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The Association Between Maternal Experience of Hurricane-Related Stressors and Initiation and Continuation of Breastfeeding in Puerto Rico after Hurricanes Irma and Maria, PRAMS-ZPER 2.0 Telephone Survey 2018

By

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Master of Science in Public Health

Epidemiology

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An abstract of

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Abstract

The Association Between Maternal Experience of Hurricane-Related Stressors and Initiation and Continuation of Breastfeeding in Puerto Rico after Hurricanes Irma and Maria, PRAMS-ZPER 2.0 Telephone Survey 2018

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Introduction: The World Health Organization recommends exclusive breastfeeding of newborns for six months after birth due to evidence supporting short- and long-term benefits to mothers and babies. Hurricane Irma passed to the north of Puerto Rico on September 6, 2017 followed shortly after by the landfall of Hurricane Maria on September 20, 2017. Maternal experience of hurricane-related stressors may impact initiation and continuance of breastfeeding, but the association has not yet been explored in Puerto Rico in the aftermath of these hurricanes.

Methods: The study population included 1,230 mothers who delivered a live birth in a Puerto Rico maternity hospital between November and December 2017 and who completed both the PRAMS-ZPER 2.0 representative cross-sectional maternal in-hospital survey and follow-up telephone survey. We estimated crude and adjusted prevalence ratios for the association between maternal self-reported exposure to individual hurricane-stressors in the aftermath of hurricanes Irma and Maria and maternal self-reported initiation and continuation of breastfeeding through analysis of responses to the PRAMS-ZPER 2.0 telephone follow-up survey.

Results: The prevalence of breastfeeding initiation among the PRAMS-ZPER 2.0 cohort was 95.3%, while the prevalence of continued breastfeeding at follow-up was 58.7%. No hurricane related stressors were associated with breastfeeding initiation except reporting fearing that their lives were in danger due to the hurricanes. After controlling for maternal age and education, women who reported feeling like their life was in danger due to the hurricanes were 92% (95% CI: [0.89, 0.95]) as likely to have reported ever breastfeeding their infant compared with women who did not report this stressor.

Conclusions: The prevalence of breastfeeding initiation and continuation among the PRAMS-ZPER 2.0 cohort at survey follow-up was high compared with the reported prevalence of breastfeeding in Puerto Rico in 2016. Few stressors were associated with prevalence of breastfeeding initiation and continuation when assessed individually. Further targeted analyses may provide additional insight into the combination of mechanisms that resulted in the observed increase of prevalence of breastfeeding initiation and continuation in Puerto Rico after Hurricanes Maria and Irma, and may suggest ways that breastfeeding among pregnant women may be promoted and supported during future disasters.

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Introduction

The World Health Organization recommends exclusive breastfeeding of infants until six months of age based on evidence supporting health benefits for women and children.[1] Approximately one quarter of all infants are exclusively breastfed through 6 months of age in the United States.[2] Maternal, infant, and child health (MICH) objective 21 of the United States Department of Health and Human Services Healthy People 2020 Initiative set the goal of increasing the proportion of infants by 2020 in the United States who are ever breastfed to 81.9%, breastfed at 6 months to 60.6%, breastfed at 1 year to 34.1%, exclusively breastfed at 3 months to 46.2%, and exclusively breastfed at 6 months to 25.5%.[2] Among 2016 births in the United States and its territories, Puerto Rico had a slightly higher prevalence of breastfeeding initiation (82.7% in Puerto Rico compared with 81.1% US average), but had a lower prevalence of infants who were still breastfed at 6 months (37.1% compared with 51.8%), breastfed at 12 months (21.2% compared with 30.7%), exclusively breastfed through 3 months (35.2% compared with 44.4%), and exclusively breastfed through 6 months (20.1% compared with 22.3%).[3] In addition, the percent of breastfed infants receiving formula before 2 days of age in Puerto Rico was 30.2% compared with the national average of 17.1%, where receiving formula before 2 days of age is less ideal than exclusive breastfeeding.[3] While Puerto Rico was meeting the Healthy People 2020 breastfeeding initiation objectives and outperforming the United States national average in 2016, it was below the United States national average and falling short of achieving any of the breastfeeding continuation objectives.[3]

Maternal breastfeeding is only contraindicated when infants are diagnosed with classic galactosemia or when the mother is living with HIV.[4] In 2011, the United States Office of the

Surgeon General released a Call to Action to Support Breastfeeding which detailed barriers to mothers' ability and intent to exclusively breastfeed through six months of age, citing lack of knowledge, social norms, poor family and social support, embarrassment, lactation problems, employment and child care, and barriers related to health services as major factors preventing breastfeeding initiation or influencing breastfeeding discontinuation.[5]

Other factors outside of the above individual-level barriers, to include natural disasters, may impact breastfeeding as well. The frequency and intensity of natural disasters such as hurricanes and tropical storms have increased in recent decades in the United States, particularly in the Caribbean.[6] Disasters do not impact all communities equally and may disproportionately affect certain groups, including postpartum women and their children.[7,8] Disparities in preparation and resilience may pose additional barriers for some postpartum women that ultimately hamper breastfeeding initiation and continuation.[9,10,11,12] Previous studies have suggested that traumatic life event experiences may shorten breastfeeding duration, with suggested possible mechanisms including competition with distribution of free infant formula, discomfort due to lack of safe breastfeeding spaces, lack of support due to decreased access to lactation counseling and consultation, and lack of well-bring resulting from experience of physical or psychological trauma (including gender-based violence) in the aftermath of disasters.[13,14] These barriers may not only affect breastfeeding at the time of the disaster, but could also contribute to future disparities in adverse health outcomes experienced by mothers and children that result from breastfeeding non-initiation or discontinuation.

