

# Sexual Functioning and Practices in a Multi-Ethnic Study of Midlife Women: Baseline Results From SWAN

Virginia S. Cain  
National Institutes of Health

Catherine B. Johannes  
Ingenix Pharmaceutical Services

Nancy E. Avis  
Wake Forest University School of Medicine

Beth Mohr  
New England Research Institute

Miriam Schocken  
University of California, Los Angeles

Joan Skurnick  
UMDNJ-New Jersey Medical School

Marcia Ory  
Texas A&M University

*This study examined the sexual practices and function of midlife women by ethnicity (African American, Caucasian, Chinese, Hispanic, Japanese) and menopausal status. Sexual behavior was compared in 3,262 women in the baseline cohort of SWAN. Participants were 42 to 52 years old, premenopausal or early perimenopausal, and not hysterectomized or using hormones. Analysis used multivariate proportional odds regression. In our sample, 79% had engaged in sex with a partner in the last 6 months, and a third considered sex to be very important. Common reasons for no sex (n = 676) were lack of partner (67%), lack of interest (33%), and fatigue (16%). Compared with Caucasians, Japanese and Chinese women were less likely, and African Americans more likely, to report sex as very important (p < 0.005). Significant ethnic differences were found for frequency of all practices. Perimenopause status was associated only with higher frequencies of masturbation and pain during intercourse.*

Sexual functioning is an important component of people's lives as evidenced by any glance at supermarket magazine covers, advertisements for a wide array of products, and general self-help books. Sexual functioning and dysfunction also has increasingly received public health, pharmaceutical, and medical attention (Laumann, Paik, & Rosen, 1999). The work of Laumann, Gagnon, Michael, and Michaels (1994) was extremely important in providing normative data for a large sample of representative men and women ages 18 to 59, although the number of women over age 40 was quite small. Consequently, the study was unable to address the

sexual functioning and practices of women as they approach and begin the menopausal transition.

It has generally been found that sexual activity declines with increasing age (Dennerstein & Burrows, 1982; Diokno, Brown, & Herzog, 1990; Kinsey, Pomeroy, & Martin, 1953; Marsiglio & Donnelly, 1991; Pfeiffer, Verwoerd, & Davis, 1972), and there has been much debate on the relative impact of menopause on sexual activity. While women attending menopause clinics often report problems related to sexual functioning (Bottigliani & DeAloysio, 1982; Sarrel & Whitehead, 1985), these samples are quite biased (Avis, 2000). Fewer than half of menopausal women seek menopause-related treatment (Avis, 2000; Avis, Crawford, & McKinlay, 1997; Morse et al., 1994), and those who do seek treatment tend to report more life stress and to suffer from more clinical depression, anxiety, and psychological symptoms (all of which are related to sexual functioning) than those who do not seek treatment (Avis, 2000; Ballinger, 1985).

Research among general populations of women does not show clear associations between menopause and declines in sexual functioning. Some studies have found lower sexual interest (Avis, Stellato, Crawford, Johannes, & Longcope,

The Study of Women Across the Nation (SWAN) was funded by the National Institute on Aging and the National Institute of Nursing Research of the National Institutes of Health to the following participating centers: University of Michigan, Ann Arbor (U01 NR04061, U01 AG12495); Massachusetts General Hospital, Boston (U01 AG12531); Rush University, Rush-Presbyterian-St. Luke's Medical Center, Chicago, IL (U01 AG12505); University of California, Davis (U01 AG12554); University of California, Los Angeles (U01 AG12539); University of Medicine and Dentistry of New Jersey-New Jersey Medical School, Newark (U01 AG12535); University of Pittsburgh, Pittsburgh, PA (U01 AG12546); and New England Research Institutes, Watertown, MA (U01 AG12553).

Address correspondence to Dr. Virginia S. Cain, Office of Behavioral and Social Sciences Research, NIH, 1 Center Drive, Room 256, Bethesda, MD 0892; e-mail: Virginia\_Cain@nih.gov.

2000; Cawood & Bancroft, 1996; Dennerstein, Smith, Morse, & Burger, 1994; Hällström, 1977; Hunter, Battersby, & Whitehead, 1986) among peri- or postmenopausal women as compared to premenopausal women. Other studies have not found such an association (Dennerstein et al., 1994; Hawton, Gath, & Day, 1994; Køster & Garde, 1993; Osborn, Hawton, & Gath, 1988). Satisfaction with one's sexual relationship has not been found to be related to menopause (Avis et al., 2000; Hawton et al., 1994; Hunter et al., 1986). This suggests that menopause may have an impact on some aspects of sexual functioning, but not others. Some inconsistencies in findings can be explained by the wide variation in the specific questions asked about sexual functioning, the time frame used (e.g., past month, past year, etc.), whether women without partners are included in analyses, and the nature of the study sample.

Although the U.S. has a growing proportion of non-Caucasians, estimated at about 27% in 2000 (U.S. Census Bureau, 2001), the vast majority of research on sexual functioning has been conducted among Caucasians. An examination of papers ( $N = 1,123$ ) published between 1971 and 1995 in two major sexuality journals showed that ethnicity of the study population was reported in only 26%, and only 4% included interethnic comparisons, mainly between Caucasians and African Americans (Wiederman, Maynard, & Fretz, 1996). Those studies that do examine racial-ethnic differences tend to study only two groups, thus making it difficult to compare results across groups. While Laumann et al. (1994) included Caucasians, African Americans, Hispanics, and Asians in their sample, the number of non-Caucasians was quite small, especially in older ages.

The present paper addresses the limitations of prior research by presenting baseline data on sexual functioning from the large, multisite, multiethnic Study of Women's Health Across the Nation (SWAN). SWAN is an observational study of mid-aged women followed as they transition through the menopause. This study provides the opportunity to examine multiple aspects of sexual practices and functioning among women of diverse racial-ethnic backgrounds and to compare differences between pre- and early perimenopausal women.

## METHOD

### *Participants*

SWAN is a national study of mid-life women conducted in two phases at seven U.S. sites: Los Angeles, Oakland, Chicago, Detroit, Pittsburgh, Newark, and Boston. First, 16,065 women ages 40 to 55 participated in a cross-sectional interview during an approximately 15-minute telephone or in-person contact, in which they were also screened for eligibility for the second phase, a longitudinal cohort study. Requirements for eligibility for the longitudinal study (in addition to community residence) were the following: age 42 to 52 at time of cross-sectional interview; either Caucasian or site-designated other ethnicity; having menses within the previous 3 months; having an intact uterus and at

least one ovary; no use of prescribed medication affecting reproductive hormones within the previous 3 months; and initiation of the baseline interview within 3 months of the date of the cross-sectional interview.

During 1996 to 1997, each site enrolled approximately 450 women from the community. At each site, roughly half of the women were non-Hispanic Caucasian and half were of one predetermined ethnic background (African American, Chinese, Japanese, or Hispanic). Four sites enrolled African Americans, while the women from the other ethnic groups were enrolled at only one site for each group. Sites used several recruitment strategies (list based, random-digit dialing, and/or "snowballing" from current participants) that varied depending on sites' specific situations and the designated ethnic group. Thus, multiple sampling frames and approaches were used to recruit a community sample of local women (Sowers et al., 2000).

