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Authors

Kattapong, V. K.

Becker, T. M.

Gilliland, F. D.

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Ischemic Heart Disease Mortality in American Indians, Hispanics, and Non-Hispanic Whites in New Mexico, 1958-1992

V.J. KATTAPONG, T.M. BECKER, AND F.D. GILLILAND

Declining ischemic heart disease mortality rates over the last quarter-century have been well documented in the United States.¹ Factors such as improved recognition and treatment of hypertension, behavioral changes caused by public awareness of the health risks of smoking, and lower serum cholesterol resulting from medication and dietary changes have probably been major contributors to this decline.² Little information exists, however, regarding long-term trends in ischemic heart disease mortality in southwestern American Indians and Hispanics. Previously, we reported ischemic heart disease mortality rates in American Indians and Hispanics in New Mexico from 1958-82.³ To further investigate trends in ischemic heart disease mortality in New Mexico, we examined mortality data for ischemic heart disease to include the years 1958-92, a thirty-five-year time span.

V.J. Kattapong is an assistant professor of neurology at the University of New Mexico School of Medicine. T.M. Becker and F.D. Gilliland are medical epidemiologists at the University of New Mexico School of Medicine.

METHODS

From the New Mexico Bureau of Vital Statistics, we obtained coded death certificate data for residents of New Mexico for the years 1958 through 1992. Cause of death was coded according to the International Classification of Diseases (ICD). The seventh revision of the ICD code was used for the years 1958–68,⁴ the eighth ICD revision for the years 1969–78,⁵ and the ninth ICD revision for the years 1979–92.⁶ For this report, deaths attributed to ischemic heart disease included ICD codes 420–420.9, 422.1, 440, 441, and 443 in the seventh revision; ICD codes 410–413 in the eighth revision; and ICD codes 410-414.9 in the ninth revision.

We adjusted all ischemic heart disease mortality rates recorded over the thirty-five-year study period to the coding scheme of the eighth ICD revision. The comparability ratio for ischemic heart disease mortality between the seventh and eighth revisions was 1.146, and the comparability ratio between the eighth and ninth revisions was 0.8784.⁷ To make the rates for the entire thirty-five-year period more comparable, we adjusted the rates to the ICD-8 coding scheme in a manner previously described.⁸

Information included on death certificates was used by the New Mexico Bureau of Vital Statistics to assign ethnicity. Hispanic ethnicity was determined by considering specific statements on the death certificate, as well as the surname of the decedent and the decedent's parents. Among Hispanic cases, no attempt was made to distinguish between recent immigrants to the state and descendants of early Spanish settlers to New Mexico. Death certificate coding as "white," and the absence of a Spanish surname or other information to indicate Hispanic ethnicity were used to determine non-Hispanic white ethnicity. American Indians were identified solely on the basis of information contained on the death certificate. Tribal affiliation of American Indian cases was primarily Navajo, Pueblo, Zuni, and Apache. Because of the small numbers of cases of Blacks and other racial/ethnic groups, they were not included in the study. Previous work has demonstrated a high correlation between self-reported ethnic status and the Bureau of Vital Statistics' assignment of Hispanic and other white ethnicity.⁹ We also have found a high correlation between the bureau's assignment of American Indian ethnicity and ethnic identification as American Indian as documented in Indian Health Service medical records.¹⁰ American Indians with Hispanic surnames are not misclassified as Hispanics in New Mexico.¹¹

The censuses of 1960,¹² 1970,¹³ 1980,¹⁴ and 1990¹⁵ were used to determine the denominators for rate calculations. The U.S. Census Bureau used different techniques to identify ethnicity. To account for the different enumeration procedures, estimates of the Hispanic population from 1960 to 1980 were adjusted in a manner that has previously been reported.¹⁶

Age-adjusted mortality rates for ischemic heart disease were calculated for the five-year periods 1958–62, 1963–67, 1968–72, 1973–77, 1978–82, 1983–87, and 1988–92. We used the direct method to calculate age-adjusted rates and standardized the rates to the 1970 U.S. standard million population. We used SAS for the rate calculations for the descriptive analysis.¹⁷

RESULTS

Distinct differences in ischemic heart disease mortality were apparent among New Mexico's three major ethnic populations during the thirty-five-year study period. American Indians of both sexes had the lowest age-adjusted ischemic heart disease mortality rates in each time period (tables 1 and 2). Hispanic men had rates that were intermediate between American Indians and non-Hispanic whites in each time period (table 1). Hispanic women had mortality rates that were intermediate between American Indian women and non-Hispanic white women, except for the time period 1963–67, when Hispanic women had the highest age-adjusted rates (table 2). Rates for all ethnic groups of both sexes were lower than those of U.S. whites in each time period.

Overall, for the thirty-five years of our study period, women in New Mexico had lower age-adjusted ischemic heart disease mortality rates in each five-year period than New Mexico men. This gender difference was apparent for each ethnic group in each time period.

