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Ethnicity and variations of pelvic organ prolapse bother

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Abstract

Introduction and hypothesis—To determine if prolapse symptom severity and bother varies among non-Hispanic white, Hispanic, and Native American women with equivalent prolapse stages on physical examination.

Methods—This was a retrospective chart review of new patients seen in an academic urogynecology clinic from January 2007 to September 2011. Data were extracted from a standardized intake form, including patients' self-identified ethnicity. All patients underwent a Pelvic Organ Prolapse Quantification (POPQ) examination and completed the Pelvic Floor Distress Inventory-20 (PFDI-20) with its Pelvic Organ Prolapse Distress Inventory (POPDI) subscale.

Results—Five hundred and eighty-eight new patients were identified with pelvic organ prolapse. Groups did not differ by age, prior prolapse, and/or incontinence surgery, or sexual activity. Based on POPDI scores, Hispanic and Native American women reported more bother compared with non-Hispanic white women with stage 2 prolapse ($p < 0.01$). Level of bother between Hispanic and Native American women with stage 2 prolapse ($p = 0.56$) was not different. In subjects with stage 3 prolapse, POPDI scores did not differ by ethnicity ($p = 0.24$). In multivariate stepwise regression

analysis controlling for significant factors, Hispanic and Native American ethnicity contributed to higher POPDI scores, as did depression.

Conclusions—Among women with stage 2 prolapse, both Hispanic and Native American women had a higher level of bother, as measured by the POPDI, compared with non-Hispanic white women. The level of symptom bother was not different between ethnicities in women with stage 3 prolapse or greater. Disease severity may overshadow ethnic differences at more advanced stages of prolapse.

Keywords

Ethnicity; Hispanic; Native American; Pelvic organ prolapse; Symptom bother

Introduction

Pelvic organ prolapse (POP) is defined as a herniation of the pelvic organs to or through the vaginal opening [1]. Symptoms of POP include lower abdominal and vaginal pressure or heaviness, the sense of something falling out or a bulge from the vaginal area [2, 3]. Although not life-threatening, women with prolapse have a variety of other symptoms and functional complaints that adversely affect daily living, including incontinence, pain, sexual dysfunction, and impaired body image [4–6]. Estimates of the prevalence of POP vary widely based on the definition used and assessment method, i.e., questionnaire vs physical examination. Based on physical examination findings, the Women’s Health Initiative found a prolapse prevalence of 41.1 % among 16,616 women without a prior hysterectomy [7]. Others report a lower prevalence of 2.9 % to 5.7 %, but these estimates were based on questionnaire responses among a community-based population [8].

The gold standard for prolapse diagnosis is a validated, reproducible physical examination, the Pelvic Organ Prolapse Quantification examination (POPQ), which divides prolapse into five stages, based on the position of the most distal aspect of the prolapse [9]. In addition to anatomical measurements, a variety of condition-specific validated questionnaires measure prolapse symptom severity and associated quality of life changes, including the distress or bother associated with prolapse symptoms. Distress measures are routinely used to evaluate other functional disorders, such as sexual dysfunction [10, 11]. Just as all women are not bothered by lack of libido, not all women are bothered by anatomical changes that can be measured on physical examination. Correlation among anatomical findings, symptoms, and distress is essential to the ascertainment of disease burden of POP.

The association between POPQ examination findings and symptoms show a moderate correlation between symptoms and severity of prolapse among non-Hispanic white women [12]. Another study, which included non-Hispanic white and African American women demonstrated increased symptoms as the prolapse extended beyond the hymen [13]. Hispanic and non-Hispanic white women were found to be more likely to have symptomatic POP than African American women; however, the single study investigating this did not use validated measures of symptom severity or symptom distress, and Native American women were not included in the analyses [14].

The primary aim of this study was to determine if prolapse symptom severity and distress varied among non-Hispanic white, Hispanic, and Native American women with equivalent prolapse stages, as measured by the validated POPQ pelvic examination using condition-specific validated questionnaires. We hypothesized that Hispanic women will report increased symptom severity and a higher level of distress than non-Hispanic white women and that Native American women will report a lower level of symptom severity and distress

than non-Hispanic white women for equivalent stages of prolapse as measured by the POPQ examination.

