Trying to do: *Lie down and rest and breathe deeply for several minutes.*
>
> Doing: *Lie down and take a series of deep breaths for 3 minutes.*
>
> Help: *Haven't asked anyone else for help with these problems.*

Assessment of help: *A positive thing to gradually improve one's physical condition.*

There were only few references to reacting in a hostile way, though emotions such as "being frustrated", "being irritated" or "being angry at oneself", when present, generally appeared together with descriptions of efforts to calm down and to take it easy when experiencing heart problems. One patient even described his efforts to avoid being regarded as a "faker" in his attempts to refrain from parts of his activities at work in order to better cope with his disease.

Fatigue. The majority of the patients' descriptions related to fatigue being "constant" or "chronic", such as "I can't go on any longer", "I can't do anything". In addition, two main types of descriptions given by the patients were common. One type related to stress either at work or through being unemployed, e.g., "too many things to do all at once", "the pressure of shift work", "too much work and too little sleep".

Example: Woman, aged 51. Education: 8 years. Single. Farmer, two children. Number of stressors: 18. Stressfulness score for fatigue: 75.

Situation: *Awfully tired at any time day or night, so that I can't do anything at all.*

Feeling: *Terrible and frightful.*

Thinking: *Too much work and stress. If there had only been two of us.*

Trying to do: *I would rather enjoy doing gardening.*

Doing: *Rest up.*

Help: *a) Get no help – try to manage myself, b) The children sometimes but I don't want to bother them.*

Assessment of help: *a) both good and bad, b) good.*

The other type of descriptions related to fatigue being experienced after meals. For the referents, descriptions of fatigue generally concerned a lack of physical condition due to infirmities of old age or, in the case of overweight for example, a lack of physical training.

Shortness of breath. The vast majority of the patients' accounts related to physical effort, such as "going for a long walk", "going upstairs", or "lifting heavy things".

Example: Man, aged 53. Education: 11 years. Married. Engineer, working full-time. Number of stressors: 9. Stressfulness score for fatigue: 75.

Situation: *Going for a long walk together with customers.*

Feeling: *Irritated at having no stamina any more.*

Thinking: *Damned.*

Trying to do: *Training.*

Doing: *Rest and then go on a little more. I'm stubborn.*

Shortness of breath was also described as occurring "with no advance notice or without the slightest effort", such as "in the morning when I wake up", or as not being regarded as having any connection with heart problems at all. In the referents, shortness of breath was generally related to asthma attacks, weight problems or muscular weakness.

Pain and aching. Altogether, 27 of the accounts referred to pain or aching. Pain was most frequently described as a result of bodily exertion. A number of accounts of pain referred to the experience of having angina or heart infarct. In the case of aching, accounts generally related either to the effects of physical strain, "when I lift something", "when playing golf", for example, or to being physically constrained, such as "I can't do anything that requires effort or endurance".

Anxiety and uneasiness. For the majority of cases, problems related to psychosocial stressors, such as close relatives (parent, child or spouse, in 5 cases altogether) suffering from disease or illness or to problems related to work ("stressful work"; 4 cases).

Example: Man, aged 52. Education: 12 years. Married. Entrepreneur, working half-time, on half-time sick-leave due to back problems. Number of stressors: 24. Stressfulness score for anxiety and uneasiness: 90.

Situation: *Anxiety at work.*

Feeling: *Worried about the future.*

Thinking: *My business governs my life completely.*

Trying to do: *I don't know what to do.*

Doing: *There's nothing to do. I've considered all the possibilities I have.*

Help: *No help. At my age it isn't easy to discover some new way of living, by getting education, for example.*

High blood pressure. Although high blood pressure was presented as a stressor by 29.7% of the patients, only four situational accounts focused on this problem, mainly in connection with the medication needed. It was noted that patients generally reported experiencing no physical symptoms connected with their condition of having high blood pressure. One patient, however, described her blood-pressure as rising for no obvious reason, resulting in problems of concentration, "worrying over my blood-pressure when I have a pricking sensation in my body".

DISCUSSION

Particular care was taken in the study to address a broad range of biopsychosocial stressors in order to elucidate what patients experienced as most stressful during the month prior to their acute hospital treatment of CHD. The one test instrument employed, earlier versions of which have been used for studying patients with other types of chronic disease,[12-16] can be considered to have been comprehensive enough for the subjects tested, since all categories of stressful factors the subjects reported were found to be represented. The subjects seemed to have no obvious problems in completing the stressor part of the instrument, suggesting this part of the measure to be well suited for measuring stress in seriously ill patients for whom brevity and simplicity are important. The contextual approach employed

also provided specific information on the emotional, cognitive and behavioural matters the subjects found relevant in the specific situations that bothered them most. That part of the instrument seemed to be somewhat less simple for the subjects to answer than the stressor part of the instrument. Perhaps this part of the instrument might better take the form of an interview based on the results obtained in the stressor part, a procedure which would allow those who had difficulties in expressing themselves in writing to communicate their ideas more readily.

