Published in final edited form as:
Climacteric. 2010 December ; 13(6): 534–543. doi:10.3109/13697131003592713.

The relationship between psychosocial status, acculturation and country of origin in mid-life Hispanic women: data from the Study of Women's Health Across the Nation (SWAN)

R. Green, **N. F. Santoro**, **A. P. McGinn**[*], **R. P. Wildman**[*], **C. A. Derby**[*,†], **A. J. Polotsky**, and **G. Weiss**[‡]

Department of Obstetrics, Gynecology & Women's Health, Albert Einstein College of Medicine/ Montefiore Medical Center, New York

[*]Department of Epidemiology and Population Health, Albert Einstein College of Medicine/ Montefiore Medical Center, New York

[†]Department of Neurology, Albert Einstein College of Medicine/Montefiore Medical Center, New York

[‡]Department of Obstetrics, Gynecology & Women's Health, UMDNJ-New Jersey Medical School, New York, USA

Abstract

Method—To test the hypothesis that psychosocial symptomatology differs by country of origin and acculturation among Hispanic women, we examined 419 women, aged 42–52 years at baseline, enrolled in the New Jersey site of the Study of Women's Health Across the Nation (SWAN). Women were categorized into six groups: Central (CA, $n = 29$) or South American (SA, $n = 106$), Puerto Rican (PR, $n = 56$), Dominican (D, $n = 42$), Cuban (Cu, $n = 44$) and non-Hispanic Caucasian (NHC, $n = 142$). Acculturation, depressive symptoms, hostility/cynicism, mistreatment/ discrimination, sleep quality, social support, and perceived stress were assessed at baseline. Physical functioning, trait anxiety and anger were assessed at the fourth annual follow-up. Comparisons between Hispanic and non-Hispanic Caucasians used χ^2, *t* test or nonparametric alternatives; ANOVA or Kruskal–Wallis testing examined differences among the five Hispanic sub-groups. Multivariable regression models used PR women as the reference group.

Results—Hispanic women were overall less educated, less acculturated ($p < 0.001$ for both) and reported more depressive symptoms, cynicism, perceived stress, and *less* mistreatment/ discrimination than NHCs. Along with D women, PR women reported worse sleep than Cu women ($p < 0.01$) and more trait anxiety than SA and Cu women ($p < 0.01$). Yet, PR women were most acculturated (21.4% highly acculturated vs. CA (0.0%), D (4.8%), SA (4.8%) and Cu (2.3%) women; $p < 0.001$). In regression models, PR women reported depressive symptoms more frequently than D, Cu, or SA women, and reported trait anxiety more frequently than Cu or SA women. Greater acculturation was associated with more favorable psychosocial status, but PR ethnicity was negatively related to psychosocial status.

Conclusion—Psychosocial symptomatology among Hispanic women differs by country of origin and the relatively adverse profile of Puerto Rican women is not explained by acculturation.

Correspondence: Dr R. Green, Department of Obstetrics, Gynecology & Women's Health, Albert Einstein College of Medicine, 1300 Morris Park Avenue, Mazer 314, Bronx, NY 10461, USA.

Conflict of interest The authors report no conflict of interest. The authors alone are responsible for the content and writing of the paper.

Keywords

MENOPAUSE; WOMEN; HISPANIC; ACCULTURATION; PSYCHOLOGY

INTRODUCTION

Hispanics are the fastest growing ethnic group within the US population[1]. Within Hispanic communities, country of origin may play a role in influencing health outcomes. For example, Puerto Rican women are at higher risk for low birth weight deliveries compared to other Latinas[2]. Another study found that country of origin was an important predictor of vulnerability to postpartum depression, with Puerto Rican ancestry being associated with the highest risk[3]. The reasons for these differences among immigrant Hispanic women have many potential origins. These include educational background, family structure and income. Relatively little is known about the relative contributions of these individual, culturally determined factors to health outcomes.

Many Spanish-speaking countries have given rise to waves of recent immigration and, when combined with long-standing populations of Hispanics, there is a wide range of acculturation within the US Hispanic population. Acculturation in the sense described herein refers to the progressive acquisition of traditional and non-traditional American values and behaviors by immigrant ethnic groups[4]. It carries with it both positive[5,6] and negative[7,8] associations with a variety of health outcomes. On the one hand, increased acculturation may allow improved access to health care and education, thereby improving perinatal outcomes for Hispanic women despite relative poverty[5,6]. On the other hand, exposure to the dominant culture appears to adversely influence some populations of Hispanic women, leading them to drink more alcohol[9,10], smoke cigarettes more frequently[10,11], initiate sexual activity at a relatively earlier age and experience more premarital childbirth[7,8].

Acculturation to the dominant US culture is believed to play a role in perceived health and vulnerability to adverse psychological symptoms and unhealthful social behaviors, but the reported relationships are complex. Mid-life Hispanic women in the Study of Women's Health Across the Nation (SWAN), who are dramatically less acculturated than the other ethnic groups, reported more bodily pain and less effective social functioning than non-Hispanic women[12]. On the other hand, other outcomes such as depression have been observed to be more frequent among more acculturated Hispanics – in some cases attributed to discrimination[13]. Thus, a combination of vulnerabilities and exposures appears to influence outcomes when examined as a function of acculturation.

The aims of the study were to assess relationships between acculturation, country of origin and psychosocial symptoms in mid-life Hispanic women enrolled in the SWAN study. We hypothesized that psychosocial symptoms would vary by country of origin. Our secondary hypothesis was that acculturation would be inversely related to worse symptomatology.

