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Gender Differences in Self-Reported Heart Disease Morbidity: Are Intervention Opportunities Missed for Women?

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ABSTRACT

Women live longer than men but report more illness, possibly because of greater use of preventive health care, which leads to increased diagnosis. This hypothesis was tested in the Alameda County Study cohort consisting of 885 men and 1,058 women who did not report chest pain or heart trouble in 1965 and who were followed for new reports of these conditions during 1973–1974, and mortality through 1988. Contrary to expectations, preventive health care use was not associated with subsequent reports of chest pain or heart trouble for women. However, having a preventive checkup in the past year was associated with more than a 50% reduction in subsequent reports of chest pain ($p < .001$) and heart trouble ($p = .06$) for men. Similarly, possession of health insurance (an indicator of access to health care) was associated with a reduction of reported chest pain in men ($p = .02$) but not women. Gender differences in associations were significant and independent of other predictors of heart disease. Having a regular physician or clinic was not associated with subsequent reports of chest pain or heart trouble for either sex. These findings are *not* consistent with the hypothesis that high rates of preventive care use cause women to be diagnosed more often, and thus to report more heart disease morbidity. Results suggest gender differences in the content of preventive care and missed intervention opportunities for women.

INTRODUCTION

Gender differences in health show an interesting paradox in which women have equivalent or higher rates of illness, disability, physician visits, and prescription drug use, yet live longer than men.[1–6] There have been few investigations of the contradiction between sex differences in morbidity and mortality in a single population based on prospective data. In the Alameda County Study, it has been demonstrated that women have lower heart disease mortality, but report equal or more heart disease morbidity than men (hypertension, chest pain, and heart trouble).[1,7]

One hypothesis that has been advanced to explain this paradox is that women report more morbidity because they use preventive health care services more frequently and are therefore more likely to be diagnosed.[1,3–6] There have been few long-term investigations of this hypothesis in representative population-based samples with prospective designs. The present study uses data from the Alameda County Study, a population-based cohort followed for self-reported morbidity during 1965–1974, to investigate the hypothesis that the paradox between sex differences in heart disease morbidity and mortality is explained by more frequent use of preventive health care.

MATERIALS AND METHODS

Study population

The study sample consists of adults aged 40 or older who participated in a 1965 mail survey of physical, social, and psychological indicators of health conducted by the Human

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Population Laboratory of the California Department of Health Services in Alameda County, a community in northern California. The sampling procedure, explained in greater detail elsewhere,[8] elicited an 86% response rate to the mailed questionnaire. The male and female response rates were virtually equal (85% and 87%, respectively). When compared with respondents, the small group of nonrespondents included a slightly higher number of older people and white, retired, single, and widowed persons. The differences between respondents and nonrespondents, however, have a negligible effect on population estimates, and respondents have been judged to be a representative sample of adults in Alameda County.[9] In 1974, a follow-up questionnaire consisting of the same set of physical, social, and psychological health parameters as the earlier survey was sent to the 1965 respondents who had survived the 9-year interim. Computerized record linkage allowed determination of vital status. Ninety-six percent of both men and women survivors were located, from whom a follow-up questionnaire was completed by 81% of the men and 82% of the women. The present analysis is restricted to the 885 men and 1,058 women who were 40 years or over in 1965, were either black or white, and did not report chest pain or heart trouble in 1965.

Morbidity ascertainment

Questions on heart disease morbidity assessed any heart trouble and any chest pain occurring during the 12 months preceding the second survey. All individuals with prevalent heart trouble or chest pain during the 12 months preceding the baseline survey were excluded from analyses. Although most of the heart disease morbidity reported at the second survey was probably incident morbidity, a few individuals may have had heart trouble or chest pain prior to the baseline visit but not within the 12-month time period. The prevalence of self-reported heart trouble in a 1974 population sample of Alameda County, as estimated by the same questionnaire item in the present study, was very similar to that reported for a national sample from the Health Interview Survey, conducted in 1972.[10]

Mortality ascertainment

The association between self-reported chest pain and heart trouble in 1974 and subsequent ischemic heart disease mortality during 1974–1988 was also examined to determine the prognosis of self-reported heart trouble and chest pain. Mortality was ascertained by using a computer-matching linkage with the California Death Registry to obtain the death certificates of persons who had died in California or who had died outside the state with notification to California. The process is described in detail elsewhere.[11,12] Ischemic heart disease death was coded according to International Classification of Diseases, Eighth Revision, codes 410–414.

