

The heart and the brain within the broader context of wellness

Approximately 40% of all premature deaths (before age 75) can be attributed to unhealthy behaviors, 30% to genetics, 15% to social factors, 10% to poor medical access, and 5% to environment.¹ Unhealthy lifestyles claim about 1 million lives per year in the United States and cause nearly 30 million cases of chronic disease.¹ Tobacco is responsible for approximately 440,000 premature deaths annually.² Overweight, a sedentary lifestyle, alcohol abuse, accidents, firearms, and illegal drugs are other lifestyle factors that are associated with premature mortality.

Of the top 10 causes of death in the United States, all of the top six have lifestyle as a primary cause. These six causes account for 1.7 million of the 2.2 million people who died in 2002.³

This article will review the impact of lifestyle on heart and brain health, as well as the impact of the heart and the brain in adopting changes in health behavior.

■ IMPACT OF LIFESTYLE ON HEART-BRAIN HEALTH

A systematic review of prospective cohort studies and randomized controlled studies of patients with coronary artery disease (CAD) revealed that lifestyle changes (ie, combined dietary changes, increased physical activity, quitting smoking) had a larger impact on subsequent mortality than did standard medications for the treatment of CAD (low-dose aspirin, statins, beta-blockers, angiotensin-converting enzyme inhibitors).⁴

The relationship between obesity and the prevalence of medical conditions was assessed by Must and colleagues using data from 16,884 adult participants from the Third National Health and Nutrition Examination Survey (NHANES III).⁵ Health conditions examined were type 2 diabetes, gallbladder disease, CAD, hypercholesterolemia, hypertension, and

osteoarthritis. The prevalence of any one of these conditions was 9% among men and women with a normal body weight (body mass index [BMI]: 18.5 to 24.9 kg/m²), and increased steadily with increasing BMI.

Impact of lifestyle on the heart

Evidence indicates that intensive lifestyle changes improve myocardial perfusion abnormalities in patients with CAD. Gould et al randomized 35 patients with documented CAD who were not receiving lipid-modifying therapy to 5 years of usual care directed by their physicians or to risk-factor modification.⁶ The risk-factor modification consisted of exercise, stress management, a very low-fat vegetarian diet, smoking cessation, and a weekly support group (the Dean Ornish Heart Disease Reversal Program). Positron emission tomography (PET) and quantitative coronary angiography were performed at baseline and again at 5 years. Myocardial perfusion abnormalities on PET were reduced in size and severity in 99% of patients randomized to intensive risk-factor modification compared with 55% of those randomized to usual care. The extent of coronary artery stenosis improved similarly in the group assigned to the active intervention relative to those assigned to usual care.⁶ On June 12, 2006, Medicare announced that it would cover 18 to 54 weeks of the Dean Ornish Heart Disease Reversal Program.

Lifestyle changes combined with medical therapy was the best strategy to prevent cardiovascular events in a study by Sdringola and colleagues.⁷ They measured the impact of various levels of treatment on the probability of cardiovascular events in 409 patients with CAD. Patients whose treatment was categorized as "poor," defined as neither lifestyle changes nor treatment with lipid-modifying drugs, had the greatest 5-year incidence of coronary events (30.6%). Patients on moderate treatment (American Heart Association diet and lipid-modifying drugs, or a diet from which < 10% of calories were derived from fat with no lipid-modifying drugs) had a 5-year incidence of CAD events of 20.3%, and those on maximal

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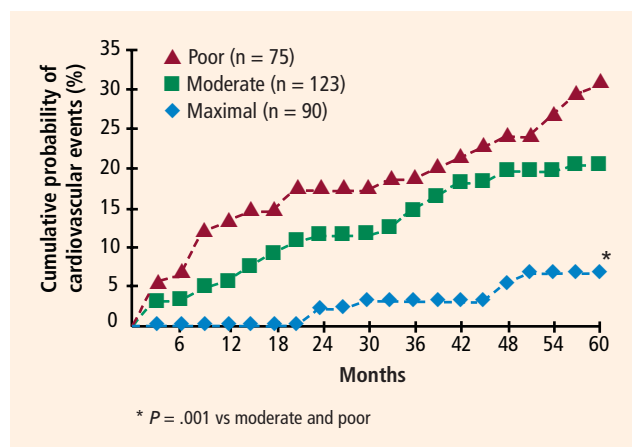


FIGURE 1. Among 409 patients with coronary artery disease (CAD), the incidence of cardiovascular events was lowest among those treated with combined intense lifestyle and lipid-modifying drug therapy (maximally intensive treatment) compared with moderately intense treatment (defined as an American Heart Association diet plus lipid-modifying drugs or a diet with 10% or fewer calories derived from fat without lipid-modifying drugs) or poor treatment (defined as no specific treatment for CAD). Reprinted from reference 7, copyright 2003, with permission from the American College of Cardiology Foundation.

treatment (a diet from which < 10% of calories were derived from fat, regular exercise, and lipid-modifying treatment dosed to meet target goals) had the lowest incidence of CAD events, 6.6% (**Figure 1**).

