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Hysterectomy and Disability Among U.S. Women

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Abstract

CONTEXT—Hysterectomies are the second most common surgery performed on women in the United States, and most are done for elective reasons. Although women with disabilities appear to have an increased risk of undergoing the procedure, little research has evaluated the relationship between disability and hysterectomy.

METHODS—Data on 42,842 women aged 18 or older from the 2000, 2005 and 2010 National Health Interview Surveys were used to evaluate the relationship between disability and the risk of having a hysterectomy over the life course. Piecewise exponential event history models were estimated to identify associations between timing of disability onset, type of disability, and the occurrence and timing of hysterectomy.

RESULTS—Women with multiple disabilities experienced a higher risk of undergoing a hysterectomy than women with no disability (hazard ratio, 1.3), and this heightened risk was concentrated at younger ages. During their 20s, 30s and early 40s, women who had multiple disabilities were more likely to have had a hysterectomy than their same-age counterparts with no or one disability (1.3–2.4). Women with a single type of disability, as well as most women who had multiple disabilities and were aged 46 or older, were not at increased risk of having had a hysterectomy.

CONCLUSIONS—Additional research is needed to investigate why young women with multiple disabilities appear to face an increased risk of having a hysterectomy, especially because it is major surgery that can carry significant health risks.

Approximately 600,000 hysterectomies are performed annually in the United States, and this surgery is the second most common—after cesarean section—among women of reproductive age.[1] Hysterectomy is a major operation, involving the removal of the uterus, cervix, fallopian tubes or ovaries, and can lead to serious complications.[2,3] Nevertheless, about 90% of hysterectomies are performed for elective reasons.[*1] When reviewed by a panel of physician experts, about 70% of elective hysterectomies were found to carry at least as many risks as benefits.[4]

Hysterectomy receipt is socially patterned. Women with a high school education or less undergo hysterectomies at much higher rates than women with more education.[5–7] In addition, women reporting relatively lower levels of income and those working in low-status occupations are far more likely to have hysterectomies than are their counterparts with higher incomes or better jobs.[5–7] Whites and blacks have an identical risk of getting a hysterectomy, whereas Hispanics and women of other races or ethnicities have a lower risk of having one.[5–8]

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[*]A hysterectomy is considered to be elective when done for a nonemergency or nononcological reason (source: Leape LL et al., *Hysterectomy: Clinical Recommendations and Indications for Use*, Santa Monica, CA: RAND, 1997).

The association between disability and having a hysterectomy has not been thoroughly considered in previous research. The health of women with disabilities in general has received relatively little attention,[9,10] even though these women may be more vulnerable than others to adverse consequences of inadequate health care access.[11–13] Indeed, they frequently face multiple forms of inequality that put them at a health disadvantage relative to other women—like low socioeconomic status and depression.[14,15]

Evidence suggests that women with varied types of disability are at heightened risk of having a hysterectomy, and that they may have a relatively high risk of hysterectomy at young ages. In 2001, Nosek and colleagues[16] found that women with mobility limitations have hysterectomies at higher rates than women without such disabilities. Findings from their in-depth interviews suggest that some women with mobility limitations face pressure from family members and medical professionals to undergo elective hysterectomy, even if they wish to have children someday. Although the Nosek et al. study provides the best evidence to date on the relationship between disability and risk of hysterectomy, it has several shortcomings: Hysterectomy rates were calculated from a national convenience sample; the focus was exclusively on women with mobility limitations; and the analysis did not adjust for potentially confounding variables, like education and income.

Historically, institutionalized women with disabilities and women with cognitive or multiple disabilities have been frequent targets of eugenics campaigns. The majority of women who involuntarily underwent hysterectomies at the height of the U.S. eugenics movement were institutionalized women who had disabilities.[17–19] Medical ethics controversies in the past decade suggest that some young women with severe cognitive disabilities still have hysterectomies at the request of their parents to eliminate menstruation and ease caregiving burdens.[20–23]

This study sought to expand our understanding of the relationship between disability and hysterectomy in several ways. First, it used data from the National Health Interview Survey (NHIS), the only nationally representative survey to include retrospective measures of the timing and type of disability, as well as the timing of hysterectomy. Second, it employed multivariate regression analysis to explore the relationship between disability and having a hysterectomy, and to assess whether the risk of hysterectomy varies by disability type. Third, it used a series of event history regressions to investigate whether the risk of undergoing a hysterectomy faced by women with disabilities, and by women with multiple disabilities in particular, changes over the life course.