Materials and methods

After obtaining approval from the Human Research Review Committee/Institutional Review Board (HRRC/IRB) at the University of New Mexico Hospital (UNMH), we performed a retrospective chart review of all new patients seen in the urogynecology clinic at UNMH in Albuquerque, New Mexico, from January 2007 through September 2011 (HRRC#: 10–511). New patients were identified from an administrative database that the clinic maintains of all new patients. All women presenting for care at our clinic underwent a standardized intake history, which included patients' self-identified ethnicity and a pelvic examination measuring prolapse stage using the Pelvic Organ Prolapse Quantification (POPQ). In addition, all women who could read and write in English completed a series of validated questionnaires of pelvic floor disorder symptoms and distress including the Pelvic Floor Distress Inventory-20 (PFDI-20) with the Pelvic Organ Prolapse Distress Inventory (POPDI) subscale. The POPDI subscale is scored from 0 to 100 with a higher number indicating a higher level of distress from pelvic organ prolapse symptoms.

Data were extracted from the standardized intake history form, dictated record and patient questionnaires. Study inclusion criteria included all English-speaking patients with a diagnosis of symptomatic POP as identified by the provider's dictated assessment. Only women who described their ethnicity as Hispanic, Native American, or non-Hispanic white were included in this study. The African American population seen at the University of New Mexico is quite small; only 9 patients were seen with symptomatic prolapse who described themselves as African Americans during the study period, and were therefore excluded from analysis. For analyses, women were dichotomized into those with stage 2 POP and those with stage 3 or greater POP. We compared POPDI scores between women with stage 2 vs stage 3 POP and compared these scores across ethnicities.

Other data collected included patient characteristics, including age, BMI, parity, as well as past medical history, including a history of depression or anxiety, surgical history, social and sexual history, including sexual activity and whether the patient had a current sexual partner, and pelvic examination findings. Data collected from the medical record also included insurance type, which was categorized as public, private, or no insurance.

Although a retrospective review study design does not support a power analysis, we utilized our anticipated sample size obtainable for the urogynecological clinic population of new patients seen from 2007 to 2010 to estimate differences in POPDI scores among our tri-ethnic population for equivalent stages of prolapse. From our preliminary query of our administrative database, the Urogynecology Division saw 2,500 new patients between 2007 and 2010. Of those, approximately 700 women presented with symptoms of prolapse. Of these 700 women, we anticipate a self-defined race/ethnic distribution of 40 % Hispanic, 45 % non-Hispanic white, 10 % Native American and 5 % other or without sufficient, critical data. These sample sizes are adequate to detect differences in distress scores of 10 points or more on the POPDI with 80 % power and $\alpha=0.05$. This is based on the variability of this measure (SD=26.9) reported by Barber et al. [15] and is an estimate of the smallest population in this study (Native American), or the comparison of Native American with Hispanic women. For the comparison group of Hispanic to non-Hispanic white women, this detectable difference would be 6 points. These values are lower than the previously established minimally important difference for the PFDI published by Barber et al. of 13.5 points, and therefore represents differences that are likely to be clinically relevant [16].

Data were analyzed using SAS v9.3 (Cary, NC, USA). Chi-squared and Student's *t* tests were used where appropriate. ANOVA with Fisher's least significant difference post hoc testing and stepwise regression analyses were performed to determine whether ethnicity was independently associated with differences in POPDI scores, while controlling for other variables that differed among groups. Variables that were considered important to the model, including age, BMI, diagnosis of depression or anxiety, prior pelvic surgery, partner status, and sexual activity, were determined a priori. All candidate variables that were found to be significant or those considered important to the model and previously defined, were put in a forward stepwise logistic regression model.

Results

From January 2007 to September 2011, 1,899 new patients in the urogynecology clinic had a dictated clinical record, a completed standardized history and physical intake form, and quality of life questionnaires. Of these, 588 were determined by the attending physician based on history and physical examination to have symptomatic pelvic organ prolapse (stage 2 or greater) and have a self-defined ethnicity of Hispanic, Native American, or non-Hispanic white (Table 1). Seven of the 588 women had incomplete POPDI questionnaires and were excluded from analyses. Our final study population included 581 women; 221 Hispanic, 76 Native American, and 284 non-Hispanic white women.