Of the women who completed the cross-sectional interview, approximately 40% were eligible for the longitudinal study. Of the eligible women, 3,302 (51%) were recruited and completed their baseline interview, a response rate comparable to similar multiethnic studies requiring the same level of commitment (Friedman et al., 1988; Jackson et al., 1996; Manolio et al., 1995). This paper reports data from the baseline interview of the longitudinal phase, including some variables collected during the cross-sectional interview.

The cross-sectional and baseline interviews included a wide range of questions on medical and social history, including questions on socioeconomic status, education, marital status, participant-defined ethnicity, menstrual cycle characteristics, and other lifestyle and psychosocial matters. Participants self-administered a sexual activities and functioning questionnaire and returned it to the interviewer in a sealed envelope. Physiological measures were also taken, but are not relevant to the current paper.

Each site adhered to its Institutional Review Board's guidelines for human research, with all participants giving verbal or written consent as appropriate. Trained interviewers administered all interviews. Instruments were developed based on the results of ethnically diverse focus groups to minimize language and cultural differences in understanding and responding to the questions. All study forms were available in English, Cantonese, Japanese, and Spanish, and staff were bilingual as appropriate.

### *Measures*

*Dependent variables.* We measured sexuality outcome variables using a self-administered questionnaire consisting of about 20 items designed to address sexual activity and function in women with and without partners. We derived the questionnaire from several sources: The Massachusetts Women's Health Study (Avis et al., 2000), The National Health and Social Life Survey (Laumann et al., 1994), the National Survey of Family Growth (Abma, Chandra, Mosher, Peterson, & Piccinino, 1997), and the Women's Health Initiative Daily Life Form (The Women's Health

Initiative Study Group, 1998). Variables of interest in our study can be categorized as importance of sex, engaging in sex with a partner within the last 6 months, sexual practices (four variables), and sexual function (five variables). In general, research on sexual functioning outcomes has measured satisfaction, frequency of activity (intercourse, masturbation, orgasm), desire, sexual thoughts or fantasies, arousal, attitudes toward sexuality, and difficulties such as pain during intercourse. These reflect the characterization of sexual function in terms of libido (sexual interest, desire, motivation, pleasure) and potency (arousal; Davidson, 1985; Iddenden, 1987; Masters & Johnson, 1966). These outcomes have been studied by other menopause researchers (Avis et al., 2000, Dennerstein, Dudley, & Burger, 2001).

We asked all respondents about the importance of sex in their lives (5-point Likert scale, *not at all important* to *extremely important*) and if they had engaged in sex with a partner in the last 6 months (yes or no). We then asked women about their reasons for engaging or not engaging in sex. Women who responded that they had a sexual partner were asked questions about various sexual practices, including sexual intercourse, sexual touching or caressing, and oral sex. These three variables were measured on a 5-point Likert scale from *not at all* to *daily*. We asked all women regardless of whether or not they had a sexual partner about their frequency of masturbation in the past 6 months, measured on a 6-point Likert scale from *not at all* to *daily*.

Women who had engaged in sex with a partner were also asked about their sexual functioning. We included questions on the frequency of arousal during sexual activity, frequency of pain during intercourse, physical pleasure, and emotional satisfaction, all of which were answered on 5-point Likert scales. We asked all women about their frequency of desire to engage in any sexual activity (5-point Likert scale, *not at all* to *daily*).

**Independent variables.** The independent variables of interest were ethnicity and menopause status. Participants self-defined as having African American, Caucasian, Chinese, Japanese, or Hispanic racial-ethnic background. Based on recent calls to distinguish between early and late menopause according to irregular bleeding (Dudley et al., 1998; Johannes, Crawford, Longcope, & McKinlay, 1996; Soules et al., 2001), we defined menopause status as *early perimenopausal*—menses had occurred in the past 3 months but was reported as less predictable—or *premenopausal*—menses had occurred in the past 3 months with no decrease in predictability. By design, women late in the perimenopausal transition (3-11 months of amenorrhea), those with hysterectomy, and those using hormones were excluded from the cohort at baseline.

**Covariates.** Other variables previously shown to differ across ethnic groups (Gold et al., 2000) and included in the present analyses were age, marital status, ability to pay for basics, employment, and educational attainment. Women provided self-reports on their current status with regard to these characteristics. We treated these variables as potential confounders of the associations between sexuality and eth-

nicity and sexuality and menopause status. In addition, we included geographic location (study site) in all adjusted models because it was a primary factor in the study sampling design. Note that the seven geographic locations for sampling were selected in large part to allow researchers to obtain sufficient numbers of ethnic minority subjects, rather than to provide a basis for geographic comparisons across field sites or to yield nationally representative or even locally representative data. Thus, estimated model coefficients for the various field sites should not be interpreted as indicative of regional differences in reporting.

## RESULTS

### Statistical Analyses

We examined bivariate associations by chi-square and student's *t* tests. For one binary outcome, binary logistic regression was used. We used the proportional odds model for ordinal logistic regression to evaluate differences by ethnicity and menopause status while adjusting for confounding variables. Because of small cell sizes, we collapsed categories into three or four categories for modeling. To select variables for models, we used the forward stepwise and backward elimination procedures with selection criteria set at  $p < 0.05$ . Age, site, and the two independent variables of interest—ethnicity and menopause status—were forced into all models. Caucasians were used as the reference group since this was the largest sample size and has most of the extant literature. We examined interactions between ethnicity and marital status, age, education, paying for basics, and employment for all outcomes. To verify that the proportional odds assumption was met, we fit separate binary logistic regression models for each successive dichotomization of the outcome and examined odds ratios for consistency across models (Brant, 1990; Scott, Goldberg, & Mayo, 1997).

### Sample Characteristics

There were 3,302 women in the SWAN baseline cohort. Only 35 women did not answer the sexual function questionnaire (1% refusal rate). Five women who responded that they had never had sex but reported having intercourse in the last 6 months were excluded from analyses, leaving 3,262 women in the analytic sample. Analyses of the variables limited to women who had sex in the last 6 months were based on 2,466 women. Table 1 shows the distribution with respect to the study variables for the full analytic sample and the subsample that engaged in sex within the past 6 months. The only variable on which these groups differed was marital status. While we did collect data on sexual preference, the small number of women reporting only sex with other women (approximately 1%) did not permit separate analyses for this group.

