

Decreased Incidence of Hip Fracture in Hispanics, Asians, and Blacks: California Hospital Discharge Data

STUART L. SILVERMAN, MD, AND ROBERTA E. MADISON, DRPH

Abstract: We examined the incidence of hip fracture in Non-Hispanic White, Hispanic, Black, and Asian Americans for the years 1983 and 1984 using a data base which contains a summary of all hospitalizations for the State of California. We found a consistently lower risk for hip fracture after age 60 in Hispanic, Black, and Asian American females than in White females who were not Hispanic. Overall age-adjusted hip fracture rates in Hispanic, Black, and Asian females were 49.7, 57.3, and 85.4, respectively, and 140.7/100,000 in White females who were not Hispanic. These differences were not found in males, although Whites (not Hispanic) had the highest incidence of hip fractures among males. (*Am J Public Health* 1988; 78:1482-1483.)

Introduction

Hip fracture, a major outcome of osteoporosis, is a significant cause of disability and mortality in the United States.¹

There is relatively little published data on the incidence of hip fractures in ethnic groups. Previous epidemiologic studies have shown White females to have a twofold increased risk for hip fracture as compared to Black females² or Mexican Americans.³

Using a statewide hospital discharge data base for the State of California in the years 1983 and 1984, we estimate the incidence of hip fractures in four ethnic groups: Hispanics, Blacks, Asian Americans, and Whites who are not Hispanic.

Methods

The California Discharge Data Program under the administration of the California Health Facilities Commission maintains records of all hospital inpatient discharges from acute care hospitals in the State.⁴ The data base was complete for the years 1983 and 1984. Race was categorized as White, Black, Hispanic, native American/Eskimo, Asian, other, and unknown. There were 3,551,874 hospitalizations in 1983 and 3,538,094 in 1984. Hip fractures were identified by the principal diagnosis of either capsular or intertrochanteric fracture, ICDA-9 codes 820.0 to 820.9.⁵

Age-specific and age-adjusted hip fracture incidence rates were calculated specific for sex and ethnicity for 1983 and 1984, and then averaged. The 1983 and 1984 population in each ethnic group was estimated from data derived from the US Census for 1980⁶ and the Center for Continuing Study of the California Economy for 1985.⁷ Age-adjusted incidence rates were calculated using the total 1980 California population as the standard, with the 10-year intervals of age.

From the Rheumatology Division, Department of Medicine, UCLA; Wadsworth VA Medical Center, and the Department of Health Science, California State University, Northridge. Address requests for a reprint to Stuart L. Silverman, MD, 434 S. San Vicente Blvd., Suite 100, Los Angeles, CA 90048. This paper, submitted to the *Journal* November 2, 1987, was revised and accepted for publication April 22, 1988.

© 1988 American Journal of Public Health 0090-0036/88\$1.50

Results

In 1983, there were 17,556 hospital discharges for hip fractures in females, of which 16,898 occurred in White (not Hispanic), Hispanic, Black, and Asian females (143 were classified as American/Indian/other, and 515 as race unknown). Comparable figures in 1984 were 15,626 and 15,289 (134 American Indian/other, and 203 race unknown).

Age-adjusted and age-specific incidence rates of hip fracture within each ethnic group are shown in Table 1. White (not Hispanic) females had the highest age-adjusted rate at 140.7, while Hispanics, Blacks, and Asians were lower, at 49.7, 57.3, and 85.4, respectively. The incidence rate of hip fracture increased exponentially with age in all four ethnic groups.

In 1983, there were 5,914 hospital discharges for hip fractures in males. Of these, 5,729 occurred in White (not Hispanic), Hispanic, Black, and Asian males (40 were classified as American Indian/other, and 145 as race unknown). Comparable figures in 1984 were 5,292 and 5,185 (49 classified as American Indian/other, and 58 as race unknown).

Male hip fracture incidence rates within each ethnic group are shown in Table 2. White males (not Hispanic), like their female counterparts, have the highest age-adjusted incidence rates at 48.9/100,000, while Hispanics, Blacks, and Asians are lower at 22.2, 38.7, and 26.3, respectively. The rate of increase in incidence of hip fracture in males is initially less than that of females but beginning in the sixth decade there is a discontinuity with a rapid exponential increase thereafter. The hip fracture rate of Black males is similar to White males until the seventh decade. The hip fracture rate of Hispanic and Asian males remains consistently lower than White males in all decades.

The age-specific incidence rates for men are greater than those for women in the first five decades of life, with female-to-male ratios of 0.42 to 0.54. After age 60, the relationship reverses in all groups except Blacks, with female-to-male ratios varying from 11.7 to 2.3. By age 70, sex ratios are higher for females in all ethnic groups, ranging from 1.4 to 2.2. By the oldest ages, the incidence rate for men has increased sharply but still trails the incidence rate for women, with female-to-male ratios of 1.2 to 2.6.

