Preconception Health Risks among U.S. Women: Disparities at the Intersection of Disability and Race or Ethnicity

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Abstract

Objective: Prior research has found that some preconception health risks are more prevalent among women in historically minorititized racial and ethnic groups. Preconception health risks are also elevated among women with disabilities. Risks could be even greater among women who both have a disability and belong to a minoritized racial or ethnic group. The purpose of this study was to assess preconception health at the intersection of disability and race or ethnicity.

Methods: We analyzed data from the 2016 Behavioral Risk Factor Surveillance System to estimate the prevalence of health behaviors, health status indicators, and preventive healthcare receipt among non-pregnant women ages 18–44 years of age. We used modified Poisson regression to compare non-Hispanic White women with disabilities and women with and without disabilities in three other race/ethnicity groups (non-Hispanic Black, Hispanic, Other Race) to a reference group of non-Hispanic White women without disabilities. Disability status was defined based on affirmative response to at least one of six questions about difficulty with seeing, hearing, mobility, cognition, personal care, or independent living tasks. Multivariate analyses adjusted for other sociodemographic characteristics such as age and marital status.

Results: In every racial and ethnic group, women with disabilities had significantly higher prevalence of most preconception health risks than their counterparts without disabilities. The

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disparity in obesity for Black women with disabilities was additive, with the adjusted prevalence ratio (PR=1.77, 95% CI=1.57–2.00) equal to the sum of the prevalence ratios for disability alone (PR=1.29, 95% CI=1.19–1.41) and Black race alone (PR= 1.47, 95% CI=1.36–1.58).

Conclusions: Women at the intersection of disability and minoritized race or ethnicity may be at especially high risk of adverse outcomes. Targeted efforts are needed to improve the health of women of reproductive age in these doubly marginalized populations.

Keywords

Introduction

An estimated 12–18% of reproductive age women in the United States have a disability related to vision, hearing, mobility, cognition, and/or ability to engage in self-care and independent living activities (Horner-Johnson, Darney, Kulkarni-Rajasekhara, Quigley, & Caughey, 2016; Mitra, Clements, Zhang, & Smith, 2016; Okoro, Hollis, Cyrus, & Griffin-Blake, 2018). Research has found higher odds of pregnancy complications and adverse pregnancy outcomes (e.g., gestational diabetes, preterm birth, infants small for gestational age) among women with disabilities than among women without disabilities (Akobirshoev, Parish, Mitra, & Rosenthal, 2017; Clements, Mitra, Zhang, & Iezzoni, 2016;Darney, Biel, Quigley, Caughey, & Horner-Johnson, 2017; Gavin, Benedict, & Adams, 2006; Mitra, Clements, et al., 2015; Mitra, Parish, Clements, Cui, & Diop, 2015; Morton et al., 2013). These complications and adverse outcomes may be due in part to elevated preconception health risks that could be prevented. Preconception health indicators include modifiable risk factors (e.g., smoking, alcohol use, lack of exercise, lack of social support) that are associated with adverse pregnancy outcomes (Broussard, Sappenfield, Fussman, Kroelinger, & Grigorescu, 2011). Addressing these risk factors is an important mechanism for improving maternal and child health.

An earlier study found significant disparities in preconception risk factors between reproductive age women with and without disabilities (Mitra et al., 2016). In contrast to other women, women with disabilities were more likely to report fair or poor health, frequent mental distress, and inadequate emotional support, and were also more likely to have obesity, report lower levels of exercise, smoke in the past month, and report more chronic diseases (Mitra et al., 2016). Relatedly, research on women who already had children and many of whom could potentially become pregnant again found that those with disabilities had higher odds of chronic conditions, adverse health behaviors, poor physical and mental health, and insufficient social and emotional support compared to women without disabilities (Kim, Kim, Hong, & Fredriksen-Goldsen, 2013). Further, multiple studies (e.g., Drew & Short, 2010; Horner-Johnson, Dobbertin, Andresen, & Iezzoni, 2014; Steele, Townsend, Courtney-Long, & Young, 2017) have found that women with disabilities are less likely to receive Pap testing to screen for cervical cancer, an important form of preconception as well as overall preventive health care.

Many of these disparities parallel those that have been found in relation to race and ethnicity. Adverse pregnancy outcomes—including preterm birth, infants small for gestational age, and severe maternal morbidity and mortality—are more common among women in minoritized racial and ethnic groups compared to non-Hispanic White women (Admon, et al., 2018; Grobman, et al., 2018; Petersen, Davis, Goodman, & al., 2019; Ratnasiri et al., 2018; Tangel, White, Nachamie, & Pick, 2018). Preconception risk factors such as physical inactivity, obesity, and diabetes are also more common among Black and Hispanic women of reproductive age than among similarly aged non-Hispanic White women (Arbour, Corwin, Salsberry, & Atkins, 2012; Robbins et al., 2018). Such disparities are rooted in structural racism that drives inequitable access to social determinants of health (Bailey, Krieger, Agénor, Graves, Linos, & Bassett, 2017; Williams, Lawrence, & Davis, 2019). Women in these racial and ethnic groups who also have disabilities may experience inequities associated with both racism and ableism, potentially magnifying threats to their health. Moreover, disability is more common across the lifespan in many racial and ethnic groups than it is in the non-Hispanic White population (Centers for Disease Control and Prevention, 2019a). In our specific population of interest, while nearly two-thirds of reproductive age women with disabilities are non-Hispanic White, an estimated 12% are non-Hispanic Black, 15% are Hispanic, and 7% belong to other racial groups or are multi-racial (Mitra, et al., 2016). Thus, the intersection of disability and race/ethnicity is important to consider in the context of preconception health.

