

Health Disparities Among Childrearing Women with Disabilities

Miok Kim · Hyun-Jun Kim · Seunghye Hong ·
Karen I. Fredriksen-Goldsen

© Springer Science+Business Media, LLC 2012

Abstract This study examines leading health indicators for childrearing women with disabilities, including health-related quality of life, chronic health conditions, adverse and preventive health behaviors, health care access, and social and emotional support. The study analyzes aggregated data from the Washington State Behavioral Risk Factor Surveillance System ($n = 28,629$). The weighted prevalence of key health indicators of childrearing women with disabilities (aged 18–59) are compared with childrearing women without disabilities. A series of adjusted logistic regression analyses are applied, controlling for confounding variables. When compared to childrearing women without disabilities, childrearing women with disabilities are less likely to have a partner or spouse, report lower income and education levels and are older. Childrearing women with disabilities, compared to childrearing women without disabilities, report significantly lower health-related quality of life including poor general health (adjusted odds ratio[AOR] = 6.85; $p < .001$), frequent mental distress (AOR = 4.02; $p < .001$), and frequent poor

physical health (AOR = 9.34; $p < .001$); higher prevalence of chronic health conditions, including arthritis, cardiovascular diseases, diabetes, asthma, high blood pressure and cholesterol, and obesity (the range of AORs = 1.59 to 5.65; $p < .001$); higher prevalence of adverse health behaviors including smoking (AOR = 2.14; $p < .001$) and lack of exercise (AOR = 1.61; $p < .001$); more financial barriers to health care (AOR = 2.11; $p < .001$) and lack of social and emotional support (AOR = 2.05; $p < .001$) while controlling for age, education, income, and relationship status. Based on population level data, the study reveals that childrearing women with disabilities experience elevated risks of health disparities across many key health indicators, many of which are preventable and modifiable. These findings underscore the importance of identifying contributing factors and developing interventions to improve the health and quality of life of childrearing women with disabilities.

Keywords Childrearing women · Disability · Health disparities · Population health

M. Kim
Department of Social Welfare, Chonbuk National University,
Jeonju, South Korea
e-mail: kmiok@jbnu.ac.kr

H.-J. Kim (✉) · K. I. Fredriksen-Goldsen
School of Social Work, University of Washington,
4101 15th Ave NE, Seattle, WA 98105, USA
e-mail: hyunjkim@u.washington.edu

K. I. Fredriksen-Goldsen
e-mail: fredrikk@u.washington.edu

S. Hong
Myron B. Thompson School of Social Work,
University of Hawai'i at Mānoa, Honolulu, HI, USA
e-mail: shong9@hawaii.edu

Introduction

The US Department of Health and Human Services (DHHS) in *Healthy People 2020* recognizes that health promotion for people with disabilities and women with children is one of the leading objectives for health disparity reduction in the US [1]. The Centers for Disease Control and Prevention (CDC) identifies health disparities related to disability status as one of the least investigated areas in current health disparities research [2]. About 19 % of the US population have some type of disability [3]. While costs associated with disabilities are more than \$300 billion per

year [4], persons living with disabilities remain a critically underserved population [5]. According to the National Health Interview Survey conducted in 1994 and 1995, the number of adult women who have intellectual and/or developmental disabilities or other substantial functional limitations *and* are living with children is about 1.5 million [6, 7]. Given the overall increasing prevalence of disability in the US [8], the number of childrearing women with disabilities is expected to increase substantially. Still, few studies exist that address the health, health disparities, and health-related quality of life of this underserved population of women.

Women with disabilities face significant social and economic risks such as lower levels of education, lower probabilities of employment, lower earnings, and greater risks of living in poverty when compared to women without disabilities [9]. Economic disadvantages are especially significant for childrearing women with disabilities since they often bear high financial burdens for necessary medicine, adaptive equipment, transportation, or housing modification, as well as child care expenses [10, 11]. Research indicates that women with disabilities have heightened risks of chronic disease, mental health problems, substance abuse and other risky health behaviors including smoking and excessive drinking, as well as lower prevalence of preventive screenings and health care access when compared to women without disabilities [12]. Population-based studies, however, have not comprehensively examined health disparities among childrearing women with disabilities. Many health disparities between people with disabilities and those without disabilities are preventable and modifiable [13, 14]. Studies have found that people with disabilities are at elevated risks of secondary health conditions or preventable health conditions, such as muscle and joint pain, sleep problems, fatigue, obesity, and mental disorders, that result from having specific types of disability [15].

Social and emotional support is defined as tangible and intangible assistance available from interpersonal relationships or the community and is another important determinant of health disparities [16]. A number of previous studies have demonstrated its association with improvements in physical and mental health-related quality of life and health behaviors [17] and also have shown that women with social support manage their health better in terms of diet, substance abuse, adherence to medicine, and exercise [18]. Childrearing women with disabilities, however, experience heightened risks of discrimination and isolation from society and a consequent lack of social resources [19, 20].

