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## Childbirth and Female Sexual Function Later in Life

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### Abstract

**Objective**—To examine relationships between parity, mode of delivery, and other parturition-related factors with women's sexual function later in life.

**Methods**—Self-administered questionnaires examined sexual desire, activity, satisfaction, and problems in a multiethnic cohort of women aged 40 years and older with at least one past childbirth event. Trained abstractors obtained information on parity, mode of delivery, and other parturition-related factors from archived records. Multivariable regression models examined associations with sexual function, controlling for age, race or ethnicity, partner status, diabetes, and general health.

**Results**—Among 1,094 participants, mean ( $\pm$ SD) age was 56.3 ( $\pm$ 8.7) years, 568 (43%) were racial or ethnic minorities (214 Black, 171 Asian, and 183 Latina), and 963 (88%) were multiparous. Fifty-six percent ( $n=601$ ) reported low sexual desire ; 53% ( $n=577$ ) reported less than monthly sexual activity, and 43% ( $n=399$ ) reported low overall sexual satisfaction. Greater parity was not associated with increased risk of reporting low sexual desire (adjusted odds ratio [AOR]=1.08, CI=0.96-1.21 per each birth), less than monthly sexual activity (AOR=1.05, CI=0.93-1.20 per each birth), or low sexual satisfaction (AOR=0.96, CI=0.85-1.09 per each birth). Compared to vaginal delivery alone, women with a history of cesarean delivery were not significantly more likely to report low desire (AOR=0.71, CI=0.34-1.47), less than monthly sexual activity (AOR=1.03, CI=0.46-2.32), or low sexual satisfaction (AOR=0.57, CI=0.26-1.22). Women with a history of operative-assisted delivery were more likely to report low desire (AOR=1.38, CI=1.04-1.83).

**Conclusions**—Among women with at least one childbirth event, parity and mode of delivery are not major determinants of sexual desire, activity, or satisfaction later in life.

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## Introduction

Epidemiologic studies suggest that more than 20% of women experience some form of sexual dysfunction,<sup>1-3</sup> but little is known about why some women develop problems with sexual activity but not others. Although increasing age, poor health-related quality of life, lack of a partner capable of having sexual activity, and specific chronic conditions such as diabetes have been suggested as possible predictors of female sexual dysfunction,<sup>1,4-7</sup> one other important factor with the potential to influence female sexual function through multiple mechanisms is childbirth. Together with changes in family size and structure, childbirth can lead to trauma to the perineum and pelvic floor, post-surgical complications (in the case of cesarean delivery), as well as other changes in health and functioning that may affect women's ability to engage in and enjoy sexual activity.<sup>5,8-11</sup>

To date, studies of the effect of parturition on female sexual function have yielded inconclusive results. Vaginal delivery<sup>12-15</sup>, perineal trauma<sup>16-19</sup>, and number of children<sup>20-22</sup> have all been identified as possible predictors of short-term postpartum sexual dysfunction. Limited follow-up studies more than a year postpartum have not consistently found that childbirth affects women's sexual wellbeing, however.<sup>23-26</sup> Almost no data are available to indicate whether parturition influences sexual activity or function in women more than two years postpartum,<sup>24-26</sup> leading consensus panels to call for more high-quality research on this issue.<sup>27,28</sup>

In a large, population-based, ethnically-diverse cohort of women aged 40 years and older, we examined relationships between parity, mode of delivery, and other childbirth-specific factors with women's sexual activity and function. Our goal was to provide new evidence to guide patient-provider discussions about the long-term effect of parturition on women's sexual activity and well-being later in life.

## Materials and Methods

### Study population

This research was conducted within the Reproductive Risks of Incontinence Study at Kaiser, an observational cohort study of risk factors for urinary tract dysfunction in community-dwelling middle-aged and older women. Participants in the Reproductive Risks of Incontinence Study at Kaiser were long-term enrollees in the Kaiser Permanente Northern California (KPNC), an integrated health care maintenance organization serving approximately 25-30% of the population in Northern California.<sup>29</sup> To be eligible for the Reproductive Risks of Incontinence Study at Kaiser, women had to be at least 40 years old and to have enrolled in KPNC by age 18. Women were also randomly sampled from within race or ethnicity strata to achieve an overall racial and ethnic composition of 20% African American, 20% Latina White, 20% Asian, and 40% non-Latina White.<sup>30</sup> No symptoms or history of urinary tract dysfunction were required for participation in the Reproductive Risks of Incontinence Study at Kaiser 2, but approximately 20% of participants were sampled from the KPNC Diabetes Registry to ensure robust participation by diabetic women.