Sex ratios based on age-adjusted overall rates of hip

TABLE 1—Hip Fracture Incidence Rates (hospital discharges/100,000 person years) among Females by Ethnic Group and Age (1983 and 1984 averaged)

Age (years)	Females			
	White (not Hispanic)	Hispanic	Black	Asian
<50	6.2	2.6	5.3	2.7
50-59	65.3	15.7	35.2	17.4
60-69	212.9	59.6	80.7	91.8
70-79	726.0	246.0	267.8	321.6
80+	2502.3	958.7	988.8	1912.7
TOTAL	140.7	49.7	57.3	85.4

TABLE 2—Hip Fracture Incidence Rates (hospital discharges/100,000 person years) among Males by Ethnic Group and Age (1983 and 1984 averaged)

Age (years)	Males			
	White (not Hispanic)	Hispanic	Black	Asian
<50	11.5	5.6	12.4	6.3
50–59	37.3	15.0	46.4	16.4
60–69	91.5	34.3	83.6	49.1
70–79	334.1	145.9	189.2	155.0
80+	1209.6	595.1	816.4	738.7
TOTAL	48.9	22.2	38.7	26.3

fracture were highest in Non-Hispanic Whites and Asians (2.9 and 3.3, respectively) and lower in Hispanics and Blacks (2.2 and 1.5, respectively).

Discussion

Our estimated incidence rates were subject to errors of ascertainment of the number of cases (the numerator) as well as the total susceptible population (the denominator). The number of cases may have been under- or overestimated by misclassification of disease or ethnicity. Although general validity studies have been done by the State of California, the investigators were unable to validate the specific ICDA codes used in this study due to the confidential nature of the data base.

Significant errors in ascertainment of ethnicity of individual cases may occur. In 1983, 3 per cent of hip fracture cases had unknown ethnicity (1.3 per cent in 1984).⁴

The number of cases would be underestimated if patients were treated outside of a hospital, but such events are rare since hip fracture usually necessitates hospitalization.

The number of cases may have been overestimated due to readmissions or admissions due to a second fracture in the same year. Readmission is possible but the ICDA code for principal diagnosis should specify a complication of the fracture or operative intervention. Previous studies have found the incidence rate of second hip fracture to be 9 per cent in a 10-year period.⁸ This suggests that refracture would increase the incidence rate at less than 1 per cent per year in patients with prior fracture.

Some errors in the estimation of the total susceptible populations probably occurred. In this study, the likely effect of underestimation of the denominators would be to decrease

differences between Whites and other ethnic groups. Thus, our estimates of ethnic differences may be underestimated.

Risk factors for hip fracture include dietary intake,⁹ reproductive history,⁹ anthropometric data,⁹ and bone-mineral content.^{9,10} We observed striking differences between ethnic groups in their incidence rates of hip fracture. However, some of these known risk factors cannot easily explain these ethnic differences. Hispanics have a lower dietary intake of calcium than Whites¹¹ but a lower rate of hip fracture. Asians have lower bone mineral content than Whites,¹² yet Asians in our study had a decreased risk. The time of menopause is similar in all ethnic groups.¹³

We conclude that both male and female Hispanics, Blacks, and Asians have lower risks of hip fracture than do Whites who are not Hispanic. Further studies are needed to define differences in risk factors between these ethnic groups. Information concerning differences in hip fracture rate and risk factors may be helpful in designing prevention strategies for different ethnic groups.

ACKNOWLEDGMENT

The authors are grateful to the State of California for use of the data tapes of the California Hospital Discharge Data Program.

REFERENCES

1. Miller CW: Survival and ambulation following hip fracture. *J Bone Joint Surg (Am)* 1978; OA:930-934.
2. Farmer ME, White LR, Brody JA, *et al*: Race and sex differences in hip fracture incidence. *Clin Orthop* 1982; 162:144-149.
3. Bauer R: Ethnic differences in hip fracture: A reduced incidence in Mexican Americans. *Am J Epidemiol* 1988; 127:145-149.
4. California Discharge Data Program (administered by the California Health Commission): Magnetic tape data base available by purchase from the Commission, Sacramento, California.
5. US Dept of Health and Human Services, Health Care Financing Administration, 2nd. Ed. *International Classification of Diseases, 9th Rev. Clinical Modification*. Washington, DC: DHHS, 1980.
6. US Bureau of the Census: *Census of the Population, 1980*. Washington, DC: Govt Printing Office, 1983.
7. Center for Continuing Study of the California Economy, Palo Alto, CA, 1986.
8. Gallagher JC, Melton LJ, Rieggs BL, Bergstrath E: Epidemiology of fractures of the proximal femur in Rochester, Minnesota. *Clin Orthop* 1980; 150:163-171.
9. Cummings SR, Kelsey JL, Nevitt MC, O'Dowd KJ: Epidemiology of osteoporosis and osteoporotic fractures. *Epidemiol Rev* 1985; 7:178-207.
10. Melton LJ, Wahner HW, Richelson LS, O'Fallon WM, Riggs BL: Osteoporosis and the risk of hip fracture. *Am J Epidemiol* 1986; 124:254-261.
11. Haffner SM, Stern MP, Hazuda HP, *et al*: The role of behavioral variables and fat patterning in explaining ethnic differences in serum lipids and lipoproteins. *Am J Epidemiol* 1986; 123:830-839.
12. Yano K, Wasnich R, Vogel JM, Heilbrum LK: Bone mineral measurements among middle-aged and elderly Japanese residents in Hawaii. *Am J Epidemiol* 1984; 119:751-764.
13. Stanford JL, Hartge P, Brinton LA, Hoover RN, Brookmeyer R: Factors influencing the age at natural menopause. *J Chronic Dis* 1987; 40:995-1002.