

Research Article

Prenatal Maternal Stress and Physical Abuse among Homeless Women and Infant Health Outcomes in the United States

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Received 27 November 2010; Accepted 26 February 2011

Academic Editor: Kenji Wakai

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Background. This study examines whether the relationship between maternal stress or abuse situations and infant birth weight differs between homeless and non-homeless women. **Methods.** Analyses are based on data from the Pregnancy Risk Assessment Monitoring System (PRAMS), 2002–2007. **Results.** Homeless women were significantly more likely to experience stressful life events, abusive situations, and poor maternal health than non-homeless women during pregnancy. Birth weight among infants of homeless women was, on average, 17.4 grams lighter than for infants of non-homeless women, after adjusting for maternal age, race, ethnicity, region, education, and marital status. The impact of maternal health, stress, and abuse variables on pregnancy and infant birth weight significantly interacted with homeless status. For example, vaginal bleeding, nausea, kidney/bladder infection, and failure to receive early prenatal care had significantly larger negative impacts on birth weight among homeless women than non-homeless women. Infant birth weight was consistently lower among homeless women, more so when maternal stress and abuse were involved, across all classifications of their prepregnancy weight. **Conclusion.** Stress and abusive situations among pregnant women have a negative influence on pregnancy-related conditions and infant birth weight. However, this negative influence is even more pronounced among homeless women.

1. Introduction

The scientific literature shows a consistent association between homelessness and stressful life events, especially among women [1–4]. The lower socioeconomic status experienced by many homeless women has been shown to be a major determinant of stressful life events [5]. Research has also shown that pregnant homeless women are exposed to more violence and abuse than their low-income, non-homeless counterparts [6]. Results from one case-control study in Worcester, Massachusetts showed that homeless mothers were more likely to experience severe sexual and physical assault than low-income housed mothers [7]. The same study also showed that homeless mothers had smaller social networks and experienced increased residential instability [7]. In a New Hampshire case-control study comparing homeless mothers with low-income housed mothers, homeless mothers were significantly more likely to report

higher levels of stress and depression [8]. Stress and abuse are therefore associated with homelessness in women.

Prenatal maternal stress and physical abuse have been shown to negatively influence pregnancy outcomes [9–13]. Researchers from the University of California found that women with higher self-reported levels of stress and anxiety were significantly more likely to deliver low birth weight and preterm children [10]. A similar prospective study from London found that self-reported depression or “high nerves” in pregnant mothers was associated with low birth weight [11]. Physical violence from an intimate partner has also been linked to antepartum hemorrhage, intrauterine growth restriction, and perinatal death in the fetus [12]. Partner abuse during pregnancy increases the risk of stress and is associated with a host of risk behaviors like smoking or using drugs, which further increase the chance of preterm or low birth weight infants [13]. In addition, women experiencing partner abuse are less likely to obtain prenatal care [13].

TABLE 1: Estimated number of births among women in each PRAMS city/state by US geographic area.

PRAMS Area	Years	PRAMS Participants		Homeless*	
		No.	No. [†]	No. [†]	% [‡]
East					
Maine	2000–2007	8,075	91,889	2,799	3
Maryland	2000–2007	9,102	374,184	14,328	4
New Jersey	2002–2007	9,487	472,135	21,285	5
New York	2000–2007	7,742	775,927	25,667	3
New York City	2004–2007	3,228	250,392	11,073	4
Rhode Island	2002–2007	7,100	59,338	2,488	4
Vermont [‡]	2000–2006	7,038	39,451	1,214	3
West Virginia	2000–2007	10,473	117,916	2,441	2
Total		62,245	2,181,232	81,295	4
Midwest					
Illinois	2000–2006	11,069	1,029,850	69,918	7
Michigan	2001–2006	6,531	560,904	12,784	2
Minnesota	2002–2007	7,576	313,618	10,648	3
Montana	2002	1,032	10,614	392	4
Nebraska	2000–2006	11,696	148,774	5,774	4
North Dakota	2002	903	7,298	121	2
Ohio	2000–2007	8,881	862,379	21,057	2
Oklahoma	2000–2007	13,271	338,138	15,108	4
Total		60,959	3,271,575	135,802	4
South					
Alabama	2000–2004	6,147	228,313	5,595	2
Arkansas	2000–2007	13,961	247,649	11,041	4
Florida	2000–2006	12,086	1,226,157	60,965	5
Georgia	2004–2006	3,333	256,221	10,387	4
Louisiana	2000–2005	9,559	314,628	7,522	2
Mississippi	2003–2007	3,800	105,416	2,612	2
North Carolina	2000–2006	8,922	641,136	28,474	4
South Carolina	2000–2007	9,925	335,517	7,036	2
Total		67,733	3,355,037	133,632	4
West					
Alaska	2000–2007	10,298	68,816	2,737	4
Colorado	2000–2007	14,681	461,811	23,877	5
Hawaii	2000–2007	14,032	121,419	2,500	2
New Mexico	2000–2006	8,662	147,033	7,367	5
Oregon	2003–2007	7,144	176,142	11,277	6
Utah	2000–2007	12,539	339,454	11,227	3
Washington	2000–2007	10,583	548,739	31,814	6
Total		77,939	1,977,272	90,799	5
Total		268,876	10,671,258	441,528	4

