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Politically related stress and low-birth-weight infants among Arab, Asian, Hispanic, non-Hispanic Black, and non-Hispanic White women in Michigan

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Abstract

Background: Despite the high cost of low birth weight and the persistent challenge of racial inequities affecting the Arab American community, there has been limited research to identify and examine risk factors for these inequities with validated data on Arab American ethnicity and recent population stressors.

Objectives: This study examined whether the 2016 presidential election is associated with low birth weight among non-Hispanic White, Arab American, Hispanic, and non-Hispanic Black women.

Design: This population-based study of singleton births in Michigan (2008–2017) used an algorithm to identify mothers who were of Arab descent.

Methods: We used logistic regression to estimate odds ratios and 95% confidence intervals for the association between race/ethnicity and the odds of low birth weight. We examined whether these associations differed before and after the 2016 presidential election and according to maternal education.

Results: There were 1,019,738 births, including 66,272 (6.5%) classified as low birth weight. The odds of having a low-birth-weight infant were higher among all minority women compared to non-Hispanic White women. The association was similar before and after the 2016 presidential election and stronger among women with higher levels of education.

Conclusion: This is the first study to estimate low birth weight among Arab American women in the context of political events. There are opportunities for future studies to discuss this issue in depth.

Plain language summary

Stress and low-birth-weight infants among women in Michigan

There have been only a few studies that investigated the relationship between political stress and infant outcomes for Arab Americans in Michigan. This study examined whether the 2016 presidential election is associated with low birth weight among non-Hispanic White, Arab American, Hispanic, and non-Hispanic Black women. The authors used singleton births in Michigan from 2008 to 2017 and an Arabic/Chaldean algorithm to identify mothers who were of Arab

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descent. Minority women were more likely to have low-birth-weight infants compared to non-Hispanic White women. There was no difference in this when comparing results before and after the 2016 presidential election. Importantly, the study showed that the differences in low birth weight were strong among women with higher levels of education.

Keywords
Arab American, low birth weight, Michigan, stress, surname list

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Introduction

Despite extensive research comparing birth outcomes among racial and ethnic groups,[1] Arab American women are often missed in the discourse because they are classified as non-Hispanic White.[2] Prior studies have shown higher levels of chronic diseases among Arab American women compared to non-Hispanic White women.[3,4] However, less is known about the occurrence of low birth weight (LBW; less than 2500 g at birth) in this population.[5–9]

Racial and ethnic inequities in birth outcomes may be attributable to population stressors such as wars or political events,[10,11] but studies exploring the fundamental causes of these inequities are limited and inconsistent. For instance, a study of Arab Americans in California reported a 34% higher occurrence of LBW following the 11 September 2001 attacks,[12] but a study in Michigan[1] showed no change in LBW associated with the attacks. Recent studies have shown that the stress surrounding presidential elections may be associated with a higher occurrence of preterm birth among Latina[13] and immigrant Hispanic and Muslim populations,[14] but there have been no studies to examine whether Arab American women are more likely to experience adverse birth outcomes associated with presidential elections.

Demographic and social factors may exacerbate or buffer health inequities, such as LBW, across populations. For instance, population density and social networks at least partially explain the differences in LBW between White, Black, and Hispanic women.[10,15] Also, LBW varies by indicators of socioeconomic status (SES), such as education.[2] Furthermore, racial and ethnic differences are found at every level of SES.[16]

Despite the high cost of LBW[17] and the persistent challenge of racial inequities affecting the Arab American community,[18] there has been limited research to identify and examine risk factors for these inequities with validated data on Arab American ethnicity and recent population stressors. We, therefore, conducted a population-based cohort study in Michigan to describe LBW occurrence across populations and to examine whether the 2016 presidential election is associated with changes in the frequency of LBW among non-Hispanic White, Arab American, Hispanic, and non-Hispanic Black women. We also examined whether any inequities in LBW across race/ethnicity vary according to education.

