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Maternal Race/Ethnicity and One-Month Exclusive Breastfeeding in Association with the In-Hospital Feeding Modality

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ABSTRACT

There are a few studies on the consequence of the use of breastmilk substitutes during the postpartum hospital stay on the duration of breastfeeding in the culturally diverse populations of the United States. The main purpose of this study was to identify the association between the in-hospital feeding pattern and the infant's postdischarge feeding modality during the first month of life in a culturally diverse population of women. Demographic, clinical, and feeding practice data was colleted from the medical charts and interviews of mothers conducted in the first month after singleton delivery of healthy term newborns. Among the 307 mothers who completed the study, exclusive in-hospital breastfeeding was reported by 54.2% of White, 38.7% of Black, 54.0% of Asian, and 44.7% of Hispanic ($p = 0.063$), and among these, only 55.6%, 50.0%, 58.9%, and 19.1%, respectively, maintained exclusive breastfeeding during the first postpartum month ($p < 0.02$). The rate of exclusive breastfeeding at the end of the first month was 10.5%, 15.8%, 20.7%, and 3.9%, respectively, for the White, Black, Asian, and Hispanic mothers whose infants received partial or no breastfeeding in-hospital. Overall, the logistic regression analysis showed significant association between initiation of exclusive breastfeeding in-hospital and exclusive breastfeeding at the end of the first month (odds ratio 7.2 and 95% confidence interval 4.0, 12.6). In conclusion, we show a larger decline in the continuation of exclusive breastfeeding and the lowest rate of exclusive breastfeeding at 1 month in the Hispanic mothers. Irrespective of race/ethnicity, mothers who practice exclusive breastfeeding in-hospital are more likely to exclusively breastfeed throughout the neonatal period.

INTRODUCTION

EXCLUSIVE BREASTFEEDING comprises approximately one-half of the reported in-hospital rate of breastfeeding in the United States (U.S.), and only one-third during the first 6 months.[1–4] Several studies have shown the association of early breastfeeding with exclusivity and duration of breastfeeding.[5–7] However, the factors that are associated with the successful maintenance of exclusive breastfeeding after hospital discharge have not been fully explored, especially among the specific racial/ethnic populations in the U.S. It is known that the patterns of breastfeeding vary considerably across these groups. The impact of formula supple-

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mentation during the hospital stay on breastfeeding has been investigated.[8–11] However, the effect of the use of breastmilk substitutes during the postpartum hospital stay on the duration of breastfeeding among the U.S. racial/ethnic groups merits further study.[12] An increased understanding of these associations may help in the development of appropriate strategies for the support of exclusive breastfeeding in the culturally diverse population of the U.S., and therefore, will support the achievement of national targets for exclusive breastfeeding as well as reduce the health disparities.

In this report, the association of continued exclusive breastfeeding at 1 week and at 1 month of age with respect to the infant's in-hospital feeding modality has been evaluated for the different racial/ethnic groups.

MATERIALS AND METHODS

This study is an Institutional Review Board-approved secondary analysis of data collected for the "randomized trial of neonatal hyperbilirubinemia prevention," and was undertaken to determine whether there is an association between the infants' feeding pattern in-hospital, at 1 week and at 4 weeks of life.

A total number of 307 mothers of known race/ethnicity who delivered healthy term infants (gestational age $\geq$37 weeks) after a singleton uncomplicated pregnancy at Saint Peter's University Hospital in the year 2000 or 2001, were included in this analysis. All the infants born to the mothers included in this study were appropriate for gestational age and born with Apgar scores $>$7 at 1 minute.

The demographic characteristics of the study population and the infant's feeding modality prior to hospital discharge and during the first month of life were extracted from the maternal/neonatal medical records and telephone survey questionnaire administered to the mothers at the end of the first week and the first month after delivery.

We analyzed the infant's feeding modality after birth (in-hospital), after discharge from the hospital at the end of the first week, and at 1 month of age using the Interagency Group for Action on Breastfeeding[13] recommended standardized terminology for the collection of information on breastfeeding behavior: (1) exclusive breastfeeding (breastmilk only or breastmilk and vitamins); (2) partial breastfeeding (breastmilk and any amount of formula per day); and (3) no breastfeeding (completely formula fed). The race and ethnic standards for federal statistics and administrative reporting were used to categorize the maternal race/ethnicity[14] as White, Black, Asian, and Hispanic. Mothers of "other" or "not recognized" race/ethnicity were not included.

