Health and the Gender Gap

A Discussion Paper on Social and Regional Factors in Well-Being

March 2016

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PUBLIC HEALTH SUMMIT

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Executive Summary

Socially determined circumstances create disproportionate obstacles for certain groups, such as ethnic or racial minorities, women, and individuals with disabilities, to achieve better health in the U.S. and around the world.[1]

The extent and degree to which these social factors influence health disparity, however, is not well understood. This discussion paper contributes to the growing literature on health disparity in several unique ways. First, it broadens our understanding of the topic beyond comparing an average woman to an average man in the U.S. by looking at different sub-populations. Second, it quantifies the relative contribution of social and demographic determinants on the gender-based health disparity.

Our empirical analysis of the Behavioral Risk Factor Surveillance System survey conducted by the Centers for Disease Control in 2013 shows the following:

- We find that the prevailing approach of looking at the mean of the distribution of health indicators provides an incomplete picture of gender-based health disparity in the U.S.

- Our results show that women report slightly worse health than men when the health problems are not severe, especially in the 35-44 age group. However, among populations with serious health problems, middle-aged men in the 45-54 age group report significantly worse health than women at the higher quantiles of self-reported health.

- Men in the U.S. Census Bureau's South region show substantially worse health than women at the higher quantiles of self-reported health.

- Socioeconomic and demographic circumstances such as employment status, income, and housing type explain roughly 44 percent of the average difference in self-reported health status between men and women. The remaining 56 percent is due to differences in gender-specific sensitivities to social characteristics and health conditions.

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1. "Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of Health," Commission on Social Determinants of Health Final Report, 2008, World Health Organization, http://apps.who.int/iris/bitstream/10665/43943/1/9789241563703_eng.pdf, accessed January 2, 2016.

Introduction

The Whats, Whys, and Wheres of Gender-Based Health Disparity

The Commission on Social Determinants of Health (CSDH), a task force established by the World Health Organization in 2005, defined health equity as the "absence of systematic differences in health, between and within countries, which are avoidable by reasonable action."

There is an abundance of evidence from both developed and developing nations which points to systematic differences in morbidity between women and men. Although women on average tend to live longer, as a group they report a higher prevalence of physical and mental disorders. The role of social and geographic factors such as income, race, and urban vs. rural residence in determining health are well recognized, but our understanding of how they influence gender-based health disparity is limited. The CSDH's final report in 2008 highlights the knowledge gap, including social determinants of health equity, and recommends increased monitoring and research to "measure and understand the problem and assess the impact of action." Similarly, the Centers for Disease Control and Prevention (CDC) recognizes that socially determined circumstances create disproportionate obstacles for certain groups, such as African-Americans, women, and individuals with disabilities, to achieve better health.[2] As a result, one of the top priorities of the CDC's National Center for Chronic Disease Prevention and Health Promotion is to eliminate gender-based health disparity.

Regrettably, the literature overlooks the possibility that the difference between men and women may vary over the entire distribution of health status indicators. In addition, the possibility that health disparity may have a geographic component is also overlooked. The failure to consider the distributional and geographic variations can paint a distorted picture of the pervasiveness and concentration of the gender-based health disparity in the U.S.

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2. Health Equity, Centers for Disease Control and Prevention, http://www.cdc.gov/chronicdisease/healthequity/, accessed January 4, 2016. Ostlin, P., Schrecker, T., Sadana, R., Bonnefoy, J., Gilson, L., Hertzman, C., Kelly, M.P., Kjellstrom, T., Labonte, R. Lundberg, O., Muntaner, C., Popay, J., Sen, G., and Vaghri, Z., "Priorities for Research on Equity and Health: Towards an Equity-Focused Health Research Agenda," 2011, *PLOS Medicine*, Volume 8 (11): e1001115.

This discussion paper uses the nationally representative data from the 2013 Behavioral Risk Factor Surveillance System (BRFSS) survey conducted by the CDC and ascertains the gender-based health disparity based on the self-reported health status of respondents. The study integrates the distributional and geographic aspects of the health disparity variation and focuses on identifying key social determinants of the gender-based health disparity. The results emerging from the research provide two valuable insights. First, the research broadens our understanding of the gender-based health disparity beyond comparing an average woman to an average man. Second, it quantifies the relative contribution of social determinants of health.