This analysis used data from the second data collection wave of the Reproductive Risks of Incontinence Study at Kaiser (Reproductive Risks of Incontinence Study at Kaiser 2, January 2003 to January 2008), in which detailed questionnaires about sexual activity and function were administered. Participants were included in analyses if they belonged to one of the four main Reproductive Risks of Incontinence Study at Kaiser 2 race/ethnicity categories, reported at least one past childbirth event, and had abstracted medical record data available within the KPNC system (N=1094). Because the objective of this analysis was to investigate the direct effects of parturition rather than changes in family structure or social

life on female sexual function, we excluded women with no prior childbirth events, recognizing that differences in sexual wellbeing among women with no children versus one or more children might reflect contextual or social factors to a greater extent than childbirth itself.<sup>26</sup> Of the 2,270 Reproductive Risks of Incontinence Study at Kaiser 2 participants, 2,252 belonged to one of the four main race or ethnicity categories, of which 1,844 had at least one childbirth event, and 1,844 answered at least one sexual function question. Of these women, 1,094 had abstracted medical record data for at least one childbirth event available within KPNC. Ninety-five percent (N=1036) were 10 or more years past their last delivery; mean time since last delivery was 27.3 ( $\pm$ SD 10.2) years.

### Data collection

Professional abstractors employed by the Kaiser Division of Research, experienced in abstracting data for multiple clinical research studies, reviewed medical records archived at KPNC to obtain detailed information on obstetric history. Abstracted variables included number of births, mode of delivery (cesarean vs. vaginal), delivery after 40 weeks of gestation, induction and augmentation of labor (including use of oxytocin and operative forceps- or vacuum-assisted vaginal delivery), spinal anesthesia, episiotomy, 3<sup>rd</sup> or 4<sup>th</sup> degree perineal lacerations, and birth weight  $\geq$  4,000 grams.

Sexual activity and function were assessed during the Reproductive Risks of Incontinence Study at Kaiser 2 visits using self-administered, structured-item questionnaire measures derived from the Female Sexual Function Index (FSFI)<sup>31</sup> and administered in prior women's health studies.<sup>4,32</sup> All questionnaires were completed in English and no translators were used during data collection. All items used Likert response scales and were selected or adapted to reflect the 3 months prior to women's study visits rather than restricting participation to women with partnered sexual activity in the past 4 weeks as would normally be required by the FSFI (Appendix 1, available online at <http://links.lww.com/xxx>). Participants completed sexual function questions in private and returned their responses to study staff in sealed envelopes. All women were asked to answer questions about their level of sexual desire, frequency of sexual activity, and overall level of sexual satisfaction in the past 3 months. For those participants who reported any sexual activity in the past 3 months (defined inclusively as "any activity that is arousing to you, including masturbation"), additional questionnaire items derived from the FSFI<sup>31</sup> that assessed specific sexual problems such as difficulty with sexual arousal, lubrication, orgasm, and pain or discomfort during vaginal intercourse.

Other general participant characteristics were also assessed using self-reported questionnaires. General self-reported health was assessed by asking each participant to describe their overall health as excellent, very good, good, fair, or poor. Verbal and written informed consent was obtained from all participants at the time of enrollment. The institutional review boards of the University of California San Francisco and Kaiser Permanente Northern California approved all study procedures for the Reproductive Risks of Incontinence Study at Kaiser cohort.

### Statistical Analysis

We first used descriptive statistics to examine the demographic and clinical characteristics of participants with abstracted parturition data. We then examined the distribution of self-reported sexual desire, frequency of sexual activity, and overall sexual satisfaction in this population. Among women reporting some sexual activity in the past 3 months, we also examined the prevalence of specific sexual problems such as difficulty with arousal, lubrication, and pain or discomfort with vaginal intercourse.

Multivariable logistic regression models were then developed to examine relationships between parity (total number of live births), mode of delivery (vaginal only, cesarean only, or vaginal plus cesarean), and other delivery-specific variables (birth after 40 weeks of gestation, history of oxytocin administration, operative (forceps- or vacuum-assisted) vaginal delivery, episiotomy, 3<sup>rd</sup> or 4<sup>th</sup> degree perineal laceration, spinal anesthesia, baby weight < 4000 grams) with sexual function. Our main analyses focused on: 1) low or very low sexual desire; 2) less than monthly sexual activity; and 3) low overall sexual satisfaction, as outcomes that have previously been linked with women's health and functioning in clinical research.<sup>4,32,33</sup> Among sexually active participants, additional multivariable logistic regression models were developed to assess relationships between parity, mode of delivery, and other parturition-specific variables with specific sexual problems such as: 1) low sexual arousal; 2) difficulty with lubrication; 3) difficulty with orgasm; and 4) pain or discomfort during sexual intercourse. Each sexual function outcome was examined independently, without adjustment for the level of other outcomes. All models were adjusted for age, race or ethnicity (categorized as Black or African-American, Asian or Asian-American, or Latina or Hispanic versus non-Latina White), partner status (current spouse or sexual partner versus no spouse or partner), self-reported general health (excellent or very good versus only good, fair, or poor), and diabetes status (current compared with no diabetes), as factors with the potential to confound the relationship between parturition and sexual function.