METHODS

Data and Sample

Data for this study come from the pooled 2000, 2005 and 2010 samples of the NHIS, downloaded from the Integrated National Health Interview Series project.[24] The NHIS is an annual survey that collects a core set of data on demographic and socioeconomic characteristics, receipt of health care services and functional limitations for each person in a sampled household. In 2000, 2005 and 2010, the NHIS also fielded a cancer control module, which was administered only to recipients of the sample adult questionnaire; this module included questions about whether respondents had had a hysterectomy and, if so, when. Information about hysterectomies was not otherwise collected by the NHIS. The current study combines information from the person, sample adult and cancer control files to create a unique data set on hysterectomy and characteristics associated with it.

Although the data are cross-sectional, it is possible to construct a longitudinal data set appropriate for event history analysis from a handful of the available variables: age, the

timing of disability onset, the timing of hysterectomy and the timing of first birth. All women who completed the cancer control module were 18 or older at the time, but they could report events that had occurred at any point before the survey. Theoretically, one could estimate the relationship between hysterectomy risk and disability beginning at birth, but for the purposes of this analysis, each woman's exposure to the risk of undergoing a hysterectomy begins at age 15—the earliest age at which the Centers for Disease Control and Prevention's hysterectomy surveillance statistics are collected.

Because hysterectomies are sometimes prescribed to address severe health problems affecting the genitourinary system, the same conditions that elevate a woman's risk of hysterectomy could also lead to disability. In such cases, the relationship between disability and the risk of undergoing a hysterectomy would be overstated.

The analytic sample included all women who completed the cancer control module, with two categories of exceptions. The first excluded group consisted of women who had ever received a diagnosis of any condition that may affect the uterus, fallopian tubes or ovaries and hence were at risk of undergoing a medically necessary hysterectomy, as well as those who had already had such a hysterectomy. The relevant conditions include any type of cancer*—regardless of whether it resulted in a functional limitation—and functional limitations resulting from cancer, pregnancy or a genitourinary problem. On the basis of this criterion, 4,365 women were excluded from the sample, the majority of whom had received a diagnosis of cancer (3,972). The second excluded group were the 3,683 women who were missing information about hysterectomy and timing, disability or any control variable; most of them had responded "I don't know" or refused to provide information on hysterectomy and timing. These restrictions yielded a final sample size of 42,842 women, 12,791 of whom had experienced disability onset prior to having had a hysterectomy.

Measures

Dependent variable—The dependent variable was the occurrence and timing of undergoing a hysterectomy. Information from the cancer control module was used to construct a time-varying, dichotomous indicator that is zero until the time interval in which a woman underwent a hysterectomy.

Disability variables—The key independent variable was women's reporting of disability. Disability is a complex concept, and as other authors have noted,[15] not only is it difficult to measure, but the measures available in most nationally representative surveys do not adequately capture contemporary conceptualizations of disability. The current study used the definition proposed by Verbrugge and Jette: "experienced difficulty doing activities in any domain of life … due to a health or physical problem."[25(p. 4)] For both the person and the sample adult files, the NHIS collects information on whether respondents experience difficulty in or need help with performing a number of tasks (e.g., self-care activities, such as bathing or eating; walking a quarter of a mile; participating in social activities). If participants report any difficulty or needing help, interviewers ask what mental or physical condition causes the limitation and when that condition began. Respondents were allowed to report multiple conditions for each limitation.

To measure disability, all survey items on functional limitations and their causes were used. These included a set of items from the NHIS person file that capture information about

*Women who had received a diagnosis of any type of cancer were excluded because it was possible that a reported "other" cancer might affect the genitourinary system, and the NHIS may have recoded some responses into this category because of the small number of cases. In supplemental analysis that included women with nongenitourinary cancers (not shown), results were the same as those reported here.

whether individuals need help because of a physical, mental or emotional problem, as well as a set of items from the sample adult file that indicate whether respondents have difficulty performing activities by themselves and without special equipment. For the current analysis, the definition of disability had an additional restriction: To be classified as having a disability, women must have experienced its onset before they had a hysterectomy (i.e., when they were "at risk"). Those who had a disability that began after they underwent a hysterectomy remained in the analysis, but they were treated as not having a disability.

