Analysis of Demographic Differences in Intent to Breastfeed and Sustained Breastfeeding in The National Children's Study

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BACKGROUND

The National Children's Study (NCS) Vanguard Study was a pilot study for a planned large-scale epidemiological birth cohort of children (and their parents) to examine environmental influences on child health and development. Between 2009 and 2014, the study enrolled and followed over 5,400 birth families in 43 counties across 31 states throughout the United States. At protocol-specified study visits, data concerning a wide variety of health-related topics were collected including basic demographics, medical conditions and history, physical measures, infant feeding, cognitive assessments, childcare arrangements and more. This information and material is available through the NCS Archive (https://ncsarchive.s-3.net) for approved research projects by qualified investigators. The NCS Archive contains study visit data from preconception to 42 months post birth, as well as a sample repository of over 220,000 biological and environmental samples. The NCS Archive is free for researchers to use exclusive of sample shipping and handling costs (1). This presentation is an example of the use of The National Children's Study (NCS) Archive data for pediatrics research, in this case with respect to breastfeeding.

METHODS

Data Source and Study Sample

The NCS Vanguard Study sample was a prospective, longitudinal cohort of mother-child pairs residing in the U.S. Potential mothers were recruited to NCS pre-conception, during pregnancy or at childbirth and followed for up to 4 years. At the birth visit, the mothers' intention to feed their child was measured by asking, "Does [mother] plan to feed baby/babies breast milk, formula, or both?" Mothers with valid responses such as "Breast feed", "Bottle/formula feed", and "Both" were used in the analysis of this study. Later on, at the 6-month visit, mothers were asked questions such as "Is baby currently being breast fed?" and "Is participant currently feeding baby pumped or expressed breast milk?" These questions were used to derive whether a mother was currently breast feeding her child(ren) 6 months after birth. Demographic characteristics of the mother such as age at child's birth, race and ethnicity, marital status, residence, education, employment status, and Women-Infant-Children (WIC) benefits were collected during the study. Marital status and education reported during the mothers' pregnancy visits were used in the analysis, whereas employment and WIC benefits status were collected at the 6-month visit. Residence was defined using the United States' Office of Management and Budget's (OMB) Metropolitan and Micropolitan Statistical Areas. Participants were considered "urban" if they resided in a county designated as a Metropolitan Statistical Area (MSA), and non-urban or "rural" if they did not.

Statistical Analysis

Descriptive analyses were performed using SAS Version 9.4 (SAS Institute Inc., Cary, NC). Differences between categorical variables were analyzed using Rao-Scott Chi-Squared and Rao-Scott Modified Chi-Squared tests with 5% level of significance. Sampling weights were not used in analysis due to unavailability of weights with the NCS Vanguard Study sample. Graphics were prepared using R version 3.4.1 (RStudio, Inc., Boston, MA).

RESULTS

Sustained Breastfeeding

Table 1 displays the distribution of demographic characteristics among NCS mothers who completed the 6-month visit. At the 6-month visit, 1329 women (53%) reported sustaining breast-feeding, while 1176 women (47%) did not. Non-Hispanic White women are more likely to sustain breastfeeding at 6 months (59.5%), followed by Hispanic women (41.7%), and Non-Hispanic Black women (24.7%). There is a significant difference in race among those who sustained breastfeeding compared to those who did not sustain breast feeding at 6-months [p<0.0001]. NCS data further show that this relationship between race-ethnicity and breastfeeding at 6 months is similar for both employed [p<0.0001] and unemployed women [p=0.004] (Figure 1).

Table 1. Demographic Characteristics of NCS Mothers by Breastfeeding Status at 6-Month Visit

Variable	Breast Feeding Status at 6-Months*						
	Total (N=2505)		Sustained (N=1329)		Did Not Sustain (N=1176)		
	n	%	n	%	n	%	P-value**
Race-Ethnicity							<0.0001
Non-Hispanic White	1574	70.93	937	80.22	637	60.61	
Hispanic	422	19.02	176	15.07	246	23.41	
Non-Hispanic Black	223	10.05	55	4.71	168	15.98	
Age at Child's Birth							<0.0001
Under age 20	60	2.41	5	0.38	55	4.71	
Age 20 through 29	1169	47.04	509	38.65	660	56.51	
Age 30 and up	1256	50.54	803	60.97	453	38.78	
Married							
Yes	1769	71.22	1110	84.22	659	56.52	
No	715	28.78	208	15.78	507	43.48	
Lives within Metropolitan Statistical Area (MSA)							0.054
Yes	2019	81.05	1120	84.66	899	76.97	
No	472	18.95	203	15.34	269	23.03	
Education							<0.0001
Less than HS or GED	293	11.81	103	7.81	190	16.34	
High School Graduate or GED	395	15.92	142	10.77	253	21.75	
Some College	734	29.58	339	25.72	395	33.96	
College Graduate	1059	42.68	734	55.69	325	27.94	
WIC Benefits							<0.0001
Yes	984	44.81	355	30.63	629	60.66	
No	1212	55.19	804	69.37	408	39.34	

Sample Size proportions are based on unweighted data.

