Can Hospital Support Reduce Racial/Ethnic Disparities in Exclusive Breastfeeding? An Assessment Using Mediation Analysis

UIC SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF ILLINOIS AT CHICAGO

Amanda C. Bennett, PhD, MPH[1]; Deborah Rosenberg, PhD[1]

[1]University of Illinois at Chicago School of Public Health, Division of Epidemiology and Biostatistics

BACKGROUND

Breastfeeding and Racial/Ethnic Disparities

- Breastfeeding (BF) is related in a dose-response manner to reductions in health risks for children and women, including: obesity, asthma, infectious diseases, and Sudden Infant Death Syndrome (SIDS).[1]
- The American Academy of Pediatrics (AAP) recommends infants be exclusively breastfed for the first six months of life.[2]
  - Only 18.2% of Illinois infants born in 2011 were exclusively breastfed for at least six months.[3]
- Non-Hispanic Black women are less likely to initiate and maintain BF than non-Hispanic White women[4] ; the evidence is less clear about racial/ethnic disparities in exclusive BF.

Hospital Breastfeeding Support

- The Baby Friendly Hospital Initiative encourages hospitals to be more supportive of BF by implementing specific practices shown to improve BF outcomes.[5]
- Only 6 /120 birthing hospitals in Illinois were designated as "Baby-Friendly" as of July 2015.[6]
- Even an effective intervention may not reduce racial/ethnic disparities in the target outcome due to:[7-8]
  - *Differential access*: Not all women are equally likely to experience supportive hospital practices
  - *Differential Effectiveness*: Hospital support may not be equally effective for all sub-groups of women

Study Objectives

- Extend the use of mediation methods to foster understanding of the mechanisms underlying racial disparities in exclusive breastfeeding.
- Explore whether differential access to and/or effectiveness of hospital support contributes to racial/ethnic disparities in exclusive breastfeeding for Illinois mothers and infants.

METHODS

Data Source: 2004-2008 Illinois Pregnancy Risk Assessment Monitoring System (PRAMS)

- Mail- and phone-based survey of women who delivered a live birth about experiences and behaviors before, during, and after pregnancy
- Inclusion criteria: infant alive and living with mother at time of survey, mother ever breastfed infant

Outcome *(Y)*: Exclusive Breastfeeding Cessation Before Six Weeks ***(among BF initiators only)***

"Exposure" *(A)*: Mother's Race/Ethnicity: non-Hispanic (NH) White, NH Black, or Hispanic

Mediator *(M)*: Hospital Breastfeeding Support

- Mothers were asked whether they experienced six BFHI practices during their delivery hospital stay:
  - Mom breastfed in the first hour after delivery
  - Hospital gave a telephone number to call for help with breastfeeding
  - Baby stayed in the same hospital room as mom ("Rooming-in")
  - Hospital staff told mom to breastfeed baby whenever he/she wants it ("On Demand")
  - Hospital did **not** give a formula gift pack or coupons
  - Baby did **not** use a pacifier in the hospital
- The number of BFHI practices experienced were counted for each women, then categorized into "high" (≥4 practices) and "low" (<4 practices) support levels.

Covariates *(C)*: infant sex, maternal age, marital status, parity, plurality, smoking during last three months of pregnancy, NICU admission, length of maternal hospital stay, & delivery method

Mediation Framework & Statistical Analysis

- Mediation analysis addresses the causal processes through which one variable is related to another.[9-10]
- In this context, the "natural direct effect" (NDE) and "natural indirect effect" (NIE) can be conceptualized as the "direct disparity" and "mediated disparity".[11]
- Bivariate analyses and multivariate logistic regression used to test relationships of the mediation framework
- The counterfactual approach to mediation analysis used to estimate odds ratios (ORs) for the NDE and NIE of race/ethnicity on exclusive breastfeeding cessation prior to six weeks.[14-15]
  - Exposure-mediator interaction was included in mediation analysis to account for potential differential effectiveness.
- All analyses used SAS survey procedures to account for the PRAMS stratified sampling design.