Puerto Rico's 2017 breastfeeding initiation and continuation data show impressive improvements in many categories compared with the 2016 results, with a 3.2% increase

(85.9%) in breastfeeding initiation, a 9.9% increase (47.0%) in breastfeeding through six months, an 8.6% increase (29.8%) in breastfeeding through 12 months, a 13.2% increase (48.4%) in exclusive breastfeeding through 3 months, and a 6.4% increase (26.5%) in exclusive breastfeeding through 6 months.[15] Variation in breastfeeding initiation and continuation at the individual level and in maternal experience of stressors associated with Hurricanes Maria and Irma may have threatened to disrupt this progress made in improving breastfeeding uptake and continuation for some women. The purpose of this study is to evaluate the associations between maternal self-reported experience of individual hurricane-related stressors and maternal self-reported breastfeeding initiation and continuation practices as they are documented in the data from the PRAMS-ZPER 2.0 telephone follow-up survey.

Methods

Study Design

This analysis was conducted using data from the Zika Postpartum Emergency Response extension of the Pregnancy Risk Assessment Monitoring Survey (PRAMS-ZPER), a survey created by the United States Centers for Disease Control and Prevention Division of Reproductive Health and administered by the Puerto Rico Department of Health. The primary aim of this survey was to investigate Zika virus awareness and transmission prevention measures among Puerto Rican residents giving birth to live born infants in Puerto Rico hospitals having more than 100 births per year.[16]

The follow-up study, PRAMS-ZPER 2.0, which was the primary data source for this analysis, was administered to PRAMS-ZPER respondents after Puerto Rico was impacted by Hurricanes Maria and Irma and pivoted in its second phase to also focus on understanding and assessing risks to mothers and babies due to hurricane-related stressors.[17] PRAMS-ZPER 2.0 questions were evaluated and adjusted based on results from PRAMS-ZPER and were verified by subject matter experts at the Puerto Rico Department of Health and available in both English and Spanish. A total of 34 hospitals met the birth volume eligibility criteria with 30 participating, accounting for coverage of 96.2% of all births in Puerto Rico. The maternal in-hospital survey recruited 1,545 women who had given birth to live infants in Puerto Rico hospitals between November and December 2017 using proportional sampling to draw the sampling schedule by time of birth.[18] All births falling within pre-established sampling time intervals were selected.[17] Among the 1,545 women recruited, 1,482 (96%) completed the in-hospital survey. All women who completed the maternal in-hospital survey were contacted in February and March 2018 to complete the telephone follow-up survey (PRAMS-ZPER 2.0). Among the 1,482 women who completed the maternal in-hospital survey, 1,230 (83%) completed the telephone survey. Two mothers were excluded from analysis who reported that

they were no longer living with their child or that their child was no longer living. PRAMS-ZPER 2.0 assigned weights to individuals using inverse probability of treatment weighting in order to conduct analysis and make inferences on the non-representative sample as if it were representative of all mothers and live births that occurred in Puerto Rico during the study period. The PRAMS-ZPER 2.0 study protocol contains additional detail on study design elements.[17]

Measures

Self-reported responses collected from the PRAMS-ZPER 2.0 maternal telephone follow-up survey were used for this analysis. Participants were asked whether they had encountered one or more adverse experiences, as well as the degree of damage that their home sustained, as a result of Hurricanes Irma and Maria. Table 1 includes the list of hurricane stressors evaluated in this study along with their corresponding survey question.

To ascertain information regarding breastfeeding initiation and continuation, mothers were asked whether they had ever breastfed or pumped breastmilk to feed their child and were *currently* (i.e. at the time of the survey) breastfeeding or pumping breastmilk to feed their child. Covariates of interest such as maternal age, race, education level, and Hispanic origin were abstracted from the Puerto Rico Demographic Registry vital records.

Statistical Analyses

We estimated the crude and adjusted associations between self-reported exposure to hurricane-related stressors and breastfeeding initiation and continuation. Log-binomial regression models were fit to estimate prevalence ratios for each breastfeeding outcome comparing exposure to hurricane-related stressors with non-exposure to the corresponding

stressor. Hispanic origin, marital status, race, and employment status were considered as potential effect modifiers, and maternal age and education were identified *a priori* as confounders and were controlled in the analysis. All analyses were conducted using SAS version 9.4. This project was determined to be non-human subjects research by Emory University and did not require IRB approval.

Results

A total of 1,163 of 1,230 (weighted frequency of 95.3%) mothers reported ever breastfeeding their infant, while 684 (58.7%) reported still breastfeeding their infant at the time of survey follow-up 2 to 4 months after delivery, as shown in Figure 1. Table 2 shows the characteristics of mothers who completed the PRAMS-ZPER 2.0 telephone survey overall and stratified by self-reported breastfeeding initiation and continuation status at the time of survey follow-up.