Prior research in the overall adult population has found that individuals in minoritized racial and ethnic groups who also have a disability experience greater disparities than those who belong to just one of these population groups, on indicators including severe depression and receipt of dental care (Horner-Johnson, Dobbertin, & Beilstein-Wedel, 2015; Jones & Sinclair, 2008). Similarly elevated disparities may exist in preconception health. However, the preconception health of women with disabilities has not yet been examined in conjunction with race and ethnicity. To address this gap, we conducted analyses of nationally representative population-based survey data to compare the prevalence of selected potentially modifiable preconception health risk factors among women with and without disabilities in different racial and ethnic groups.

Material and Methods

Data Source

We analyzed data from the 2016 Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an ongoing random digit dial telephone survey of the non-institutionalized population 18 years of age and older. The survey is conducted by each U.S. state and participating territory in collaboration with the Centers for Disease Control and Prevention to provide population-level data on health risk behaviors and preventive health practices. We analyzed data from all 50 states, the District of Columbia, and three territories. Response rates in 2016 ranged from 30.7% to 65.0%, with a median of 47.1 % (Centers for Disease Control and Prevention, 2017a). Because this was a secondary analysis of publicly available data that do not include identifying information, Institutional Review Board approval was not required.

Our analyses were limited to women ages 18–44 years (n=67,790). We excluded women who were pregnant at the time of their interview (n=2,497) or who had a hysterectomy (n=3,214). We also excluded women with unknown race or ethnicity or missing values for disability status (n=2,762). Our final analytic sample included 59,317 women ages 18–44 years, including 37,942 (64.0%) White women, 6,662 (11.2%) Black women, 9,162 (15.5%) Hispanic women, and 5,551 (9.4%) women from other races and ethnicities.

Measures

We categorized women as having a disability if they answered yes to any of the following questions (Centers for Disease Control and Prevention, 2019b): 1) Are you deaf or do you have serious difficulty hearing? 2) Are you blind or do you have serious difficulty seeing, even when wearing glasses? 3) Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions? 4) Do you have serious difficulty walking or climbing stairs? 5) Do you have difficulty dressing or bathing? 6) Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor's office or shopping?

We grouped race and ethnicity into the following categories: non-Hispanic White, non-Hispanic Black, Hispanic of any race, and Other Race (including Asians, Native Hawaiians and other Pacific Islanders, American Indians and Alaska Natives, and multi-racial individuals). We also created a new variable combining disability status and race/ethnicity. This variable included the following eight categories: 1) non-Hispanic White without disability, 2) non-Hispanic White with disability, 3) non-Hispanic Black without disability, 4) non-Hispanic Black with disability, 5) Hispanic without disability, 6) Hispanic with disability, 7) Other Race without disability, 8) Other Race with disability.

The preconception health indicators we analyzed were drawn from a list of 45 variables as defined by the Core State Preconception Health Indicators Working Group as key preconception health indicators (Broussard et al., 2011). The indicators identified by the Working Group cover multiple domains, including general health status, social determinants of health, health care, substance use, nutrition and physical activity, mental health, emotional and social support, chronic conditions, and infections (Broussard et al., 2011). We examined the 17 indicators for which data were available in the 2016 BRFSS, as described below.

The dataset included one variable per domain in the general health status and social determinants of health domains. To assess general health status, we classified women as having fair or poor health based on their response to the question: "In general, would you say your health is excellent, very good, good, fair, or poor?" In the social determinants of health domain, we utilized data on highest level of educational attainment to identify women with less than a high school degree or GED.

The health care indicators established by the Working Group and available in the BRFSS data included presence of health insurance, receipt of routine checkup within the past year, dental visit within the past year, and receipt of a Pap test within the past 3 years. We categorized women as having no health insurance if they indicated that they did not have any

type of health care coverage. We created dichotomous variables for the latter three indicators based on how recently women reported having received each type of care.

The available substance use indicators were current smoking, heavy drinking in the past month, and binge drinking in the past month, as coded within the BRFSS (Centers for Disease Control and Prevention, 2017b). Women were classified as current smokers if they had smoked at least 100 cigarettes in their lifetime and were currently smoking every day or some days. Heavy drinking for women was defined as consuming on average more than one drink per day during the past 30 days. Binge drinking for women was defined as consuming four or more drinks on a single occasion within the past 30 days.

Nutrition and physical activity indicators included obesity and engaging in exercise or physical activity. Obesity was defined as having a body mass index of 30 or above. Lack of physical activity in the past month was determined based on no reported participation in any physical activity or exercise other than as part of their job during the past month.

BRFSS data provided one indicator each in the mental health and emotional and social support domains. The mental health indicator of frequent mental distress was defined by the respondent's self-report of having 14 or more days in the past 30 days when their mental health was not good. We categorized women as having inadequate social support if they indicated never, rarely, or sometimes (as opposed to always or usually) receiving the social and emotional support they needed.

Chronic conditions indicators included diabetes and current asthma. Women who had ever have been told by a health professional that they had diabetes—excluding women who were only told they had diabetes during pregnancy—were categorized as having diabetes. women were considered to have current asthma if they indicated they had ever been told by a health professional that they had asthma and subsequently responded that they still had asthma.

Indicators available in the infections domain included receipt of HIV testing and influenza vaccine. We coded women as not having received HIV testing if they reported never having been tested for HIV. We categorized women as not having been vaccinated for influenza if they had not received a flu shot within the past year.

