Awareness and Use of Blood Cholesterol Tests in 40–74-Year-Olds by Educational Level

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Synopsis

Questions on awareness, use, and results of blood cholesterol tests were included in telephone surveys on cancer conducted in 1988 on random samples of persons 40–74 years of age in Long Island, NY (N = 440), and in Connecticut (N = 453). Educational level was significantly and positively associated with the proportions reporting ever having heard of blood cholesterol tests, ever having had a test done ("by a doctor"), and having a recent test, 1987–88, but not with the proportion reportedly having been told by a doctor that their cholesterol level was "high."

In multivariate analyses, greater education (college graduate versus all others) and greater frequency of medical checkups (annual versus other) were significant independent predictors of ever having had a cholesterol test or having been tested in 1987 or 1988. Implications of findings were discussed with regard to monitoring changes over time in awareness and use of cholesterol tests according to educational level and to planning interventions aimed at less educated groups.

THE NEED for increased public education regarding the importance of screening for blood cholesterol has been recognized, as witnessed by the National Cholesterol Education Program (NCEP) of the National Heart, Lung, and Blood Institute (NHLBI) that was initiated in 1985 (*1*) and the U.S. Surgeon General's report on "Nutrition and Health" (*2*). Awareness and use of cholesterol levels increased after 1985, and data from the Behavioral Risk Factor Surveillance System (BRFSS) (*3*) based on telephone surveys of random samples of persons 18 years old will be useful in assessing the impact of the American Medical Association's 1989 "Campaign Against Cholesterol" (*4*).

Low levels of education are strongly associated with high overall mortality (*5*), poor knowledge and use of various preventive screening tests, and high levels of certain risk factors for cardiovascular diseases (*6–8*). Data from the 1989 BRFSS Survey showed significant differences by educational group in the frequency of ever having had a cholesterol test and knowledge of cholesterol level (*3*). This report examines data on educational level in relation to awareness and use of cholesterol tests, along with self-reported "high" cholesterol levels, obtained during surveys of random samples of persons 40–74 years old living in Long Island, NY, (Nassau and Suffolk Counties) and Connecticut in 1988.

Methods

Telephone surveys of samples of Long Island and Connecticut residents were conducted from February to early May 1988, by random-digit dialing. The sampling frame was households with a telephone, estimated at about 94 percent of households in the northeastern United States (*9*), and the subjects (one respondent per household) were 40–74 years old. Questions on awareness and use of blood cholesterol tests were included in the survey, which focused on colorectal cancer (*10*). Although the age criterion of 40–74 years was selected on the basis of relevance to cancer screening, the U.S. Preventive Services Task Force has recommended cholesterol

Table 1. Responses to telephone surveys in 1988 regarding awareness and use of blood cholesterol tests among 40–74-year-olds, by sex and area

Question	Long Island, NY				Connecticut			
	Men (N = 169)		Women (N = 271)		Men (N = 202)		Women (N = 251)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Ever heard of test	145	85.8	242	89.3	181	89.6	233	92.8
Ever had test	105	62.1	152	56.1	128	63.4	145	57.8
Had last test in 1987–88	80	47.3	114	42.1	97	48.0	113	45.0
Ever told level "high"	36	21.3	54	19.9	31	15.3	37	14.7
Ever told level "high" among ever tested	. . .	34.3	. . .	35.5	. . .	24.2	. . .	25.5
Among those ever "high":								
Level still high	12	33.3	19	35.2	11	35.5	11	29.7
Level no longer high	18	50.0	21	38.9	12	38.7	12	32.4
Don't know	6	16.7	14	25.9	8	25.8	14	37.8

NOTE: None of the differences between men and women within each geographic area, or between areas within each sex, were statistically significant (see text).

