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WIC Infant Food Package Issuance Data are a Valid Measure of Infant Feeding Practices

Shannon E. Whaley, PhD[1], Maria Koleilat, DrPH[1], and Lu Jiang, PhD[1]

Abstract

Background: Multiple datasets collect breastfeeding data in the United States (US), but a coordinated monitoring and surveillance system does not currently exist. The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) reaches over 50% of all infants in the US and provides a potential wealth of administrative data about the breastfeeding practices of low-income women.
Objective: The objective of this research was to assess whether WIC administrative data are a valid source of information about breastfeeding practices.
Methods: A phone survey of 2015 postpartum WIC mothers in Southern California was conducted to assess the feeding practices of mothers with infants 2-12 months old. Survey data were linked with WIC administrative records from the same month in order to assess the percent agreement between feeding behavior as reported by survey methods and as documented in WIC administrative records.
Results: The unweighted κ test statistic was used to test the agreement between survey responses and WIC administrative data. Substantial to almost perfect agreement was found between the two measures.
Conclusions: WIC administrative data are a valid source of information about breastfeeding. With appropriate funding support, WIC administrative data should be considered for use in nationwide breastfeeding surveillance and monitoring systems.

Keywords

WIC, data collection, instrument validation

Well Established

Multiple datasets collect breastfeeding data, but a coordinated breastfeeding monitoring and surveillance system does not currently exist.

Newly Expressed

This study suggests that WIC food package issuance data can contribute significantly to breastfeeding surveillance and monitoring.

Background

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC), funded by the United States Department of Agriculture, provides nutritious food and nutrition education as well as breastfeeding education and support to low-income pregnant and postpartum women and to children up to 5 years old. Considered one of the premier public health nutrition programs in the United States (US), over 9 million women, infants, and children receive WIC benefits,[1] over 1.4 million in California alone.[2] About half of all infants born in the US receive services from the WIC program.[1]

Breastfeeding support is a significant priority of the WIC program, and as outlined in the 2011 Surgeon General's Call to Action to Support Breastfeeding,[3] it is a nationally recognized primary prevention strategy for early childhood obesity. Infant feeding practices are an important predictor of health conditions later in life for both mother and child,[4] and breastfeeding has been associated with nutritional, health, and economic benefits.[4,5] Timely and reliable data sources about breastfeeding are needed not only to document trends in breastfeeding behavior across the country, but to identify the impact of breastfeeding on

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[1]Public Health Foundation Enterprises WIC Program, Irwindale, CA, USA

Corresponding Author:
Shannon E. Whaley, PhD, Department of Research and Evaluation, PHFE WIC Program, 12781 Schabarum Ave, Irwindale, CA 91706, USA
Email: Shannon@phfewic.org

modifiable adverse health outcomes for children and their mothers. As noted by Chapman and Perez-Escamilla,[6] multiple datasets collect breastfeeding data in the US, but a coordinated monitoring and surveillance system does not currently exist.

Obtaining valid data about infant feeding practices of a large population is both challenging and expensive. Assessing breastfeeding rates among the low-income population, a group often shown to display the lowest rates of breastfeeding,[7] can be particularly challenging, given high rates of mobility and lower rates of having a medical home where routine care is provided to mothers and their children. Multiple national surveys have been used to gather data about breastfeeding behavior, and these surveys have been instrumental in documenting breastfeeding rates and identifying factors that influence breastfeeding success.[6] However, existing surveys vary significantly in their methods and exact wording of questions, are labor intensive and costly, and do not provide a comprehensive surveillance and monitoring framework for breastfeeding in the US.[6] Given these limitations, it is useful to look to administrative data sources that have the potential to enhance breastfeeding surveillance at comparatively lower cost.

Administrative data from WIC are collected on ~50% of all births in the US and therefore have the potential to capture surveillance and monitoring information about infant feeding practices among the low-income population. Across the US, infants on WIC are issued WIC food "packages" that provide varying amounts of formula based on the breastfeeding practices of the mother. The purpose of this research is to validate the use of WIC administrative data as an indicator of infant feeding behavior by comparing WIC food package issuance data to survey response data for a sample of 2015 WIC recipients in Southern California. These data have the capacity to complement national survey data about breastfeeding, thus establishing the validity of WIC food package issuance data as an indicator of infant feeding behavior that can provide an evidence base for the use of WIC administrative data in breastfeeding surveillance and research.

Methods

Study Site

The Public Health Foundation Enterprises (PHFE) WIC program is the largest local-agency WIC program in the country, serving over 5000 newborns and over 300,000 total participants every month in Los Angeles, Orange, and San Bernardino Counties. The ethnic composition of the population served matches that of the low-income population in the region: 84% Hispanic, 6% African-American, 6% Asian, and 4% white. About half of the Hispanic population served is Spanish speaking.

