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Racial And Ethnic Disparities In Pharmacologic Treatment For Emotional Distress Among Older Adults With Cancer

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Abstract

Objective: Disparities in self-reported emotional distress and subsequent pharmacologic treatment for emotional distress are not well understood among older adults with cancer. The main objective of this study is to understand racial and ethnic disparities in emotional distress medication and the relationship between self-reported levels of emotional distress. We hypothesize that as self-reported levels of emotional distress increase in severity, the race and ethnic disparities in emotional distress medication will diminish or decrease. Our secondary aim was to understand the role of socioeconomic factors on racial and ethnic disparities in medication use.

Methods: In this retrospective cohort study, we used the SEER-MHOS (2007-2012) database linked to Medicare Part D enrollment and claims. The main outcome was receipt of any emotional distress medication 90 days post-MHOS. Bivariate sample proportions and multivariate logistic regression were used to illustrate differences in receipt of emotional distress medication among key categories and race/ ethnicity. The three models of emotional distress we investigated were: self-reported depression in the past year, functional limitations, and emotional well-being. Results are reported in odds ratios and predicted margins.

Results: A total of 8,889 beneficiaries were included in our study and 28.7% of our sample received medication treatment for emotional distress. There was a significant association between all levels of emotional distress and race/ ethnicity. Half of those reporting depression in the past year (50%) and nearly half of those with severe functional limitations (47%) and poor emotional well-being (56%) received emotional distress medication. After adjusting for all covariates, racial and ethnic minorities had decreased odds of receiving medication for emotional distress compared to non-Hispanic whites. This pattern persisted for non-Hispanic Blacks even when limiting to those experiencing high levels of emotional distress. Non-Hispanic Blacks reporting depression in the past year (AOR=0.36), severe functional limitations (AOR=0.32), and poor emotional well-being

(AOR=0.24) had decreased odds of receiving emotional distress medication compared to non-Hispanic whites ($p<0.001$).

Conclusion: Emotional distress may be undertreated among older adults with cancer, and especially for certain racial and ethnic minorities who self-report depression, functional limitations, and poor emotional well-being. Further research is needed to understand whether low levels of medication use among certain race and ethnic groups are due to utilization of other forms of emotional distress treatment such as therapy or strong social support networks.

Introduction

Race, ethnic, and socioeconomic disparities across the cancer care trajectory, from screening and diagnosis to treatment and survival, are well documented (Blinder & Griggs, 2013; Kolb et al., 2006; O'Keefe et al., 2015). Cancer is an age-related disease, with the majority of newly diagnosed cases occurring in adults ≥ 65 years of age (White et al., 2014). Given the rapidly growing older adult population, the number of cancer survivors is projected to reach 22 million by 2030 (Miller et al., 2019). Among older adults, primarily covered through Medicare, race and ethnic disparities in healthcare have been widely reported (Gornick, 2008). Social determinants of health, such as differences in education, income, and occupation, have been the root cause of these disparities translating to differences in health outcomes among racial and ethnic minorities (Lisovicz et al., 2008). Despite the progress and innovation in cancer care over time, the persistence of disparities highlights the inequities within our healthcare system. It is vital to continue to uncover these disparities to develop effective policies and procedures to improve quality of life (QoL) and overall survivorship among vulnerable populations.

Cancer survivors are particularly susceptible to psychological distress, which has been linked to poor health outcomes and known to affect demographic groups differently (Erim et al., 2019; Kaiser et al., 2010). Cancer diagnosis and treatment cause high levels of distress for many patients, defined as anxiety and depressive symptoms related to the entire cancer experience (Berry-Stoelzle et al., 2020; Carlson & Bultz, 2003). Cancer-related distress among older adults can decrease quality of life (Huo et al., 2019; Weinberger et al., 2011) and impact cancer survivorship (Bultz & Carlson, 2006). Evidence suggests racial disparities in self-reported emotional distress, with Black cancer survivors reporting higher levels of emotional distress compared to whites (Apenteng et al., 2017). One explanation is existing socioeconomic disparities among racial and ethnic minorities, which may exacerbate cancer-related psychological distress