In the present study, fatigue, shortness of breath, pain, and high blood-pressure formed a group of factors, which, after excluding heart problems from the analysis, represented a typical group of stressors that can occur in CHD patients prior to the acute event. Of these, shortness of breath, which was reported by 50.4% of the patients, has been described as an atypical cardiac symptom.[17] This illustrates the need of studying in greater detail what patients interpret as symptoms relating to CHD, which can also allow educational programs to be developed aimed at increasing their awareness.[18] Although fatigue, shortness of breath, pain, and high blood-pressure represented a set of factors that were recognized by the CHD patients in particular as being stressful, the situational accounts the patients provided illustrate the biopsychosocial complexities involved in what were seen as constituting the various categories of stressful factors.

Also, the frequent association of CHD with combinations of two or more causal factors, such as stress, smoking, high workload, heredity, poor eating habits, anxiety and worries, overweight, and too little physical exercise, underscores the need of a multifactorial approach in assessing risk factors and evaluating interventions in CHD.[19] Stress ranked as the most common cause of cardiac events. Although “stress” is a term in general use, it has been regarded as too imprecise and the suggestion has been made that it be replaced by more specific terms such as depression, social isolation and lack of social support.[5] The situational

accounts provided by the the CHD patients highlight the importance of patients' putting their symptoms or problems in the context of their everyday life, which can result in a deeper understanding of how patients view their reality, enabling intervention to be made more effective.[14-16] The finding of the CHD patients being less likely than their referents to live with a partner was found more clearly for the women than the men patients. The percentage having a high school, college or university education was much lower in the women than in the men patients. This is in line with other findings reported in the literature.[20] It emphasizes the need of examining both biological and psychological/psychosocial risk factors in CHD. The finding of women patients showing little or no causal representation of what are generally viewed as established risk factors, such as poor eating habits, little physical exercise, and smoking may perhaps reflect a misconception particularly prominent in women of heart disease not being a real threat to them.[21] In the present study, however, gender-specific conclusions must be taken with caution due to so few women being included.

In the epidemiological literature, high blood pressure, tobacco use, inappropriate diet, and physical inactivity have been considered to be major CHD risk factors, their reportedly explaining up to 75% or more of the new cases of CHD.[22] However, although such factors may admittedly be regarded as causal, there are difficulties in explaining the social, economic and cultural differences in the rate of occurrence of CHD.[23] Other factors – social, economic or cultural[23] as well as genetic ones[24] – may well be underlying causes of CHD, not necessarily connected with those referred as the major ones. On the basis of the present study one could argue that a contextual approach can provide definite indications of possible improvements in biopsychosocially integrated epidemiological research.

Although a relationship between anger or hostility and CHD has long been proposed, the present study provided no evidence of CHD patients displaying aggressive behavior to a greater extent than commonly observed in the population. At the same time, other norms of

traditional masculinity, such as ambitiousness and independence, were often reflected in the accounts given by the CHD patients. Also, as both the quantitative and the qualitative analyses indicate, anxiety and dejection appeared to be more common than anger in CHD patients. Relatively little has been reported concerning an association between anxiety and CHD, although the studies conducted appear consistent in finding a positive association.[25] As is evident from the present results, anxiety may be associated with preexisting coronary vulnerability or with external matters such as family problems and problems related to work. Obviously, the use of self-report measures here does not imply the presence of any specific anxiety disorder in CHD. The results do indicate, however, that further studies are needed to clarify the role of the association of anxiety with the development and outcome of CHD. Dejection was reported by 22.9% of the patients. This represents a prevalence within the range of that reported for major depression in patients with CHD, such estimates ranging from 16% to 23%.[25] Although the CHD patients reported dejection significantly more often than the referents, factors in addition to the severity of CHD, such as not living with a partner,[26] may play an important role in mediating or moderating the effects of dejection in patients with CHD.

CONCLUSIONS

The patients' frequent association of CHD with combinations of two or more causal factors (e.g., stress, smoking, heredity, high workload, poor eating habits, anxiety and worries, overweight, and too little physical exercise) emphasizes the importance of using a multifactorial approach in evaluating the risk factors and interventions involved. Heart problems, fatigue, shortness of breath, pain, and high blood-pressure represented typical stressors in CHD patients prior to an acute event although the patients, particularly the

women, failed in many cases to interpret their symptoms, if any, to be associated with cardiac problems. The contextual approach provided specific information on the emotional, cognitive and behavioural matters the subjects found relevant in the specific situations that had bothered them the most prior to their acute hospital treatment of CHD. Anxiety and depression were found to be more common than anger in CHD patients.