Given the positive association between family functioning and the health of the primary household child caregiver, the health status of childrearing women with disabilities also affects their children and family [21–23].

The impact of parental disability on relationships with children depends on the degree and specific characteristics of a parent's disability [11]. Women with severe disabilities may experience challenges in performing routine parenting tasks, especially when timely and adequate supports are unavailable. Separations between family members for disability related medical treatment may interfere with a mother's ability to provide on-going parenting. Thus, health disparity reduction among childrearing women with disabilities is not only a matter of individual well-being, but is also significant in improving family functioning.

Health-related needs and concerns of childrearing women with disabilities, however, have rarely been identified in disability research or women's health research. In fact there are no basic estimates of the prevalence of childrearing women with disabilities. In order to increase the health and well-being of childrearing women with disabilities, it is essential to understand and define the health disparities experienced by this population in order to respond with tailored interventions that can reduce or eliminate those disparities. Interventions targeting socio-demographic disadvantages, risky health behaviors, and barriers to health care access may prevent people with disabilities from acquiring adverse secondary health conditions that may deteriorate health-related quality of life [24]. Public health professionals need to better understand health disparities among childrearing women with disabilities. To address these gaps in the literature, the objective of this study is to examine leading health indicators of childrearing women with and without disabilities. Utilizing population-based data, we examine the prevalence of health disparities, including health-related quality of life, chronic health conditions, adverse and preventive health behaviors, health care access, and social and emotional support.

Methods

The Washington State Behavioral Risk Factor Surveillance System (WA-BRFSS) data were used in this study. BRFSS is an ongoing annual population-based telephone survey study designed by the CDC to investigate health conditions and behaviors of non-institutionalized US adult residents age 18 or older [25]. BRFSS respondents were recruited with random-digit dialed telephone numbers, and the interviews were conducted in English or Spanish. For this study we analyzed WA-BRFSS data collected from 2003 to 2009. Sample weights provided by BRFSS were applied to correct for unequal probabilities of selection resulting from sample design, nonresponse, and telephone non-coverage and to reflect the age, sex, and racial and ethnic distribution of Washington State (See http://www.cdc.gov/brfss/technical_infodata/weighting.htm to find detailed information

about BRFSS weighting formula). Childrearing women were defined as women age 18–59 living with children (age less than 18) in their household. The weighted percentages of childrearing women with disabilities and childrearing women without disabilities were respectively 17 % (unweighted $n = 5,295$) and 83 % (unweighted $n = 23,334$). The total sample size was 28,629.

Measures

Disability is measured by asking if participants are limited in any way in any activities because of physical, mental, or emotional problems and if they have any health problem that requires them to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone. As suggested in *Healthy People 2010* [26], respondents who answer positive to either question are categorized as disabled.

Health-related quality of life is assessed according to respondents' self-rating of general health, frequent mental distress, and frequent poor physical health, as suggested by the CDC [27]. The self-rating of general health is dichotomized into two categories: excellent/very good/good (0) and fair/poor (1). Participants are also asked, in the past 30 days, how many days their mental or physical health was not good, and each variable was dichotomized with the cut-off of 14 or more days as consistently used in other health research studies [28–30]. Previous studies show that this HRQOL measure is reliable and valid [27]. In WA-BRFSS, the measures of health-related quality of life also include days of limited activities as a result of poor physical or mental health in the past 30 days; but we exclude this component from further analyses because it is similar with how disability was measured.

Chronic health conditions in BRFSS are measured by asking whether the participants had ever been told by a health professional that they have asthma, obesity (defined as body mass index (kg/m²) greater than or equal to 30), arthritis (including various types of arthritis such as rheumatoid arthritis, gout, lupus, or fibromyalgia), diabetes (excluding pre-diabetes and gestational diabetes during pregnancy), high blood pressure (excluding borderline, pre-hypertensive, or only during pregnancy), heart attack, angina, and stroke.

Adverse health behaviors include current smoking (defined as having ever smoked 100 or more cigarettes and currently smoking everyday or some days) [31], excessive drinking (defined as 4 or more drinks on one occasion during the past month) [32], and lack of exercise (defined as not having been involved in any physical activities or exercise except regular job duties during the past month). Measures of *preventive health behaviors* include receiving a flu shot within the past year [33] and a Pap test within the past 3 years [34].

Health care access includes three measures. The participants were asked the following: whether they had any health insurance coverage, whether they were experiencing financial barriers to seeing a doctor in the last 12 months; and whether they had a personal doctor or health care provider.

Social and emotional support is assessed through the following item: “How often do you get the social and emotional support that you need?” Respondents are provided with five choices: always, usually, sometimes, rarely, and never. We dichotomized the responses into always/usually/sometimes (0) and rarely/never (1).

Socio-demographic characteristics include age, race/ethnicity (White vs. non-White), education (\leq high school graduate vs. \geq some college), income (at or below vs. above 200 % poverty level guided by the annual federal poverty guidelines, employment (employed vs. not employed), and relationship status (married/partnered vs. other).