for survivors (Singh et al., 2017). Treatment for emotional distress among cancer survivors includes behavioral and pharmacologic approaches, both of which have proven to be effective (Yi & Syrjala, 2017). Nonetheless, studies confirm medication therapy is utilized more than behavioral therapy in the Medicare population (Alwhaibi et al., 2017; Findley et al., 2012). Oncologists' treatment patterns for mental health distress among cancer patients also show an overwhelming preference for medication use, e.g. antidepressants, anti-anxiety, or sleep-aids (Granek et al., 2018). Furthermore, medication treatment for emotional distress can be easily measured through health insurance administrative claims data that provide detailed records of medication utilization (Tyree et al., 2006).

Though available treatments for emotional distress are effective, there continue to be disparities in access and quality of mental health care for racial and ethnic minorities. Alegría et al., 2008 found a significant difference in access to mental health treatment among racial and ethnic minorities compared to whites after adjustment for socioeconomic characteristics. Studies using SEER-Medicare have highlighted racial disparities in supportive medication treatment among cancer survivors, where antidepressants and anxiolytics are prescribed less frequently to Blacks, Hispanics, and Asians compared to non-Hispanic whites (Check et al., 2016a; Lamba et al., 2020); however, both of these studies limit to a specific type or stage of cancer. There is robust literature on racial disparities in treatment for emotional distress and, separately, levels of reported emotional distress. To our knowledge, no study has been conducted examining medication use by self-reported levels of emotional distress among older adults with cancer. The relationship between pharmacologic therapy and patient reported emotional distress can further contribute to the understanding of disparities in medication treatment (Presley et al., 2020).

The measurement of emotional distress can vary, as some researchers use clinical diagnosis codes for depression (Alwhaibi et al., 2017) while others use self-reported questionnaires and validated distress scales (Alegría et al., 2008; Hoffman et al., 2009). Apenteng et al., 2017 utilize self-reported responses to the Patient Health Questionnaire (PHQ-4), a validated screening tool for emotional distress, to categorize levels of psychological distress. Within the SEER-MHOS dataset, the Veterans RAND 12-Item Health Survey (VR-12) is widely used to understand health-related quality of life (HRQOL) among cancer patients and survivors, including both physical component summary (PCS) and mental component summary (MCS) scores (Doucette et al., 2019). Alobaidi et al., 2019 utilize the MCS scores from the VR-12 to understand mental HRQOL on survival among older adults with multiple myeloma. Our focus will hone in on two of the total eight subscales of the VR-12 –role limitations due to emotional problems and mental health, in order to assess emotional distress (Kazis et al., 2019).

Additionally, adjustment for socioeconomic factors as an analytical technique in disparities research has been controversial. On occasion, adjustment for socioeconomic factors, such as education and income, can remove significance from the race effect on a given outcome, which subsequently requires careful interpretation of the data (Meghani & Chittams, 2015). Racial and ethnic disparities are closely intertwined with socioeconomic status, both of which lead to differences in health outcomes (Anderson et al., 2004). The Institute of Medicine (IOM) report recognizes the role of socioeconomic differences in race and ethnic disparities (McGuire et al., 2006).

In this study, we describe the prevalence of pharmacologic therapy for emotional distress among older adults with cancer and aim to focus on racial and ethnic disparities. We use patient reported levels of emotional distress and race/ ethnicity to understand utilization of prescription

medication for emotional distress. We hypothesize that prescription medication utilization will increase with increasing levels of emotional distress severity. We test the hypothesis that racial and ethnic disparities in prescription medication treatment will diminish at higher self-reported emotional distress levels. In addition, we explore the effect of socioeconomic characteristics on race and ethnic disparities in pharmacologic treatment for emotional distress.

Methods

Data Source

We used the Surveillance, Epidemiology and End Results (SEER)-Medicare Health Outcomes Survey (MHOS) data with a novel linkage to Medicare Part D claims. SEER provides detailed cancer registry data such as cancer type(s), stage, histology, diagnosis date, covering about 26% of the US population (Ambs et al., 2008). The Centers for Medicare and Medicaid Services (CMS) administer the MHOS annually to randomly selected beneficiaries enrolled in Medicare Advantage (MA) plans to collect self-reported responses on sociodemographic characteristics and health status. MHOS is used to understand the physical and mental functioning of beneficiaries and has widely been used to understand HRQOL. The SEER-MHOS represents a linkage for those with a SEER-reported cancer who responded to the MHOS. Medicare Part D claims were linked for Part D-enrolled MHOS respondents for the period from 2007 to 2012. Part D claims provide detailed information on all oral prescription drugs covered by Medicare.