Death rates and other health outcomes have been calculated according to the quality of self-reported diets. Among 42,254 women who completed dietary questionnaires in a prospective cohort study, those with a Recommended Food Score in the lowest quartile had rates of death, cancer, heart disease, and stroke that were significantly higher than those for women with a Recommended Food Score in the highest three quartiles (**Table 1**).⁸ The Recommended Food Score was an index developed by the authors that gauged how often a subject ate foods recommended by dietary guidelines (fruits, vegetables, whole grains, low-fat dairy products, and lean meats and poultry).

Current or former smoking is an especially powerful risk factor for stroke and myocardial infarction.⁹ In fact, of all the identified risk factors for these two diseases, a substantial number are related to lifestyle.

Impact of lifestyle on the brain

Several lifestyle factors have been found to influence the incidence of dementia and Alzheimer disease as well as the rate of mental decline. These factors include mental stimulation, physical activity, nutrition, tobacco use, alcohol consumption, and social interaction.

TABLE 1
Likelihood of death based on diet*

	Odds ratio			
	Worst diet	Poor diet	Good diet	Best diet
All deaths	1.79	1.41	1.12	1.00
Death from cancer	1.45	1.19	1.03	1.00
Death from heart disease	1.67	1.37	1.25	1.00
Death from stroke	1.49	1.12	1.05	1.00

* Based on a prospective cohort study of 42,254 US women from 1987 to 1989 with median follow-up of 5.6 years. Subjects' diets were classified into four quartiles (worst to best) according to their responses to a 62-item diet questionnaire (see text). Derived from data in reference 8.

Ott and colleagues examined the relationship between smoking habits and dementia in 6,870 men and women.¹⁰ After adjusting for age, sex, alcohol use, and education, former smokers were found to have a 30% to 40% increased risk and current smokers a doubling in the risk of dementia, compared with never smokers.

The association between occupational complexity and the risk of Alzheimer disease was assessed in a study of 10,079 Swedish twins.¹¹ Participants were categorized by the complexity of their work with data, people, or things. Study subjects who had greater complexity with people or data in their jobs had lower rates of dementia and Alzheimer disease after adjusting for education. Among 55 pairs of twins in whom complexity of occupation differed, the relationship between job complexity with people and a reduced risk of Alzheimer disease and dementia was maintained, as was the relationship between complexity with data and a reduced risk of Alzheimer disease.

Physical activity has also been correlated with cognitive function. In older women, an increase in time spent walking was associated with superior cognitive function on five measures.¹²

■ IMPACT OF THE HEART AND BRAIN ON LIFESTYLE

The condition of the heart and brain affects a person's lifestyle. Exercise can be dangerous or even impossible with a diseased heart. Brain chemistry and structure influence mood, personality, and health-related behaviors, such as addiction, compulsive behavior, and food cravings. It is also known that cognition can influence behavior through awareness, motivation, and skills.

Four components of behavior change

Cognitive functions of the brain have a direct impact on a person's behavior. However, cognitive functioning is just one component of behavior change. Successful behavior change requires awareness, motivation, skill, and opportunity. A model I developed uses a point system to predict the likelihood of successful health behavior change: awareness contributes 10% to the total score; motivation, 25%; skill, 25%; and opportunity, 40%.¹³ Success is considered unlikely with accrual of 40 points or less, possible with 40 to 65 points, and likely with more than 65 points.

Information and education by themselves are not sufficient to effect behavioral change. As an example, despite repeated national educational campaigns about the health benefits of physical activity, the number of Americans who partake in at least 30 minutes of moderately intense physical activity at least 5 days a week remained unchanged from 1986 to 2000.¹⁴ Effecting change will mean moving beyond education to discovering what motivates people to change their behavior, offering training to give people the appropriate skills to engage in healthier behaviors, and providing opportunities to change behavior.

Are there uniquely American factors at work?

A recent study found that self-reported health was superior in English adults aged 55 to 64 years compared with their counterparts in the United States, and the finding was independent of education and income.¹⁵ One explanation that has been offered is that the higher rate of obesity in the United States has more than offset the higher rates of smoking and alcohol consumption in England, but the authors acknowledge that this did not explain all of the differences between the countries. Approximately two thirds of the US population is overweight, with one third being obese. One contributor to the obesity epidemic in the United States is a built environment that has engineered activity out of daily living (ie, streets not friendly to pedestrians), which serves to further hinder the motivation for people to engage in physical activity.

CONCLUSION

Lifestyle influences the health of the heart and the brain, and both organs influence the healthfulness of

our behavior and our overall health. The interaction of both within the context of the body and life must be considered.

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