Table 3 and Figure 2 show unadjusted prevalence ratios for the associations between both hurricane stressors and select maternal characteristics and breastfeeding initiation and continuation at survey follow-up. While many of the unadjusted prevalence ratios for breastfeeding initiation suggested no association or weak associations, the prevalence ratios for continuation of breastfeeding by age, education level, and marital status, in particular, suggested an increased prevalence of breastfeeding at survey follow-up among older, more educated, and married mothers. Several crude associations suggested weak but statistically significant protective effects of hurricane related stressors on breastfeeding initiation or continuation, including having to move to another municipality (initiation PR 1.02, 95% CI (1.00, 1.04), continuation PR 1.09, 95% CI (1.00, 1.19)); feeling unsafe because of lack of order and security (initiation PR 1.04, 95% CI (1.02, 1.06), continuation PR 1.22, 95% CI (1.14, 1.31)); trouble getting clean drinking water (continuation PR 1.09, 95% CI (1.03, 1.16)); and being without electricity for one week or longer (continuation PR 1.43, 95% CI (1.02, 2.01)), to name a few. Some hurricane stressors, like women reporting someone close to them dying in the disaster, were observed to be detrimental to breastfeeding *initiation* (PR 0.95, 95% CI (0.89, 1.00)) but were protective against discontinuation among mothers who had initiated breastfeeding (PR 1.09, 95% CI (0.95, 1.26)).

Table 4 and Figure 3 shows adjusted prevalence ratios for the associations between hurricane stressors and initiation and continuation of breastfeeding, controlling for maternal age and education after finding no evidence of effect measure modification. The strongest of these was the relationship between reporting having felt like their life was in danger due to the hurricane and breastfeeding initiation, with women who reported feeling like their life was in danger being 8% less likely to have initiated breastfeeding (PR 0.92, 95% CI (0.89, 0.95)); however, this stressor was positively associated with breastfeeding continuation, with those who felt that their life was in danger being 5% more likely to report *continuation* of breastfeeding at survey follow-up (1.05, 95% (0.99, 1.11)). Compared with women who experienced no home damage related to the hurricane, women who experienced minor home damage (PR 1.07, 95% CI (1.01, 1.14)) had a lower breastfeeding continuation prevalence ratio than women who experienced major home damage (PR 1.15, 95% CI (1.03, 1.30)). But women whose homes were destroyed (PR 1.06, 95% CI (0.90, 1.25)) had lower breastfeeding continuance prevalence ratios than those whose homes had major damage.

Discussion

In this study, we estimated crude and adjusted prevalence ratios for the associations between maternal self-reported exposure to individual hurricane-stressors in the aftermath of hurricanes Irma and Maria and maternal self-reported initiation and continuation of breastfeeding through analysis of responses to the PRAMS-ZPER 2.0 telephone follow-up survey. We found that the prevalence of breastfeeding initiation (95.3%) and continuation (58.7%) among the PRAMS-ZPER 2.0 respondents at survey follow-up was high compared with the corresponding prevalence of breastfeeding in Puerto Rico in 2016. This was contrary to our hypothesis that the prevalence of breastfeeding initiation would be lower than the reported prevalence from Puerto Rico in 2016 of 82.7% due to disruptions associated with Hurricanes Maria and Irma. In addition, while we hypothesized that maternal experience of hurricane-related stressors may lead to a decline in maternal initiation and continuation of breastfeeding, the results from our analysis suggest that the relationships between breastfeeding and individual hurricane are quite modest at best.

In considering and attempting to explain some of the observed results, it is plausible that some hurricane-related stressors may lead to an increase in breastfeeding initiation and continuation such as trouble getting clean drinking water, trouble getting enough food to eat, and being without electricity for one week or longer because these stressors may act as barriers to procuring, preparing, or storing formula. Other stressors, like being injured or becoming ill due to the hurricane may plausibly be detrimental to continuation of breastfeeding, as was observed (PR 0.90, 95% CI (0.81, 1.00)). Mechanisms behind some observed adjusted prevalence ratios may be more challenging to suggest. For instance, women who experienced walking through debris or floodwater in the aftermath of the hurricane had a higher prevalence of breastfeeding continuation than women who did not report walking through debris of floodwater (PR 1.07, 95% CI (1.01, 1.13)). It may be that transportation was restricted as a

result of the debris and floodwater, and so it may have been more challenging to procure formula, but the relationship between mechanism and stressor is less evident than, for instance, the example of lack of access to clean drinking water leading to increased uptake of breastfeeding.

Limitations

First, the PRAMS-ZPER 2.0 survey is not directed at understanding how hurricane stressors impact breastfeeding and does not explicitly ask mothers why they never breastfed their children or why they discontinued breastfeeding their children. Qualitative research including key informant interviews or focus groups may be especially helpful in the future for identifying trends or uncovering mechanisms and possible risk factors of breastfeeding non-initiation and discontinuation in the aftermath of disasters.

Second, the survey outcomes of interest were limited to breastfeeding or pumping initiation and any breastfeeding or pumping continuation at the time of follow-up. As a result, we are unable to distinguish between mothers who exclusively breastfeed and mothers who supplemented with formula and/or solid foods. We also cannot distinguish between women whose babies received breast milk by breast or by bottle; additional information on breastmilk delivery (direct versus expressed) may also be helpful to consider when determining how to best support nursing mothers in disasters.

Third, within-cohort differences in breastfeeding duration are not evident when analyzing breastfeeding continuation. The maternal in-hospital surveys took place between November and December 2017 with follow-ups taking place between February and March 2018. The number of months between enrollment and follow-up may range between 2 to 4 months. A mother who still breastfed at her two month follow-up would be analyzed the same as a mother who still breastfed at her four month follow-up.