Study Sample

A total of 8,889 cancer patients are included in the analysis for this study (**Figure 1**). We selected beneficiaries in the SEER-MHOS dataset with a primary cancer (any invasive disease or Stage 0 breast cancer) diagnosis between January 2003 and December 2012. These beneficiaries have to complete at least one MHOS within 5 years of cancer diagnosis and between January 2008

and December 2012. Beneficiaries with an unknown cancer diagnosis month and diagnosis concurrent with autopsy were excluded. Beneficiaries who were aged ≥66 years at MHOS data and had continuous enrollment in Medicare Parts A, B, and Medicare Advantage and Part D during the 12 months pre-post MHOS date or until death were included. Detailed sample selection criteria can be found in the Presley et al., 2020, study.

Key Outcome Measures

The main outcome measure is receipt of prescription medications for the treatment of emotional distress. The categories of medications included were antidepressants, anxiolytics/sedatives, and antipsychotics. Relevant medications were identified based on clinical guidelines and the literature. Once we specified the relevant medications by generic name, we searched for Part D claims during the measurement period, the MHOS date and the following three months, including earlier fills with days supply that extended into this period. We constructed indicators for receipt of individual drugs, which were combined to construct indicators for any emotional distress medication overall and by category.

The two key independent variables in this study were race/ ethnicity and emotional distress. Race/ethnicity was measured based on responses to two MHOS questions. The first, "How would you describe your race?" included six response categories: White, Black or African American, Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaskan Native, or Another Race (Centers for Medicare and Medicaid, 2010). Hispanic ethnicity was assessed based on response to: "Are you of Hispanic or Latino origin or descent?" We combined responses to the two questions to create four categories: non-Hispanic white, non-Hispanic Black, Hispanic, and Asian/ other.

We compared three alternative approaches to measure emotional distress based on response to MHOS questions: feeling depressed, functional impairment due to emotional distress, and emotional well-being. Self-reported depression was based on responses to the MHOS question, "In the past year, have you felt depressed or sad much of the time?" Responses were categorized into "yes" and "no".

Functional limitations were measured on the role-emotional subscale of the VR-12, based on responses to the following MHOS question, "During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?" The two problems of interest were "accomplished less than you would like" and "didn't do work or other activities as carefully as usual." Respondents answered the questions on a 5-point Likert scale ranging from "none of the time" to "all of the time." The minimum and maximum scores were 0 and 10, respectively, after summing the scores for both questions. We grouped the responses into three categories as follows: none/ mild (score 0-4), moderate (score 5-7), and severe (score 8-10). These categorizations were made with a qualitative understanding of emotional distress levels; e.g. if they answered 5 for either question they were placed in the severe category.

Emotional well-being was measured on the mental health subscale of the VR-12, based on responses to the following MHOS questions, "Have you felt calm and peaceful?" and "Have you felt downhearted and blue?" Respondents answered the questions on a 6-point Likert scale ranging from "yes, all of the time" to "no, none of the time." A numerical score of 1 to 6 was attached to each level, with the highest numerical scores associated with feeling calm and peaceful none of the time and feeling downhearted and blue all of the time. The minimum and maximum scores were 0 and 12, respectively, after summing the scores for both questions. We grouped the

responses into three categories as follows: good/ normal (score 0-4), moderate (score 5-8), poor (score 9-12).

Higher levels of emotional distress correspond to higher scores in functional limitations and emotional well-being. The latter two approaches to emotional distress variables were validated by Apenteng et al., 2017, where similar methods were employed for questions from the PHQ-4.