Statistical Analyses

We used Stata version 11.0 (StataCorp LP, College Station, TX, USA) for data cleaning and analyses. First, by utilizing weighted estimates with 95 % confidence intervals, prevalence of sociodemographic characteristics are examined for childrearing women with disabilities and childrearing women without disabilities. Chi-square tests are applied to examine differences between the two groups; a bivariate linear regression, with coding childrearing women without disabilities as the reference group, is applied to examine difference in mean age. Next, we estimate weighted prevalence of health indicators for childrearing women with disabilities and childrearing women without disabilities; and test a series of adjusted logistic regression models to examine whether the differences in health-related indicators between the two groups statistically are significant, controlling for age, education, income, and relationship status. Again, childrearing women without disabilities are treated as the reference group. No multicollinearity problems were detected with the variables included in these analyses.

Results

Background Information

Table 1 shows comparisons of the sociodemographic characteristics by the two stratified adult women groups based on 95 % confidence intervals of weighted prevalence. Childrearing women with disabilities are older than childrearing women without disabilities ($b = 2.96$; $p < .001$); childrearing women with disabilities are more

likely than childrearing women without disabilities to be in their 40's and 50's. When compared to childrearing women without disabilities, childrearing women with disabilities are more likely to be White ($\chi^2 = 453.35$; $p < .001$). Childrearing women with disabilities show lower levels of household income ($\chi^2 = 862.89$; $p < .001$), education ($\chi^2 = 41.76$; $p < .05$), and employment ($\chi^2 = 1,166.15$; $p < .001$) than childrearing women without disabilities. Childrearing women with disabilities are less likely to be married or partnered than childrearing women without disabilities ($\chi^2 = 932.64$; $p < .001$).

Health-Related Quality of Life

The weighted prevalence rates of poor general health (32 %), frequent mental distress (29 %), and frequent poor physical health (32 %) for childrearing women with disabilities are notably higher than those for childrearing women without disabilities (see Table 2); and these differences remain significant after controlling for age, income, education, and relationship status. The adjusted odds of poor general health (adjusted odds ratio[AOR] = 6.85; $p < .001$), frequent mental distress (AOR = 4.02; $p < .001$), and frequent poor physical health (AOR = 9.34; $p < .001$) for childrearing women with disabilities are about 7, 4, and 9 times, respectively, greater than those for childrearing women without disabilities.

Chronic Health Conditions

The weighted prevalence rates of asthma (32 %), arthritis (44 %), obesity (36 %), diabetes (8 %), high blood pressure (22 %), high cholesterol (32 %), heart attack (2 %), angina (2 %), and stroke (2 %) for childrearing women

with disabilities are higher than childrearing women without disabilities (see Table 2). These differences remain significant even when controlling for age, education, income, and relationship status. The adjusted odds of arthritis for childrearing women with disabilities are about 5.7 times greater than those for childrearing women without disabilities (AOR = 5.65; $p < .001$). The adjusted odds of asthma (AOR = 2.91; $p < .001$), obesity (AOR = 2.06; $p < .001$), diabetes (AOR = 2.67; $p < .001$), high blood pressure (AOR = 2.29; $p < .001$), high cholesterol (AOR = 1.59; $p < .001$), heart attack (AOR = 3.43; $p < .001$), angina (AOR = 3.31; $p < .001$), and stroke (AOR = 3.17; $p < .001$) for childrearing women with disabilities are about 2–3 times greater than those for childrearing women without disabilities.

Health Behaviors

As shown in the weighted prevalence rates in Table 3, childrearing women with disabilities are more likely to smoke (30 %) and lack exercise (25 %) than childrearing women without disabilities, and these differences remain significant even after controlling for age, education, income, and relationship status. There were no significant differences in the rates of excessive drinking among the two groups. The adjusted odds of current smoking (AOR = 2.14; $p < .001$) and lack of exercise (AOR = 1.61; $p < .001$) for childrearing women with disabilities are about 2 times greater than those for childrearing women without disabilities. The weighted prevalence of receiving a flu shot within the past year (28 %) for childrearing women with disabilities is greater than that for childrearing women without disabilities (25 %) while prevalence of receiving a Pap test within the last 3 years

Table 1 Socio-demographic characteristics of childrearing women with and without disabilities: Washington State Behavioral Risk Factor Surveillance System, 2003–2009

	Childrearing women with disabilities (n = 5,295) % (95 % CI)	Childrearing women without disabilities (n = 23,334) % (95 % CI)	Significance
Age, M (95 % CI)	38.28 (37.87, 38.70)	35.33 (35.14, 35.51)	b = 2.96***
18–29	20.45 (18.68, 22.34)	28.18 (27.29, 29.09)	$\chi^2 = 1,955.29$ ***
30–39	31.37 (29.75, 33.03)	36.76 (35.97, 37.56)	
40–49	33.74 (32.13, 35.39)	28.35 (27.65, 29.07)	
50–59	14.44 (13.37, 15.58)	6.7 (6.35, 7.06)	
Race/ethnicity, White, %	81.23 (79.65, 82.72)	74.17 (73.37, 74.97)	$\chi^2 = 453.35$ ***
Education, ≤high school, %	35.77 (33.99, 37.58)	33.42 (32.58, 34.27)	$\chi^2 = 41.76$ *
Income, ≤200 % poverty level, %	50.47 (48.59, 52.36)	39.31 (38.41, 40.22)	$\chi^2 = 862.89$ ***
Employed, %	47.86 (46.04, 49.68)	60.02 (59.16, 60.88)	$\chi^2 = 1,166.15$ ***
Married/partnered, %	67.33 (65.57, 69.04)	77.39 (76.57, 78.18)	$\chi^2 = 932.64$ ***