We also conducted sensitivity analyses to further investigate the relationship of parity and mode of delivery to sexual activity and function. Rather than examining parity and mode of delivery as separate variables, we constructed multivariable models in which 1) total number of vaginal deliveries and 2) total number of cesarean deliveries were each examined as potential predictors of sexual function, once again adjusting for age, race or ethnicity, partner status, and general health. The goal of these models was to assess for possible differences in the cumulative effect of vaginal versus cesarean deliveries on sexual activity and function, considering each distinct from the other. In order to examine whether additional health determinants affected the relationship between parity, delivery characteristics, and sexual function, we constructed expanded multivariate models that controlled for a wider array of factors with the potential to affect women's sexual well-being, namely age, race/ethnicity, partner status, diabetes status, self-reported general health, body mass index, menopausal status, estrogen use, selective serotonin reuptake inhibitor use, weekly urinary incontinence, and smoking and alcohol use. *P*-values less than 0.05 were considered statistically significant. All analyses were performed in SAS version 9.2 (SAS Institute, NC).

## Results

Among the 1,094 participants, mean ( $\pm$ SD) age was 56.3 ( $\pm$ 8.7) years. Over half (52%) were from racial or ethnic minorities (Table 1). Just over half (51%) reported being in excellent or very good overall health. Approximately three quarters (74%) reported having a spouse or sexual partner. Most women were multiparous ( $n=963$ ; 88%), with 39% having two births, 30% having three births, and 19% having four or more births. Over 80% of participants reported only vaginal deliveries, while 7% reported only cesarean deliveries.

Approximately half of participants (55%) reported low or very low sexual desire, with 53% reporting less than monthly sexual activity, and 20% of participants rated their overall sexual satisfaction as low or very low (Table 2). Of the 663 (61%) sexually active participants, 16% reported low or very low levels of sexual arousal, 56% reported at least some difficulty with lubrication, and 13% reported at least moderate pain or discomfort with vaginal intercourse (Table 3).

In multivariate analyses controlling for age, race or ethnicity, partner status, general health status, and diabetes status, we detected no significant associations between parity or mode of delivery and the outcomes of low sexual desire, less than monthly sexual activity, or low overall sexual satisfaction (Table 4). Participants who had undergone operative vaginal delivery were more likely to report low sexual desire (AOR 1.38, 95% CI 1.04-1.83). No other significant associations were detected between parturition-specific variables and sexual desire, frequency of sexual activity, or overall sexual satisfaction.

In contrast, increasing age was significantly associated with both low sexual desire (AOR 1.20, 95% CI 1.09-1.31 for each 5 year increase) and less than monthly sexual activity (AOR 1.42, 95% CI 1.28-1.58). African American and Asian participants were significantly more likely to report less than monthly sexual activity than White participants (AOR 1.80, 95% CI 1.22-2.76 and OR 2.06, 95% CI 1.36-3.13, respectively). Participants who lacked a sexual partner were significantly more likely to report low desire (AOR 2.93, 95% CI 2.13-4.05), less than monthly sexual activity (AOR 9.19, 95% CI 6.20-13.63) or low satisfaction (AOR 1.92, 95% CI 1.36-2.71). Compared to participants who reported excellent or very good overall health, participants who reported good, fair, or poor overall health were also more likely to report low desire (AOR 1.62, 95% CI 1.23-2.12), less than monthly sexual activity (AOR 1.58 95% CI 1.18-2.12), or low satisfaction (AOR 1.48, 95% CI 1.11-1.96).

Among sexually active participants, women who reported both vaginal and cesarean deliveries were more likely to report difficulty with lubrication compared to participants with only vaginal deliveries (AOR 2.57, 95% CI 1.15-5.73), after adjusting for age, race/ethnicity, partner status, and overall health (Table 5). No other significant associations between parity, mode of delivery, or other parturition-specific variables and specific sexual problems were detected in multivariable analysis. Increasing age was associated with an increased odds of reporting difficulty with lubrication (AOR 1.27, 95% CI 1.11-1.46). Women without a sexual partner were more likely to report difficulty with sexual arousal (AOR 2.10, 95% CI 1.16-3.80), but less likely to report that their (unpartnered) sexual activity was complicated by problems with lubrication (AOR 0.48, 95% CI 0.24 -0.95) or difficulty achieving orgasm (AOR 0.43, 95% CI 0.19-0.94). No other significant associations between participant characteristics and risk of sexual problems were detected in these models.

Sensitivity analyses that examined the relationship of 1) total number of vaginal deliveries and 2) total number of cesarean deliveries to each of our sexual function outcomes also revealed no significant relationships between these variables and self-reported sexual desire, activity, satisfaction, or problems (Appendixes 2 and 3, available online at <http://links.lww.com/xxx>). Findings were not substantially changed in additional multivariate analyses adjusting for an expanded set of co-variables with the potential to affect sexual function (including body mass index, menopausal status, estrogen use, selective serotonin reuptake inhibitor use, weekly urinary incontinence, smoking, and alcohol consumption) (Appendixes 4 and 5, available online at <http://links.lww.com/xxx>).

