scene of the assaults, or to explore social and psychic trauma. Nevertheless, the data we describe provide a basis for future studies on the effect of preventive measures and hold implications for public policy.

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Hypertension Prevalence among Penobscot Indians of Indian Island, Maine

RONALD D. DEPREZ, PHD, MPH, ELIZABETH MILLER, MPH, AND SUZANNE K. HART, MA

Abstract: Prevalence of hypertension, measured on a random sample of Penobscot Indian adults on reservation in Maine, was 23 per cent. Only 50 per cent of the hypertensive Penobscots were aware of their condition. Among those treated with antihypertensive medications, 56 per cent were controlled. When compared to a statewide sample of Maine adults, the prevalence of hypertension among Penobscots was similar but awareness was significantly lower. (*Am J Public Health* 1985; 75:653–654.)

Introduction

Studies of hypertension among American Indians have shown a wide variance of prevalence rates among tribes.[1–7] Comparability is difficult, however, due to varying methods of selecting subjects, differences in measuring blood pressure, and definitions of hypertension. Nevertheless, the prevalence of hypertension in many Indian tribes is generally lower than that of the White United States population, and blood pressure does not seem to rise uniformly with age in Indians as with Whites.

To add to the knowledge of hypertension in northeast Indians, a hypertension prevalence study among Penobscot reservation Indians was undertaken in 1981 in Maine. Results of this study are compared to results of a similar survey of Maine adults, 97 per cent of whom are White.

Methods

The Penobscot Indian data are based on information collected from a sample of adult Penobscots aged 18 and older living on reservation at Indian Island, Maine in 1981. Households were randomly selected and all adults living in the selected households were eligible. A total of 68 households was selected from a total of 149 households on the reservation. Interviews were completed with 103 of the 288 adult Indians living on the reservation (interview completion rate 88 per cent). Complete blood pressure readings were not available on three of the 103 respondents.

Data on the statewide prevalence of hypertension are based on a complex sample survey of adults using a disproportionately stratified multi-stage random sample of 770 enumerated Maine households in 1980–81.[8] The survey instrument, blood pressure protocols, and measures computed were identical for each survey. Blood pressure was measured three times during each interview. The blood pressures reported in this study are the mean of the second and third measurements. Standard definitions of hypertension prevalence, awareness, treatment, and control are used to compare the two populations.*

Relative weight was estimated by dividing each respondent's self-reported weight by the US median weight for persons in the same age-sex and height groupings.[9] Respondents were then grouped into one of three categories: 1) *low,* more than 10 per cent under median body weight; 2) *normal,* or within 10 per cent mean body weight; and 3) *heavy,* more than 10 per cent over median body weight. Thirty-five per cent of the Penobscot Indian respondents were in the heavy group and 14 per cent were in the low group. Statewide, 23 per cent of residents were in the heavy group, 31 per cent in the low group. Thus, Indians tended to be heavier compared to the non-Indian Maine residents.

Results

Prevalence

The estimated crude prevalence of hypertension was 26 per cent for the Indian Island population and 24 per cent for the statewide population. The age- and sex-adjusted prevalence estimates for Indian and statewide survey respondents were identical, 23 per cent for each (Table 1).

Prevalence did not vary by age or sex among Indians

Address reprint requests to Ronald D. Deprez, PhD, MPH, Director, Division of Research and Evaluation, Medical Care Development, Inc., 11 Parkwood Drive, Augusta, ME 04330. Ms. Miller is Project Director and Ms. Hart is Data Analyst, both with the Hypertension Control Project at Medical Care Development. This paper, submitted to the Journal April 10, 1984, was revised and accepted for publication January 28, 1985.

**Definitions:*

Hypertension Prevalence—Mean diastolic blood pressure (DBP ≥90 mm Hg or on hypertensive medication.

Awareness—Response to the question "Have you ever been told by a doctor you have high blood pressure?"

Treatment—Response to the question asked of aware hypertensives. "Are you now taking medicine for high blood pressure?"

Control—Currently taking antihypertensive medication with a DBP <90 mm Hg.

TABLE 1—Prevalence, Awareness, Treatment, and Control of Hypertension, Maine Statewide and Penobscot Indian Reservation Surveys

Indicator	Statewide Survey (N = 1229)		Penobscot Reservation Survey (N = 100)		Z p (Z)*
Hypertensive**	(294)	23	(26)	23	—
Aware hypertensive	(222)	75	(13)	50	2.469 (.007)
Aware, treated, hypertensive	(187)	85	(9)	69	1.226 (.111)
Aware, treated, controlled	(150)	80	(5)	56	1.428 (.076)

*one tailed test.
**age- and sex-adjusted to 1980 Census Population.
SOURCE: Medical Care Development, Inc.

surveyed, but the sample is small. In the statewide survey, prevalence increased with age but varied little by sex.

Increases in relative weight and hypertension prevalence were not observed among the Penobscot Indian sample but were observed in the statewide sample.

Awareness, Treatment, and Control

Disease awareness among hypertensives in the Indian sample was significantly lower than among hypertensives in the statewide sample, but treatment status among aware hypertensives was similar for both hypertensive populations. Awareness varied by sex among hypertensive Indian and statewide respondents (42 per cent males to 52 per cent females, and 66 per cent males to 83 per cent females, respectively).

Of the nine Indian hypertensive respondents on medication, five (56 per cent) were controlled (DBP <90 mm Hg). This control rate was lower than that observed in the statewide sample where 80 per cent of the hypertensives on medication were controlled.

Multiple linear regression was conducted to determine the concurrent effects of age, sex, and relative weight on DBP for each sample. All three factors were significant for the statewide sample but explained only 15 per cent of the variation in DBP. However, for the Indian sample, none of the three factors reached significance.

Discussion

Awareness and control of high blood pressure in the American public has improved dramatically in the past decade. However, the Penobscot Indians do not seem to have shared in this progress. Low awareness rates in a population suggests a lack of hypertension detection opportunities in medical and community settings. Yet, for several years, the Island has had a federally funded free health clinic whose protocols require that blood pressure be taken on all patients regardless of the reason for the visit. Perhaps not enough of the high-risk population go to the clinic for medical attention. Prior to the study community screening programs were not operative.

DeStefano, *et al*,[5] reported in 1979 that of 640 reservation Navajo Indians aged 19+ in northeastern Arizona and northwestern New Mexico, 17 per cent were hypertensive when defined as having a DBP ≥90 mm Hg. The comparable rate among Penobscot Indians was 21 per cent. In addition, DeStefano reported that 53 per cent of the hypertensive Navajos had previous knowledge of their high blood pressure, which is comparable to 50 per cent of the hypertensive Penobscots.

Health Center staff cite nutritional habits rather than medication compliance behavior as the principal factor in poor control. Penobscots consume large quantities of high sodium foods, such as salted fish, and processed convenience foods, which have been shown to modify the effects of antihypertensive medications.[10] Also, alcoholism and diabetes, prevalent medical problems among native Americans,[11–14] can complicate the control of hypertension in those individuals with multiple diseases.

Poor physician-patient relationships can be a factor in poor control among some treated Indian hypertensives and are a critical factor in the maintenance of long-term chronic disease therapy.[15] Although most of the staff at the Health Center are Indian, the physicians have always been non-Indian. These ethnic differences can compromise the communication between the physician and Indian patients and ultimately affect patient compliance with medical regimens.

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