Table 2. Awareness and use of blood cholesterol test by age within each sex, both areas (Long Island, NY, and Connecticut) combined

Sex	Age 40–49 years		Age 50–59 years		Age 60–74 years		χ^2 test, P value
	Number	Percent	Number	Percent	Number	Percent	
	Ever heard of cholesterol test						
Men	139	89.1	94	89.5	93	84.5	.44
Women	188	91.3	128	92.8	159	89.3	.56
	Ever had cholesterol test						
Men	86	55.1	69	65.7	78	70.9	.02
Women	101	49.0	85	61.6	111	62.4	.01
	Had last cholesterol test in 1987–88						
Men	57	36.5	58	55.2	62	56.4	.001
Women	65	31.6	66	47.8	96	53.9	<.001
	Ever told cholesterol level was "high" among ever tested						
Men	17	19.8	28	40.6	26	33.3	.02
Women	22	21.8	29	34.1	40	36.0	.06

screening for "middle-aged men" and possibly for women and the "elderly" (*11*).

The survey, described elsewhere (*10*), was conducted by a professional survey firm, Northeast Research of Orono, ME, with extensive experience. Telephone calls were made, including calls during the evening hours and weekends, to a maximum of nine attempts per number; some interviews were obtained by "conversion callbacks" of persons who had initially refused or terminated the interview. Estimated response rates, which took into account estimated eligible persons among persons unable to be screened for eligibility, were 74.2 percent in Long Island and 77.8 percent in Connecticut (*10*).

The higher ratio of female to male respondents in Long Island versus Connecticut (table 1), due not to selection bias but to a larger number of "conversion" interviews among women in the former area, indicated that comparisons of survey responses between the two areas should be stratified by sex. Within each sex the age distribution of respondents in the telephone survey was similar to that estimated from census data (*10*). Proportions of Long Island and Connecticut respondents who were white (91 percent and 92 percent) or black (6 percent and 7 percent) were similar to those reported in the 1980 census. For all ages combined, the proportions of high school and college graduates were similar in the two areas, but age-specific proportions were about 2–15 percent higher than those estimated from the 1980 census (*10*).

Educational level was queried in eight categories, but for purposes of analysis the responses were

collapsed into four: under 12 years, 12 years, post-secondary, and college graduate. Total family income (before taxes) in 1987 was queried by category—$15,000 or less, $15,001–$30,000, $30,001–$50,000, and $50,001 or more—and data were missing for only 6.1 percent of respondents in Connecticut and 9.9 percent in Long Island. Frequency of medical checkups and date of last checkup were also queried, and responses were internally consistent in that 96.7 percent of those reporting annual checkups also reported that their last checkup was in 1987 or 1988.

Questions relating to cholesterol tests were whether the respondent had ever heard of a cholesterol blood test and ever had the test done "by a doctor," month and year of most recent cholesterol test, and whether the respondent had been told "by a doctor" that his or her cholesterol level was "high," and if so, if it was "still high now."

Chi-square tests, or Fisher's exact test in certain fourfold tables, were used to test for statistical significance of differences in frequencies in various categories (sex and educational level). Logistic regression was used for multivariate analysis of the independent effects of variables, including educational level and frequency of medical checkups, and to test for interactions. In the absence of interaction terms, regression coefficients can be interpreted as odds ratios. Confidence limits (95 percent) on odds ratios were obtained from the standard errors of the coefficients, using a normal approximation.

Results

Responses by area and sex. Among the subgroups defined by geographic area and sex, about 85–90 percent of respondents reportedly had heard of a blood cholesterol test, 56–63 percent had ever had a cholesterol test done "by a doctor," and 42–48 percent had their last test in 1987–88 (table 1). There were no statistically significant differences in responses to any of the questions on cholesterol tests by sex within each area or by area within each sex. For both sexes combined, however, the proportion reportedly ever told that their cholesterol level was "high" (among those who had ever had a test) was significantly greater in Long Island than Connecticut ($\chi^2 = 4.16$, $P<.05$). The majority of those with "high" levels also reported knowing whether their level was "still high." The proportion not knowing if their level was "still high" was greater in Connecticut than in Long Island, but the difference was not statistically significant.

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Associations with age, race, and educational level. Because of the similar age distributions within each sex and only small differences in responses for Long Island and Connecticut (except for the proportion with self-reported "high" cholesterol), data for the two areas were combined.