## Discussion

In this cohort of women aged 40 years and older with at least one prior childbirth event, we found that neither type of delivery nor total number of deliveries was a significant predictor of sexual desire, frequency of sexual activity, or overall sexual satisfaction. We also found no evidence that delivery after 40 weeks of gestation, oxytocin administration, episiotomy, perineal lacerations, spinal anesthesia, or macrosomia were associated with long-term detriment to sexual function. In contrast, women's interest and satisfaction in sexual activity

were strongly influenced by age, race or ethnicity, partner status, and general health, independent of obstetric history. Taken as a whole, these findings suggest that parturition is not a major contributor to sexual dysfunction in women later in life.

Many pregnant women and their clinicians are concerned about the potential effects of childbirth on sexual function,<sup>34</sup> with some even preferring cesarean delivery because of concerns about sexual dysfunction after vaginal delivery.<sup>35</sup> Several studies have pointed to an increased short-term risk of postpartum sexual dysfunction, particularly after vaginal delivery,<sup>12,14</sup> episiotomy,<sup>16,19</sup> or perineal trauma during delivery.<sup>16-18</sup> In our study, women with a history of operative vaginal delivery reported lower interest in sex, which could be related to residual delivery-rated pain or pelvic floor dysfunction;<sup>36,37</sup> however, operative vaginal delivery was not a predictor of frequency of sexual activity, sexual satisfaction, or other sexual problems. Overall, our findings suggest that clinicians may counsel pregnant women that, regardless of short-term postpartum effects, their long-term sexual quality of life will not be determined by factors related to childbirth.

A few previous studies have also examined women's sexual function more than 2 years after childbirth. In a case-control study of identical twins with discordant obstetric histories, no significant relationship between sexual quality of life and cesarean versus vaginal delivery was detected.<sup>26</sup> Unlike our study, that study included nulliparous women and reported better sexual function for nulliparous compared to parous women, a finding that was attributed to psychological and contextual factors rather than direct effects of childbirth. A survey of postmenopausal women in the Women's Health Initiative Observational Study also reported no association between parity and sexual satisfaction as measured by a single dichotomous item.<sup>24</sup> That analysis did not assess other sexual function domains, however, nor distinguished between the effects of vaginal compared with cesarean delivery.

Interestingly, sexually active women with a history of both vaginal and cesarean deliveries in our study were more likely to report problems with lubrication compared to women with vaginal delivery only. It is possible that women who have undergone both vaginal and cesarean delivery differ in hormonal status, genital vascular perfusion, or other factors that influence lubrication. Given the small number of participants with both vaginal and cesarean deliveries; however, this may be a chance finding rather than a true biological association.

This study benefits from a large, diverse sample of women, assessment of multiple dimensions of sexual function, and careful abstraction of data on parturition-specific factors. Nevertheless, our research has several limitations. First, sexual function was assessed at only one time point, precluding examination of longitudinal changes after childbirth. Second, while the sexual function measures used were derived from validated instruments,<sup>31</sup> have been administered in other women's health studies,<sup>4,32</sup> and have been used to document effects of other health-related factors on sexual function,<sup>32,33,38</sup> they have not undergone psychometric evaluation in their current form. Furthermore, participants were long-time members of a health-maintenance organization and were participating in an observational study of risk factors for urinary tract dysfunction, and findings may not be fully generalizable to other populations.

In addition, study power may also have been limited for some parturition-related factors that were less prevalent or for specific sexual problems that were assessed only among women who reported recent sexual activity. For example, while confidence intervals for our estimates of the relationship of parity to sexual satisfaction excluded a more than 15% decreased odds and more than 9% increased odds of low satisfaction associated with each childbirth event, confidence intervals for our estimates of the relationship of spinal anesthesia to difficulty with lubrication included the possibility of a more than 50%

decreased odds and greater than 100% increased odds of lubrication difficulty associated with anesthesia.

In conclusion, these findings provide reassuring evidence for women who have had or are planning to have children that neither the total number of deliveries nor type of delivery is likely to have a substantial long-term detrimental effect on their sexual function. Instead, attention should be focused on other health and contextual factors that may influence sexual activity later in life.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1**  
**Demographic and Clinical Characteristics of Participants With Abstracted Records for at Least One Delivery Event (n=1094)**