CI confidence interval, estimates were weighted

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 2 Weighted prevalence rates of health-related quality of life and chronic health conditions and the results of adjusted logistic regression analyses: Washington State Behavioral Risk Factor Surveillance System, 2003–2009

	Childrearing women with disabilities % (95 % CI)	Childrearing women without disabilities % (95 % CI)	OR (95 % CI)	AOR (95 % CI)
Health-related quality of life				
Poor general health	31.88 (30.21, 33.59)	6.06 (5.65, 6.49)	7.26*** (6.52, 8.08)	6.85*** (6.06, 7.73)
Frequent mental distress	28.94 (27.30, 30.64)	8.83 (8.35, 9.34)	4.21*** (3.80, 4.66)	4.02*** (3.60, 4.50)
Frequent poor physical health	32.46 (30.79, 34.18)	4.43 (4.09, 4.81)	10.36*** (9.24, 11.62)	9.34*** (8.27, 10.54)
Chronic health conditions				
Asthma	31.68 (29.97, 33.43)	13.84 (13.25, 14.46)	2.89*** (2.63, 3.17)	2.91*** (2.63, 3.21)
Arthritis	44.14 (41.83, 46.47)	10.63 (9.98, 11.33)	6.64*** (5.90, 7.47)	5.65*** (4.96, 6.42)
Obesity	36.33 (34.56, 38.14)	20.06 (19.35, 20.78)	2.27*** (2.08, 2.49)	2.06*** (1.87, 2.26)
Diabetes	7.58 (6.74, 8.51)	2.14 (1.93, 2.37)	3.75*** (3.19, 4.42)	2.67*** (2.25, 3.18)
High blood pressure	21.78 (19.65, 24.06)	8.63 (7.96, 9.35)	2.95*** (2.52, 3.45)	2.29*** (1.92, 2.72)
High cholesterol	32.11 (29.77, 34.55)	20.26 (19.29, 21.26)	1.86*** (1.64, 2.11)	1.59*** (1.39, 1.82)
Heart attack	1.99 (1.55, 2.56)	0.37 (0.28, 0.49)	5.52*** (3.77, 8.09)	3.43*** (2.31, 5.07)
Angina	2.16 (1.72, 2.71)	0.45 (0.33, 0.61)	4.88*** (3.33, 7.14)	3.31*** (2.26, 4.87)
Stroke	2.05 (1.63, 2.57)	0.47 (0.36, 0.60)	4.46*** (3.17, 6.29)	3.17*** (2.19, 4.57)

OR odds ratio, AOR adjusted odds ratio, CI confidence interval, adjusted logistic regression models controlled for age, education, income, and relationship status

* $p < .05$; ** $p < .01$; *** $p < .001$

are similar each other. When controlling for age, income, education, and relationship status, the higher odds of receiving a flu shot for childrearing women with disabilities remain significant (AOR = 1.12; $p < .05$).

Health Care Access and Social and Emotional Support

Table 3 indicates that after controlling for age, education, income, and relationship status, childrearing women with disabilities, compared to childrearing women without disabilities, are more likely to have health insurance coverage (AOR = 1.31; $p < .001$) and a regular source of medical care (AOR = 1.61; $p < .001$). However, childrearing women with disabilities report higher likelihoods of experiencing financial barriers to health services than childrearing women without disabilities even after accounting for age, education, income, and relationship status (AOR = 2.11; $p < .001$). The adjusted odds of experiencing financial barriers to health services for childrearing women with disabilities are about 2 times greater than those for childrearing without disabilities. When controlling for age, education, income, and relationship status, childrearing women with disabilities are more likely to lack social and emotional support than childrearing women without disabilities (AOR = 2.05; $p < .001$). The adjusted odds of lack of social and emotional support for childrearing women with disabilities are 2 times greater than those for childrearing women without disabilities.

Discussion

To our knowledge this is the first study to examine health disparities of childrearing women with disabilities using population-based data. The findings illustrate significant health disparities among childrearing women with disabilities, relative to childrearing women without disabilities, across nearly every leading health indicator, including health-related quality of life, chronic health conditions, adverse health behaviors, financial barriers to care, and lack of social and emotional support. The findings shed important new light on both the existence and extent of disparities impacting this at-risk population, many of which are preventable and modifiable and suggest important areas in need of further research to respond to these disparities and resulting inequalities.