### Engaged in Sex and Importance of Sex

We asked all women if they had engaged in sex in the last 6 months and how important sex is to them. Seventy-nine

**Table 1. Characteristics of the Study Sample: SWAN Baseline Cohort**

Variable	Full analytic sample (n = 3,262)	Women who engaged in sex in last 6 months (n = 2,466)
Mean age, years (range)	46.3 (42-52)	46.2 (42-52)
	%	%
Ethnicity		
Caucasian	47.0	47.4
African American	28.2	27.5
Hispanic	8.8	8.5
Chinese	7.5	7.8
Japanese	8.5	8.9
Menopause status		
Early perimenopause	46.4	46.3
Premenopause	53.6	53.7
Marital status		
Married, living with partner	66.1	76.9
Never married	13.5	8.3
Separated	4.9	3.7
Widowed	2.1	1.2
Divorced	13.4	9.9
Education		
Less than high school	7.1	6.3
Completed high school	17.8	17.9
More than high school	32.4	33.3
College graduate	20.1	20.2
More than college	22.6	22.3
Employment		
Day shift only	53.5	54.2
Evening/night shift	20.0	19.8
Rotating shift	6.8	6.8
Not employed	19.7	19.2
Difficulty paying for basics		
Very hard	9.2	7.2
Moderately hard	30.7	30.2
Not at all hard	60.1	62.6
Sexual preference		
Never had sex	1.1	—
With woman only	1.4	1.2
With man only	96.6	96.7
With both	0.9	1.0

percent of women had engaged in sex with a partner in the past 6 months. Twenty-three percent reported that sex was not important or not very important, 44% said it was moderately important, and 32% reported that sex was quite or extremely important in their lives. Unadjusted chi-square analysis revealed that rates for engaging in sex did not vary significantly by ethnicity or menopause status. Importance of sex varied by ethnic group but not by menopause status, with Caucasian, African American, and Hispanic women more likely to find sex quite or extremely important than Chinese or Japanese women.

Adjusted results from proportional odds regression models (Table 2) show that menopause status was not an independent predictor of importance of sex or engaging in sex. Ethnic differences in the importance of sex remained after controlling for the demographic and socioeconomic variables. African American women were somewhat more likely than Caucasian women to report that sex was impor-

tant in their lives (adjusted odds ratio [OR] = 1.40, 95% Confidence Interval [CI] = 1.17-1.68), while Chinese and Japanese women were less likely (OR = 0.57, 95% CI = 0.41-0.81 for Chinese, similar for Japanese). Hispanic and Caucasian women did not differ on this variable.

The apparent ethnic variation in the engaged in sex outcome (Table 2) can be explained by the presence of a significant interaction between ethnicity and marital status for African American women. We conducted analyses stratified by marital status group and found that only in the two unmarried categories were African American women more likely to engage in sex than Caucasian women. For never-married African American women, the OR was 3.3, 95% CI = 1.97-5.50, and for widowed, separated, or divorced women, the OR was 1.74, 95% CI = 1.14-2.66. Married African American women were not more likely than Caucasian women to report engaging in sex (OR = 1.20, 95% CI = 0.68-2.12). Stratified results did not differ appreciably from those shown in Table 2 for the other ethnic groups.

### Reasons for Engaging in and Not Engaging in Sex

Figures 1 and 2 display unadjusted proportions of women reporting various reasons for not engaging in sex (Figure 1)

**Table 2. Importance of Sex and Engaged in Sex: Results From Multivariate Proportional Odds and Binary Logistic Regression Models**

Variable	Importance		Engaged in sex <sup>a</sup>	
	OR	95% CI	OR	95% CI
Ethnic group				
Caucasian	ref		ref	
African American	1.40	1.17-1.68	1.75	1.34-2.29
Hispanic	0.95	0.63-1.42	0.87	0.50-1.50
Chinese	0.57	0.41-0.81	1.09	0.63-1.88
Japanese	0.57	0.41-0.79	1.21	0.72-2.01
Menopause status				
Premenopause	ref		ref	
Perimenopause	1.02	0.89-1.17	1.05	0.86-1.28
Age (years)	0.96	0.93-0.98	0.92	0.89-0.96
Marital status				
Married	ref		ref	
Never	0.51	0.42-0.63	0.07	0.05-0.09
Wid/sep/divorced	0.75	0.63-0.89	0.11	0.09-0.14
Paying for basics				
Not hard	ref		ref	
Somewhat	0.87	0.75-1.01	0.79	0.63-0.99
Very hard	0.64	0.50-0.81	0.67	0.48-0.95

Note. OR = Odds ratio; CI = Confidence interval. All models included ethnicity, menopause status, age, site, marital status, education level, employment, and ability to pay for basics. The odds ratios for the importance model represent a shift from one ordered category to the next higher. Importance was divided into 3 categories: not at all to not very, moderately, and quite to extremely important.

<sup>a</sup> Results shown above are from the main effects model. A significant interaction was found between ethnicity and marital status for African American women. Odds ratios comparing African American to Caucasian women stratified by marital status categories are as follows: Never married, OR = 3.30, 95% CI = 1.97-5.50; Married, OR = 1.20, 95% CI = 0.68-2.12; Wid/sep/divorced, OR = 1.74, 95% CI = 1.14-2.66.

or engaging in sex with a partner in the past 6 months (Figure 2). The 676 women who responded that they had not engaged in sexual activities with a partner during the past 6 months were asked to respond (yes or no) to seven reasons why they did not engage in sex. Responses to the reasons were missing for 163 women and 18 were excluded because of conflicting responses. Overall, the most common reason for not engaging in sexual activity was lack of a partner (67%). This was the most common reason for all ethnic groups except for Japanese women, for whom a higher proportion reported no interest (Figure 1). We noted ethnic variation for lack of a partner, from a low of 44% among Japanese women to a high of 72% among African American women. Lack of interest was reported by about a third of the sample overall, and although Japanese women were more likely to report this than the other ethnic groups, ethnic variation for this reason was not statistically significant. Overall, about 16% of the sample indicated that they were too tired or busy to engage in sexual activity and 12% reported that their partner was too tired or busy. We noted ethnic differences for both of these variables. Only about 4% of women indicated that their own physical problem interfered with sex and 10% that lack of sex was due to their partner's physical problem. We found no ethnic variation for these two reasons.

The 2,466 women who reported that they engaged in sex in the last 6 months were asked to respond (yes or no) to

five reasons why they did engage in sex, and the responses to these by ethnic group are shown in Figure 2. Overall, the most common reasons were to express love and for pleasure or enjoyment, with about 90% of women answering yes to these two categories. As expected in this mid-aged group of women, the least common reason for having sex was the desire to get pregnant (2.5% overall). About three quarters of the sample responded that they had engaged in sex because their partner wanted to, and to relieve tension. Responses to all of these questions varied by ethnic group. Hispanic women were the least likely to indicate that they engaged in sex for pleasure and the most likely to report the desire to get pregnant as the reason. The proportion of women responding that they engaged in sex because their partner wanted them to was lowest for African American and highest for Hispanic and Japanese women.

### Sexual Practices

*Unadjusted results.* The distribution of responses for the four sexual practices by ethnicity and menopause status, unadjusted for any covariates, is shown in Table 3. We found ethnic differences for all of the sexual practice outcomes, while menopause status differed only for the masturbation outcome (positive association with perimenopause).

*Adjusted results.* Results from the proportional odds models for the four sexual practices are summarized in

Figure 1. Reasons for not engaging in sexual activity in the past 6 months by ethnic group, SWAN baseline cohort,  $N = 615$ .  
\* $p < 0.02$ , chi-square analysis for ethnic group difference.

