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BREAST CANCER IN MEN: DOES HISPANIC ETHNICITY PREDICT RECEIPT OF ADJUVANT RADIOTHERAPY?

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Abstract

BREAST CANCER IN MEN: DOES HISPANIC ETHNICITY PREDICT RECEIPT OF ADJUVANT RADIOTHERAPY?
By Lavonne Cole

Despite periods of increasing incidence and years of documented morbidity and mortality, breast cancer in men remains under-researched in the United States. Little is known about the factors that predict receipt of post-surgery adjuvant therapy prescribe to men diagnosed with breast cancer. The purpose of this research was to explore whether Hispanic ethnicity was a predictor to receiving adjuvant radiotherapy in Hispanic men diagnosed with breast cancer in the United States from 2004 to 2013.

Methods: Data for the study were extracted from the National Cancer Institute's Surveillance (NCI), Epidemiology, and End Results (SEER) database. A retrospective review of the data collected on 3,051 men including 213 Hispanic men was conducted. Multiple Regression analyses were performed to test the hypothesis that Hispanic ethnicity predicts receipt of radiotherapy.

Results: Hispanic ethnicity was found to be not significant, as a predictor of receipt of radiotherapy ($P = 0.501$) in the sample of men diagnosed with breast cancer and reported to the (NCI), Epidemiology, and End Results (SEER) program from 2004 to 2013.

Summary: The prospect that Hispanic ethnicity may not influence receipt of radiotherapy compared to non-Hispanic whites and blacks is an important finding given that previous studies have described differences in receipt of various adjuvant therapies in minority groups including Hispanics. However, the small number of Hispanic men receiving radiotherapy in this study (48) limits generalization of these results.

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Chapter I: Introduction

Introduction and Rationale

Carcinoma of the male breast, commonly referred to as male breast cancer (MBC), is a rare, but serious, medical condition diagnosed annually in thousands of men in the United Sates and many countries worldwide. (Fentiman 2010) Approximately 2,000 men are diagnosed with breast cancer each year in the United States and several hundred (400) die from the disease. (CDC 2016) Nevertheless, despite periods of increasing incidence (Giordano, et al. 2004) and years of documented breast cancer related morbidity and mortality, male breast cancer remains under-researched in the United States. (O'Malley, et al. 2005)

Most of what is known about the management of breast cancer in men has been learned from studies of diagnosed women. This is understandable given that millions of women are diagnosed worldwide, including hundreds of thousand annually in the United States, (WHO 2016, Breast Cancer.Org 2016). However, the absence of men, in breast cancer studies has hampered the development of evidence-based educational materials (Pituskin, et al. 2007), important risk reduction strategies and optimal treatment protocols specific to the needs of men. (S. Giordano 2008)

According to estimates from the American Cancer Society (ACS), 2,470 men will be diagnosed with invasive breast cancer this year, in 2017, and 460 will die from the disease. (American Cancer Society 2017) As in other years, a number of these men will likely experience the diagnosis of breast cancer from a position of personal ignorance due

to the limited availability of information about MBC. (Robinson and Metoyer 2008) Others may encounter health care providers who are ill-prepared to recognize and diagnose MBC, thereby potentially contributing to delays in receipt of appropriate medical follow-up. (Zurrida, et al. 2010) By contrast, women often benefit from a complex network of well-established breast-health programs designed to promote breast cancer awareness, encourage early detection through screening and provide linkages to facilities that provide timely and appropriate medical management. (National Breast and Cervical Cancer Early Detection Program 2017)

In general, the stark difference in the availability of information and support services for men, compared to those available for women, has been characterized as a function of the rarity of disease in men which limits the development of randomized clinical trials. (Crew, et al. 2007) However, in recent years, researchers have proposed and supported efforts to pool case-data across institutions to overcome this limitation, and increase sample sizes for prospective studies. (Zurrida, et al. 2010, Cook 2017) Supporters anticipate that these collaborative studies will provide many opportunities to better understand breast cancer in men and most importantly, identify optimal treatment protocols based on evidence gathered from studies of men, and not, as is the current protocol, extrapolations from studies of women. (S. Giordano 2008, Korde, et al. 2010)

To date, none of the collaborative studies have focused on racial or ethnic groups (Cook 2017) However, because little is known about breast cancer in Hispanic/Latino men (hereafter referred to as Hispanic), and existing research shows that Hispanic women, underuse important post-surgery treatments (known as adjuvant therapy) that

could impact survival outcomes (Bickell, et al. 2006), this review will assess whether Hispanic ethnicity influences receipt of adjuvant radiotherapy in Hispanic men.