Variables studied

Variables chosen for this analysis were either known cardiovascular risk factors or had been shown by previous analyses of this cohort to be significant predictors of mortality from ischemic heart disease and/or all causes or were thought to be important as potential confounders. Table 1 describes the method of measurement and coding for the independent variables used in this study. There were three demographic variables (age, race, income), three health status variables (high blood pressure, diabetes, doctor visits in past 12 months), five behavioral variables[8,13] (cigarette smoking, alcohol consumption,[14] leisure physical activity, relative weight,[15] sleeping patterns), and five psychosocial variables[8,16] (marital status, social isolation, church membership, other group membership, and life satisfaction).

Preventive health care utilization was measured in two ways. Use of preventive checkups was assessed by using responses to the question, "When was the last time you went to a doctor for a general checkup—even though you were feeling well and had not been sick?" Respondents also reported if they had a regular doctor or clinic. Health insurance coverage was used as a proxy for financial access to health care.

Analyses

The objective of these analyses was to investigate the hypothesis that sex differences in use of preventive health care account for the *lack* of a male excess in self-reported heart disease morbidity despite a substantial male excess of heart disease mortality. Preventive health care may influence sex differences in self-reported morbidity in two ways: the sex ratio for morbidity may vary with preventive health care use (interaction), or the sex ratio for morbidity may be explained by sex differences in the distribution of preventive health care (confounding). Analyses of confounding are not valid in the presence of interaction because there is no single adjusted sex effect.[17] Therefore, analyses began with tests for interactions between sex and other independent variables.

To identify possible interactions between predictors and gender, sex-specific logistic models were applied to both outcomes (chest pain and heart trouble) for each of the four categories of independent variables shown in Table 1. From these models potential interacting variables were identified by comparing estimated coefficients for men with those for women.

The statistical significance of possible interactions was tested by placing sex by predictor interaction terms in logistic models with both sexes combined. The models were ranked in descending order of the log-likelihood statistic ($-2\log L$).[17] Pair-wise likelihood comparisons (likelihood ratio tests) were then made between different interaction models. The best fitting model was defined as that with the lowest log-likelihood statistic which differed significantly ($p \leq .10$) from the model with the next lowest log-likelihood. The significance level criterion was extended beyond the usual .05 level because of the recognized low power of interaction analyses.

Sex ratios (male-to-female relative risks), the statistical significance of sex ratios, and their 95% confidence intervals were estimated within levels of interacting variables by the best fitting logistic models. Standard interval estimation and hypothesis testing for logistic coefficients and their linear combinations were used.[17] A sex ratio greater than 1 indicated a male excess for the outcome, and a sex ratio less than 1 indicated a female excess. Relative risks for other risk variables were similarly estimated. All multivariate analyses were performed by the Statistical Analysis Systems program, Proc Logist.[18]

The prognosis of self-reported heart trouble and chest pain in 1974 for subsequent ischemic heart disease mortality during

TABLE 1. CLASSIFICATION OF VARIABLES INFLUENCING HEART DISEASE: ALAMEDA COUNTY, CALIFORNIA, 1965

Variable	*Categories*	*Remarks*
Demographic variables		
Age	Completed years	
Race	White (with Hispanic); Black	Other races excluded
Income	Adequate; inadequate	Based on family income and household size
Physical health status		
High blood pressure	No; yes	During last year
Diabetes	No; yes	During last year
Recent MD visit(s)	None; 1–5; 6 or more	During last year
Behavioral variables		
Smoking history	Never; past; current	
Alcohol consumption	Abstainers; low; high (≥45 drinks/month)	Based on frequency of drinking and amount consumed for beer, wine, and liquor combined
Leisure physical activity	Active; inactive	Based on frequency and presumed strenuousness of specific leisure time activities
Relative weight	Average (9.9% underweight to 29.9% overweight); extreme underweight; extreme overweight	Measured by the Quetelet Index, weight/height; categories based on Metropolitan Life Insurance reports of desirable weights
Sleeping patterns	7–8 hours/night; more or less	Based on usual number of hours slept each night
Psychosocial variables		
Marital status	Currently married; not married	
Social isolation	Isolated; not isolated	Based on three questions about how many friends and relatives a person has and how often they are seen
Church membership	Member; nonmember	
Other membership	Member; nonmember	
Life satisfaction	Satisfied; dissatisfied	Based on nine questions about satisfaction with aspects of one's life, such as marriage or job
Preventive health care variables		
Recent preventive checkup	Yes; no	During last year
Regular MD/clinic	Yes; no	
Health insurance	Yes; no	

