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Maternal health behaviors and infant health outcomes among homeless mothers: U.S. Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) 2000–2007

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ABSTRACT

Objective. To determine whether participation in the Women, Infants, and Children Program is associated with improved maternal and infant health outcomes among homeless women in the Pregnancy Risk Assessment Monitoring System.

Method. Analyses were based on Pregnancy Risk Assessment Monitoring System participants from 31 states/cities in the United States, 2000–2007 ($n = 272{,}859$). Overall, 4% of women completing the Pregnancy Risk Assessment Monitoring System survey were homeless, with 76% participating in the Women, Infants, and Children Program, a federally-funded supplemental nutrition program for low-income women and children less than 5 years old.

Results. Among women in the Pregnancy Risk Assessment Monitoring System survey who reported using the Women, Infants, and Children Program, those experiencing homelessness were older, less educated, less likely to have private health insurance, and more likely to receive government assistance. Homeless women in the Women, Infants, and Children Program compared with those not in the program were significantly more likely to have a higher body mass index, to initiate breastfeeding after delivery, have prenatal care visits, have a longer gestational age, and have a greater infant birth weight.

Conclusion. Characteristics of homeless pregnant women choosing to participate in the Women, Infants, and Children Program are consistent with the requirements for program participation for women in general. Homeless women accessing the Women, Infants, and Children Program had better maternal and infant health outcomes.

Introduction

The Special Supplemental Nutrition Program for WIC is a federally-funded, state-administered program for low-income women who are pregnant, breastfeeding, or non-breastfeeding for up to 6 months postpartum; infants; and children 1–5 years old (Food and Nutrition Service [FNS], 2010). Other eligibility requirements include the presence of a nutritional or medical risk (e.g., anemia or maternal underweight or overweight status) and residing in the geographical state of application (Food and Nutrition Service [FNS], 2010). WIC provides clients with food vouchers, such as whole grain products, fruits and vegetables, milk, and eggs, and nutrition education about healthy eating patterns such as increasing folic acid during pregnancy (Food and Nutrition Service [FNS], 2010). WIC clients also receive referrals to agencies offering services for medical and dental care, housing, and other food resources (Food and Nutrition Service [FNS], 2010). WIC participation has been associated with decreased infant mortality rates, decreased health care costs, and improved nutrient intakes among children (Avruch and Cackley, 1995; Khanani et al., 2010; Rose et al., 1998).

WIC-eligible homeless women may not utilize the program because of limited access and inadequate cooking and food storage facilities, which may result in less healthy food choices and poor infant health outcomes (Avruch and Cackley, 1995; Bassuk, 1993; Beal and Redlener, 1995; Bloom et al., 2004; Davis et al., 2008; Hamm and Holden, 1999; Khanani et al., 2010; Killion, 1995; Richards and Smith, 2006; Rose et al., 1998; Smith et al., 2010; Stein et al., 2000). Identifying the number of people who are homeless in a given year in the United States (U.S.) is estimated to be as high as 3.5 million people, with approximately one-third children (National Coalition for the Homeless, 2009). Unfortunately, little is known about the state of homelessness among pregnant women in this country. Some studies have shown that homeless pregnant women tend to be younger, less educated, unmarried, African-American, and more likely to use

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Table 1
Homeless and homeless WIC[a] participants in each PRAMS[b] state/city by United States geographic area.

PRAMS[b] area	Years available	Homeless[*]		WIC	
		No.[†]	%[†]	No.[†]	%[†]
East					
Maine	2000–2007	2799	3	2006	72
Maryland	2000–2007	14,328	4	11,589	81
New Jersey	2002–2007	21,285	5	15,427	72
New York	2000–2007	25,667	3	19,129	75
New York City	2004–2007	11,073	4	8845	80
Rhode Island	2002–2007	2488	4	2028	82
Vermont	2000–2007	1214	3	1071	88
West Virginia	2000–2007	2441	2	2088	86
Total		81,295	4	62,183	76
Midwest					
Illinois	2000–2006	69,918	7	53,378	76
Michigan	2001–2006	12,784	2	10,187	80
Minnesota	2002–2007	10,648	3	8685	82
Montana	2002	392	4	350	89
Nebraska	2000–2006	5774	4	4324	75
North Dakota	2002	121	2	101	83
Ohio	2000–2007	21,057	2	16,903	80
Oklahoma	2000–2007	15,108	5	11,875	79
Total		135,802	4	105,803	78
South					
Alabama	2000–2004	5595	2	4563	82
Arkansas	2000–2007	11,041	4	7822	71
Florida	2000–2006	60,965	5	44,258	73
Georgia	2004–2006	10,387	4	6661	64
Louisiana	2000–2005	7522	2	5511	73
Mississippi	2003–2007	2612	2	1713	66
North Carolina	2000–2006	28,474	4	21,950	77
South Carolina	2000–2007	7036	2	5022	71
Total		133,632	4	97,500	73
West					
Alaska	2000–2007	2737	4	2101	77
Colorado	2000–2007	23,877	5	15,228	64
Hawaii	2000–2007	2500	2	1941	78
New Mexico	2000–2006	7367	5	5622	76
Oregon	2003–2007	11,277	6	9243	82
Utah	2000–2007	11,227	3	7999	71
Washington	2000–2007	31,814	6	26,731	84
Total		90,799	5	68,865	76
Total		441,528	4	334,351	76

