

Breastfeeding Patterns in the Rural Community of Hilo, Hawai'i: An Exploration of Existing Data Sets

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Abstract

Before any breastfeeding promotion effort, an understanding of the existing breastfeeding patterns is essential. Hawai'i County is a rural, ethnically diverse, medically underserved community. The purpose of this study was to describe the breastfeeding patterns of women living in Hilo, Hawai'i. Data from several existing national, state, and local data sets were accessed to identify and describe the breastfeeding patterns of women in this community. Available breastfeeding data about women in Hilo was obtained from the Hawai'i WIC program and includes initiation, duration, exclusivity of breastfeeding, and reasons for not breastfeeding. These data were compared to data from published reports available at the county, state, and national level. The State of Hawai'i and Hilo exceed national targets for breastfeeding initiation; however, rates soon drop following delivery, and mixed feedings of infants is common. The highest percentage of mothers weaned their infants within the first four weeks postpartum. The reasons the majority of the mothers gave for weaning were tied to breastfeeding situations that are amenable to skilled lactation support (eg, milk supply issues and latch or sucking problems). While available data sets offer valuable information on the breastfeeding patterns in this rural community, there are limitations to their usefulness, primarily due to the inconsistent operational definitions of infant feeding variables used in the surveys, and the lack of availability of community level data.

Introduction

Despite recommendations from government and health organizations, the duration of breastfeeding in the United States is still below desired levels.¹ The Healthy People 2020 targets recommend that 81.9% of mothers initiate breastfeeding, 60.6% breastfeed for at least six months postpartum, and 34.1% continue breastfeeding through 12 months after delivery.¹ In a recent news release, the Surgeon General of the United States released a Call to Action to support breastfeeding which identifies specific ways that communities, families, and health professionals can increase support for breastfeeding.²

The Island of Hawai'i is the largest island geographically in the state with a land mass of 4,028 square miles. It has the second largest county population; however, it has the lowest population density per square mile in the State.³ Hilo is the setting for this study and the largest city on the island with a population of 42,916, and is on the eastern and windward side of the island. Economically, Hilo has lower household income and higher poverty rates than either the State of Hawai'i or the United States.⁴ and lower household income than the northern and western regions of the island.⁵

An important factor that may be influencing breastfeeding rates reported for Hilo is access to breastfeeding support. The availability of information and resources that support breastfeeding infants may help women to initiate and to prolong duration of breastfeeding.⁶ An analysis of recent data from the Centers for Disease Control and Prevention (CDC) focused on breastfeeding support revealed that the State of Hawai'i scored lowest in the nation for breastfeeding support after

hospital discharge.⁷ Moreover, the availability of breastfeeding services may be more limited in rural settings in the State. The geographic setting of Hilo is classified as a rural region, which creates particular difficulties with access to health care that can result in suboptimal services to support breastfeeding. The purpose of this study is to gain a better understanding of a local community's breastfeeding patterns, specifically Hilo, Hawai'i.

Methodology

The present research report is the first part of a larger ethnographic study that explored breastfeeding support and service needs of women in Hilo, Hawai'i. Approval for this research was obtained from the Institutional Review Board (IRB) at the University of Hawai'i at Manoa prior to data collection.

To understand the characteristics and breastfeeding patterns of women living in Hilo, several existing national, state, and local data sets were used to describe breastfeeding patterns of women. The goal of the analysis was to access data at the lowest level possible (ie, community) when available and compare with state and national data to gain an understanding of community breastfeeding patterns. An effort was made to compare like data (ie, indicator, year) and triangulate findings among different data sets when direct comparisons were not possible. State and County level data were obtained from surveillance systems through review of published reports and online websites from the Pediatric Nutrition Surveillance System (PedNSS), the National Immunization Survey (NIS), and Hawai'i Pregnancy Risk Assessment Monitoring System (PRAMS).

