Lipids
Workshop IV

Participants
Thomas A. Pearson, MD, PhD, Chairman; W. Virgil Brown, MD; Karen Donato, RD;
Frank A. Franklin Jr, MD, PhD; Russell B. Luepker, MD; Patrick E. McBride, MD, MPH;
Rebecca M. Mullis, RD, PhD; Lynne W. Scott, RD, PhD; Barbara Shannon, RD, PhD;
Richard B. Shekelle, PhD; Elaine J. Stone, PhD; Neil J. Stone, MD; and Christine Williams, MD

The American Heart Association Prevention I Conference dealt exclusively with issues related to blood cholesterol level and disease.1 The AHA has endorsed a number of national recommendations and guidelines in this area, including the Adult Treatment Panel Guidelines on the Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults,2 the Report of the Expert Panel on Population Strategies for Blood Cholesterol Reduction,3 the Report for the Laboratory Standardization Panel of the National Cholesterol Education Program,4 the Report of the Expert Panel on Blood Cholesterol Levels in Children and Adolescents,5 and the joint American Heart Association—National Heart, Lung, and Blood Institute report on cholesterol lowering in patients with established heart disease.6 A recent National Institutes of Health consensus conference focused on triglycerides, high-density lipoproteins, and coronary heart disease.7

Because the research on coronary heart disease and serum lipids is so extensive, only the relation of behavioral factors to serum lipids, and vice versa, are addressed: patient and physician behaviors related to cholesterol awareness, screening, diagnosis, and follow-up; eating behaviors as determinants of serum lipid levels; compliance of physicians and hyperlipidemic patients with guidelines for use of lipid-lowering medications; and the possible effect of low serum lipids on behaviors such as depression and aggression.

Cholesterol Level Awareness, Screening, and Diagnosis

Increased awareness of the importance of blood cholesterol as a cause of heart disease has been a major goal of the National Cholesterol Education Program2-5 and has led to declining blood cholesterol levels for American adults.8,9 Ninety-three percent of the US population has heard about high blood cholesterol, and the majority have been screened for it.10 Public cholesterol screening, made possible by new and simplified technology, is widely used in the United States.11 Physicians agree on the importance of cholesterol screening, generally know the guidelines for screening, and report successful screening in their offices.10,12,13 Most pediatricians do not routinely screen children for high blood cholesterol but report frequent screening of children at high risk.14 Therefore, there is much evidence to suggest that attitudes of both the general population and the medical community toward awareness of and screening for lipid disorders have changed.

Despite this significant progress, much of the US population remains at high risk due to elevations in blood cholesterol levels.8,9 The median cholesterol level in the United States is approximately 200 mg/dl, indicating that 50% of the population has a blood cholesterol level above the ideal. Although a large number of Americans have become aware of their cholesterol levels through mass screening, many have not. The proportion of persons who have had their cholesterol levels checked is highest for white women, lower for young men, and especially low for Hispanic-Americans, African-Americans, and Native Americans. Rates are also low for those in low socioeconomic and educational strata, suggesting that there are economic barriers to screening and follow-up. Thus, inequities in cholesterol awareness persist.

Moreover, it is not clear what people do with the information obtained at cholesterol screening, particularly when values are interpreted as desirable, borderline-high, or high-risk and when cholesterol levels vary from one measurement to the next. Lipid measurements at public screenings are often inaccurate, leading to inappropriate referral or reassurance.15 Effective referral and follow-up are frequently lacking in these public programs. Many people inappropriately use public screening as an alternative to medical care and consultation with a health professional.11

Screening in medical facilities has the theoretical advantage of ensured follow-up for those with clinically treatable blood cholesterol levels, but it is often not carried out. Although physicians report successful screening in their offices, chart surveys indicate that less than half the adult population have had their cholesterol level measured, and only 35% had such a measurement recorded in their charts.12,16 Screening of family members, including children, is rare.12 The proportion of patients whose blood cholesterol level is measured varies remarkably by provider (5% to 83%), suggesting that individual physicians’ attitudes play a large role in screening.12 Finally, follow-up of a patient with an
elevated serum cholesterol level by determining the lipoprotein profile remains a problem area. In one study, only 7% to 14% of patients for whom assessment of such a profile would be appropriate had had one done. This is especially important in light of new recommendations to expand screening for elevated high-density lipoprotein cholesterol and triglyceride levels. Recommendations

Public policy. The AHA should advocate and lobby for reimbursement of services aimed at cardiovascular disease prevention, particularly screening for and diagnosis of lipid disorders.

Educational programs.
1. Programs should be developed to increase awareness of cholesterol levels, knowledge of results, diagnosis, and follow-up among minorities and the socioeconomically disadvantaged.
2. Educational efforts should include emphasis on other lipoprotein fractions, such as high-density lipoprotein cholesterol, to encourage hyperlipidemic patients to understand the importance of these fractions and to urge the wider, appropriate determination of lipoprotein profiles by physicians.
3. Educational programs for primary care physicians (including those in obstetrics/gynecology) and medical students should emphasize the role of lipids as a cause of cardiovascular disease in women, the elderly, and minorities.
4. Practice aids should be developed to help physicians identify children with a positive family history of cardiovascular disease who should be screened for lipid abnormalities.
5. Specific educational programs for cardiologists and cardiac surgeons should emphasize risk assessment, screening, diagnosis, and management of lipid disorders in patients with established coronary disease, including premenopausal women as well as older men and women.