Problem Statement

Existing research has shown that 23% of Hispanic women diagnosed with breast cancer underused post-surgery adjuvant therapy of all types, compared to 16% of Non-Hispanic white women. (Bickell, et al. 2006) Because Hispanic men are impacted by many of the same environmental, social and economic factors as Hispanic women, underuse of adjuvant therapy may also be prevalent and unidentified among this group. Given that early detection and treatment are essential to favorable cancer outcomes, there is a need to assess whether Hispanic men diagnosed with breast cancer are receiving commonly recommended adjuvant radiotherapy after surgery.

Theoretical Framework

The theoretical framework for this research—the Social Ecological Model, will be the basis for describing the characteristics, behaviors, economic and environment circumstances, and organizational practices and regulations that may influence receipt of recommended radiotherapy.

Purpose Statement

The purpose of the research is to explore whether Hispanic ethnicity was a predictor to receiving adjuvant radiotherapy in Hispanic men diagnosed with breast cancer in the US from 2004 to 2013.

Research Question

Does Hispanic ethnicity predict receipt of adjuvant radiotherapy in men diagnosed with breast cancer?

Significance Statement

Identifying the factors that predict under-use or non-receipt of recommended post-surgery therapy in men diagnosed with breast cancer provides an opportunity to develop strategies to eliminate the barriers to treatment thereby reducing the risk of local recurrence and other complications that could lead to death.

Definition of Terms

MBC—Male Breast Cancer

NCI—National Cancer Institute

Radiotherapy—"is a cancer treatment that uses high doses of radiation to kill cancer cells and shrink tumors" [*]

SEER—Surveillance (NCI), Epidemiology, and End Results (SEER) database

[*]*National Cancer Institute* https://www.cancer.gov/about-cancer/treatment/types/radiation-therapy

Chapter II: Review of Literature

Introduction

Breast cancer can occur in men and women. (American Cancer Society 2017) However, because the diagnosis is uncommon in men, existing systems for educating communities about breast cancer risks and the importance of early detection and treatment, seldom incorporate the experiences or needs of men. The organizers of breast cancer awareness campaigns such as Pink Ribbon and Breast Cancer Awareness Month routinely overlook breast cancer incidence in men, highlighting only the female nature of the disease. Unfortunately, as has been noted in survey responses from diagnosed men, the feminization of the disease inadvertently contributes to delays in care because unlike women, men are not encouraged to be suspicious of masses or other abnormal changes to the chest/breast area. (Quincey, Winstnaley and Williamson 2016)

Diagnostic and support services for men who seek care are also less structured than services available for women. The CDC's, National Breast and Cervical Cancer Early Detection Program (NBCCEDP), awards funding to states to provide screening and diagnostic services to uninsured women. There are no similar federal programs available to support diagnostic services and treatment for men. Consequently, men seeking services can be disadvantaged by health care providers who do not make the appropriate referrals or do not suspect breast cancer. (Pituskin, et al. 2007)

Once diagnosed, decisions related to surgical options and post-surgery care are often complicated for men and their families by the lack of educational material specifically addressing breast cancer in men, and the minimal amount of support and

counseling received from health care providers. (Pituskin, et al. 2007) Accepting and managing illness under these conditions has been described as overwhelming and isolating by participants in a video interview of men diagnosed with breast cancer. (Healthtalk.org 2015) Other participants concerned by the reality that treatment options are based on what has been successful in women and not on research demonstrating efficacy in men, expressed fear and frustration and a desire to influence the care system to increase the level of interest and research about male breast cancer including inclusion of men in research studies. (Quincey, Winstnaley and Williamson 2016)

Characteristically, men diagnosed with breast cancer are older than women and on initial diagnosis often present with more advanced disease than women. Signs and symptoms of the disease are similar to those observed in women: painless lumps, swelling of the breast, reddening or dimpling of the nipple, nipple inversion and in rare cases discharge from the nipple; however due in part to the absence of a national public awareness campaign, in many communities little is known about the occurrence of breast cancer in men, the factors that may increase risk, the importance of seeking medical attention when breast abnormalities first appear or the importance of completing the full course of therapy as recommended. (Komen 2017, Thomas 2010)

Review of literature

Male breast cancer (MBC) is an uncommon but serious health problem. The earliest reference of the disease is believed to date back to ancient times (3000-2500 BC). (Donegan and Relich 1996); Yet many Americans are unaware that approximately 2,000 men are diagnosed annually in the US. (Robinson and Metoyer 2008) According to the

American Cancer Society, 2,470 additional men will be diagnosed in 2017, and an estimated 460 will die of the disease. (American Cancer Society 2017)

The causes of male breast cancer have not been fully identified; however several potential risks have been proposed. Genetic factors—specifically family history, gene mutation and the congenital condition Kleinfelter syndrome (KS), along with high estrogen levels, exposure to radiation, and aging, have all been identified as factors that increase risk of developing male breast cancer. (BreastCancer.Org 2016) However, much of the current literature about male breast cancer risk has focused on estrogen-progesterone imbalances, genetic mutations and family history.

