

Acculturation and decreased
breastfeeding among Hispanic
women:

An analysis of data from the
2000/2001 Oregon Pregnancy Risk
Assessment Monitoring System



Masters Thesis Presentation
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Presentation Outline

- Background
- Study Objective
- Methods
- Results
- Discussion
- Q & A



Background: Importance of Breastfeeding

- Human breast milk provides numerous health benefits to breastfed babies, mothers who breastfeed, and society in general.
 - Infants/Children:
 - Decreased infectious disease
 - Decrease in other health problems throughout life
 - Possible increase in level of cognitive development
 - Mothers:
 - Quicker, easier recovery from childbirth
 - Reduced risk of breast cancer/ovarian cancer
 - Increased level of bonding with new infant
 - Family/Society:
 - Decreased employee absenteeism
 - Cost savings
 - Decrease in health expenditures
 - Decreased impact on environment





Background: U.S. Trends in Breastfeeding

- **Healthy People 2010 goals: Increase the proportion of mothers who breastfeed**



	1998 Baseline	2002 Progress	2010 Target
Any early postpartum*	64%	70%	75%
Exclusive† at three months	N/A‡	43%	60%
Any at six months	29%	33%	50%
Exclusive† at six months	N/A‡	13%	25%
Any at 1 year	16%	20%	25%



Background: Breastfeeding among Hispanic women

- Breastfeeding prevalence in foreign Hispanic cultures different than U.S.
- **BF in Mexico:**
 - 80-90% ever-breastfed
 - Mean duration: 9 months
 - Strong cultural values and beliefs
 - *Tener un bebe saludable* (to have a healthy baby)
- **BF in Puerto Rico:**
 - Cultural beliefs and values do not play major role
 - Lower prevalence of BF than U.S.
 - Until 2002, BF in public = indecent exposure
 - Now laws supporting BF in public and workplace
- **Central and South America:**
 - Range of 74-97% of ever-breastfed
 - Little research has been done





Background: Acculturation

- **Definition:**
 - A process by which immigrants begin to adopt cultural norms, attitudes, beliefs, and behaviors of a dominant culture
- **“Epidemiologic Paradox”:**
 - While women with lower levels of acculturation tend toward having less education, lower SES, higher rates of uninsurance, and less access to health care, they continue to experience fewer adverse perinatal outcomes than women with higher levels of acculturation.
- **Acculturation Hypothesis:**
 - As immigrant persons adapt to the values, behaviors, attitudes, beliefs of US mainstream culture, they experience negative health effects.



Background: Measuring Acculturation

- **Unidimensional Models:**
 - Continuum of “unacculturated” to “completely acculturated”
- **Bidimensional Models:**
 - Acculturation occurs with maintenance of certain aspects of original culture
- **Examples:**
 - Short Acculturation Scale
 - Acculturation Rating Scale for Mexican-Americans II
 - Variables as proxies





Background: Breastfeeding and Acculturation

- **Increased acculturation has been associated with:**
 - decreased breastfeeding initiation in a sample of Mexican-American women¹
 - decreased intention to breastfeed among primiparous Hispanic women and with lower history of breastfeeding among multiparous Hispanic women²
 - decreased ever-breastfeeding among a nationally representative sample of Hispanic women³
 - decreased intention to and initiation of breastfeeding among primarily Mexican-American women⁴
- **Acculturation has been found to have no effect on:**
 - breastfeeding initiation among a sample of Puerto Rican women⁵
 - the decision to breastfeed among Mexican-American adolescent mothers, after adjusting for other factors⁶



Study Objectives & Rationale

- **To assess the relationship between acculturation and any breastfeeding at ten weeks among a population-based sample of Hispanic women in Oregon in 2000-2001.**
- **To address confounding and effect modification in the relationship between acculturation and any breastfeeding at ten weeks.**
- **This is the first population-based study to assess the relationship between acculturation and breastfeeding beyond the neonatal time period (more than one month after birth).**



Hypothesis

- High-acculturation Hispanic women are less likely to breastfeed at 10 weeks than low-acculturation Hispanic women.