STATISTICAL ANALYSIS

A power analysis of the study sample was conducted. We estimated that at least 29 subjects in each racial/ethnic group would be necessary to achieve a power of $>$80% for a difference of more than 30% in the rate of exclusive breastfeeding at the end of the first month for mothers who initiate exclusive breastfeeding in-hospital, relative to partial or no breastfeeding.

The difference in the infant's types of feeding with respect to the maternal race/ethnic background and in-hospital feeding modality was analyzed using the χ^2 test for the categorical data and analysis of variance for the continuous data. The association between the initiation of exclusive breastfeeding in-hospital and continuation of exclusive breastfeeding at the end of the first month in each of the racial/ethnic group of mothers was evaluated. To identify the variables for inclusion in the logistic regression model, comparison between the demographic and clinical variables such as maternal age, parity, mode of delivery, gestational age, neonatal birth weight, weight at discharge, weight loss prior to discharge, age at discharge, and the occurrence of neonatal jaundice with respect to the different racial/ethnic groups was carried out. Variables that showed statistically significant differences between the racial/ethnic groups with $p < 0.1$ were included in the logistic regression model. Estimated odds ratio (OR) is presented with 95% confidence interval (95% CI).

RESULTS

The characteristics of the study groups based on the maternal race ethnic background are presented in Table 1. White mothers represented 54.1%, Blacks 10.1%, Asian 20.5%, and Hispanic 15.3% of the study population. No significant differences in parity, mode of delivery, gestational age, birth weight, percent of weight loss, and infant's age at discharge from the hospital were identified between the groups with different racial/ethnic backgrounds. Black and Hispanic mothers in this study were younger than the White and Asian. Jaundice before and after discharge was noted in almost an equal proportion of infants in each racial/ethnic group. None of the mothers in this study reported smoking or drug use.

As shown in Figure 1A, the Asian mothers were less likely not to breastfeed their infants in-hospital compared with the White, Black, and Hispanic ($p < 0.01$). The lower rate of exclusive breastfeeding initiation among the Black mothers (38.7%) compared with the White (54.2%) and Asian (54.0%) mothers did not reach statistical significance ($p = 0.06$). A similar pattern of feeding modality was observed at the end of the first week after delivery (Fig. 1B). Towards the end of the first month (Fig. 1C), a significant decrease in the rate of exclusive breastfeeding was observed in the Hispanic mothers. Only 10.9% (5/47) of the Hispanic mothers reported exclusive breastfeeding compared with 35.5% (59/166) of the White, 29.0% (9/31) Black, and 41.3% (26/63) Asian mothers ($p < 0.01$).

Overall, the feeding pattern at the end of the first month was allied with the in-hospital feeding modality (Table 2). Among mothers who exclusively breastfed their infants in-hospital, 50.9% continued exclusive breastfeeding during the first month compared with 20.3% of those who partially breastfed and 4.2% of those who did no breastfeeding prior to discharge from hospital ($p < 0.001$). The probability of exclusive breastfeeding at the end of the first month in the mothers who initiated breastfeeding in-hospital was calculated as 7.2 (95% CI 4.0, 12.6).

As shown in Figure 2A, the continuation of exclusive breastfeeding was recorded at a significantly lower rate among the Hispanic moth-

Table 1. Characteristics of Study Participants Based on Race/Ethnicity

	White (n = *166*)	*Black* (n = *31*)	*Asian* (n = *63*)	*Hispanic* (n = *47*)	p-*value**
Maternal age (years)	31.8 ± 4.9	29.4 ± 6.0	31.0 ± 5.0	28.9 ± 6.0	0.003
Mothers (*n*, %) ≥25 years old	154 (92.8%)	23 (74.2%)	55 (87.3%)	38 (80.9%)	0.1
Primiparas (*n*, %)	59 (35.5%)	11 (35.5%)	26 (41.3%)	13 (27.7%)	NS
Cesarean section (*n*, %)	47 (28.3%)	8 (25.8%)	18 (28.6%)	10 (21.3%)	NS
Gestational age (weeks)	38.8 ± 1.4	39.2 ± 1.1	39.1 ± 1.1	38.4 ± 5.5	NS
Birth weight (grams)	3337 ± 442	3472 ± 405	3235 ± 386	3353 ± 363	NS
Weight at discharge (grams)	3173 ± 441	3317 ± 427	3133 ± 674	3178 ± 609	NS
Weight loss (%)	5.1 ± 2.8%	4.7 ± 2.8%	5.4 ± 1.9	4.2 ± 2.6	NS
Age at discharge (hours)	58.6 ± 22.5	57.3 ± 18.1	58.4 ± 19.6	57.3 ± 16.9	NS
Jaundice in-hospital (*n*, %)	43 (25.9%)	12 (38.7%)	20 (31.8%)	10 (21.3%)	NS
Jaundice after discharge (*n*, %)	22 (13.4%)	3 (9.7%)	10 (15.9%)	6 (12.8%)	NS