The PedNSS is a program-based national surveillance system that monitors the nutritional status of low-income infants, children, and women in federally funded maternal and child health programs. Data are collected at the individual clinic sites. The data are then aggregated at the state level and submitted to the CDC.⁸ For this study, data for the State of Hawai'i and National estimates from 2009 were used to describe breastfeeding rates. National data from PedNSS is available at <http://www.cdc.gov/breastfeeding/data/index.htm>, and Hawai'i State data was obtained from the Hawai'i WIC program.

The NIS consists of two parts: a random dialed telephone survey to households and a mailed survey to immunization providers to monitor childhood immunization coverage.⁹ Starting in 2001, breastfeeding questions were added to the telephone survey to assess breastfeeding practices. Data collected from the NIS is used for the CDC Breastfeeding Report Card 2010 and current data on Healthy People 2020 breastfeeding goals.¹⁰ Data from NIS from births in 2007 were used to describe State of Hawai'i and national estimates on breastfeeding and supplementation

rates and is available at <http://www.cdc.gov/breastfeeding/data/index.htm>.

PRAMS is a population based surveillance system that collects data from mothers on indicators before, during, and shortly after their pregnancy. The questionnaires include core questions developed by the CDC and Hawai'i state-developed questions.¹¹ Every month a stratified random sample is drawn from the birth certificate files of live births that have occurred two to three months prior to the random sampling process. PRAMS data is only available at the state and county level. The PRAMS trend report for the State of Hawai'i, reported data for breastfeeding for at least 8 weeks which was aggregated for the time period from 2004-2008 to generate "stable estimates for the individual estimates by county, race, and maternal age groups."¹² Additional PRAMS data on breastfeeding initiation and exclusivity were obtained from the Hawai'i Department of Health Family Health Services Division Breastfeeding Fact Sheets.¹³

Data were collected directly from Hawai'i Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) on a number of breastfeeding indicators including initiation and duration rates, supplementation, and reasons for weaning. WIC is a federally funded program that provides supplemental foods, nutritional education, and breastfeeding promotion to low-income, nutritionally at risk women and children.¹⁴ Eligibility is limited to women who live at or below the 185% Federal Poverty Level (FPL). Data, including general information on breastfeeding, are collected from participants at each visit and entered in a local and statewide database. Data on breastfeeding at the local level was obtained directly from Hilo WIC office and the State Department of Health WIC Services Branch. Data on exclusive breastfeeding mothers was obtained by month and represents the proportion of mothers in WIC who were currently exclusively breastfeeding. Additionally, data on factors influencing premature weaning were also obtained and evaluated by time since birth. A WIC participant is asked for reasons why they stopped breastfeeding and include such options as "not enough milk." The top three reasons by months postpartum are reported in this study by three time periods: less than one week postpartum, one to four weeks postpartum and four to ten weeks postpartum. The WIC data is the only maternal-child health data provided to the CDC by Hawai'i for the generation of the standard PedNSS reports; therefore, the PedNSS and WIC data reported in this study should be similar to one another.

Results

Breastfeeding Initiation

Data on breastfeeding initiation were available from several data sets at national, state, county, and community level. Data varied on years available and indicator. The only data sets with breastfeeding initiation rates specific to Hilo were available from the Hilo WIC program directly, and CDC through the PedNSS (2009) provided by the Hilo WIC program; the two data sets, as noted earlier, are directly comparable. Table 1 contains PedNSS/

WIC data on breastfeeding prevalence ("ever breastfed") for the year 2009. Based on Healthy People 2020 targets, Hilo (82%) and the State of Hawai'i (84%) both appear to meet the target for initiating breastfeeding (81.9%).¹⁵ Data available from WIC showed that breastfeeding rates varied across Hawai'i County with Hilo having lower rates of "ever breastfeeding" than other parts of the Island.