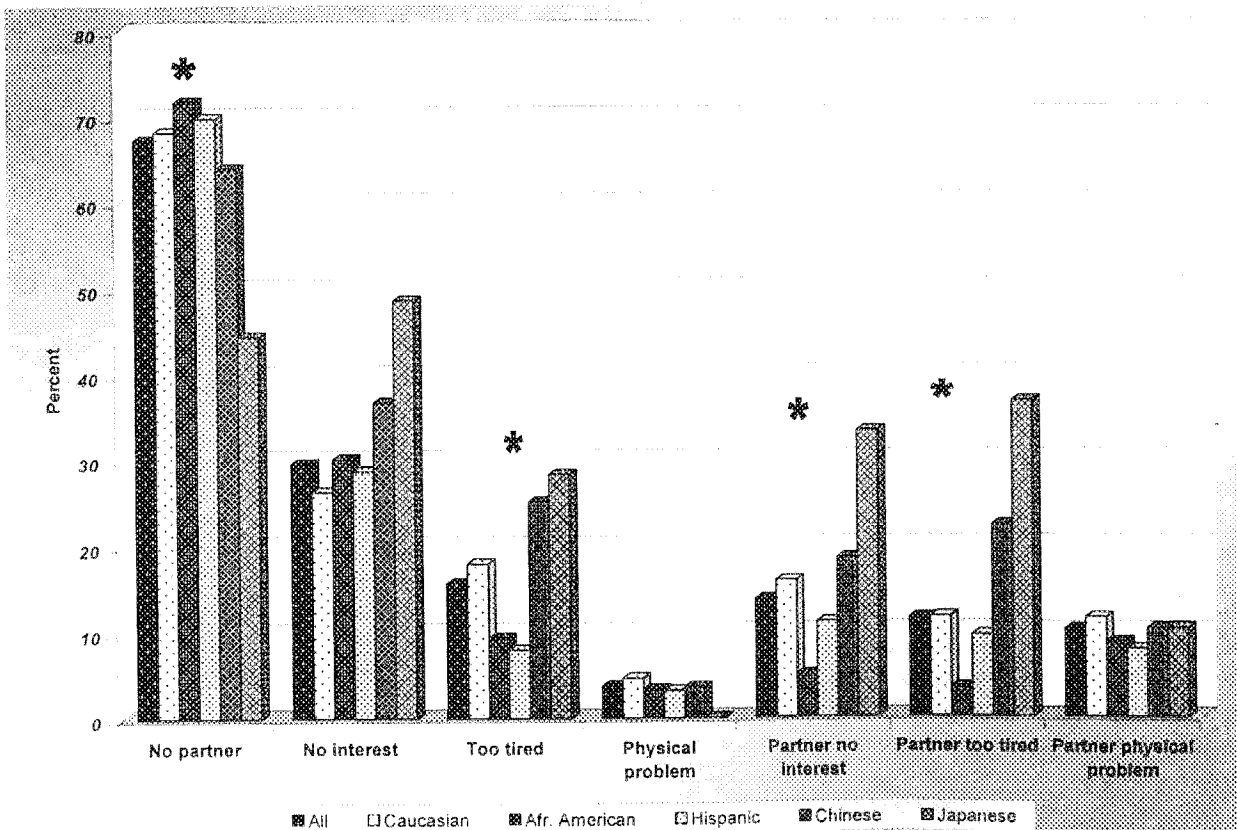


Figure 2. Reasons for engaging in sexual activity in the past 6 months by ethnic group, SWAN baseline cohort,  $N = 2,466$ .  
 $*p < 0.005$ , chi-square analysis for ethnic group difference.

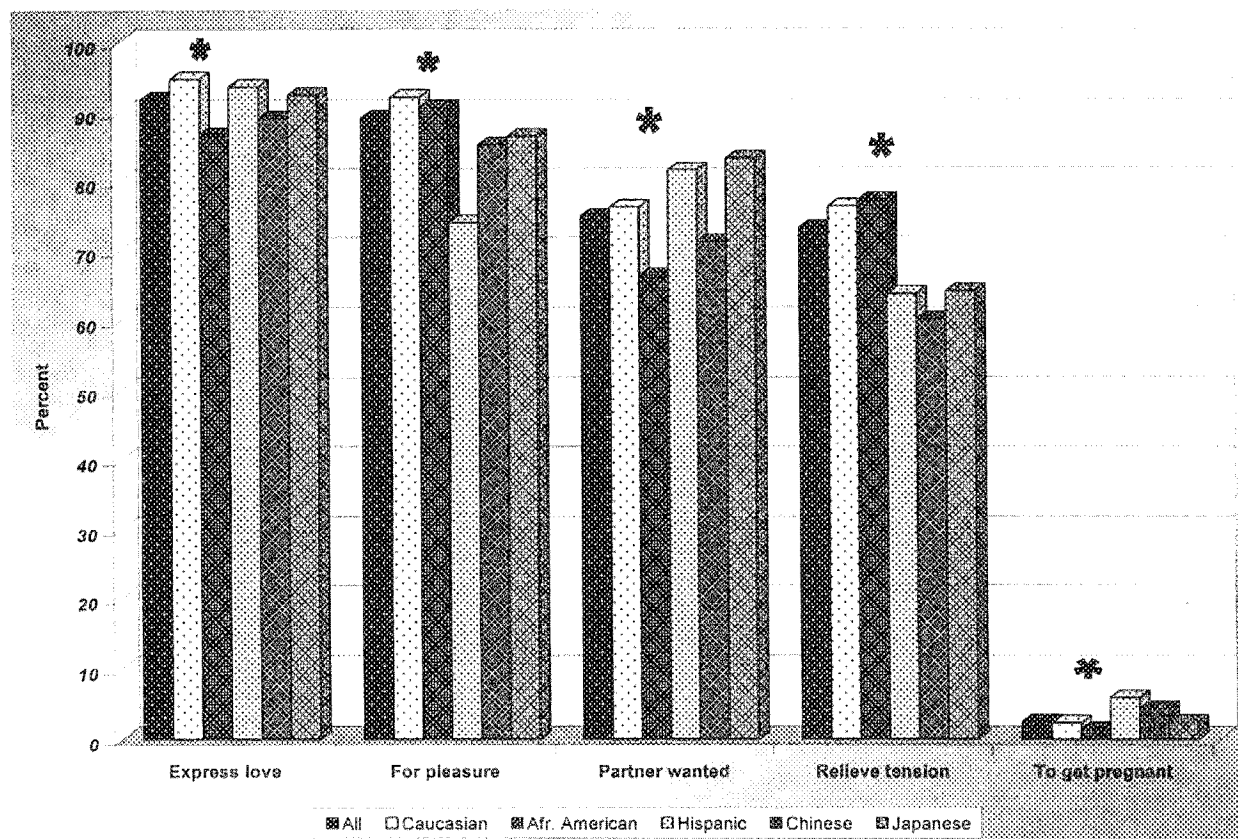


Table 4. The table includes odds ratios and 95% CI for the two major predictor variables, ethnicity and menopause status, along with age and the other socioeconomic status covariates. Although we included site in all models, the regression results are not included in the tables, as they are not indicative of regional differences. Menopause status was not an independent predictor of intercourse frequency, sexual touching, or oral sex, but there were ethnic differences. The odds of more frequent sexual intercourse were higher for African American than for Caucasian women (OR = 1.43, 95% CI = 1.16-1.77), and lower for Japanese than for Caucasian women (OR = 0.56, 95% CI = 0.38-0.83). The odds of more frequent sexual touching were lower for Japanese than Caucasian women (OR = 0.44, 95% CI = 0.30-0.64). Adjustment for the other covariates had very little effect on the ethnic variation in reported frequency of oral sex. Odds ratios were lower than Caucasians for African American, Chinese, and Japanese women, while the odds ratio for Hispanics was similar to Caucasians. All four ethnic groups tended to report less frequent masturbation than did Caucasian women. Perimenopausal women were more likely to engage in this sexual practice than premenopausal women (OR = 1.25, 95% CI = 1.08-1.44).

