

Michele Casper, PhD
Steve Rith-Najarian, MD
Janet Croft, PhD
Wayne Giles, MD MPH
Ralph Donehoo, BA MPH

Four of the authors are with the Division of Chronic Disease Control and Community Intervention, Center for Chronic Disease Control and Health Promotion, Centers for Disease Control and Prevention. Dr. Casper is an Epidemiologist, Dr. Croft is an Epidemiologist, Dr. Giles is a Medical Officer, and Mr. Donehoo is a Statistician. Dr. Rith-Najarian is a Diabetes Control Officer for the Indian Health Service, Bemidji Area Office.

Teasheet requests to Dr. Michele Casper, Centers for Disease Control and Prevention, Mailstop K47, 4770 Buford Highway, Atlanta, GA 30341-3724; tel. 404-488-5529; fax 404-488-5486.

Blood Pressure, Diabetes, and Body Mass Index among Chippewa and Menominee Indians: The Inter-Tribal Heart Project Preliminary Data

SYNOPSIS

THE HEART DISEASE MORTALITY RATES of the Chippewa and Menominee, who reside in the upper Midwest, are higher than the rates of most other tribes in the United States. Little is known, however, about the prevalence of hypertension, diabetes, and obesity among these communities. The Inter-Tribal Heart Project (ITHP) was designed to determine the prevalence of risk factors for heart disease and to implement community-based heart disease prevention programs.

Age-stratified random samples of active users of the tribal-Indian Health Service (IHS) clinics, ages 25 and older, were drawn from three communities within the Bemidji Service Area. Between September 1992 and June 1994, 1396 people completed an extensive questionnaire and underwent a physical exam for heart disease risk factors.

Preliminary data indicate mean blood pressure levels of 126 mmHg for systolic blood pressure (SBP) and 74.4 mmHg for diastolic blood pressure (DBP). Mean SBP and DBP were higher among men than women. Mean body mass index (BMI), which did not vary by gender, was 30.6 mmHg. The prevalence of hypertension was 33%; and diabetes, 33%. Men had a higher prevalence of hypertension than women, but there was little gender difference in the prevalence of diabetes.

These preliminary data suggest that the prevalences of hypertension, diabetes, and obesity in these communities are higher than the recent estimates for the total United States. The next stage of the ITHP will focus on policies and programs to prevent and treat these conditions.

Hearth disease has become the leading cause of death among Native Americans in recent years (1). The Bemidji Service Area, where the Chippewa, Menominee, and other related tribes reside, has one of the highest heart disease mortality rates of the 12 Indian Health Service (IHS) Areas (1). This area encompasses Minnesota, Wisconsin, and Michigan.

Hypertension, diabetes, and obesity are important risk factors for heart disease; however, very little is known about the prevalence of these risk factors among the tribal communities in the Bemidji Service Area.

Table 1. Mean blood pressures and body mass index by age group and gender: Inter-Tribal Heart Project preliminary data

Sex	n	Systolic Blood Pressure		Diastolic Blood Pressure		Body Mass Index	
		Mean	s	Mean	s	Mean	s
Age							
25-44	386	117.7	13.5	73.9	11.4	30.2	10.0
45-64	432	128.2	17.0	77.4	10.2	31.0	5.5
65+	161	142.6	21.3	74.0	10.5	31.1	9.8
Gender							
Women	600	124.1	19.1	72.7	10.3	30.8	8.5
Men	381	130.1	17.4	79.7	10.3	30.4	10.3
Total	981	126.0	18.7	75.4	10.8	30.6	9.3

Examination of the patterns of these risk factors will provide important information for improving the cardiovascular health profile of the people in these communities via community-based and clinic-based prevention activities.

The ITHP, a partnership of three tribal communities from the Bemidji Service Area, the Centers for Disease Control and Prevention, and the IHS, was designed to determine the prevalence of risk factors for heart disease and to implement community-based heart disease prevention programs.

Methods

The Inter-Tribal Heart Project (ITHP) is a two-phase project. During the first phase, we administered a questionnaire and physical examination to obtain data on selected risk factors for heart disease among three tribal communities within the Bemidji Service Area. During the second phase, community members are encouraged to participate in the design and implementation of health promotion activities and policies to prevent heart disease. Two Chippewa reservations in Minnesota (Red Lake and White Earth) and the Menominee reservation in Wisconsin are participating in the ITHP.