METHODS

Study participants

We performed a cross-sectional assessment of the relationships between psychosocial symptoms, acculturation, and Hispanic ethnicity, utilizing data from women enrolled at the Newark, New Jersey (NJ) site of SWAN. SWAN is a multi-center, multiethnic, longitudinal study designed to characterize the biological and psychosocial changes that occur during the menopausal transition in a community-based sample. Details of the study design and recruitment have been previously published[14]. Briefly, SWAN is being conducted at the

following seven sites, each of which recruited women from one race-ethnic background (African American, Hispanic, Japanese, or Chinese) and non-Hispanic Caucasian women as a control group: Boston, Chicago, the Detroit area, Los Angeles, Newark, NJ, Pittsburgh, PA and Oakland, CA. A total of 3302 women were enrolled from 1996 to 1997 into the national cohort. At enrolment, women were required to have an intact uterus and at least one ovary, were not pregnant or breastfeeding, and were between 42 and 52 years of age. All participants were still menstruating, and women using oral contraceptives or hormone replacement therapy within the previous 3 months were excluded.

The Newark, NJ site is the only site that recruited Hispanic women. A total of 420 women (278 Hispanic, 142 non-Hispanic Caucasian) were enrolled from Hudson County, NJ using random digit dialing and snowball sampling (asking ineligible women to provide the names of up to five other women within the eligible age range and living in the Hudson county target areas). Census tracts containing higher than average densities of Hispanic households were oversampled. Women were asked to designate their primary race-ethnicity from among the following choices: (1) Black/African American, (2) Puerto Rican, (3) Mexican or Mexican American, (4) Dominican, (5) Central American, (6) Cuban or Cuban American, (7) South American, Spanish, or other Hispanic, (8) Chinese or Chinese American, (9) Japanese or Japanese American, (10) Caucasian/white non-Hispanic (European descent), (11) other, specify, or (12) no primary affiliation/mixed. Women at the Newark site who identified themselves as Puerto Rican (n = 56), Dominican (n = 42), Central American (n = 29), Cuban (n = 44), South American (n = 106), Mexican (n = 1), or non-Hispanic Caucasian (n = 142) were eligible for enrollment[14]. The current analyses use data from 277 Hispanic and 142 non-Hispanic women from the baseline SWAN visit for all but a few psychosocial factors which were measured beginning at the fourth follow-up visit (see below). The study was approved by the institutional review board of the New Jersey Medical School and all women signed informed consent prior to participation.

We use the term `psychosocial status' to define overall performance on a variety of psychological and social symptom scales that are thought to reflect both inner, psychological perceptions and outward, social expression of these perceptions (behaviors). Psychosocial symptoms were assessed in several domains. These included depressive symptoms, anxiety symptoms, cynicism and hostility, sleep, social support, perceived stress, and functional status. All were examined with respect to acculturation, per our main, *a priori* hypothesis. A possible explanatory variable, perception of discrimination/mistreatment (which may be related to acculturation), was also included.

Psychosocial measures

This is a cross-sectional analysis relating demographic/acculturation factors to outcomes in which some measures were assessed at baseline and some were added at the fourth follow-up visit.

Baseline measures—The following measures were obtained at baseline for all women in the NJ site. Depressive symptoms were assessed with the Center for Epidemiological Studies Depression (CES-D) scale, a well-validated 20-item scale with four-level responses indicating frequency of experiencing each symptom in the past week[15]. Each question had a four-level response; thus the total score could range from 0 to 60. The CES-D was dichotomized such that a score of 16 or above defined the presence of depressive symptomatology, but not the diagnosis of depression. This measure has been shown to correlate well with other depressive symptom questionnaires and with diagnostic interviews that assess severity of depression[16].

Cynicism was measured at the baseline visit with a subscale of the Cooke–Medley Questionnaire consisting of 13 items with a true/false response option, with scores ranges from 0 to 13[17].

Sleep problems were assessed at the baseline visit with four questions assessing the following aspects of sleep: initiation, maintenance, early awakening, and overall quality. Participants were asked how often in the past 2 weeks they experienced each of the first three on a scale of 1 to 5 (not at all to 5 or more times per week). Overall quality of sleep included five response categories, very sound/restful to very restless. All four questions were summed to create a sleep scale, with higher values indicating more problems associated with sleep.

Social support was measured at the baseline visit using four items from the 20-item Medical Outcomes Study (MOS) Social Support Survey[18–21]. Participants were asked how often each of the four kinds of needed emotional and instrumental support are available to them, with five-level response choices ranging from none of the time to all of the time and these responses were summed, with higher scores indicating stronger social support.

Perceived stress was measured at the baseline visit with the shortened version of the Perceived Stress Scale[22,23]. The shortened scale consist of four items assessing perceived stress in the previous 2 weeks with a five-point response scale (never to very often) which were summed to provide total scores ranging from 0 to 20[24].

Mistreatment blatant and subtle[25] was measured utilizing `The Everyday Discrimination Scale'. This measure assesses feelings of interpersonal mistreatment or discrimination across a wide variety of domains; these were assessed at the baseline visit by asking participants to indicate how often they have had each of ten experiences, such as being treated with less respect, less courtesy, poorer service than other people in day-to-day life with four response options: often, sometimes, rarely, never. Items are totaled with appropriate reverse scoring so that greater values correspond to more frequent experience of mistreatment[26].

Fourth visit measures—The following measures were added at the fourth visit: physical functioning, trait anxiety and anger expression, resulting in approximately 40% of the baseline cohort missing data on these measures due to loss to follow-up and/or missed fourth follow-up visit.

Physical functioning was measured using the SF-36 scale[27–30] and assessed using an ordinal three-category variable based on the physical functioning scale, which is a subscale of the larger instrument, the Medical Outcomes Scale (MOS-SF-36). The scale reflects the difficulty of undertaking ten physical activities that range from vigorous athletic activities to the ability to bathe and dress. An interviewer first asked women whether they were `limited in any way in activities because of any impairments or health problems'. If the answer was `no', the MOS-SF-36 physical functioning scale was not administered; otherwise, the physical functioning scale was administered. The responses were scored using norm-based methods and transformed to have a mean of 50 (standard deviation=100 in the general US population); several validity studies have found the physical functioning scale to have moderate to good content validity and also evidence for discriminant validity[21,27,28,30].