A Brief Review of the Literature

Research on the gender-based mortality rate differences indicate that, on average, women live longer than men.[3] However, a number of studies using the international data on subjective gender-based morbidity show that a self-reported health status of women tends to be worse than that of men.[4] In contrast to international evidence, Case and Paxson show that in the U.S., all of the gender-based differences in self-reported health status can be explained by gender-specific prevalence and severity of chronic health conditions.[5] Crimmins et al. similarly show that differences in gender-specific indicators of disability and diseases explain almost all of the observed differences in self-reported health status between men and women in 11 European countries, the UK, and the U.S.[6]

All of the aforementioned studies have one methodological commonality. Namely, they all estimate gender-based health disparity at the mean of the health status indicator distribution. By doing so, estimates of gender-based health disparity are forced to be the same, regardless of the intensity of self-reported health status. In contrast, our study estimates gender-based health disparity and decomposes it into explained and unexplained parts at various quantiles of the health status indicator distribution within each U.S. Census Bureau region, which provides a more accurate assessment of the difference in health status between men and women in the U.S.

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3. Barford, A., Dorling, D., Smith, D.G., Shaw, M., "Life expectancy: women now on top everywhere," *BMJ*, 2006, 332:808. Baerlocher, Mark O., "Differences in healthy life expectancy among men and women," 2007, *CMAJ*, Volume 177 (10): 1174.

4. McDonough, P. and Walters, V., "Gender and health: reassessing patterns and explanations," 2001, *Social Science and Medicine*, Volume 52, pp. 547-559. Malmusi, D., Vives, A., Benach, J., and Borrell, C., "Gender inequalities in health: exploring the contribution of living conditions in the intersection of social class," 2014, *Global Health Action*, Volume 7: 23189.

5. Case, A. and Paxson, C., "Sex differences in morbidity and mortality," 2004, NBER Working Paper 10653, http://www.nber.org/papers/w10653, accessed December 10, 2015.

6. Crimmins, E.M., Kim, J.K., and Sole-Auro, A., "Gender differences in health: results from SHARE, ELSA and HRS," 2010, *European Journal of Public Health*, Volume 21, No. 1, pp. 81-91.

Methodology and Data

We estimate the impact of gender on the self-reported health status using the data from the Behavioral Risk Factor Surveillance System, a nationally representative land-line and cell-phone survey of the civilian, non-institutionalized adult population, conducted by the CDC. The BRFSS data are suitable for our purposes because they contain information on respondents' self-reported health status (number of sick days), existing and past health conditions, demographic, and socioeconomic characteristics. The description of variables used in our statistical analyses is provided in Table 1. The data set contains a sample of 491,773 adult men and women. We used a sample of 87,507 complete records for respondents with at least one sick day. The size and the detailed nature of the data set allow us to partition it by geographic region and analyze health disparity separately for each of the four regions (Northeast, Midwest, South, and West) as defined by the Census Bureau. (See Table 7.)

To assess the magnitude of the self-reported health status differences between adult men and women at different points of the health status variable distribution due to sociodemographic factors and existing health conditions, we used the Unconditional Quantile Regression (UQR) method developed by Firpo, Fortin, and Lemieux.[7] We chose the 25th, 50th (median), and the 75th percentiles (quantiles) of the health status distribution in order to investigate the gender differences in self-reported health status for individuals with differing intensity of health problems. Much of the existing literature on the gender-based health disparity provides evidence for the gender differences at the mean of the health status distribution. In other words, the impact of gender is assumed to be similar regardless of the intensity of one's health status. The UQR method, on the other hand, allows gender differences to vary at different levels of the health status intensity.

After estimating separate equations at three distinct quantiles of the self-reported health status variable for each of the four U.S. Census-defined regions (12 quantile-region groups), we decompose the differences in each quantile-region group using the Oaxaca-Blinder method.[8] The Oaxaca-Blinder decomposition exercise allows us to separate the total gender-based difference in self-reported health status into an explained part due to differences in characteristics between men and women and an unexplained part due to gender-specific differences in sensitivities of health status to characteristics.

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7. Firpo, S., Fortin, N.M., and Lemieux, T., "Unconditional Quantile Regressions," 2009, *Econometrica*, 77, pp. 953-973.

8. Oaxaca, R.L., "Male-Female Wage Differentials in Urban Labor Markets," 1973, International Economic Review, 14 (3), pp. 693-709. Hlavac, M., "Oaxaca: Oaxaca-Blinder Decomposition in R," R package version 0.1.3. http://CRAN.R-project.org/package=oaxaca