There was no significant association between age and awareness of blood cholesterol tests (table 2). The proportions of respondents who had ever had a cholesterol test ("by a doctor"), who had their last test in 1987–88, and had ever been told ("by a doctor") that their cholesterol level was high (among those who ever had the test), increased with age (table 2). Among those ever told that their level was high, the proportion not knowing whether it was still high did not show a clear association with age but numbers in each age-sex category were small (data not shown).

On the basis of the small sample size for blacks (total of 59), awareness and use of blood cholesterol tests were lower for blacks versus whites—74.6 percent of blacks versus 91.0 percent of whites had ever heard of a blood cholesterol test and 44.1 percent of blacks versus 60.7 percent of whites had ever had the test. Differences were consistent within each age group (that is, 40–49, 50–59 and 60–74 years; data not shown).

Responses to questions on awareness and ever or recent use of cholesterol tests were positively associated with level of education, within each sex, with stronger associations for men than for women (table 3). These findings were consistent within each age group (data not shown; see also logistic regression analyses). In contrast, the proportion of respondents reportedly ever told that their cholesterol level was "high" was negatively, albeit not statistically significantly, associated with level of education.

Among those respondents who reported ever being told by a physician that their cholesterol test result was "high," the proportion not knowing if their level was "still high" was not consistently or significantly associated with educational level—25.0

Table 3. Awareness and use of blood cholesterol tests by sex and educational level of respondents, ages 40–74 years and both areas (Long Island, NY, and Connecticut) combined

Sex	Less than 12 years		12 years		Post-secondary		College graduate		χ^2test, P value[1]
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
	Ever heard of cholesterol test								
Total	90	72.0	275	88.1	180	94.7	255	96.6	.001
Men	31	62.0	82	85.4	72	91.1	140	96.6	<.001
Women	59	78.7	193	89.4	108	97.3	115	96.6	<.001
	Ever had cholesterol test								
Total	58	46.4	158	50.6	123	64.7	190	72.0	<.001
Men	18	36.0	50	52.0	51	64.6	113	77.9	<.001
Women	40	53.3	108	50.0	72	64.9	77	[2]64.9	<.005
	Had last test in 1987–88								
Total	47	37.6	128	41.0	82	43.6	146	55.3	<.001
Men	15	30.0	39	40.6	36	45.6	86	59.3	.001
Women	32	42.7	89	41.2	46	41.4	60	50.4	.39
	Ever told cholesterol "high," among ever tested								
Total	20	34.5	47	29.7	37	30.1	48	25.3	.52
Men	7	38.9	16	32.0	15	29.4	28	24.8	.54
Women	13	32.5	31	28.7	22	30.5	20	26.0	.40

[1]Association with educational level; chi-square test with 3 degrees of freedom.

[2] For difference in response between men and women within each educational level: $P < .05$.

Table 4. Logistic model results for prediction of responses to questions regarding blood cholesterol tests

Question	Age [1]		Education [2]		Sex [3]		Annual checkup [4]	
	Odds ratio	95 percent confidence limits	Odds ratio	95 percent confidence limits	Odds ratio	95 percent confidence limits	Odds ratio	95 percent confidence limits
Ever heard of test	0.83	0.65,1.06	2.32	[5]1.56,3.46	0.79	0.62,1.00	1.10	0.86,1.41
Ever had test	1.17	1.00,1.38	1.56	[5]1.31,1.84	1.18	[5]1.02,1.38	1.63	[5]1.48,1.90
Had last test in 1987–88	1.23	[5]1.05,1.45	1.45	[5]1.23,1.72	1.23	[5]1.05,1.44	2.24	[5]1.89,2.64
Don't know if "still high"[6]	0.79	0.53,1.18	1.14	0.75,1.71	0.71	0.47,1.06	0.64	0.43,0.97

[1] 60–74 versus 40–59 years.
[2] College graduate versus all others.
[3] Men versus women.
[4] Annual checkups versus all others.
[5] $P < .05$ (that is, 95 percent confidence limits do not include 1.00).
[6] Among those ever told that their level was high.

percent (5 of 20) for those with less than 12 years of education, 25.5 percent (12 of 47) for 12 years, 32.4 percent (12 of 37) for post-secondary, and 27.1 percent (13 of 48) for college graduates (P = .89 for chi-square test).