### Sexual Function

*Unadjusted results.* The distribution of responses to the

five measures of sexual function by ethnic group and menopause status is shown in Table 5. For those women who reported engaging in sexual activities with a partner in the last 6 months, a fairly high level of emotional satisfaction and physical pleasure in the relationship was reported overall, and 70% reported feeling aroused during sexual activity almost always or always. These three variables did not vary appreciably by menopause status, but responses were distributed differently by ethnic group. About 20% of women reported that they sometimes or always experienced vaginal or pelvic pain during intercourse. The distribution of responses to this variable differed by menopause status, with 25% of perimenopausal compared to 17% of premenopausal women reporting pain sometimes or always.

*Adjusted results.* Odds ratios for the main predictor variables—ethnicity and menopause status adjusted for site—along with age and the socioeconomic status variables are presented in Table 6, as are odds ratios for the other covariates if they remained in the model ( $p < 0.05$ ). Adjustment for age, site, and the other covariates did not change the results with respect to menopausal status. As in the unadjusted models, the only sexual function outcome positively related to menopause status was pain; the OR for perimenopause compared with premenopause was 1.42, 95% CI = 1.21-1.67.

Table 3. Sexual Practices by Ethnicity and Menopausal Status, SWAN Baseline Cohort

Outcome	Ethnic group							Menopause status	
	All women		Caucasian	African American	Hispanic	Chinese	Japanese	Pre	Peri
	N	%	%	%	%	%	%	%	
Women who had engaged in sexual activity with a partner in the last 6 months, <i>n</i> = 2,466									
Sexual intercourse <sup>a</sup>									
0-2 times/month	899	37.1	38.5	29.8	24.3	44.0	58.5	37.0	37.4
Once/week	776	32.0	31.6	31.7	40.3	35.7	24.4	31.3	32.6
> once/week to daily	746	30.9	29.9	38.4	35.4	20.3	17.1	31.7	30.0
Sexual touching/caressing <sup>a</sup>									
0-2 times/month	611	25.5	21.8	25.7	20.4	30.9	44.6	26.6	24.1
Once/week	587	24.5	22.7	22.3	42.8	24.6	23.3	23.4	25.9
> once/week to daily	1202	50.1	55.5	52.0	36.8	44.6	32.1	50.0	50.0
Oral sex <sup>a</sup>									
0-2 times/month	1792	76.4	71.5	85.8	53.2	89.4	87.3	75.6	78.0
Once/week	360	15.3	19.2	7.5	31.7	7.4	8.0	15.1	15.0
> once/week to daily	194	8.3	9.3	6.7	15.1	3.1	4.7	9.3	7.0
All women, <i>n</i> = 3,178 <sup>b</sup>									
Masturbation <sup>a,c</sup>									
Not at all	1610	50.7	36.6	62.1	79.6	64.1	50.4	50.9	50.0
< once/month	675	21.2	24.7	18.4	8.8	17.3	27.6	23.1	19.2
1-2 times/month	539	16.9	22.5	11.8	7.7	13.8	15.0	15.4	18.8
≥ once/week	354	11.1	16.3	7.7	3.9	4.8	7.0	10.6	12.0

<sup>a</sup> Ethnic difference statistically significant,  $p < 0.001$ , chi-square. <sup>b</sup> Response was missing to this question for 84 women. <sup>c</sup> Menopause status difference statistically significant,  $p = 0.008$ .

Table 4. Sexual Practices: Results From Multivariate Proportional Odds Regression Models

Variable	Sexual intercourse		Sexual touching or caressing		Oral sex		Masturbation	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Ethnic group								
Caucasian	ref		ref		ref		ref	
African American	1.43	1.16-1.77	0.84	0.68-1.04	0.34	0.25-0.46	0.41	0.34-0.50
Hispanic	1.56	0.97-2.51	0.61	0.37-1.00	1.27	0.77-2.10	0.28	0.17-0.44
Chinese	0.85	0.57-1.26	0.79	0.52-1.18	0.42	0.22-0.79	0.25	0.17-0.36
Japanese	0.56	0.38-0.83	0.44	0.30-0.64	0.45	0.26-0.77	0.50	0.36-0.70
Menopause status								
Premenopause	ref		ref		ref		ref	
Perimenopausal	0.93	0.80-1.09	1.07	0.92-1.26	0.85	0.69-1.04	1.25	1.08-1.44
Age (years)	0.96	0.93-0.98	0.97	0.94-1.01	0.92	0.86-0.96	0.94	0.92-0.97
Marital status								
Married	ref				ref		ref	
Never married	0.69	0.52-0.92			1.96	1.36-2.82	1.60	1.30-1.98
Wid/sep/divorced	0.96	0.76-1.20			2.02	1.54-2.67	1.99	1.66-2.37
Education								
High school							ref	
Less than high school							0.71	0.47-1.06
More than high school							1.60	1.29-1.98
College graduate							2.20	1.74-2.78
More than college							2.96	2.34-3.73
Paying for basics								
Not at all hard			ref					
Moderately hard			0.66	0.55-0.78				
Very hard			0.49	0.36-0.68				
Employment								
Day shift only	ref							
Evening/night shift	0.94	0.77-1.15						
Rotating shift	0.66	0.48-0.90						
Not employed	0.85	0.69-1.05						

Note. OR = odds ratio; CI = confidence interval. All models included all variables listed above with ethnicity, menopause status, site, and age forced into the model. Other variables are included in the table only if they remained in the final model ( $p < 0.05$ ). Odds ratios represent a shift from one ordered category to the next higher. All outcomes were divided into 3 categories: 0-2 times/month, once/week, and more than once/week to daily.