PRAMS: Pregnancy Risk Assessment Monitoring System.

*Homeless within past 12 months.

[†]Estimates were weighted to be representative of all women who gave birth in each state during the specified years.

[‡]Only data from October through December was available for 2000 in Vermont.

Hence, such pregnancy-related outcomes are linked to stress and abuse experienced by the mother.

Research has shown adverse birth outcomes related to homelessness, including low birth weight and premature infants, which are strong risk factors for infant mortality

and developmental disabilities [14–16]. However, to our knowledge, no study has considered the modifying effect of homelessness on the relationship between maternal psychological stress and physical abuse and infant birth weight. In the current study, we examine whether the relationship

TABLE 2: Homeless status according to selected pregnancy and morbidity variables among women completing the PRAMS survey in 31 participating cities/states, 2000–2007.

	Homeless		Non-homeless		P value [†]	Homeless versus Non-homeless	
	No.*	%*	No.*	%*		Odds Ratio [‡]	95% CI [‡]
Previous live birth							
Yes	271,724	64	5,882,289	58	<.001	1.00	
No	156,161	36	4,253,935	42		0.69	0.64–0.74
Previous low birth weight ^δ							
Yes	53,707	21	591,493	10	<.001	1.00	
No	203,297	79	5,047,475	90		0.59	0.52–0.65
Previous premature birth ^δ							
Yes	41,539	16	4,976,926	12	<.001	1.00	
No	221,018	84	668,761	88		0.80	0.71–0.90
Prenatal care early as wanted							
Yes	298,052	69	8,371,517	82	<.001	1.00	
No	131,279	30	1,731,623	17		1.76	1.63–1.90
Did not want	4,715	1	45,170	1		2.53	1.82–3.52
Preterm labor							
Yes	132,731	31	2,545,315	25	<.001	1.00	
No	300,730	69	7,615,461	75		0.73	0.68–0.79
Vaginal bleeding							
Yes	72,666	17	1,588,901	16	.033	1.00	
No	357,266	83	8,558,210	84		0.86	0.78–0.83
Nausea							
Yes	163,993	38	2,809,289	28	<.001	1.00	
No	268,307	62	7,352,693	72		0.70	0.66–0.75
Kidney/bladder infection							
Yes	122,303	28	1,813,790	18	<.001	1.00	
No	310,854	72	8,336,483	82		0.63	0.58–0.68

Note: Of the 31 Pregnancy Risk Assessment Monitoring System (PRAMS) cities/states Montana and Vermont did not collect information on ethnicity.

*Estimates were weighted to represent all homeless women who gave birth.

[†]Based on the Rao-Scott chi-square.

[‡]Based on weighted data, with the estimated odds ratios and 95% confidence intervals adjusted for maternal age, race, ethnicity, marital status, and region.

^δLimited to those with a previous live birth.

between maternal stress/abuse and infant birth weight differs between homeless and non-homeless women.

2. Methods

Analyses were based on data from 31 areas in the United States participating in the Pregnancy Risk Assessment Monitoring System (PRAMS), 2000–2007. Of 272,859 women who completed the PRAMS survey during these years, approximately 1% did not have information on homeless status. These women were dropped from the current study, leaving 268,876 for assessment.

2.1. PRAMS Weighting Process. Because PRAMS areas typically oversample low weight births and stratify by the mother's race and ethnicity, the three weighting variables provided in the PRAMS data file (sampling weight, non-response weight, and non-coverage weight) were used. These weights are described in detail elsewhere [17]. The product

of the three components of the weights produces the analysis weight, which is interpreted as the number of women like themselves in the population that each respondent represents. Weighted estimates were calculated to obtain a representation of all women who gave birth in each state during the specified years. Statistical evaluation of the PRAMS data involved statistical software that takes into account the complex sampling design (i.e., complex survey modules of SAS).