The mean patient age was 59.9 ± 13.1 years, the mean BMI was 29.2 ± 6.6 kg/m², and the mean POPDI score was 44.3 ± 26.5 . Baseline characteristics among the entire population across the three ethnicities are demonstrated in Table 2. For the purposes of analysis, subjects were dichotomized into those with stage 2 POP and those with stage 3 or greater POP.

Among patients with stage 2 POP, there was no difference among ethnicities with regard to age, BMI, prior hysterectomy, previous POP repair or anti-incontinence procedures, depression, anxiety, or rates of sexual activity. Non-Hispanic white women had a lower median parity (2 vs 3, 3; $p < 0.01$) and were less likely to have public health insurance than Hispanic or Native American women (45.9 % vs 65.3 %, 75 %, $p < 0.01$; Table 3). Non-Hispanic white women also had a lower score on the POPDI questionnaire for stage 2 POP, indicating less bother, compared with Hispanic and Native American women (36.8 ± 25.0 vs 46.3 ± 25.9 and 49.3 ± 27.7 respectively, $p < 0.01$).

Of the patients with stage 3 POP or greater, there was no difference between ethnicities for age, previous POP repair or prior anti-incontinence procedures, anxiety, rates of sexual activity, or POPDI scores. Non-Hispanic white women had a lower BMI than Hispanic and Native American women (27.0 kg/m² vs 30.3 kg/m², 28.9 kg/m², $p < 0.01$). Parity varied across all three ethnicities, with Native American women having the highest parity, followed by Hispanic then non-Hispanic white women (4 vs 3 vs 2, all $p < 0.04$). Native American women were less likely to have had a hysterectomy than Hispanic and non-Hispanic white women (23.8 % vs, 35.9 % and 44.9 % respectively, $p = 0.04$), Table 4. Hispanic women were more likely than Native American or non-Hispanic white women to carry a diagnosis of depression (21.7 % vs 4.8 % and 11.8 % respectively, $p = 0.02$). Non-Hispanic white women were more likely to have a current partner than Native American women (65.1 % vs 45.2 %, $p = 0.03$) otherwise partner status did not vary between groups. Similar to women with stage 2 POP, non-Hispanic white women with stage 3 or greater POP were less likely to have public health insurance than Hispanic and Native American women (48.0 % vs 64.8 % and 75.6 %, $p = 0.01$).

For stage 2 POP, POPDI scores were significantly higher, representing greater distress, among Hispanic and Native American women compared with non-Hispanic white women. In women with stage 3 or greater POP, there was no difference in POPDI scores across ethnicities (Table 5).

The finding of a higher level of bother among Hispanic and Native American women compared with non-Hispanic white women with stage 2 POP was further explored with a regression model. All significant variables identified on univariate analysis for stage 2 POP were incorporated into the model, including parity, insurance type, POPDI score, and ethnicity. Other candidate variables that were not significant in the univariate analysis, but were considered to be important in possibly affecting distress or POP symptom severity were also entered as candidate variables in a stepwise linear logistic regression model. These included age, BMI, partner status, depression, anxiety, prior hysterectomy, prior prolapse surgery, prior incontinence surgery, and sexual activity.

The “best model” determined by forward stepwise regression for significant determinants of POPDI score included ethnicity and depression. Hispanic women were found to have an increase in POPDI score of 12.8 points and Native American women 10.4 points, both compared with non-Hispanic white women. A diagnosis of depression also led to an increase in score of 12.3 points (Table 6).

Given the correlation between increased symptoms when the prolapse progresses beyond the hymen, the group with stage 2 POP was further explored among the three ethnicities. Three categories were defined from POPQ measurements of patients with stage 2 POP based on the most distal aspect of the prolapse: -1, 0, and +1. Although there was a trend toward Native American women having less of the -1 designation compared with the Hispanic and non-Hispanic white women, this was non-significant (5.4 % vs 12.6 %, 16.6 %, $p=0.46$). There was no difference in the percentage of women with the most distal aspect of the prolapse at 0 among Hispanic, Native American and non-Hispanic white women (47.9 % vs 44.0 % vs 54.1 %), there was also no difference among women with the most distal aspect of the prolapse at +1 (39.5 % vs 39.5 % vs 40.5 %; all $p=0.45$).