<b>Demographic History</b>	
Age	
<50 years	289 (26%)
50-64 years	578 (53%)
65 years	227 (21%)
Race/ethnicity	
White/Caucasian	526 (48%)
Black/African-American	214 (20%)
Asian/Asian-American	171 (16%)
Latina/Hispanic	183 (17%)
Current spouse or partner	800 (74%)
Working full time outside of the home	414 (39%)
College graduate	369 (34%)
<b>General health history</b>	
Excellent or very good overall health <sup>*</sup>	558 (51%)
Mean body mass index, kg/m <sup>2</sup>	28.8 (6.6)
Postmenopausal <sup>†</sup>	901 (82%)
Diabetes mellitus	155 (14%)
Estrogen therapy <sup>‡</sup>	149 (14%)
Selective serotonin reuptake inhibitor use	94 (9%)
Urinary incontinence (weekly)	328 (30%)
Current smoker	74 (7%)
More than 5 alcoholic beverages per week	128 (12%)
<b>Parturition-related factors</b>	
Number of live births	
1	131 (12%)
2	427 (39%)
3	327 (30%)
4 or more	209 (19%)
Type of delivery <sup>§</sup>	
All vaginal	945 (86%)
All cesarean	75 (7%)
Mixed vaginal and cesarean delivery	73 (7%)
Ever birth after 40 weeks of gestation	226 (21%)
Ever oxytocin administration	324 (30%)
Ever had operative vaginal delivery	484 (44%)

Ever had episiotomy	936 (86%)
Ever had 3 <sup>rd</sup> or 4 <sup>th</sup> degree laceration	175 (16%)
Ever had spinal anesthesia	114 (10%)
Ever baby weight > 4000 grams (macrosomia)	165 (15%)

Data are n (%) or mean ( $\pm$ standard deviation).

\* Overall health was assessed by asking participants to indicate whether their general health was excellent, very good, good, fair, or poor.

<sup>†</sup> Participants were considered postmenopausal if they reported having permanently stopped having periods (at least 6 months or more).

<sup>‡</sup> Includes oral, transdermal, and topical estrogen preparations.

<sup>§</sup> For 10 parturition events for which information about mode of delivery was missing, delivery was assumed to be vaginal.

Includes forceps-assisted or vacuum-assisted delivery.

**Table 2**  
**Self-reported Sexual Desire, Frequency of Sexual Activity, and Sexual Satisfaction, by Age, Race or Ethnicity, Partner Status, Diabetes Status, and Parturition Factors**

	Low Sexual Desire or Interest*	Less Than Monthly Sexual Activity <sup>†</sup>	Low Sexual Satisfaction <sup>‡</sup>
<b>All eligible participants</b>	601 (56%)	577 (53%)	399 (43%)
<b>Age</b>			
<50 years	116 (40%)	97 (34%)	99 (37%)
50-64 years	325 (57%)	313 (54%)	225 (45%)
65 years	160 (71%)	167 (75%)	75 (49%)
<b>Race/ethnicity</b>			
White/Caucasian	308 (59%)	260 (50%)	205 (46%)
Black/African-American	107 (50%)	137 (64%)	76 (44%)
Asian/Asian-American	92 (54%)	92 (54%)	66 (44%)
Latina/Hispanic	94 (53%)	88 (48%)	52 (34%)
<b>Partner status</b>			
Current spouse or partner	389 (49%)	319 (40%)	296 (40%)
No spouse or partner	212 (74%)	250 (87%)	102 (58%)
<b>Self-reported overall health</b>			
Excellent or very good	272 (50%)	256 (46%)	190 (39%)
Good, fair, or poor	328 (62%)	320 (60%)	208 (48%)
<b>Diabetes status</b>			
No current diabetes	503 (54%)	476 (51%)	337 (42%)
Current diabetes	98 (64%)	101 (65%)	62 (51%)
<b>Number of live births</b>			
1	68 (52%)	66 (50%)	50 (48%)
2	203 (48%)	196 (46%)	155 (40%)
3	201 (63%)	185 (57%)	119 (45%)
4 or more	129 (62%)	130 (62%)	75 (45%)
<b>Type of delivery</b>			
Vaginal only	530 (57%)	503 (54%)	345 (44%)
Cesarean only	32 (43%)	29 (39%)	23 (33%)
Mixed vaginal and cesarean delivery	38 (53%)	44 (60%)	31 (50%)
<b>Ever birth after 40 weeks of gestation</b>	102 (45%)	105 (47%)	79 (39%)
<b>Ever oxytocin administration</b>	170 (53%)	156 (48%)	126 (43%)
<b>Ever had operative vaginal delivery<sup>§</sup></b>	295 (62%)	289 (60%)	181 (46%)
<b>Ever had episiotomy</b>	523 (57%)	505 (54%)	343 (44%)
<b>Ever had 3<sup>rd</sup> or 4<sup>th</sup> degree laceration</b>	83 (49%)	86 (49%)	61 (41%)
<b>Ever had spinal anesthesia</b>	62 (54%)	62 (54%)	44 (45%)
<b>Ever baby weight 4000 grams (macrosomia)</b>	98 (60%)	86 (52%)	70 (48%)

Data are n (%).

Percentages reflect the prevalence of each sexual function outcome based on demographic, health-related, and obstetric characteristics.

\* Data missing for 11 participants.

† Data missing for 5 participants.

‡ Data missing for 171 participants, of which 82 responded “not applicable.”