[a] WIC indicates The Special Supplemental Nutrition Program for Women, Infants, and Children.
[b] PRAMS indicates 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.

government assistance programs; however, these studies have been based on small sample sizes or a small geographic region (Bloom et al., 2004; Little et al., 2005; Webb et al., 2003). In addition, no research has evaluated the association between WIC participation and homelessness during the pregnancy period.

The purpose of this study was to evaluate the extent of homelessness among WIC participants and to assess whether participation was associated with improved maternal and infant health outcomes. Selected demographic and health behavior variables were compared among non-homeless WIC participants, homeless women who participate in WIC, and homeless women who do not participate in WIC. We hypothesize that homeless pregnant women who use WIC compared with non-homeless WIC users are younger, less educated, less likely married, less likely to have insurance, less likely to have pre-pregnancy BMI in the normal range, and less likely to use multivitamins in the pre-conception period. We further hypothesize that participation in WIC among homeless pregnant women would result in better maternal-related health behaviors and better infant health outcomes.

Materials and methods

Study population

Data from 31 states/cities in the United States participating in the PRAMS, 2000–2007. Each of these 31 areas achieved at least a 70% response rate for each individual year the survey was conducted. PRAMS is an ongoing, state-specific surveillance program that obtains data about maternal health practices before, during, and after pregnancy among women who delivered an infant in the past 2–4 months (Centers for Disease Control and Prevention [CDC], 2009). Participating women are mailed a pre-letter to explain the PRAMS program, an introductory letter, and a survey.

Of the 272,859 survey respondents, 6018 had missing information on homeless or WIC status and 138,476 were neither homeless or had not participated in the WIC program. These individuals were not included in the current study, but analyses were based on 128,365 pregnant women completing the PRAMS survey (i.e., 117,184 non-homeless WIC participants, 8557 homeless WIC participants, and 2624 homeless non-WIC participants).

Study variables

Homelessness was based on responses to the question "This question is about things that may have happened during the *12 months before* your new baby was born…I was homeless." The term "homeless" was not defined and left to participants' interpretation. WIC participation was based on the question "During your pregnancy, were you on WIC (the Special Supplemental Nutrition Program for Women, Infants, and Children)?"

BMI [kg/m^2] was derived from self-reported height and weight prior to pregnancy. BMI may be underestimated because women in the age range 15–44 tend to underestimate their weight (Kovalchik, 2009; Merrill and Richardson, 2009). Classifications of BMI are 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).

Breastfeeding duration was determined by the PRAMS questions "*Are you still breastfeeding or feeding pumped milk to your new baby?*" If women responded "*yes*," then duration of breastfeeding was estimated by subtracting the infant's date of birth from the date the PRAMS survey was filled out by the participant. If women responded "*no*," then duration of breastfeeding was determined from the following PRAMS survey question: "*How many weeks or months did you breastfeed or pump milk to feed your baby?*" Maternal recall about breastfeeding initiation and duration has shown good reliability and validity, especially if recalled within 3 years after their infant's birth (Li et al., 2005).

Homeless status among PRAMS survey participants and WIC participation rates were compared among four geographic areas in the United States: East (Maine, Maryland, New Jersey, New York, New York City, Rhode Island, Vermont, West Virginia), Midwest (Illinois, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, Oklahoma), South (Alabama, Arkansas, Florida,

Notes to Table 2:
Of the 31 PRAMS cities/states, Montana and Vermont did not collect information on ethnicity; Georgia and New York City did not collect information on government aid; Vermont did not collect information on BMI.
[a] WIC indicates The Special Supplemental Nutrition Program for Women, Infants, and Children.
[b] PRAMS indicates Pregnancy Risk Assessment Monitoring System.
[*] 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 the other variables listed in the table.
[δ] Government aid includes welfare, public assistance, general assistance, food stamps, or supplemental security income. This variable does not include WIC. Other includes income assistance from family or friends, unemployment, child support/alimony, and/or social security/disability.