



Sex differences in the use of healthcare services among US adults with and without a cancer diagnosis

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ABSTRACT

Objective: Cancer imposes higher burden on men. Sex differences in healthcare utilization may contribute to this problem. We compared healthcare utilization among adults with and without a history of cancer as measured by having at least one physician visit within the previous 12 months.

Material and methods: We analyzed data from 7,229 responders (weighted population size=211,722,892) enrolled in the 2007 Health Information and National Trends Survey (HINTS), a nationally representative sample of non-institutionalized adults in the United States. We used survey weights in all analyses and variance estimation procedures to account for the complex survey design and used logistic regression models to calculate odds ratios (ORs) and 95% confidence intervals (CIs).

Results: Study participants consisted of 2808 (48.6%) males and 4421 (51.4%) females. Overall, men were less likely to have seen a physician within the previous 12 months (OR=0.39; 95% CI: 0.31-0.48) regardless of their cancer status. Cancer survivors were more likely to visit a physician within the previous 12 months (OR=2.01; 95% CI: 1.28-3.19) regardless of sex. When stratified by personal history of cancer, men without a history of cancer were less likely to visit a physician (OR=0.38; 95% CI: 0.30-0.47) whereas men with a history of cancer were as likely to have seen a physician in the previous 12 months as women with similar cancer status (OR=1.24; 95% CI: 0.44-3.45).

Conclusion: Men increase their healthcare utilization to that of women only after they receive diagnosis of cancer. Targeted interventions to promote utilization of preventive care services by men are needed to reduce the burden of chronic illnesses including cancer among men.

Keywords: Cancer prevention; compliance; healthcare utilization; health promotion; men.

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Introduction

Cancer incidence and mortality rates have continued to change over time.^[1-4] Incidence rates of some types of cancer have decreased such as cervical, breast and colorectal cancers^[5], while those of some other types of cancer such as pancreas, and liver cancers have increased.^[6] In the last century, medical advancements have improved life expectancy in cancer and non-cancer patients. Despite the advances, men continue to have a lifespan up to 6 years less

than their female counterparts.^[1-4] Although biological differences of the sexes may contribute to a higher life expectancy among women, different lifestyle choices and utilization of healthcare resources which may be influenced by one's perceived risk of cancer may be contributory factors.^[4,7]

Literature suggests that greater amount of money is spent on men's healthcare because problems requiring treatment are usually identified at later stages.^[4] Some cancers

such as breast, colon, lung and prostate cancers have gained a lot of attention in terms of promoting screening and early detection.^[8] Despite the level of promotion, men consistently tend to have less favorable outcomes than women. Some screening methods rely more heavily on informed decision making such as screening for breast and prostate cancers.^[5] Informed decision making with physician's recommendations may increase the utilization of healthcare services and subsequently reduce disparities in healthcare between male and female patients.

We postulated that differences in healthcare utilization may be a major underlying factor playing a greater role in the differences in cancer burden among men and women. Therefore, we examined healthcare utilization as measured by having at least a physician's visit in the previous year among men and women with and without personal history of cancer.

Material and methods

Subjects

The design and results of 2007 Health Information and National Trends Survey (HINTS) have been published and available at <http://hints.cancer.gov/docs/HINTS2007FinalReport.pdf>.^[9] In brief, the 2007 HINTS used a dual mode of surveys (mail and telephone) and the survey was conducted in English and Spanish. All participants in the survey gave informed consent. A total of 7,674 respondents completed the survey. For the current study, we obtained approval of exemption from Howard University Institutional Review Board (IRB-14-MED-28) and downloaded the publicly available de-identified data of the 2007 HINTS.

Statistical analysis

Based on the guidelines used in this bimodal HINTS dataset, we assessed the effect of the sampling method in association with our main variables. There were no significant differences based on the survey mode used with respect to our main variables of interest (p value >0.05 for all comparisons), we therefore used the combined data for our analyses. We included all respondents who were 18 years and older. Therefore, we excluded any respondent who did not give his or her age ($n=81$) because we wanted to be certain that our study was limited to adult population. Moreover, cancer can be regarded as a disease of aging. We also excluded those who did not answer questions regarding whether they had a cancer diagnosis or not ($n=292$) since this was the main exposure variable for our study. Finally, we excluded those who did not answer whether they had physician's visit or not ($n=72$) since this was our main outcome (dependent) variable. All remaining 7,229 respondents indicated their gender (the primary independent variable of our study).

We compared the demographic characteristics of men versus women. We used logistic regression models to compare the association between sex and cancer status with use of healthcare resources. We used survey weights in all analyses to obtain national estimates and variance estimations were performed using Taylor series linearization to account for the complex survey design. We used logistic regression models to evaluate the association of sex with having at least one physician's visit within the previous 12 months and examined this relationship with and without cancer diagnosis. Our final models included age, education, health insurance, race, smoking, body mass index, marital status, and personal health perception of respondents. We calculated odds ratios (ORs) and 95% confidence intervals (CIs). We used Stata® Statistical Software version 11.2 (College Station, Texas, USA) for all analyses and reported only weighted percentages.