In a 2008 study, Contractor, Kaur, and Rodrigues, described Kleinfelter syndrome, (a genetic disorder in men that alters estrogen progesterone levels), as the medical condition with the strongest association to male breast cancer. (Contractor, et al. 2008). Men diagnosed with KS have been found to have an increased risk of developing breast cancer 20 to 50 that of times unaffected men. (Fentiman, Fourquet and Hortobagyi 2006). A somewhat different perspective from Giordano et al., proposed that male breast cancer may be a marker for Kleinfelter disease, and that testing male breast cancer cases for KS could identify previously undiagnosed KS cases. (Giordano, Buzdar and Hortobagyi 2002) Brinton's investigation recognized an increased risk of breast cancer among men diagnosed with KS, but cautioned that additional research is needed to "clarify" if the chromosomal abnormality present in these men (XXY vs. the normal XY), predisposes developing breast cancer, for reasons other than hormonal imbalance. (Brinton 2011)

Approximately 20% of men diagnosed with breast cancer have at least one first-degree relative also diagnosed. (Fentiman, Fourquet and Hortobagyi 2006) This type of familial history is relatively common among Ashkenazi Jewish men, many of whom have inherited mutations of the tumor suppressor genes BRCA1 and BRCA2. Mutations of BRCA2 have been identified in up to 40% of male breast cancer cases, (Weiss, Moysich and Swede 2005) and compared to non-carriers, higher rates of MBC have been observed in the US, among men who have inherited both mutations. (Fentiman, Male Breast Cancer 2010) Although these outcomes have been derived from small studies, counseling and genetic testing is increasingly being recommended for men of Ashkenazi heritage because male carriers can pass mutated genes to their offspring. Research by Liede et al., revealed that once informed, male carriers experience varying levels of anxiety associated with fear of developing breast, prostate or other BRCA1 or BRCA2 associated cancers and fear and guilt of potentially passing mutated genes to their children, particularly their daughters since lifetime risk of developing breast cancer ranges from 28% - 78% among female carriers. (Liede, et al. 2000)

In the area of supportive needs, 29% of participants in the Liede study agreed that there was a need to establish support groups for carriers of the BRCA1 and BRCA2 mutations to provide a venue where carriers could concerns including how to manage the "general perception that breast cancer is not a man's disease." (Liede, et al. 2000) Although other researchers have found that men are less interested in support groups than women, the issue of how to managing internalized sentiments of inadequacy and the perceptions of others about decreased masculinity have surfaced as areas of concern in other studies. Robinson described participant's account of being ridiculed and laughed at

after disclosing a diagnosis and of questioning their own masculinity after mastectomy. (Robinson and Metoyer 2008) Donovan and Flynn identified sexuality related masculinity concerns when it was revealed that some men were making concerted efforts to avoid being seen shirtless by other men to avoid the possibility of being perceived as “half woman” or gay. (Donovan and Flynn 2007) The danger of adopting misinformation about MBC diagnosis is evidenced in the details of a 2016 case report by Patel, Rajgopal and Hyklova. (Patel, et al. 2016) Patel described a troubling experience with an Afghan MBC patient who fervently challenged his diagnosis, and refused treatment for some time because he perceived breast cancer to be a “women’s disease.” Patel’s conclusion reminds health care professionals that ethnicity and culture may” exacerbate” the way minority men respond to “a gender-biased” diagnosis and this could impact the success of treatment plans. (Patel, et al. 2016)

Based on the most recent data from the US Census Bureau (2015), Hispanics are the largest ethnic minority population in the United States. (US Census Bureau 2016) The Census Bureau defines Hispanic/Latino as individuals of “Cuban, Mexican, Puerto Rican, South or Central American or other Spanish culture or origin regardless of race." (US Census Bureau 2017) The average growth rate of the Hispanic/Latino population rose 2.8 % annually from 2007 through 2014; by July 2015 there were 56 million Hispanics living in the US. (Pew 2016) As the population increased, studies on Hispanic health also increased. Many have focused on acculturation (the idea that incorporating the ways of America improves health), and its relationship to disparities in health. (Thomson and Hoffman-Goetz 2009) Few have focused on Hispanic men diagnosed with breast cancer. (Hunta, Schneidera and Co 2004)

As a group, Hispanics are connected by language and religion with most speaking Spanish, and belonging to the Catholic faith. (Pew 2016) However, despite these important commonalities, differences in life experiences and economic standing have created very distinct communities of Hispanics with varying health profiles. Recently, an investigation into the use of preventive cancer screening services found lower preventive cancer screening rates among Mexicans, compared to Cubans and other Hispanic subgroups that were explained by socioeconomic differences. (Bustamante, et al. 2010) The Office of Minority Health's 2015 Data Brief shows that this economic difference still exists. The Data Brief lists family income levels for Mexicans at $35,000, substantially lower than those of Cubans who have for decades been at the higher end of the scale ($75,000). (Wilson-Frederick and González 2015) It has been suggested that this income difference is related to governmental assistance received by first generation Cuban immigrant that allowed them to start and succeed in business whereas Mexican immigrants, more often, are employed in agricultural and other lower income generating jobs. (Guarnaccia and Martinez 2002) Despite its origin, poverty rates among Hispanics of all nationalities (21.4 % vs. 9.1% for Non-Hispanic Whites) make them vulnerable to inequities of all types including disparities in health. (Proctor, Semega and Melissa 2016)