Methods: Oregon PRAMS 2000-2001

- A postpartum population-based survey asking Oregon women about attitudes and behaviors before, during and after pregnancy
- Oregon PRAMS was modeled after the CDC-sponsored multi-state PRAMS program; however, Oregon PRAMS data not collected under CDC protocol until 2002
- Mothers who gave birth in Oregon between January 1, 2000 and November 4, 2001 were randomly sampled from birth certificate files.
- Mothers sampled 2 to 6 months postpartum



Methods: Oregon PRAMS 2000-2001

- 6 Sampling Strata:
 - Hispanic
 - Non-Hispanic:
 - White, normal birth weight ($\geq 2500\text{g}$)
 - White, low birth weight ($< 2500\text{g}$)
 - African American
 - Asian/Pacific Islander
 - American Indian/Alaskan Native
- Complex sampling survey design
 - Low birth weight and racial/ethnic minority groups are over-sampled





Methods: Oregon PRAMS 2000-2001

- PRAMS data is weighted for:
 - Over-sampling
 - Accounts for over-sampling of low birth weight and minority groups
 - Non-response
 - Accounts for tendency of women with certain characteristics to have lower response rate
 - Birth certificate data allows us to know these characteristics
 - Primiparous Hispanic women in 2000 were more likely to respond than multiparous women
 - Non-coverage
 - Some births may not have been accounted for in state's birth certificate files
- The three weights are multiplied together to generate the final weight used in analysis.
- Interpretation of the weights
 - Each woman sampled was given a weight corresponding to the number of childbearing women in Oregon that she represented.



Methods: Oregon PRAMS 2000-2001

- Survey sent to 5367 women
 - 3895 responded
 - Response rate: 72.6% (unweighted)
- Inclusion/Exclusion Criteria:
 - Included (N = 1011):
 - Hispanic Oregon resident women who gave birth between 01/01/2000 and 11/04/2001
 - Child was alive and living with mother at the time of survey
 - Excluded from multivariable analysis:
 - 62 women did not have information on the language in which the survey was completed
 - Women not answering breastfeeding questions
 - Women not answering any other question that was used as a variable in multivariable analysis



Methods: Dependent Variable

- Any breastfeeding at ten weeks
 - Derived from the following questions:
 - “Did you ever breastfeed or pump breast milk to feed your new baby after delivery ?”
 - “Are you still breastfeeding or feeding pumped milk to your new baby ?”
 - “How many weeks or months did you breastfeed or pump milk to feed your new baby ?”



Methods: Independent Variable of Interest

- Variables:
 - **Maternal nativity:**
 - Foreign-born
 - U.S.-born
 - **Survey language:**
 - Spanish
 - English
 - **Acculturation:**
 - Low acculturation: Foreign-born/Spanish (n = 686, 67.9%)
 - Intermediate acculturation: Foreign-born/English or U.S.-born/Spanish (n=100, 9.9%)
 - High acculturation: U.S.-born/English (n=225, 22.2%)



Methods: Other independent variables

- **Childbearing Intention:**
 - Intended
 - Mistimed
 - Unwanted
- **Family Income:**
 - \geq \$20,000
 - $<$ \$20,000
- **Maternal Age:**
 - $<$ 20
 - 20-29
 - \geq 30
- **Smoking Status:**
 - Yes
 - No
- **WIC Enrollment:**
 - Yes
 - No
- **Marital Status:**
 - Married/Separated
 - Unmarried/Divorced/Annulled/Widowed
- **Education:**
 - 0-8 years
 - 9-11 years
 - \geq 12 years
- **Parity:**
 - Primiparous
 - Multiparous



Methods: Other independent variables

- Low weight birth:
 - $< 2500\text{g}$
 - $\geq 2500\text{g}$
- Type of delivery:
 - Vaginal
 - Cesarean
- Prenatal Care Initiation:
 - Within first trimester
 - After first trimester
- Body Mass Index:
 - Underweight / Normal weight (BMI < 25)
 - Overweight (BMI:25-30)
 - Obese (BMI > 30)
- County of Residence:
 - Rural
 - Urban



Methods: Outline of Analysis

- SUDAAN version 9.0.1 and SPSS version 13.0 utilized
- Descriptive analysis:
 - Frequency distributions and cross-tabulations
- Univariable logistic regression:
 - Crude odds ratios (ORs)
- Multivariable logistic regression:
 - Adjusted ORs