**The number of women for some variables diverged due to missing data (non-responses).*

***Rao-Scott Modified Chi-Squared Test at level of significance 5%.*

Figure 1. Breastfeeding Status and Race-Ethnicity of NCS Mothers by Employment Status at 6-Month Visit

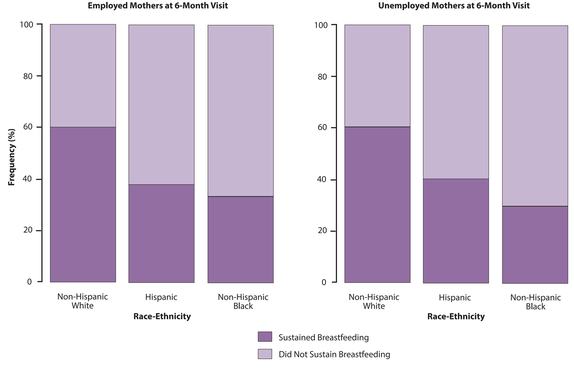
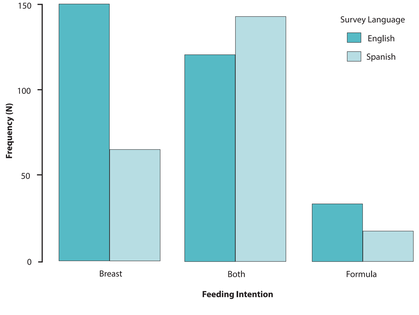


Figure 2. Feeding Intention among Hispanic NCS Mothers by Survey Language at Birth Visit



Intent to Breastfeed

At birth, 3,612 women responded to a feeding intent question: 57.2% of NCS mothers stated they intended to breastfeed exclusively; 14.2% stated they intended to formula feed exclusively; and 28.6% stated they would combine breastfeeding and formula feeding. With respect to feeding intention at birth and race-ethnicity: Non-Hispanic White mothers were most likely to intend exclusive breastfeeding (65.9% breast only; 11.9% formula only; 22.2% both); Hispanic mothers were the next most likely to intend exclusive breastfeeding (39.5% breast only; 9.7% formula only; 50.7% both); and Non-Hispanic Black mothers were the least likely to intend exclusive breastfeeding (25.5% breast only; 39.1% formula only; 35.4% both) [p<.0001] (Table 2). However, if the Hispanic mothers are divided into primary English speakers or Spanish speakers, the English speaking mothers were more likely to intend exclusive breastfeeding (49.2%) as compared to the Spanish speaking mothers (28.8%) [p<.0001] (Figure 2). The demographic distribution of women who at birth intended exclusive breastfeeding (n=2,066) was maintained among those who sustained breastfeeding at 6 months: 70.7% of Non-Hispanic White mothers were breastfeeding at 6 months as compared to 53.3% of Hispanic mothers and 41% of Non-Hispanic Black mothers [p<.0001] (Figure 3).

Table 2. Feeding Intention by Race-Ethnicity of NCS Women at Birth Visit

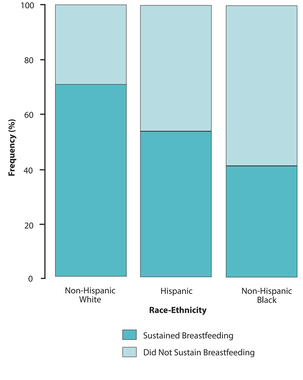
Variable	Feeding Intention at Birth Visit*								
	Total (N=3612)		Breast Only (N=2066)		Bottle Formula Only (N=512)		Both Breast & Bottle/Formula (N=1034)		
	n	%	n	%	n	%	n	%	P-value**
Race-Ethnicity									<0.0001
Non-Hispanic White	2328	71.28	1535	82.88	277	57.59	516	55.31	
Hispanic	554	16.96	219	11.83	54	11.23	281	30.12	
Non-Hispanic Black	384	11.76	98	5.29	150	31.19	136	14.58	

Sample Size proportions are based on unweighted data.

**The number of women for some variables diverged due to missing data (non-responses).*

***Rao-Scott Modified Chi-Squared Test at level of significance 5%.*

Figure 3. Breastfeeding Status at 6-Month Visit by Race-Ethnicity among NCS Mothers who Intended to Exclusively Breastfeed at Birth Visit



CONCLUSIONS

The National Children's Study (NCS), a prospective study of children and mothers covering the prenatal, perinatal, and early childhood periods provides to researchers a wealth of data pertaining to many areas of child and maternal health, including breastfeeding. NCS data are consistent with national estimates (2): women who sustain breastfeeding at 6 months tend to be Non-Hispanic White, older, married, live within a Metropolitan Statistical Area, have a higher education and not to receive WIC benefits. The comparability of NCS to national estimates argues for the representativeness of the NCS cohort for breastfeeding analyses. The NCS can provide estimates on demographic variations in feeding intentions, and the relationship between feeding intentions and sustained breastfeeding at 6 months among different race-ethnicity groups. Additionally, the NCS Archive sample collection can provide breast milk samples for laboratory analysis.

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REFERENCES

1 The National Children's Study Archive Study Description and Guide. *Eunice Kennedy Shriver National Institute of Child Health and Human Development's (NICHD) National Children's Study (NCS) Archive.* [Online] July 2017. [Cited: August 24, 2017.] https://ncsarchive.s-3.net/static/data/NCS_Archive_Study_Description%20and%20User's%20Manual_July%202017.pdf.

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For more information, please contact:

NICHD Website https://www.nichd.nih.gov/research/NCS/

NCS Archive Website https://ncsarchive.s-3.net/

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