Culturally, Hispanic men, like men of other racial and ethnic communities occupy positions of respect and leadership within the family and community. They are also critical to the financial stability of the family unit. As a result, work often takes priority over seeking medical care. (CDC's Healthy Communities Program 2017) Bunkley and colleagues' discussion about the loss of arm-strength following a radical mastectomy highlights the difficult and stressful choices that must be made by Hispanic men who

work in physically demanding jobs. (Bunkley, et al. 2000) Breast cancer specific stress has been observed in diagnosed men (Brain, et al. 2006), however, fear and denial has been shown to influence the decision to seek help. (Tudiver and Talbot 1999) More commonly, Hispanic men diagnosed with breast cancer experience a sense of isolation and confusion due to the absence of medical support and direct instruction from providers about the best treatment choice. (Tyson-Martinez, et al. 2017) In addition, depending on region of origin or ancestry, the sense of confusion likely conflicts with normally adaptive problem solving strategies rooted in elements of *Machismo.* Although machismo is often viewed as synonymous with aggression, in practice, for many Hispanic men, machismo or "macho" actions are associated with a sense of responsibility—the idea that as the man he should lead and provide for the family. (Getrich, et al. 2012) Consequently, the lack of tailored information to help with decision making may result in a fatalistic response, followed by abandonment of compliance with medical recommendations.

Radiotherapy is commonly prescribed postoperatively as supplemental treatment for breast cancer. (Male Breast Cancer 2006) Historically, men have received radiotherapy in greater proportions than women (Macdonald, et al. 2005). Investigating whether ethnicity predicts receipt of this important treatment in this group of men may reveal opportunities to improve the overall care, and breast cancer outcomes for this generally underserved and largely understudied group of men.

Compared to Hispanic women for whom breast cancer is the leading cause of death (Siegel, et al. 2015), the smaller number of breast cancer cases in Hispanic men may appear non-critical as a public health concern. However, because the medical challenges of the diagnosis are severe, the impact of the associated deaths significant to

Hispanic families and communities, investigating whether receipt of radiotherapy (a multi-week regimen to reduce tumor recurrence), is dependent on ethnicity may provide opportunities to develop interventions to minimize negative effects and improve outcomes.

Chapter III: Methodology

Introduction

The data for this analysis was extracted from the National Cancer Institute's Surveillance (NCI), Epidemiology, and End Results (SEER) database. SEER is a compilation of cancer data collected from population-based "cancer registries strategically located across the United States." (National Cancer Institute 2012) SEER data represents approximately 28% of the US population. Specific population coverage includes 25.6 percent of African Americans, 24.9 percent of Whites, 38.4 percent of Hispanics, 43.8 percent of American Indians and Alaska Native, 50.4 percent of Asians, and 66.5 percent of Hawaiian /Pacific Islander. (United States Cancer Statistics (USCS) 2017) Access to SEER data is obtained by written request. Once approved data can be extracted using *SEER*stat*—the statistical software package distributed along with access to the research data. (National Cancer Institute 2012)

*SEER*stat* 8.3.4 was used to extract case listing data for analysis from the most recent file of registry data, *the SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2015 Sub (1973-2013 varying)* database. Study variables include demographic data (age, ethnicity: Spanish-Hispanic-Latino, Non-Spanish-Hispanic-Latino), diagnostic and staging data (tumor size, tumor grade, stage), and treatment data (surgical, radiotherapy). This research assesses whether being a male of Spanish-Hispanic-Latino (Hispanic) ethnicity is a significant predictor of receiving adjuvant radiotherapy following breast cancer surgery.

Population and Sample

All Men with a reported diagnosis of breast cancer from 2004 through 2013 (4961) were selected from the SEER 18 database. Six percent (313) were Spanish-Hispanic-Latino, and approximately 94% (4,648) were Non-Spanish-Hispanic-Latino. Records selected for inclusion in the analysis were:

1. Men diagnosed with only one primary tumor
2. Men who received surgery following diagnosis

All other records were excluded. The key exclusion criteria were men with multiple primaries (n = 1,538). These records were excluded to standardize the sample and minimize the potential influence multiple primary tumors could have on post-surgery treatment recommendations. Other excluded records were, records with one primary tumor, and no surgery performed (n = 355), and records containing apparent data entry errors (n = 17). These records represented records with illogical responses to related variables such as surgery recommend “no” surgery performed “yes.”