Logistic regression analyses (table 4) involved prediction of dichotomous responses to knowledge and behavior questions. All racial-ethnic groups were combined in view of the small numbers of nonwhites. On the basis of sample sizes, education was dichotomized into college graduate versus all other levels and age into under 60 and older than 60 years. Only educational level was significantly associated with ever having heard of blood cholesterol tests, although the association with sex (that is, lower awareness in men, as found in the univariate analysis in tables 1 and 2) approached statistical significance. Education (college graduate versus all others), sex (male versus female), and frequency of medical checkups (annual versus less frequently or none) were all significant independent predictors of ever having had a cholesterol test; the association with age approached statistical significance. These same variables, along with age, were also significant, independent predictors of having had a test in 1987–88.

Among persons who reportedly had ever been told by a doctor that their cholesterol level was "high," having versus not having annual checkups was the only variable significantly (that is, negatively) associated with lack of knowledge as to whether the cholesterol level was "still high" (table 4).

Results in table 4 are for models with only main

effects, or without product (or "interaction") terms. In other logistic models, there was little evidence for significant interactions. A statistically significant (positive) interaction (data not shown), however, was found between education (college graduate versus others) and sex (male versus female) in the prediction of ever having had a cholesterol test (regression coefficient = .320, 95 percent confidence limits (CL) or CL = .054 and .586). Thus, male college graduates tended to have had a cholesterol test more often than other groups, independent of other variables, as also shown in the univariate analysis (table 3). Logistic analyses also were done with both annual income level (under $30,000, $30,001-$50,000, and $50,001 and up) and education, but education was a stronger predictor of knowledge and use of cholesterol tests (data not shown).

Discussion

Study limitations. Telephone survey data are not without biases despite high response rates, estimated at 74–78 percent in this study. Response rates were higher, however, than in other telephone surveys of blood cholesterol levels using similar methods. In the 1986 NHLBI-Food and Drug Administration (FDA) national survey, the rate was 67 percent of eligible households (*12*) and in the 1989 BRFSS Survey, the average response rate was 66 percent (*3*). Telephone survey respondents have higher educational levels than the general population (*9,10,12*), but detailed studies of the effects of bias on associations with educational level are not available.

Comparisons with other surveys. Comparisons with results of other surveys must take into account differences in the wording of specific questions, as well as respondents' age and socioeconomic status (SES), calendar year of survey, and geographic area.

The higher prevalence of ever having had a cholesterol test for Long Island respondents (56 percent for men and 62 percent for women) versus New York State respondents in the 1988 BRFSS telephone surveys of persons 18 years old (50 percent) (*13*) may reflect the higher SES of Long Island residents and the older age group in this study. The prevalence of ever having had a blood cholesterol test ("by a doctor") among Connecticut respondents (63 percent in men and 58 percent in women, table 2) was slightly lower than the 64 percent figure for Connecticut in the 1989 BRFSS Survey (*3*). While the restriction of this study to older age groups (40–74 years) should lead to higher prevalences of cholesterol testing (table 2), the restriction to cholesterol tests reportedly done "by a doctor" (in this study) should result in lower prevalences than those in the BRFSS Surveys.

In the 1989 BRFSS Survey (*3*), the largest difference by age was a lower frequency of ever having had a cholesterol test among 18–34-year-olds, or a younger age group than included in this study. The BRFSS Survey also reported increases from ages 35–49 to 50–64 and 65 and more years, however, which are consistent with these findings for ages 40–49, 50–59, and 60–74 (table 2). The need for cholesterol screening in older age groups (other than "middle-aged men") is controversial (*11*), but some groups (*1*) recommend periodic screening of all adults ages 20 and older.

The prevalence of ever having had a cholesterol test (done "by a doctor") was greater for men than women in this study, while the reverse was found in the 1989 BRFSS; data were not presented by age within sex or by State, and the question was not restricted to tests done "by a doctor" (*3*). Wynder and coworkers' (*14*) finding of higher rates of cholesterol testing in women in the metropolitan New York area may reflect the fact that the screening program was conducted during hours when persons not employed were more likely to participate.

The lower prevalence of use of cholesterol tests among blacks than whites in this study was consistent with the 1989 BRFSS Survey (*3*), although this study involved small numbers of blacks.