Table 5. Sexual Function Outcomes by Ethnicity and Menopausal Status, SWAN Baseline Cohort

Outcome	Ethnic group							Menopause status	
	All women		Caucasian	African American	Hispanic	Chinese	Japanese	Pre	Peri
	<i>N</i>	%	%	%	%	%	%	%	
All women, <i>n</i> = 3,248 <sup>a</sup>									
Desire <sup>b</sup>									
0-2 times/month	1353	41.6	36.7	37.7	37.4	61.4	67.8	41.4	41.3
Once/week	948	29.1	31.7	26.7	37.8	26.1	17.3	28.4	30.0
> once/week to daily	952	29.3	31.7	35.6	24.8	12.4	14.8	30.1	28.7
Women who had engaged in sexual activity with a partner in the last 6 months, <i>n</i> = 2,466									
Emotional satisfaction <sup>b</sup>									
Not at all/slightly	337	13.7	12.8	17.6	12.0	10.5	11.0	14.0	13.2
Moderately	779	31.6	28.6	27.4	19.8	31.6	43.4	31.1	32.5
Very/extremely	1346	54.7	58.6	55.0	38.2	57.9	45.7	54.9	54.3
Physical pleasure <sup>b</sup>									
Not at all/slightly	255	10.4	9.4	11.2	10.0	11.6	11.9	10.8	9.7
Moderately	756	30.7	26.5	23.2	51.2	42.1	46.6	29.9	31.7
Very/extremely	1452	58.9	64.1	65.6	38.8	46.3	41.5	59.3	58.6
Arousal <sup>b</sup>									
Never/almost never	128	5.2	4.8	3.8	15.5	4.3	2.8	5.1	5.2
Sometimes	606	24.7	17.3	25.6	41.1	38.8	33.5	24.1	25.5
Almost always/always	1721	70.1	77.9	70.6	43.5	56.9	63.6	70.8	69.3
Pain <sup>b,c</sup>									
Never	1373	57.1	59.9	58.7	65.4	40.3	44.0	58.9	54.5
Almost never	525	21.8	22.7	17.8	6.3	33.0	34.7	23.8	20.4
Sometimes/always	508	21.1	17.4	23.5	28.3	26.7	21.3	17.3	25.1

<sup>a</sup> Response missing to this question for 48 women. <sup>b</sup> Ethnic difference statistically significant,  $p < 0.001$ , chi-square. <sup>c</sup> Menopause status difference statistically significant,  $p < 0.001$ , chi-square.

Following adjustment for covariates, there were some changes with respect to ethnicity. After adjustment, ethnic variation was no longer apparent for emotional satisfaction. Adjusted results revealed very little ethnic variation for physical pleasure. While the odds of more frequent physical pleasure were somewhat lower for Hispanic, Chinese, and Japanese women than for Caucasian women, the confidence intervals were fairly wide. After adjustment, all ethnic groups were less likely to report frequent arousal during sexual activity than were Caucasian women. The odds ratio of more frequent pain was higher for all other ethnic groups than for Caucasians, but the 95% CI included 1 for Hispanic and Japanese women.

Adjustment did little to change the ethnic variation seen in the desire outcome. Chinese (OR = 0.31, 95% CI = 0.22-0.44) and Japanese (OR = 0.33, 95% CI = 0.23-0.47) women were less likely than Caucasian women to report a desire to engage in sexual activity, while results for African American and Hispanic women were similar to those of Caucasian women. We found a statistically significant ( $p < 0.05$ ) Ethnicity X Marital Status interaction for the desire variable. We fitted separate regression models for each strata of the marital status variable, but stratified results overall were similar to those that included all women. The odds of desire were lower for Chinese and Japanese women than for Caucasian women among never-married, married, and widowed, separated, or divorced women.

## DISCUSSION

This study provides the first look at sexual functioning among a community-based ethnically diverse group of female "Baby Boomers" who are approaching their 50s and entering menopause. The data presented come from the first round of a longitudinal study that will follow women as they pass through menopause. Thus, the results are constrained to women prior to the onset of or early in the menopausal transition. Our study found that the majority (78%) of mid-life SWAN women engage in some form of sexual activity with a partner, which is slightly lower than the 84% of women in the approximate age range found by Laumann et al. (1994). The primary reason given by women for not engaging in sex was lack of a partner, as reported in other studies (Greendale, Hogan, & Shumaker, 1996; Koster & Garde, 1993; Pfeiffer et al., 1972). The slightly lower percentage of women in this study reporting some form of sexual activity with a partner could be due to a number of factors including SWAN's large sample size and the ethnic diversity of the sample. In addition, the selection criteria for SWAN eliminated women with a history of hysterectomy and/or oophorectomy and those using oral contraceptives or hormone replacement therapy. Some caution in interpretation is still advised because SWAN is not a true national probability sample, and some sampling bias may exist due to possible shared characteristics of women who agreed to participate and various cohort eligibility criteria that may be related to sexual activity (Sowers et al., 2000).

**Table 6. Sexual Function: Results From Multivariate Proportional Odds Regression Models**

Variable	Desire <sup>a</sup>		Emotional satisfaction		Physical pleasure		Arousal		Pain	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Ethnic group										
Caucasian	ref		ref		ref		ref		ref	
African American	1.15	0.97-1.38	0.85	0.68-1.06	0.95	0.75-1.20	0.64	0.49-0.84	1.29	1.03-1.61
Hispanic	0.96	0.65-1.44	0.66	0.40-1.09	0.59	0.35-1.02	0.33	0.18-0.59	1.30	0.76-2.21
Chinese	0.31	0.22-0.44	1.13	0.75-1.71	0.66	0.43-1.01	0.56	0.35-0.90	2.08	1.37-3.16
Japanese	0.33	0.23-0.47	0.83	0.56-1.22	0.66	0.44-0.97	0.61	0.39-0.96	1.45	0.99-2.14
Menopause status										
Premenopause	ref		ref		ref		ref		ref	
Perimenopausal	0.98	0.86-1.13	0.99	0.84-1.16	0.98	0.83-1.16	0.96	0.80-1.15	1.42	1.21-1.67
Age (years)	0.94	0.92-0.96	1.01	0.98-1.04	1.00	0.97-1.03	0.99	0.96-1.02	0.96	0.93-0.99
Marital status										
Married	ref		ref		ref		ref		ref	
Never married	0.64	0.52-0.79	0.77	0.58-1.04	1.07	0.78-1.45	1.60	1.12-2.31	0.64	0.47-0.89
Wid/sep/divorced	0.84	0.71-1.00	0.78	0.62-0.98	1.58	1.23-2.03	1.68	1.27-2.23	0.76	0.60-0.96
Education										
High school					ref		ref			
Less than high school					0.77	0.52-1.14	0.77	0.51-1.15		
More than high school					1.17	0.92-1.48	1.14	0.88-1.47		
College graduate					1.31	1.00-1.71	1.38	1.02-1.85		
More than college					1.35	1.03-1.78	1.78	1.31-2.43		
Paying for basics										
Not at all hard	ref		ref		ref		ref			
Moderately hard	0.75	0.64-0.87	0.67	0.56-0.80	0.73	0.61-0.89	0.84	0.68-1.04		
Very hard	0.66	0.52-0.85	0.58	0.43-0.80	0.60	0.43-0.83	0.55	0.39-0.77		
Employment										
Day shift only					ref					
Evening/night shift					1.06	0.85-1.32				
Rotating shift					0.78	0.56-1.09				
Not employed					0.72	0.58-0.89				

*Note.* OR = odds ratio; CI = confidence interval. All models included all the variables listed above with ethnicity, site and age forced into the model. Only the variables that remained in the final model are reported above. Odds ratios represent a shift from one ordered category to the next higher. All outcomes were divided into 3 categories described as follows. Desire: 0-2 times/month, once/week, more than once/week to daily; Emotional satisfaction and Physical pleasure: not at all/slightly, moderately, very/extremely; Arousal: never/almost never, sometimes, almost always/always; Pain: never, almost never, sometimes/always.