Research Design

The study is a retrospective review of treatment received by men diagnosed with breast cancer. The outcome of interest is receipt of radiotherapy (radiation) following surgery.

Procedures

Microsoft Excel 2010 was used to create Pivot tables to evaluate the completeness of the data extracted from SEER, and the accuracy (in terms of logic) of responses to related selected variables. The analysis dataset contained 3,051 records. The statistical

computing software package, R-3.2.4 was used to perform all analysis. Ethnicity was re-coded to 0 for non-Hispanic and 1 for Hispanic and a Univariate logistic model was developed using ethnicity as the independent variable and radiation as the dependent variable. Multiple regression analyses were performed by adding age, tumor size, tumor grade and diagnostic stage to the model as additional predictor variables; tumor grade and diagnostic stage were added as categorical variables, with age, and tumor size added as continuous variables.

Instruments

The study did not require use of any survey or data collection instruments.

Data Analysis Methodology

A Multiple regression model was developed to test the hypothesis that receiving radiotherapy was dependent on ethnicity. Next four additional predictors: age, tumor size, tumor grade and diagnostic stage, were added to the model to test their effect on receipt of radiotherapy.

Chapter IV: Results

Introduction

This study examined the effect of ethnicity on receipt of radiotherapy in men diagnosed with breast cancer. Radiotherapy is an important component of breast cancer treatment that has been underused in minority groups including Hispanic women. (Bickell, et al. 2006) To date there have been no published studies looking at the effect of ethnicity in receipt of radiotherapy in men diagnosed with breast cancer. The research hypothesis for this study is whether Hispanic ethnicity predicts receipt of radiotherapy in men diagnosed with breast cancer. Multiple Regression analyses were performed to test this hypothesis. Besides ethnicity, several other predictors were added to the model, including, age, tumor size, tumor grade and diagnostic stage. Table 1 summarizes the findings from the multiple regression analyses that regressed ethnicity and the four other predictor variables on receipt of radiotherapy.

Table 1. Regression of Radiotherapy Controlling for Age, Tumor Size, Tumor grade and Diagnostic stage

Independent Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value
Ethnicity	-0.11253	0.501	-0.150833	0.369	-0.127023	0.450	-1.06E-01	0.545	-1.06E-01	0.545
Age	xxx		-0.011778	0.000	-0.01198	0.000	-1.39E-02	0.000	-1.39E-02	0.000
Tumor size	xxx		xxx		-0.000652	0.000	2.10E-05	0.908	2.07E-05	0.909
Tumor Grade	xxx		xxx		xxx		-6.57E-01	0.000	-1.05E-01	0.035
Diagnostic stage	xxx		xxx		xxx		xxx		-6.57E-01	0.000
CL P < .05										

Key Findings

In the first regression model, ethnicity was added as the sole predictor which was found to be not significant (P = 0.501). In the next model age was added with ethnicity as the predictor and ethnicity was still not significant (P = 0.369). Tumor size was added

along with age and ethnicity in the third model where ethnicity remained not significant (P = 0.450). In the fourth model, tumor grade was added with ethnicity, age, tumor size, and still ethnicity was found to be a non-significant predictor (P = 0.545). In the final model, a total of five predictors were used including ethnicity, age, tumor size, tumor grade and diagnostic stage. Ethnicity was a non-significant predictor in this final model as well (P = 0.545). In all of the regression models some of the predictors showed some significance. Age, tumor grade and diagnostic stage were found to be significant in the final model, but ethnicity—the predictor of interest was non-significant throughout all models.

Other Findings

No unexpected findings were observed when these variables were regressed.

Summary

Ethnicity had no effect on receipt of adjuvant radiotherapy in the sample of men diagnosed with breast cancer and reported to the (NCI), Epidemiology, and End Results (SEER) program from 2004 to 2013.

Chapter V: Conclusions, Implications and Recommendation

Introduction

Throughout the last decade, improvements in cancer survival rates have been attributed to advances in methods of detection and treatment. (Tyson-Martinez, et al. 2017) However, not all populations have successfully accessed and utilized these advances. Existing research indicates that there is considerable variation in post-operative use of radiotherapy among men (from 3% to 78%), although exact reasons for the variation have not been explained. (Cutuli, et al. 2010) This analysis investigated whether ethnicity influenced receipt (utilization) of radiotherapy among Hispanic men diagnosed with breast cancer.

Summary of Study

The initial hypothesis that Hispanic ethnicity predicts receipt of radiotherapy considered that the disproportionate access to health care experienced by many minorities in the United States including Hispanics (B. Thomas 2014), would also influence access to radiation oncologists who provide radiotherapy. The hypothesis also considered that the health-related beliefs and attitudes about illness among Hispanics would contribute to increased refusal to accept radiotherapy as recommended. The hypothesis was not supported. Ethnicity was not found to be a significant predictor of receipt of radiotherapy in Hispanic men diagnosed with breast cancer from 2004 - 2013.

