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Perineal Body Length Among Different Racial Groups in the First Stage of Labor

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Abstract

Objective—Anatomic differences among racial groups may contribute to observed differences in the occurrence of severe perineal lacerations at the time of vaginal delivery. The purpose of this study was to identify differences in perineal body length between racial groups.

Methods—Perineal body length was measured in primigravid women aged 18 to 45 years who were admitted in labor. Women were classified into 1 of 6 racial groups: White, Filipino, Japanese, Chinese, Native Hawaiian, or Micronesian. The primary outcome, perineal body length, was compared using analysis of variance.

Results—A total of 200 women were recruited. There were no significant differences in perineal body length ($P = 0.42$) and severe perineal lacerations ($P = 0.82$) between the different racial groups. The mean (SD) perineal body length of women who had a severe laceration was 3.9 (0.5) versus 3.9 (0.6) cm in women who did not have a severe laceration ($P = 0.98$).

Conclusion—Perineal body length does not seem to differ among the different racial groups studied and therefore an unlikely cause of racial variation in rates of severe perineal lacerations.

Keywords

perineal body length; perineal laceration; race

Severe (third- and fourth-degree) perineal lacerations occurring at the time of vaginal delivery have been associated with short- and long-term morbidity including fistula formation, fecal incontinence, fecal urgency, chronic perineal pain, and dyspareunia.[1–6] Studies have shown factors such as maternal age, nulliparity, operative vaginal delivery, episiotomy, persistent occiput posterior position, and increasing birth weight are associated with severe perineal lacerations during vaginal delivery.[7–11] Some studies have suggested that race may also play a role in the risk for severe perineal lacerations. In a retrospective cohort study, nulliparous Filipino and Chinese women were found to be at increased risk for

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third- and fourth-degree laceration compared to other racial groups.[12] Other retrospective studies have identified the Asian race as a risk factor for severe lacerations.[13] Specifically, Indian and Filipino women were found to be at increased risk for sustaining anal sphincter lacerations.[14]

Differences in the proportion of tissue types and quality of collagen in the perineal region have been proposed as reasons for racial differences in the risk for severe perineal lacerations.[12] Other studies have focused on anatomic differences that may exist between women of different racial groups. A retrospective study by Deering et al[15] showed that women with shortened perineal body length (ie, <2.5 cm) had a higher chance of sustaining a third- or fourth-degree laceration. The mean (SD) perineal body length in that study was found to be 3.9 (SD 0.70) cm. A recent study by Dua et al[16] found no difference in the perineal length in White and Asian women but noted that women with a short perineum were more likely to have third-degree lacerations in labor.

To date, there are limited data examining racial differences in perineal body length. The purpose of this study was to identify differences in the perineal body length between different racial groups and describe whether these differences may contribute to an increased risk of third- and fourth-degree perineal lacerations.

MATERIALS AND METHODS

Approval for this study was obtained from the Western Internal Review Board. A prospective cohort study was performed between April 2009 and March 2011 at Kapiolani Medical Center for Women and Children in Honolulu, Hawaii. Primigravid women aged 18 to 45 in first stage of labor were recruited in the Labor and Delivery suite. Written informed consent was obtained from all subjects. Subjects were recruited into 6 racial groups: White, Filipino, Japanese, Chinese, Native Hawaiian (part-Native Hawaiian), and Micronesian. A subject was eligible if she stated that all four of her grandparents identified with a single racial group. For example, a woman was eligible if all four of her grandparents were Chinese or if all four of her grandparents were white. Otherwise, multiple race patients were excluded from the study. An exception was made for women reporting Native Hawaiian descent. Because of the small number of full-Native Hawaiians in Hawaii, women in the Native Hawaiian group could identify with more than 1 racial group as long as one of those groups was Native Hawaiian.