We also included beneficiary demographics such as age, sex, education, marital status, region (Northeast, South, Midwest, West), MA plan type (HMO or PPO/PDP), receipt of the Part D low-income subsidy (LIS, full or partial versus none). Although the MHOS reports family income, a large proportion of observations were missing responses. Instead, we included information on poverty rates linked at the census-tract level, based on data from the 2000 Census and American Community Survey.

Statistical Analyses

We described baseline sample characteristics overall and stratified by race/ ethnicity using N (proportion) for categorical variables. Chi-squared statistics were used to describe the bivariate unadjusted associations between study variables and race/ ethnicity, the unadjusted association between emotional distress and receipt of any emotional distress medication, and the unadjusted association between race/ ethnicity and receipt of any emotional distress medication. We used multivariable logistic regression analysis to test the association between receipt of prescription medication, and race/ethnicity and emotional distress. We estimated three parallel models, using the three alternative measures of emotional distress, adjusting for all other covariates. To assess whether the role of race/ethnicity varied by level of emotional distress, we estimated the models on samples stratified by emotional distress. To assess whether the estimated effect of race/ethnicity was influenced by controls for education, poverty and the Part D LIS, we also compared results

for models with and without those variables. Both odds ratios and marginal effects (e.g. predicted probabilities) were outputted from the logistic regression All analyses were performed using SAS version 9.4 and Microsoft Excel version 16.9.

Results

Patient Characteristics

Among the 8,889 beneficiaries in the sample, 67.0% were non-Hispanic white, 9.9% were non-Hispanic Black, 9.5% were Hispanic, and 12.9% were Asian/ Other (**Table 1**). The sample was 44% female and the majority reported being married currently (58.5%). Nearly half of the sample reported >10% poverty rates (48.4%), with 20.7% receiving the Part D LIS. Beneficiaries self-reported depression for much of the past year (15.1%), moderate-to-severe functional limitations (47.9%), and moderate-to-poor emotional well-being (45.8%). Sample characteristics varied by race/ ethnicity ($p<0.001$), with differences in poverty, education, Part D LIS, and self-reported emotional distress. Over half (53.3%) of non-Hispanic Blacks and a third (32.7%) of Hispanics reported high poverty, compared to 11.9% of non-Hispanic whites and 15.2% of Asians. Non-Hispanic whites had higher educational attainment than the study sample overall and compared to all other race/ ethnicity categories: 52.1% of non-Hispanic whites report pursuing higher education compared to 23.8% of non-Hispanic Blacks, 21.0% of Hispanics, and 39.0% of Asians. Nearly half of non-Hispanic Black beneficiaries (26.7%) and Hispanic (41.1%) receive the Part D LIS, compared to a smaller percentage of Asians (32.4%) and a fraction of non-Hispanic whites (11.8%). Racial minorities also reported greater moderate-to-severe functional limitations and moderate-to-poor emotional well-being compared to non-Hispanic whites. There was no association between sex and race/ ethnicity.

Overall, emotional distress medication was received by 28.7% of our sample, with 20.1% receiving antidepressants, 4.3% receiving anxiolytics/ sedatives, and 1.8% receiving antipsychotics (**Figure 2**). Medication rates overall and by category (antidepressants, anxiolytics/ sedatives) varied by race/ ethnicity ($p<0.001$). Non-Hispanic whites had the highest medication rates (30.9%) compared to non-Hispanic Blacks (21.0%), Hispanics (28.1%), and Asians (23.5%). Non-Hispanic Blacks had the lowest medication rates for emotional distress overall, and for antidepressants and anxiolytics/ sedatives compared to all other race/ ethnicity categories.

Among those receiving medication for emotional distress, the majority were non-Hispanic white (72.9%) while a fraction of non-Hispanic Blacks, Hispanics, and Asians made up the remainder (**Table 2**). Overall, as levels of emotional distress increase, medication rates for emotional distress increase for all categories of race/ ethnicity. Half of those reporting depression in the past year (50%) and nearly half of those with severe functional limitations (47%) and poor emotional well-being (56%) received emotional distress medication. Across all levels of emotional distress, non-Hispanic whites consistently had higher rates of medication than the overall sample. Over half (56%) of non-Hispanic whites who reported depression in past year received medication for emotional distress compared to a third (33%) of non-Hispanic Blacks. Similarly, 53% of non-Hispanic whites reporting severe functional limitations received medication compared to 34% of non-Hispanic Blacks. More than half (62%) of non-Hispanic whites reporting poor emotional well-being received medication compared to a third of non-Hispanic Blacks (33%).