§ Includes forceps-assisted or vacuum-assisted delivery.

**Table 3**  
**Sexual Activity-Specific Problems by Age, Race or Ethnicity, Partner Status, Diabetes Status, and Parturition Factors**

	Difficulty With Arousal*	Difficulty With Lubrication <sup>†</sup>	Difficulty With Orgasm <sup>‡</sup>	Pain With Intercourse <sup>§</sup>
<b>All sexually active participants</b>	103 (16%)	148 (23%)	115 (18%)	81 (14%)
<b>Age</b>				
<50 years	21 (9%)	30 (13%)	30 (13%)	20 (9%)
50-64 years	63 (19%)	92 (28%)	67 (20%)	54 (19%)
65 years	19 (21%)	26 (30%)	18 (21%)	7 (11%)
<b>Race/ethnicity</b>				
White/Caucasian	56 (17%)	84 (26%)	65 (20%)	47 (17%)
Black/African-American	8 (8%)	19 (18%)	9 (9%)	11 (12%)
Asian/Asian-American	15 (15%)	18 (19%)	17 (17%)	10 (11%)
Latina/Hispanic	24 (20%)	27 (23%)	24 (20%)	13 (12%)
<b>Partner status</b>				
Current spouse or partner	82 (14%)	136 (24%)	107 (19%)	79 (15%)
No spouse or partner	21 (27%)	12 (16%)	8 (10%)	2 (6%)
<b>Self-reported overall health</b>				
Excellent or very good	63 (17%)	77 (21%)	69 (18%)	46 (14%)
Good, fair, or poor	40 (14%)	71 (26%)	46 (17%)	35 (15%)
<b>Diabetes status</b>				
No current diabetes	93 (16%)	130 (23%)	104 (18%)	69 (14%)
Current diabetes	10 (14%)	18 (24%)	11 (15%)	12 (19%)
<b>Number of live births</b>				
1	6 (8%)	14 (18%)	10 (13%)	7 (10%)
2	42 (14%)	67 (23%)	53 (18%)	45 (17%)
3	34 (19%)	46 (25%)	35 (19%)	22 (14%)
4 or more	21 (20%)	21 (21%)	17 (17%)	7 (8%)
<b>Mode of delivery</b>				
Vaginal only	94 (17%)	124 (22%)	105 (19%)	66 (14%)
Cesarean only	3 (6%)	11 (20%)	3 (6%)	10 (19%)
Mixed vaginal and cesarean delivery	6 (15%)	13 (33%)	7 (18%)	5 (15%)
<b>Ever birth after 40 weeks gestation</b>	17 (12%)	27 (19%)	22 (15%)	19 (14%)
<b>Ever oxytocin administration</b>	29 (13%)	44 (20%)	38 (18%)	24 (13%)
<b>Ever had operative vaginal delivery<sup>¶</sup></b>	46 (18%)	66 (25%)	52 (20%)	32 (15%)
<b>Ever had episiotomy</b>	92 (17%)	129 (24%)	106 (19%)	66 (14%)
<b>Ever had 3<sup>rd</sup> or 4<sup>th</sup> degree laceration</b>	16 (15%)	23 (21%)	15 (14%)	13 (14%)

	Difficulty With Arousal <sup>*</sup>	Difficulty With Lubrication <sup>†</sup>	Difficulty With Orgasm <sup>‡</sup>	Pain With Intercourse <sup>§</sup>
Ever had spinal anesthesia	9 (14%)	16 (24%)	6 (9%)	9 (15%)
Ever baby weight 4000 grams (macrosomia)	21 (21%)	20 (20%)	22 (22%)	12 (14%)

Data are n(%).

<sup>\*</sup>Data missing for 8 participants.

<sup>†</sup>Data missing for 14 participants.

<sup>‡</sup>Data missing for 11 participants.

<sup>§</sup>Of participants who answered this question, 81 (12%) reported not attempting vaginal intercourse. Data missing for an additional nine participants.

Participants were eligible to answer questions about sexual activity-specific problems only if they reported sexual activity in the past 3 months.

<sup>¶</sup>Includes forceps-assisted or vacuum-assisted delivery.



**Table 4**  
**Adjusted Associations Between Participant Characteristics and Self-Reported Sexual Desire, Frequency of Sexual Activity, and Overall Sexual Satisfaction (n=1094)**