1974–1988 was examined by sex-specific, age-adjusted proportional hazards regression models. One model included age and self-reported heart trouble, and another model included age and self-reported chest pain. Coefficients for the heart trouble and chest pain terms were used to estimate relative hazards. Relative hazards greater than 1 imply that these two health conditions were associated with increased risk of ischemic heart disease mortality.

RESULTS

Distribution of self-reported heart disease morbidity, preventive health care use, and health insurance by age and sex

As seen in Table 2, at most ages women were more likely than men to report new chest pain, whereas self-reports of heart trouble were more common for women in the youngest and oldest age groups. Reports of heart trouble increased with age for both men and women, whereas reports of chest pain showed no consistent pattern with age.

Age- and sex-specific prevalence of preventive health care use and health insurance at baseline (1965) are presented in Table 3. Men were less likely to have recently had a preventive checkup or to have a regular doctor or clinic, but were more likely to have health insurance.

Sex-specific associations between preventive health care use and health insurance, and self-reported heart disease morbidity

In the best fitting logistic models (Table 4), no recent preventive checkup and lack of health insurance were associated with increased male risk for new self-reported heart disease morbidity, but had no effect on female risk. Men who did not report a recent preventive checkup had 2.5 times the risk of chest pain and 1.7 times the risk of heart trouble compared with those

TABLE 2. AGE- AND SEX-SPECIFIC SELF-REPORTED HEART DISEASE MORBIDITY AMONG ADULTS AGED 40+ WHO DID NOT REPORT CHEST PAIN OR HEART TROUBLE IN 1965: ALAMEDA COUNTY, CALIFORNIA, 1973–1974

Morbidity by age at baseline	*Men*		*Women*		*Sex ratio (men/women)*	*95% Confidence interval*
	n/N	*%*	*n/N*	*%*		
Chest pain						
40–49	32/427	7.5	50/474	10.5	0.7	
50–59	26/276	9.4	24/318	7.5	1.2	
60–69	9/138	6.5	17/193	8.8	0.7	
70+	3/44	6.8	12/73	16.4	0.4	
Age adjusted					0.8	(0.6, 1.0)
Heart trouble						
40–49	16/427	3.7	22/474	4.6	0.8	
50–59	32/276	11.6	34/318	10.7	1.1	
60–69	18/183	13.0	23/193	11.9	1.1	
70+	9/44	20.5	19/73	26.0	0.8	
Age adjusted					0.9	(0.7, 1.3)

who had a recent preventive checkup. Uninsured men had 2.4 times the risk of chest pain compared with those who had health insurance. The analogous risk ratios for females were approximately 1.00 with significance probabilities exceeding .5, indicating that preventive health care use and health insurance were not associated with heart disease morbidity in women. Gender differences in the above associations are summarized graphically in Figure 1. Sex differences in the association between both preventive health care, and health insurance with self-reported chest pain, were statistically significant ($p \leq .02$ and .03, respectively). The sex difference in the association between preventive health care and self-reported heart trouble was significant at $p \leq .07$. Having a regular physician or clinic was not associated with self-reported heart disease morbidity in either men or women.

Sex ratios for self-reported heart disease morbidity by preventive health care use and health insurance

The best fitting model for chest pain contained two independent interactions between sex and health care indicators: one between sex and preventive checkup ($p = .02$) and another between sex and health insurance ($p = .03$). As shown in Table 5, the sex ratio reversed from a female excess among those with both health insurance and a recent preventive checkup (*OR* [M/F] = 0.5), to a significant male excess among those with neither (*OR* [M/F] = 3.5). There were no interactions between sex and any demographic or behavioral variables in this model. The model indicates that no recent preventive checkup and lack of health insurance predicted subsequent chest pain in men but not women.