Among patients who self-reported no depression in the past year, 97.1% of the sample also reported none/ mild functional limitations and 97.7% reported good/ normal emotional well-being (**Table A**). Among patients who self-reported depression in the past year, 53.4% of the sample reported severe functional limitations and 77.5% reported poor emotional well-being. We will test

these three emotional distress variables independently in all subsequent logistic regression models due to imperfect correlations.

Unadjusted and adjusted associations with emotional distress medication

We found significant associations between race/ ethnicity and receipt of prescription medication for emotional distress in both the unadjusted and adjusted model (**Table B**). In the adjusted model, we controlled for all covariates including levels of reported emotional distress and found the odds of receiving emotional distress medication were significant lower for non-Hispanic Blacks (AOR=0.40), Hispanics (AOR=0.64), and Asians (AOR=0.55) compared to non-Hispanic whites. Those receiving the Part D LIS had significantly higher odds of receiving medication for emotional distress (OR=1.54, AOR=1.46). Those with high educational attainment had lower odds of receiving medication for emotional distress although this effect was not statistically significant.

We found those reporting higher levels of emotional distress across the three measures of emotional distress had higher odds of receiving emotional distress medication in both adjusted and unadjusted models (**Table 3**). The odds of receiving emotional distress medication was significantly higher ($p<0.001$) among beneficiaries who self-report depression in the past year (OR=2.95, AOR=2.89) compared to those reporting no depression. Moreover, this translates into a predicted probability of receiving medication (0.43 versus 0.21), with an absolute difference of 22% for those reporting depression vs no depression. The odds of receiving emotional distress medication was significantly higher ($p<0.001$) for those reporting moderate and severe functional limitations compared to none/ mild functional limitations in the adjusted model. Similarly, the odds of receiving medication for emotional distress was significantly higher ($p<0.001$) for those reporting moderate and poor emotional well-being compared to good/ normal emotional well-being in the adjusted model. The predicted probability of those receiving emotional distress

medication was highest in the most severe categories of functional limitations and emotional well-being, 0.41 and 0.48, respectively. In contrast, the predicted probability of receiving medication was lowest in the lowest categories of functional limitations and emotional well-being, 0.16 for both, with an absolutely difference of 25% and 32%, respectively.

Adjustment for socioeconomic factors had no effect on race/ ethnicity

After adjusting for all covariates, including those closely tied to socioeconomic status such as education, poverty, and Part D LIS, all racial and ethnic minorities had significantly lower odds of receiving medication for emotional distress ($p<0.001$) (**Table 4**). This translates into a predicted probability of 0.42 for non-Hispanic whites versus 0.22 for non-Hispanic Blacks. After removing education, poverty, and Part D LIS from the model, racial and ethnic minorities continued to have a significantly lower odds of receiving medication for emotional distress ($p<0.001$), though the odds were slightly biased towards the null. This translates into a predicted probability of 0.40 for non-Hispanic whites versus 0.23 for non-Hispanic Blacks.

Stratifying by levels of emotional distress

Models were stratified by levels of emotional distress and reported both adjusted odds ratios and predicted probabilities to understand whether the race/ ethnicity disparities in medication for emotional distress diminishes with higher reported levels of emotional distress (**Table 5)**. The probability of receiving emotional distress medication was higher for all categories of race/ ethnicity for those reporting depression in the past year compared to those reporting no depression. After stratifying by levels of depression (depression = yes), non-Hispanic Blacks had significantly lower odds of receiving emotional distress medication (AOR=0.36) compared to non-Hispanic whites ($p<0.001$). Similarly, the predicted probability of receiving emotional distress medication increased with increasing levels of severity in both functional limitations and