Variables and Analysis

Survey data. In August 2010, PHFE WIC contracted with Field Research Corporation, an independent survey research firm, to conduct a phone survey of a random sample of 2015 WIC postpartum mothers. The survey focused on the feeding practices of postpartum mothers on WIC with infants 2-12 months old. Each participant was invited to participate in "a 20-minute phone survey about her postpartum experiences." The participants were told that the survey was being done on behalf of the WIC program but that their responses would not affect any of their WIC benefits. During the survey, the following 2 questions regarding infant feeding were asked: "Are you currently breastfeeding?" and "Is your baby taking any formula?" If participants responded affirmatively to the breastfeeding question, follow-up questions were asked to capture the amount of breastfeeding on a typical day. If participants responded affirmatively to the formula question, follow-up questions were asked about the amount of formula given on a typical day and in a typical week. For the purposes of this validation study, a feeding practice variable was created by combining answers to these 2 questions and categorizing mothers as either fully breastfeeding (breastfeeding and not giving any formula), fully formula feeding (not breastfeeding and giving formula), or combination feeding (both breastfeeding and giving formula).

Over 98% of the PHFE WIC population speaks English or Spanish, therefore questionnaires were written in English and translated into Spanish. The surveys were conducted through a computer-assisted telephone interviewing system and averaged 20 minutes in length. Up to 8 attempts were made to reach and interview eligible respondents from each telephone listing dialed. When WIC participants were reached by phone, nearly 9 out of 10 completed the survey (88.2% cooperation rate). The survey yielded a total response rate of 43.1%, as many WIC participants were never reached after 8 call attempts. Approval from the Independent Review Consulting Institutional Review Board was obtained for all protocols prior to commencement of the study.

The sample listings for the survey were drawn from the population of all infants receiving services from PHFE WIC in July 2010. All participant information for the sample, including participant ID and land line and/or mobile telephone numbers, was extracted from the WIC administrative database. A stratified sampling approach was used to ensure adequate representation in the sample of (1) infants of all ages 2-12 months, (2) English- and Spanish-speaking mothers, and (3) feeding type preferences. Therefore, sample weights were computed to realign the distribution of the sample to the population of WIC mothers served by PHFE WIC.

Administrative data from WIC. Administrative data in California are entered by WIC staff into the Integrated Statewide Information System (ISIS). This system captures participant demographic data as well as food package issuance information for each participant. Food packages for postpartum women/infants include: (1) the **fully breastfeeding** package (for those breastfeeding and receiving no formula from WIC), (2) the **fully formula** package (for those not breastfeeding and receiving the maximum allowable amount of

Table 1. Percentage Overlap between Survey-Reported Infant Feeding Categories and WIC Food Package Type

	WIC food package		
	Fully breastfeeding	Combo	Fully formula
All infants (N = 1985, κ = 0.79)			
Survey data			
Fully breastfeeding	**88.9**	4.7	0.5
Combo	10.1	**76.8**	8.8
Fully formula	1.0	18.6	**90.8**
Infants 0-6 mo (n = 1131, κ = 0.76)			
Survey data			
Fully breastfeeding	**85.5**	5.4	0.7
Combo	13.8	**77.1**	11.3
Fully formula	0.8	17.5	**88.0**
Infants > 6-12 mo (n = 854, κ = 0.84)			
Survey data			
Fully breastfeeding	**93.8**	3.6	0.3
Combo	4.8	**76.1**	6.0
Fully formula	1.5	20.3	**93.8**

Note: WIC food package is the reference group for calculated percentage. All figures represent percentages. Because of rounding, the total of each column may appear to approximate but not equal 100%.

formula from WIC), and (3) the **combination feeding** package (for those breastfeeding and receiving some formula from WIC). Through a partnership with the California WIC program, PHFE WIC receives a monthly download of PHFE WIC participant data, including food package issuance data for all infants on the program. Thus, all infants served can be categorized as fully breastfeeding, combination breastfeeding and formula feeding, or fully formula feeding based on food package issuance. For this study, food package issuance data for August 2010 were captured from ISIS in order to match the survey data collection period.

Data analysis. Statistical analysis was performed using SAS (version 9.2, SAS Institute, Inc, Cary, NC, 2008). Survey data and WIC administrative records were merged by matching participant ID numbers. The agreement between the WIC administrative food package data and the survey data was assessed using the unweighted kappa statistic (κ). The values of the κ coefficient generally range from 0-1, where perfect agreement would equate to a κ of 1 and chance agreement would equate to a κ of 0.[8] Judgments of level of agreement were based on the scale used by Landis and Koch,[9] in which a κ between 0.61-0.8 is considered substantial agreement, and a κ between 0.8-0.99 is considered almost perfect agreement. κ coefficients were also estimated within strata defined by infant age to assess whether agreement between the 2 datasets differed by infant age.

Results

Of the 2015 participants surveyed, 1985 had complete data in ISIS regarding the infant feeding packages they received. The demographic characteristics of the sample population matched those of the PHFE WIC population. Mothers had a median age of 27 years and about one-third of the sample (32%) had less than a high school education. The majority of the women were Hispanic (81%), 54% of whom were born in 1 of 27 countries outside of the US. The most common birth country for those born outside of the US was Mexico (68%), followed by Guatemala (9%) and El Salvador (8%).