Finally, combinations of exposures to hurricane-related stressors were not assessed, which may elucidate how patterns of exposure or non-exposure may impact breastfeeding initiation and continuation.

Conclusions

We found that the prevalence of breastfeeding initiation and continuation among the PRAMS-ZPER 2.0 cohort at survey follow-up was high compared with the reported prevalence of breastfeeding in Puerto Rico in 2016. Few hurricane-related stressors were associated with prevalence of breastfeeding initiation and continuation when assessed individually; however, women who felt their life was in danger from the hurricane were less likely to initiate breastfeeding. By understanding the relationships between hurricane stressors and breastfeeding experience, health departments may understand how to better support mothers in the planning, preparation, response, and recovery phases of an emergency to both promote initiation of breastfeeding in new mothers and prevent any disruption in those already breastfeeding. Future studies directed at understanding impacts on breastfeeding initiation and duration resulting from exposure to hurricane related stressors may benefit from instead considering individual or combinations of mechanisms and barriers to initiation and continuation. Needs assessments in the immediate aftermath of disasters may consider qualitative approaches such as key informant interviews or focus groups to rapidly suggest how to best promote breastfeeding initiation and duration among breastfeeding women immediately before or after a disaster.

Tables

Table 1. List of Hurricane Stressors Evaluated as Exposures

Hurricane Stressors (#30)
Felt like life was in danger
Were injured or became ill
Member of household was injured or became ill
Walked through debris or floodwater
Without electricity for one week or longer
Someone close to you died in the disaster
Living in temporary housing
Lost personal belongings
Separated from loved ones
Trouble getting services or aid from the government
Trouble dealing with insurance or relief agencies
Trouble getting clean drinking water
Trouble getting enough food to eat
Felt unsafe because of lack of order & security
Had to move to another municipality
Home Damage due to the Hurricane (#31)
None
Minor
Major
Destroyed
Things that happened due to hurricanes (#39)
Missed one or more prenatal care appointments
Had to change doctors
Doctor not present at birth of baby
Had to deliver baby in a different hospital

Table 2. Characteristics of enrolled PRAMS-ZPER 2.0 telephone follow-up survey cohort, stratified by ever or currently breastfeeding their child at the time of survey, Puerto Rico, Spring 2018[†§]

Characteristic	Total (N = 1230)	Ever Breastfed or Pumped Breastmilk to Feed	Currently Breastfeeding or Pumping
Age			
<=17	38 (3.1%)	34 (2.9%)	13 (1.9%)
18-19	91 (7.3%)	87 (7.3%)	34 (4.9%)
20-24	387 (31.3%)	362 (30.9%)	192 (27.6%)
25-29	312 (25.4%)	300 (25.8%)	197 (28.9%)
30-34	244 (20.0%)	231 (20%)	152 (22.6%)
35-39	131 (10.7%)	124 (10.7%)	78 (11.3%)
40+	27 (2.3%)	25 (2.3%)	18 (2.8%)
Education Level			
8th grade equivalent	17 (1.4%)	15 (1.3%)	5 (0.7%)
9th-12th grade equivalent, without a diploma	95 (7.7%)	83 (7.2%)	36 (5.2%)
High school diploma or GED	303 (24.5%)	283 (24.1%)	138 (19.8%)
Some college or technical school	249 (20.2%)	240 (20.6%)	126 (18.5%)
Associate's degree	189 (15.3%)	175 (14.9%)	106 (15.3%)
Bachelor's degree	274 (22.4%)	267 (23.2%)	194 (28.5%)
Master's degree	80 (6.5%)	77 (6.7%)	58 (8.7%)
Doctoral or professional degree	23 (2.0%)	23 (2.1%)	21 (3.2%)
Hispanic Origin			
Puerto Rican	1174 (95.3%)	1110 (95.5%)	653 (95.4%)
Dominican	26 (2.2%)	25 (2.3%)	16 (2.5%)
Other Hispanic Origin	12 (0.9%)	12 (1%)	10 (1.4%)
Not Hispanic	16 (1.3%)	14 (1.2%)	5 (0.7%)
Marital Status			
Married	472 (38.7%)	452 (39.5%)	307 (45.5%)
Not Married	748 (60.5%)	701 (60.5%)	371 (54.5%)
Race*			
White	1087 (88.2%)	1031 (88.1%)	601 (87.3%)
Black	139 (11.5%)	131 (11.4%)	82 (12%)
Other	8 (0.6%)	6 (0.5%)	5 (0.7%)
Working for a job at pay at time of hurricane			
Yes, full time (More than 30 hours)	215 (17.7%)	206 (18.1%)	117 (17.6%)
Yes, part time (30 hours or less)	338 (27.7%)	328 (28.6%)	229 (33.8%)
Not Employed	662 (53.4%)	620 (53.3%)	336 (48.6%)
Hurricane Stressors (#30)			
Felt like life was in danger	473 (38.3%)	440 (93.6%)	265 (60.6%)
Were injured or became ill	123 (10.1%)	116 (95.7%)	62 (53.1%)
Member of household was injured or became ill	136 (11.1%)	128 (95.8%)	83 (64.4%)
Walked through debris or floodwater	364 (29.4%)	346 (95.3%)	216 (62.2%)
Without electricity for one week or longer	1197 (97.3%)	1138 (95.3%)	672 (59%)
Someone close to you died in the disaster	52 (4.3%)	46 (90.5%)	30 (64%)
Living in temporary housing	420 (34.3%)	395 (93.9%)	233 (58.8%)
Lost personal belongings	466 (37.7%)	436 (93.7%)	258 (58.9%)
Separated from loved ones	372 (30.1%)	356 (96.1%)	221 (62.6%)
Trouble getting services or aid from the government	292 (23.7%)	279 (95.9%)	164 (59%)
Trouble dealing with insurance or relief agencies	231 (18.8%)	216 (94.6%)	136 (62.5%)
Trouble getting clean drinking water	513 (41.5%)	491 (95.9%)	303 (61.8%)
Trouble getting enough food to eat	429 (34.8%)	405 (94.6%)	247 (61.3%)
Felt unsafe because of lack of order & security	744 (60.3%)	717 (96.8%)	451 (63.1%)
Had to move to another municipality	156 (12.5%)	152 (97.3%)	96 (63.4%)
Home Damage due to the Hurricane (#31)			
None	419 (34.3%)	402 (35.1%)	231 (34%)
Minor	647 (52.6%)	616 (53.5%)	369 (54.7%)
Major	87 (7.1%)	79 (6.9%)	49 (7.2%)
Destroyed	56 (4.5%)	53 (4.5%)	29 (4.2%)
Things that happened due to hurricanes (#39)			
Missed one or more prenatal care appointments	455 (36.6%)	427 (94.0%)	253 (59.2%)
Had to change doctors	43 (3.7%)	41 (94.8%)	25 (60.9%)
Doctor not present at birth of baby	51 (4.1%)	50 (97.8%)	28 (54.6%)
Had to deliver baby in a different hospital	68 (5.7%)	63 (93.6%)	39 (61.6%)