<sup>a</sup> A statistically significant ( $p = .05$ ) Marital Status X Ethnic Group interaction was found for the desire outcome.

The high percentage of women in this study reporting that sex is moderately to extremely important (77%) suggests that sex is an important part of most mid-aged women's lives. The primary reasons given by women for engaging in sex were to express love and for pleasure. Of those women who engaged in sex within the past 6 months, just over 60% reported fairly regular sexual intercourse and 24% reported fairly regular oral sex (at least once a week). About half of the women reported engaging in masturbation in the last 6 months, which is consistent with other research (Laumann et al., 1994).

A substantial number of women (40%) reported a low frequency of sexual desire. However, lack of frequent desire does not appear to preclude emotional satisfaction or physical pleasure with relationships. Because our questions asked about frequency of desire rather than degree of desire, this result may represent a lack of time or energy rather than dysfunction. Other researchers have suggested that the nature of the sexual relationship, whether long-term and/or exclusive, makes an important contribution to both emotional and physical satisfaction (Waite & Joyner, 2001).

One interesting finding from this study is that menopausal status, at least in the early stages, is only minimally associated with sexual practices and functioning. While early perimenopausal women reported more frequent pain with intercourse and greater frequency of masturbation than premenopausal women, the two groups did not differ on importance of sex, desire, satisfaction, arousal, physical pleasure, or sexual activities. This finding is consistent with other cross-sectional studies that have not found an association between menopausal status and satisfaction (Avis et al., 2000; Hawton et al., 1994; Hunter et al., 1986), frequency of intercourse (Avis et al., 2000; Dennerstein, Dudley, Hopper, & Burger, 1997; Hawton et al., 1994), or desire (Køster & Garde, 1993).

Pain during intercourse was reported by approximately 20% of the women. Contrary to previous studies, we found that pain was associated with menopausal status, even in this early perimenopausal group. The Massachusetts Women's Health Study (MWHS) found that 22.5% of a sample of older women ages 51 to 61 reported any pain (Avis et al., 2000), but pain was not significantly related to menopausal

status. However, the MWSH sample size of 200 women was considerably smaller than that of SWAN and had less power to detect differences between menopausal statuses. Because frequency of masturbation was higher among the perimenopausal women, there is some suggestion—needing further exploration in longitudinal research—that women experiencing pain during intercourse might substitute masturbation for other sexual activities.

Although specific patterns were not always consistent, we did find some differences in practices and functioning across ethnic groups. Differences were found for importance of sex, practices, and some areas of functioning (desire, arousal, and pain). We did not find differences in engaging in sex, emotional satisfaction, or physical pleasure. Our results were fairly consistent with Laumann et al. (1994) for Caucasian, African American, and Hispanic women. Both studies found that Caucasian women were more likely to report masturbation and lower frequency of sexual intercourse. Neither study found ethnic differences in emotional satisfaction or physical pleasure. The Laumann study had insufficient numbers to study Asian women.

It is important that we take care in interpreting ethnic differences, particularly with respect to the Japanese, Chinese, and Hispanic women. The differences observed could be due to cultural differences in sexual attitudes and practices or to women's interpretation of the study questions. Despite careful translation, we cannot rule out the possibility that terms such as desire and arousal may have different meanings across cultures or that women respond to them differently. Future SWAN research will attempt to further explore the biological and psychosocial factors that underlie these differences. In addition, Japanese, Chinese, and Hispanic women in SWAN were limited to one geographic site each. Although we included a site indicator variable in the models, we cannot rule out the possibility of geographic variation in responses or variation within ethnic groups. For example, the Hispanic sample in SWAN was primarily of Puerto Rican descent, and thus results cannot be generalized to the entire Hispanic population in the U.S.

The results presented in this paper included "the ability to pay for basics" as a measure of socioeconomic status. We found that women who reported experiencing financial strain were more likely to report lower frequency of desire and arousal and lower levels of emotional and physical satisfaction than their more financially secure counterparts. Yet, 76% of the women who found paying for basics somewhat hard and 66% of those who found it very hard reported that sex was moderately to extremely important to them. This suggests a need to consider lower-income women at risk for sexual dysfunction, to understand what may be underlying this finding, and to identify strategies for providing appropriate interventions.

This study demonstrates that it is possible to collect information on sexual practices and functioning from ethnically diverse women. Despite beliefs that women might be reluctant to report on their sexual lives, there was less than a 1% refusal rate and very little missing data. This

may be attributable to the use of a nonthreatening self-administered questionnaire format, and the fact that rapport existed before these questions were asked. It also may reflect a general willingness of women to respond to these types of questions.

Limitations of the study include the cross-sectional nature of the data and the fact that only premenopausal and early perimenopausal women were studied. SWAN will study these women longitudinally as they progress through the transition, which will enable us to determine patterns of change in activities and functioning over time and to separate the effects of menopause from those of age. Other studies have suggested that some of the changes in sexual functioning occur later in the transition (Dennerstein et al., 2001).

This study presents a snapshot of the sexual lives of mid-life women of five ethnicities who are in a premenopausal or early perimenopausal status and not taking any hormonal replacement therapy. In general, women in our study are sexually active and engage in a range of sexual practices demonstrating variability in a community-based sample of women. For the most part, women reported their sexual relationships to be emotionally and physically satisfying, even though 20% reported experiencing pain during intercourse.

Future research on the SWAN population will examine how progression through the menopausal transition influences an array of sexual practices and functioning in a diverse population of mid-life women. SWAN will be able to investigate how sexual practices and functioning interact with women's choices about hormone replacement therapy and other treatments employed to ease menopausal symptomatology.

## REFERENCES

- Abma, J., Chandra, A., Mosher, W., Peterson, L., & Piccinino, L. (1997). Fertility, family planning, and women's health: New data from the 1995 National Survey of Family Growth. *Vital and Health Statistics, 23*, 1-114.
- Avis, N. E. (2000). Is there a relationship between menopause and mood? In R. A. Lobo, J. Kelsey, & R. Marcus (Eds.), *Menopause: Biology and pathobiology* (pp. 339-352). San Diego, CA: Academic Press.
- Avis, N. E., Crawford, S. L., & McKinlay, S. M. (1997). Psychosocial, behavioral, and health factors related to menopause symptomatology. *Women's Health, 3*, 103-120.
- Avis, N. E., Stellato, R., Crawford, S., Johannes, C., & Longcope, C. (2000). Is there an association between menopause status and sexual functioning? *Menopause, 7*, 286-288.
- Ballinger, S. E. (1985). Psychosocial stress and symptoms of menopause: A comparative study of menopause clinic patients and non-patients. *Maturitas, 7*, 315-327.
- Bottigioni, F., & DeAloysio, D. (1982). Female sexual activity as a function of climacteric conditions and age. *Maturitas, 4*, 27-32.
- Brant, R. (1990). Assessing proportionality in the proportional odds model for ordinal logistic regression. *Biometrics, 46*, 1171-1178.
- Cawood, E. H. H., & Bancroft, J. (1996). Menopausal hormones, the menopause, sexuality and well-being of women. *Psychological Medicine, 26*, 925-936.
- Davison, J. M. (1985). Sexual behavior and its relationship to ovarian hormones in the menopause. *Maturitas, 7*, 193-201.
- Dennerstein, L., & Burrows, G. D. (1982). Hormone replacement therapy and sexuality in women. *Clinical Endocrinology Metabolism, 11*, 661-679.
- Dennerstein, L., Dudley, E., & Burger, H. (2001). Are changes in sexual