Table 1 | Variables Used to Analyze Gender-Based Health Disparity

VARIABLE	QUESTION
Health Status	How many days during the past 30 days was your physical health not good?
Age	Respondent's age
Sex	Indicate sex of respondent: male or female?
Race	Imputed race: White, black, Asian, American Indian, Hispanic, other
Marital Status	Are you married, divorced, widowed, separated, never married, a member of an unmarried couple?
Number of Children	How many children less than 18 years of age live in your household?
Education	What is the highest grade or year of school you completed?
Employment Status	Are you currently employed, self-employed, out of work, homemaker, student, retired, unable to work?
Income	What is your annual household income from all sources?
Housing Type	Do you own or rent your home?
Rural Residence	Metropolitan Statistical Area status: inside MSA (urban), outside MSA (rural)
Body Mass Index	Four categories of body mass index: underweight, normal weight, overweight, obese.
Tobacco Use	Four-level smoker status: everyday smoker, someday smoker, former smoker, non-smoker.
Alcohol Use	Calculated total number of alcoholic beverages consumed per month
Blood Pressure	Have you ever been told that you have high blood pressure?
Cholesterol	Have you ever been told that your blood cholesterol is high?
Infarction	Have you ever been told you had a heart attack, also called a myocardial infarction?
Coronary Heart Disease	Have you ever been told you have angina or coronary heart disease?
Stroke	Have you ever been told you had a stroke?
Asthma	Have you ever been told you have asthma?
Skin Cancer	Have you ever been told you have skin cancer?
Other Cancers	Have you ever been told you have any other types of cancer?
COPD	Have you ever been told you have chronic obstructive pulmonary disease, emphysema, or chronic bronchitis?
Arthritis	Have you ever been told you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?
Depression	Have you ever been told that you have a depressive disorder, including depression, major depression, dysthymia, or minor depression?
Kidney	Have you ever been told you have kidney disease?
Diabetes	Have you ever been told you have diabetes?
Blindness	Are you blind or do you have serious difficulty seeing, even when wearing glasses?

Source: Behavioral Risk Factor Surveillance System 2013

Average Gender-Based Health Disparity by Region

A regional comparison of self-reported health status between men and women shows the following (Table 2):

Contrary to the international literature and consistent with the more recent U.S.-specific studies, we find the gender-based health disparity was statistically insignificant in the U.S. in 2013. The South region of the U.S. exhibits a small but statistically significant gender-based health disparity. Overall, the data from the BRFSS 2013 survey provide a weak indication that, on average, men report slightly worse health status.

Table 2 | **Average Self-Reported Sick Days by Sex and Region**

REGION	WOMEN	MEN	DIFFERENCE	T-STATISTIC	SIGNIFICANCE*
Northeast	11.12	11.12	0.00	0.02	No significant difference
Midwest	11.38	11.53	-0.15	-0.99	No significant difference
South	12.78	13.24	-0.46	-3.31	Significant difference
West	11.90	11.96	-0.06	-0.33	No significant difference
National	11.95	12.11	-0.16	-2.03	No significant difference

*The significance level of 1 percent is chosen as a cutoff.
Source: Author's calculations based on the BRFSS 2013 data

The difference in self-reported health between men and women may vary over the entire distribution of the health status variable. We explored the differences between men and women at the 25th, 50th, and 75th quantiles and found the following (Table 3): All four regions show a similar pattern of gender-based disparity. Women report a slightly greater number of sick days in a month when the average number of sick days is low. Among the people who report a high number of sick days, men report a slightly greater number. The difference is most pronounced in the South, showing worse health for men.

Table 3 | **Average Number of Self-Reported Sick Days by Sex, Region, and Quantile**

	25TH QUANTILE			50TH QUANTILE			75TH QUANTILE		
REGION	WOMEN	MEN	DIFFERENCE	WOMEN	MEN	DIFFERENCE	WOMEN	MEN	DIFFERENCE
Northeast	1.90	1.82	0.08	4.98	4.82	0.16	19.44	19.73	-0.28
Midwest	1.90	1.86	0.04	5.02	4.91	0.11	19.69	20.01	-0.32
South	2.60	2.49	0.11	6.98	6.99	0.01	26.14	33.79	-7.65
West	1.97	1.89	0.07	6.48	6.31	0.17	20.47	21.68	-1.21

Source: Author's calculations based on the BRFSS 2013 data

National Data

How much of the observed difference in self-reported health between men and women is due to social circumstances and how much is due to differences in the prevalence of various chronic diseases? Table 4 shows relative contributions of socioeconomic and demographic factors as well as existing health conditions to the difference.

Our findings indicate that there were two opposing forces driving health disparity in the U.S. in 2013. First, differences in characteristics between men and women contributed to the observed health disparity. For example, health risk indicators such as drinking and smoking show marked gender differences, with men engaging in riskier behavior more often. Second, the impact of observed characteristics such as income or employment status on one's health differed between men and women.

The results further indicate that if the second factor for women, the impact of characteristics on health, were identical to that of men, the self-reported health of women would have been substantially worse. Although women are disadvantaged in terms of socioeconomic factors, they appear to do much better with less than men do with more.

Roughly 63 percent of the explained (driven by characteristic differences) portion of the health disparity is due to socioeconomic and demographic factors.