We included the following sociodemographic characteristics as covariates in all of our multivariate analyses: age (18–24 years, 25–34 years, 34–44 years); marital status (married or part of an unmarried couple, divorced/separated/widowed, never married); employment status (employed, unemployed, student/homemaker/retired, unable to work); and household income (<\$15,000; \$15,000-<\$25,000; \$25,000-<\$35,000; \$35,000-<\$50,000; \$50k). Additionally, we included education (less than high school, high school, some college, college degree or higher) as a covariate in analyses for all preconception health indicators other than education itself. Similarly, we include health insurance status (yes or no) as a covariate for analyses of all other preconception health indicators.

Statistical Analysis

We compared demographic and socioeconomic characteristics of women with and without disabilities in each racial and ethnic group. Differences between women with and without

disabilities were evaluated using chi-squared tests. All the available preconception health indicators were analyzed as binary (yes/no) variables, coded such that higher prevalence indicated greater risk to preconception health. We calculated the prevalence for each of the risk indicators among women with and without disabilities in each racial and ethnic group. We conducted modified Poisson regressions to estimate the unadjusted and adjusted prevalence ratios (with 95% confidence intervals) for each preconception risk factor in each disability by race-ethnicity category, using non-Hispanic White women without disabilities as the reference group. Multivariable models adjusted for the covariates described above. Because a number of model covariates had missing values (household income: 14.6%; employment: 1.0%), consistent with best practices (Royston & White, 2011; Schenker et al., 2006), we conducted multiple imputation by chained equations to impute values for the variables with missing data. This imputation method, suitable for large datasets with many variables, uses a series of regression models wherin each variable with missing data is sequentially modeled conditional upon the other variables in the data (Azur, Stuart, Frangakis, & Leaf, 2011). We used Stata version 16 for all analyses, applying *svy* commands to account for the complex sampling design of the BRFSS.

Results

Sample characteristics

Table 1 presents the demographic and socioeconomic characteristics of women with and without disabilities, stratified by race and ethnicity. In each racial and ethnic group, women with disabilities had significantly less education, were less likely to be married, and were less likely to be employed than their counterparts without disabilities. Pre-proo Compared to women without disabilities, women with disabilities were over-represented in the lowest income categories and under-represented in the highest income categories in every racial and ethnic group.

Differences in Preconception Risk Factors between Women with and without Disabilities within Racial and Ethnic Groups

The proportions and 95% confidence intervals of the preconception risk factors for women with and without disabilities are shown in Table 2, stratified by race and ethnicity. In every racial and ethnic group, women with disabilities were significantly more likely to report fair/ poor health, less than a high school education, no dental visit in the past year, current smoking, binge drinking in the past month, obesity, lack of exercise, frequent mental distress, diabetes, and current asthma compared to women without disabilities in the same racial or ethnic group. For the remaining risk factors (no health insurance, no checkup in past year, no Pap test in past 3 years, heavy drinking, inadequate social support, never tested for HIV, and no influenza vaccination in the past year), women with disabilities were generally at greater risk than their counterparts without disabilities, but the differences were not statistically significant in all racial and ethnic groups. The exception to this overall pattern was HIV testing, which women with disabilities were approximately as or more likely to have received compared to women without disabilities of the same race or ethnicity.

Preconception Risks at the Intersection of Race/Ethnicity and Disability

When comparing all groups to non-Hispanic White women without disabilities, prevalence ratios (PR) for women with disabilities in each racial and ethnic group were significantly elevated in our unadjusted analyses for the majority of the risk factors we examined (Table 3). Of the variables on which women with disabilities in minoritized racial and ethnic groups did not differ significantly from non-Hispanic White women without disabilities, most were ones for which women without disabilities in the same racial and ethnic groups had significantly lower PRs compared to the reference group (i.e., less prevalence of risk than among their non-Hispanic White counterparts). There were two factors on which we found significantly lower PRs for women with disabilities compared to the reference group: 1) never tested for HIV (for all disability groups); and 2) no checkup in past year (Black women with disabilities only). There were also two factors (obesity and physical inactivity) on which Black women with disabilities had elevated PRs with confidence intervals that did not overlap with those of Black women without disabilities or White women with disabilities, indicating greater disparity for women with the combination of Black race and disability status than for women with only one of these characteristics.

With the addition of covariates to the models (Table 4), PRs were somewhat attenuated. PRs for women with disabilities in certain racial and ethnic groups that were significant in unadjusted analyses no longer significantly differed from the reference group for the following indicators: no health insurance (Other Race only), no dental visit in past year (Hispanic and Other Race only), no Pap test in past 3 years (Hispanic only), current smoking (Black only), and no flu vaccine in past year (Black and Other Race only). Other indicators shifted from insignificant to significantly lower PRs for some groups. These included: no checkup in past year (Hispanic only), no Pap test in past 3 years (Black only), and current smoking (Hispanic only). Despite these changes, women with disabilities in each racial and ethnic group continued to have significantly elevated PRs compared to the reference group for the majority (ranging from 9 to 13) of the 17 pre-conception health risk indicators. Black women with disabilities continued to have a higher PR for obesity, not only compared to the reference group but also compared to White women with disabilities and Black women without disabilities.

Discussion

To our knowledge, this is the first paper examining the preconception health of women with disabilities by racial and ethnic group. Our findings regarding overall patterns of disparities in preconception risk factors between women with and without disabilities largely confirm those reported previously (e.g., Mitra et al., 2016; Kim et al., 2013; Drew & Short, 2010; Horner-Johnson et al., 2014; Steele et al., 2017). Further, we found that most of these disparities were apparent in each racial and ethnic group; that is, they were not driven exclusively by non-Hispanic White women.