Results

A total of 7,229 male and female respondents (weighted population size=211,722,892) who gave information about their attendance to clinic visit were included in this analysis. A total of 4,421 (51.5%) respondents were females with a mean age of 46.7 years (95% CI=46.5-47.0 years) and 2,808 (48.5%) were males with a mean age of 44.9 years (95% CI: 44.6-45.1 years) (Table 1). Men were more likely to be married and current smokers, but they were less likely to have health insurance. There was no sex difference in respondents' individual perception of health (Table 1). Many types of cancers were reported by respondents of which the most common cancer types were breast (16.6%), cervical (10.3%), prostate (10.2%), and melanoma (9.7%). Many types of cancers were reported in small numbers, so meaningful analysis by cancer types could not be made.

Overall, 6,428 (84.0%) respondents reported having a physician's visit within the previous year. In general, regardless of sex, cancer survivors were more likely to have had a physician's visit within the previous 12 months (OR=2.01; 95% CI: 1.28-3.19). However, regardless of cancer status, male respondents were less likely to have had a physician's visit in the previous year (77.8% vs. 89.8%; OR=0.39; 95% CI: 0.31-0.48). This 61% reduced odds of having a physician's visit was limited to men without any cancer diagnosis. In stratified analysis by cancer status, men without a cancer diagnosis were less likely to have had a physician's visit (OR=0.38; 95% CI: 0.30-0.47) whereas men who were cancer survivors were as likely as women who were cancer survivors to have had a physician's visit in the previous year (OR=1.24; 95% CI: 0.44-3.45) (Table 2).

Table 1. Demographic characteristics of respondents by sex

Characteristics	Female, n=4421 (weighted 51.5%)	Male, n=2808 (weighted 48.5%)	p
Mean Age, years	46.7 (95% CI: 46.5-47.0)	44.9 (95% CI: 44.6-45.1)	
Race			
White (non-Hispanic)	3257 (69.7)	2124 (69.2)	<0.002
Black (non-Hispanic)	455 (12.8)	213 (9.6)	
Hispanic	369 (11.5)	241 (14.5)	
Others	248 (5.9)	168 (6.7)	
Education			
<High School	404 (13.2)	255 (14.1)	0.01
High School	1137 (25.8)	633 (27.3)	
Some College	1341 (36.2)	820 (33.5)	
College	1522 (24.8)	1090 (25.0)	
Health insurance			
Not insured	480 (14.9)	319 (19.0)	0.01
Insured	3884 (85.1)	2453 (81.0)	
Marital status			
Not married	2015 (45.2)	903 (40.6)	<0.001
Married	2385 (54.7)	1896 (59.4)	
Smoking status			
Never	2499 (58.1)	1237 (48.0)	<0.001
Former	1141 (22.0)	1042 (29.4)	
Current	726 (19.9)	489 (22.8)	
Body mass index in kg/m²			
Less than 25	1809 (44.2)	780 (31.0)	<0.001
25-29	1253 (27.9)	1216 (41.3)	
30 or more	1303 (28.0)	799 (27.7)	
History of cancer			
No	3839 (92.0)	2406 (93.6)	0.001
Yes	582 (8.0)	402 (6.4)	
Health status			
Poor	731 (16.5)	415 (16.0)	0.82
Good	1531 (36.6)	1001 (36.1)	
Excellent	2147 (46.9)	1382 (47.9)	
Weighted population size=211,722,892			
Missing: health insurance=93; education=27; race=154; smoking=95; BMI=69; health status=22 and Marital status=30			

Discussion

We evaluated the use of healthcare services as measured by having a physician's visit in the previous year among a representative sample of U.S. adults. Overall, we noted that men were less likely to have had a physician's visit when compared to women. This was primarily among those without a cancer diagnosis. Our study showed that men were as likely as women to see a physician after they have been diagnosed with cancer. This suggests that men do not utilize healthcare services until they have been diagnosed with a major illness. The implication of this finding is that greater efforts and strategies to encourage men to utilize preventive care services are needed to reduce poorer health outcomes among men and reduce health disparities by sex in the United States and possibly all over the world.

In this analysis of a nationally representative survey of US adults, male respondents without a personal history of cancer underutilize healthcare services than female respondents until they develop cancer. The use of healthcare services may be seen as one's individual behavior^[8], but there is also a need to consider factors in societal determinants. One determinant includes "net worth". It has been suggested that net worth should be used in studies of health disparities^[10,11] and may prove to be beneficial when exploring the utilization of healthcare services. A person's net worth implies how one feels about oneself. The way people view themselves and how they are viewed by others may influence the likelihood of using available healthcare services.