Among both the New Mexico and the U.S. white populations, a dramatic trend towards declining age-adjusted ischemic heart disease mortality rates was observed for each ethnic group over the initial thirty-year span of the data. In the U.S. total population, a 50 percent decline for females and a 43 percent decline for males occurred between 1958 and 1987. In New Mexico over the same time period, 1958 to 1987, larger declines in age-adjusted ischemic heart disease mortality rates occurred for non-Hispanic white

Table 1
Mortality from Ischemic Heart Disease in New Mexico Males, 1958-1992
(Age Adjusted Rates per 100,000)

	Time Period													
	1958-1962	1963-1967	1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1958-1962	1963-1967	1968-1972	1973-1977	1978-1982	1983-1987	1988-1992
Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate
Hispanic	167.2	709	195.6	929	224.5	1,259	187.1	1,195	159.8	1,024	123.7	1,045	111.3	968
American Indian	95.0	67	74.4	58	101.7	99	98.4	105	76.6	84	65.0	99	68.0	119
Non-Hispanic White	301.1	2,632	302.5	3,296	318.9	3,681	282.5	3,775	231.4	3,361	158.2	3,057	145.3	2,877
U.S. White	461.2		501.2		443.8		395.4		352.9		260.7		216.5	

Table 2
Mortality from Ischemic Heart Disease in New Mexico Females, 1958–1992
(Age Adjusted Rates per 100,000)

	Time Period													
	1958–1962	1963–1967	1968–1972	1973–1977	1978–1982	1983–1987	1988–1992	1958–1962	1963–1967	1968–1972	1973–1977	1978–1982	1983–1987	1988–1992
	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths	Mortality Rate	Deaths
Hispanic	121.8	439	133.9	623	139.4	789	104.9	699	91.6	672	68.8	736	66.0	783
American Indian	44.8	26	63.0	35	59.2	52	39.4	42	28.3	36	27.6	51	29.5	67
Non-Hispanic White	142.9	1,281	123.0	1,562	142.2	2,137	127.4	2,269	109.8	2,219	79.5	2,374	73.0	2,344
U.S. White	261.5		279.1		234.3		205.7		184.1		131.8		114.1	

males than for either Hispanic or American Indian males, or for females of any ethnic group. We observed a 26 percent decline for Hispanic males, a 32 percent decline for American Indian males, and a 47 percent decline for non-Hispanic white males. For females in New Mexico, a 44 percent decline occurred in Hispanics, a 38 percent decline in American Indians, and a 44 percent decline in non-Hispanic whites.

In the last ten years of the thirty-five-year study period, clear differences in age-adjusted mortality rates among the three groups remained, and their relative ranking of ischemic heart disease mortality rates stayed the same compared with the earlier period, 1958–82 (with American Indians showing the lowest rates of all three groups, followed by Hispanics and then non-Hispanic whites). However, in the most recent five-year time period examined, 1988–92, mortality rates for American Indians of both sexes increased slightly. For 1988–92, American Indian males had an average annual age-adjusted mortality rate of 68.0 per 100,000, compared with a rate of 65.0 in the time period 1978–82, an increase of 5.0 percent ($p < .05$). In 1988–92, American Indian females had an age-adjusted mortality rate of 29.5 per 100,000, compared with a rate of 27.6 in the time period 1978–82, a 7.0 percent increase ($p < .05$).

DISCUSSION

Ischemic heart disease mortality rates in the United States have been declining since the 1960s.¹⁸ Rates in New Mexico have followed this trend, although they have varied widely between ethnic groups and sexes. This variation is comparable with differences seen in cerebrovascular disease mortality over the 1958–87 period.¹⁹

Few descriptive reports have addressed ischemic heart disease in American Indians. Welty and Coulehan²⁰ found the mortality rates from cardiovascular disease in American Indians/Alaska Natives to be 19 percent lower than the rate for the U.S. population as a whole but found that the mortality ratio varies widely from quite favorable to quite unfavorable in various regions of the United States. An increase in cardiac mortality has been noted in Alaska Natives in recent years.²¹ After controlling for age, sex, and diabetes, the incidence of fatal coronary heart disease in Pima Indians aged 50 to 79 years of age was found to be less than half

that found in the Framingham study population.²² However, since the 1970s, incidence of cardiovascular disease has been increasing among American Indians,²³ including the Navajo.²⁴

Adequate data are lacking regarding risk factors for ischemic heart disease in American Indians, although a report on risk factors among three geographically distinct native groups is forthcoming from the Strong Heart Study.²⁵ Differences between American Indians and the general U.S. population in the distributions of lipoproteins have been reported. In the Pima, total low-density lipoprotein (LDL) and high-density lipoprotein (HDL) cholesterol levels are lower than levels in non-Hispanic whites for most age groups, and serum triglyceride levels are higher.²⁶ In addition, total and LDL cholesterol levels do not increase with increasing age in Pima males.²⁷ Similarly, southwestern American Indians have been found to have a higher HDL to LDL ratio than non-American Indians.²⁸ Total serum cholesterol concentration among Navajo men is similar to that of the general population, as determined in the second National Health and Nutrition Examination Survey (NHANES II), although the small sample size for American Indians in that survey was very small and the data are suspect. Total cholesterol concentrations are similar in younger Navajo women and U.S. women, but are significantly lower in Navajo women over 55 than in U.S. women over 55.²⁹ Data from the Strong Heart Study³⁰ suggest that Arizona American Indians continue to have lower total cholesterol concentrations than the national mean and, additionally, show lower levels of total cholesterol among the Sioux and the Oklahoma tribes, compared with values for the U.S. population. High-density lipoprotein levels are also lower than U.S. levels for all races combined.