The results of this study may be reflective of the regional environments where Hispanics reside. As indicated in Table 2, the largest percentage (63%), of diagnosed Hispanics resided in California, an area of the country that has traditionally supported this

population through official policies. (Aboii 2016) In addition, the results may also reflect, the impact of positive community support including the availability of Spanish speaking providers which has been previously reported in the literature as important to improving compliance with treatment recommendations. (Tyson-Martinez, et al. 2017, Quincey, Winstnaley and Williamson 2016) However, a similar analysis utilizing a more comprehensive data set that includes Hispanic residing in rural and smaller cities may produce different outcomes.

Table 2. Description of Study Population

Characteristics	White Non-Hispanic		Black Non-Hispanic		Hispanic		Other		Unknown		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No. Records	2255	74	397	13	213	7	169	5	17	1	3051	100
Mean age in years	65.6		61.1		62.1		63.1		55.0		64.6	
Residence of diagnosis												
AK	0	0	0	0	0	0	4	2	0	0	4	0
CA	785	35	86	22	135	63	114	67	9	53	1129	37
CT	151	7	14	4	10	5	1	1	2	12	178	6
GA	220	10	94	24	9	4	2	1	1	6	326	11
HI	11	0	0	0	4	2	17	10	0	0	32	1
IA	110	5	3	1	1	0	1	1	1	6	116	4
KY	127	6	13	3	1	0	0	0	0	0	141	5
LA	121	5	70	18	1	0	1	1	0	0	193	6
MI	128	6	43	11	4	2	3	2	2	12	180	6
NJ	322	14	66	17	23	11	15	9	2	12	428	14
NM	65	3	2	1	21	10	4	2	0	0	92	3
UT	76	3	1	0	1	0	1	1	0	0	79	3
WA	139	6	5	1	3	1	6	4	0	0	153	5
Staging												
In situ	255	11	53	13	28	13	18	11	9	53	363	12
Localized	957	42	152	38	88	41	63	39	4	24	1264	42
Regional	947	42	162	41	87	41	83	51	3	18	1282	42
Distant	87	4	27	7	10	5	5	3	0	0	129	4
Unknown	9	0	3	1	0	0	0	0	1	0	13	0
Received Radiation												
N0	1722	76	321	81	165	77	129	76	10	59	2347	77
Yes	533	24	76	19	48	23	40	24	7	41	704	23

Limitations

The study delimiters include the selection of Hispanic ethnicity as a study group and the selection of a single post-surgery treatment method for analysis which further limited the size of the study group and thereby, the ability to stratify by other factors that

might influence receipt of treatment such insurance coverage, acculturation level based on years of residence in the U.S., or individual characteristics specific to country of origin. Additionally, the study is limited in that the extracted dataset did not include mortality variables which may have provided a more detailed picture of the distribution of cases and disparities nationally. It is also possible that the overrepresentation of cases in western states may be due to a reporting artifact and that the low number of cases reported outside of western states may reflect lack of services, under-diagnosis or underreporting.

Implications

Caution is warranted in assessing the implications of this study given the small number of Hispanic men who received radiotherapy (48) following surgery. However, the prospect that ethnicity may not predict receipt of radiotherapy—a breast cancer treatment frequently recommended for men due to the fact that they have a limited amount of breast tissue that may preclude the surgical removal of the entire tumor (Yu, et al. 2012), warrants further investigation.

Recommendations

Future studies of the factors that may influence breast cancer treatment in Hispanic men should consider the selection of a larger dataset linked to hospital, or other medical management records systems, such as Medicare, that provide information on all treatment options including why treatments were not received (e.g., patient refusal, vs health care system referral or linkage to care failure), as well as data on mortality status which may more accurately reflect the distribution of cases and disparities nationally.

Conclusions

Although the study finding did not support the hypothesis that Hispanic ethnicity predicts receipt of post-surgery radiotherapy in this sample of Hispanic men diagnosed with breast cancer, understanding the factors that may influence receipt of critical breast cancer treatment remains important to ensuring that this traditionally undeserved group has timely access to treatments that are known to improve overall breast cancer survival.

Works Cited

Alferi, Susan, Charles Carver, Michael Antoni, Charlene Weiss, and Ron Durán. "Health Psychology." *An exploratory study of social support, distress, and life disruption among low-income hispanic women under treatment for early stage breast cancer.*, 2001: 41-46.

American Cancer Society. *Breast Cancer in Men.* September 15, 2017. http://www.cancer.org/cancer/breastcancerinmen/detailedguide/breast-cancer-in-men-key-statistics (accessed February 15, 2017).

Anderson, William, Ismail Jatoi, Julia Tse, and Phillip Rosenberg. "Male Breast Cancer: A Population-Based Comparison with Female Breast Cancer." *Journal of Clinical Oncology*, 2010: 232-238.

