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Variation in Hysterectomy Prevalence and Trends Among U.S. States and Territories — Behavioral Risk Factor Surveillance System, 2012–2020

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Abstract

Purpose: We estimated up-to-date state- and territory-level hysterectomy prevalence and trends, which can help correct the population at risk denominator and calculate more accurate uterine and cervical cancer rates.

Methods: We analyzed self-reported data for a population-based sample of 1,267,013 U.S. women aged ≥18 years who participated in the Behavioral Risk Factor Surveillance System surveys from 2012 to 2020. Estimates were age-standardized and stratified by sociodemographic characteristics and geography. Trends were assessed by testing for any differences in hysterectomy prevalence across years.

Results: Hysterectomy prevalence was highest among women aged 70–79 years (46.7%) and ≥80 years (48.8%). Prevalence was also higher among women who were non-Hispanic (NH) Black (21.3%), NH American Indian and Alaska Native (21.1%), and from the South (21.1%). Hysterectomy prevalence declined by 1.9 percentage points from 18.9% in 2012 to 17.0% in 2020.

Conclusions: Approximately one in five U.S. women overall and half of U.S. women aged ≥70 years reported undergoing a hysterectomy. Our findings reveal large variations in hysterectomy prevalence within and between each of the four census regions and by race and other sociodemographic characteristics, underscoring the importance of adjusting epidemiologic measures of uterine and cervical cancers for hysterectomy status.

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Author contributions

MS and SVG conceptualized the project. SVG, MCW, and TDT contributed to the methods. SRD and EEA undertook all analyses. EEA prepared figures. SVG wrote the main manuscript text. All authors reviewed and approved the manuscript.

Competing interests

The authors did not report any conflicts of interest.

Keywords

Behavioral Risk Factor Surveillance System; cervical cancer; hysterectomy; prevalence; uterine cancer; women's health

INTRODUCTION

Hysterectomy, which includes the removal of the uterus and often the cervix, is one of the most common nonobstetric surgical procedures among U.S. women [1]. Most hysterectomies are for non-cancerous indications, but approximately 10%–17% are undertaken for gynecologic malignancies [2, 3]. Uterine fibroids, abnormal uterine bleeding, and endometriosis are the most common indications for hysterectomy [4]. In recent years, more hysterectomies have been performed in outpatient settings [4-6]; however, this shift to outpatient hysterectomies may have occurred later among Black women [7].

In the U.S., the prevalence of hysterectomy varies by sociodemographic and geographic characteristics. Previous population-based estimates of hysterectomy prevalence are found to be higher among Black women relative to White women [8, 9]. Even after adjusting for the higher prevalence of uterine fibroids among Black women, the Black-White differences in hysterectomy use remained [10]. Higher estimates have also been observed among women living in the South [11, 12]. In addition, higher levels of hysterectomy have been observed among women with lower income and lower education levels [11].

Hysterectomy includes the removal of the uterus and often the cervix. Women without a uterus or cervix are no longer at risk for these cancers, and thus, hysterectomy reduces the population of women at risk for developing uterine and cervical cancer [13]. Measures of cancer incidence often do not adjust for hysterectomy prevalence; however, correcting for hysterectomy prevalence leads to more accurate estimates of uterine [9] and cervical [14] cancer incidence rates. Due to the limited research on population-level hysterectomy trends and the implications for accurate cancer incidence rates, we provide up-to-date hysterectomy prevalence and patterns for U.S. states, the District of Columbia, Puerto Rico, and Guam.

METHODS

Data

Data from the Behavioral Risk Factor Surveillance System (BRFSS) were analyzed for 1,267,013 respondents aged 18 years or older in even-numbered years from 2012 to 2020, representing 127,885,148 women. Based on previous work [15], we examined data from BRFSS because it included the U.S. territories and had a larger sample size (than the National Health Interview Survey) to better support analyses of hysterectomy estimates for smaller subpopulations. BRFSS is a system of annual landline and cellular telephone surveys of the noninstitutionalized U.S. adult population that collects data at the state and local level. The survey uses random digit dialing techniques on both landline telephones and cell phones to conduct the interviews. BRFSS implemented methodological changes in 2011 involving the addition of cell phone interviews and a new weighting method. Consistent with BRFSS guidance, we did not compare pre-2012 data with post-redesign data [16]. The

BRFSS question on hysterectomy was part of the measure of cervical cancer screening in the core component and was asked by all jurisdictions in even-numbered years from 2012 to 2020. In 2016, the question on hysterectomy status was not asked in eight states, and these data were suppressed in the public-use data set and not included in our analyses. The median survey response rates were 45.2% (2012), 47.0% (2014), 47.1% (2016), 49.9% (2018), and 47.9% (2020). Information about the survey design, sampling, instrument, and data collection methods are available elsewhere [17].