State level data from the NIS was available for the year 2007 and showed a State of Hawai'i breastfeeding initiation rate of 87.5% meeting the Healthy People 2020 target (81.9%).¹⁶ State level breastfeeding initiation data were also available through PRAMS. PRAMS data shows that the rate of breastfeeding initiation for the State of Hawai'i increased from 89.1% in 2000 to 92.2% in 2008 (data not shown in Tables),¹³ well above the target rate. PRAMS data also contained information on "never breastfeeding" at the county level for aggregated data from 2004-2008. The percentages varied across the State with Hawai'i County having higher rates of mothers who had never breastfed (11.8%, 95% CI 10.5%-13.2%), than Honolulu (9.4%, 95% CI 8.9%-10.1%), Maui (7.7%, 95% CI 6.6%-9.0%), or Kaua'i (6.7%, 5.1%-8.6%) or the State of Hawai'i (9.4%, 95% CI 8.9%-9.9%; data not shown in Tables).¹³

Breastfeeding Duration

Data on breastfeeding duration were available from several data sets with breastfeeding rates specific to Hilo available from the Hilo WIC program directly, and CDC through the PedNSS (2009) provided by the Hilo WIC program. The indicators were breastfeeding continuation at 6 and 12 months postpartum ("breastfeeding duration of 6 months," and "breastfeeding duration of 12 months"). Table 1 contains PedNSS/WIC data on breastfeeding duration for the year 2009. Based on Healthy People 2020 guidelines, Hilo and the State of Hawai'i both are below target, but are still higher than the national levels. NIS data, which is more representative of the State than WIC or PedNSS data, showed rates of breastfeeding duration closer to target levels (see table 2). Overall, the State, county, and local data available indicate State of Hawai'i and Hilo falling short of meeting duration targets.

Breastfeeding Exclusivity

Much of the data on breastfeeding duration does not include information on the actual amount of breastfeeding (ie, breastfeeding exclusivity). Three data sources with data on breastfeeding exclusivity were state level data from the NIS, PRAMS, and WIC data for Hilo and Kona. The NIS state level data shows the State of Hawai'i meeting the Healthy People 2020 target goals for exclusive breastfeeding through 3 months, but falling short of the target for exclusive breastfeeding through 6 months (see Table 2).

Exclusive breastfeeding varies across the Island of Hawai'i with monthly reports from WIC showing consistently higher exclusive breastfeeding rates in Kona compared with Hilo. For example, in June of 2010, the Kona WIC office reported that 33% of all infants served were exclusively breastfeeding while

BF Rates	Hilo n (%) ^a	Honoka'a n (%) ^a	Waimea n (%) ^a	State of Hawai'i n (%) ^b
Ever Breastfed	475 (82.0)	52 (92.9)	141 (89.2)	8,488 (84.4)
Breastfed at least 6 months	198 (38.8)	23 (51.1)	75 (52.5)	4,505 (41.3)
Breastfed at least 12 months	168 (31.5)	15 (35.7)	59 (40.4)	7,754 (22.3)

BF = breastfeeding; WIC = The Special Supplemental Nutrition Program for Women, Infants, and Children; n refers to the number of respondents in the survey.

^a Data collected by the WIC Office in Hilo

^b PedNSS data provided by the State of Hawaii WIC Office

	State of Hawai'i %	United States %	Healthy People 2020 Targets ^a
Ever Breastfed	87.5±5.4	75.0±1.2	81.9%
Breastfeeding at least 6 months	60.4±7.3	43.0±1.3	60.6%
Breastfeeding at least 12 months	33.1±6.7	22.4±1.1	34.1%
Exclusive Breastfeeding through 3 months	42.3±7.4	33.0±1.2	46.2%
Exclusive Breastfeeding through 6 months	16.0±5.5	13.3±0.9	25.5%

^a US Department of Health and Human Services, 2010

Reason for Weaning	Breastfeeding Duration		
	< 1 wk n (%)	> 1 -4 wks n (%)	4 – 10 wks n (%)
Baby or mom sick	4 (8.5)	12 (9.8)	4 (8.0)
Baby preferred bottle	15 (31.9)	19 (15.5)	15 (30.0)
Breast pain/problems	1 (2.1)	6 (4.9)	1 (2.0)
Latch on or sucking problem	19 (40.4)	22 (17.9)	1 (2.0)
No time, not convenient	0	11 (8.9)	1 (2.0)
Not enough milk	5 (10.6)	38 (30.9)	11 (22.0)
Return to work/school	1 (2.1)	7 (5.7)	16 (32.0)
Right time to wean	0	0	0
Other	0	8 (6.5)	1 (2.0)
Total	47 (15.6)	123 (40.7)	50 (16.56)