To further investigate the stage 2 prolapse group and to determine if the increased bother seen in this group remained when only assessing those with prolapse at or beyond the hymen, we excluded women whose most distal aspect of the prolapse was -1. For women with prolapse to the hymen or beyond to the extent of +1, similar results were found. POPDI_6 scores of Hispanic and Native American women were not significantly different, but were significantly higher in Hispanic and Native American women (48.5 ± 25.1 and 49.4 ± 28.5) compared with non-Hispanic white women (37.3 ± 25.6 ; $p<0.01$). This remained significant after stepwise logistics regression was repeated ($p<0.01$).

Discussion

We found in this tri-ethnic population that Hispanic and Native American women report more distress from their stage 2 POP compared with non-Hispanic white women. When we examined more advanced stages of POP we did not find a significant difference in the level of distress from POP across the ethnicities, as measured by the POPDI score. Although POP is common and adversely affects the lives of women, race/ethnic disparities in disease prevalence, severity and impact are poorly understood for POP. Symptoms and degree of distress or bother from symptoms are important in determining the burden of disease among women. Our study finds that Native American women have a higher level of bother for stage 2 POP and confirms previous findings that Hispanic women have a higher level of bother from prolapse symptoms compared with non-Hispanic white women. Another interesting

finding is that for more advanced prolapse (stage 3 POP), there was no significant difference in level of distress across ethnicities as measured by the POPDI, suggesting that disease severity may overshadow ethnic difference. This study provides more information on the puzzling issue of stage 2 prolapse, as some women with stage 2 prolapse are highly bothered, whereas others are asymptomatic. Although there was a trend toward Native American women having less severe stage 2 POP this was not significant, but this may be secondary to the smaller numbers in the Native American group. The findings in this study add to the literature on understanding disease burden between two important minority groups in the United States, Native American and Hispanic women. Another noteworthy finding is the contribution that depression may make to the increase in distress of women with stage 2 prolapse. There is support that depression may be associated with prolapse symptom severity: a case control study found that women with prolapse were more likely to have depression [17]. In these situations, however, the directionality is unclear if prolapse contributes to depression or if women with depression experience more symptom severity from prolapse than women without depression.

Data support the notion that differences exist based on race/ethnicity for other pelvic floor disorders such as urinary incontinence. Racial differences have been described in prevalence, quantity, and type of urinary incontinence, as well as the degree of bother associated with symptoms, with Hispanic women reporting greater prevalence, worse symptoms and increased bother compared with non-Hispanic white women [18–20]. However, the relationship between ethnicity and POP prevalence and symptom bother is poorly understood. A large cross-sectional analysis of the 2005–2006 National Health and Nutrition Examination Survey concluded that 2.9 % of women reported symptoms of pelvic organ prolapse, but did not find a difference in prevalence by racial/ethnic group. However, this study was limited by a lack of physical examination measures [21]. The majority of studies that report no POP prevalence differences across racial groups are mainly limited to comparisons of African American and non-Hispanic white women [22, 23].

Race/ethnic differences regarding distress from prolapse are limited; a single study has investigated racial/ethnic differences in POP bother or distress. This cohort study concluded that Hispanic and non-Hispanic white women are more likely to have symptomatic POP than African American women; however, this study did not use validated measures of symptom severity or symptom distress, included only 19 Hispanic women with symptomatic prolapse, and did not include Native American women in the analyses [14].

According to 2010 census data, the Hispanic or Latino population is the largest minority group in the United States, comprising 16 % of the total population [24]. It is estimated that one in four women in the USA will be Latina in the year 2050 [25]. The previously discussed study by Whitcomb et al. [14] identified a 4–5 times higher risk of symptomatic pelvic prolapse among Latina and white women compared with African American women. Given the prevalence of prolapse in the USA and the prior research that supports the idea that Latina women may be more bothered by their pelvic floor dysfunction than non-Hispanic white women, this work is important in helping to better define the burden of disease among these minority women.