In addition to the elevated prevalence of health risks in comparison to the reference group, there were some preconception health risk indicators on which prevalence ratios for minoritized women with disabilities were *either* higher than the PRs for their counterparts without disabilities *or* higher than those for non-Hispanic White women with disabilities, but

not both simultaneously. In our adjusted analyses, obesity was the only risk factor on which minoritized women (specifically Black women) with disabilities appeared to experience compounded disparity. The effect was additive, with the PR for the combination of Black race and disability status equal to the sum of each of the individual effects. While obesity is known to be prevalent among Black women (Fryar, Carroll, & Ogden, 2018) and among women with disabilities (Mitra, et al., 2016; Kim et al., 2013), ours is the first study to show an additive effect for women living at the intersection of race and disability.

Our findings emphasize the need for increased attention to the preconception health of women with disabilities, particularly women with disabilities in marginalized racial and ethnic groups who may encounter biases related to both race/ethnicity and disability. Given long-standing societal beliefs that women with disabilities are asexual and cannot or should have children(Stevens 2011; National Council on Disability, 2012), clinicians may assume that supporting preconception health is less relevant for this population. Similarly, the U.S. has a long history of stratified reproduction, in which the fertility of white women is valued over that of women of color(Ginsburg & Rapp, 1995). Unaddressed, such biases can lead to discriminatory care, which in turn may cause women to distrust clinicians and avoid future health care encounters. Training clinicians to recognize and counter their implicit biases is a crucial component of developing more equitable systems of care, including comprehensive and respectful preconception care.

Unfortunately, few clinicians receive instruction in addressing biases or knowledge gaps about disability. A recent survey of U.S. obstetrician-gynecologists found that only 17% had received any information or training on provision of care to women with disabilities (Taouk, Fialkow & Schulkin, 2018). The Alliance for Disability in Health Care Education (2019) has developed a minimum set of disability competencies clinicians should be expected to demonstrate. The competencies emphasize grounding in conceptual models of disability and the history of discrimination that compounds disability; consideration of social determinants of health; and recognition of disability as a dimension of human diversity similar to and intersecting with age, gender, sexual identity, race, ethnicity, and language (Alliance for Disability in Health Care Education, 2019). Integration of these competencies into health education curricula and evaluation standards would be an important step toward expanding best practices, improving the quality of care available to women with disabilities, and reducing preconception health disparities.

Limitations

Our study shares several limitations inherent in analyses of survey data. Data in the BRFSS are self-reported and may be influenced by social desirability biases. Responses may also be influenced by selection bias if associations between preconception risk factors and disability and/or race and ethnicity differ in survey responders versus non-responders. Due to limitations of the BRFSS survey methodology, women with sensory or intellectual disability may not be well represented in the dataset. The level of detail possible in our analyses was limited by sample sizes of women with disabilities and women in less prevalent racial and ethnic groups. Because of these limitations, we were unable to analyze differences by specific disability type. The population of people with disabilities is heterogeneous and

includes multiple types of disabilities. Future research should consider the type of disability, as women with certain disabilities may be more vulnerable to preconception risk factors. Additional research is needed on ways in which each disability type may intersect with race and ethnicity in association with preconception health risks. Similarly, we grouped together Asian, Native Hawaiian and other Pacific Islander, American Indian and Alaska Native, and multi-racial women for analyses. Disability prevalence and preconception risk factors may differ across these groups and warrant more detailed examination with larger datasets. Further, while utilizing non-Hispanic White women without disabilities as the reference group in regression analyses is standard practice, it risks incorrectly implying that other groups constitute a departure from the norm. There is an ongoing need for research centered on the experiences of marginalized women and addressing resilience as well as disparities, particularly in Black women.

Implications for Practice and Policy

As the diversity of the U.S. continues to increase (Vespa, Armstrong, & Medina, 2018), we can expect the racial and ethnic diversity of the disability population to grow as well. Addressing the preconception health needs of a diverse population of women with disabilities will therefore become increasingly relevant as a strategy to optimize pregnancy outcomes and maximize health of women and infants. Clinicians providing preconception care to women with disabilities in minoritized racial and ethnic groups should be attentive to the potentially compounded health risks these women may face. While several of the increased risks we observed were related to health behaviors, it is important to recognize that these behaviors do not occur in a vacuum. Women with disabilities in our study population had much lower incomes than their counterparts without disabilities. Income was especially low among Black women and Hispanic women with disabilities. Thus, women in these groups may have less access to healthy foods and safe spaces in which to exercise. Policies are urgently needed to address structural inequities in distributions of wealth and other social determinants of health, which drive disparities in health outcomes.

Conclusions

Existing literature has found that women with disabilities and women in minoritized racial and ethnic groups are each at high risk of adverse pregnancy outcomes. Our findings of even greater disparities on some preconception health indicators for women at the intersection of race or ethnicity and disability—particularly for non-Hispanic Black women with disabilities— suggest that these women may be at especially high risk of adverse pregnancy outcomes. Targeted efforts are needed to improve the health of women of reproductive age in these doubly marginalized populations.

Acknowledgments

Biography

Willi Horner-Johnson, PhD is an Associate Professor in the Institute on Disability and Development at Oregon Health & Science University. Her research focuses on health and healthcare disparities impacting individuals with disabilities, particularly those who also belong to other marginalized groups.

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Table 1.