Trait anxiety encompasses a broad, stable dimension of personality consisting of chronic negative emotions including sadness, anxiety, guilt, and anger, as well as associated behavioral and cognitive characteristics such as low self-esteem and self-preoccupation. Trait anxiety was measured with the ten-item version of the 20-item Trait Anxiety scale from the State-Trait Anxiety Inventory[31]. Participants are asked to respond on the basis of

how they generally feel to statements such as `I feel nervous and restless' and `I am a steady person'. Items are scored on a four-point scale ranging from 1 (not at all like me) to 4 (a lot like me). High scores reflect high levels of negative affect and anxiety.

Anger expression (in/out) is a measurement of anger coping style, taken from the Speilberger Anger Expression Scale. There are two components, `anger in' and `anger out'. The `anger out' scale assesses an anger coping style in which one engages in outwardly expressive behavior towards other people or objects in the environment, whereas the `anger in' scale assesses an anger coping style in which one holds in or suppresses angry feelings[32].

Acculturation

The level of acculturation for Hispanic women was ascertained from four questions regarding the language in which women usually think, read and speak, talk with their friends, and listen to the radio or watch television[33]. The acculturation scale allows researchers to quickly identify Hispanics who are low or high in acculturation. The 12-item scale relates to three factors: (1) language use, (2) media, and (3) ethnic and social relations. The scale has been used with respondents and has been referenced with a variety of Hispanic subgroups including Mexican Americans, Cuban Americans, Puerto Ricans, Dominicans and Central and South Americans.

Responses to each of the four questions were coded as 0=only Spanish, 1=Spanish more often than English, 2=English and Spanish equally, 3=English more often than Spanish, or 4=only English. The mean of the responses to these four questions was then calculated and used to create a categorical variable (0=low, 1–2 mid, ≥3=high acculturation).

Statistical methods

Of the 420 women enrolled at the Newark, NJ SWAN site, 278 self-reported Hispanic ethnicity. One woman identifying herself as Mexican American was excluded from the current analyses, leaving 419 women for the current analyses: 277 Hispanic and 142 non-Hispanic Caucasians. Levels or distributions of demographic and psychosocial variables were compared between non-Hispanic Caucasians and Hispanics (Puerto Ricans, Cubans, Dominicans, and Central Americans and South Americans combined) using the χ^2 test for categorical variables and *t* tests or Wilcoxon rank sum tests for continuous variables. Hispanics and non-Hispanic Caucasians were compared in univariate analyses to provide an estimate of the basic differences between these two groups; however, as the primary purpose of the current analyses was to examine differences in psychosocial symptoms among Hispanic participants in SWAN, the remainder of the analyses focused only on the Hispanic women.

χ^2 tests were used to compare differences in categorical variables by Hispanic sub-ethnicity, using exact tests when necessary, and analysis of variance (ANOVA) or Kruskall–Wallis tests were used to compare differences of continuous variables by Hispanic sub-ethnicity. When significant differences were observed between Hispanic subethnicity groups, *post-hoc* tests were conducted using a rank test for corrected multiple comparisons[34]. Regression analyses were used to adjust Hispanic ethnicity differences in selected psychosocial symptoms for age, education and acculturation. Since the selected psychosocial factors, which included mistreatment/discrimination blatant and subtle, trait anxiety and physical functioning, were not normally distributed, we created dichotomous variables based on the 75th percentile. Odds ratio and 95% confidence limits were estimated from logistic regression analyses with Puerto Ricans as the reference group.

RESULTS

Differences between Hispanic and non-Hispanic Caucasians

Demographic and psychosocial factors for all women by race/ethnicity are reported in Table 1. Hispanic and non-Hispanic Caucasians differed significantly for every variable in Table 1 except age, smoking, sleep, social support, trait anxiety, outward anger, and physical functioning. Borderline differences that were not statistically significant included sleep (p=0.08), social support (p=0.06), trait anxiety (p=0.09), and outward anger (p=0.08). Fewer Hispanic women reported education beyond high school and Hispanic women reported more depressive symptoms than non-Hispanic Caucasians (29.3% vs. 43.7%; p<0.01). Compared to non-Hispanic Caucasians, Hispanic women reported more cynicism (p<0.001), perceived stress (p=0.03), and anger expression in (p=0.03). Additionally, Hispanic women reported *less* frequent experiences of mistreatment and discrimination compared to non-Hispanic Caucasians (p<0.001).

Factors that differed among Hispanic women by country of origin

When examining differences in psychosocial factors among Hispanic women, Cubans had the lowest proportion of women with depressive symptoms (31.8%), followed by South Americans (39.4%), Dominicans (40.5%), Central Americans (44.8%), and Puerto Ricans (58.9%). These differences were statistically significant comparing all Hispanic sub-ethnicities (p=0.04); however, no pair-wise comparisons were significantly different from one another in *post-hoc* testing, likely due to the small sample sizes. Significant differences were observed between Hispanic sub-ethnicity groups for sleep disturbances (p<0.01), trait anxiety (p<0.01) and physical functioning (p=0.01). In *post-hoc* comparisons, Puerto Ricans and Dominicans had greater sleep disturbances than Cubans. Puerto Rican women also had higher trait anxiety compared to Cubans and South Americans. However, due to small sample sizes, there were no significant group differences for physical functioning.