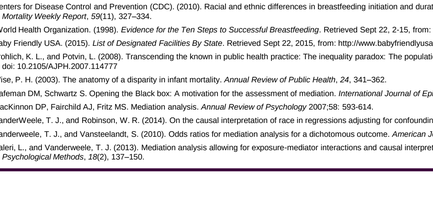


Figure 1. Mediation Framework

The **pink arrow** represents differential access to hospital BF support;

The **yellow arrow** represents the effect of hospital support on exclusive BF cessation;

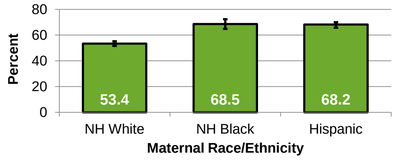
The **purple arrow** represents the differential effectiveness of hospital support by race/ethnicity;

The **green arrow** represents the NDE, or direct disparity measure ;

Together, the **pink** and **yellow** arrows represent the NIE, or mediated disparity measure

RESULTS

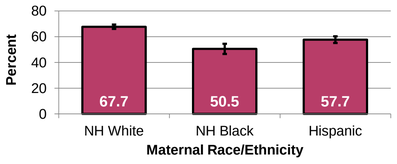
Exposure – Outcome Relationship



After adjustment for covariates, NH Black and Hispanic BF initiators have significantly higher odds of ceasing exclusive breastfeeding within six weeks than NH Whites.

NH Black vs. NH White aOR = 1.73 (1.41 – 2.12)
Hispanic vs. NH White aOR = 1.88 (1.61 – 2.18)

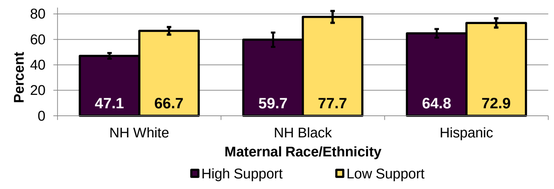
Exposure – Mediator Relationship



After adjustment for covariates, NH Black and Hispanic BF initiators have significantly lower odds of experiencing a high level of hospital BF support than NH Whites.

NH Black vs. NH White aOR = 0.59 (0.48 – 0.73)
Hispanic vs. NH White aOR = 0.67 (0.57 – 0.79)

Exposure-Mediator Interaction



Race/ethnicity significantly modified the effect of high hospital support on exclusive BF cessation before six weeks. High hospital support was associated with lower odds of exclusive BF cessation before six weeks in all racial/ethnic groups, but the protective effect was weaker among Hispanic women.

Race/Ethnicity- Specific aOR of Exclusive BF Cessation Before 6 Weeks for High vs. Low Support:
NH Whites: 0.49 (0.41 – 0.58) ; *NH Blacks*: 0.45 (0.31 – 0.65) ; *Hispanics*: 0.71 (0.56 – 0.91)

Mediation Analysis

Effect	Interpretation	Black vs. White		Hisp vs. White	
		aOR	95% CI	aOR	95% CI
Total Disparity *Total Effect (TE)*	Racial disparity in exclusive BF cessation before control for hospital support *(under current observed experience of hospital support)*	1.82	(1.43 - 2.31)	1.76	(1.49 - 2.07)
Direct Disparity *Natural Direct Effect (NDE)*	Racial disparity in exclusive BF cessation after controlling for hospital support *(if Blacks/Hispanics experienced support equal to Whites)*	1.66	(1.33 - 2.07)	1.70	(1.45 - 2.00)
Mediated Disparity *Natural Indirect Effect (NIE)*	Within NH Blacks or Hispanics, excess odds of exclusive BF cessation under observed support vs. if their support had been equal to whites	1.10	(1.04 - 1.16)	1.03	(1.00 - 1.06)

Mediation Results Interpretation

High hospital breastfeeding support appears to be only a weak mediator of racial/ethnic disparities in exclusive breastfeeding cessation before six weeks. Mediation of the Black-White disparity was statistically significant while mediation of the Hispanic-White disparity was not, even though results were qualitatively similar.

- Assuming equal access to hospital support, the racial/ethnic disparities in exclusive BF cessation were slightly reduced, but substantial disparities remained:
  - NH Black vs. NH White : reduced from 1.82 (TE) to 1.66 (NDE)
  - Hispanic vs. NH White : reduced from 1.76 (TE) to 1.70 (NDE)

CONCLUSIONS & PUBLIC HEALTH IMPLICATIONS

High hospital breastfeeding support was a very modest mediator of racial/ethnic disparities in exclusive breastfeeding cessation before six weeks.

- Equalizing access to hospital support would slightly decrease the Black-White disparity in early exclusive BF cessation, but a substantial Black-White disparity due to other factors would remain.
- One explanation for non-significant mediation of the Hispanic-White disparity may be differential effectiveness: hospital support was less effective for Hispanics than for Whites at preventing exclusive BF cessation.

While breastfeeding support in the hospital is important for improving population breastfeeding outcomes, improving hospital support may not help solve the problem of persistent disparities.

- More research about the factors that cause and maintain disparities in breastfeeding is necessary to inform targeted interventions for Black and Hispanic women.
- Counterfactual mediation analysis is a methodological tool that can be applied to identify factors that influence disparities and to evaluate whether interventions are addressing the determinants of disparities.

CONTACT INFORMATION

Amanda Bennett – amanda.c.bennett@illinois.gov

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