Badakhshi, Harun, Arne Gruenl, Jalid Sehouli, Volker Budach, and Dirk Boehmer. "The impact of patient compliance with adjuvant radiotherapy: a comprehensive cohort study." *Cancer Medicine*, 2013: 712-717.

Bickell, Nina, et al. "Missed Opportunities: Racial Dispariities in Adjuvant Breast Cancer Treatment." *Journal of Clinical Oncology*, 2006: 1357-1362.

Breast Cancer.Org. *U.S. Breast Cancer Statistics.* November 7, 2016. http://www.breastcancer.org/symptoms/understand_bc/statistics.

Breast Thermography. June 20, 2016. http://www.breastthermography.com/what_is_breast_cancer_mf.htm (accessed March 12, 2017).

BreastCancer.Org. *The Risk Factors for Male Breast Cancer.* September 29, 2016. http://www.breastcancer.org/symptoms/types/male_bc/risk (accessed February 6, 2017).

Brinton, Louise. "Breast Cancer Risk Among Klinefelter Syndrome Patients." *Acta Paediatrica*, 2011: 814-818.

Bunkley, Darrell T, John D Robinson, Nelson E Bennett, and Sherilyn Gordon. "Breast Cancer in Men: Emascualtion by Association." *Journal of Cinical Psychology in Medical Settings*, 2000: 91-97.

CDC. *Basic Information About Breast Cancer.* April 4, 2016. https://www.cdc.gov/cancer/breast/basic_info/index.htm (accessed March 12, 2017).

Chinea, Felix, et al. "Ethnic heterogeneity and prostate cancer mortality in Hispanic/Latino men." *Cancer Epidemiol Biomarkers & Prevention*, 2017: 25-28.

Contractor, Kaiyumars, Kanchan Kaur, Gabriel Rodrigues, Dhananjay Kulkarni, and Hermant Singhal. "Male Breast Cancer: Is the Scenario changing." *World Journal of Surgical Oncology*, 2008: 1-11.

Cook, Michael. "National Cancer Institute Division of Cancer Epidemiology & Genetics, Metabolic Epidemiology Branch." *Discovering the causes of cancer and the means of prevention.* August 8, 2017. https://dceg.cancer.gov/research/cancer-types/breast-cancer/male-breast-cancer-pooling-project (accessed August 8, 2017).

Crew, Katherine, Xiaoyan Neugut, Judith Jacobson, Victor Grann, George Raptis, and Dawn Hershman. "Racial Disparities in Treatment and Survival of Male Breast Cancer." *Journal of Clinical Oncology*, 2007: 1089-1098.

Cutuli, B., et al. "Male breast cancer. Evolution of treatment and prognostic factors: Analysis of 489 cases." *Critical Reviews in Oncology/Hematology*, 2010: 246–254.

Donegan, William, and Phillip Relich. "Breast Cancer in Men." *Surgical Clinic of North America*, 1996: 343-366.

Fentiman, Ian. "Male Breast Cancer." In *Breast Cancer Epidemiology*, by Chritopher I Li, 261-272. New York: Springer Publishing Company, 2010.

Fentiman, Ian, Alain Fourquet, and Gabriel Hortobagyi. "Male Breast Cancer." *The Lancet*, 2006: 595-604.

Giordano, SH, DS Cohen, AU Buzdar , G Perkins, and GN Hortobagyi . "Breast carcinoma in men: a population-based study." *Cancer*, 2004: 51-57.

Giordano, Sharon. "A Review of the Diagnosis and Management of Male Breast Cancer." *The Oncologist*, 2005: 471-479.

Giordano, Sharon H, Aman U Buzdar, and Gabriel N Hortobagyi. "Breast cancer in men." *Annals of Internal Medicine*, 2002: 678-687.

Giordano, Sharon. *Male Breast Cancer: It's Time for Evidence Instead of Extrapolation.* Editorial, Freuburgh: Onkoligie, 2008.

Healthtalk.org. October 1, 2015. http://www.healthtalk.org/peoples-experiences/cancer/breast-cancer-men/topics (accessed February 11, 2017).

Johnson, C H. *SEER Program Coding and Staging Manual 2004, Revision 1.* Manual , Bethesda: National Cancer Institute, NIH Publication number 04-5581,, 2004.

Joshi M.D., Megha, Arthur K. C. Lee M.D., Massimo Loda M.D., and Mauricio G Camus M.D. "Male breast carcinoma: An evaluation of prognostic factors contributing to a poorer outcome." *Cancer*, 1996: 490-498.

Komen, Susan G. *Breast Cancer In Men.* March 29, 2017. http://ww5.komen.org/BreastCancer/BreastCancerinMen.html (accessed April 4, 2017).