Sample Characteristics of Women 18–44 Years Old With and Without Disability Stratified by Race/Ethnicity (weighted percentages, BRFSS 2016)

Characteristic	Non-Hispanic White n=37,942[a]			Non-Hispanic Black n=6,662			Hispanic n=9,162			Other Race[b] n=5,551		
	Disability Status			Disability Status			Disability Status			Disability Status		
	No n=32,002	Yes n=5,940	p value	No n=5,477	Yes n=1,185	p value	No n=7,520	Yes n=1,642	p value	No n=4,618	Yes n=933	p value
Age			0.045			<0.001			0.228			0.768
18–24	26.9	29.7		28.9	25.1		26.3	27.9		31.8	33.5	
25–34	37.6	36.4		38.6	33.7		39.7	35.7		33	33.6	
35–44	35.5	33.9		32.5	41.2		34	36.4		35.1	32.9	
Age, Mean (SD)	32.6 (7.4)	32.3 (7.7)	0.011	31.9 (7.4)	32.8 (7.5)	<0.001	31.8 (7.4)	32.3 (7.6)	0.007	31.2 (7.6)	32.3 (7.8)	<0.001
Education			<0.001			<0.001			0.004			<0.001
Less than high school	4.8	15.5		6.2	17.8		30.5	35.7		3.3	13.8	
High school graduate	19.9	31.7		28.7	35.2		29.3	26.6		17.8	31.2	
Some college	36.4	37.9		39.0	34.9		25.8	27.7		30.6	35.4	
College graduate	39.0	15.0		26.2	12.1		14.4	9.9		48.3	19.5	
Marital Status			<0.001			0.002			<0.001			<0.001
Married/coupled	49.3	33.7		23.0	17.0		41.6	29.4		44.0	27.7	
Previously married[c]	8.0	16.7		9.8	14.6		11.0	14.9		6.5	11.5	
Never married	42.7	49.6		67.2	68.4		47.5	55.7		49.4	60.8	
Employment			<0.001			<0.001			<0.001			<0.001
Employed	68.6	45.6		69.4	45.9		52.2	43.0		58.3	44.5	
Unemployed	26.6	25.5		20.7	17.9		37.0	31.2		35.3	24.9	
Out of workforce[c]	3.8	11.6		8.1	14.5		8.3	14.7		5.1	10.8	
Unable to work	0.9	17.2		1.8	21.8		2.5	11.1		1.4	19.8	
Health coverage			<0.001			0.006			0.598			0.010
Insured	7.5	13.3		12.8	18.0		32.9	31.7		8.8	14.2	
Uninsured	92.5	86.7		87.2	82.0		67.1	68.3		91.2	85.8	
Income			<0.001			<0.001			<0.001			<0.001
Less than $15,000	6.1	23.0		15.3	32.8		20.8	30.3		8.6	19.9	
$15,000–<$25,000	11.8	26.9		23.8	29.7		31.5	34.6		12.1	33.2	

Characteristic	Non-Hispanic White n=37,942[a]			Non-Hispanic Black n=6,662			Hispanic n=9,162			Other Race[b] n=5,551		
	Disability Status			Disability Status			Disability Status			Disability Status		
	No n=32,002	Yes n=5,940	p value	No n=5,477	Yes n=1,185	p value	No n=7,520	Yes n=1,642	p value	No n=4,618	Yes n=933	p value
$25,000– <$35,000	8.4	10.9		13.3	10.0		13.3	11.3		9.6	11.5	
$35,000– <$50,000	13.7	12.2		14.6	13.8		12.1	10.6		11.0	9.0	
$50,000 or more	60.0	27.0		33.0	13.7		22.3	13.2		58.7	26.3	

[a] Sample sizes are unweighted counts

[b] Includes Asian, Native Hawaiian and other Pacific Islander, American Indian and Alaska Native, and multiple races

[c] Includes divorced, separated, or widowed

[d] Includes students, homemakers, and retired persons

BRFSS=Behavioral Risk Factor Surveillance System

Table 2.

Frequencies (with 95% Confidence Intervals) for Preconception Risk Factors Among Women 18–44 Years Old With and Without Disability, Stratified by Race/Ethnicity (BRFSS 2016)