- functioning during midlife due to aging or menopause? *Fertility and Sterility*, 76, 456-460.
- Dennerstein, L., Dudley, E. C., Hopper, J. L., & Burger, H. (1997). Sexuality, hormones and the menopausal transition. *Maturitas*, 26, 83-93.
- Dennerstein, L., Smith, A. M. A., Morse, C. A., & Burger, H. G. (1994). Sexuality and the menopause. *Journal of Psychosomatic Obstetrics and Gynaecology*, 15, 59-66.
- Diokno, A. C., Brown, M. B., & Herzog, A. G. (1990). Sexual function in the elderly. *Archives of Internal Medicine*, 150, 197-200.
- Dudley, E. C., Hopper, J. L., Taffe, J., Guthrie, J. R., Burger, H. G., & Dennerstein, L. (1998). Using longitudinal data to define the perimenopause by menstrual cycle characteristics. *Climacteric*, 1, 18-25.
- Friedman, G. D., Cutter, G. R., Donahue, R. P., Hughes, G. H., Hulley, S. B., Jacobs, D. R., et al. (1988). CARDIA: Study design recruitment, and some characteristics of the examined subjects. *Journal of Clinical Epidemiology*, 41, 1105-1116.
- Gold, E. B., Sternfeld, B., Kelsey, J. L., Brown, C., Mouton, C., Reame, N., et al. (2000). Relation of demographic and lifestyle factors to symptoms in a multi-racial/ethnic population of women 40-55 years of age. *American Journal of Epidemiology*, 152, 463-473.
- Greendale, G. A., Hogan, P., & Shumaker, S. (1996). Sexual functioning in postmenopausal women: The postmenopausal estrogen/progestin interventions (PEPI) trial. *Journal of Women's Health*, 5, 445-458.
- Hällström, T. (1977). Sexuality in the climacteric. *Clinics in Obstetrics and Gynaecology*, 4, 227-239.
- Hawton, K., Gath, D., & Day, A. (1994). Sexual function in a community sample of middle-aged women with partners: Effects of age, marital, socioeconomic, psychiatric, gynecological, and menopausal factors. *Archives of Sexual Behavior*, 23, 375-395.
- Hunter, M., Battersby, R., & Whitehead, M. (1986). Relationships between psychological symptoms, somatic complaints and menopausal status. *Maturitas*, 8, 217-228.
- Iddenden, D. A. (1987). Sexuality during the menopause. *The Medical Clinics of North America*, 7, 87-94.
- Jackson, R., Chambless, L. E., Yang, K., Byrne, T., Watson, R., Folsom, A., et al. (1996). Differences between respondents and nonrespondents in a multicenter community-based study vary by gender and ethnicity. *Journal of Clinical Epidemiology*, 49, 1441-1446.
- Johannes, C. B., Crawford, S. L., Longcope, C., & McKinlay, S. M. (1996). Bleeding patterns and changes in the perimenopause: A longitudinal characterization of menstrual cycles. *Clinical Consultations in Obstetrics and Gynecology*, 8, 9-20.
- Kinsey, A. C., Pomeroy, W. B., & Martin, C. W. (1953). *Sexual behavior in the human female*. Philadelphia: WB Saunders.
- Køster, A., & Garde, K. (1993). Sexual desire and menopausal development. A prospective study of Danish women born in 1936. *Maturitas*, 16, 49-60.
- Laumann, E. O., Gagnon, J. H., Michael, R. T., & Michaels, S. (1994). *The social organization of sexuality*. Chicago: University of Chicago Press.
- Laumann, E. O., Paik, A., & Rosen, R. C. (1999). Sexual dysfunction in the United States: Prevalence and predictors. *Journal of the American Medical Association*, 281, 537-544.
- Manolio, T. A., Burke, G. L., Psaty, B. M., Newman, A. B., Haan, M., Powe, N., et al. (1995). Black-white differences in subclinical cardiovascular disease among older adults: The Cardiovascular Health Study. *Journal of Clinical Epidemiology*, 48, 1141-1152.
- Marsiglio, W., & Donnelly, D. (1991). Sexual relations in later life: A national study of married persons. *Journal of Gerontology*, 46, S338-344.
- Masters, W., & Johnson, V. (1966). *Human sexual response*. Boston: Little Brown.
- Morse, C., Smith, A., Dennerstein, L., Green, A., Hopper, J., & Burger, H. (1994). The treatment-seeking women at menopause. *Maturitas*, 18, 161-173.
- Osborn, M., Hawton, K., & Gath, D. (1988). Sexual dysfunction among middle aged women in the community. *British Medical Journal*, 296, 959-962.
- Pfeiffer, E., Verwoerdt, A., & Davis, G. C. (1972). Sexual behavior in middle life. *American Journal of Psychiatry*, 128, 1262-1267.
- Sarrel, P. M., & Whitehead, M. I. (1985). Sex and menopause: Defining the issues. *Maturitas*, 7, 217-224.
- Scott, S. C., Goldberg, M. S., & Mayo, N. E. (1997). Statistical assessment of ordinal outcomes in comparative studies. *Journal of Clinical Epidemiology*, 50, 45-55.
- Soules, M. R., Sherman, S., Parrott, E., Rebar, R., Santoro, N., Utian, W., et al. (2001). Executive summary: Stages of Reproductive Aging Workshop (STRAW). *Fertility and Sterility*, 76, 874-878.
- Sowers, M. F., Crawford, S. L., Sternfeld, B., Morganstein, D., Gold, E. B., Greendale, G. A., et al. (2000). SWAN: A multiethnic, community-based cohort study of women and the menopausal transition. In R. A. Lobo, J. Kelsey, & R. Marcus (Eds.), *Menopause: Biology and pathobiology*. San Diego: Academic Press.
- U.S. Census Bureau. (2001). *Profiles of general demographic characteristics, 2000 census of population and housing*. Washington, DC: Author.
- Waite, L. J., & Joyner, K. (2001). Emotional satisfaction and physical pleasure in sexual unions: Time horizon, sexual behavior, and sexual exclusivity. *Journal of Marriage and Family*, 63, 247-264.
- Wiederman, M. W., Maynard, C., & Fretz, A. (1996). Ethnicity in 25 years of published sexuality research: 1971-1995. *The Journal of Sex Research*, 33, 339-342.
- The Women's Health Initiative Study Group. (1998). Design of the Women's Health Initiative Clinical Trial and Observational Study. *Controlled Clinical Trials*, 19, 61-109.

Manuscript accepted March 18, 2003