Methods

Study population

We conducted a population-based cohort study using birth records on singleton births between 2008 and 2017 in Michigan obtained from the state's Division for Vital Records and Health Statistics department. As Arab ethnicity is not routinely recorded in vital statistics records, we used a validated name algorithm[19] to identify mothers who were likely of Arab descent rather than classifying ethnicity based on self-report alone. This algorithm has been used extensively to study Arab health,[20–23] and it has a positive predictive value of 91%.[19]

Birth weight and covariates

The main outcome of interest was LBW, defined as a gestational weight less than 2500 g. The primary predictor was the mother's race and ethnicity based on the race, Hispanic ethnicity, and ancestry recorded on the birth certificate as well as Arab ethnicity as indicated by the validated name algorithm. Race/ethnicity was categorized as non-Hispanic White, non-Hispanic Black, Hispanic, Arab American, and non-Hispanic Asian. All other races, including unknown, were excluded from the analysis due to small numbers. A priori, we selected the following covariates as potential confounders: mother's age at birth (<20, 20–29, 30–35, ⩾35 years); marital status (never married, married, or separated, divorced/widowed); mother's education (<12, 12, 13–15, 16+ years); currently smokes (yes/no); hypertension (pre-pregnancy or gestational); diabetes (pre-pregnancy or gestational); pre-eclampsia; and if the mother received Women, Infants, and Children (WIC) support. We also describe the sample in terms of fathers' age (<20, 20–29, 30–35, ⩾35 years) and education (<12, 12, 13–15, 16+ years). Delivery variables included parity (first birth versus second or more), pay source (private insurance, Medicaid, or other), less than four prenatal visits, birth season, infant sex, and gestational weight. We classified birth season as winter (December to February),

Table 1. Characteristics of mothers and fathers for singleton infant births in Michigan, 2008–2017, N = 1,019,738.

	All		Non-Hispanic White		Non-Hispanic Black		Hispanic		Arab American		Asian	
	N	%	N	%	N	%	N	%	N	%	N	%
Total births	1,019,738		680,492		185,781		71,770		51,489		30,206	
Mother's characteristics												
Age (years)												
<20	77,351	7.6	39,042	5.7	27,862	15.0	8528	11.9	1589	3.1	330	1.1
20–29	548,787	53.8	359,722	52.9	111,509	60.0	39,292	54.7	27,107	52.6	11,157	36.9
30–35	259,050	25.4	189,510	27.8	28,599	15.4	14,833	20.7	14,264	27.7	11,844	39.2
⩾35	134,550	13.2	92,218	13.6	17,811	9.6	9117	12.7	8529	16.6	6875	22.8
Marital status												
Never married	398,579	39.1	209,401	30.8	147,110	79.2	35,929	50.1	3986	7.7	2153	7.1
Currently married	591,216	58.0	447,244	65.7	35,396	19.1	33,777	47.1	47,046	91.4	27,753	91.9
Divorced/Widowed	29,943	2.9	23,847	3.5	3275	1.8	2064	2.9	457	0.9	300	1.0
Education												
<12	139,466	13.7	61,727	9.1	40,157	21.6	26,258	36.6	9730	18.9	1594	5.3
12	262,753	25.8	158,472	23.3	67,190	36.2	21,087	29.4	12,353	24.0	3651	12.1
13–15	331,394	32.5	235,424	34.6	61,932	33.3	16,332	22.8	12,863	25.0	4843	16.0
16+	286,125	28.1	224,869	33.0	16,502	8.9	8093	11.3	16,543	32.1	20,118	66.6
Currently smokes	207,226	20.3	160,395	23.6	32,906	17.7	9602	13.4	3352	6.5	971	3.2
Medical risk factor[a]	114,531	11.2	78,403	11.5	19,211	10.3	7547	10.5	5275	10.2	4095	13.6
Received WIC[b]	434,279	42.6	235,281	34.6	122,382	65.9	46,871	65.3	24,259	47.1	5486	18.2
Father's characteristics												
Age (years)[b]												
<20	23,609	2.7	13,761	2.2	6493	6.2	2987	4.8	264	0.5	104	0.4
20–29	355,955	40.9	254,619	40.8	53,561	50.9	28,961	46.8	13,674	27.2	5140	17.3
30–35	258,032	29.6	195,357	31.3	20,521	19.5	15,566	25.2	15,513	30.8	11,075	37.3
⩾35	233,227	26.8	159,926	25.6	24,749	23.5	14,337	23.2	20,858	41.5	13,357	45.0
Mean (±SD)	30.9 (6.6)		30.8 (6.3)		29.3 (7.8)		29.7 (6.9)		33.8 (6.8)		34.5 (6)	
Education[b]												
<12	95,240	11.0	49,863	8.0	14,720	14.2	22,618	36.9	6793	13.6	1246	4.2
12	267,385	30.9	184,991	29.8	45,596	43.9	19,857	32.4	13,524	27.1	3417	11.6
13–15	255,168	29.5	194,125	31.3	33,144	31.9	11,402	18.6	12,229	24.5	4268	14.4
16+	247,210	28.6	191,460	30.9	10,407	10.0	7348	12.0	17,345	34.8	20,650	69.8