Indicator	NH White (N=37,942)					NH Black (N=6,662)					Hispanic (N=9,162)					Other Race (N=5,551)				
	Disability status					Disability status					Disability status					Disability Status				
	No		Yes			No		Yes			No		Yes			No		Yes		
	%[a]	95% CI	%	95% CI	p value	%	95% CI	%	95% CI	p value	%	95% CI	%	95% CI	p value	%	95% CI	%	95% CI	p value
General Health Status																				
Fair/poor health	4.5	4.1–5.0	34.8	32.7–36.9	<0.001	8.7	7.6–9.9	38.4	33.8–43.2	<0.001	14.3	12.9–15.7	38.8	34.8–42.9	<0.001	5.7	4.6–7.0	35.6	30.1–41.6	<0.001
Social Determinants																				
< High school education	4.8	4.2–5.3	15.5	13.7–17.4	<0.001	6.2	5.1–7.5	17.8	14.3–22.0	<0.001	30.5	28.6–32.5	35.7	31.8–39.9	0.02	3.3	2.5–4.3	13.8	10.2–18.4	<0.001
Health Care																				
No health insurance	7.5	7.0–8.0	13.3	11.9–14.9	<0.001	12.8	11.3–14.3	18.0	14.5–22.2	0.006	32.9	31.0–34.8	31.7	27.8–35.8	0.598	8.8	7.4–10.5	14.2	10.3–19.2	0.010
No checkup in past year	34.5	33.6–35.5	36.3	34.1–38.5	0.143	21.4	19.5–23.4	25.3	21.0–30.1	0.112	36.3	34.4–38.3	35.7	31.9–39.8	0.792	30.0	27.5–32.6	37.7	31.9–43.8	0.016
No dental visit in past year	25.8	24.9–26.6	45.0	42.8–47.3	<0.001	33.6	31.5–35.7	48.6	43.7–53.5	<0.001	37.4	35.6–39.4	44.6	40.5–48.8	0.002	28.3	25.8–30.9	38.2	32.5–44.2	0.001
No Pap test in past 3 years	9.8	9.2–10.5	16.0	14.3–17.8	<0.001	6.0	4.8–7.5	7.6	5.6–10.2	0.222	8.5	7.4–9.7	12.7	10.1–15.9	0.003	10.0	8.2–12.1	11.3	8.4–15.1	0.497
Substance Use																				
Current smoking	15.3	14.7–16.0	39.6	37.5–41.8	<0.001	11.4	10.1–12.8	26.5	22.5–30.9	<0.001	5.4	4.7–6.2	16.7	13.9–19.9	<0.001	6.7	5.7–7.7	29.7	24.8–35.1	<0.001
Heavy drinking	8.0	7.4–8.5	7.7	6.6–8.9	0.663	4.2	3.3–5.5	8.5	5.5–12.9	0.006	2.6	2.1–3.2	6.7	4.8–9.2	<0.001	3.5	2.8–4.4	8.4	5.4–12.9	<0.001
Binge drinking	3.5	3.2–4.0	5.6	4.6–6.8	<0.001	2.8	2.2–3.6	5.4	3.1–9.3	0.035	1.5	1.2–1.9	4.5	3.0–6.9	<0.001	1.5	1.1–2.1	6.3	4.0–10.0	<0.001
Nutrition and Physical Activity																				
Obesity	22.0	21.2–22.8	34.9	32.7–37.2	<0.001	36.4	34.2–38.6	52.1	47.2–57.0	<0.001	29.0	27.0–31.0	39.1	34.9–43.5	<0.001	12.9	11.3–14.7	38.6	32.5–45.1	<0.001

Indicator	NH White (N=37,942)					NH Black (N=6,662)					Hispanic (N=9,162)					Other Race (N=5,551)				
	Disability status					Disability status					Disability status					Disability Status				
	No		Yes			No		Yes			No		Yes			No		Yes		
	%[a]	95% CI	%	95% CI	p value	%	95% CI	%	95% CI	p value	%	95% CI	%	95% CI	p value	%	95% CI	%	95% CI	p value
No exercise in past month	12.6	12.0–13.3	28.8	26.8–30.8	<0.001	25.4	23.5–27.3	38.1	33.6–43.0	<0.001	28.4	26.6–30.2	34.5	30.7–38.5	0.004	18.5	16.3–20.9	26.2	21.5–31.5	0.003
Mental Health																				
Frequent mental distress	10.2	9.6–10.8	49.2	46.9–51.5	<0.001	8.0	6.8–9.3	36.8	32.2–41.6	<0.001	7.1	6.1–8.2	26.4	22.7–30.5	<0.001	6.6	5.5–8.0	43.8	37.7–50.2	<0.001
Inadequate social support [b]	11.0	9.1–13.3	38.4	31.2–46.1	<0.001	26.0	19.6–33.5	62.8	48.2–75.4	<0.001	23.6	14.5–36.1	31.9	13.7–58.1	0.51	17.1	10.8–25.9			
Chronic Conditions																				
Diabetes	1.4	1.2–1.6	6.0	5.0–7.2	<0.001	3.0	2.4–3.7	9.5	7.2–12.5	<0.001	2.6	2.0–3.3	4.9	3.6–6.7	0.001	2.6	1.8–3.7	6.6	4.0–10.7	0.002
Current asthma	10.4	9.8–11.0	22.3	20.5–24.2	<0.001	12.3	10.6–14.2	23.2	19.6–27.2	<0.001	6.1	5.3–7.0	17.2	14.4–20.3	<0.001	6.6	5.4–7.9	20.9	16.3–26.5	<0.001
Infections																				
Never tested for HIV	52.9	51.9–53.9	40.1	37.8–42.4	<0.001	25.2	23.0–27.7	25.2	20.9–30.0	0.978	47.0	44.9–49.0	42.8	38.5–47.3	0.097	62.8	59.8–65.6	37.0	31.3–43.1	<0.001
No flu vaccine in past year	64.0	63.0–64.9	70.7	68.5–72.8	<0.001	72.2	70.2–74.1	69.9	65.1–74.3	0.367	71.8	70.0–73.5	75.4	71.8–78.6	0.074	58.2	55.2–61.2	70.5	64.7–75.7	<0.001

Note:

[a] Weighted percentages

[b] Only four states (Louisiana, Minnesota, Rhode Island, Tennessee) collected data on social support and total sample size for this item was 3,473; the sample size for women with disabilities in the Other Race group was insufficient for reporting estimates on this indicator.

BRFSS=Behavioral Risk Factor Surveillance System; CI=Confidence Interval

Table 3.