Research initiatives.
1. The barriers to cholesterol screening and diagnosis for minorities and the socioeconomically disadvantaged should be better understood.
2. An office practice-based system for screening, follow-up, and diagnosis should be developed and evaluated for effectiveness.
3. Techniques for accurate measurement of serum lipids with immediate feedback of results should be developed, evaluated, and disseminated. This immediate feedback should enhance and facilitate efforts in diagnosis, modification of exercise and eating patterns, and drug therapy.
4. On a national basis, cholesterol awareness, screening, and intervention activities should be monitored at 3- to 5-year intervals to gauge the progress of public and professional programs.

Eating Behaviors and Serum Lipids

The importance of eating habits as determinants of serum lipid levels is well established. Indeed, the decline of mean blood cholesterol level in American adults must largely be attributable to dietary changes, because drug therapy has played only a small role to date. Major shifts in food consumption in the US population have occurred, with saturated fats from animal products being increasingly replaced by unsaturated vegetable fats. The food and restaurant industry has developed products that better meet national recommendations for healthy eating patterns. The new Food and Drug Administration food labeling program provides opportunities for education at the population level. Physicians are increasingly providing their patients with dietary recommendations.

However, considerable challenges remain in getting Americans to adopt healthy eating patterns. There is no comprehensive theory to explain or predict eating behaviors that is sensitive to cognitive, sociocultural, physiological, and economic factors. Nor are there trend data to describe what the population is eating. For example, the US population is steadily gaining weight, leading to increases in total cholesterol and decreases in high-density lipoprotein cholesterol levels. The dietary basis for this is unclear. Continued nutritional surveillance requires maintenance and frequent updating of a data base of foodstuffs consumed in the United States.

Although it is recognized that eating patterns associated with elevated blood lipid levels originate in youth, nutrition education for children both at home and at school is limited. Nutritional advice for the hyperlipidemic patient is usually provided by the physician, but its contents and quality are not standardized. Nutritionists rarely help formulate dietary treatment plans. Moreover, the nonpharmacological treatment is frequently not reimbursed by insurance plans, creating barriers for the socioeconomically disadvantaged. It is difficult to determine eating patterns in individuals, so the clinician cannot assess the effect of these patterns on blood lipids and target specific behavioral changes; in addition, compliance with diet over the long term is not well defined and is probably poor. The proportion of hyperlipidemic adults who can maintain the AHA Step 1 or Step 2 diet over a period of years is not known except for highly selected subjects in clinical trials with specialized interventions.

Recommendations

Public policy.
1. The AHA should promote a single message on healthy eating to the public through coordination of government and nongovernment health agencies. The eating pattern followed to optimize blood lipid levels is also optimal for overall disease prevention and health promotion.
2. All government food and nutrition programs (eg, supplemental programs for pregnant and lactating women, infants, schoolchildren, the poor, and the elderly) should be in keeping with healthy eating practices.
3. The Nutrition Monitoring Act should be used to ensure the availability of a nutrition data base that reflects the current food supply, including brand-specific data, as an essential resource for nutrition surveillance, education, and research.
4. Nutrition services for initiation and maintenance of lipid-lowering eating behaviors should be reimbursed adequately.

**Education programs.**

1. Additional intervention programs should be developed for promoting healthy eating patterns. These programs should include both educational and skill-building strategies, must be based on behavioral change theory, and should be appropriate for the patient's age, socioeconomic status, and culture. It should be possible to implement these programs in settings where the target groups have access to them, and they should be economically feasible as well as viable over the long term.

2. All educational programs should be rigorously evaluated for effectiveness and cost benefit.

**Research initiatives.**

1. Studies should be directed toward development of a comprehensive and coherent theory that predicts eating behavior.

2. The natural history of lipid-modifying eating patterns should be defined in cohorts of patients from real-life practice settings.

3. Methods of measuring eating behavior patterns should be developed that are adaptable to clinical practice, reasonably priced, and widely disseminated.

4. "Booster" programs should be developed and evaluated for the long-term maintenance of desirable eating behaviors.

**Compliance With Lipid-Lowering Drug Regimens**

The field of lipid-lowering pharmacology has progressed greatly in the last few decades, spurred on by the increasingly understood importance of modification of lipid levels as a means of preventing coronary disease. New agents, with more convenient dosing schedules and fewer side effects, have been brought into practice. In turn, testing of these agents in randomized clinical trials has begun, demonstrating their effectiveness in both primary\(^{20,21}\) and secondary\(^{22-24}\) prevention of clinical coronary events and atherosclerotic progression. These results have prompted the standardization of indications for drug therapy for established coronary disease;\(^{25}\) these indications have recently been expanded.