† Percent of mothers who currently breastfed their infants excludes mothers who never breastfed their infants

* A total of 10 women self-identified their race as white and black/African American

§ Presented counts reflect unweighted survey results

Table 3. Crude prevalence ratios for breastfeeding initiation and continuation, PRAMS-ZPER 2.0 telephone follow-up survey, Puerto Rico, Spring 2018

Characteristic	Ever Breastfed of Pumped Breastmilk to Feed Their Child (N = 1219)		Currently Breastfeeding or Pumping Breastmilk to Feed Their Child (N = 1162)	
	Prevalence Ratio	95% CI	Prevalence Ratio	95% CI
Age				
<=17	1.00		1.00	
18-19	1.05	0.99, 1.13	1.03	0.75, 1.43
20-24	1.03	0.96, 1.09	1.38	1.04, 1.83
25-29	1.05	0.99, 1.12	1.73	1.30, 2.29
30-34	1.04	0.98, 1.11	1.73	1.30, 2.30
35-39	1.05	0.98, 1.12	1.61	1.21, 2.16
40+	1.05	0.97, 1.14	1.89	1.38, 2.60
Education Level				
8th grade equivalent	1.00		1.00	
9th-12th grade equivalent, without a diploma	1.01	0.90, 1.15	1.26	0.77, 2.04
High school diploma or GED	1.05	0.95, 1.21	1.41	0.89, 2.25
Some college or technical school	1.08	0.99, 1.25	1.54	0.97, 2.45
Associate's degree	1.05	0.95, 1.2	1.78	1.12, 2.82
Bachelor's degree	1.09	1.00, 1.26	2.12	1.34, 3.36
Master's degree	1.07	0.98, 1.24	2.25	1.41, 3.57
Doctoral or professional degree	1.13	0.95, 1.35	2.67	1.68, 4.25
Hispanic Origin				
Puerto Rican	1.00		1.00	
Dominican	1.00	0.94, 1.07	1.09	0.90, 1.31
Other Hispanic Origin	1.06	1.04, 1.07	1.41	1.19, 1.68
Not Hispanic	0.93	0.83, 1.05	0.60	0.38, 0.95
Marital Status				
Not Married	1.00		1.00	
Married	1.01	1.00, 1.03	1.28	1.2, 1.36
Race*				
White	1.00		1.00	
Black	0.99	0.96, 1.01	1.06	0.97, 1.17
Other	0.92	0.76, 1.10	1.43	1.13, 1.81
Working for a job at pay at time of hurricane				
Yes, full time (More than 30 hours)	1.00		1.00	
Yes, part time (30 hours or less)	1.01	0.99, 1.03	1.21	1.11, 1.32
Not Employed	0.97	0.95, 0.99	0.94	0.86, 1.03
Hurricane Stressors (#30)				
Felt like life was in danger	0.97	0.95, 0.99	1.05	0.99, 1.12
Were injured or became ill	1.00	0.98, 1.03	0.90	0.80, 1.00
Member of household was injured or became ill	1.01	0.98, 1.03	1.11	1.02, 1.21
Walked through debris or floodwater	1.00	0.98, 1.02	1.08	1.02, 1.16
Without electricity for one week or longer	1.00	0.94, 1.07	1.43	1.02, 2.01
Someone close to you died in the disaster	0.95	0.89, 1.00	1.09	0.95, 1.26
Living in temporary housing	0.98	0.96, 1.00	1.00	0.94, 1.07
Lost personal belongings	0.97	0.96, 0.99	1.00	0.94, 1.07
Separated from loved ones	1.01	0.99, 1.03	1.10	1.03, 1.17
Trouble getting services or aid from the government	1.01	0.99, 1.03	1.01	0.94, 1.08
Trouble dealing with insurance or relief agencies	0.99	0.97, 1.01	1.08	1.00, 1.16
Trouble getting clean drinking water	1.01	0.99, 1.03	1.09	1.03, 1.16
Trouble getting enough food to eat	0.99	0.97, 1.01	1.07	1.00, 1.14
Felt unsafe because of lack of order & security	1.04	1.02, 1.06	1.22	1.14, 1.31
Had to move to another municipality	1.02	1.00, 1.04	1.09	1.00, 1.19
Home Damage due to the Hurricane (#31)				
None	1.00		1.00	
Minor	1.00	0.98, 1.01	1.05	0.98, 1.13
Major	0.96	0.92, 1.00	1.06	0.93, 1.20
Destroyed	0.99	0.95, 1.03	0.95	0.80, 1.13
Things that happened due to hurricanes (#39)				
Missed one or more prenatal care appointments	0.98	0.96, 1.00	1.01	0.95, 1.08
Had to change doctors	1.00	0.95, 1.04	1.03	0.88, 1.21
Doctor not present at birth of baby	1.03	1.00, 1.06	0.92	0.78, 1.09
Had to deliver baby in a different hospital	0.98	0.94, 1.02	1.05	0.92, 1.19