Unadjusted Prevalence Ratios (with 95% Confidence Intervals) for Preconception Risk Factors Among Women 18–44 Years Old (BRFSS 2016), N=59,317

Indicator	NH White Disability		NH Black No Disability		NH Black Disability		Hispanic No Disability		Hispanic Disability		Other Race No Disability		Other Race Disability	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
General Health Status														
Fair/poor health	7.69***	6.88 – 8.58	1.92***	1.63 – 2.26	8.47***	7.27 – 9.88	3.15***	2.76 – 3.61	8.56***	7.44 – 9.84	1.25	0.99 – 1.57	7.87***	6.53 – 9.48
Social Determinants														
<High school education	3.25***	2.76 – 3.83	1.30*	1.04 – 1.63	3.75***	2.94 – 4.78	6.42***	5.64 – 7.32	7.52***	6.41 – 8.83	0.70*	0.52 – 0.94	2.91***	2.11 – 3.99
Health Care														
No health insurance	1.79***	1.57 – 2.04	1.71***	1.50 – 1.96	2.42***	1.93 – 3.02	4.41***	4.03 – 4.82	4.25***	3.68 – 4.90	1.19	0.99 – 1.43	1.90***	1.38 – 2.62
No checkup in past year	1.05	0.98 – 1.12	0.62***	0.56 – 0.68	0.73***	0.61 – 0.88	1.05	0.99 – 1.12	1.03	0.92 – 1.16	0.87**	0.80 – 0.95	1.09	0.93 – 1.28
No dental visit in past year	1.75***	1.65 – 1.86	1.30***	1.21 – 1.40	1.89***	1.70 – 2.10	1.45***	1.37 – 1.54	1.73***	1.57 – 1.91	1.10	1.00 – 1.21	1.48***	1.27 – 1.74
No Pap test in past 3 years	1.63***	1.43 – 1.85	0.61***	0.49 – 0.77	0.77	0.57 – 1.05	0.86	0.74 – 1.00	1.29*	1.02 – 1.64	1.02	0.83 – 1.25	1.15	0.85 – 1.56
Substance Use														
Current smoking	2.59***	2.41 – 2.78	0.74***	0.66 – 0.84	1.73***	1.46 – 2.04	0.35***	0.30 – 0.41	1.09	0.90 – 1.31	0.43***	0.37 – 0.51	1.94***	1.62 – 2.32
Heavy drinking	0.96	0.82 – 1.13	0.53***	0.41 – 0.70	1.07	0.69 – 1.65	0.33***	0.26 – 0.41	0.84	0.61 – 1.17	0.44***	0.35 – 0.56	1.06	0.68 – 1.65
Binge drinking	1.58***	1.25 – 1.99	0.79	0.60 – 1.04	1.52	0.86 – 2.70	0.42***	0.32 – 0.56	1.28	0.83 – 2.00	0.43***	0.31 – 0.59	1.79*	1.11 – 2.88
Nutrition and Physical Activity														
Obesity	1.59***	1.47 – 1.71	1.66***	1.54 – 1.78	2.37***	2.14 – 2.63	1.32***	1.22 – 1.43	1.78***	1.59 – 2.00	0.59***	0.51 – 0.68	1.76***	1.49 – 2.08
No exercise in past month	2.28***	2.09 – 2.49	2.01***	1.84 – 2.20	3.02***	2.65 – 3.46	2.25***	2.08 – 2.44	2.74***	2.42 – 3.10	1.47***	1.28 – 1.68	2.08***	1.70 – 2.53
Mental Health														

Indicator	NH White Disability		NH Black No Disability		NH Black Disability		Hispanic No Disability		Hispanic Disability		Other Race No Disability		Other Race Disability	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Frequent mental distress	4.82***	4.47–5.19	0.78**	0.66–0.93	3.60***	3.12–4.15	0.70***	0.60–0.82	2.59***	2.21–3.04	0.65***	0.53–0.79	4.29***	3.68–5.01
Inadequate social support[a]	3.47***	2.64–4.56	2.35***	1.69–3.27	5.69***	4.25–7.62	2.14**	1.30–3.52	2.89**	1.35–6.20	1.54	0.96–2.49		
Chronic Conditions														
Diabetes	4.36***	3.48–5.47	2.18***	1.68–2.83	6.91***	5.06–9.44	1.88***	1.42–2.48	3.58***	2.55–5.03	1.89**	1.29–2.76	4.76***	2.85–7.97
Current asthma	2.14***	1.93–2.36	1.18*	1.01–1.37	2.23***	1.87–2.65	0.58***	0.50–0.68	1.65***	1.38–1.97	0.63***	0.52–0.76	2.01***	1.56–2.58
Infections														
Never tested for HIV	0.76***	0.71–0.81	0.48***	0.43–0.52	0.48***	0.40–0.57	0.89***	0.85–0.93	0.81***	0.73–0.90	1.19***	1.13–1.25	0.70***	0.59–0.82
No flu vaccine in past year	1.11***	1.07–1.14	1.13***	1.09–1.16	1.09**	1.02–1.17	1.12***	1.09–1.15	1.18***	1.12–1.24	0.91***	0.86–0.96	1.10*	1.02–1.19

***
p<0.001

**
p<0.01

*
p<0.05

Note: Non-Hispanic White women with no disabilities served as the reference group.

[a]Only four states (Louisiana, Minnesota, Rhode Island, Tennessee) collected data on social support and total sample size for this item was 3,473; the sample size for women with disabilities in the Other Race group was insufficient for reporting estimates on this indicator.

BRFSS=Behavioral Risk Factor Surveillance System; PR=Prevalence Ratio; CI=Confidence Interval

Table 4.