	Low Sexual Desire or Interest AOR (95% CI) <sup>* †</sup>	Less Than Monthly Sexual Activity AOR (95% CI) <sup>*</sup>	Low Sexual Satisfaction AOR (95% CI) <sup>* ‡</sup>
<b>General demographic and clinical characteristics</b>			
Age (per each 5-year increase)	<b>1.20 (1.09 - 1.31)</b>	<b>1.42 (1.28 - 1.58)</b>	1.07 (0.97 - 1.18)
<b>Race/ethnicity</b>			
Black/African-American vs. White	<b>0.60 (0.41 - 0.86)</b>	<b>1.80 (1.19 - 2.71)</b>	0.83 (0.56 - 1.22)
Asian/Asian-American vs. White	1.06 (0.72 - 1.56)	<b>2.06 (1.36 - 3.13)</b>	0.98 (0.66 - 1.45)
Latina/Hispanic vs. White	0.90 (0.61 - 1.31)	1.27 (0.84 - 1.92)	<b>0.62 (0.41 - 0.93)</b>
<b>Lack of a current spouse or sexual partner</b>	<b>2.93 (2.13 - 4.05)</b>	<b>9.19 (6.20 - 13.63)</b>	<b>1.92 (1.36 - 2.71)</b>
<b>Poor, fair, or good vs. excellent or very good overall health<sup>§</sup></b>	<b>1.62 (1.23 - 2.12)</b>	<b>1.58 (1.18 - 2.12)</b>	<b>1.48 (1.11 - 1.96)</b>
<b>Current diabetes mellitus vs. no diabetes</b>	1.13 (0.77 - 1.68)	1.25 (0.81 - 1.91)	1.18 (0.78 - 1.79)
<b>Obstetric and delivery-specific characteristics</b>			
<b>Parity (per each additional one birth)</b>	1.08 (0.96 - 1.21)	1.05 (0.93 - 1.20)	0.96 (0.85 - 1.09)
<b>Mode of delivery</b>			
Cesarean delivery only vs. vaginal only	0.71 (0.34 - 1.47)	1.03 (0.46 - 2.32)	0.57 (0.26 - 1.22)
Mixed vaginal and cesarean deliveries vs. vaginal only	0.79 (0.44 - 1.44)	1.54 (0.80 - 2.98)	1.18 (0.65 - 2.15)
<b>Ever birth after 40 weeks of gestation</b>	0.73 (0.53 - 1.01)	0.96 (0.67 - 1.37)	0.89 (0.64 - 1.26)
<b>Ever oxytocin administration</b>	1.15 (0.86 - 1.54)	1.07 (0.78 - 1.46)	1.04 (0.77 - 1.41)
<b>Ever had operative-assisted vaginal delivery<sup>§</sup></b>	<b>1.38 (1.04 - 1.83)</b>	1.36 (1.00 - 1.84)	1.04 (0.77 - 1.40)
<b>Ever had episiotomy</b>	0.83 (0.50 - 1.36)	0.97 (0.56 - 1.68)	0.87 (0.52 - 1.46)
<b>Ever had 3<sup>rd</sup> or 4<sup>th</sup> degree laceration</b>	0.78 (0.55 - 1.13)	0.96 (0.65 - 1.42)	0.94 (0.64 - 1.38)
<b>Ever had spinal anesthesia</b>	1.09 (0.65 - 1.84)	1.08 (0.61 - 1.92)	1.15 (0.68 - 1.96)
<b>Ever baby weight 4000 grams (macrosomia)</b>	1.23 (0.84 - 1.80)	1.09 (0.73 - 1.64)	1.24 (0.85 - 1.82)

AOR, adjusted odds ratio; CI, confidence interval.

Boldface type for adjusted odds ratios and confidence intervals indicates an association reaching statistical significance at a threshold of  $P < 0.05$ .

\* Adjusted odds ratios and confidence intervals were obtained from multivariable logistic regression models adjusting for age, race or ethnicity, partner status, diabetes status, self-reported general health, parity, delivery mode, birth after 40 weeks of gestation, oxytocin administration, operative-assisted vaginal delivery, episiotomy, third- or fourth-degree laceration, spinal anesthesia, and baby weight 4000 grams or higher.

<sup>†</sup> Women were considered to have low sexual desire if they reported that their level of sexual desire or interest was low, very low, or none.

<sup>‡</sup> Women were considered to have low sexual satisfaction if they reported their overall level of sexual satisfaction was moderately dissatisfied or very dissatisfied.

<sup>§</sup> Overall health was assessed by asking participants to indicate whether their general health was excellent, very good, good, fair, or poor.

Includes forceps-assisted or vacuum-assisted delivery.

**Table 5**  
**Adjusted Associations Between Participant Characteristics and Sexual Activity-Specific Problems Among Sexually Active Participants (n=663)**