Korde, Larissa, Jo-Anne Zujewski, Leah Kamin, Sharon Giordano, and Susan Domchek. "Multidisciplinary Meeting on Male Breast Cancer: Summary and Research Recommendations." *Journal of Clinical Oncology*, 2010: 2114-2122.

Livaudais, Jennifer, Gloria Coronado, Noah Espinoza, Ilda Islas, Genoveva Ibarra, and Beti Thompson. "Educating Hispanic Women About Breast Cancer Prevention: Evaluation of a Home-Based Promotora-Led Intervention." *Journal of Womens Health*, 2009: 2049-2046.

Macdonald, G., C. Paltiel, I. A Olivotto, and S. Tyldesley. "A comparative analysis of radiotherapy use and patient outcome in males and females with breast cancer." *Annals of Oncology*, 2005: 1442-1448.

Memorial Sloan Kettering. *What You Need Know About Male Breast Cancer.* October 26, 2016. https://www.mskcc.org/blog/what-you-need-know-about-male-breast-cancer (accessed February 20, 2017).

Moses, Kelvin, Heather Orom, Alicia Brasel, Jacquelyne Gaddy, and Willie Underwood III. "Racial/Ethnic Disparity in Treatment for Prostate Cancer: Does Cancer Severity Matter?" *Urology*, 2017: 76-83.

National Breast and Cervical Cancer Early Detection Program. *Cennters for Disease Control and Prevention.* August 31, 2017. https://www.cdc.gov/cancer/nbccedp/about.htm (accessed September 8, 2017).

National Cancer Institute. "About SEER." *SEER Facts Sheets and Brochures.* March 1, 2012. https://seer.cancer.gov/about/factsheets/ (accessed April 10, 2017).

O'Malley, Cynthia, Sarah Shema, Edward White, and Sally Glaser. "Incidence of male breast cancer in California, 1988–2000: racial/ethnic variation in 1759 men." *Breast Cancer Research and Treatment*, 2005: 145-150.

Patel, Faaizah, Rajgopal Achuthan, Lucie Hyklova, Andrew Hanby, and Valerie Speirs. "Management of breast cancer in an Asian man with post-traumatic stress disorde: a case report." *Journal Of Medical Case Reports*, 2016: 1-4.

Pew, Center Research. *Key facts about how the U.S. Hispanic population is changing.* September 8, 2016. http://www.pewresearch.org/fact-tank/2016/09/08/key-facts-about-how-the-u-s-hispanic-population-is-changing/ (accessed February 7, 2017).

Pituskin, Edith, Beverly williams, Heather-Jane Au, and Kristine Martin-McDonald. "Experiences of Men with breat cancer: a qualitative study." *Journal of Men's Health and Gender*, 2007: 44-51.

Quincey, Kerry, Sue Winstnaley, and Iain Williamson. "Marginalised malignancies: A qualitative synthesis of men's accounts of living with breast cancer." *Social science & medicine*, 2016: 17-25.

Robinson, John, and Kenneth Metoyer. "Breast Cancer in Men: A Need for Psychological Intervention." *Journal of Clinical Psychology in Medical Settings*, 2008: 134-139.

Siegel, R. L, K. D Miller, and A Jemal. "Cancer Statistics 2017." *CA; A Cancer Journal for Clinicians* 65 (2017): 7–30.

Thomas, B. "Health and health care disparities: the effect of social and environmental factors on individual and population health,." *International Journal of Environmental Research and Public Health*, 2014: 7492-7507.

Thomas, Eileen. "Men's Awareness and Knowledge of Male Breast Cancer." *AmericanJournal of Nursing*, 2010: 32-40.

Tyson-Martinez, Denora, Coralia Vasquez-Otero, Patricia Medina-Ramirez, Nora Arriola, and Susan McMillan. "Understanding the Supportive Care Needs of Hispanic Men Cancer Survivors." *Ethnicity and Health*, 2017: 1-16.

"United States Cancer Statistics (USCS) ." *Surveillance, Epidemiology, and End Results (SEER) Program.* June 6, 2017. https://www.cdc.gov/cancer/npcr/uscs/technical_notes/contributors/seer.htm (accessed August 29, 2017).

US Census Bureau. *Hispanic Origin.* January 26, 2017. https://www.census.gov/topics/population/hispanic-origin/about.html (accessed March 8, 2017).

WHO. *Cancer.* October 1, 2016. http://www.who.int/cancer/breast_cancer_awareness/en/ (accessed February 11, 2017).

Yu, Edward, et al. "The Impact of Post-Mastectomy Radiation Therapy on Male Breast Cancer Patients—A Case Series." *International Journal of Radiation Oncology* Biology* Physics*, 2012: 696-700.

Zurrida, Stefano, Franco Nole, Bernardo Bonanni, Oreste Amone, and Mauro Mastropasqua. "Male Breast Cancer." *Future Oncology*, 2010: 985-991.