**p*-Values are from χ^2 for categorical and analysis of variance for continuous data. NS if $p > 0.1$.

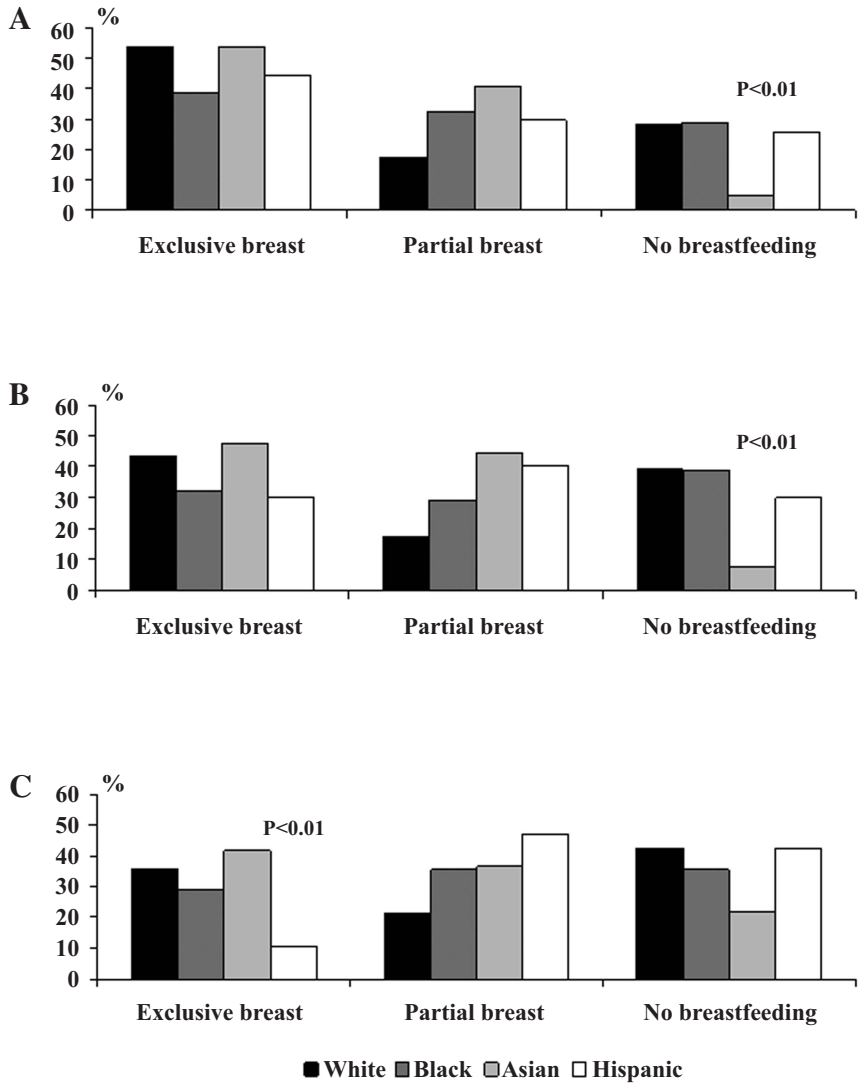

FIG. 1. Comparison of the feeding pattern among mothers from different racial/ethnic groups (%) (**A**) in-hosptal; (**B**) at the end of the first week; (**C**) at the end of the first month.

TABLE 2. FEEDING PATTERNS AT 1 MONTH POSTPARTUM, STRATIFIED BY IN-HOSPITAL FEEDING MODALITY (*N*, %)

Feeding initiated in-hospital	*Feeding at the end of the first month*			
	Exclusive breast	*Partial breast*	*No breastfeeding*	(n, *%)*
Exclusive breast (n = 157)	80 (50.9%)	47 (30.0%)	30 (19.1%)	157 (100%)
Partial breast (n = 79)	16 (20.3%)	34 (43.0%)	29 (36.7%)	79 (100%)
No breastfeeding (n = 71)	3 (4.2%)**	11 (15.5%*	57 (80.3%)**	71 (100%)

*$p < 0.05$, **$p < 0.001$ based on the χ^2 test results.