Perineal body length was defined as the distance between the posterior fourchette to the center of the anal orifice when the patient was in the dorsal lithotomy position. Physicians trained in this measurement recorded perineal body length to the nearest millimeter using a disposable measuring tape. The measurement was performed in the absence of a contraction and without Valsalva. Demographic information including age, race, weight, height, type of delivery, lacerations sustained, episiotomy, birth weight, and fetal head position was also collected. The diagnosis of laceration severity was determined by the attending physician. Statistical analysis was performed using SPSS for Windows (version 16, SPSS, Chicago, Ill). Descriptive statistics including frequency measures were calculated to compare demographic information between racial groups. The primary outcome, perineal body

length, was compared using analysis of variance. Secondary outcomes including third- and fourth-degree lacerations were compared using χ^2 tests. Multiple linear regression and multiple logistic regression were used to control for confounders and confirm relationships. For a variable to be considered a confounder to the relationship between race and perineal body length, it had to be associated with both. We used a *P* value cutoff of 0.20 in bivariate analysis to determine which candidate variables were included in the model. Variables were included in an initial multivariate model and removed in a stepwise manner. Data normality was tested using the Kolmogorov-Smirnov test. Previous studies have documented a mean (SD) perineal body length of 3.9 (0.5) cm. A sample size calculation was performed to detect a difference of 1 cm between racial groups (80% power and significance of 0.05).

RESULTS

A total of 200 women participated in the study. The mean (SD) age, body mass index (BMI), and fetal birth weights are shown in Table 1. The overall mean (SD) age of the cohort was 27 (6.3) years. There were significant differences in age between groups. Chinese women tended to be older (mean [SD] age, 32 [5.9]), and Native Hawaiian women tended to be younger (mean [SD] age, 23 [5.3]). The mean (SD) BMI for the study population was 31 (6.3) kg/m^2 and was statistically different between racial groups. Native Hawaiian women had the highest mean (SD) BMI (35 [8] kg/m^2), and Japanese women had the lowest BMI (27 [6] kg/m^2).

The mean perineal body length by race is shown in Table 2. The mean (SD) perineal body lengths in centimeters for the racial groups were as follows: White group, 3.9 (0.6); Filipino group, 4.0 (0.6); Japanese group, 3.9 (0.6); Chinese group, 3.8 (0.4); Native Hawaiian group, 4.1 (0.9); and Micronesian group, 3.8 (0.4). The potential variables were not associated with our outcome measures to the 0.20 level; thus, multiple linear regression was not performed.

The rates of total vaginal delivery, severe laceration, assisted vaginal delivery, episiotomy, and fetal occiput position are presented in Table 3. Among the 148 women who had a vaginal delivery, 11% of the subjects had a severe perineal laceration. The mean (SD) perineal body length for women who had a severe laceration was 3.9 (0.5) versus 3.9 (0.6) for women who did not have a severe laceration ($P = 0.98$). The highest assisted vaginal delivery rates, which included forcep-assisted deliveries and vacuum-assisted deliveries, were noted in the Chinese group (40%) and lowest in the Hawaiian group (13%). The highest episiotomy rates were noted in the white group (29%) versus the Filipino group (9%). These trends did not reach statistical significance.

DISCUSSION

Because of short-term complications such as perineal pain and the risk of long-term morbidity such as fecal incontinence, both patients and physicians want to decrease the risk for severe perineal lacerations. In this study, perineal body length did not seem to differ among the different racial groups represented in the study. The racial group with the longest perineal body length had a mean perineal body length of only 0.3 cm longer than the group with the shortest mean perineal body length. Racial variation in perineal body length does

not seem to be a factor in the higher rates of severe perineal lacerations noted among Asian women in previous studies. This finding is consistent with a study published by Dua et al in 2009. Contrary to previous studies, women who had a severe perineal laceration had a perineal body length similar to women who did not. However, given the small number of women who had a severe laceration, we are not able to definitively conclude that shortened perineal body length is not a risk factor for severe lacerations.

To date, this is the only study to measure perineal body length among women in several different Asian racial subgroups. “Asian” as a racial category has been used to combine diverse groups of people, such as Chinese, Filipino, Laotian, Hmong, Korean, Japanese, and Vietnamese, into a single large group. This is often done to overcome the challenge of finding an adequate sample size in regions where this demographic is underrepresented. It remains unclear whether differences exist among the several subgroups within the Asian category. Given the racial diversity and the large number of Asian and Pacific Islander patients in Hawaii, we were able to enroll subjects into Asian subgroups. However, we were unable to include Asian Indian women, who have been previously identified as a high-risk group for lacerations, in our study because few women in this subgroup reside in Hawaii.