Three measures of disability were constructed, each tailored to answer one of the three research questions guiding this study. The first question asked whether women with any type of disability were more likely than other women to undergo a hysterectomy. To answer this question, disability was measured as a time-varying, dichotomous variable that indicated whether a woman had a functional limitation owing to a mental or physical condition in a given time interval.*

The second research question asked whether the relationship between disability and hysterectomy differed by disability type. To construct categories of disability type, this study used information about the mental or physical conditions that respondents reported as causing their functional limitations. On the basis of the number of cases of each disability type and whether previous studies had suggested that having a particular type may heighten the risk of hysterectomy,* this study disaggregated disability into six categories (each a time-varying, dichotomous variable): sensory, cognitive or developmental disability, or mental illness; musculoskeletal disability; arthritis-related disability; other disability; multiple disabilities; and no disability.*

In preliminary analyses, women with multiple disabilities experienced a heightened risk of undergoing a hysterectomy relative to all other women. Thus, the third research question explored whether this increased risk was constant over the life course. To address this question, the study used a simplified variable, which consisted of a single time-varying, dichotomous variable that indicated whether women had multiple disabilities in a given time interval; this approach created interaction terms between the multiple disability indicator and each interval.

Independent variables—All of the multivariate event history models also controlled for other independent variables, most of which have been associated with hysterectomy: education, birth year, incidence and timing of first birth, race or ethnicity, and survey wave. Education was measured as a time-varying variable with four categories: less than high school, high school graduate, some college and college graduate. Lower levels of education have been associated with an increased risk of hysterectomy,[5–7] and people with disabilities are more likely than others to have no more than a high school education.[15] In addition, childbearing at age 21 or younger has been positively associated with having a

*Information on when a functionally limiting mental or physical condition began was used as an approximation of when the limitation began even though the onset of a limitation may not be immediate. Unfortunately, the 2000, 2005 and 2010 waves of the NHIS collected information about when the condition, rather than the limitation, began.

*For example, historical accounts[17–19] suggest that cognitive disability and disabilities associated with high rates of institutionalization should be considered separately from other kinds of disability. However, because very few women in the NHIS sample reported mental illness or cognitive, developmental or sensory disabilities, and because women with these types of disabilities are more likely to experience onset early in life and to be at a higher risk of institutionalization relative to women with other types, this study used a category combining these types.

*The first disability category includes limitations that necessitate help in performing activities, or involve difficulty in performing activities without special equipment, as a result of difficulty or inability to see or hear; a birth defect; mental retardation; some other developmental problem; senility or dementia; depression, anxiety or an emotional problem; an alcohol or drug problem; or some other mental problem. The "other" disability category involves diverse conditions, such as nervous system conditions, digestive conditions and blood problems.

hysterectomy.[6,7] Evidence also suggests that women of reproductive age are more likely to have undergone a hysterectomy during the middle part of the 20th century than earlier or later in the century;[1,26–28] hence, models adjusted for the woman's birth year to capture the differing risk of hysterectomy across cohorts. Minority women do not experience a heightened risk of having a hysterectomy relative to white women,[5] and Hispanics have lower rates of hysterectomy than whites.[8] Nevertheless, multivariate models adjusted for race and ethnicity to capture unseen distinctions. To account for potential differences in historical context, models also included binary variables for the survey year.

Analysis

Two-tailed t tests were used to determine whether hysterectomy experience and demographic, socioeconomic and other characteristics differed by disability status. To investigate some puzzling bivariate relationships between disability and hysterectomy, this study also estimated the age-specific hazard of hysterectomy by disability status. Smoothed instantaneous hazard rates were obtained using a Gaussian kernel smoother.[29]

The study then estimated a series of piecewise exponential event history models to examine the relationship between disability and the probability and timing of hysterectomy. Piecewise exponential models are a variant of event history models that allow researchers to relax some of the assumptions of standard event history models. Event history models with a continuous time scale assume that the hazard of an event and any difference in the hazard between groups remain unchanged over time.[30] However, evidence from surveillance statistics indicates that the hazard of hysterectomy increases with age[1,25–27] (violating the first assumption), and preliminary explorations suggested that the difference in the hazard by disability status disappears at later ages (violating the second assumption). Piecewise exponential event history models allow these assumptions to be relaxed because they break the time scale into intervals. The key assumption that must be satisfied in setting up these models is that the hazard is more similar within a given time interval than it is across time intervals.[30] Hence, 14 dichotomous age-group variables were created, representing five-year intervals from ages 15 to 85 (the NHIS top code). The use of five-year intervals is a common choice for studying demographic and health outcomes, largely because this approach provides a small enough number of age intervals for table display and analysis, yet yields intervals that are brief enough that one can reasonably assume that the risk of experiencing certain outcomes is constant within the interval.