Measures

The prevalence of respondents who reported a hysterectomy (hysterectomy prevalence) was self-reported and defined as "yes" to the following question: "Have you had a hysterectomy?" Approximately 8.9% (n=113,118) of respondents who answered "don't know/not sure" or "refused" or were missing for the hysterectomy status question were excluded from the analyses. Respondents who reported being pregnant at the time of survey administration were recoded as not having a hysterectomy.

Hysterectomy prevalence data were examined by age, race/ethnicity, education level, household income, health insurance status, body mass index, and geography. Race and ethnicity were grouped as non-Hispanic White, non-Hispanic Black, non-Hispanic American Indian or Alaska Native, non-Hispanic Asian or Pacific Islander, and Hispanic. A participant's education level was characterized as either less than high school, high school or GED, some college, or college graduate. Household income was categorized into five groups: <$15,000, $15,000–$24,999, $25,000–$34,999, $35,000–$49,999, and ≥$50,000. Health insurance status was characterized as yes for women who reported having any type of health coverage. Body mass index was expressed per kg/m^2 and categorized into the following predefined categories: <18.5, 18.5–24.9, 25.0–29.9, and ≥30.0.

In addition, hysterectomy prevalence was estimated for all U.S. states, the District of Columbia, Puerto Rico, and Guam. Geographic area was also categorized by the four U.S. census regions and nine divisions: Northeast region (New England and Middle Atlantic divisions), Midwest region (East North Central and West North Central divisions), South region (South Atlantic, East South Central, and West South Central divisions), and West region (Mountain and Pacific divisions).

Analysis

Weighted hysterectomy prevalence with 95% confidence intervals (CI) was estimated. All estimates were age-standardized to the 2000 U.S. standard population using the direct method. The absolute change in hysterectomy prevalence between 2012 and 2020 was calculated as the difference in the weighted proportion between the two years and presented with 95% CI. Wald F tests were used to test for any differences in age-standardized estimates of hysterectomy prevalence across years. The increase or decrease in prevalence was considered significant if the *P* value was less than an alpha of 0.05. Sampling design parameters, such as stratification, clustering, and weighting, were specified using SAS-callable SUDAAN (version 9.4), which accounted for the complex sampling design and nonresponse. Figures were developed using R (version 4.0.3).

Ethics

This study did not require institutional review board approval because it involved analyses of publicly available, fully deidentified data.

RESULTS

From 2012 to 2020, the age-standardized hysterectomy prevalence among adult U.S. women was 17.9% (95% CI: 17.8%, 18.0%) (Table 1). Age-specific hysterectomy prevalence steadily increased with each consecutive age group and was highest among women aged ≥80 years (48.8%). The prevalence of hysterectomy varied by race and ethnicity, with the highest estimates reported among women who were non-Hispanic (NH) Black (21.3%) and NH American Indian and Alaska Native (AI/AN) (21.1%). Estimates were also higher among women with a BMI ≥30 kg/m^2 (21.2%) and an annual household income of <$15,000 (20.4%).

Hysterectomy prevalence declined from 18.9% in 2012 to 17.0% in 2020 (−1.9; 95% CI: −2.3, −1.5). The decline was largest among women aged 60–69 years (−6.1%; 95% CI: −7.4%, −4.7%).

Overall hysterectomy prevalence varied by U.S. state and territory, and age-standardized estimates ranged from 11.0% (Guam) to 29.2% (Alabama). Hysterectomy prevalence was considerably higher in the South (21.1; 95% CI: 20.9, 21.4) compared to the other three census regions (Appendix Table 1). However, prevalence varied by state within each of the four census regions; in the South region, prevalence ranged from 11.7% in the District of Columbia to 29.2% in Alabama. Estimates declined from 2012 to 2020 for most states and territories (Supplementary File 1), with the largest decline observed in Guam (absolute percent change: −7.0, 95% CI: −10.8, −3.2) and Oregon (absolute percent change: −4.7, 95% CI: −6.7, −2.6) (Figure 1).