Factors related to acculturation

As expected, the level of acculturation was substantially higher among non-Hispanic Caucasians compared to Hispanics (p<0.001). Among the Hispanic sub-ethnicity groups, there were also significant differences in acculturation: 21% of Puerto Ricans reported high acculturation versus 2–5% among the other Hispanic groups. Thus, overall there was a difference in acculturation among the Hispanic sub-ethnicity groups (p<0.0001), with significant *post-hoc* comparisons seen for Puerto Ricans compared to Central Americans and South Americans. Table 2 illustrates that those Hispanic women who are more acculturated also report more frequent experiences of mistreatment and discrimination (p<0.01), but less trait anxiety (p≤0.02).

Regression models exploring the relationships between psychosocial factors (dependent variable) and Hispanic ethnicity (Puerto Rican as referent) adjusted for age, race and acculturation are shown in Table 3. After adjustment, Puerto Rican women were significantly more likely to report depressive symptoms than Dominicans, Cubans and South Americans. Additionally, Puerto Rican women were more likely to report worse physical functioning than the other Hispanic subgroups. Marital status and employment did not differ among Hispanic women (data not shown).

However, since physical functioning was only measured at the 4th study visit, approximately 40% of women had missing values for this variable, resulting in relatively wide confidence intervals. Puerto Rican women reported more trait anxiety compared to Cubans (odds ratio (OR) 0.18, 95% confidence interval (CI) 0.05–0.74) and South Americans (OR 0.22, 95% CI 0.07–0.65). Further adjustment of all models for body mass

index, smoking and financial strain resulted in associations that were in the same general direction, with wider confidence intervals due to small sample sizes.

Effects of cohort attrition over time

A comparison of baseline characteristics between women with data at the fourth visit (n=251) and women not attending the fourth visit (n=168) revealed a difference in baseline smoking status, such that women who reported smoking at baseline were less likely to attend the fourth visit compared to women who did not report smoking at baseline (p=0.04). All other variables, including age, race, education, acculturation and all psychosocial factors measured at baseline were comparable among women with and without data at the fourth follow-up visit (data not shown).

DISCUSSION

Herein we report significant and consistent differences in self-reported psychosocial symptoms among Hispanic women from different countries of origin and degrees of acculturation. We also observe greater self-reported adverse psychosocial symptomatology among Hispanic mid-life women compared to non-Hispanic Caucasians from similar communities in New Jersey. Our two main explanatory variables, country of origin and acculturation, provide partial insight into our findings. The data imply that Puerto Rican women may be at higher risk for psychosocial symptomatology during the menopause transition. Contrary to our *a priori* hypothesis, acculturation, rather than providing protection against symptoms, was associated with no change or worse symptoms in most cases.

These findings are in agreement with an accruing body of literature that suggests that it is not appropriate to regard Hispanics as a single ethnic entity[12,35,36]. Indeed, we and others find increased morbidity among women of Puerto Rican descent. Puerto Rican women were more likely to report depressive symptoms and trait anxiety in our study. Others have observed that Puerto Rican women are at greater risk for postpartum depression[3] and are more likely to have babies of low birth weight[2], when compared to other native-born Hispanics, and are at increased risk for depression in later life[37]. Taken together, an overall increased psychosocial burden appears to accrue to Hispanic women from Puerto Rico. These findings might be related to different conditions prompting immigration. Puerto Rican women who relocate to the US may come from a more disadvantaged socioeconomic background than other Hispanic immigrants, such as those from Cuba, who are more likely to come from upper strata of society and immigrate for political motivations. Our data support some of these notions, as we observed slightly more high school graduates among Cuban compared to Puerto Rican women, but these differences, as well as differences in income between the two groups (data not shown), were not statistically significant. These findings may be due to the small sample sizes available for comparison. On multivariable regression, our most robust findings were in the realms of depression and anxiety, with Cuban and South American women being least likely to suffer from these symptoms, compared to Puerto Rican women, who were most likely.

Our findings that acculturation *per se* was not associated with psychosocial status have some support in the published literature. We found that acculturation was associated with perceived discrimination, with the most acculturated women reporting the most perceived discrimination, a possible indicator of `acculturation stress'. As women come into more close contact with the dominant culture through progressive acculturation, the potential for interaction and, with it, negative interaction, increases. This may explain our findings. Increased acculturation has been hypothesized to lead to worsening health outcomes in some studies of Hispanic populations, another so-called Hispanic paradox attributed to `acculturation stress'[35]. In this scenario, increased time since immigration results in a loss of

healthy behaviors, resulting in an adverse influence on a variety of health outcomes. For example, Central American immigrants who are less acculturated are more likely to be married, and less likely to engage in unhealthy habits, such as cigarette smoking[36]. Adverse effects of migration include a loss of family and social structure, and exposure to street drugs and pregnancy outside marriage. These factors result in a deterioration of the ethnic advantage in perinatal outcomes[38,39]. Increased acculturation has also to be associated with increased experiences of discrimination and mistreatment, or `othering'[40] and has been linked to increased vulnerability to alcohol and cigarette smoking, particularly in Puerto Rican women[9,10]. Our data appear in part to fit this model, in that Puerto Rican women, who were the most acculturated in our sample, showed higher trait anxiety and endorsed a greater number of symptoms of depression (although not statistically significantly different in pairwise, within-Hispanic comparisons).

Our findings of increased symptomatology among Hispanic women compared to non-Hispanic Caucasians is somewhat at odds with reported data. Hispanics experience lower mortality rates than US-born non-Hispanic Caucasians[41,42]. These improved outcomes have been attributed to several factors. First, it is possible that out-migration of Latinos results in a failure to record health problems and mortality, the so-called `salmon bias'[43,44]. However, examination of non-immigrant populations and Hispanic groups who cannot readily migrate back to their country of origin, e.g. Cubans, does not support the notion that differential out-migration influences the outcome reporting in a biased fashion[44]. Indeed, within the SWAN study, selective out-migration is unlikely to explain our findings, because our baseline results are in general agreement with the 4th year follow-up data, and the portion of our sample that was lost to follow-up is known to be less healthy and more symptomatic at baseline (data not shown). It is more likely that the nativity advantage that has been observed in Mexican populations does not extend to Caribbean and Central/South Americans, and caution needs to be exercised in attributing better health outcomes to different Hispanic subpopulations[45]. The nativity advantage in health outcomes that is seen in some Hispanic populations implies that immigration-associated improvements in socioeconomic status are not linked to improved health outcomes[46].