Table 4. Adjusted prevalence ratios for breastfeeding initiation and continuation, PRAMS-ZPER 2.0 telephone follow-up survey, Puerto Rico, Spring 2018

Characteristic	Ever Breastfed of Pumped Breastmilk to Feed Their Child (N = 1219)		Pumping Breastmilk to Feed Their Child (N = 1162)	
	Prevalence Ratio	95% CI	Prevalence Ratio	95% CI
Hurricane Stressors (#30)				
Felt like life was in danger	0.92	0.89, 0.95	1.05	0.99, 1.11
Were injured or became ill	1.00	0.98, 1.03	0.90	0.81, 1.00
Member of household was injured or became ill	1.00	0.98, 1.02	1.04	0.96, 1.11
Walked through debris or floodwater	1.00	0.98, 1.02	1.07	1.01, 1.13
Without electricity for one week or longer	1.03	0.96, 1.09	1.33	0.95, 1.86
Someone close to you died in the disaster	0.94	0.89, 1.00	1.26	1.09, 1.46
Living in temporary housing	0.98	0.96, 1.00	0.98	0.93, 1.04
Lost personal belongings	0.98	0.96, 1.00	1.05	0.99, 1.11
Separated from loved ones	1.01	0.99, 1.03	1.10	1.03, 1.16
Trouble getting services or aid from the government	1.00	0.98, 1.02	0.98	0.92, 1.05
Trouble dealing with insurance or relief agencies	0.99	0.97, 1.01	1.02	0.96, 1.10
Trouble getting clean drinking water	1.00	0.99, 1.02	1.00	0.99, 1.02
Trouble getting enough food to eat	0.99	0.98, 1.01	1.02	0.97, 1.08
Felt unsafe because of lack of order & security	1.03	1.01, 1.05	1.13	1.05, 1.21
Had to move to another municipality	1.02	0.98, 1.06	1.08	0.99, 1.17
Home Damage due to the Hurricane (#31)				
None	1.00		1.00	
Minor	0.99	0.96, 1.01	1.07	1.01, 1.14
Major	0.96	0.91, 1.00	1.15	1.03, 1.30
Destroyed	1.00	0.94, 1.06	1.06	0.90, 1.25
Things that happened due to hurricanes (#39)				
Missed one or more prenatal care appointments	0.98	0.96, 1.00	1.01	0.95, 1.07
Had to change doctors	1.02	0.97, 1.07	0.96	0.83, 1.11
Doctor not present at birth of baby	1.03	0.95, 1.12	1.03	0.87, 1.21
Had to deliver baby in a different hospital	1.00	0.96, 1.05	0.97	0.87, 1.09

Figures

Figure 1. Breastfeeding Initiation and Continuation Status at Follow-Up, PRAMS-ZPER 2.0 Telephone Follow-Up Survey 2018