Childrearing women with disabilities, compared to childrearing women without disabilities, are at risk socio-demographically for health disparities. Despite their older ages on average, childrearing women with disabilities are less likely to have a partner or spouse. They have less income, less education, and lower employment rates as compared to childrearing women without disabilities. The link between socio-economic disadvantages, adverse health, and poor health-related quality of life is well-established [35]. Yet, the health-related quality of life of childrearing women with disabilities has not been

Table 3 Weighted prevalence rates of adverse health behaviors, preventive health behaviors, health care access, and social and emotional support and the results of adjusted logistic regression analyses: Washington State Behavioral Risk Factor Surveillance System, 2003–2009

	Childrearing women with disabilities % (95 % CI)	Childrearing women without disabilities % (95 % CI)	OR (95 % CI)	AOR (95 % CI)
Adverse health behaviors				
Current smoking	29.58 (27.90, 31.32)	15.13 (14.52, 15.75)	2.36*** (2.14, 2.59)	2.14*** (1.92, 2.37)
Excessive drinking	10.23 (9.17, 11.41)	10.67 (10.12, 11.25)	0.95 (0.83, 1.09)	0.99 (0.86, 1.14)
Lack of exercise	25.34 (23.78, 26.97)	16.52 (15.86, 17.21)	1.71*** (1.56, 1.89)	1.61*** (1.44, 1.79)
Preventive health behaviors				
Flu shot	27.70 (26.13, 29.33)	25.38 (24.63, 26.15)	1.13** (1.03, 1.23)	1.12* (1.02, 1.24)
Pap smear	94.65 (92.48, 96.22)	94.67 (93.83, 95.40)	1.00 (0.67, 1.48)	1.29 (0.79, 2.11)
Health care access				
Health insurance coverage	84.77 (83.38, 86.07)	83.36 (82.67, 84.03)	1.11 (0.99, 1.25)	1.31*** (1.14, 1.50)
Regular source of medical care	84.75 (83.27, 86.12)	79.06 (78.30, 79.79)	1.47*** (1.31, 1.66)	1.61*** (1.41, 1.84)
Financial barrier to health services	29.68 (28.05, 31.37)	15.18 (14.56, 15.82)	2.36*** (2.15, 2.59)	2.11*** (1.90, 2.35)
Lack of social and emotional support	9.23 (8.17, 10.42)	4.38 (3.97, 4.84)	2.22*** (1.87, 2.63)	2.05*** (1.70, 2.47)

OR odds ratio, AOR adjusted odds ratio, CI confidence interval, adjusted logistic regression models controlled for age, education, income, and relationship status

* $p < .05$; ** $p < .01$; *** $p < .001$

previously examined. The findings presented here illustrate that the elevation in risk of poor health-related quality of life across multiple indicators (general health as well as frequent poor physical and mental health) and chronic health conditions among childrearing women with disabilities remains, even when controlling for socio-demographic characteristics. Recent research suggests that health disparities of persons living with disabilities can be reduced [13]. Wilber et al. suggest that reducing socio-demographic risk, promoting healthy behaviors, and improving health care access and support will reduce the likelihood of having adverse secondary health conditions and increase health-related quality of life for persons living with disabilities [24].

This study found that smoking is an important risk factor for childrearing women with disabilities. When comparing people with disabilities to people without disabilities, population level data suggests that people with disabilities are in general more likely to smoke, regardless of gender [36, 37]. Our study corroborates these general findings and provides specific evidence that childrearing women with disabilities are also at higher risk of smoking than childrearing women without disabilities. Smoking among childrearing women with disabilities is a particularly important concern because of smoking's critical health consequences for mothers and the potentially harmful effects of second-hand smoke on family members, especially young children [38, 39]. Smoking is a significant public health concern, and future studies are needed to identify specific contributing factors that account for the higher prevalence rates of smoking

among childrearing women with disabilities. Suggested areas to examine include whether smoking functions as a coping mechanism [40] for the life challenges faced by childrearing women with disabilities, and if so what are the most effective prevention and intervention strategies to reduce smoking among this at-risk population.

Our study finds more physical inactivity among childrearing women with disabilities compared to childrearing women without disabilities. It is plausible that childrearing women with disabilities may not be able to exercise because of the nature or severity of their disabilities. Previous studies have found that a lack of exercise among those with disabilities can increase functional limitations and elevate the risks for secondary conditions [41, 42], which may result in even poorer health, more chronic health conditions, and greater financial burdens. Public health policies and health providers need to identify obstacles to increasing levels of physical activities among childrearing women with disabilities so that the lack of exercise does not result in additional negative health outcomes.