^a Data Reported by the WIC Office in Hilo

Formula Supplementation	State of Hawai'i percent +/- standard error	United States percent +/- standard error
Before 2 days	26.3±7.2	25.4±1.4
Before 3 months	38.3±8.3	37.2±1.8
Before 6 months	46.6±9.5	43.8±2.0

Formula supplementation is defined as supplementation of breast milk with formula (with or without other supplementary liquids or solids) among infants breastfed at the age specified (2 days, 3 months, or 6 months).

Hilo reported that 22% of all infants served were exclusively breastfeeding (data not shown in Tables).¹⁷ PRAMS also includes data on breastfeeding exclusivity. State of Hawai'i PRAMS data for the years 2004 through 2008 showed 39.8 % of mothers who initiated breastfeeding did so exclusively for at least eight weeks (data not shown in Tables).¹³

Factors Influencing Premature Weaning

The Hawai'i WIC program collects information about the reasons for weaning and the age of weaning, and includes data

specific to those served by Hilo WIC. In 2009, the three most common reasons given by WIC mothers for weaning an infant were not enough milk (25.5%), the baby preferred a bottle (21.5%), and latch or sucking problems (14.9%; see Table 3). The most frequent period for weaning an infant was between one and four weeks postpartum (40.7%) with 16% of mothers breastfeeding less than one week. "Latch or sucking problems" were cited as being the most common reason (40.2% of mothers) for weaning within the first week postpartum. Similarly, between one and four weeks postpartum, 30.8% of mothers

stopped breastfeeding because they thought that they did not have enough milk for their babies.¹⁸

Supplementation

Data for supplementation rates were available at the State level from the NIS (Table 4). Approximately one quarter of breastfeeding mothers in Hawai'i are supplementing breastfeeding within two days of birth with the number increasing to nearly 50% by six months. The State of Hawai'i rates for formula supplementation are similar to national levels.

Discussion

Summary of Findings

Based on the analysis of the available data sets, the State of Hawai'i and Hilo are meeting target rates for breastfeeding initiation set out by the federal government.¹ New national targets have been established in Healthy People 2020 (HP2020), which have increased the recommendations for breastfeeding initiation. Based on the most recent data for breastfeeding initiation, the Hawai'i State and Hilo initiation rate of 89.1% continues to exceed the national average (73.9%) according to Healthy People 2020.¹⁰

Rates of breastfeeding duration are perhaps a more useful indicator of community breastfeeding patterns. The benefits of breastfeeding are described as dose dependent, which is why duration has been a focus within many data sets. The federal guidelines for breastfeeding duration for HP2020 have increased; target duration rates are 60.6% at six months and 34.1% at one year.¹ Based on current targets, the majority of national surveys report that the State of Hawai'i is close to six month and one-year target breastfeeding rates but lower for rates of exclusive breastfeeding.

In examining the Hilo WIC data, the majority of mothers are initiating breastfeeding, but duration rates drop below national recommendations. For example, the HP2020 target for breastfeeding duration of at least 6 months is 60.6% whereas only 38.8% of Hilo WIC mothers are breastfeeding at 6 months. Note, however, that WIC mothers throughout the State of Hawai'i failed to meet HP2020 targets for this particular indicator (41.3%) although regional differences in breastfeeding duration are notable, whereas the national target is achieved for the State of Hawai'i based upon a representative sample of mothers responding to the NIS. These discrepancies between Hilo vs. the State of Hawai'i, and WIC data vs. data from representative surveys both need to be considered to draw meaningful conclusions. First, the data shows that in general, mothers enrolled in the WIC program initiate breastfeeding at rates comparable to Hawai'i mothers, and achieve HP2020 targets for breastfeeding initiation. However, they perform worse than a representative sample of Hawai'i mothers, and fall below national targets, in breastfeeding duration. Second, although Hilo's WIC data is comparable to the state's WIC data, arguably Hilo's WIC data is more representative of breastfeeding among Hilo mothers than the state's WIC data is representative of the State of Hawai'i's mothers; this is because poverty levels in Hawai'i county in

general, and Hilo in specific, are higher than in the State of Hawai'i,^{4,5} resulting in a greater proportion of the population being eligible for WIC services. Nevertheless, the comparability of WIC data to nationally representative data must be considered as this data is evaluated.