Table 4 | **Decomposition of the Gender-Based Mean Difference in Sick Days: Average National Difference = 0.16 days (Men's Sick Days - Women's Sick Days)**

MAJOR COMPONENTS	EXPLAINED	UNEXPLAINED
Socioeconomic and Demographic Factors	-0.36	-3.21
Existing Health Conditions and Health Risks	-0.21	-1.77
Intercept Term	0	5.71
Total	-0.57	0.73

Note: Totals add up to 0.16 (-0.57 + 0.73)

Regional Data: South

The South was the only region with a substantial gender-based health disparity. Instead of focusing on the mean of the distribution, we decomposed the gender-based health disparity in the South at the 25th and the 75th quantiles. Our results indicate the following:

Women reported a greater number of sick days than did men at the 25th quantile.

Over 50 percent of the difference in self-reported health between men and women at the 25th quantile is due to differences in socioeconomic and demographic factors.

Men reported a disproportionately higher number of sick days than did women in the South at the 75th quantile.

Although the women in the South are unambiguously disadvantaged in terms of socioeconomic factors (Table 6, Column 1), the impact of men's characteristics appear to be large and adverse.

Table 5 | **Decomposition of the Gender-Based Mean Difference in Sick Days (South): 25th Quantile Difference = -0.11 days (Men's Sick Days - Women's Sick Days)**

MAJOR COMPONENTS	EXPLAINED	UNEXPLAINED
Socioeconomic and Demographic Factors	-0.08	-2.11
Existing Health Conditions and Health Risks	-0.07	-0.55
Intercept Term	0.00	-1.52
Total	-0.15	0.04

Note: Totals add up to -0.11 (-0.15 + 0.04)

Table 6 | **Decomposition of the Gender-Based Mean Difference in Sick Days (South): 75th Quantile Difference = 7.65 days (Men's Sick Days - Women's Sick Days)**

MAJOR COMPONENTS	EXPLAINED	UNEXPLAINED
Socioeconomic and Demographic Factors	-1.58	-33.99
Existing Health Conditions and Health Risks	0.14	-16.75
Intercept Term	0.00	59.82
Total	-1.43	9.08

Note: Total is 7.65 (-1.43 + 9.08)

Table 7 | **Census Bureau Regions**

NORTHEAST	MIDWEST	SOUTH	WEST
New England Division	**East North Central Division**	**South Atlantic Division**	**Mountain Division**
Connecticut	Connecticut	Delaware	Arizona
Maine	Indiana	District of Columbia	Colorado
Massachusetts	Michigan	Florida	Idaho
New Hampshire	Ohio	Georgia	Montana
Rhode Island	Wisconsin	Maryland	Nevada
Vermont		North Carolina	New Mexico
	West North Central Division	South Carolina	Utah
Middle Atlantic Division		Virginia	Wyoming
	Iowa	West Virginia	
New Jersey	Kansas		**Pacific Division**
New York	Minnesota	**East South Central Division**	
Pennsylvania	Missouri		Alaska
	Nebraska	Alabama	California
	North Dakota	Kentucky	Hawaii
	South Dakota	Mississippi	Oregon
		Tennessee	Washington
		West South Central Division	
		Arkansas	
		Louisiana	
		Oklahoma	
		Texas	

Conclusion

Gender-based disparities in health are a major concern to policymakers around the world. This discussion paper contributes to the existing literature in two distinct ways. First, it broadens our understanding of the topic beyond comparing an average woman to an average man in the U.S. by looking at different sub-populations. Second, it quantifies the relative contribution of social and demographic determinants of health on the gender-based health disparity.

We find that the prevailing approach of looking at the mean of the distribution of health indicators provides an incomplete picture of gender-based health disparity in the U.S.

Our results show that women report slightly worse health than men when the problems are not severe. However, among individuals with severe problems, men report significantly worse health than women.

Men in the South report substantially worse health than women at a higher quantile of the data.

Socioeconomic and demographic factors are the primary factors in explaining health differences between men and women.

About the Author

DR. KEN SAGYNBEKOV is a health economist at the Milken Institute. His research focuses primarily on applied microeconomic analysis of health and crime, with an emphasis on quantitative methods. Sagynbekov's work has been published in peer-reviewed academic journals and government reports. Before joining the Institute, he was a tenured assistant professor of economics at the University of Regina in Canada, where he taught econometrics and the economics of health and served as lead investigator in several large government-funded research projects. In addition to academia, Sagynbekov worked as an economic consultant in Central Asia with USAID's fiscal reform initiative. He received a bachelor's degree in finance from Clemson University and earned his M.A. and Ph.D. degrees in economics from the University of Mississippi. He works at the Institute's Santa Monica office.

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