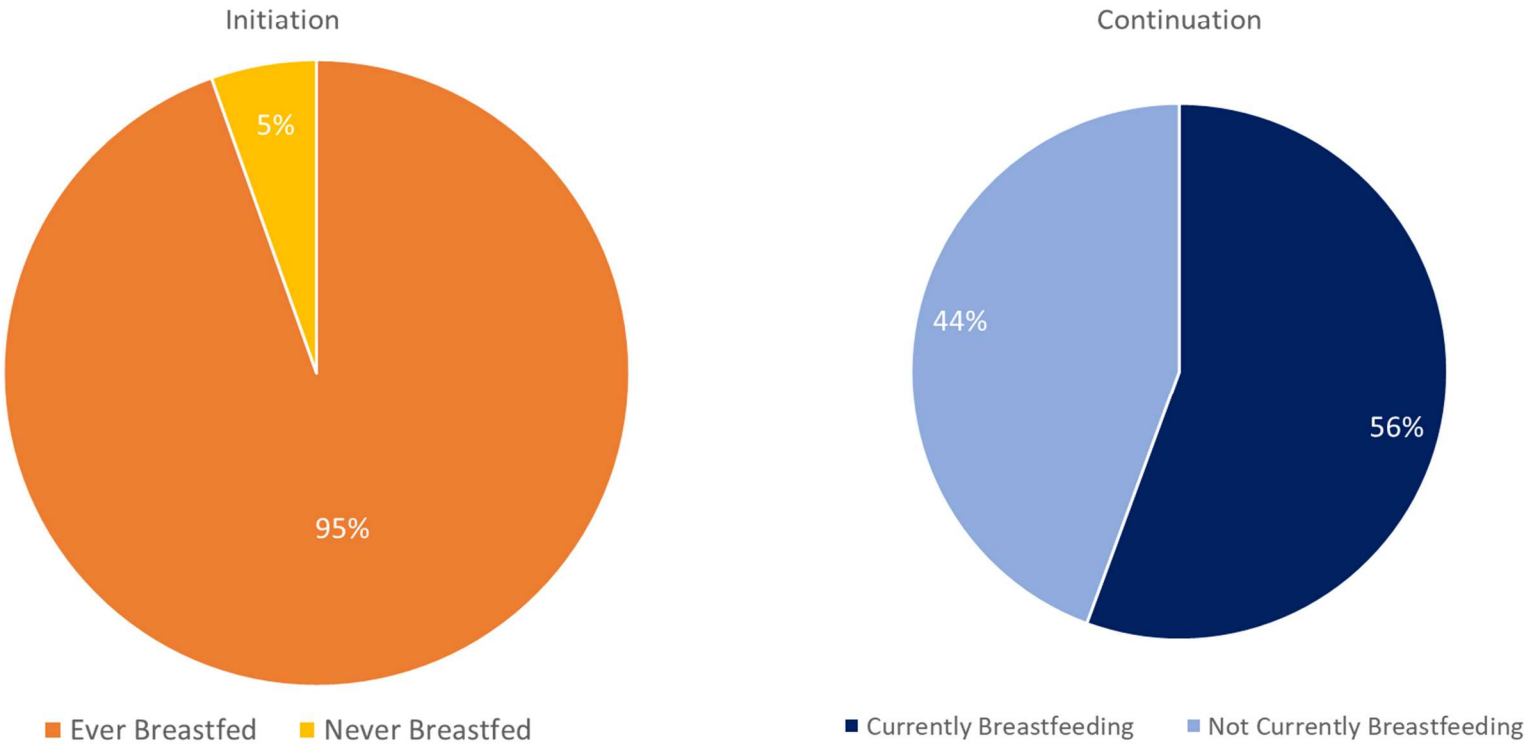


Figure 2. Log-Transformed Crude Prevalence Ratios for the Associations Between Hurricane Stressors and Maternal Self-Reported Breastfeeding Initiation, PRAMS-ZPER 2.0 Telephone Follow-up Survey, 2018