	Difficulty With Arousal AOR (95% CI) <sup>* †</sup>	Difficulty With Lubrication AOR (95% CI) <sup>* ‡</sup>	Difficulty With Orgasm AOR (95% CI) <sup>* §</sup>	Pain/Discomfort With Intercourse AOR (95% CI) <sup>*</sup>
<b>General demographic and clinical characteristics</b>				
Age (per each 5-year increase)	1.15 (0.98 - 1.34)	<b>1.27 (1.11 - 1.46)</b>	1.14 (0.98 - 1.33)	1.17 (0.98 - 1.40)
<b>Race/ethnicity</b>				
Black/African-American vs White	0.50 (0.22 - 1.14)	0.68 (0.38 - 1.24)	0.47 (0.22 - 1.02)	0.69 (0.33 - 1.44)
Asian/Asian-American vs White	1.22 (0.63 - 2.37)	0.79 (0.43 - 1.44)	1.03 (0.55 - 1.92)	0.67 (0.31 - 1.43)
Latina/Hispanic vs White	1.52 (0.85 - 2.73)	1.00 (0.58 - 1.70)	1.26 (0.72 - 2.20)	0.72 (0.36 - 1.44)
Lack of a spouse or sexual partner	<b>2.10 (1.16 - 3.80)</b>	<b>0.48 (0.24 - 0.95)</b>	<b>0.43 (0.19 - 0.94)</b>	0.31 (0.07 - 1.35)
Poor, fair, or good vs. excellent or very good self-reported overall health <sup>¶</sup>	0.87 (0.55 - 1.39)	1.40 (0.94 - 2.08)	0.91 (0.59 - 1.42)	1.05 (0.63 - 1.74)
Current diabetes vs. no diabetes	0.76 (0.36 - 1.64)	1.11 (0.60 - 2.05)	0.92 (0.45 - 1.88)	1.68 (0.81 - 3.48)
<b>Obstetric and delivery-specific characteristics</b>				
Parity (per each additional 1 birth)	1.08 (0.89 - 1.31)	0.91 (0.76 - 1.10)	0.91 (0.75 - 1.11)	0.83 (0.64 - 1.07)
<b>Mode of delivery</b>				
Cesarean delivery only vs vaginal only	0.28 (0.06 - 1.25)	1.57 (0.54 - 4.53)	0.46 (0.10 - 2.04)	2.02 (0.60 - 6.76)
Mixed vaginal and cesarean delivery vs vaginal only	0.75 (0.26 - 2.11)	<b>2.57 (1.15 - 5.73)</b>	1.35 (0.52 - 3.50)	1.65 (0.55 - 4.97)
Ever birth after 40 weeks of gestation	0.77 (0.42 - 1.41)	0.94 (0.57 - 1.54)	0.90 (0.52 - 1.56)	1.11 (0.61 - 2.00)
Ever oxytocin administration	0.89 (0.54 - 1.47)	0.92 (0.60 - 1.41)	1.18 (0.74 - 1.87)	0.84 (0.49 - 1.44)
Ever had operative-assisted vaginal delivery <sup>#</sup>	0.99 (0.61 - 1.59)	1.05 (0.70 - 1.59)	1.09 (0.70 - 1.71)	1.01 (0.59 - 1.73)
Ever had episiotomy	0.79 (0.34 - 1.85)	1.41 (0.63 - 3.14)	1.52 (0.62 - 3.75)	1.09 (0.42 - 2.86)
Ever had 3 <sup>rd</sup> or 4 <sup>th</sup> degree laceration	0.95 (0.52 - 1.75)	1.02 (0.60 - 1.74)	0.65 (0.35 - 1.21)	1.13 (0.57 - 2.24)
Ever had spinal anesthesia	1.31 (0.53 - 3.22)	1.01 (0.49 - 2.11)	0.57 (0.21 - 1.54)	0.75 (0.30 - 1.91)
Ever baby weight 4000 grams (macrosomia)	1.57 (0.88 - 2.82)	0.73 (0.41 - 1.29)	1.45 (0.82 - 2.55)	0.93 (0.46 - 1.91)

AOR, adjusted odds ratio; CI, confidence interval.

Boldface type for adjusted odds ratios and confidence intervals indicates an association reaching statistical significance at a threshold of P < 0.05.

\* Adjusted odds ratios and confidence intervals were obtained from multivariable logistic regression models adjusting for age, race or ethnicity, partner status, diabetes status, self-reported general health, parity, delivery mode, birth after 40 weeks of gestation, oxytocin administration, operative-assisted vaginal delivery, episiotomy, third- or fourth-degree laceration, spinal anesthesia, and baby weight 4000 grams or more. Difficulty with arousal, lubrication, orgasm, and pain or discomfort with vaginal intercourse assessed only in women reporting some sexual activity in the past 3 months.

<sup>†</sup> Participants were considered to have low sexual arousal if they reported their level of sexual arousal during sexual activity was low, very low, or none.

<sup>‡</sup> Participants were considered to have difficulty with lubrication if they reported it was difficult, very difficult, extremely difficult, or impossible to become lubricated during sexual activity.

§ Participants were considered to have difficulty with orgasm if they reported it was difficult, very difficult, extremely difficult, or impossible to reach orgasm during sexual stimulation or intercourse.

Participants were considered to have pain or discomfort with intercourse if they reported their level of discomfort or pain during or after vaginal penetration was moderate, high, or very high.

¶ Overall health was assessed by asking participants to indicate whether their general health was excellent, very good, good, fair, or poor.

# Includes forceps-assisted or vacuum-assisted delivery