Strengths of this study include the relatively large number of Hispanic and Native American subjects, the use of a standardized history, and the use of validated, condition-specific questionnaires, as well as physician-determined diagnosis of stage of POP according to the POPQ. To our knowledge, this is also one of the only studies to provide prolapse symptom severity information on Native American women, who are largely missing from the current urogynecological literature. Weaknesses of this study include those inherent in its retrospective design. The use of the standardized history and physical form, the POPQ

examination, and validated patient questionnaires alleviates some of this bias. We were unable to collect information on socioeconomic status, although we did use insurance type as a marker for socioeconomic status. Another weakness is that the POPDI is not necessarily validated in native people or people of other cultures and therefore may not reflect the level of bother or symptom severity as accurately as those from non-Hispanic white women, i.e. the differences we observed in bother between ethnicities may have been secondary to inherent weaknesses in the measurement tool. Yet, these measures are utilized widely and have been validated in populations of diverse ethnicities. Finally, only women who could read and write in English were included in this study, as a validated version of the PFDI in Spanish was not used in the clinic during the study period. It is possible that Spanish speakers are inherently different from English speakers and this would not have been captured in this study.

As we continue to work to understand ethnic differences in prevalence and symptom severity in pelvic floor dysfunction there are many areas for further research. This includes expanding the literature on urinary incontinence and fecal incontinence by providing more focus on Hispanic and Native American women. Future directions of study include investigating whether a higher level of bother for prolapse affects both treatment choices and patient outcomes.

In conclusion, among women with stage 2 POP, both Hispanic and Native American women had a higher level of distress, as measured by the POPDI, compared with non-Hispanic white women. In cases of more advanced prolapse, stage 3 or greater, the level of distress was not different among ethnicities, suggesting that disease severity might overshadow ethnic differences in more advanced stages of prolapse. Providers should be mindful that depression may also increase the symptom severity experienced by patients with prolapse.

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Table 1

Patient ethnicity and stage of pelvic organ prolapse (POP)

Race/ethnicity	Stage 2 POP	Stage 3 POP	Stage 4 POP	Total
Hispanic	119	98	8	225
Native American	37	35	7	79
Non-Hispanic white	157	108	19	284

Table 2

Patient characteristics: entire population

	Hispanic Mean ± SD Median (LQ, UQ) n (%)	Native American Mean ± SD Median (LQ, UQ) n (%)	Non-Hispanic white Mean ± SD Median (LQ, UQ) n (%)	p values
Age (years)	58.6±13.1	60.9±11.4	60.6±13.5	0.18*
BMI (kg/m ²)	30.2±6.0 ^a	30.3±7.2 ^a	28.2±6.6 ^b	<0.01*
Parity (median)	3 (2.4) ^a	4 (3.5) ^b	2 (2.3) ^a	<0.01**
Previous hysterectomy	85 (37.8%) ^a	19 (24.1%) ^b	121 (42.6%) ^a	0.01***
Previous POP repair	30 (13.3%)	9 (11.4%)	52 (18.4%)	0.18***
Previous incontinence surgery	18 (8.0%)	8 (10.1%)	30 (10.6%)	0.60***
Depression	49 (21.8%)	12 (15.2%)	61 (21.5%)	0.44***
Anxiety	35 (15.6%)	6 (7.6%)	40 (14.1%)	0.20***
Current partner	117 (52.9%)	41 (51.9%)	176 (62.4%)	0.06***
Sexually active	106 (47.8%)	32 (40.5%)	129 (45.9%)	0.54***
Dyspareunia	43 (43.0%)	9 (29.0%)	47 (39.2%)	0.40***
Public insurance	145 (65.0%) ^a	58 (75.3%) ^a	132 (46.8%) ^b	<0.01***
POPDI 6 score	48.0±26.7 ^a	45.4±27.5 ^{a,b}	41.1±25.8 ^b	0.01***

LQ lower quartile, *UQ* upper quartile

* ANOVA

** Kruskal–Wallis

*** Fisher's exact test

Fisher's least significant difference is indicated by superscripts ^a, ^b. Ethnicities with different letters are significantly different