This study’s methodology is also unique in that the subject’s race was classified based on the race of the subject’s parents and grandparents. By going back 2 generations in the lineage, we were able to increase the accuracy of our classification system.[17]

The exclusion of multiparous women is another strength of this study. The study by Dua et al noted that primigravid women had significantly longer perineal body lengths (3.77 cm) compared to multigravid women (3.65 cm).[16] By excluding multigravid women, our study eliminated the potential bias of parity on perineal body length.

We also measured perineal body length specifically in the first stage of labor. It is unclear how the perineum changes in length during labor. Clinical observation points to potential dynamic changes in perineal body length in different stages of labor. Thus, the length of the perineum may differ before and after labor has begun. Perineal length close to the time of delivery may have the most clinical relevance in examining perineal lacerations. However, no normative data exist on perineal body length in nonlaboring women versus women in different stages of labor.

Previous studies have demonstrated that race plays a role in the severity of perineal lacerations. However, our study failed to show a difference in perineal body length between several racial groups in the first stage of labor. There seemed to be no difference in the perineal body length between women who did have a severe laceration and those who did not have a severe laceration. We did find a trend between higher episiotomy rates among white women who also had the highest severe laceration rates in our cohort. This supports previous studies that identify episiotomy as a risk factor for sphincter injury during delivery. The mechanism for how race affects perineal laceration remains unclear. Future research should examine how changes in the perineum during labor affect laceration rates and how perineal tissues differ between racial groups.

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TABLE 1

Mean and SD of Age, BMI, and Birth Weight by Race

	Age, Mean (SD)	**BMI in kg/m^2, Mean (SD)**	**Birth Weight in Grams, Mean (SD)**
White	28.4 (5.4)	31.2 (5.4)	3435.6 (506.2)
Filipino	27.7 (6.3)	30.3 (4.2)	3152.3 (392.3)
Japanese	30.0 (5.8)	27.3 (5.5)	3027.3 (339.7)
Chinese	31.7 (5.9)	28.1 (3.8)	3319.5 (416.2)
Hawaiian	23.4 (5.3)	34.7 (8.1)	3380.6 (470.2)
Micronesian	23.9 (4.8)	34.1 (6.2)	3234.2 (390.9)
P	<0.001	<0.001	0.001

TABLE 2

Mean, Confidence Interval, and Median of Perineal Body Length (in Centimeters) by Race

Race	n	Mean (95% CI)	Median	Minimum	Maximum
White	31	3.9 (3.7–4.2)	4.0	2.2	6.0
Filipino	35	4.0 (3.7–4.2)	4.0	2.7	6.0
Japanese	36	3.9 (3.7–4.1)	4.0	2.5	5.2
Chinese	31	3.8 (3.6–3.9)	4.0	2.5	4.3
Hawaiian	36	4.1 (3.8–4.4)	4.0	2.2	6.0
Micronesian	31	3.8 (3.6–3.9)	4.0	2.8	4.5
Total	200	3.9 (3.8–4.0)	4.0	2.2	6.0

TABLE 3

Number of Total Vaginal Deliveries, Severe Lacerations Sustained, Assisted Vaginal Deliveries, Episiotomies, and Occiput Posterior Positions by Race

Race	n	Severe Laceration n (%)	Assisted Vaginal Delivery n (%)	Episiotomy n (%)	Occiput Posterior Position n (%)
White	24	4 (16.7)	4 (16.7)	7 (29.2)	2 (8.3)
Filipino	23	1 (4.3)	4 (17.4)	2 (8.7)	3 (13.0)
Japanese	30	3 (10.0)	7 (23.3)	5 (16.7)	3 (10.0)
Chinese	20	2 (10.0)	8 (40.0)	4 (20.0)	5 (25.0)
Hawaiian	31	3 (9.7)	4 (12.9)	5 (16.1)	1 (3.2)
Micronesian	20	3 (15.0)	3 (15.0)	3 (15.0)	3 (15.0)
Total	148	16 (11.0)	30 (20.2)	26 (17.6)	17 (11.5)
P		0.82	0.20	0.48	0.84