TABLE 3. AGE- AND SEX-SPECIFIC PREVALENCE OF LACK OF PREVENTIVE HEALTH CARE AND HEALTH INSURANCE: ALAMEDA COUNTY, CALIFORNIA, 1965

Preventive care, insurance, and age at baseline	*Men*		*Women*		*Sex ratio (men/women)*	*95% Confidence interval*
	n	*%*	*n*	*%*		
No recent preventive checkup						
40–49	214	50.1	190	40.1	1.3	
50–59	152	55.1	138	43.4	1.3	
60–69	64	46.4	92	47.7	1.0	
70+	22	50.0	28	38.4	1.3	
Age adjusted					1.2	(1.1, 1.3)
No regular MD/clinic						
40–49	79	18.5	64	13.5	1.4	
50–59	53	19.2	41	12.9	1.5	
60–69	19	13.8	14	7.3	1.9	
70+	9	20.5	12	16.4	1.2	
Age adjusted					1.4	(1.2, 1.8)
No health insurance						
40–49	28	6.6	49	10.3	0.6	
50–59	22	8.0	27	8.5	0.9	
60–69	20	14.5	28	14.5	1.0	
70+	6	13.6	12	16.4	0.8	
Age adjusted					0.8	(0.6, 1.1)

TABLE 4. ASSOCIATIONS BETWEEN PREVENTIVE HEALTH CARE AND HEALTH INSURANCE IN 1965 AND SELF-REPORTED HEART DISEASE MORBIDITY BY SEX: ALAMEDA COUNTY, CALIFORNIA, 1973–1974

Sex and health care category	*Chest pain odds ratio (95% confidence interval)*	*Heart trouble odds ratio (95% confidence interval)*
Men		
Preventive checkup (no/yes)	2.53 (1.44–4.24)	1.72 (0.99–3.01)
Regular MD/clinic (no/yes)	0.89 (0.54–1.47)	1.06 (0.63–1.80)
Health insurance (no/yes)	2.37 (1.16–4.83	0.78 (0.44–1.38)
Women		
Preventive checkup (no/yes)	1.09 (0.69–1.72)	0.91 (0.55–1.50)
Regular MD/clinic (no/yes)	0.89 (0.54–1.47)	1.06 (0.63–1.80)
Health insurance (no/yes)	0.80 (0.38–1.65)	0.78 (0.44–1.38)

Note: Associations were estimated by best fitting logistic models adjusted for age, race, income, high blood pressure diabetes, recent MD visits, cigarette smoking, alcohol use, leisure time physical activity, relative weight, sleeping patterns, marital status, social isolation, church membership, other group membership, life satisfaction, and relevant interactions. The chest pain model included two interactions: sex by preventive checkup and sex by health insurance. The heart trouble model included four interactions: sex by preventive checkup, sex by income, sex by past smoking, and sex by leisure time physical activity.

The best fitting model for the heart trouble outcome contained four interactions with sex: past smoking ($p = .11$), physical activity ($p = .09$), income ($p = .10$), and preventive checkup ($p = .07$). The model indicates that past smoking, lack of physical activity, and no recent preventive checkup were predictive of subsequent heart trouble for men but not women, whereas inadequate income was predictive for women but not men. Therefore, the sex ratio ranged from a female excess among those who reported a recent preventive checkup, were physically active, were never smokers, and had inadequate income (*OR* [M/F] = 0.3, 95% *CI* = 0.1, 0.8) to a male excess among those who did not report a recent preventive checkup, were physically inactive, past smokers, and had adequate income (*OR* [M/F] = 6.0, 95% *CI* = 1.9, 18.8).