We identified participants in the ITHP survey of heart disease risk factors by drawing age-stratified random samples of 850 active users of the tribal-IHS clinics, ages 25 and older, for each reservation. Between September 1992 and May 1994 we conducted interviews and examinations.

Local ITHP coordinators and community members provided extensive input for the design of the questionnaire and physical examination. The questionnaire covered topics such as medical history, access to health care, tobacco use, hypertension, diabetes, cholesterol, physical activity, and dietary habits. The physical examination included anthropometric measurements; assessment of blood pressure; and laboratory measurements of serum glucose, insulin, and lipids. We administered a 2-hour oral glucose tolerance test to participants with fasting blood glucose <225 mg/dl and not taking medication for diabetes.

Protocols for measuring blood pressure included the following: After participants had been seated for five minutes, we recorded three consecutive measurements, using an appropriate size cuff on the right arm, the bell of a standard stethoscope, and a Baum mercury sphygmomanometer. Measurements included the first and fifth phases of the Korotkoff sounds. We used the mean of the last two measurements to estimate blood pressure.

Hypertension was defined as systolic blood pressure (SBP) ≥140 mmHg, diastolic blood pressure (DBP) ≥90 mmHg, or currently taking antihypertensive medication. Diabetes was defined as fasting glucose ≥140 mg/dl, a 2-hour glucose ≥200 mg/dl after a 75-gram oral glucose tolerance test, or taking medication for diabetes.

Trained interviewers measured height (with shoes removed) to the nearest centimeter with a vertical mounted ruler. They measured each participant, who wore light clothing and no shoes, to the nearest kilogram

Table 2. Prevalence of hypertension and diabetes according to hypertensive and diabetic status: Inter-Tribal Heart Project preliminary data

	Prevalence of Hypertension				Prevalence of Diabetes			
	Total Population		Diabetics		Total Population		Hypertensives	
	%	n	%	n	%	n	%	n
Age								
25-44	16	61	31	8	10	26	21	8
45-64	37	157	49	45	34	93	47	45
65+	62	98	67	37	56	58	61	37
Gender								
Women	29	171	49	51	29	109	44	51
Men	39	146	58	39	27	68	47	39
Total	33	317	52	90	28	177	46	90

of weight with a zero calibrated Detecto scale. Body mass index (BMI) (kilograms/meters²) was calculated for each participant.

Results

Preliminary analysis of the first 981 of 1500 anticipated participants shows most ITHP participants to be between the ages of 45 and 64 (44%), followed by ages 25 to 44 (40%) and ages 65 plus (17%). Sixty-one percent of the participants are women.

Mean SBP increases monotonically with age group (Table 1). Mean DBP increases from the youngest age group to the middle age group and decreases slightly for the age group 65 plus. Similar patterns in mean blood pressure by age group were observed for both women and men. Mean values for BMI did not differ with age. Mean SBP and DBP are both higher among men compared to women, while mean BMI values are very similar for women and men.

Prevalences of hypertension and diabetes increased dramatically with successive age groups (Table 2). While hypertension prevalence is higher among men, there is little gender difference in prevalence of diabetes. For each of the age and gender groups, participants with diabetes had substantially higher prevalences of hypertension compared to the total sample. Similarly, participants with hypertension showed higher prevalences of diabetes compared to the total sample.

Discussion

These preliminary data for the three communities of the ITHP suggest that while the age-group and gender-specific patterns of blood pressure and diabetes are similar to those reported for the United States, the prevalences of hypertension and diabetes are higher than the U.S. estimates (2-4).

The level of mean SBP and the rise with increasing age group are similar to that reported for the Second National Health and Nutrition Examination Survey (NHANES II) (4). The level of mean DBP is somewhat lower than observed in NHANES II; however, we noted a pattern of a rise followed by either a slight plateau or decrease with increasing age group for other populations (4). The mean level of BMI among ITHP participants was considerably higher than that observed for white adults and black adults in NHANES II (5).

Several researchers have noted the coexistence of hypertension and diabetes in several studies (6-9). The clustering of diabetes and hypertension, as well as the high mean values for BMI, indicate that a relatively large proportion of the people in these communities are at increased risk of developing heart disease or experiencing a stroke.

These preliminary data suggest that a full spectrum of policies and programs directed at the primary prevention of heart disease and assurance of quality health care are warranted in these communities. Because of the high prevalence of diabetes and increased prevalence of hypertension among people with diabetes, primary prevention of these risk factors demands special attention.

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