2.2. Study Variables. Homeless status was based on responses to the following: "This question is about things that may have happened during the 12 months before your new baby was born... I was homeless." Demographic variables considered in this study were maternal age, race, ethnicity, US geographical region, maternal education, and marital status. Pregnancy- and morbidity-related variables include tobacco smoking and alcohol use, previous live birth, previous low birth weight, previous premature birth, prenatal care,

TABLE 3: Homeless status according to selected stress variables among women completing the PRAMS survey in 31-participating cities/states, 2000–2007.

Stress because...	Homeless		Non-homeless		P value [†]	Homeless versus Non-homeless	
	No.*	%*	No.*	%*		Odds ratio [‡]	95% CI [‡]
Family member ill							
Yes	109,608	25	2,614,848	26	.492	1.00	
No	326,797	75	7,591,618	74		0.82	0.76–0.89
Divorce							
Yes	128,954	30	899,462	9	<.001	1.00	
No	307,120	70	9,313,874	91		0.29	0.27–0.32
Moved							
Yes	277,698	64	3,559,225	35	<.001	1.00	
No	159,223	36	6,659,451	65		0.31	0.29–0.33
Partner lost job							
Yes	133,001	31	1,259,603	12	<.001	1.00	
No	296,101	69	8,931,838	88		0.35	0.33–0.38
Lost job							
Yes	144,256	34	1,023,845	10	<.001	1.00	
No	281,662	66	9,170,578	90		0.30	0.28–0.32
Argument with partner							
Yes	186,504	43	2,762,782	27	<.001	1.00	
No	249,447	57	7,436,843	73		0.54	0.50–0.58
Partner did not want pregnancy							
Yes	95,989	22	889,597	9	<.001	1.00	
No	338,051	78	9,315,897	91		0.40	0.37–0.44
Bills you could not pay							
Yes	207,260	47	2,459,949	24	<.001	1.00	
No	229,239	53	7,740,287	76		0.40	0.37–0.42
In fight							
Yes	80,257	18	404,808	4	<.001	1.00	
No	355,058	82	9,792,609	96		0.20	0.18–0.22
Partner went to jail							
Yes	74,502	17	433,255	4	<.001	1.00	
No	362,923	83	9,775,152	96		0.23	0.20–0.25
Drugs							
Yes	116,998	27	1,248,539	12	<.001	1.00	
No	320,583	73	8,966,179	88		0.35	0.33–0.38
Someone close died							
Yes	106,017	24	1,859,160	18	<.001	1.00	
No	331,592	76	8,348,188	82		0.68	0.62–0.73

Note: Of the 31 Pregnancy Risk Assessment Monitoring System (PRAMS) cities/states Montana and Vermont did not collect information on ethnicity.

*Estimates were weighted to represent all homeless women who gave birth.

[†]Based on the Rao-Scott chi-square.

[‡]Based on weighted data, with the estimated odds ratios and 95% confidence intervals adjusted for maternal age, race, ethnicity, marital status, and region.

preterm labor, vaginal bleeding, nausea, and kidney/bladder infection. Body Mass Index (BMI) is derived from self-reported height and weight questions: “Just before you got pregnant, how much did you weigh?” and “How tall are you without shoes?” BMI was classified as underweight (<18.5),

normal weight (18.5–24.9), overweight (25–29.9), class I & II obesity (30–39.9), and class III obesity (≥ 40). Several psychological stress and physical abuse variables obtained in the originally requested data set were considered. Psychological stress variables included the following stressors: a family

TABLE 4: Homeless status according to selected physical abuse variables among women completing the PRAMS survey in 31-participating cities/states, 2000–2007.

	Homeless		Non-homeless		P value [†]	Homeless versus Non-homeless	
	No.*	%*	No.*	%*		Odds ratio [‡]	95% CI [‡]
Physical abuse before pregnancy—Husband							
Yes	65,648	15	378,206	4	<.001	1.00	
No	368,886	85	9,773,874	96		0.25	0.23–0.28
Physical abuse before pregnancy—Anyone else							
Yes	26,871	9	122,456	2	<.001	1.00	
No	261,745	91	6,054,159	98		0.22	0.19–0.26
Physical abuse during pregnancy—Husband ^δ							
Yes	53,196	12	291,961	3	<.001	1.00	
No	380,775	88	9,855,224	97		0.26	0.23–0.30
Physical abuse during pregnancy—Anyone else ^δ							
Yes	18,313	6	82,855	1	<.001	1.00	
No	269,532	94	6,089,211	99		0.24	0.23–0.30

Note: Of the 31 Pregnancy Risk Assessment Monitoring System (PRAMS) cities/states Montana and Vermont did not collect information on ethnicity.