DISCUSSION

Approximately one in five women, and half of the women aged 70 years and older, reported undergoing a hysterectomy in the U.S. Our results show that hysterectomy prevalence remained high in 2020, with modest declines in recent years, consistent with national trends [12, 18]. The main reason for the decline might be the increased availability and adoption of alternative options to hysterectomy, reflecting a shift in clinical practices and patient preferences. Some of these treatment alternatives to hysterectomy are less invasive (including nonsurgical management options) [19], safer [20], and cost-effective [21]. Additional reasons for the declining trend may include improvements in symptom management [22] and increased preference for organ and fertility preservation [23].

Despite a reduction in hysterectomy prevalence, estimates remained higher among Black and AI/AN women. Racial inequities in hysterectomy are often attributed to higher rates of non-cancerous gynecologic conditions [10, 24] and poorer access to quality gynecologic care and alternative treatments [25]. Hysterectomy as a method of forced surgical sterilization disproportionately impacted Black, Native American, and Hispanic

women [26, 27]. In addition, many women with lower incomes and who were Black underwent unnecessary hysterectomies as practice for medical students at select teaching hospitals [28]. In a qualitative study, Black women have also reported that alternative management options to hysterectomy were not offered by clinicians [29], which may signal the implicit racial bias among healthcare professionals and its influence on care.

Hysterectomy prevalence among NH Black and NH AI/AN women was highest in the South region, especially in the East South Central and West South Central regions (Supplementary File 2). These findings highlight the importance of understanding racial patterns in hysterectomy by geography, particularly when prevalence can be used to correct uterine and cervical cancer rates. Furthermore, states with a higher prevalence of hysterectomy were mostly concentrated in the South region, especially in the East South Central division, which includes Alabama (29.2%) and Mississippi (27.8%), and West South Central division, which includes Louisiana (27.4%) and Arkansas (27.0%). However, even within the South (and other census regions), there was a wide variation in hysterectomy prevalence among states, indicating within-region variation. The inter-region and within-region variation in hysterectomy prevalence can be considered in future geographic analyses.

The findings in this report are subject to several limitations. Hysterectomy status was self-reported; however, previous studies have found high agreement of self-reported hysterectomy history with clinical confirmation [10] and administrative records [30]. Nonresponse bias could stem from systematic differences between respondents and nonrespondents. To minimize the potential impact of nonresponse, BRFSS implemented raking as a weighting methodology to adjust for nonresponse [16]. The 95% CIs of state-and territory-specific estimates were wide due to limited sample sizes. Finally, estimates by hysterectomy indication (non-cancerous or cancerous) were not ascertained in the survey. Despite these limitations, our analyses benefited from the most recent survey year available and a large, population-based sample that included data from Puerto Rico and Guam.

This study provides a better understanding of hysterectomy prevalence by sociodemographic and geographic characteristics, and our findings can be used to understand the changes in hysterectomy prevalence over time, provide estimates for risk prediction models of gynecologic cancers, and inform future research on corrections of population-based measures. The findings from this study indicate that overall hysterectomy prevalence declined slightly in recent years but remained high among NH Black and NH AI/AN women and women from the South, especially in the East and West South Central divisions. These findings also highlight the importance of understanding variations in hysterectomy prevalence within and between each of the four census regions and adjusting for hysterectomy prevalence whenever uterine and cervical cancer incidence rates and patterns are examined over time and by sociodemographic characteristics.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data availability

Behavioral Risk Factor Surveillance System data are publicly available.