Competing interests: None reported.

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Table I
Descriptive Statistics of the Patient and Referent Groups

Characteristic	Patients		Referents	
	Men (n = 97)	Women (n = 20)	Men (n = 97)	Women (n = 20)
Age				
m	63.8	68.0	63.7	67.5
sd	9.5	7.0	9.7	7.4
Range	32.8-83.7	51.0-77.9	32.8-83.7	51.2-78.1
Living with partner (%)	77.3	40.0	86.6	70.0
Education (%)				
< High school	59.8	85.0	60.8	65.0
High school graduate	26.8	10.0	19.6	25.0
College/university	13.4	5.0	19.6	10.0
Body mass index (BMI)†				
m	27.3	28.6	25.9	24.8
sd	3.5	4.8	2.9	3.2
Range	19.8-41.1	21.6-41.1	20.3-37.6	18.5-32.4
Ever a smoker (%)	62.5‡	45.0	68.0	65.0
Presently a smoker (%)	20.0	10.0	14.4	20.0

†For BMI (kg/m^2), n = 94 and 96 for the male patient and male referent groups, respectively, and n=18 and 20 for the corresponding women patient and referent groups. ‡n = 96.

Table II
Patient Causal Representations of Their Heart Disease By Age Group†

	Frequency By Age Group	
	<65 yrs	≥65 yrs
Do not know/no information given††	9	31***
Stress	27	10**
Smoking	17	6**
High work-load	12	5*
Heredity	11	5*
Eating habits	6	6
Anxiety/worries/grief/loneliness	5	5
Overweight	4	3
Too little physical exercise	5	2
Infection	2	3
Diabetes	2	2

†Table includes only responses given by four or more patients. Additional causal representations were economic problems, high blood-pressure, medical/odontological treatment, infirmities of old age, work injury, change of residence, and cholesterol.
††Regarding the category "Do not know/no information given", the respective numbers of subgroups were 6/3 for <65 yrs and 21/10 for ≥65 years.
*$p < .05$. ** $p < .01$. *** $p < .001$.

Table III

Stressors with a Mean Frequency of >20% and Number of Categories of Situational Accounts Related to Such Stressors as Reported by Patients with Coronary Heart Disease and by Referents†

	Frequency			
	Stressors (%)		Situational Descriptions (*n*)‡	
Stressor	Patients	Referents	Patients	Referents
Heart problems	62.4	0.0***	36 (28)	0 (0)
Fatigue	59.0	13.7***	26 (18)	5 (2)
Shortness of breath	50.4	8.5***	12 (8)	5 (3)
Pain	47.9	13.7***	10 (8)	6 (3)
Aching	41.9	17.9***	17 (9)	13 (7)
Anxiety and uneasiness	29.9	6.8***	14 (9)	3 (1)
High blood pressure	29.9	12.0***	4 (0)	7 (0)
Weight	25.6	14.5*	6 (4)	5 (2)
Effects on sexuality	24.8	10.3**	4 (4)	5 (5)
Stiffness of joints	24.8	15.4 ns	3 (0)	5 (3)
Limitation of movement	24.8	12.0*	8 (6)	6 (2)
Coughing	23.9	10.3*	7 (5)	5 (1)
Dejection	23.1	6.8**	4 (4)	1 (1)
Sleep disturbances	23.1	16.2 ns	5 (5)	5 (1)
Medicine/medical treatment	22.2	6.8**	2 (2)	1 (1)
Sweating	22.2	6.8**	5 (3)	2 (1)
Headache	20.5	13.7 ns	4 (3)	7 (5)
Loss/limitation of bodily functioning	20.5	11.1 ns	5 (2)	3 (3)

†Significant results with regard to stressors as based on pair differences between patients and referents (n = 117) matched by age, sex and municipality. ‡The numbers within parentheses refer to the frequency of stressfulness values of 50-100 on a 0-100 stressfulness scale (0 = not stressful at all; 100 = extremely stressful).

*p < .05. ** p < .01. *** p < .001. ns = not significant.

Table IV

Variables Selected By Conditional Logistic Regression Analysis Modelling the Relationship Between Matched Patients (n = 117) and Referents (n = 117) and a Set of Significant Variables†

Stressor		95.0% Confidence Interval		
	Odds Ratio	Lower	Upper	p
Fatigue	5.02	1.88	16.50	.003
Shortness of breath	11.07	3.17	58.10	.001
Pain	3.26	1.30	9.35	.02
High blood pressure	4.55	1.28	20.22	.03

†The set included all significant ($p < .05$) variables listed in Table III except for "heart problems".