In terms of preventive health behaviors, childrearing women with disabilities demonstrate two positive health practices: they obtain comparable levels of Pap exams and slightly higher levels of flu shots when controlling for potentially confounding variables. As DHHS suggests, getting a flu vaccine can be critical for people with disabilities, especially for those who have mobility limitations, unavoidable contact with potentially infected family members, and restrictions that may inhibit practicing preventive measures [43]. In 2010, 44 % of people with

disabilities in the US received influenza vaccinations, which is significantly higher than that of people without disabilities [44]. Our study, however, found that the prevalence rate of flu vaccine receipt for childrearing women with disabilities (28 %) is notably lower than the national rate while it was only slightly greater than that of childrearing women without disabilities. Given that childrearing women with disabilities may have increased exposure to influenza because of children living in the household, it will be important to find ways to promote influenza immunization among childrearing women, both through educating the women directly about the benefits of such vaccinations as well as encouraging health providers to prioritize influenza vaccinations for childrearing women with disabilities since they may be at increased risk.

Childrearing women with disabilities report greater financial barriers to health services compared to childrearing women without disabilities, but they are more likely to have health insurance and a regular source of medical care. While these findings may seem contradictory, it is likely that women with disabilities may in fact experience greater health care expenses than those without disabilities. Since women with disabilities report more chronic health conditions, they may visit health providers more frequently [45]. Many insurance plans limit the number of visits to a health care provider, which could both increase both out-of-pocket expenses and create additional financial barriers to care once the maximum number of visits has been exceeded. Since childrearing women with disabilities are more likely to meet the federal poverty guidelines compared to those not disabled, they may have increased access to Medicaid, yet consequentially find it more difficult to locate medical services that accept such types of coverage. Eliminating such financial barriers to health services for childrearing women with disabilities will be essential to reduce elevated risks of morbidity and mortality and to increase health-related quality of life [46].

Our findings regarding the lack of social and emotional support among childrearing women with disabilities underscore the need for additional structural supports, such as increasing engagement with families, friends, neighbors, and communities. Securing social and emotional support is critical to improve the health-related quality of life among childrearing women with disabilities [47]. As previous studies suggest, social and emotional support is associated with improvements in physical and mental health-related quality of life as well as health behaviors and health care access [14, 17, 18]. A longitudinal study found that lack of social support increases the degree of disability in terms of Activities of Daily Living and Instrumental Activities of Daily Living [48]. It is thus warranted to explore what factors enhance social support in this specific population. For example, lack of social and emotional support among childrearing women with

disabilities may be associated with heightened risks of discrimination [19, 20] and lack of access to services [49].

While the findings of this study reveal important health disparities, there are limitations to consider. First, we cannot examine causal relationships and changes over time. BRFSS is a cross-sectional study, and it does not allow us to examine the temporal relationships between disability and the indicators of health disparities. Second, the measures we used in this study are limited to those included in BRFSS, as a secondary data source. For example, no information is available on the specific types or degrees of disabilities in BRFSS, which could have important implications for understanding and developing interventions aimed at reducing these disparities. Future studies are needed to investigate the role of specific risk and protective factors as they relate to health disparities of childrearing women with disabilities. Disability and its corresponding socio-economic disadvantages need to be understood within the larger social context, and the impact of stigma, prejudice, discrimination, and marginalization on childrearing women with disabilities needs to be explored.

As the proportion of the US population with disabilities continues to increase and health care costs rise exponentially, addressing the unique needs of childrearing women with disabilities is critical. As one of the first studies to utilize population-based data to examine leading health indicators among childrearing women, these findings reveal that women with a disability are more likely to experience significant health disparities, including reduced health-related quality of life, more chronic health conditions, adverse health behaviors, financial barriers to care, and lack of social and emotional support. Women with disabilities face many social inequalities as a health disparate population and as mothers. Existing evidence demonstrates that a mother's health is critically related to their children's health and well-being [23, 50, 51]. It is the right of childrearing women with disabilities to experience good health and well-being, and it is critical that we identify risk factors and develop interventions to improve their health and health-related quality of life.

Acknowledgments This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2010-013-B00026). The data used in this study were provided by Washington State Department of Health, Center for Health Statistics, Behavioral Risk Factor Surveillance System, supported in part by Centers for Disease Control and Prevention Cooperative Agreement (U58/CCU002118-17, U58/CCU022819-1, 2, 3, 4, 5, and U58/DP001996-1).

References

1. U.S. Department of Health and Human Services. (2011). *Healthy people 2020 objectives. 2011*. Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/>.