Although use of lipid-lowering medications has increased, the proportion of hyperlipidemic patients taking them is low. There are probably several reasons for this. First, prescription of cholesterol-lowering medications by physicians still lags behind national recommendations. Second, there appear to be inappropriate use of drugs of this class (for example, prescription of a low-density lipoprotein cholesterol—lowering agent for the hypertriglyceridemic patient). Third, patient compliance is a growing problem. In randomized clinical trials involving highly selected patients and skilled intervention specialists, only 50.8% of patients given cholestyramine fully complied with the regimen.\(^{25}\) In the Helsinki Heart Study, good compliance with gemfibrozil was documented, using a digoxin marker, in only 64% of subjects.\(^{26}\) In a more commonplace setting, surveys of prescription refills suggest that fewer than one third of patients prescribed any of the major drugs were still taking the drugs at the end of 12 months.\(^{27}\) It should be noted that most interventions require at least 2 years to demonstrate an effect on cardiac endpoints.\(^{20-24}\)

Reasons for poor compliance are likely to be multifactorial.\(^{28}\) They include the lack of symptoms of hyperlipidemia and a general lack of knowledge by patients about the link between elevated lipids and disease. There are other patient-related reasons for noncompliance, including lack of belief in the value of this therapy, poor taste and texture of the drugs, a variety of adverse reactions that reduce quality of life, and cost of medication. Complex regimens with multiple pills per dose several times per day over an extended period of time add to these difficulties. Finally, lack of time for providers to describe drug therapy, lack of comprehensible, written instructions, and few "booster" appointments provide little support for long-term compliance.

**Recommendations**

**Educational programs.**

1. A review of current patient and physician educational materials should be undertaken and should include review of the strengths and weaknesses of each item and guidelines on how to use the information provided.

2. An office practice—based system for drug treatment of lipid disorders should be developed, providing enough time and visits for adequate physician-patient interaction. This should be implemented in physicians' offices through the assistance of trained AHA volunteers or staff.

3. Written or videotaped materials appropriate for gender, ethnic background, literacy level, and socioeconomic status should be developed to increase compliance with lipid-modifying regimens by patients with diagnosed lipid disorders. These materials need to be product specific. All written materials should be easy to reproduce and tailor to the health care provider's practice.

4. Cardiologists and cardiac surgeons should be provided with educational programs emphasizing the increasing importance of pharmacological lipid management in the total care of patients with established vascular disease.

5. Pharmacists should be considered important sources of patient education. They could also monitor compliance to increase adherence to refill recommendations.

6. All AHA educational programs should be rigorously evaluated for cost-effectiveness and benefit.

**Research initiatives.**

1. Clinical epidemiological studies should be done of the natural history of lipid-modifying drug interventions in patients from actual practice settings, assessing quality of life as well as rates and reasons for nonadherence. Better methods of assessing compliance with these drug regimens should be developed.

2. Novel office practice—based systems to improve screening, diagnosis, follow-up, tracking, and adherence to the diet and drug therapies should be evaluated for effectiveness, cost, and quality of life for patients, including those with established vascular disease, premenopausal women, older men and women, and patients with multiple risk factors.
3. Effective interventions for multiple concurrent risk factors that include abnormalities in the lipid profile should be developed.

Effects of Low Serum Cholesterol Level and Cholesterol Lowering on Human Behavior

Concerns have been raised about the potential of low serum cholesterol levels or the lowering of cholesterol levels to cause negative behaviors in humans, including aggression and depression. Evidence for such a link has included increased aggression in monkeys fed diets similar to the AHA Step 1 Diet. Studies of low cholesterol levels in persons with criminal and violent tendencies have been cited. A recent cross-sectional epidemiological study showed increased depression in men with the lowest cholesterol levels, but this finding was limited to those 70 years of age and older. Finally, one meta-analysis of primary prevention trials has demonstrated in those with the lowest cholesterol levels an increase in deaths due to accidents, suicides, and homicides that counterbalances a reduction in coronary heart disease deaths. Evidence of this kind has been used to argue for the rethinking or reduction of programs and policies aimed at lowering blood cholesterol levels.

These data have prompted a more organized examination of this issue at an NHLBI conference. Certainly, numerous alternative explanations of low blood cholesterol levels in violent or depressed individuals can be cited, with clear prospective data on the influence of cholesterol on these states lacking or negative. Two additional meta-analyses, which included all randomized clinical trials completed by 1990 and 1992, failed to demonstrate any association of cholesterol-lowering with death due to accident, suicide, or homicide. Moreover, there were numerous instances in which the people who died violently or accidentally had not complied with their cholesterol-lowering drug regimen. Conflicting evidence led the NHLBI working group to conclude that no causal relation was demonstrated between low cholesterol level, cholesterol lowering, and negative behaviors.

Recommendations

Public policy. The AHA should endorse the findings of the 1990 NHLBI Conference on Low Blood Cholesterol; that no causal relation has been demonstrated between either low cholesterol level or cholesterol lowering and aggression or depression.

Educational programs. A working group should be convened to summarize and update the facts on this issue, for clarification and dissemination of the AHA position to the public and to health care professionals.

Research initiatives. The effects of low cholesterol level on human behavior should be examined from basic mechanistic, psychological, and epidemiological perspectives to better explain currently available research findings.

References


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