The survey interviewers asked if respondents were ever told "by a doctor" that their cholesterol level was "high," as was done in NHLBI-FDA sponsored national surveys (*12*) of adults 18 years old in 1983 (with 7 percent prevalence of "high" levels) and in 1986 (8 percent prevalence). The higher prevalence of "high" cholesterol levels in this study (15–21 percent, table 1) could reflect the older age groups, as well as geographic differences in prevalence. It should be noted that a large proportion of persons found to have hypercholesterolemia in community surveys are unaware of their condition (*15*).

Associations with educational level. Educational level was positively and significantly associated with awareness and use of cholesterol tests, with an approximately twofold greater prevalence of ever having had a cholesterol test or having a test in 1987–88 in the highest versus the lowest education

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groups (table 3). This finding is consistent with that reported for the 1989 BRFSS Survey, although the category of college graduates was not analyzed (*3*).

In the BRFSS study, the differences by education persisted after adjustment for age (and race). In this study after adjustment for age in multivariate analyses, an association with educational level (college graduate versus all others) was still apparent (table 4). In this survey, not surprisingly, having annual medical checkups was also independently associated with having a cholesterol test (table 4).

Thus, the results of this study and the BRFSS Survey (*3*) suggest that programs aimed at increasing awareness and use of cholesterol tests, as with many other screening tests, could be targeted toward lower education (or income) groups and possibly blacks. Examples of other screening tests whose underuse is strongly associated with lower education level are colorectal cancer screening tests for both sexes (*10*) and in certain high-risk subgroups (*16*), based on data from the same surveys used in this study, and mammography (*17*).

Informing targeted groups about the importance of cholesterol tests might be facilitated by cholesterol education and testing programs at alternative settings such as neighborhood health clinics and churches. In urban black communities, where levels of both blood cholesterol and blood pressure may be elevated, cholesterol screening should be combined with blood pressure testing, and inclusion of churches in screening programs may recruit large numbers of the targeted population (*18*).

In view of secular increases in awareness and use of cholesterol tests and in medical treatment of high cholesterol levels, it will be important to examine trends within educational groups to see if increases in screening and reductions in prevalence of high cholesterol levels are occurring within lower educational groups and if disparities are decreasing or increasing.

While lower educational level is clearly associated with awareness and use of cholesterol tests, the association with followup after being informed of "high" cholesterol levels is less clear. The majority of respondents reportedly ever told that their cholesterol level was "high" also reported knowing that their level was either "still high" or "no longer high" (table 1). This suggests that repeat cholesterol testing was often done (to rule out or confirm high levels) or that successful treatment was obtained, but this information was not obtained in this survey. Educational level was not associated with lack of knowledge of whether the cholesterol level was "still high" (table 4). In the Minnesota Heart Health Program, 82 percent of patients referred to medical care because of elevated blood cholesterol remembered (about 6 months later) that the referral had occurred, and 57 percent had visited a physician, but level of education was not associated with frequency of consulting a physician (*19*). In this study, having annual medical checkups, however, was associated with knowledge as to whether or not the cholesterol level was "still high" (table 4), presumably reflecting an increased likelihood of having repeated cholesterol testing or treatment, or both. If a physician is visited, the likelihood for treatment of elevated cholesterol levels has been increasing in recent years as reported in community surveys during the 1980s in Minnesota (*14*) and in national surveys of the general population (*12*) and of physicians (*20*).

Educational level was negatively (albeit not statistically significantly) associated with the frequency of ever having been told by a doctor that cholesterol level was "high" (table 3). This finding is consistent with other data showing higher prevalences of ischemic heart disease (IHD) risk factors in economically disadvantaged groups (*6–8, 21*).

Finally, geographic variation in death rates for IHD in the United States (*22*) and among various countries (*23*), as well as variation in the rate of decline over time (*22,24*), may be related to variation in blood cholesterol and other risk factors. Such variation may not necessarily be explained by variation in SES. New York State ranked first while Connecticut ranked 34th among all States in IHD death rates (ages 35–64) in each sex in 1985 (*22*). Long Island and Connecticut respondents differed in reported history of "high" cholesterol level (table 1), despite similarities in distribution of SES, education, and racial-ethnic composition in the two areas (*10*). Future studies of IHD death rates should examine actual cholesterol test results and IHD prevalence, as well as use of IHD diagnostic and treatment facilities, in these two areas.