Non-Hispanic Caucasians tended to report more frequent experiences of mistreatment and discrimination compared to the Hispanic women. It is possible that the non-Hispanic Caucasian women had greater expectations that they would not experience discrimination and/or were more sensitized to gender discrimination and therefore more likely to report unfair treatment. However, it is also possible that the instrument utilized was not sufficiently culturally sensitive to detect the experience of discrimination from the Hispanic women's point of view. Although the scale was designed to measure discriminatory experiences for individuals from a variety of racial/ethnic backgrounds, those using the scale typically report significant findings for African-Americans, and null or contradictory findings for Caucasians[47,48]. What remains unclear is whether the `Everyday Discrimination Scale' measures the same construct for women across different backgrounds. This discrepancy in reporting bears further study to understand the reasons why the Hispanic participants answered in the way they did and whether race/ethnicity influences the way women interpret experiences of `everyday' discrimination.

The present study has several limitations. The cross-sectional design makes it difficult to form causal inference for the observed associations. It is also possible that our relatively small sample size was unable to detect differences between our Hispanic and non-Hispanic participants, although overall psychosocial symptomatology was significantly worse in Hispanics. The heterogeneous nature of the sample of Hispanic women resulted in smaller subgroups being available for comparison, limiting the power to detect between-group differences. We were unable to optimally match our Hispanic participants at the SWAN

New Jersey site to the non-Hispanic Caucasian participants, because (despite similar areas of residence) the Caucasians remained more highly educated and described having less difficulty paying for the basic necessities of life, a measure of financial strain. On the other hand, because SWAN used a community-based sample of women, we are therefore able to provide data on a group of women who have rarely been studied. The relatively low socioeconomic status of the SWAN New Jersey cohort represents a frequently overlooked demographic; however, the findings reported here may not be generalizable to Hispanic women outside this geographic area. Furthermore, the study design allows us to make comparisons across ethnic subgroups of Hispanic women all selected from the same geographic area, thus reducing confounding by differences in source populations between groups. Participants took on average 2–2½ h to complete the study visit; this was substantially longer than the time needed by the non-Hispanic Caucasians. This increased time for completion of the surveys was believed to be somewhat burdensome to participants; however, there was no systematic evidence for the survey completion time being directly related to study dropout. The majority of the interview was interviewer-administered and all research assistants were bilingual. Women who appeared to be of low literacy were interviewer-assisted for the entire interview.

Nonetheless, these findings should be added to the growing body of evidence that it is inappropriate to combine all Hispanics into a single population for the purposes of epidemiologic study. Moreover, the findings of increased overall symptomatology among Puerto Rican women suggest that this population subgroup may be exceptionally vulnerable to menopausal symptoms and to the putative hazards of acculturation.

Acknowledgments

We thank the study staff at each site and all the women who participated in SWAN.

Clinical Centers University of Michigan, Ann Arbor – MaryFran Sowers, PI; Massachusetts General Hospital, Boston, MA – Robert Neer, PI 1994–1999; Joel Finkelstein, PI 1999–present; Rush University, Rush University Medical Center, Chicago, IL – Lynda Powell, PI 1994–2009; Howard Kravitz, PI 2009; University of California, Davis/Kaiser – Ellen Gold, PI; University of California, Los Angeles – Gail Greendale, PI; University of Medicine and Dentistry, New Jersey Medical School, Newark – Gerson Weiss, PI 1994–2004; Nanette Santoro, PI 2004–present; and the University of Pittsburgh, Pittsburgh, PA – Karen Matthews, PI.

NIH Program Office National Institute on Aging, Bethesda, MD – Marcia Ory 1994–2001; Sherry Sherman 1994–present; National Institute of Nursing Research, Bethesda, MD – Program Officers.

Central Laboratory University of Michigan, Ann Arbor – Daniel McConnell (Central Ligand Assay Satellite Services).

Coordinating Center New England Research Institutes, Watertown, MA – Sonja McKinlay, PI 1995–2001; University of Pittsburgh, Pittsburgh, PA – Kim Sutton-Tyrrell, PI 2001–present.

Steering Committee Chris Gallagher, Chair; Susan Johnson, Chair.

Source of funding The Study of Women's Health Across the Nation (SWAN) has grant support from the National Institutes of Health (NIH), DHHS, through the National Institute on Aging (NIA), the National Institute of Nursing Research (NINR) and the NIH Office of Research on Women's Health (ORWH) (Grants NR004061; AG012505, AG012535, AG012531, AG012539, AG012546, AG012553, AG012554, AG012495). The content of this manuscript is solely the responsibility of the authors and does not necessarily represent the official views of the NIA, NINR, ORWH or the NIH. N.S. was supported by HD041978.

References

1. Ramirez, R.; Cruz, GDL. The Hispanic population in the United States: March 2002. US Census Bureau; Washington, DC: 2002. p. 20-545.