*Estimates were weighted to represent all homeless women who gave birth.

[†]Based on the Rao-Scott chi-square.

[‡]Based on weighted data, with the estimated odds ratios and 95% confidence intervals adjusted for maternal age, race, ethnicity, marital status, and region.

^δOf the 31 PRAMS cities/states, Oregon and New York City did not collect information on these variables.

member's illness, being divorced or separated, moving to a new address, having a partner lose their job, the survey respondent losing their job, arguing with their partner more than usual, the respondent's partner not wanting the pregnancy, being unable to pay bills, the survey respondent being in a physical fight, the survey respondent or their partner going to jail, having someone close to the respondent with drug or alcohol problems, and having someone close to them die. Four physical abuse variables were considered: abuse before pregnancy from a partner, abuse before pregnancy from someone other than a partner, abuse during pregnancy from a partner, and abuse during pregnancy from someone other than a partner. Physical abuse was defined on the PRAMS survey as being pushed, hit, slapped, kicked, choked or physically hurt in any other way by their partner.

2.3. Statistical Techniques. Bivariate analyses were performed between homeless status and selected demographic, pregnancy and morbidity, BMI, stress, and abuse variables. Relationships were assessed for significance using the Rao-Scott chi-square test. Average infant birth weight was compared between homeless and non-homeless women using analysis of variance, adjusted for maternal age, race, ethnicity, marital status, education, area, stress, and abuse variables. Logistic regression models were calculated, regressing homeless status on the demographic, pregnancy and morbidity, BMI, stress, and abuse variables. Odds ratios obtained from logistic regression were adjusted for maternal age, race, ethnicity, marital status, education, and geographical region. Poststratification weights, described above, were applied

to obtain representative population-based estimates of all homeless women giving birth in the PRAMS geographic areas. Ninety-five percent confidence intervals were calculated, and two-sided tests of significance were used, based on the 0.05 level. Statistical analyses were derived using complex survey modules in Statistical Analysis System (SAS) software, version 9.2 (SAS Institute Inc., Cary, NC, USA, 2007).

3. Results

The estimated number of births in the PRAMS areas for the specified years is presented in Table 1. The percentage of homeless women giving birth varied from 2 to 7. Overall, 4% of women who completed the PRAMS survey were homeless.

Homeless status is presented for selected pregnancy and morbidity variables in Table 2. Homeless women were significantly more likely to have previously given birth, to have a previous low birth weight child or to have a premature birth, to experience preterm labor, to have vaginal bleeding, nausea, and kidney/bladder infection, and to not receive prenatal care as early as wanted.

Homeless status is presented according to selected stressful life events in Table 3. Each stressful event was significantly greater among homeless women. Homeless women were significantly more likely to have an ill family member, to experience divorce or separation, to move to a new address, to lose their job or to have a partner who lost a job, to argue more than usual with a partner, to have a partner who did not want the pregnancy, to be unable to pay bills, to have been in a physical fight, to go to jail or to have a partner who went to

TABLE 5: Birth weight (grams) according to homeless status and other selected demographic variables among women completing the PRAMS survey in 31 participating cities/states, 2000–2007.

	Weight (Grams)		P value [†]
	Estimate*	SE*	
Homeless			
Yes	0.00		
No	17.37	1.01	<.001
Demographics			
Maternal Age, years			
<19	0.00		
19–25	32.04	0.91	<.001
26–29	60.77	0.97	<.001
≥30	64.51	0.94	<.001
Race			
Caucasian	0.00		
African American	–201.11	0.43	<.001
Other	–74.01	0.82	<.001
Ethnicity			
non-hispanic	0.00		
Hispanic	–4.71	0.49	<.001
Missing	–12.95	0.47	<.001
Region			
East	0.00		
Midwest	–1.86	0.52	<.001
South	–31.13	0.07	<.001
West	–20.23	0.09	<.001
Maternal education, years			
<12	0.00		
12	38.05	0.61	<.001
>12	72.47	0.62	<.001
Missing	–2.97	1.35	.028
Marital status			
Yes	0.00		
No	–68.82	6.31	<.001
Missing	–19.46	0.47	.002

PRAMS: Pregnancy Risk Assessment Monitoring System.