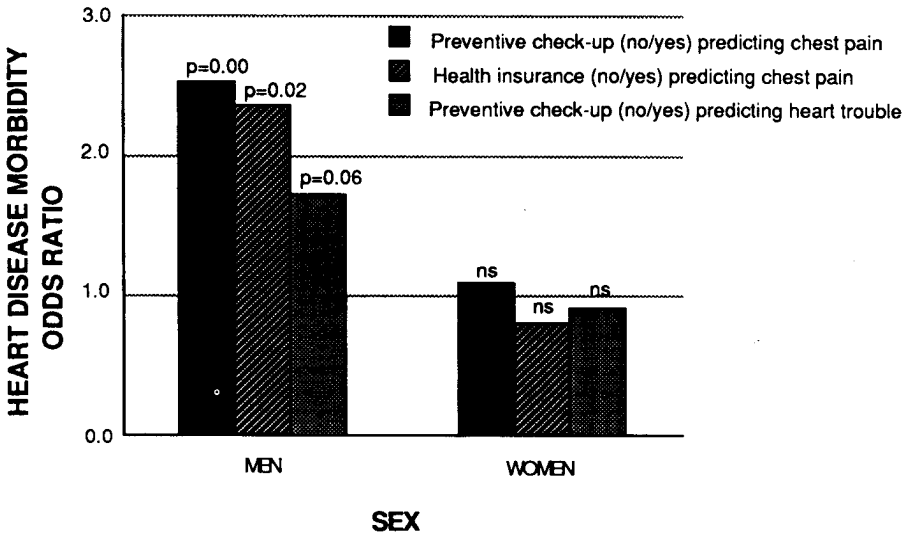

FIG. 1. Gender differences in the associations between preventive checkup and health insurance in 1965 and self-reported heart disease morbidity: Alameda County, California, 1973–1974 (as estimated by best fitting logistic model).

TABLE 5. ASSOCIATION BETWEEN SEX AND NEW REPORT OF CHEST PAIN BY PREVENTIVE CHECKUP AND HEALTH INSURANCE IN 1965: ALMEDA COUNTY, CALIFORNIA, 1973–1974

Health care category	*Sex odds ratio (males/ females)*	*95% Confidence interval*
Health insurance and preventive checkup	0.50	0.29–0.85
Health insurance only	1.16	0.71–1.91
Preventive checkup only	1.49	0.54–4.12
Neither	3.46	1.29–9.27

Note: Association was estimated by best fitting logistic model described in Table 4.

Prognosis of self-reported chest pain and heart trouble

Self-reported chest pain in 1974 was associated with a 2.5-fold increase in risk of subsequent heart disease death in women ($p < .0002$) and a 1.8-fold increase in risk among men ($p < .07$). Self-reported heart trouble in 1974 was associated with a threefold increase in risk of subsequent heart disease death in women ($p < .0001$) and 2.5-fold increase in men ($p < .0008$).

DISCUSSION

The patterns of gender differences in self-reported morbidity observed in the Alameda County Study cohort are generally consistent with those reported for other populations: women report equal or more heart disease morbidity than men (hypertension, chest pain, and heart trouble).[1,7] The higher rates of preventive health care use (preventive checkups, and having a regular doctor or clinic) for women in the present study, although modest, are consistent with prior reports in the literature.[4,6,19] Lower employment rates among women probably account for the larger proportion of uninsured among women. Unemployed women would not receive employment-related insurance benefits, especially if unmarried.

Although the present study is prospective, findings may not reflect the true incidence of new heart disease morbidity. These analyses concern reports of new morbidity during 1973–1974 among individuals who did not report morbidity in 1965. New reports of chest pain may reflect recurrence of past symptoms. It is unlikely, however, that heart trouble is interpreted by respondents as a condition that comes and goes. Comparison of the prevalence of self-reported heart trouble in the Alameda County Study in 1965 with data from the National Health Examination Survey in 1960–1962 suggests that self-report may underestimate rather than overestimate the actual prevalence heart disease for both men and women.[10]

Findings from the present study are *not* consistent with the hypothesis that high rates of preventive health care utilization cause women to be diagnosed more often and thus to report more heart disease morbidity. Preventive checkup and health insurance showed a protective association for men, but were not associated with self-reported chest pain or heart trouble for women. The lack of an association between having a regular physician or clinic and subsequent morbidity in the presence of an association with preventive checkups may indicate that this variable is a poor marker of preventive care. For a healthy individual, having a regular physician or clinic may indicate preventive care, whereas it may be a marker of illness among those with chronic disease.

The protective association between preventive health care, health insurance, and self-reported heart trouble among men may be of clinical significance, with preventive health care use and financial access to care leading to a reduction in risk of ischemic heart disease mortality among men. This association was not confounded by behavioral and social predictors of ischemic heart disease, including smoking, alcohol use, relative weight, reported high blood pressure, diabetes, leisure exercise, marital status, social isolation, church or group membership, age, and income. It is possible that this association is explained by a direct effect of access and use of preventive health care on risk mediated by risk factors not available for examination in this study. Possible pathways include management of blood pressure and/or blood lipids, and life-style changes including diet modification and stress management. In previous analyses of the Alameda County Study data, preventive health care use modified declines in ischemic heart disease mortality risk observed between two cohorts separated by 9 years.[10] Ischemic heart disease mortality declined by about 50% among users of preventive health care, but no declines were observed for those who did not use preventive care. This finding lends credence to the hypothesis that the content of preventive care is responsible for the protective association between preventive health care use and self-reported heart disease morbidity among men.