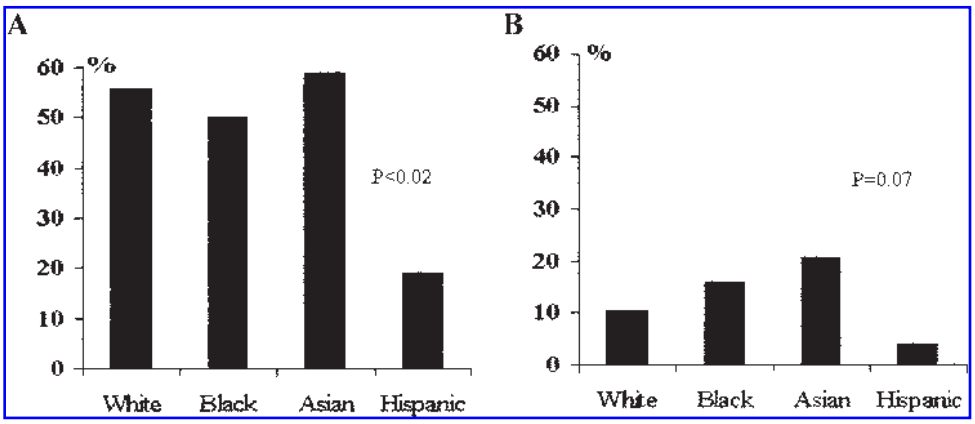

FIG. 2. Exclusive breastfeeding at the end of the first month among mothers who initiated exclusive (**A**) and partial/no breastfeeding (**B**) in-hospital prior to discharge, based on race/ethnicity.

ers (19.1%) compared with White (55.6%), Black (50.0%), and Asian (58.8%), $p < 0.02$. Moreover, the Hispanic mothers who practiced partial/no breastfeeding of their infants' in-hospital were less likely to exclusively breastfeed their infants' at the end of the first month than the mothers from other racial/ethnic groups. Overall, the exclusive breastfeeding rate among the mothers who practiced partial/no breastfeeding in-hospital was very low (12.7%, 19/150). Consequently, the difference between exclusive breastfeeding at the end of the month among the mothers from the diverse racial/ethnic groups who initiated partial/no breastfeeding in-hospital did not reach statistical significance (Fig. 2B). Logistic regression that was carried out to control for maternal age found little impact on the findings.

DISCUSSION

Contrasting data regarding the breastfeeding pattern across the different cultural groups has been reported. The same racial/cultural group may demonstrate different feeding patterns when compared in different national settings. For example, breastfeeding initiation and continuation rates in the United Kingdom are higher among the Black and Asian mothers as compared with White.[15] Our prospectively collected data on the feeding pattern of 307 mothers was very similar to the U.S. national data in terms of the racial/ethnic distribution of in-hospital initiation of exclusive breastfeeding.[4] This study shows that the greater likelihood of discontinuation of exclusive breastfeeding and lower rate of exclusive breastfeeding at 1 month for Hispanic mothers is associated with and may be influenced by in-hospital feeding practices.[16,17] It remains to be shown whether this is one factor that contributes to the marked differences between exclusive breastfeeding intentions and practices among the Hispanic mothers.[18] Moreover, despite the maternal age and significant cultural variation in exclusive breastfeeding continuation, our data would seem to support the hypothesis that initiation of exclusive breastfeeding during the hospital stay is a significant factor for exclusive breastfeeding at 1 month postpartum compared with partial or no breastfeeding. However, this assumption may be confounded by another variable such as previous intention or racial/ethnic social pressure. A negative association between formula supplementation during the hospital stay and duration of exclusive breastfeeding has been identified in groups of Italian,[9] Swedish[10] and Turkish women.[11] Blomquist et al.[10] showed that administration of supplementary donor milk or formula during the early neonatal period was associated with an increased risk of a shorter duration of breast-feeding, even after adjustment for maternal age (<25 years) and smoking. Nevertheless, Faldella et al.[19] reported a weak rela-

tionship between prevalence of breastfeeding at 3 months of age and magnitude of routine formula supplementation in the maternity ward.

This study did not investigate important factors that may impact the feeding decision such as cultural beliefs, family structure, health, and cost considerations,[20] socioeconomic and immigration status,[21] as well as cultural difference in the values or intention to breastfeed prior to the infant's birth.[18,22] Moreover, although maternal recall is a valid and reliable estimate of breastfeeding initiation and duration,[23] self-reported data for the determination of the postdischarge feeding modality may limit the interpretation of the conclusion.

CONCLUSION

Despite these limitations, this study clearly shows that women who practice exclusive breastfeeding in-hospital are more likely to be exclusively breastfeeding at 1 month post-delivery compared with those who introduce formula during the in-hospital stay. Race, ethnicity, and culture should be considered in the antenatal feeding counseling strategies, and during the in-hospital and postpartum contact.

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