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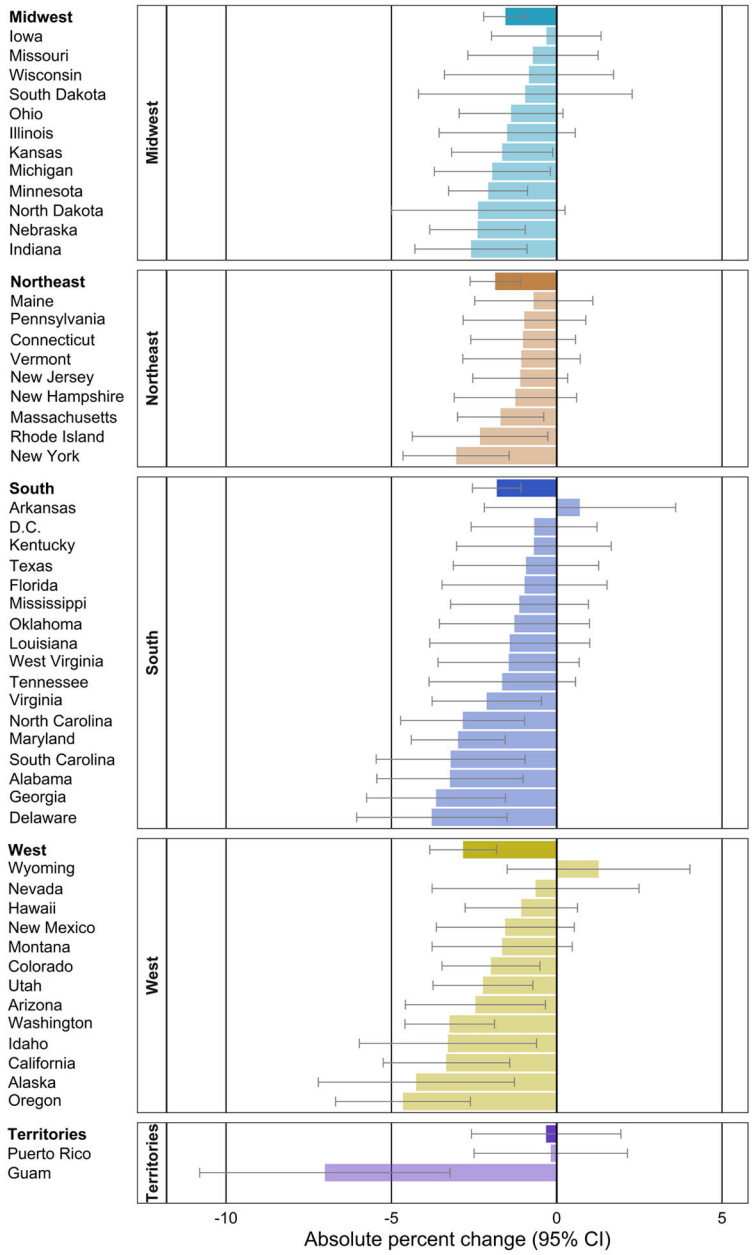

Figure 1. Absolute change[a] in age-standardized[b] prevalence of self-reported hysterectomy from 2012 to 2020 among adult women aged ≥18 years, by U.S. state and territory—Behavioral Risk Factor Surveillance System.

Abbreviations:

CI: confidence interval; DC: District of Columbia

Notes:

a. Absolute percent change = hysterectomy prevalence in 2020 – hysterectomy prevalence in 2012.

b. Age-standardized to the 2000 U.S. standard population using the direct method.

Table 1.

Age-specific and age-standardized[a] prevalence and patterns of self-reported hysterectomy among adult women aged ≥18 years, by selected characteristics —Behavioral Risk Factor Surveillance System, United States, 2012–2020.

Characteristics	No.[b]	Weighted % (95% CI)	Absolute percent change 2020 – 2012 (95% CI)[c]	*P* value (any difference across years)[d]
Overall	333,362	17.9 (17.8, 18.0)	−1.9 (−2.3, −1.5)	<.0001
Survey years				
2012	79,607	18.9 (18.6, 19.1)	–	–
2014	75,260	18.6 (18.3, 18.8)	–	–
2016	63,620	18.0 (17.7, 18.3)	–	–
2018	62,020	17.3 (17.0, 17.6)	–	–
2020	52,855	17.0 (16.6, 17.3)	–	–
Age groups (years)				
18-29	743	0.6 (0.5, 0.6)	−0.2 (−0.4, 0.1)	0.0218
30-39	6,918	4.6 (4.4, 4.8)	−1.1 (−1.7, −0.5)	0.0006
40-49	25,701	15.8 (15.4, 16.1)	−1.6 (−2.7, −0.4)	0.0009
50-59	63,076	27.5 (27.1, 27.9)	−2.2 (−3.6, −0.7)	0.0001
60-69	94,652	36.3 (35.9, 36.7)	−6.1 (−7.4, −4.7)	<.0001
70-79	88,740	46.7 (46.2, 47.2)	−4.8; (−6.5, −3.1)	<.0001
≥80	53,532	48.8 (48.1, 49.5)	−0.1 (−2.4, 2.3)	0.5300
Missing [no. (%)][e]	0 (0%)			
Race / Ethnicity				
Non-Hispanic White	266,811	18.4 (18.3, 18.5)	−1.7 (−2.2, −1.3)	<.0001
Non-Hispanic Black	31,329	21.3 (20.9, 21.7)	−1.5 (−2.9, −0.1)	0.0105
Non-Hispanic AI/AN	4,510	21.1 (20.0, 22.2)	−1.9 (−5.5, 1.7)	0.3755

