

# ETHNIC DIFFERENCES IN VASOMOTOR SYMPTOMS AND BLOOD PRESSURE DURING MENOPAUSE

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Menopause, or the period of time following the female amenorrhea usually occurring during the ages of 45–55 years, has long been suspect for its role in female hypertension and cardiovascular disease (CVD). Loss of estrogen and other hormones during this period of change often presents symptoms that range from mere inconveniences, such as bloating, headaches, and mood swings, to those that present serious long-term health risks, such as osteoporosis, breast cancer, and CVD. Symptoms such as hot flashes, which may cause temporary vasodilation and, consequently, irregularities in blood pressure (BP) and long-term hypertension, may be hazardous to cardiovascular health. As a continuation of the previous year's work and part of the larger-ranging Hilo Women's Health Study, we sought to evaluate the effects of symptoms such as hot flashes on BP and thus predict whether the severity of hot flashes during the menopausal stage will prove to be a determining factor in future BP and cardiovascular health. By using a random postal sample in the uniquely multiethnic community of Hilo, we also hoped to gain a better profile of the menopausal population and better examine ethnic differences in symptom reporting than other previous studies, which may have focused primarily on symptomatic White samples. Through an ambulatory phase measuring blood pressure, objective (skin conductance recorded at sternal and back sites) and subjective hot flashes (recorded in a participant diary), mood, activity, and various other data, we examined the interrelationship between such symptoms and their physiological effects.

## INTRODUCTION

Ethnic differences in the prevalence of hypertension (HT) and stroke have been especially evident among some of the United States' most common minorities, including African Americans, Hispanics, and Japanese Americans. Though data detailing the risk of Japanese Americans for cardiovascular disease (CVD) and HT is scarce, existent study results suggest that Japanese Americans tend to have higher blood pressure than white Americans and are at a marginally higher risk for HT when compared with Whites. Japanese Americans in Hawaii have also been found to be at significantly higher risk for HT and CVD than Japanese in Japan, suggesting the existence of harmful changes in culture and lifestyle inherent to Westernization.

Doubly at risk for hypertension and cardiovascular disease, however, are perimenopausal and postmenopausal minority women. Due to a variety of risk factors caused by the loss of estrogen, including increased vasomotor activity, arterial hardening, and changes in adiposity distribution, menopausal women are at increased risk for HT, CVD, and their accompanying complications.

In previous symptom-based menopausal studies, Japanese and Japanese Americans have reported a much lower rate of hot flashes during menopause than any other ethnic group. By measuring objective hot flashes as well as reported hot flashes, our study investigates this to determine whether this is a result of cultural restrictions against complaint, physiological fact, or a combination of both.

Previous studies on the menopausal population have primarily concentrated

on symptomatic samples from hospitals or overwhelmingly White samples. With a random, multiethnic sample from the town of Hilo, Hawaii, our study seeks to unravel the mystery of the connection between menopause, vasomotor symptoms, and BP.

## METHODS

### Participant selection

Subjects were selected from responders of a random postal survey in the community of Hilo, as well as being recruited through the use of snowballing brochures and newspaper ads. Participants were limited to those who were normotensive, not on hormone replacement therapy or BP medication, had not had a hysterectomy, and were between the ages of 45 and 55.

### Ambulatory hookup

During the initial ambulatory phase of the study, participants were monitored with a Spacelabs 90207 ambulatory BP monitor (Spacelabs Healthcare, Issaquah, WA) measuring BP every twenty minutes during wake time and every 30 minutes during sleep. Additional subjective information was obtained through the use of a participant diary, in which time, BP, mood, location, position, activity, and any hot flashes were reported during waking hours of a 24-hour period while participants were monitored.

### Hot flash monitoring

A Biolog hot flash monitor (UFI, Morro Bay, CA) measured skin conductance on sternal and nuccal sites, two of the most common sites of hot flashes in menopausal women. As defined in similar studies measuring

hot flashes through skin conductance, increases of 2  $\mu$ ohms or more in skin conductance over a 45 second period, with a lockout time of 20 minutes, were considered an objectively measured hot flash, while buttons pushed on the device by the participant to indicate a hot flash were considered subjective hot flashes.

The Hilo Women's Health Study has been approved by an IRB at the University of Hawaii and is funded by a grant from MBRS, NIGMS.

### Statistics

All statistics were computed using SPSS 13. Individual BP readings along with diary information was compounded into a database for analysis, with one case for each reading. Subjective and objective hot flash times were also entered, and each case specified whether a hot flash had occurred within the last 5 or 20 minutes.

BP data were computed into *z*-scores, split by individual participant, to control for between-subjects effects. Two-tailed *t* tests were used for analysis of BP differences between ethnic groups (Japanese and all else) when hot flashes were experienced within the last 5 or 20 minutes. One-way ANOVAs controlled for confounding factors that may have affected BP readings, including location, position, and mood.

When analyzing subjective hot flashes, all measurements taken during sleep were eliminated, since no reported hot flash information was provided during

sleep. Analyses including objective hot flashes were done both including and excluding sleep, since objective data from the Biolog was available throughout the 24-hour period.

Two participants did not complete the ambulatory phase and several more removed the BP cuff during sleep, for which no information about BP during sleep was obtained. The use of a random postal survey and subsequent snowballing ensured that the great majority of the sample was selected randomly.

### RESULTS

While objective hot flashes (HFs) caused a highly significant increase in SBP and DBP, subjective HFs caused virtually no change. Negative mood also caused a significant rise in BP. Japanese Americans generally experienced a much less significant change in BP when experiencing a HF than in women of other ethnicities, but experienced a much greater spike in BP when experiencing a negative mood.

### DISCUSSION

Because the BP of Japanese American women is much less reactive when a HF is experienced but more reactive when negative moods are felt, their BP may be more reactive to psychological/emotional factors rather than physio-

logical changes. Further studies to confirm and expand upon this will be necessary, as well as more complete analyses with a larger sample size upon the completion of the Hilo Women's Health Study. A future longitudinal study continuing the Hilo Women's Health Study to connect bone density, menopause, BP, and hot flashes is currently being planned.

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