All results were statistically significant at the $p < 0.05$ level.
WIC: Women, Infants, and Children.
[a]The presence of any of the following: hypertension (pre-pregnancy or gestational), diabetes (pre-pregnancy or gestational), or pre-eclampsia.
[b]Missing values: WIC (24,923), father's age (148,915), and father's education (154,735).

spring (March to May), summer (June to August), and fall (September to November). All covariates were derived from the birth certificate data.

Statistical analysis

We described the distribution of the mothers' and fathers' characteristics and delivery experiences using counts and percentages by race/ethnicity categories. Results were deemed statistically significant at a p value of <0.05. We used logistic regression to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for the association between race/ethnicity and the odds of LBW, adjusting for factors selected a priori as potential confounders based on the literature. First, we examined whether there were racial/ethnic differences in LBW from 2009 to 2017, adjusting for mother's age, current smoking, season, prenatal care visits, presence of medical risk factors, WIC status, mother's education, and marital status. Second, we examined the association between race/ethnicity and LBW comparing the year before the 2016 US presidential election (November 2015 to October 2016) and the year after the election (November 2016 to October 2017), adjusting for the same confounders. Third, we examined whether the association between race/ethnicity and LBW varied by education ($\leqslant$12 years versus $>$12 years) using an interaction term in a model including the same confounders as the earlier analyses, and we estimated the associations between race/ethnicity and LBW for low ($<$12 years) and high ($>$12 years) education after adjusting for

Table 2. Characteristics of mothers' delivery experience in Michigan, 2008–2017, N = 403,662.

	All		Non-Hispanic White		Non-Hispanic Black		Hispanic		Arab American		Asian	
	N	%	N	%	N	%	N	%	N	%	N	%
First birth	403,662	39.6	276,003	40.6	71,407	38.4	24,241	33.8	18,030	35.0	13,981	46.3
Pay source												
Private insurance	552,243	54.2	418,389	61.5	66,652	35.9	21,214	29.6	22,509	43.7	23,479	77.7
Medicaid	446,692	43.8	248,942	36.6	114,424	61.6	49,436	68.9	27,637	53.7	6253	20.7
All other	20,803	2.0	13,161	1.9	4705	2.5	1120	1.6	1343	2.6	474	1.6
Attended by MD/DO	940,932	92.3	625,947	92.0	173,780	93.5	65,424	91.2	46,909	91.1	28,872	95.6
Prenatal visits (4+)[a]	27,253	2.7	11,553	1.7	9804	5.5	3049	4.3	2405	4.8	442	1.5
Season												
Winter	241,100	23.6	158,336	23.3	46,911	25.3	16,918	23.6	11,786	22.9	7149	23.7
Spring	256,688	25.2	173,218	25.5	45,303	24.4	17,930	25.0	12,715	24.7	7522	24.9
Summer	269,360	26.4	180,951	26.6	47,458	25.5	19,093	26.6	14,121	27.4	7737	25.6
Fall	252,590	24.8	167,987	24.7	46,109	24.8	17,829	24.8	12,867	25.0	7798	25.8
Female infant	497,108	48.7	331,430	48.7	91,193	49.1	35,172	49.0	24,764	48.1	14,549	48.2
Birth weight (<2500 g)	66,272	6.5	35,415	5.2	21,817	11.7	4166	5.8	2755	5.4	2119	7.0
Gestational age (<37 weeks)	108,934	10.7	62,776	9.2	30,858	16.6	8141	11.3	4379	8.5	2780	9.2

All results were statistically significant at the $p < 0.05$ level.
MD: Medical doctor; DO: Doctor of osteopathic medicine.
[a]The number of prenatal visits was missing for 23,173 records.

confounders. All analyses were conducted using SAS software, version 9.4.[24]

Results

There were 1,019,738 births, including 66,272 (6.5%) classified as LBW. Arab American mothers have similar age distributions compared to non-Hispanic Whites. Approximately 16% of Arab American mothers were 35 years of age or older compared to 9.6% of non-Hispanic Black, 12.7% of Hispanics, and 22.8% of Asian mothers (Table 1). Arab American mothers were more likely to be currently married (91.4%) compared to other racial and ethnic groups except for Asian Americans (91.9%). Arab American mothers also were less likely (81.1%) to have 12 or more years of education compared to non-Hispanic White (90.9%) and Asian (94.7%) mothers. All results were statistically significant at the $p < 0.05$ level.