Variable	N	%	OR	95% CI	P-value
Gender					
Male	112	51.2	1.0		
Female	108	48.8	1.1	0.8-1.5	0.5
Age					
18-24	120	54.5	1.0		
25-34	110	49.5	1.2	0.9-1.6	0.3
35-44	100	45.5	1.3	1.0-1.7	0.05
45-54	90	40.5	1.4	1.1-1.8	0.01
55-64	80	36.0	1.5	1.2-1.9	<0.001
65+	70	31.5	1.6	1.3-2.0	<0.001
Education					
High school or less	130	59.0	1.0		
Some college	110	49.5	1.1	0.8-1.5	0.4
Bachelor's	100	45.5	1.2	0.9-1.6	0.2
Master's	90	40.5	1.3	1.0-1.7	0.05
PhD	80	36.0	1.4	1.1-1.8	0.01
Income					
< \$10,000	140	63.0	1.0		
\$10,000-\$20,000	110	49.5	1.1	0.8-1.5	0.4
\$20,000-\$30,000	100	45.5	1.2	0.9-1.6	0.2
\$30,000-\$40,000	90	40.5	1.3	1.0-1.7	0.05
> \$40,000	80	36.0	1.4	1.1-1.8	0.01





Methods: Model Building

- Backward elimination model selection
- Acculturation was main variable of interest, therefore included in model regardless of significance
- All other predictors included in model building (statistical, biological, or other importance)
- Exit criteria: $p > 0.10$
- Interactions assessed between acculturation with each remaining predictor in main effects model



Results: Sample Characteristics*

- Maternal Nativity:
 - 76.6% foreign-born / 23.4% US-born
 - 71.4% of sample born in Mexico
 - Of the foreign-born, 93.3% Mexico
- Survey Language:
 - 69.1% completed survey in Spanish
 - 30.9% completed survey in English
 - 62 women missing survey language
 - 16 (6.1%) US-born
 - 46 (5.3%) foreign-born



*All values presented are unweighted numbers and weighted percentages, and are based on all 1011 women in the sample except as noted otherwise

Results: Sample Characteristics

All Hispanic Women	Low Acculturation	Intermediate Acculturation	High Acculturation
95.0% Normal birthweight	95.2%	94.0%	94.7%
93.6% Did not smoke	96.9%	96.9%	82.2%
80.3% Urban county	82.2%	80.0%	74.6%
79.0% Vaginal delivery	80.4%	73.8%	79.0%
75.8% Enrolled in WIC	84.4%	69.2%	52.2%
61.9% Aged 20-29	63.4%	59.3%	58.5%
61.2% Multiparous	64.0%	55.9%	55.2%
62.8% Family Income < \$20,000	71.3%	51.0%	41.8%
60.3% < 12 yrs education	74.4%	42.0%	25.0%
58.8% Married	62.3%	54.3%	50.0%
58.6% intended childbirth	64.6%	53.8%	42.1%
56.8% First trimester prenatal care	53.0%	62.0%	65.8%
40.3% BMI Underweight/Normal	33.8%	54.8%	53.7%



Results: Breastfeeding Frequencies

Frequencies and percentages of women who initiated breastfeeding, and who breastfed for 10 or more weeks

	Unweighted number (n)	Weighted Percent
Initiated Breastfeeding		
Yes	939	92.9%
No	66	6.5%
Missing	6	0.6%
Total	1011	100%
Breastfed 10 or more weeks		
Yes	724	71.6%
No	287	28.4%
Total	1011	100%

Results: Univariable Analysis



Association between acculturation and any breastfeeding at ten weeks

Variable	N*	Any BF at 10 weeks (#, weighted %)	Odds Ratio (95% CI)	p-value
Acculturation				
Low	686	533 (77.7%)	Referent	
Intermediate	100	63 (63.2%)	0.49 (0.32 – 0.75)	
High	225	128 (56.9%)	0.38 (0.28 – 0.51)	p < 0.001



Results: Univariable Analysis

- **Other significant associations:**
 - Maternal age
 - Maternal smoking
 - Marital status
 - Maternal education
 - Body mass index
 - County of residence



- **Non-Significant associations:**
 - Childbearing intention
 - Family income
 - WIC enrollment
 - Parity
 - Low birth weight
 - Type of delivery
 - Prenatal care initiation



Results: Multivariable Model-Building

- All variables entered into initial multivariable model
- Removed in the following order: maternal education, childbearing intention, county of residence, prenatal care initiation, family income, body mass index, low birth weight, marital status.