2. Rosenberg TJ, Raggio TP, Chiasson MA. A further examination of the `epidemiologic paradox': birth outcomes among Latinas. J Natl Med Assoc. 2005; 97:550–6. [PubMed: 15868775]
3. Beck CT, Froman RD, Bernal H. Acculturation level and postpartum depression in Hispanic mothers. Am J Matern Child Nurs. 2005; 30:299–304.
4. Hazuda HP, Stern MP, Haffner SM. Acculturation and assimilation among Mexican Americans: scales and population-based data. Soc Sci Q. 1988; 69:687–706.
5. McGlade MS, Saha S, Dahlstrom ME. The Latina paradox: an opportunity for restructuring prenatal care delivery. Am J Public Health. 2004; 94:2062–5. [PubMed: 15569952]
6. Page RL. Positive pregnancy outcomes in Mexican immigrants: what can we learn? J Obstet Gynecol Neonatal Nurs. 2004; 33:783–90.
7. Ruiz RJ, Dolbier CL, Fleschler R. The relationships among acculturation, biobehavioral risk, stress, corticotropin-releasing hormone, and poor birth outcomes in Hispanic women. Ethn Dis. 2006; 16:926–32. [PubMed: 17061748]
8. Landale NS, Hauan SM. Migration and premarital childbearing among Puerto Rican women. Demography. 1996; 33:429–42. [PubMed: 8939416]
9. Coonrod DV, Bay RC, Balcazar H. Ethnicity, acculturation and obstetric outcomes. Different risk factor profiles in low- and high-acculturation Hispanics and in white non-Hispanics. J Reprod Med. 2004; 49:17–22. [PubMed: 14976790]
10. Zemore SE. Acculturation and alcohol among Latino adults in the United States: a comprehensive review. Alcohol Clin Exp Res. 2007; 31:1968–90. [PubMed: 18034692]
11. Bethel JW, Schenker MB. Acculturation and smoking patterns among Hispanics: a review. Am J Prev Med. 2005; 29:143–8. [PubMed: 16005811]
12. Avis NE, Colvin A. Disentangling cultural issues in quality of life data. Menopause. 2007; 14:708–16. [PubMed: 17327811]
13. Finch BK, Kolody B, Vega WA. Perceived discrimination and depression among Mexican-origin adults in California. J Health Soc Behav. 2000; 41:295–313. [PubMed: 11011506]
14. Sowers, M.; Crawford, S.; Sternfeld, B., et al. Design, survey sampling and recruitment methods of SWAN: A multi-center, multi-ethnic, community-based cohort study of women and the menopausal transition. In: Kelsey, J.; Lobo, RA.; Marcus, R., editors. Menopause: Biology and Pathobiology. Academic Press; San Diego, CA: 2000. p. 175-88.
15. Radloff L. The CES-D scale: a self-report depression scale for research in the general population. Appl Pscyho Measurement. 1977; 1:385–401.
16. Fechner-Bates S, Coyne JC, Schwenk TL. The relationship of self-reported distress to depressive disorders and other psychopathology. J Consult Clin Psychol. 1994; 62:550–9. [PubMed: 8063981]
17. Barefoot JC, Dodge KA, Peterson BL, Dahlstrom WG, Williams RB Jr. The Cook-Medley hostility scale: item content and ability to predict survival. Psychosom Med. 1989; 51:46–57. [PubMed: 2928460]
18. Sherborne C, Stewart A. The MOS social support survey. Social Sci Med. 1991; 32:705–14.
19. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care. 1992; 30:473–83. [PubMed: 1593914]
20. McHorney CA, Ware JE Jr, Lu JF, Sherbourne CD. The MOS 36-item Short-Form Health Survey (SF-36). III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups. Med Care. 1994; 32:40–66. [PubMed: 8277801]
21. McHorney CA, Ware JE Jr, Raczek AE. The MOS 36-Item Short-Form Health Survey (SF-36). II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. Med Care. 1993; 31:247–63. [PubMed: 8450681]
22. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983; 24:385–96. [PubMed: 6668417]
23. Cohen S, Williamson G. Stress and infectious disease in humans. Psych Bull. 1991; 109:5–24.
24. Cohen, S.; Williamson, G. Perceived Stress in a Probability Sample of the United States. Sage; Newbury Park, CA: 1988.