Three sets of piecewise exponential event history models were estimated, one to address each study question. The first model examined whether women with any disability are at elevated risk of having a hysterectomy; it controlled for the dichotomous disability measure, all of the control variables and the 14 variables representing the five-year age-groups. The second model assessed whether the hazard of hysterectomy varied by disability type. In addition to controlling for the previous variables, this model also adjusted for dichotomous variables for each disability type, and used "no disability" as the reference category. Finally, to evaluate whether the risk of hysterectomy changed by age, a set of models were estimated that included only a dichotomous variable for having multiple disabilities and interaction terms between that variable and each age-group. For these models, the reference category was women in that age-group who had no or one disability.

In all multivariate models, two-tailed t tests were used to assess the statistical significance of each hazard ratio. All bivariate and multivariate analyses used the NHIS sample adult weights to adjust for the complex survey design, and were conducted in Stata version 12.1.

RESULTS

Descriptive and Bivariate Findings

Among women aged 18 or older, 30% have some sort of disability. Twelve percent of women with disabilities have had a hysterectomy, compared with 19% of women without disabilities (Table 1).

Of respondents who reported having a disability, 5% have only a sensory, cognitive or developmental disability, or mental illness; 32% have a musculoskeletal disability; 14% have functionally limiting arthritis; 18% have some other kind of disability; and 31% have at least two disabilities.* Women with disabilities have attained a significantly lower level of education than other women. For example, 21% of those with disabilities have less than a high school diploma, compared with 14% of those without disabilities; 19% and 28%, respectively, have graduated from college.

Women with disabilities were born earlier in the 20th century, on average, than other women (mean birth year, 1954 vs. 1963). They also were more likely to have had at least one birth (78% vs. 70%), and were about a half year younger at first birth. Respondents with disabilities were more likely than others to be white (73% vs. 69%), and less likely to be Hispanic (10% vs. 13%) or of other race or ethnicity (4% vs. 6%). Finally, women who reported a disability were more likely than others to be interviewed in 2010 than earlier.

Additional nonparametric analysis showed that women are at the greatest risk of having a hysterectomy between the ages of 40 and 50 (not shown). The risk is higher at all ages for women with disabilities than for those with none, though at older ages the risks for the two groups converge.

Multivariate Findings

In multivariate analysis that controlled for background characteristics and survey year, women who reported having any disability were more likely than others to have had a hysterectomy (hazard ratio, 1.1—Table 2). Compared with women aged 41–45, those aged 15–35 had a considerably reduced risk of having a hysterectomy (0.2–0.6), as did those aged 51–85 (0.1–0.5). Respondents in the 36–40 and 46–50 age-groups also had reduced risks, but these were less dramatic (0.8 each).

All of the control variables except survey year were associated with hysterectomy. The later women's birth year, the lower their risk of hysterectomy (hazard ratio, 0.99). Respondents who had given birth were more likely than others to have had a hysterectomy (2.4). Hispanics and women of other racial or ethnic background were less likely than whites to have undergone a hysterectomy (0.6 for each), whereas blacks and whites had a similar risk. Finally, compared with college graduates, those with less education had an elevated risk of hysterectomy (1.4–2.5).

In the second model, no single disability type was associated with hysterectomy risk, but women with multiple disabilities experienced a higher risk than women with no disabilities (hazard ratio, 1.3). Thus, results from the binary disability model appear to have been driven entirely by the higher risk associated with having multiple disabilities. Other findings in the second model were similar or identical to those in the first.

*Forty-two percent of women with multiple disabilities have a sensory, cognitive or developmental disability, or mental illness; 67% a musculoskeletal disability; 63% an arthritis-related disability; and 20% some other type of disability.

The final model, which included interaction terms between the multiple disability variable and each age-group, demonstrated that the association between hysterectomy and multiple disabilities was not constant across the life course, but was concentrated at younger ages (Table 3). Throughout their 20s, 30s and early 40s, women with multiple disabilities were more likely to have had a hysterectomy than their same-age counterparts with no or one disability. The largest differential was at ages 21–25 (hazard ratio, 2.4). The only other age at which women with multiple disabilities had an elevated risk of hysterectomy was 66–70 (1.8).

DISCUSSION

This is the first nationally representative study to investigate the relationship between disability and hysterectomy. The analysis found that women with multiple disabilities between the ages of 21 and 45—and especially 21–25-year-olds—face a greater risk of hysterectomy than their same-age peers with no or one disability. These findings suggest that disability merits attention as a potential risk factor for hysterectomy. By disaggregating types of disability and considering the timing of disability and hysterectomy, the present analysis found that women with a single type of disability are not at elevated risk of undergoing a hysterectomy, nor are most women with multiple disabilities who are 45 or older.

