

# Example of the effects of mental stress on coronary heart disease research paper

[Health & Medicine](#), [Stress](#)



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## **AU ID**

Coronary heart disease is the leading cause of death worldwide, and especially industrialized countries (Moran et al., 2014). Risk factors associated to coronary heart disease have been studied in the last decades. Some of these well-known risk factors are high blood pressure, high blood sugar and lipids, smoking, and alcohol consumption (Bagchi et al., 2001; Wilson et al., 1998). In the last few years, mental stress has also been proposed as a risk factor for coronary disease (Party, 1988). Nabi et al. (2013) define stress as a state “ experienced when a person feels that environmental demands tax or exceed his or her adaptive capacity, resulting in psychological and biological changes that may place him or her at risk for disease” (p. 2697). As Bunker et al. (2003) report, mental stress may include “ depression, anxiety, panic disorder, social isolation and lack of quality social support, acute and chronic life events, psychosocial work

characteristics, type A behavior, hostility” (p. 272). Nevertheless, the exact effects of stress over coronary heart disease remain unknown. This review attempts to logically explore and discuss what are the effects of mental stress on coronary heart disease.

### **The perception of mental stress**

Mental stress can be assessed as a symptom. Pursuing this train of thought, Nabi et al. (2013) analyzed data from a prospective study of 6895 and 3413 adult men and women, respectively, with a maximum follow-up of 18.3 years. They explored the perceived impact of stress on health using a Lickert scale questionnaire asking, “ To what extent do you feel that the stress or pressure you have experienced in your life has affected your health?”

Possible respond choices were: (i) ‘ not at all’, (ii) ‘ slightly’, (iii) ‘ moderately’, (iv) ‘ a lot’, or (v) ‘ extremely’ (p. 2698). They recorded 352 coronary deaths or first non-fatal myocardial infarction events during follow-up.

Participants who responded ‘ a lot or extremely’ on the questionnaire had a 2.12 times higher (95% CI 1.52 – 2.98) risk of coronary events. The authors concluded that the perception that stress affects health is associated with a higher risk of coronary artery disease.

### **Mental stress may induce a hypercoagulable state**

Coronary heart disease consists on the partial or total blocking of the coronary arteries. These are the ones that bring oxygen and nutrients to the heart itself during the diastole. Thrombosis and atherosclerosis may block the arteries, resulting in myocardial infarction, and sometimes death.

Thrombosis occurs when the blood hypercoagulates within the vessel.

Matejovic et al. (2011) explored inflammatory, coagulation, and microvascular responses in 13 healthy intensive care physicians, following a 24-hour shift, which exerts high levels of stress on the individuals. The researchers found no greater changes before and after the shift, except on Tissue Factor, a procoagulant protein. Therefore, they concluded that 24-hours work shifts might induce a low-grade hypercoagulable state, which in the long run may contribute to coronary artery disease.

## **Stress and The Framingham Heart Study**

The Framingham Heart Study is a prospective cohort study exploring coronary risk factors, that began more than 65 years ago in Framingham, Massachusetts (Mahmood, Levy, Vasan, & Wang, 2014). A predictive model of coronary disease at 2- and 10-years resulted from this study. The model currently includes lipid profile, smoking, age, and gender to predict coronary artery disease (Wilson et al., 1998). It has been only recently that stress was considered a possible candidate to be included in the Framingham algorithm. Kivimäki et al. (2011) published a report about job strain as a stress factor that could improve the Framingham model. They based their findings on a prospective cohort study of 5533 adults, 1666 of them females, with mean age 48.9 years, who participated from 1985 to 2004, and used the job strain questionnaire to obtain indicators of this phenomenon (high job demands, low job control, low social support). Then, they added this variable to the original Framingham Heart Study model. The authors state, “ although job strain was associated with an increased risk of CHD, adding job strain into the Framingham risk score did not improve discriminatory capacity of the

new model relative to the existing Framingham algorithm” (p. 1580). In fact, it only improved the original model by 0.7% (95% CI: -4.2 to 5.6%), which was not statistically significant.

### **Short-term mental stress, and diet effects on signs**

Fish consumption is considered a protective factor against coronary heart disease, due to its beneficial effects on lipid profile. Therefore, Matsumura et al. (2012) focused on exposing fish-eating subjects and their controls to mental arithmetic tests, as a way of inducing short-term mental stress. They designed a trial of 12 fish-eaters (those who consumed more than 70 g of fish, more than three times in a week, for at least the last year), and their 13 controls (less than 70 g of fish, less than twice a week), all adults, and measured blood pressure, and electrical activity of the heart (via electrocardiogram), before and after performing an arithmetic test. Fish-eaters presented lower heart rate, blood pressure, and pulse wave velocity, while higher pre-ejection period and baroflex sensitivity, both during rest and mental test, when compared to controls. Fish-eaters also exhibit faster systolic and mean blood pressure recovery after the mental arithmetic test. These findings suggest that fish consumption might be a protective factor against coronary heart disease, even when in presence of short-term mental stressors.

### **Conclusions**

Current evidence supports the premise that mental stress exerts an effect on coronary heart disease. The proposed mechanisms are beyond the scope of this review. Nevertheless, although the evidence is not strong enough to

predict coronary heart disease from mental stress, by exploring the perception of stress on health, long- and short-term stressors, as well as dietary characteristics in individuals, the mental health professional will be able to identify risk factors, and start stress-management therapies along with a physician's medical assessment, that could save or prolong lives.

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