25. Williams, D.; Spencer, M.; Jackson, J.; Anderson, N. Self, Social Identity and Physical Health. Oxford University Press; Oxford: 1999. Race, stress and physical health: the role of group identity; p. 71-96.
26. Guyll M, Matthews KA, Bromberger JT. Discrimination and unfair treatment: relationship to cardiovascular reactivity among African American and European American women. Health Psychol. 2001; 20:315–25. [PubMed: 11570645]
27. Brazier JE, Harper R, Jones NM, et al. Validating the SF-36 health survey questionnaire: new outcome measure for primary care. BMJ. 1992; 305:160–4. [PubMed: 1285753]
28. Ware JE Jr, Keller SD, Gandek B, Brazier JE, Sullivan M. Evaluating translations of health status questionnaires. Methods from the IQOLA project. International Quality of Life Assessment. Int J Technol Assess Health Care. 1995; 11:525–51. [PubMed: 7591551]
29. Haley SM, McHorney CA, Ware JE. Evaluation of the MOS SF-36 physical functioning scale (PF-10). I. Unidimensionality and reproducibility of the Rasch item scale. J Clin Epidemiol. 1994; 47:671–84. [PubMed: 7722580]
30. Stansfeld SA, Roberts R, Foot SP. Assessing the validity of the Sf-36 General Health Survey. Quality Life Res. 1997; 6:3.
31. Spielberger, D.; Gorsuch, R.; Lushese, R. STAI Manual. Consulting Psychologists Press; Palo Alto: 1970. p. 9-12.
32. Knight RG, Chisholm BJ, Paulin JM, Waal-Manning HJ. The Spielberger Anger Expression Scale: some psychometric data. Br J Clin Psychol. 1988; 27:279–81. [PubMed: 3191313]
33. Marin G, Sabogal F, Marin BV, Otero-Sabogal R, Perez-Stable E. Development of a short acculturation scale for Hispanics. Hisp J Behav Sci. 1987; 2:183–205.
34. Siegel, S.; Castllan, J. Nonparametric Statistics for the Behavioral Sciences. Vol. Ch 8. McGraw-Hill; New York: 1988.
35. Lara M, Gamboa C, Kahramanian MI, Morales LS, Bautista DE. Acculturation and Latino health in the United States: a review of the literature and its sociopolitical context. Annu Rev Public Health. 2005; 26:367–97. [PubMed: 15760294]
36. Tirodkar MA, Song J, Chang RW, Dunlop DD, Chang HJ. Racial and ethnic differences in activities of daily living disability among the elderly: the case of Spanish speakers. Arch Phys Med Rehabil. 2008; 89:1262–6. [PubMed: 18534555]
37. Robinson JCL, Gruman C, Covington T, Gaztambide S, Blank K. Depression in later-life Puerto Rican primary care patients: the role of illness, stress, social integration and religiosity. Int Psychogeriatr. 2003; 15:239–51. [PubMed: 14756160]
38. Gaffney KF. Prenatal risk factors among foreign-born Central American women: a comparative study. Public Health Nurs. 2000; 17:415–22. [PubMed: 11115139]
39. Madan A, Palaniappan L, Urizar G, Wang Y, Fortmann S, Gould JB. Sociocultural factors that affect pregnancy outcomes in two dissimilar immigrant groups in the United States. J Pediatr. 2006; 148:341–6. [PubMed: 16615964]
40. Abraido-Lanza AF, Chao MT, Florez KR. Do healthy behaviors decline with greater acculturation? Implications for the Latino mortality paradox. Soc Sci Med. 2005; 61:1243–55. [PubMed: 15970234]
41. Gonzalez-Quintero VH, Tolaymat L, Luke B, et al. Outcome of pregnancies among Hispanics: revisiting the epidemiologic paradox. J Reprod Med. 2006; 51:10–14. [PubMed: 16482770]
42. Lerman-Garber I, Villa AR, Caballero E. Diabetes and cardiovascular disease. Is there a true Hispanic paradox? Rev Invest Clin. 2004; 56:282–96. [PubMed: 15612509]
43. Abraido-Lanza AF, Dohrenwend BP, Ng-Mak DS, Turner JB. The Latino mortality paradox: a test of the `salmon bias' and healthy migrant hypotheses. Am J Public Health. 1999; 89:1543–8. [PubMed: 10511837]
44. Palloni A, Arias E. Paradox lost: explaining the Hispanic adult mortality advantage. Demography. 2004; 41:385–415. [PubMed: 15461007]
45. Turra CM, Goldman N. Socioeconomic differences in mortality among US adults: insights into the Hispanic paradox. J Gerontol. 2007; 62:S184–92.
46. Turner RJ, Lloyd DA, Taylor J. Stress burden, drug dependence and the nativity paradox among US Hispanics. Drug Alcohol Dependence. 2006; 83:79–89.

47. Viruell-Fuentes EA. Beyond acculturation: immigration, discrimination, and health research among Mexicans in the United States. Soc Sci Med. 2007; 65:1524–35. [PubMed: 17602812]

48. Troxel W, Matthews KA, Bromberger JT, Sutton-Tyrell K. Chronic stress burden, discrimination, and subclinical caratoid artery disease in African American and Caucasian women. Health Psychol. 2003; 22:300–9. [PubMed: 12790258]

Table 1

Psychosocial factors in Caucasians and Hispanics by ethnicity. Data are given as *n* (%) or median (interquartile range)