Adjusted Prevalence Ratios (with 95% Confidence Intervals) for Preconception Risk Factors Among Women 18–44 Years Old (BRFSS 2016), N=59,317

Indicator [a]	NH White Disability		NH Black No Disability		NH Black Disability		Hispanic No Disability		Hispanic Disability		Other Race No Disability		Other Race Disability	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
General Health Status														
Fair/poor health	4.68 ***	4.12 – 5.31	1.49 ***	1.26 – 1.76	4.39 ***	3.71 – 5.19	1.99 ***	1.71 – 2.30	4.52 ***	3.87 – 5.28	1.32 *	1.05 – 1.67	4.79 ***	4.01 – 5.72
Social Determinants														
<High school education [b]	1.74 ***	1.46 – 2.08	0.94	0.75 – 1.18	1.75 ***	1.37 – 2.25	2.93 ***	2.54 – 3.37	3.05 ***	2.57 – 3.61	0.62 **	0.46 – 0.84	1.57 **	1.15 – 2.13
Health Care														
No health insurance [c]	1.10	0.96 – 1.27	1.23 **	1.07 – 1.42	1.34 *	1.07 – 1.68	2.21 ***	2.00 – 2.44	1.96 ***	1.69 – 2.28	1.20 *	1.00 – 1.44	1.21	0.89 – 1.64
No checkup in past year	1.00	0.93 – 1.07	0.57 ***	0.52 – 0.63	0.68 ***	0.57 – 0.81	0.84 ***	0.79 – 0.89	0.84 **	0.75 – 0.95	0.87 **	0.80 – 0.95	1.04	0.89 – 1.22
No dental visit in past year	1.34 ***	1.26 – 1.43	1.08 *	1.01 – 1.16	1.32 ***	1.18 – 1.48	0.97	0.91 – 1.04	1.10	1.00 – 1.22	1.11 *	1.01 – 1.22	1.14	1.00 – 1.32
No Pap test in past 3 years	1.26 **	1.09 – 1.46	0.51 ***	0.40 – 0.64	0.51 ***	0.37 – 0.71	0.56 ***	0.46 – 0.67	0.79	0.61 – 1.03	1.07	0.87 – 1.31	0.90	0.66 – 1.22
Substance Use														
Current smoking	1.62 ***	1.50 – 1.76	0.52 ***	0.46 – 0.59	0.88	0.75 – 1.04	0.22 ***	0.18 – 0.25	0.58 ***	0.48 – 0.70	0.50 ***	0.43 – 0.58	1.26 *	1.04 – 1.52
Heavy drinking	1.18	0.99 – 1.40	0.49 ***	0.37 – 0.65	1.23	0.78 – 1.93	0.41 ***	0.32 – 0.53	1.09	0.79 – 1.51	0.44 ***	0.35 – 0.56	1.27	0.80 – 2.01
Binge drinking	1.53 ***	1.20 – 1.94	0.66 **	0.49 – 0.87	1.42	0.79 – 2.56	0.44 ***	0.32 – 0.60	1.27	0.82 – 1.96	0.43 ***	0.31 – 0.60	1.62	0.99 – 2.67
Nutrition and Physical Activity														
Obesity	1.29 ***	1.19 – 1.41	1.47 ***	1.36 – 1.58	1.77 ***	1.57 – 2.00	1.10 *	1.01 – 1.19	1.37 ***	1.22 – 1.54	0.63 ***	0.55 – 0.72	1.46 ***	1.23 – 1.75
No exercise in past month	1.53 ***	1.40 – 1.68	1.66 ***	1.51 – 1.82	1.79 ***	1.55 – 2.07	1.45 ***	1.33 – 1.58	1.59 ***	1.40 – 1.80	1.53 ***	1.34 – 1.75	1.38 **	1.12 – 1.70
Mental Health														
Frequent mental distress	3.92 ***	3.60 – 4.27	0.68 ***	0.57 – 0.80	2.73 ***	2.35 – 3.16	0.62 ***	0.52 – 0.73	2.11 ***	1.78 – 2.49	0.66 ***	0.54 – 0.81	3.51 ***	3.00 – 4.12

Indicator[a]	NH White Disability		NH Black No Disability		NH Black Disability		Hispanic No Disability		Hispanic Disability		Other Race No Disability		Other Race Disability	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Inadequate social support[d]	2.55***	1.93 – 3.37	1.78***	1.27 – 2.50	3.19***	2.17 – 4.70	1.58	0.96 – 2.62	1.73	0.81 – 3.69	1.42	0.90 – 2.25		
Chronic Conditions														
Diabetes	2.52***	1.96 – 3.23	1.86***	1.41 – 2.44	3.29***	2.37 – 4.58	1.39*	1.05 – 1.84	2.03***	1.40 – 2.94	1.94***	1.33 – 2.84	2.61***	1.63 – 4.18
Current asthma	1.83***	1.64 – 2.04	1.10	0.94 – 1.28	1.83***	1.52 – 2.20	0.60***	0.51 – 0.71	1.51***	1.25 – 1.82	0.62***	0.51 – 0.75	1.69***	1.31 – 2.17
Infections														
Never tested for HIV	0.76***	0.71 – 0.80	0.48***	0.44 – 0.53	0.49***	0.41 – 0.59	0.86***	0.82 – 0.90	0.79***	0.72 – 0.88	1.13***	1.08 – 1.19	0.67***	0.57 – 0.79
No flu vaccine in past year	1.05*	1.01 – 1.08	1.06***	1.03 – 1.10	1.00	0.94 – 1.07	1.03	1.00 – 1.06	1.07*	1.02 – 1.12	0.91***	0.86 – 0.96	1.03	0.95 – 1.12

***
p<0.001

**
p<0.01

*
p<0.05

Note: Non-Hispanic White women with no disabilities served as the reference group.

[a] Models are adjusted for age, education, marital status, employment, health insurance, and income unless otherwise noted

[b] Models are adjusted for age, marital status, employment, health insurance, and income

[c] Models are adjusted for age, education, marital status, employment, and income

[d] Only four states (Louisiana, Minnesota, Rhode Island, Tennessee) collected data on social support and total sample size for this item was 3,473; the sample size for women with disabilities in the Other Race group was insufficient for reporting estimates on this indicator.

BRFSS=Behavioral Risk Factor Surveillance System; PR=Prevalence Ratio; CI=Confidence Interval