Tobacco use is prevalent in many tribes.³¹ Amount of smoking has variously been reported as less frequent or more frequent among southwestern American Indians than among other ethnic groups.³² A cross-sectional survey of Indian Health Service facilities showed a relatively low prevalence of hypertension among American Indians and Alaska Natives compared with other ethnic groups in the U.S.³³ Similar results were found in the Strong Heart Study.³⁴

Other risk factors for cardiovascular disease have been examined in American Indians. Rates of diabetes are extremely high among New Mexico's and other southwestern Indian tribes.³⁵ Incidence rates for Alaska Natives were lower than for the general population.³⁶ However, among the Chippewa (Ojibwa), Plains

Indian, Mohawk, and Choctaw populations, prevalence of diabetes was higher than in the U.S. population in general.³⁷ A recent report based on Indian Health Service data also shows high rates among American Indians from different geographic areas.³⁸ The prevalence of diabetes in the Navajo has been found to be lower than in some tribes but substantially higher than in the general U.S. population.³⁹ It has been suggested that the prevalence of diabetes among Navajo and other southwestern American Indian tribes may continue to rise.⁴⁰ In addition to diabetes as a major risk factor for ischemic heart disease in American Indians, the prevalence of obesity in American Indians/Alaska Natives is high and is increasing.⁴¹ Other risk factors for ischemic heart disease appear to be present among these populations, in particular among southwestern American Indians;⁴² however, ischemic heart disease mortality rates among southwestern American Indians remain far below rates that would be predicted by the risk factor data. In New Mexico, the recent increase in ischemic heart disease mortality rates we observed in American Indians may be due to Western influences that have resulted in changes in risk factor prevalence—such as cigarette smoking, diet, and sedentary lifestyle.⁴³ The increase may also be attributable to growing differences in access to health care—although the appropriate data for evaluating these hypotheses are not available.

We have discussed potential sources of error in our analysis of vital statistics in previous publications.⁴⁴ A significant shortcoming of our analysis is related to our combining all American Indians into one group and all Hispanics into one group. American Indians in this state consist of several distinct tribes, largely Navajo, Pueblo, Zuni, and Apache. Many Hispanics in New Mexico are of different ancestry from Hispanics in other parts of the country and even in other parts of the Southwest. New Mexico Hispanics trace their ancestry to original Spanish settlers and to more recent immigrants from Mexico.⁴⁵ In our analysis of mortality rates, we were unable to separate ethnic groups by tribe or by heritage; for American Indians, in particular, rate calculations subdivided in such a manner would be subject to wide fluctuations based on small numerators and denominators. Furthermore, many tribal health leaders may not want to have tribal-specific data presented.

An additional limitation concerns potential misclassification of mortality data in New Mexico. We have found that the ICD category “symptoms, signs, and ill-defined conditions” is listed as the cause of death more frequently in New Mexico than in the

U.S. population. This observation is particularly true in New Mexico's minority groups.⁴⁶

To determine whether additional misclassification in cardiovascular causes of death may affect our data, we examined percentages of deaths due to diseases of the circulatory system for New Mexico and for the United States. We examined the proportions of specific circulatory disease-related deaths in U.S. whites and non-Hispanic whites in New Mexico. In New Mexico from 1988 to 1992, 40 percent of circulatory deaths were ascribed to ischemic heart disease (ICD codes 410–414), and 41 percent of the deaths were attributed to other heart and circulatory disorders (ICD codes 399–400, 403–409, 415–429, and 439–459). In the United States, during the midpoint of the same five-year period, 55 percent of deaths were attributed to ischemic heart disease, and 27 percent were secondary to other heart and circulatory disorders. The percentages of other specific types of circulatory deaths in New Mexico were similar to those of the United States. We also looked at percentages of specific types of circulatory deaths in American Indians in the last two time periods, 1983–87 and 1988–92. For American Indians in New Mexico from 1983 to 1987, 26 percent of circulatory deaths were attributed to ischemic heart disease, and 49 percent to other heart and circulatory disorders. These percentages did not change in the most recent time period, 1988–92. Since the percentages were stable in American Indians in New Mexico over the last ten years, trends in misclassification do not account for the recent increase in ischemic heart disease mortality rates in this ethnic group.

In conclusion, our data on ischemic heart disease mortality in New Mexico showed clear differences among the state's principal ethnic populations, consistent with our previous analysis of vital data collected through 1982. Our data suggest that ischemic heart disease mortality rates have increased among American Indians in the most recent five-year period of our analysis, 1988–92. Collection of additional data on risk factors for ischemic heart disease among New Mexico's American Indians is warranted to help explain the recent increase in rates.

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