	***Puerto Ricans* (*PR*) (*n* = 56)**	***Dominicans* (*D*) (*n* = 42)**	***Central Americans* (*CA*) (*n* = 29)**	***Cubans* (*Cu*) (*n* = 44)**	***South Americans* (*SA*) (*n* = 106)**	***NHC* (*n* = 142)**	***p Values***		
							NHC vs. Hispanic	***Hispanic comparisons***	***Post-hoc comparisons***
Mean age (SD) (years)	46.4 (3.1)	45.4 (2.6)	47.4 (2.9)	46.7 (3.0)	46.3 (2.5)	46.2 (2.8)	0.71	0.05	NA
Education ≥high school	32 (61.5)	17 (43.6)	11 (42.3)	29 (67.4)	54 (53.5)	125 (95.4)	<0.001	0.12	NA
Current smokers	15 (26.8)	5 (12.8)	0 (0.0)	11 (25.0)	15 (14.4)	32 (22.7)	0.15	0.01	PR vs. CA
Acculturation									
low	28 (50.0)	34 (81.0)	27 (93.1)	29 (65.9)	79 (76.0)	0 (0.0)	<0.001	<0.0001	PR vs. Cu PR vs. SA
mid	16 (28.6)	6 (14.3)	2 (6.9)	14 (31.8)	20 (19.2)	4 (2.9)			
high	12 (21.4)	2 (4.8)	0 (0.0)	1 (2.3)	5 (4.8)	136 (97.1)			
Depressed									
yes	33 (58.9)	17 (40.5)	16 (55.2)	14 (31.8)	41 (39.4)	41 (29.3)	<0.01	0.04	NS **
no	23 (41.1)	25 (59.5)	13 (44.8)	30 (68.2)	63 (60.6)	99 (70.7)			
Cynicism	7.0 (3.0–10.0)	6.0 (3.0–9.0)	7.0 (3.0–11.0)	5.0 (2.0–8.0)	6.0 (3.0–8.0)	3.0 (2.0–6.0)	<0.001	0.61	NA
Mistreatment/discrimination (blatant factor) *	1.0 (1.3, 1.8)	1.0 (1.3, 1.8)	1.0 (1.0, 2.0)	1.0 (1.0, 1.0)	1.0 (1.0, 1.3)	1.3 (1.5, 2.0)	<0.001	0.07	NA
Mistreatment/discrimination (subtle factor) *	1.1 (1.8, 2.3)	1.0 (1.8, 2.2)	1.0 (1.7, 2.3)	1.0 (1.3, 1.5)	1.0 (1.5, 2.0)	1.8 (2.2, 2.5)	<0.001	0.15	NA
Perceived stress	12.0 (8.0–12.0)	12.0 (9.0–12.0)	11.0 (8.0–12.0)	10.0 (7.0–12.0)	10.0 (8.0–12.0)	9.0 (7.0–12.0)	0.03	0.10	NA
Sleep problems	4.0 (2.0–6.5)	3.5 (1.0–6.0)	2.0 (1.0–4.0)	2.0 (0.0–4.0)	3.0 (0.0–6.0)	4.0 (1.0–6.0)	0.08	<0.01	PR vs. Cu Cu vs. D
Social support	12.0 (7.5–15.5)	11.0 (7.0–16.0)	11.0 (6.0–15.0)	14.0 (12.0–16.0)	11.5 (7.0–14.5)	13.0 (10.0–15.0)	0.06	0.05	NA
Trait anxiety †	20.0 (15.5–23.5)	20.0 (16.0–22.0)	20.5 (16.5–23.0)	15.5 (13.0–19.0)	16.0 (13.0–20.0)	16.0 (13.0–20.0)	0.09	<0.01	PR vs. SA PR vs. Cu
Anger expression in †	14.0 (11.5–16.0)	13.0 (11.0–16.0)	14.0 (11.0–16.0)	14.0 (10.0–16.0)	14.0 (11.0–15.0)	12.0 (11.0–14.0)	0.03	0.93	NA
Anger expression out †	14.5 (11.0–17.0)	12.0 (9.0–16.0)	14.5 (11.5–16.5)	11.0 (10.0–15.0)	12.0 (10.0–14.0)	13.0 (11.0–15.0)	0.08	0.09	NA
Physical functioning †,‡	77.5 (25.0, 50.0)	100.0 (50.0, 50.0)	100.0 (72.0, 100)	100.0 (50.0, 92.5)	100.0 (50.0, 90.0)	95.0 (50.0, 80.0)	0.18	0.01	NS **

* 75th and 90th percentiles presented in parentheses;

† measured at 4th year follow-up, approximately 40% of women have missing values;

‡10th and 25th percentiles presented in parentheses;

** NS = all groups comparable in *post-hoc* testing using adjustment for multiple comparisons; NHC, non-Hispanic Caucasian; NA, not available; SD, standard deviation

Table 2

Psychosocial factors by acculturation (excluding non-Hispanic Caucasians). Data are given as percentage or median (interquartile range)

	Acculturation		
	***Low* (*n* = 197)**	***Medium/high* (*n* = 78)**	***p Value* (*Wilcoxon rank sum*)**
Depressed			
yes	46.7	37.2	0.15 (χ^2)
no	53.3	62.8	
Cynicism	6.0 (4.0–9.0)	7.0 (2.5–8.0)	0.23
Mistreatment/discrimination (blatant factor)*	1.0 (1.0–1.5)	1.0 (1.3–1.5)	<0.01
Mistreatment/discrimination (subtle factor)*	1.0 (1.4–2.0)	1.3 (1.8–2.3)	<0.01
Perceived stress	11.0 (8.0–12.0)	10.5 (7.0–12.0)	0.45
Sleep problems	3.0 (0.0–6.0)	3.0 (0.0–5.0)	0.78
Social support	12.0 (8.0–16.0)	11.0 (7.0–14.0)	0.11
Trait anxiety‡	18.0 (15.0–22.0)	16.0 (13.0–18.0)	0.02
Anger expression in‡	14.0 (11.0–16.0)	14.0 (11.5–16.0)	0.42
Anger expression out‡	12.0 (10.0–15.0)	12.0 (10.0–16.0)	0.52
Physical functioning†,‡	100.0 (50.0–72.2)	100.0 (45.0–65.0)	0.38

*75th and 90th percentiles presented in parentheses;

†10th and 25th percentiles presented in parentheses;

‡measured at 4th year follow-up; approximately 40% of women have missing values

Table 3

Multivariable regression models for selected psychosocial factors between Hispanic ethnic groups. Data are given as odds ratio (95% confidence interval)

	***Puerto Rican* (*n* = 56)**	***Dominican* (*n* = 42)**	***Central American* (*n* = 29)**	***Cuban* (*n* = 44)**	***South American* (*n* = 106)**
Depression	ref.	0.32 (0.13, 0.79)	0.64 (0.24, 1.76)	0.31 (0.13, 0.74)	0.39 (0.19, 0.80)
Mistreatment/discrimination (blatant)	ref.	1.48 (0.52, 4.21)	1.38 (0.39, 4.87)	0.39 (0.11, 1.37)	0.74 (0.30, 1.79)
Mistreatment/discrimination (subtle)	ref.	1.36 (0.51, 3.63)	1.68 (0.53, 5.30)	0.31 (0.09, 1.07)	0.93 (0.41, 2.10)
Sleep problems	ref.	1.07 (0.39, 2.94)	0.54 (0.15, 1.97)	0.45 (0.14, 1.40)	0.71 (0.30, 1.66)
Trait anxiety *	ref.	0.52 (0.16, 1.71)	0.78 (0.17, 3.47)	0.18 (0.05, 0.74)	0.22 (0.07, 0.65)
Better physical functioning *	ref.	3.39 (1.01, 11.36)	19.13 (1.96, 186.50)	5.39 (1.50, 19.34)	6.16 (2.09, 18.14)

All models adjusted for acculturation, age and education;

* measured at 4th year follow-up; approximately 40% of women have missing values