According to the Hilo WIC, the highest percentage of mothers weaned their infants within the first four weeks postpartum. The reasons the majority of the mothers gave for weaning were tied to breastfeeding situations amenable to skilled lactation support (eg, milk supply issues and latch or sucking problems).¹⁹ This is consistent with the findings of researchers examining reasons for weaning among a broad spectrum of populations.² The NIS data shows that a quarter of breastfeeding mothers in the State of Hawai'i supplemented with formula by two days of age with this percentage increasing over the next six months.⁸ The introduction of formula decreases the amount of breast milk an infant receives, reduces breast milk production by their mothers, and may lead to early weaning.²

The recent Call to Action from the Surgeon General outlined steps to remove obstacles faced by women who want to breastfeed.² WIC, a federal program, has frequently been mentioned in the literature as a deterrent to breastfeeding due to the provision of formula.^{20,21} An attempt to ameliorate this situation has been mandated and operationalized through increased breastfeeding promotion by WIC staff and increased availability of breast pumps; however, the contradiction cannot be reconciled entirely. Recent increases to the food packages for breastfeeding mothers are another attempt to promote breastfeeding through WIC. The new packages were created to better "support the establishment of successful, long-term breastfeeding" but research is needed to determine the impact of these changes, if any, on breastfeeding duration.²² In one study with WIC participants in Louisiana, researchers found that significantly more mothers "reported that incentives provided to encourage breastfeeding did not affect their decision to breastfeed than those who said incentives affected their decision to breastfeed."²³ It is difficult to see how an agency that depends on funding from formula companies can truly be perceived as supportive of breastfeeding.²⁴

Limitations

PRAMS, NIS, PedNSS, and WIC data sets were accessed to explore breastfeeding patterns in the Hilo, Hawai'i community. A major limitation to the analysis was that community level data was limited to WIC data, which as noted earlier may be limited in its true representativeness of the Hilo community. While these data sets offer valuable information on the breastfeeding patterns in this rural community, several limitations to their usefulness in understanding the patterns of infant feeding in Hilo became obvious.

Operational Definitions of Key Variables

Measurement of breastfeeding varied among different surveys and these measurements are not necessarily reflective of what constitutes appropriate breastfeeding. International organizations concerned with breastfeeding have attempted

to standardize definitions of different levels of breastfeeding by creating frameworks to further define different levels of breastfeeding but no consensus currently exists.^{25,26} The use of the term breastfeeding alone is not sufficient to describe different patterns in breastfeeding behaviors (eg, partial, mixed, exclusive, token).²⁷ Many of the existing survey questions do not gather information about the frequency of breastfeeding per day or the duration of exclusive breastfeeding, which may better assess breastfeeding.

The problem with potentially inaccurate and misleading measurement concerning breastfeeding is highlighted by the following example from the NIS survey. One of the questions asked of respondents is: “Was [child] ever breastfed or fed breast milk?”¹⁶ In this survey, there is no attempt to quantify the frequency of feedings. A mother might have breastfed once in the span of her hospital stay and be counted as a breastfeeding mother. The variations in the wordings of the survey questions between the different surveys could also cause a mother to give different answers for the same breastfeeding outcome measure.²⁸ Therefore, the high rates of breastfeeding initiation found in the Hawai‘i statistics do not provide an accurate picture of the actual quantity of breastfeeding. It appears that mothers may be attempting to breastfeed but it is unclear how much actual exclusive breastfeeding is occurring and the duration of breastfeeding is not assessed well, particularly at the local community level. One national survey did collect data about exclusive breastfeeding. According to the NIS data for the State of Hawai‘i, breastfeeding at six months was 60%, but the exclusive breastfeeding rate at six months was 16%, well below target levels.¹⁶ The analysis of data sets would be more meaningful if breastfeeding was more accurately quantified. The rapid drop off in rates for duration of breastfeeding suggests that something detrimental happens between breastfeeding initiation and breastfeeding duration outcomes.