2. Centers for Disease Control and Prevention. (2011). Rationale for regular reporting on health disparities and inequalities—United States. *Morbidity and Mortality Weekly Report*, 60, 3–10.
3. U.S. Bureau of the Census. (2005). *Survey of income and program participation, June–September 2005*. Retrieved from <http://www.census.gov/hhes/www/disability/sipp/disable05.html>.
4. Centers for Disease Control and Prevention. (2009). Prevalence and most common causes of disability among adults—United States, 2005. *Morbidity and Mortality Weekly Report*, 58(16), 421–426.
5. Drum, C. E., Krahn, G., Culley, C., & Hammond, L. (2005). Recognizing and responding to the health disparities of people with disabilities. *California Journal of Health Promotion*, 3(3), 29–42.
6. Anderson, L., Byun, S., Larson, S., & Lakin, C. (2005). Mothers with disabilities—characteristics and outcomes: An analysis of from the 1994/1994 NHIS-D. *DD Data Brief*, 7(3). Minneapolis, MN: Institute on Community Integration.
7. Olkin, R., Abrams, K., Preston, P., & Kirshbaum, M. (2006). Comparison of parents with and without disabilities raising teens: Information from the NHIS and two national surveys. *Rehabilitation Psychology*, 51, 43–49.
8. Fujiura, G. T. (2007). Disability trends. In M. J. Field, A. M. Jette, & Institute of Medicine (US) Committee on Disability in America (Eds.), *The future of disability in America*. Washington, DC: National Academy of Sciences.
9. Disability NOD. (2000). *The 2000 N.O.D./Harris survey of Americans with disabilities*. New York: Lew Harris and Associates, Inc.
10. Preston, P. (2012). Parents with disabilities. In J. H. Stone, & M. Blouin (Eds.), *International encyclopedia of rehabilitation*. Retrieved from <http://cirrie.buffalo.edu/encyclopedia/en/article/36/>.
11. Kirshbaum, M., & Olkin, R. (2002). Parents with physical, systemic or visual disabilities. *Sexuality and Disability*, 20(1), 29–52.
12. Wisdom, J. P., McGee, M. G., Horner-Johnson, W., Michael, Y. L., Adams, E., & Berlin, M. (2010). Health disparities between women with and without disabilities: A review of the research. *Social Work in Public Health*, 25(3), 368–386.
13. Krahn, G. L., Hammond, L., & Turner, A. (2006). A cascade of disparities: Health and health care access for people with intellectual disabilities. *Mental Retardation and Developmental Disabilities Research Reviews*, 12(1), 70–82.
14. U.S. Department of Health and Human Services. (2005). *The surgeon general's call to action to improve the health and wellness of persons with disabilities*. Washington, DC: US Department of Health and Human Services. Retrieved from <http://www.surgeongeneral.gov/library/calls/disabilities/index.html>.
15. Kinne, S., Patrick, D. L., & Doyle, D. L. (2004). Prevalence of secondary conditions among people with disabilities. *American Journal of Public Health*, 94, 443–445.
16. Heaney, C. A., & Israel, B. A. (2008). Social networks and social support. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research and practice* (pp. 189–210). San Francisco: Jossey-Bass.
17. Strine, T. W., Chapman, D. P., Balluz, L., & Mokdad, A. H. (2008). Health-related quality of life and health behaviors by social and emotional support: Their relevance to psychiatry and medicine. *Social Psychiatry and Psychiatric Epidemiology*, 43, 151–159.
18. Jackson, T. (2006). Relationships between perceived close social support and health practices within community samples of American women and men. *The Journal of Psychology*, 140, 229–246.
19. Kirshbaum, M., Taube, D., & Baer, R. (2003). Parents with disabilities: Problems in family court practice. *Journal of the Center for Children and Courts*, 4, 27–48.
20. Llewellyn, G., & McConnell, D. (2002). Mothers with learning difficulties and their support networks. *Journal of Intellectual Disability Research*, 46, 17–34.
21. Leclere, F., & Kowalewski, B. (1994). Disability in the family—The effects on children's well-being. *Journal of Marriage and the Family*, 56(2), 457–468.
22. Martens, L., & Addington, J. (2001). The psychological well-being of family members of individuals with schizophrenia. *Social Psychiatry and Psychiatric Epidemiology*, 36(3), 128–133.
23. Armistead, L., Klein, K., & Forehand, R. (1995). Parental physical illness and child functioning. *Clinical Psychology Review*, 15(5), 409–422.
24. Wilber, N., Mitra, M., Walker, D. K., Allen, D., Meyers, A. R., & Tupper, P. (2002). Disability as a public health issue: Findings and reflections from the Massachusetts survey of secondary conditions. *Milbank Quarterly*, 80(2), 393–421.
25. Washington State Department of Health. Behavioral Risk Factor Surveillance System (BRFSS) sampling method. Retrieved from <http://www.doh.wa.gov/DataandStatisticalReports/HealthBehaviors/BehavioralRiskFactorSurveillanceSystemBRFSS/BRFSSCollectingData.aspx>.
26. U.S. Department of Health and Human Services. (2000). *Healthy people 2010: Understanding and improving health*. Washington, DC: US Department of Health and Human Services.
27. Centers for Disease Control and Prevention. (2000). *Measuring healthy days*. Atlanta, GA: CDC. Retrieved from <http://www.cdc.gov/hrqol/pdfs/mhd.pdf>.
28. Jiang, Y., & Hesser, J. (2006). Associations between health-related quality of life and demographics and health risks. Results from Rhode Island's 2002 behavioral risk factor survey. *Health and Quality of Life Outcomes*, 4, 14. Retrieved from <http://www.hqlo.com/content/4/1/14>.
29. Centers for Disease Control and Prevention. (2009). *Health-related quality of life*. Retrieved from <http://www.cdc.gov/hrqol/index.htm>.
30. Fredriksen-Goldsen, K. I., Kim, H.-J., Barkan, S. E., Balsam, K. F., & Mincer, S. (2010). Disparities in health-related quality of life: A comparison of lesbian and bisexual women. *American Journal of Public Health*, 100(11), 2255–2261.
31. Centers for Disease Control and Prevention. (2011). Vital signs: Current cigarette smoking among adults aged ≥ 18 years—United States, 2005–2010. *Morbidity and Mortality Weekly Report*, 60, 1207–1212.
32. National Institute of Alcohol Abuse and Alcoholism. (2004). NIAAA council approves definition of binge drinking. *NIAAA Newsletter*, 3, 3. Retrieved from http://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.pdf.
33. Centers for Disease Control and Prevention. (2011). *Key facts about seasonal flu vaccine*. Retrieved from <http://www.cdc.gov/flu/protect/keyfacts.htm>.
34. Centers for Disease Control and Prevention. (2010). QuickStats: Percentage of women aged ≥ 18 years who had a Papanicolaou (Pap) smear test during the preceding 3 years, by age group and poverty status—National Health Interview Survey, United States, 2008. *Morbidity and Mortality Weekly Report*, 59, 431.
35. Braveman, P. A., Cubbin, C., Egerter, S., Williams, D. R., & Pamuk, E. (2010). Socioeconomic disparities in health in the United States: What the patterns tell us. *American Journal of Public Health*, 100(Suppl 1), S186–S196.
36. Armour, B. S., Campbell, V. A., Crews, J. E., Malarcher, A., Maurice, E., & Richard, R. A. (2007). State-level prevalence of cigarette smoking and treatment advice, by disability status,