Another determinant includes current knowledge and belief about a health condition. Kulaksizoglu et al.^[11] noted that improving knowledge/awareness of a condition (i.e. prostate disease) may encourage patients to make appropriate lifestyle changes to reduce their personal risk. Capik et al.^[12] cautioned that improving or increasing knowledge may not necessarily improve participation in healthcare services. Wolff, et al.^[13] noted that some populations do feel that daily well-being and safety are of a higher priority than concerning themselves with an illness they don't feel they have. Understanding one's knowledge and beliefs are very important when trying to create a change in one's behavior.^[13] It has been noted that psychosocial factors do, in fact, influence screening behaviors^[14,15], and possibly utilization of major healthcare services. Further exploration may yield a better understanding of the disparity in healthcare utilization. However, it is noteworthy that in our study, men have similar perception of their health as women with over 80% of both sexes regarding their health status as good or excellent. We opined that, in general, men probably did not take good care of their health until they are diagnosed with major illness. It is important for families to encourage the males in their households to get preventive and health maintenance evaluations. Healthcare providers should also make efforts to maximize the delivery of preventive

Table 2. Comparison of cancer survivor men and women having a physician's visit within the previous year

No history of cancer (OR 95% CI)				Cancer survivors (OR 95% CI)			
Sex	Visits to a physician within the previous year n, (%)	Univariate	Multivariate	Sex	Visits to a physician within the previous year n, (%)	Univariate	Multivariate
Female (n=3839)	3501 (89.4)	Reference	Reference	Female (n=582)	551 (94.1)	Reference	Reference
Male (n=2406)	1985 (76.5)	0.39 (0.31-0.47)	0.38 (0.30-0.47)	Male (n=402)	391 (97.0)	2.03 (0.71-5.84)	1.24 (0.44-3.45)

Adjusted for age, health insurance coverage, education, race, smoking status, body mass index, personal health and marital status

services to men by combining screening tests and counseling for different illnesses (i.e. multiple opportunistic screenings, recommended vaccinations, and health maintenance counseling such as obesity avoidance, increase in physical activities and smoking cessation). The increased adoption of electronic medical records and clinical encounter reminders for healthcare providers may further enhance healthcare delivery to men.

Cancer incidence and mortality rates change over the years in line with attitudes about healthcare. Today, more and more health professionals agree that standards of healthcare should be monitored, improved and evaluated on a continual basis.^[14] This constant review approach should be used to inform policies aimed at improving utilization of healthcare services particularly for men in order to eliminate disparities in accessing health services. Abdus et al.^[16] noted that an intention of the Affordable Care Act (ACA) is to address health care disparities. The ACA seeks to make healthcare more accessible, more affordable and of a higher quality for those that enroll. Some researchers agree that the ACA is making progress in reducing health care disparities.^[16,17] However, there are areas that require further attention such as health literacy and quality of care delivered.

It is unclear how the type of cancer diagnosed influence clinic attendance. However, it is conceivable that patients who were diagnosed with cancers at early stages and those with cancers that are amenable to surgical treatment or chemotherapy may be more inclined to be compliant with their clinic visits. Unfortunately, we do not have details of cancer diagnosis and adequate information on the treatment received to explore this issue further in our study. However, using the Australian Comprehensive Cancer Outcomes and Research Database (ACCORD) colorectal database, Kosmider et al.^[18] reported that among 619 patients with curatively treated colorectal cancer, 130 (21%) failed to attend one or more appointments. The cancer survivors who failed to attend were more likely not to have received adjuvant therapy but were more likely to require the services of an interpreter. This suggests that low intensity of treatment and residual barriers may also play a role in clinic attendance even among patients with cancer diagnosis. In Ontario, Nathan et al.^[19] reported that among 3,912 survivors of childhood cancers, only 1,695 (43.3%) had attended

at least one adult survivor clinic visit after a median follow up of 7.8 years. However, the authors noted that females, those who received higher intensity of cancer treatment, treatment with radiation therapy, and higher socioeconomic status were associated with higher rates of clinic attendance while those living more than 50 kilometers from the clinic were less likely to attend. This study also underscores the importance of residual access barriers and the impact of socioeconomic status which may be a reflection of health literacy. This findings reported by Nathan et al.^[19] are of paramount importance given the fact that healthcare delivery is free to the target population in Canada when compared to other regions of the world where healthcare delivery may be cash based or individual purchases of third party healthcare insurance, thereby creating a health system which potentially leads to and perpetuate poorer health coverage for those with lower socioeconomic status.

There are many notable strengths of our study. We studied a large number of nationally representative adults in the United States. The survey was conducted in both English and Spanish to ensure a wide reach of the population. Furthermore, the survey utilized bimodal communication modalities (phone and mail).

Study limitations

However, our study is limited by being based on self-report. We could not confirm the reported physician's visit through medical record review and we could not ascertain the specific reason for the physician's visit. Furthermore, because lack of relevant data, we could not analyze attendance to clinic based on the type, stage and details of treatment received for the cancer diagnosed.

In conclusion, men should be encouraged to utilize healthcare resources and increase in their receipt of preventive services rather than waiting until they develop major illnesses such as cancer.

Ethics Committee Approval: The study was approved by Howard University Institutional Review Board on April 7, 2014 (IRB-14-MED-28)

Informed Consent: The original study consented the participants. Our study was based on publicly available de-identified data, but our study was approved by Howard University Institutional Review Board.

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