The variability in the operational definitions of breastfeeding makes it difficult to make comparisons across data sets. It also makes it difficult to interpret breastfeeding research and apply evidence-based findings to practice.²⁶ For example, an infant whose diet contains 100% breast milk compared to an infant whose diet contains 50% or less breast milk and 50% or more artificial milk are likely to have very different health outcomes.²⁵ According to Labbok,²⁶ “Policy-makers and HCPs must be very clear concerning what patterns of feeding we recommend based on the definition used in the articles that convinced us.”

Lack of Community Level Data

For many of the data sources examined, local data were aggregated into state data, which in turn were aggregated into national data sets, most often housed at the CDC. National and state data were more readily available for most surveys and for some indicators, were the only available level of data. This creates a problem when trying to understand infant feeding behaviors within smaller regions, as was the goal of this research.

For many data sets, the rates for all regions in the State of Hawai‘i are aggregated into one rate masking any regional

variations. Less available are data from within the counties. For example, one of the major data sources for Hawai‘i, PRAMS, cannot be disaggregated below the county level (ie, city level). The data from WIC were one of the few disaggregated sources available that facilitated an examination of breastfeeding rates within Hawai‘i County but are limited in their representativeness due to the eligibility requirements of WIC. Hilo WIC breastfeeding initiation rates meet national targets, whereas breastfeeding duration rates are dramatically lower. However, looking at WIC data on breastfeeding within Hawai‘i County, rates for the northern and western regions of the Island (ie, communities of Kona, Waimea, and Honoka‘a) are higher in all categories of breastfeeding activities than those reported for Hilo, suggesting that even among low income women, considerable geographic variations in breastfeeding patterns persist. These findings highlight the need to consider differences in geography and population distribution across the county and the importance of community level data in understanding breastfeeding patterns.

Conclusion

Prior to any breastfeeding promotion, it is important to gain an understanding of a community’s breastfeeding patterns. These data sets offered a valuable starting point for this study, but were limited in their usefulness for a thorough understanding of community breastfeeding patterns. The limited amount and quality of community level data combined with inconsistencies in breastfeeding definitions and different survey methodologies created an unclear picture of breastfeeding patterns. State data was often the only data available on which to gain an understanding. The high breastfeeding initiation rates may provide a false sense of how well Hawai‘i is meeting breastfeeding goals. Even though Healthy People 2020 targets are met for initiation, breastfeeding duration rates, at least in some lower income communities, may drop off below desired levels with even lower levels of exclusive breastfeeding.

The influences on breastfeeding decisions are multi-factorial and include maternal influences,²⁹ culture and contextual influences,^{30,31} and the health care system.^{19,32} Appropriate and timely breastfeeding services can improve breastfeeding exclusivity and duration.³³ In addition, the provision of ongoing support has been shown to increase the proportion of women who continued to breastfeed for up to six months.³⁴ Access to breastfeeding support services has become essential to increasing breastfeeding initiation and duration.⁶ The challenges of acceptance and support for breastfeeding in communities and larger society are complex and vary by region.

More research is needed to understand this community’s breastfeeding patterns and support and service needs. The second phase of this research is to include the voices of mothers and healthcare workers in Hawai‘i County to gain further understanding of breastfeeding patterns and support and service needs of the community. A quantitative exploration of breastfeeding rates in Hilo would shed light on the accuracy of existing government data set reports of breastfeeding initiation

and duration. Finally, deeper exploration of breastfeeding in other areas of the Island could help explain the differences in breastfeeding rates among regions in Hawai'i County.

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