References

1. Report of the National Cholesterol Education Program Expert Panel on detection, evaluation, and treatment of high blood cholesterol in adults. Arch Intern Med 148: 36–39 (1988).
2. The Surgeon General's report on nutrition and health. U.S. Department of Health and Human Services, DHHS (PHS) Publication No. 88-50210. U.S. Government Printing Office, Washington, DC, 1988.
3. Factors related to cholesterol screening and cholesterol level awareness—United States, 1989. MMWR 39: 633–637, Sept. 21, 1990.
4. AMA announces campaign against cholesterol. Nation's Health, January 1989, p. 17.
5. Kitagawa, M., and Hauser, M.: Differential mortality in the United States. Harvard University Press, Cambridge, MA, 1973.
6. Feldman, J. J., et al.: National trends in educational differentials in mortality. Am J Epidemiol 129: 919–933 (1989).
7. Matthews, H. A., et al.: Educational attainment and behavioral and biologic risk factors for coronary heart disease in middle-aged women. Am J Epidemiol 129: 1132–1144 (1989).
8. Winkleby, M. A., Fortmann, S. P., and Barrett, D. C.: Social class disparities in risk factors for disease: eight-year prevalence patterns by level of education. Prev Med 19: 1–12 (1990).
9. Marcus, A. C., and Crane, L. A.: Telephone surveys in public health research. Med Care 24: 97–112 (1986).
10. Polednak, A. P.: Knowledge of colorectal cancer and use of screening tests in persons 40–74 years of age. Prev Med 19: 213–226 (1990).
11. U.S. Preventive Services Task Force: Guide to clinical preventive services. Williams and Wilkins, Baltimore, MD, 1990, p. 17.
12. Schucker, B., et al.: Change in public perspective on cholesterol and heart disease. Results from two national surveys. JAMA 258: 3527–3531, Dec. 25, 1987.
13. State-specific changes in cholesterol screening and awareness—United States, 1987-88. MMWR 39: 304–314, May 11, 1990.
14. Wynder, E. L., Field, F., and Haley, N. J.: Population screening for cholesterol determination: a pilot study. JAMA 256: 2839–2842, Nov. 28, 1986.
15. Burke, G. L., et al.: Trends in serum cholesterol levels from 1980 to 1987: the Minnesota Heart Study. N Engl J Med 324: 941–946, Apr. 4, 1991.
16. Polednak, A. P.: Knowledge of colorectal cancer and use of screening tests among higher-risk persons. J Cancer Educ 5: 115–124 (1990).
17. National Cancer Institute Breast Cancer Screening Consortium: Screening mammography—a missed clinical opportunity? Results of the NCI Breast Cancer Screening Consortium and National Health Interview survey studies. JAMA 264: 54–59, July 4, 1990.
18. Russell, N. K., et al.: The yield of cholesterol screening in an urban black community. Am J Public Health 81: 448–451 (1991).
19. Rastam, L., Luepker, R. V., and Pirie, P. L.: Effect of screening and referral on follow-up and treatment of high blood cholesterol levels. Am J Prev Med 4: 244–248 (1988).
20. Schucker, B., et al.: Change in physician perspective on cholesterol and heart disease. Results from two national surveys. JAMA 258: 3521–3526, Dec. 25, 1987.
21. Wing, S.: Social inequalities in the decline of coronary mortality. Am J Public Health 78: 1514–1516 (1988).
22. State- and sex-specific premature mortality due to ischemic heart disease 1985. MMWR 37: 313–323, May 27, 1988.
23. Stamler, J.: Opportunities and pitfalls in international comparisons related to patterns, trends and determinants of CHD mortality. Int J Epidemiol 18 (supp. 1): S3–S18 (1989).
24. Sempos, C., et al.: Divergence of the recent trends in coronary mortality for the four major race-sex groups in the United States. Am J Public Health 78: 1422–1427 (1988).