The lack of association between use of preventive health care or health insurance and self-reported heart trouble or chest pain among women is troubling in light of previous reports from the Alameda County Study which have demonstrated the predictive validity of self-reported chest pain[20,21] and heart trouble[20–23] for subsequent ischemic heart disease death among both men and women, as measured by single questions. The predictive validity of chest pain for subsequent ischemic heart disease mortality among women has also been demonstrated in other U.S. population-based studies with more detailed assessment of chest pain, including a measure of Rose angina.[24,25]

In the present study, self-reported heart trouble and chest pain were associated with significantly increased risk of subsequent ischemic heart disease mortality, suggesting that self-reported heart disease morbidity in this study is a valid indicator of increased heart disease risk for men and women. This finding also supports the hypothesis that the lack of association between preventive care and self-reported heart trouble and chest pain among women represents a missed opportunity for intervention among women that could have reduced mortality risk. Although

the data in the present study do not permit us to distinguish between types of preventive care by sex, they do permit an overall assessment of the effectiveness of preventive care received for the reduction of heart disease morbidity.

Differences in medical care practices at preventive visits could explain why preventive health care showed a protective association with self-reported heart trouble or chest pain among men but not women. For example, physicians may begin screening for hypercholesterolemia and silent EKG abnormalities at a later age among women than men. Alternatively, women's preventive visits may be focused on gynecologic screening, whereas men's are focused on screening and prevention for chronic disease, especially heart disease. It is possible that an important intervention opportunity to reduce women's heart disease risk is being missed in the context of preventive health care visits.

Data from this study are representative of the adult population in Alameda County, California in 1965. However, these data remain relevant to current populations. First, many individuals in this cohort are now just passing through the age of highest heart disease risk. The mortality follow-up for this cohort is completed through 1988 and is still continuing. An understanding of the past experience of this cohort is important to interpreting the findings of current studies of sex differences in treatment effects, care-seeking behavior, and diagnostic evaluations.

The possibility of gender bias in the context of medical care in response to cardiac symptoms has received considerable recent attention.[26–30] It has been observed that women are less likely to have coronary angiography, coronary angioplasty, or coronary surgery following hospital admission for myocardial infarction, angina, chronic ischemic heart disease, or chest pain.[26] Likewise, women with angina prior to myocardial infarction were less likely to be referred for cardiac catheterization.[27] It has been suggested that societal expectations lead physicians to attribute women's symptoms to nonphysical causes.[29]

In summary, the findings of the present study are not consistent with the hypothesis that women report more morbidity because of more frequent use of preventive health services. The lack of association between preventive health care use or financial access (health insurance) and self-reported heart disease morbidity among women suggests that an intervention opportunity may have been missed. Further investigation regarding the content of preventive health care among women and men and its effectiveness for preventing heart disease morbidity is warranted.