Percentage overlap between WIC food package type and survey-reported infant feeding categories is presented in Table 1. Based on the κ analyses, there was substantial agreement between WIC administrative food package data and survey data (κ = 0.79). Participants' reported feeding behaviors on the survey were highly congruent with the WIC infant packages they received. Nearly 89% of those receiving "fully breastfeeding" packages reported that they fully breastfed their babies and were not using any formula. As illustrated in Table 1, about 10% of those receiving the "fully breastfeeding" packages reported combination feeding at the time of the survey, and very few reported they were fully formula feeding. Survey responses indicated that the average amount of formula given to these infants whose mothers received the "fully breastfeeding" package but reported combination or formula feeding was 15 ounces per week.

Over 90% of participants who received the "fully formula" packages reported they fed their babies only formula and gave no breast milk. The remaining mothers receiving the "fully formula" package reported doing varying amounts of breastfeeding. The number of times they breastfed per day ranged from 1-24 feedings, with a mean of 5.4 feedings.

As expected, the lowest levels of agreement were found among participants receiving the "combination feeding" package. Over 76% reported they were feeding both breast milk and formula at home, as suggested by the package type. In fact, some were fully breastfeeding and some were fully formula feeding at the time of the survey (Table 1).

Table 1 also shows the percentage of agreement within strata defined by age. κ Analyses showed somewhat better agreement between WIC administrative food package data and survey data for older infants (older than 6 months, κ = 0.84) than for younger infants (0 to 6 months; κ = 0.76).

Discussion

Results demonstrate that WIC food package issuance data are a valid indicator of infant feeding behavior, particularly for full breastfeeding and full formula feeding. κ Test statistics demonstrated levels of substantial agreement between survey responses and food package issuance, with agreement levels somewhat higher for infants older than 6 months of age. The fact that the percent agreement for combination feeders was lower is not surprising given that combination feeders often vary from day to day in the amount of breast milk and formula they feed to their infants, and a survey

interview does not easily capture these day-to-day fluctuations. The fact that the percent agreement for full breastfeeding and full formula feeding is high demonstrates that these WIC food package types are particularly good indicators of actual feeding behavior.

These results are important for many reasons. There are relatively limited data available on breastfeeding rates at the population level, and it has been recognized that integrating existing datasets and surveys into a comprehensive monitoring and surveillance system would greatly enhance the evaluation of breastfeeding practices.[6] In light of the discontinuation of the Pregnancy and Pediatric Nutrition Surveillance Systems (PNSS and PedNSS) after 2011,[10] it is important to consider administrative data sources that can provide valid population data on infant feeding behavior. WIC administrative datasets also include sociodemographic variables as well as actual measures of infant and child heights and weights over time.[11] These administrative data may therefore enable examination of determinants of infant feeding practices as well as consequences of infant feeding choices.

Nationwide, issuance of food packages to participants is a core WIC administrative function, therefore data associated with food package issuance are widely captured. However, few existing WIC administrative systems at the state and local level have the capacity to track food package issuance as a means of surveillance, and there is currently little to no funding for these efforts, thus these data are not currently widely available. Documentation of the validity of food package issuance data as indicators of infant feeding behavior lend support to funding WIC programs to access these data, which comes at a substantially lower price tag with a much larger reach to the population than periodic surveys of WIC participants.

Although the use of WIC administrative data allows for examination of population-level data of WIC participants, there are some limitations to this work. First, WIC food package issuance data capture rates of "full" breastfeeding, and although many mothers may in fact be exclusively breastfeeding, the "full" breastfeeding data cannot be considered synonymous with exclusive breastfeeding. Identifying data systems that capture exclusive breastfeeding would be an important addition to a breastfeeding surveillance system. Second, these data are available only for low-income infants receiving WIC benefits. Although WIC currently serves over 50% of all newborns in the US and is estimated to serve the majority of the low-income, WIC-eligible infant population,[1] it is widely noted that WIC participants have lower breastfeeding rates than nonparticipants.[12-18] This difference may be a result of demographic or environmental factors that influence feeding choices of low-income mothers and/or because of the provision of infant formula by the WIC program. Although validation of WIC administrative data will not provide a measure that will enable comparisons of feeding practices of WIC and WIC nonparticipants, it does provide an important tool for assessing infant feeding practices for the very large number of infants served by the program. Future studies are needed to validate food package issuance in a WIC population with larger numbers of non-Hispanic women. Although the authors do not have reason to believe the findings would be different in other regions, a potential limitation of this work is that it was conducted in the predominantly Hispanic community served in Southern California.

Conclusions

Given the many ties between breastfeeding and a myriad of improved health outcomes for women and children, data systems that provide surveillance of infant feeding behavior are critical for expanding the understanding of how the timing and dose of breastfeeding influence health outcomes, particularly of low-income women and children. Administrative data from WIC are a valid source of information about breastfeeding, and with appropriate funding support, they should be considered for use in nationwide breastfeeding surveillance and monitoring systems.

Declaration of Conflicting Interests

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