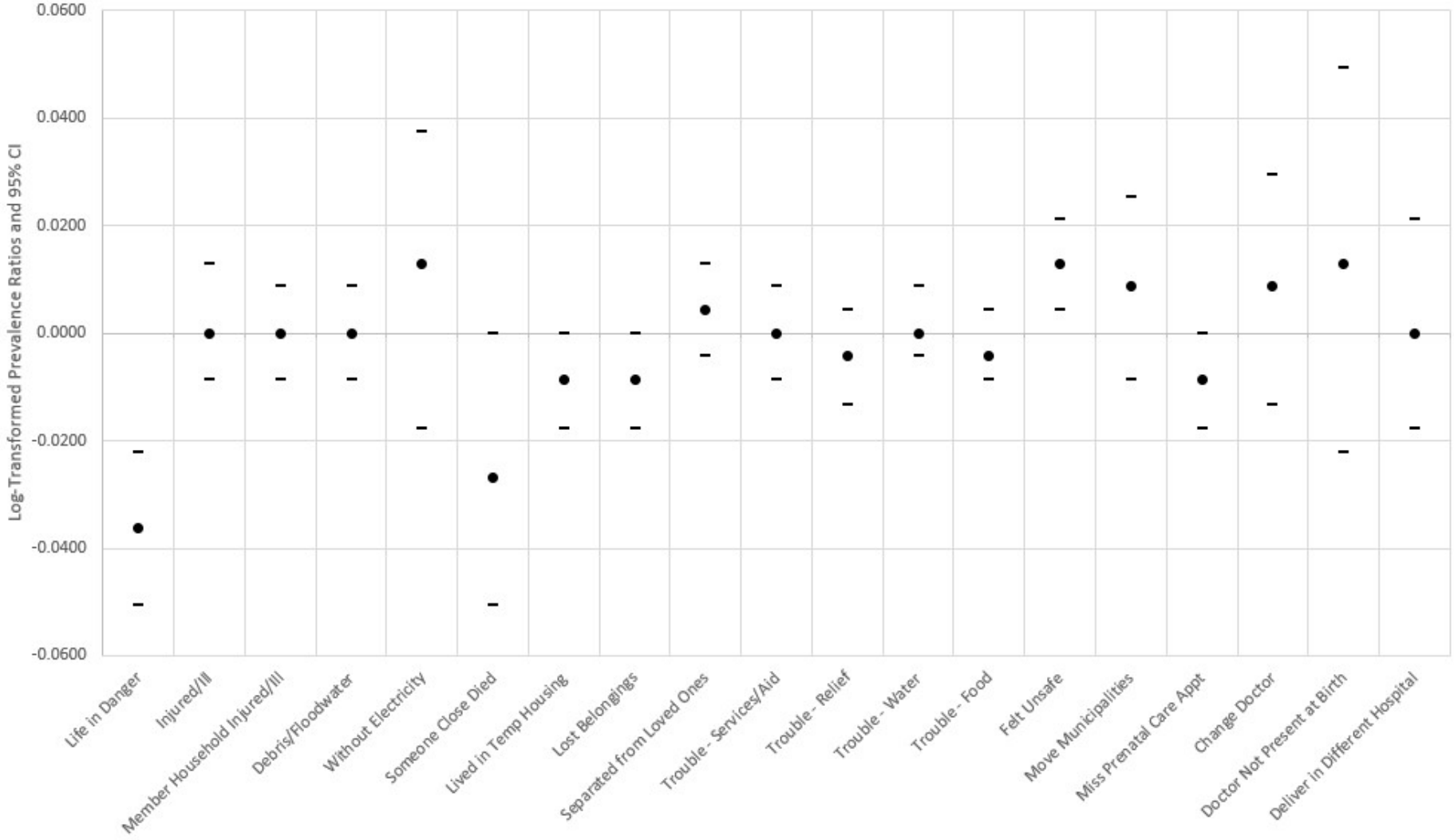
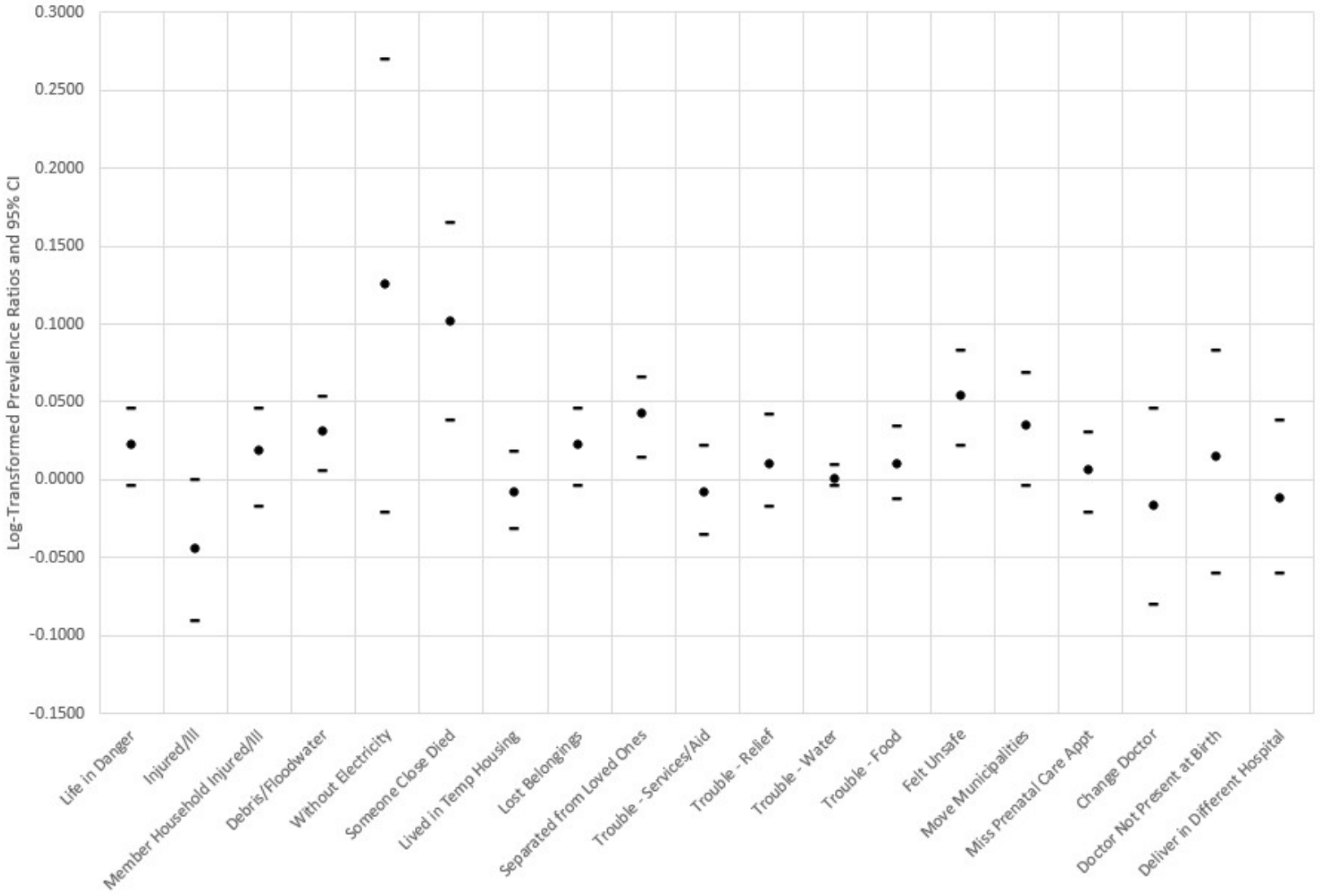


Figure 3. Log-Transformed Adjusted Prevalence Ratios for the Associations Between Hurricane Stressors and Maternal Self-Reported Breastfeeding Continuation, PRAMS-ZPER 2.0 Telephone Follow-up Survey, 2018



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