Characteristics	No.[b]	Weighted % (95% CI)	Absolute percent change 2020 – 2012 (95% CI)[c]	*P* value (any difference across years)[d]
Non-Hispanic Asian	2,279	8.9 (8.0, 9.9)	−4.0 (−6.5, −1.5)	0.0003
Non-Hispanic NHPI	605	16.2 (13.5, 19.3)	−0.4 (−7.1, 6.3)	0.1095
Hispanic	16,778	15.0 (14.5, 15.4)	−1.8 (−3.3, −0.2)	0.0259
Missing [no. (%)][e]	4,099 (1.2%)			
Education level				
Less than high school	31,484	19.7 (19.3, 20.2)	−3.0 (−4.4, −1.5)	<.0001
High school or GED	109,993	20.1 (19.8, 20.4)	−1.7 (−2.6, −0.8)	<.0001
Some college or technical college	102,283	19.6 (19.3, 19.8)	−1.1 (−1.9, −0.3)	0.0043
College graduate	88,903	13.4 (13.3, 13.6)	−1.4 (−2.0, −0.9)	<.0001
Missing [no. (%)][e]	699 (0.2%)			
Household income				
<$15,000	38,651	20.4 (20.0, 20.8)	−2.6 (−4.1, −1.1)	0.0001
$15,000–$24,999	60,430	20.1 (19.8, 20.5)	−1.7 (−2.8, −0.5)	0.0011
$25,000–$34,999	35,764	19.5 (19.0, 20.0)	−1.6 (−3.2, 0.0)	0.0454
$35,000–$49,999	40,692	18.8 (18.4, 19.2)	−0.9 (−2.2, 0.4)	0.7555
≥$50,000	95,486	16.0 (15.8, 16.2)	−1.4 (−2.0, −0.7)	0.0004
Missing [no. (%)][e]	62,339 (18.7%)			
Health insurance status				
Yes	317,820	18.1 (18.0, 18.3)	−1.8 (−2.2, −1.4)	<.0001
No	14,820	15.4 (14.8, 16.0)	−3.3 (−5.1, −1.5)	0.0001
Missing [no. (%)][e]	722 (0.2%)			
Body mass index (kg/m^2)				
<18.5	5,951	16.2 (15.1, 17.5)	−3.0 (−5.8, −0.3)	0.1036

Characteristics	No.[b]	Weighted % (95% CI)	Absolute percent change 2020 – 2012 (95% CI)[c]	*P* value (any difference across years)[d]
18.5–24.9	96,029	15.2 (15.0, 15.4)	−1.5 (−2.2, −0.8)	<.0001
25.0–29.9	102,252	18.1 (17.9, 18.4)	−2.0 (−2.8, −1.2)	<.0001
≥30.0	106,226	21.2 (20.9, 21.4)	−2.4 (−3.3, −1.6)	<.0001
Missing [no. (%)][e]	22,904 (6.9%)			

Abbreviations:

AI/AN, American Indian and Alaska Native; CI, confidence interval; GED, General Educational Development; NHPI, Native Hawaiian and Pacific Islander.

Notes:

[a.] Age-standardized to the 2000 U.S. standard population using the direct method.

[b.] Unweighted number of respondents who reported a hysterectomy.

[c.] Absolute percent change = hysterectomy prevalence in 2020 – hysterectomy prevalence in 2012.

[d.] *P* value = testing for any difference across years were calculated using Wald F tests.

[e.] Includes don't know, not sure, and refused.