Table 2 presents the characteristics of the mothers' delivery experiences. Compared to non-Hispanic White (36.6%) and Asian (20.7%) mothers, Arab Americans were more likely (53.7%) to receive Medicaid. Giving birth to a baby weighing less than 2500 g was similar among Arab American (5.4%) and non-Hispanic White (5.2%) mothers. All results were statistically significant at the $p < 0.05$ level.

Table 3 presents the association between race/ethnicity and the odds of having an LBW infant for the entire study period, as well as before and after the 2016 presidential election. Compared to non-Hispanic White mothers, the odds of having an LBW infant were 18% higher among Arab American mothers (95% CI: 1.13–1.24), 75% higher among Asian mothers (95% CI: 1.67–1.84), and 2.06-fold higher among non-Hispanic Black mothers (95% CI: 2.02–2.11). These associations were similar for births in the year before the 2016 US presidential election (November 2015 to October 2016) and the year after the election (November 2016 to October 2017).

Among mothers with 12 or fewer years of education, the odds of LBW were higher among non-Hispanic Black, Asian, and Arab American women compared to non-Hispanic White women, and these associations were stronger among mothers with more than 12 years of education (Table 4). The p value for interaction was statistically significant for each race/ethnicity.

Discussion

In this population-based study of singleton births in Michigan, the odds of having a low-birth-weight infant were higher among non-Hispanic Black, Asian, and Arab American women compared to non-Hispanic White women. This association persisted even after accounting for potential confounding factors. The association was similar before and after the 2016 presidential election and stronger among women with higher levels of education.

Several studies have examined racial/ethnic differences in birth outcomes,[1,5–10,12–15,25,26] with a focus on Arab American women,[5,7–9,12] and a few have examined whether the stress of the 11 September 2001 attacks[6,12] or presidential elections[13,14] play a role.

Table 3. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the association between race/ethnicity and the odds of low birth weight, Michigan 2008–2017, N = 1,019,738.

	No. of births	LBW (%)	OR[a]	95% CI
All years				
Non-Hispanic White	680,492	5.2	Ref	
Non-Hispanic Black	185,781	11.7	2.06	2.02–2.11
Hispanic	71,770	5.8	1.03	0.99–1.06
Arab American	51,489	5.4	1.18	1.13–1.24
Asian	30,206	7.0	1.75	1.67–1.84
Year before election (November 2015 to October 2016)				
Non-Hispanic White	67,415	5.2	Ref	
Non-Hispanic Black	18,197	12.2	2.13	2.00–2.28
Hispanic	7061	6.2	1.07	0.96–1.19
Arab American	5677	5.4	1.23	1.08–1.39
Asian	3068	7.1	1.79	1.54–2.07
Year after election (November 2016 to October 2017)				
Non-Hispanic White	65,543	5.4	Ref	
Non-Hispanic Black	18,407	12.1	2.10	1.97–2.24
Hispanic	7001	5.9	0.95	0.85–1.06
Arab American	5902	5.9	1.26	1.11–1.42
Asian	3259	7.7	1.87	1.62–2.15

LBW: low birth weight; WIC: Women, Infants, and Children.
[a]Adjusted for mother's age (categorical), smoking, season, prenatal care visits (<4 versus 4+), presence of a medical risk factor, WIC status, mother's education, and marital status.

Table 4. Odds ratios (ORs) and 95% confidence intervals (CIs) for the association between race/ethnicity and the odds of LBW stratified by education, Michigan 2008–2017, N = 1,019,738.