*Estimates were weighted to represent all homeless women who gave birth, and each variable estimate was adjusted for the other variables in the table.

[†]Based on the *F* statistic.

jail, to have someone else close to them with drug or alcohol problems, and to have someone close to them that had died.

Homeless status is presented according to selected abuse variables in Table 4. Homeless women were significantly more likely to experience physical abuse. Abuse from a partner or anyone else before or during pregnancy was about 4 to 6 times greater among homeless women.

Birth weight is presented by homeless status in Table 5. Birth weight among infants to homeless women was an average of 17.4 grams lighter than for infants of non-homeless women, after adjusting for maternal age, race, ethnicity, region, education, and marital status. Birth weight

according to pregnancy and health variables and stress and abuse variables tend to significantly interact with homeless status (Table 6). For example, infant birth weight was greater among women with a previous live birth, but significantly more so among non-homeless women. A similar result is observed for previous low birth weight, previous premature birth, and preterm labor. Vaginal bleeding, nausea, kidney/bladder infection, and failure to receive early prenatal care had significantly larger negative impacts on birth weight among homeless women compared with non-homeless women. Infant birth weight was consistently lower among homeless women across all classifications of their pre-pregnancy weight. Finally, experiencing stress or abuse among homeless women compared with non-homeless women tended to have a much more negative impact on infant birth weight.

4. Discussion

The current study showed the regional variation in homelessness and confirms other studies in showing that homelessness is related to poorer pregnancy and health outcomes, stressful life events, and abusive conditions [7, 8]. In addition, as in other studies, lower birth weight was associated with homelessness [9].

This study goes beyond previous studies by evaluating how stress and abuse are related to pregnancy and health outcomes based on homeless status. In this study, homelessness modified the effect of maternal pregnancy practices and outcomes, as well as stressful and abusive life events on infant birth weight. The overall lower infant birth weight and preterm birth among homeless women as compared with non-homeless women was also reported in a Canadian prospective cohort study by Little et al. [16]. The modifying impact of homelessness on adverse maternal health and infant birth weight in our study may have been due to the severity of adverse health circumstances reported by homeless women, such as vaginal bleeding, kidney disease, and nausea. Studies have found that homeless women engage more frequently in risky health behaviors, such as smoking, and experience more barriers to prenatal care, including cost and location; such correlations may contribute to the modifying effect of homelessness on poor maternal health and child outcomes [7, 8, 18].

Likewise, the degree of abuse and stress experienced by homeless women may have contributed to findings that homeless women who reported such symptoms were more likely to have low birth weight children than housed women. Studies have shown that homeless women are more likely to experience stress and violence than housed women [6, 8]. Sexual violence or prostitution in particular could have played a role in unwanted pregnancies and poor maternal health behaviors, such as increased smoking or drinking, which in turn could lead to lower birth weight children. In addition, a study by Stein et al. shows that adverse child health outcomes are seen more frequently in mothers whose homeless situation is more prolonged or severe during pregnancy [14]. Due to the effect of homelessness on stress and abuse, it is not surprising that homeless women in

TABLE 6: Birth weight (grams) according to homeless status, pregnancy and health variables, and stress and abuse variables among women completing the PRAMS survey in 31 participating cities/states, 2000–2007.

	Homeless			Non-homeless			Interaction
	Estimate*	SE*	P value [†]	Estimate*	SE*	P value [†]	P value
Pregnancy and health							
Previous live birth							
Yes	0.00			0.00			<.001
No	-42.14	2.24	<.001	-95.87	-0.37	<.001	
Previous low birth weight							
Yes	0.00			0.00			<.001
No	279.61	2.52	<.001	359.66	0.72	<.001	
Previous premature birth							
Yes	0.00			0.00			.004
No	313.95	2.90	<.001	321.59	0.78	<.001	
Prenatal care early							
Yes	0.00			0.00			<.001
No	-44.82	2.50	<.001	-20.08	0.52	<.001	
Did not want	-212.37	2.75	<.001	-85.61	2.60	<.001	
Preterm labor							
Yes	1.00			1.00			.114
No	234.10	2.40	<.001	240.93	0.43	<.001	
Vaginal bleeding							
Yes	0.00			0.00			<.001
No	189.46	2.97	<.001	166.72	0.50	<.001	
Nausea							
Yes	0.00			0.00			<.001
No	70.81	2.07	<.001	55.95	0.41	<.001	
Kidney/bladder infection							
Yes	0.00			0.00			<.001
No	55.66	2.43	<.001	37.32	0.52	<.001	
Pre-pregnancy BMI (kg/m ²)							
Underweight	0.00			0.00			<.001
Normal weight	59.32	4.82	<.001	141.74	0.84	<.001	
Overweight	147.42	5.03	<.001	215.65	0.89	<.001	
Class I & II obesity	176.82	5.39	<.001	233.36	0.94	<.001	
Class III obesity	192.42	6.44	<.001	259.52	1.33	<.001	
Missing	90.16	5.04	<.001	192.53	1.12	<.001	
Stress							
Family member ill							
Yes	0.00			0.00			<.001
No	27.23	2.55	<.001	8.79	0.41	<.001	
Divorce							
Yes	0.00			0.00			<.001
No	6.97	2.50	.005	30.11	0.75	<.001	
Moved							
Yes	0.00			0.00			<.001
No	2.95	1.90	0.120	6.74	0.39	<.001	
Partner lost job							
Yes	0.00			0.00			<.001
No	17.94	2.43	<.001	8.99	0.57	<.001	