Results from the current study partially support the findings of previous research suggesting that women with several types of disabilities, particularly cognitive ones, face an increased risk of hysterectomy.[16–19] Although the present study found that women with multiple disabilities were at a heightened risk, because of insufficient sample sizes, it was not possible to empirically test whether women with only a cognitive disability were at an increased risk. However, no single disability type—including the category that combined sensory, cognitive and developmental disabilities and mental illness—was associated with hysterectomy risk.

Previous research has also suggested that young women with disabilities are at an especially high risk of having a hysterectomy.[16–19] The current study supports this claim, although only for women with multiple disabilities. These findings are consistent with the claim that young women with disabilities face pressure to undergo hysterectomy to manage menstruation or prevent pregnancy, but they do not rule out alternative explanations for observed relationships. Research exploring the circumstances under which young women with multiple disabilities undergo hysterectomies would provide important insights into the relationship between hysterectomy and disability. However, testing hypotheses about whether young women with disabilities experience such pressure is beyond the scope of the current study and the NHIS data.

Limitations

The present study has a number of limitations. First, the NHIS hysterectomy questions rely on self-reports and are retrospective; hence, estimates using these measures may be skewed by recall bias and subject to heaping (i.e., respondents may be likely to report years at the middle or end of a decade as the year in which their hysterectomy was received). The result may be an underestimate of the relationship between disability and the timing of hysterectomy, also known as attenuation bias. Nevertheless, the NHIS includes rich data on disability, health care, demographic and socioeconomic characteristics that are not available from in-patient hospital records. Furthermore, supplementary analyses found that although the incidence of self-reported hysterectomy in this study was systematically lower than the incidence of hysterectomy estimated from national in-patient records,[1,26–28] the estimated

incidence rates were similar in magnitude across the two sources (results available upon request).

Second, analysis was limited to a noninstitutionalized population of women, so the potentially higher risk of hysterectomy faced by institutionalized women was not captured. Third, the NHIS data reveal nothing about the circumstances in which women underwent hysterectomy. Future qualitative research could clarify the decision-making context for hysterectomy among women with disabilities. A final limitation is that, because the public-use version of the NHIS does not reveal respondents' state of residence at the time of survey, and the state a woman resided in at the time of her hysterectomy is unknown, it was impossible to place women in their local policy contexts. This is important because some states have allowed, or even required, sterilization via hysterectomy in some situations. Compulsory sterilization laws covering people with disabilities existed in 25 states in the early 20th century,[17] and sterilization of people with mental disabilities without their consent is still permitted in 12 states (including Virginia, Connecticut and Washington), by either court precedent or legal statute.[31,32] Other research should examine the state policy context regarding involuntary sterilization.

Conclusions

These findings contribute to a broader body of work that seeks to explain why elective hysterectomies are so common among U.S. women. The increased risk of hysterectomy found among young women with multiple disabilities has important implications for their health, as hysterectomy is major surgery that can carry significant risks. Indeed, hysterectomies performed for benign conditions for which alternative treatment options are available but have not yet been tried are considered inappropriate by panels of expert physicians,[4,33] and one study in southern California found that 70% of the hysterectomies performed were inappropriate.[32] Furthermore, the ethics committee of the American College of Obstetricians and Gynecologists has released a statement discouraging hysterectomy for the purpose of contraception or easing of caregiving burdens.[23] Additional research is needed to further explore why young women with multiple disabilities are at an elevated risk of having a hysterectomy.

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TABLE 1

Selected characteristics of women aged 18 or older, by disability status, National Health Interview Survey, 2000, 2005 and 2010

Characteristic	Any disability (N=12,791)	No disability (N=30,051)
Has had hysterectomy ***	11.5	18.6
Disability type		
Sensory/cognitive/developmental/mental	5.3	na
Musculoskeletal	31.8	na
Arthritis-related	14.4	na
Other	17.6	na
Multiple	30.8	na
None	na	100.0
Education		
<high school ***	20.7	13.5
High school ***	30.3	27.9
Some college	30.3	30.9
College ***	18.8	27.7
Birth year (mean) ***	1954.2	1962.7
Has had live birth ***	77.5	69.7
Age at first birth (mean) ***	22.7	23.3
Race/ethnicity		
White ***	72.7	68.8
Black	12.6	12.4
Hispanic ***	10.4	13.1
Other ***	4.2	5.7
Survey year		
2000 ***	29.3	33.2
2005	32.6	33.5
2010 ***	38.1	33.2

*** p<.001.

Notes: All figures are population-weighted, and are percentages unless indicated otherwise. Because of rounding, percentage distributions may not add to 100.0. Two-tailed t tests were used to identify significant differences between women with any disability and those with none.

na=not applicable.