	Mother's education ⩽12					Mother's education >12					P interaction
	Births (N)	Low birth weight				Births (N)	Low birth weight				
		N	%	OR[a]	95% CI		N	%	OR[a]	95% CI	
All years											
Non-Hispanic White	220,199	15,569	7.1	Ref		460,293	19,846	4.3	Ref		
Non-Hispanic Black	107,347	13,479	12.6	1.92	1.86–1.97	78,434	8338	10.6	2.30	2.232.37	<0.001
Hispanic	47,345	2947	6.2	1.01	0.97–1.06	24,425	1219	5.0	1.12	1.05–1.19	<0.001
Arab American	22,083	1345	6.1	1.12	1.05–1.19	29,406	1410	4.8	1.24	1.17–1.32	0.013
Asian	5245	425	8.1	1.47	1.32–1.64	24,961	1694	6.8	1.81	1.71–1.91	0.002

LBE: low birth weight; WIC: Women, Infants, and Children.
[a]Adjusted for mother's age (categorical), smoking, season, prenatal care visits (<4 versus 4+), presence of a medical risk factor, WIC status, and marital status.

Two prior studies examined whether the September 2001 terrorist attacks were associated with higher odds of LBW among Arab Americans. A study based in California[11] reported that Arab Americans, but not other groups, experienced higher odds of LBW following the attacks, whereas a study based in Michigan[3] reported no differences in LBW in the year following the attacks compared to the same 6 months in the previous calendar year. This is consistent with our study results showing that the frequency of LBW among Arab Americans in Michigan was similar before and after the 2016 presidential election.

In addition, two recent studies examined whether the 2016 presidential election is associated with preterm birth. One national, population-based study found that Latina women were more likely to have a preterm birth after the election relative to before the election.[13] The other study found that the rate of preterm birth among women living in New York from the Middle East and North Africa was higher after the 2016 inauguration compared to before the inauguration.[27] Neither of these studies examined LBW, so our results could not be directly compared. However, we speculate that like California, Arab American women who

live in New York may not live in as densely populated ethnic enclaves as they do in Michigan. Therefore, both the study in California and New York found differences in birth outcomes after a significant event, whereas our study, where Arab Americans are densely populated, did not find a difference in LBW when comparing the times before and after the 2016 presidential election.

In addition to sociopolitical stressors, education also influences LBW. In a meta-analysis, higher maternal education was protective against LBW,[28] but we found that the differences in LBW were stronger among women with higher education. Future studies should explore the interactions between ethnicity, education, and LBW.

Community-based organizations such as Arab Community Center for Economic and Social Services (ACCESS)[29] were formed to address the social, economic, health, educational, employment, and other needs of Arab enclaves. ACCESS provides assistance and outreach to the ~350,000 Arab Americans who live in Detroit and surrounding neighborhoods. ACCESS is an example of how an organization can help an ethnic enclave to buffer some of the stressors that may negatively affect health by providing resources such as social support, health care, and education.

This study had strengths and limitations. One strength is that we used a validated surname list and 10 years of data for a sufficient sample size and to observe changes over time. We also used the most recently available data and compared Arab Americans to not only Whites but also other racial and ethnic groups. Although 10 years of data were analyzed, a limitation may be that we needed data beyond 2018 to observe an association between presidential elections and LBW by race/ethnicity, especially given the political events that occurred from 2019 to the beginning of 2021 surrounding the response to the 2020 presidential election results and the days leading up to the inauguration of Joe Biden in January 2021. Another limitation is that the dataset did not include variables about self-perceived discrimination, other stressors, or acculturation, which also may affect the association between LBW and Arab ethnicity.

Conclusion

This is the first study to estimate LBW among Arab American women in the context of political events. Future studies might examine this association using qualitative methods to better understand the influence of political events on maternal and child health among Arab American women.

Declarations

Ethics approval and consent to participate

This study was reviewed and approved by both Oakland University and the State of Michigan's Institutional Review Boards (IRBs): 1316464-2 and 201812-05-XA. It was a secondary data analysis and all identifiers were removed so consent to participate was not required.

Consent for publication

Not applicable.

Author contribution(s)

Florence J Dallo: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Supervision; Writing—original draft; Writing—review & editing.
David R Williams: Conceptualization; Funding acquisition; Writing—review & editing.
Julie J Ruterbusch: Data curation; Methodology; Writing—review & editing.
Murray A Mittleman: Conceptualization; Methodology; Writing—review & editing.
Kwame S Sakyi: Methodology; Writing—review & editing.
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Competing interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Availability of data and materials

Not applicable.

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Supplemental material

Supplemental material for this article is available online.

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