- United States, 2004. *Preventing Chronic Disease*, 4(4). Retrieved from http://www.cdc.gov/ped/issues/2007/oct/pdf/06_0179.pdf.
37. Becker, H., & Brown, A. (2008). Disparities in smoking behaviors among those with and without disabilities from 2001 to 2005. *Public Health Nursing*, 25(6), 526–535.
 38. Treyster, Z., & Gitterman, B. (2011). Second hand smoke exposure in children: Environmental factors, physiological effects, and interventions within pediatrics. *Reviews on Environmental Health*, 26(3), 187–195.
 39. Alwan, N., Siddiqi, K., Thomson, H., & Cameron, I. (2010). Children's exposure to second-hand smoke in the home: A household survey in the North of England. *Health and Social Care in the Community*, 18(3), 257–263.
 40. Kassel, J. D., Stroud, L. R., & Paronis, C. A. (2003). Smoking, stress, and negative affect: Correlation, causation, and context across stages of smoking. *Psychological Bulletin*, 129, 270–304.
 41. Santiago, M., & Coyle, C. (2004). Leisure-time physical activity and secondary conditions in women with physical disabilities. *Disability and Rehabilitation*, 26(8), 485–494.
 42. Rimmer, J. H., & Shenoy, S. S. (2006). Impact of exercise on targeted secondary conditions. In M. J. Field, A. M. Jette, & L. Martin (Eds.), *Workshop on disability in America: A new look* (pp. 205–221). Washington, DC: The National Academic Press.
 43. U.S. Department of Health and Human Services. *Who's at risk: People with disabilities*. Retrieved from <http://www.flu.gov/at-risk/disabilities/index.html>.
 44. Houtenville, A. J., & Ruiz, T. (2011). *Annual disability statistics compendium: 2011*. Durham, NH: University of New Hampshire, Institute on Disability.
 45. Mele, N., Archer, J., & Pusch, B. (2005). Access to breast cancer screening services for women with disabilities. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 34(4), 453–464.
 46. Phillips, L., & Phillips, W. (2006). Better reproductive healthcare for women with disabilities—A role for nursing leadership. *Advances in Nursing Science*, 29(2), 134–151.
 47. Farber, R. (2000). Mothers with disabilities: In their own voice. *American Journal of Occupational Therapy*, 54(3), 260–268.
 48. McLaughlin, D., Leung, J., Pachana, N., Flicker, L., Hankey, G., & Dobson, A. (2012). Social support and subsequent disability: It is not the size of your network that counts. *Age Ageing*. Advance online publication. doi:10.1093/ageing/afs036.
 49. Barker, T. L., Maralani, V., & Research and Training Center on Families with Adults with Disabilities. (1997). *Challenges and strategies of disabled parents: Findings from a national survey of parents with disabilities*. Oakland, CA: Berkeley Planning Associates.
 50. Rahman, A., Iqbal, Z., Bunn, J., Lovel, H., & Harrington, R. (2004). Impact of maternal depression on infant nutritional status and illness: A cohort study. *Archives of General Psychiatry*, 61(9), 946–952.
 51. Rahman, A., Bunn, J., Lovel, H., & Creed, F. (2007). Maternal depression increases infant risk of diarrhoeal illness: A cohort study. *Archives of Disease in Childhood*, 92(1), 24–28.