Table 3

Patient characteristics: stage 2 POP

	Hispanic (n=119) Mean ± SD Median (LQ, UQ) n (%)	Native American (n=37) Mean ± SD Median (LQ, UQ) n (%)	Non-Hispanic white (n=157) Mean ± SD Median (LQ, UQ) n (%)	p values
Age (years)	55.6±12.5	56.5±12.4	57.8±13.4	0.37 *
BMI (kg/m ²)	30.2±6.2	32.1±8.6	29.2±7.5	0.11 *
Parity (median)	3 (2.4) ^a	3 (2.4) ^a	2 (2.3) ^b	<0.01 **
Previous hysterectomy	47 (39.5 %)	9 (24.3 %)	64 (40.8 %)	0.17 ***
Previous POP repair	17 (14.3 %)	6 (16.2 %)	28 (18.0 %)	0.75 ***
Previous incontinence surgery	10 (8.4 %)	6 (16.2 %)	20 (12.8 %)	0.29 ***
Depression	26 (21.9 %)	10 (27.0 %)	46 (29.3 %)	0.38 ***
Anxiety	20 (16.8 %)	4 (10.8 %)	24 (15.3 %)	0.72 ***
Current partner	63 (53.4 %)	22 (59.5 %)	94 (60.3 %)	0.52 ***
Sexually active	65 (55.1 %)	18 (48.7)	77 (49.7 %)	0.65 ***
Dyspareunia	29 (47.5 %)	7 (38.9)	30 (41.1 %)	0.74 ***
Public insurance	77 (65.3 %) ^a	27 (75 %) ^a	72 (45.9) ^b	<0.01 ***
POPDI score	46.3±25.9 ^a	49.3±27.7 ^a	36.8±25.0 ^b	<0.01 *

* ANOVA

** Kruskal–Wallis

*** Fisher's exact test

Fisher's least significant difference is indicated by superscripts ^a, ^b. Ethnicities with different letters are significantly different

Table 4

Patient characteristics: stage 3 POP

	Hispanic (n=104) Mean ± SD Median (LQ, UQ) n (%)	Native American (n=39) Mean ± SD Median (LQ, UQ) n (%)	Non-Hispanic white (n=127) Mean ± SD Median (LQ, UQ) n (%)	p values
Age (years)	62.0±12.8	64.7±8.9	64.0±12.8	0.34*
BMI (kg/m ²)	30.3±5.8 ^a	28.9±5.7 ^a	27.0±5.2 ^b	<0.01*
Parity (median)	3 (2, 4) ^a	4 (3, 6) ^b	2 (2, 4) ^c	All p 0.03**
Previous hysterectomy	38 (35.9%) ^a	10 (23.8%) ^b	57 (44.9%) ^a	0.04***
Previous POP repair	13 (12.3%)	3 (7.1%)	24 (18.9%)	0.14***
Previous incontinence surgery	8 (7.6%)	2 (4.8%)	10 (7.9%)	0.90***
Depression	23 (21.7%) ^a	2 (4.8%) ^b	15 (11.8%) ^b	0.02***
Anxiety	15 (14.2%)	2 (4.8%)	16 (12.6%)	0.29***
Current partner	54 (52.4%) ^{a,b}	19 (45.2%) ^a	82 (65.1%) ^b	0.04***
Sexually active	41 (39.4%)	14 (33.3%)	52 (41.3%)	0.66***
Dyspareunia	14 (35.9%)	2 (15.4%)	17 (36.2%)	0.37***
Public insurance	68 (64.8%) ^a	31 (75.6%) ^a	60 (48.0%) ^b	0.01***
POPDI score	50.0±27.6	41.7±27.1	46.3±26.0	0.24***

* ANOVA

** Kruskal–Wallis

*** Fisher's exact test

Fisher's least significant difference is indicated by superscripts a, b, c. Ethnicities with different letters are significantly different

Table 5

Multivariate analysis Pelvic Organ Prolapse Distress Inventory (POPDI) scores across ethnicities

Prolapse stage	Hispanic	Native American	Non-Hispanic white	p value
POPDI score (mean ± SE)				
Stage 2 POP	n=117 46.3±25.9 ^b	n=37 49.3±27.7 ^b	n=157 36.8±25.0 ^a	<0.01
Stage 3 POP	n=104 50.0±27.6	n=39 41.7±27.1	n=127 46.3±26.0	0.24

Fisher's least significant difference is indicated by superscripts ^a, ^b. Ethnicities with different letters are significantly different

Table 6

Significant determinants of POPDI score for stage 2 POP

Determinants of POPDI score	POPDI score effect Regression coefficients (\pm SE)	<i>p</i> value
Hispanic women	12.8 \pm 4.6	0.006
Native American women	10.4 \pm 3.1	0.001
Depression	12.3 \pm 4.6	< 0.001

"Best" model by stepwise regression

Candidate factors included ethnicity, age, BMI, parity, partner status, depression, anxiety, prior hysterectomy, previous POP and/or incontinence surgery, sexual activity, and insurance status