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REFERENCES

1. Wingard DL. The sex differential in morbidity, mortality and life style. Ann Rev Public Health 1984;5:433–458.
2. Wingard DL, Suarez L, Barrett-Connor E. The sex differential in mortality from all causes and ischemic heart disease. Am J Epidemiol 1983;117:165–172.
3. Verbrugge LM. The twain meet: Empirical explanations of sex differences in health and mortality. In: Ory M, Warner HR, eds. Gender, health and longevity. New York: Springer Publishing, 1990.
4. Verbrugge LM. Gender and health: An update on hypotheses and evidence. J Health Soc Behav 1985;26:156.
5. Waldron I. An analysis of causes of sex differences in mortality and morbidity. In Gove WR, Carpenter GR, eds. The fundamental connection between nature and nurture. Lexington, MA: Lexington Books, 1982:69–115.
6. National Center for Health Statistics, Hing E, Kovar MG, Rice DP. Sex differences in health and use of medical care, United States, 1979. (Vital and health statistics, Series 3: Data from the National Health Interview Survey, the National Ambulatory Medical Care Survey, the National Hospital Discharge Survey, no. 24). DHHS Pub No. (PHS) 83-1408. Hyattsville, MD: National Center for Health Statistics, 1983.
7. Wingard DL, Cohn BA, Kaplan GA, Cirillo PM, Cohen RD. Sex differentials in morbidity and mortality risks examined by age and cause in the same cohort. Am J Epidemiol 1989;130:601–610.
8. Berkman LF, Breslow L. Health and ways of living. The Alameda County Study. New York: Oxford University Press, 1983.
9. Hochstim JR. Health and ways of living—The Alameda County Population Laboratory. In Kessler I, Levin ML, eds. The community as an epidemiologic laboratory. Baltimore: Johns Hopkins University Press, 1970:149–176.
10. Cohn BA, Kaplan GA, Cohen RD. Did early detection and treatment contribute to the decline in ischemic heart disease mortality? Prospective evidence from the Alameda County Study. Am J Epidemiol 1988;127:1143–1154.
11. Belloc N, Arellano M. Computer record linkage on a survey population. Health Serv Rep 1973;88:344–350.
12. Arellano MG, Petersen GR, Pettiti DB, Smith RE. The California Automated Mortality Linkage System (CAMLIS). Am J Public Health 1984;74:1324–1330.
13. Wingard DL, Berkman LF, Brand RJ. A multivariate analysis of health-related practices: A nine-year mortality follow-up of the Alameda County Study. Am J Epidemiol 1982;116:765–775.
14. Cahalan D, Cisin IH. American drinking practices: Summary of findings from a national probability sample. II. Measurement of massed versus spaced drinking. Q J Studies Alcohol 1968;29:642–656.
15. Metropolitan Life Insurance Company. New weight standards for men and women. Stat Bull Metropol Life Ins Co 1959;40:1–4.
16. Berkman LF, Syme SL. Social networks, host resistance and mortality: A nine-year follow-up study of Alameda County residents. Am J Epidemiol 1979;109:186–204.
17. Kleinbaum DG, Kupper LL, Morgenstern H. Epidemiologic research: Principles and quantitative methods. Belmont, CA: Lifetime Learning Publications, 1982.
18. SAS Institute Inc. SUGI Supplemental User's Guide, Version 5 Edition. Cary, NC: SAS Institute, 1986.
19. Cleary PD, Mechanic D, Greenley JR. Sex differences in medical care utilization: An empirical investigation. J Health Soc Behav 1982;23:106–119.
20. Kaplan GA, Kotler PL. Self-reports predictive of mortality from ischemic heart disease: A nine-year follow-up of the Human Population Laboratory cohort. J. Chron Dis 1985;38:195–201.
21. Wingard DL, Cohn BA. Coronary heart disease among women in Alameda County, 1965–1973. In: Eaker ED, ed. Coronary heart disease in women: Proceedings of an NIH workshop. New York: Haymarket Doyma, 1987.
22. Kaplan GA, Cohn BA, Cohen RD, Guralnik I. The decline in ischemic heart disease mortality: Prospective evidence from the Alameda County Study. Am J Epidemiol 1988;127:1131–1142.
23. Cohn BA, Wingard DL, Cohen RD, Cirillo PM, Kaplan GA. Sex

differences in time from self-reported heart trouble to heart disease death in the Alameda County Study: Significance of time dependence of risk variable effects. Am J Epidemiol 1990; 131:434–442.

24. La Croix AZ, Guralnik JM, Curb JD, Wallace RB, Ostfield AM, Hennekens CH. Chest pain and coronary heart disease mortality among older men and women in three communities. Circulation 1990;81:437–446.
25. La Croix AZ, Haynes SG, Savage DD, et al. Chest pain and coronary heart disease mortality among women: Results from the NHANES I Follow-up Study. Circulation 1986;74 (suppl. II): (abstr.)II–332.
26. Ayanian JZ, Epstein AM. Differences in the use of procedures between women and men hospitalized for coronary heart disease. N Engl J Med 1991;325:221–225.
27. Steingart RM, Packer M, Hamm P, et al. Sex differences in the management of coronary heart disease. N Engl J Med 1991; 325:226–230.
28. Healy B. The Yentl syndrome. N Engl J Med 1991;325:274–276.
29. American Medical Association Council on Ethical and Judicial Affairs. Gender disparities in clinical decision making. JAMA 1991;266:559–562.
30. Healy B. Women's health, public welfare. JAMA 1991;266:566–568.

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