Variable	Crude OR (95% CI)	MVM1* Adjusted OR (95% CI)	MVM9* Adjusted OR (95% CI)
Acculturation			
Low	Referent	Referent	Referent
Intermediate	0.49 (0.32 – 0.75)	0.40 (0.24 – 0.68)	0.45 (0.29 – 0.71)
High	0.38 (0.28 – 0.51)	0.30 (0.19 – 0.41)	0.34 (0.23 – 0.50)

* MVM = Multivariable Model



Results: Effect Modification/Interactions

- Two important interactions found:
 - WIC enrollment ($p = 0.017$)
 - Low acculturation:
 - Enrolled in WIC & breastfeeding at 10 weeks – 450 (77.7%)
 - Not enrolled in WIC & breastfeeding at 10 weeks – 59 (78.8%)
 - High acculturation:
 - Enrolled in WIC & breastfeeding at 10 wks – 49 (42.0%)
 - Not enrolled in WIC & breastfeeding at 10 wks – 68 (72.9%)
 - Parity ($p = 0.078$)
 - Low acculturation:
 - Primiparous & breastfeeding at 10 wks – 196 (77.5%)
 - Multiparous & breastfeeding at 10 wks – 337 (77.8%)
 - High acculturation:
 - Primiparous & breastfeeding at 10 wks – 64 (62.3%)
 - Multiparous & breastfeeding at 10 wks – 64 (52.4%)

Summary of crude and adjusted associations between acculturation, maternal characteristics, and any breastfeeding at ten weeks

		Crude OR & 95% CI	Main Effects Model	Interaction Model
Acculturation	Low	Referent	Referent	Interaction results below
	Intermediate	0.49 (0.32 – 0.75)	0.45 (0.29 – 0.71)	
	High	0.38 (0.28 – 0.51)	0.34 (0.23 – 0.50)	
Maternal Age	< 20 years	0.46 (0.33 – 0.64)	0.41 (0.28 – 0.61)	0.42 (0.28 – 0.63)
	20-29	Referent	Referent	Referent
	> 30	0.99 (0.70 – 1.39)	0.85 (0.58 – 1.23)	0.82 (0.56 – 1.19)
Smoking	Yes	0.29 (0.16 – 0.50)	0.48 (0.26 – 0.90)	0.52 (0.27 – 1.01)
	No	Referent	Referent	Referent
WIC enrollment	Enrolled in WIC	Referent	Referent	Interaction results below
	Not enrolled in WIC	1.16 (0.83 – 1.64)	1.78 (1.18 – 2.69)	
Parity	Primiparous	0.98 (0.75 – 1.28)	1.34 (0.96 – 1.86)	Interaction results below
	Multiparous	Referent	Referent	
Interaction	Low acculturation	N/A	N/A	Referent
	Not enrolled in WIC			1.10 (0.62 – 1.98)
	Intermediate	N/A	N/A	Referent
	Not enrolled in WIC			1.06 (0.40 – 2.82)
High	N/A	N/A	Referent	
Not enrolled in WIC			3.34 (1.86 – 6.00)	
Interaction	Low acculturation	N/A	N/A	1.17 (0.78 – 1.74)
	Multiparous			Referent
	Intermediate	N/A	N/A	0.81 (0.34 – 1.91)
	Multiparous			Referent
High	N/A	N/A	2.25 (1.24 – 4.11)	
Multiparous			Referent	



Discussion

- After controlling for several maternal and infant characteristics, acculturation remained a significant predictor of any breastfeeding at ten weeks among Hispanic women in Oregon in 2000 & 2001.



- The relationship between acculturation and breastfeeding at ten weeks may be modified by enrollment in WIC and parity.



Discussion: Comparison with the Literature

Consistent with the literature:

- These findings are consistent with other studies that have shown an association between increased acculturation and decreased breastfeeding practices among Hispanic women of Mexican origin or descent.
- The population of Hispanic women in Oregon is largely comprised of Mexican-origin and Mexican-American women.



Discussion: Comparison with the Literature

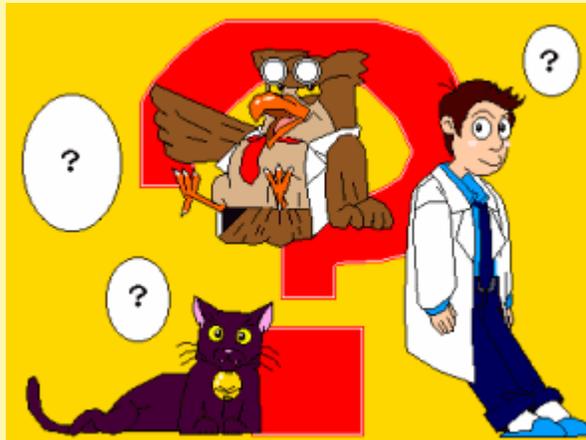
Inconsistent with the literature:

- 2 studies among Puerto Rico-origin women:
 - No association between acculturation and breastfeeding
 - Or
 - Mixed results
- 1 study with Mexico-origin women:
 - Mixed results



Discussion

Why do highly acculturated women
breastfeed less???