TABLE 6: Continued.

	Homeless			Non-homeless			Interaction
	Estimate*	SE*	P value [†]	Estimate*	SE*	P value [†]	P value
Lost job							
Yes	0.00			0.00			.090
No	17.83	2.19	<.001	26.23	0.60	<.001	
Argument with partner							
Yes	0.00			0.00			<.001
No	33.65	2.33	<.001	13.92	0.42	<.001	
Partner did not want pregnancy							
Yes	0.00			0.00			<.001
No	25.02	2.62	<.001	8.82	0.67	<.001	
Bills you could not pay							
Yes	0.00			0.00			<.001
No	16.25	2.00	<.001	22.19	0.44	<.001	
In fight							
Yes	0.00			0.00			<.001
No	55.67	3.48	<.001	43.34	1.03	<.001	
Partner went to jail							
Yes	0.00			0.00			<.001
No	58.06	3.45	<.001	27.28	1.03	<.001	
Drugs							
Yes	0.00			0.00			<.001
No	75.80	2.89	<.001	18.13	0.60	<.001	
Someone close died							
Yes	0.00			0.00			<.001
No	-4.22	2.37	.075	24.78	0.47	<.001	
Abuse							
Abuse before pregnancy—Husband							
Yes	0.00			0.00			
No	41.83	3.92	<.001	30.33	1.08	<.001	.065
Abuse before pregnancy—Anyone else							
Yes	0.00			0.00			<.001
No	6.84	0.44	<.001	29.77	0.10	<.001	

PRAMS: Pregnancy Risk Assessment Monitoring System.

*Estimates were weighted to represent all homeless women who gave birth and each variable estimate was adjusted for maternal age, race, ethnicity, region, maternal education, and marital status.

[†]Based on the F statistic.

our study who reported these factors were more likely to have more serious health problems than housed women who reported similar circumstances.

This research presents new insight into the prevalence of maternal pregnancy and health conditions, stress, and abuse among homeless women in the United States by identifying the modifying effect of homelessness. The results provide public health professionals with pertinent information about this high-risk population and what measures can be undertaken to improve conditions for pregnant homeless women. It can also serve as an impetus for policy-level recommendations regarding public health programs and

practices for pregnant women experiencing homelessness within the United States.

The researchers recognize some limitations related to this study. Based on the homelessness question presented on the PRAMS survey, the duration (e.g., number of weeks, months) of homelessness and whether the mother was still experiencing homelessness at the time of survey administration cannot be determined. In addition, the questions related to stress and to abuse failed to measure the duration of experiencing these factors. Some additional limitations include the self-reported and retrospective nature of the PRAMS data and that there was not information on whether

homeless women resided in shelters, with family or friends, or on the street.

5. Conclusion

Homeless women are more likely to previously have experienced a low birth weight child, preterm labor, vaginal bleeding, nausea, and kidney/bladder infection, and less likely to have received early prenatal care. In addition, stressful life events and abusive relationships are more common in homeless women. Infant birth weight among homeless women is, on average, 17.4 grams lighter than in non-homeless women. The negative impact of selected pregnancy and morbidity variables (previous low birth weight, premature birth and preterm labor, receipt of early prenatal care, vaginal bleeding, nausea, kidney/bladder infection) and stress or abuse variables on infant birth weight tended to be significantly greater among homeless women.

Declaration of Interest

The authors have nothing to report.

Acknowledgments

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