TABLE 2

Hazard ratios (and 95% confidence intervals) from piecewise exponential event history models assessing the likelihood that women with selected characteristics have had a hysterectomy, by disability status

Characteristic	Any disability	Disability type
Disability type		
Any	1.14 (1.06–1.22)**	na
Sensory/cognitive/developmental/mental	na	0.76 (0.55–1.06)
Musculoskeletal	na	1.01 (0.87–1.18)
Arthritis-related	na	1.05 (0.89–1.24)
Other	na	0.95 (0.79–1.13)
Multiple	na	1.30 (1.20–1.42)***
None (ref)	1.00	1.00
Birth year	0.99 (0.99–0.99)***	0.99 (0.99–0.99)***
Has had live birth	2.42 (2.23–2.62)***	2.41 (2.23–2.62)***
Race/ethnicity		
White (ref)	1.00	1.00
Black	0.99 (0.91–1.08)	0.99 (0.91–1.07)
Hispanic	0.55 (0.49–0.60)***	0.55 (0.49–0.60)***
Other	0.55 (0.47–0.65)***	0.55 (0.47–0.65)***
Education		
<high school	2.54 (2.30–2.82)***	2.53 (2.28–2.80)***
High school	1.60 (1.46–1.76)***	1.60 (1.46–1.75)***
Some college	1.42 (1.30–1.56)***	1.42 (1.29–1.56)***
College (ref)	1.00	1.00
Survey year		
2000 (ref)	1.00	1.00
2005	1.03 (0.97–1.10)	1.03 (0.97–1.09)
2010	1.06 (0.98–1.14)	1.05 (0.98–1.13)
Age-group		
15–20	0.40 (0.37–0.44)***	0.40 (0.36–0.44)***
21–25	0.16 (0.13–0.18)***	0.15 (0.13–0.18)***
26–30	0.39 (0.35–0.44)***	0.39 (0.35–0.44)***
31–35	0.57 (0.52–0.62)***	0.57 (0.51–0.62)***
36–40	0.82 (0.75–0.90)***	0.82 (0.75–0.90)***
41–45 (ref)	1.00	1.00
46–50	0.78 (0.70–0.87)***	0.78 (0.70–0.87)***
51–55	0.48 (0.42–0.55)***	0.48 (0.42–0.55)***
56–60	0.35 (0.29–0.42)***	0.35 (0.29–0.42)***
61–65	0.30 (0.25–0.36)***	0.30 (0.25–0.36)***

Characteristic	Any disability	Disability type
66–70	0.33 (0.27–0.40) ***	0.33 (0.27–0.40) ***
71–75	0.45 (0.36–0.56) ***	0.45 (0.36–0.57) ***
76–80	0.12 (0.07–0.21) ***	0.12 (0.07–0.21) ***
81–85	0.07 (0.03–0.16) ***	0.07 (0.03–0.16) ***

** p<.01.

*** p<.001.

Notes: Two-tailed t tests were used to assess statistical significance.

na=not applicable. ref=reference group.

TABLE 3

Hazard ratios (and 95% confidence intervals) from piecewise exponential event history models assessing the likelihood that women with multiple disabilities have had a hysterectomy, by age-group

Age-group	Hazard ratio
15–20	1.12 (0.78–1.61)
21–25	2.43 (1.63–3.64) ***
26–30	1.77 (1.33–2.36) ***
31–35	1.30 (1.02–1.66) *
36–40	1.50 (1.22–1.84) ***
41–45	1.30 (1.05–1.60) *
46–50	0.93 (0.72–1.20)
51–55	1.01 (0.73–1.38)
56–60	1.27 (0.79–2.05)
61–65	1.10 (0.71–1.71)
66–70	1.81 (1.19–2.76) **
71–75	1.20 (0.78–1.84)
76–80	1.55 (0.62–3.85)
81–85	1.07 (0.22–5.31)

* p<.05.

** p<.01

*** p<.001.

Notes: Models included terms for interaction between age-group and having multiple disabilities. The reference group for each age-group is same-age women with no or one disability. Two-tailed t tests were used to assess statistical significance.