Discussion: Why do highly acculturated women breastfeed less?

- Determined by process of acculturation
- Differences in support for breastfeeding between US and other countries
 - Breastfeeding practices in other countries are not uniform



Discussion: Why do highly acculturated women breastfeed less?

- Loss of traditional cultural values:
 - Hispanic mothers identify *la familia* as an important concept in Mexican culture. Traditionally, female family members act as role models for new mothers. Acculturation often includes decreased connection to family, including loss of support for traditional Mexican beliefs regarding infant care and breastfeeding.
 - Childbearing and childrearing very highly regarded in Mexican culture
- Loss of social networks and support systems
 - Lesser need for tightly-knitted social networks
 - Role of male partner support
- Work/employment roles
- Increased exposure to infant formula marketing





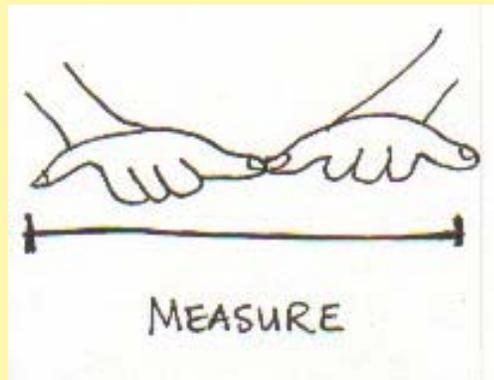
Discussion: Relationship with WIC

- While WIC enrollment does not have a significant effect on women with low or intermediate acculturation, those with high acculturation who are enrolled in WIC are significantly less likely to breastfeed than those who are not enrolled in WIC.
- The interaction between WIC enrollment and acculturation raises the possibility that WIC causes decreased breastfeeding among women who are highly acculturated.
- This is a cross-sectional study; causality cannot be imputed.
- Possibility #1: WIC provision of free infant formula encourages high-acculturation Hispanic women to stop breastfeeding sooner.
- Possibility #2: High-acculturation Hispanic women are more likely to enroll in WIC if they have decided to stop breastfeeding and want free infant formula.



Discussion: Possible Limitations

- Measurement of acculturation:
 - Maternal nativity and survey language are proxies for acculturation
 - Limitations of survey language already discussed
 - Unknown reliability of maternal nativity



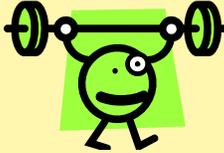


Discussion: Possible Limitations

- Misclassification bias
 - Mixed mode of survey distribution
 - Social acceptability responses
 - Recall bias
- Non-response bias
- Cross sectional study design



Discussion: Study Strengths

- Strength of association between acculturation and any breastfeeding 
- Internal and external consistency of results
- Association remains after adjusting for potential confounders
- Evidence of dose-response relationship



Discussion: Public Health Implications

- Decreased breastfeeding among highly acculturated Hispanic women is a community-wide health issue
- Breastfeeding promotion needs to target highly acculturated women specifically





Discussion: Public Health Implications

- Possible programmatic activities:
 - Pair new US-born mothers with foreign-born mothers and a lactation consultant for breastfeeding promotion
 - Peer counseling where low-acculturation mothers who breastfeed mentor high-acculturation mothers





Discussion: Future Research

- Mechanisms of how acculturation causes Hispanic women to breastfeed less
- Pilot studies on acculturation-specific breastfeeding programs (i.e. pairing of low- and high-acculturation mothers)
- Examination of WIC/acculturation interaction
- Prospective intervention studies rather than cross-sectional



Conclusions

- Because the Hispanic population is the fastest growing minority group in the US, it is important to address health issues among Hispanic men and women.
- Breastfeeding is an important health issue because it affects the health of babies who are breastfed, mothers who breastfeed, and society at large.
- Breastfeeding programs need to protect, support, and promote breastfeeding among highly acculturated women.



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