emotional well-being across all categories of race/ ethnicity. Interestingly, non-Hispanic Blacks reporting poor emotional well-being had significantly lower odds of receiving medication for emotional distress (AOR=0.24) compared to non-Hispanic whites ($p<0.001$). The odds of receiving emotional distress medication for Hispanics and Asians were not significantly different compared to non-Hispanic whites among those reporting poor emotional well-being. Correspondingly, non-Hispanic Blacks who report severe functional limitations had lower odds of receiving emotional distress medication (AOR=0.32) compared to non-Hispanic whites ($p<0.001$). In other words, non-Hispanic Blacks reporting severe functional limitations were half as likely (0.29 vs. 0.57) to receive medication for emotional distress compared to that of non-Hispanic whites, with an absolute difference of 28%. In the most severe categories of emotional distress, there was no significant difference in the odds of receiving medication for Hispanics compared to non-Hispanic whites. Asians had significantly ($p<0.001$) lower odds of receiving medication for emotional distress in all levels of emotional distress aside from poor emotional well-being, which was not statistically significant from non-Hispanic whites.

Discussion

In this large, U.S. population-based study, we found race and ethnic disparities in receipt of pharmacologic therapy for emotional distress, even when controlling for level of emotional distress. Using SEER-MHOS data with a novel linkage to Part D Medicare claims, we found a significant association between receipt of emotional distress medication and levels of emotional distress. As reported emotional distress increases in severity, beneficiaries had higher odds and probability of receiving medication, which was expected. Disparities persisted, particularly for non-Hispanic Black cancer survivors, even conditioning on reported levels of emotional distress. The disparities in treatment diminished with higher levels of emotional distress for Hispanic cancer

survivors and little change among Asian cancer survivors. These findings emphasize the importance of developing policies and procedures to eliminate these disparities and ensure all cancer survivors are receiving adequate treatment for emotional distress.

Our results provide further evidence of racial and ethnic disparities in pharmacologic therapy among patients who self-report emotional distress. After adjusting for all covariates, racial and ethnic minorities had decreased odds of receiving medication for emotional distress compared to non-Hispanic whites. Non-Hispanic Black patients, despite reporting depression, severe functional limitations, or poor emotional well-being, were less likely to receive medication for emotional distress compared to non-Hispanic whites. In our study, approximately 28.7% of older adults with cancer received any emotional distress medication, and these findings are consistent with the literature in documenting patterns of psychotropic medications among older adult cancer survivors (Hawkins et al., 2017). Our findings are consistent with several studies noting racial differences in antidepressant treatment among patients with and without cancer (Check et al., 2016b; Findley et al., 2012; Han & Liu, 2005; McGregor et al., 2020). Interestingly, the disparities in treatment for emotional distress diminished at high levels of emotional distress for Hispanics compared to non-Hispanic whites. We found that adjustment for socioeconomic characteristics had little effect on the race and ethnic disparity in emotional distress medication treatment.

There are many explanations for the cause of these disparities, many of which are rooted in systemic factors such as historic socioeconomic differences between racial and ethnic minority groups compared to the white population or systemic racism transcending through the health care system (Gollust et al., 2018). These factors create inequities in access to care, namely mental health care services, which historically have been underutilized by minority populations (Aklin & Gómez, 2017). Furthermore, minority populations may not seek care due to language barriers,

stigma, or cultural preferences (Jimenez et al., 2012; Rao et al., 2007). It is increasingly vital to highlight disparities across the continuum of mental health care to find solutions for groups most at risk.

Fiscella & Williams (2004) explain the complex relationship between socioeconomic factors, race, and health as a cause of health disparities, namely the effect of institutional racism – including factors such as education, income, and wealth. Older adults of low socioeconomic status are particularly vulnerable as they experience greater functional limitations and decline (Fiscella & Williams, 2004). Our results, after controlling for a few socioeconomic factors, continued to demonstrate significance of the race/ethnicity effect. Other studies have found race and ethnic disparities to persist despite controlling for socioeconomic factors (Du et al., 2007). These findings show that there may be barriers to emotional distress treatment not directly rooted in the following socioeconomic factors: education, poverty, and Part D LIS.

Conversely, our findings also show that those with the Part LIS had higher odds of receiving medication for emotional distress, which is evidence for an affordability issue. The LIS allows for reduced Part D premiums and cost-sharing to increase access to prescription medications and varies by income level (Stuart et al., 2012). We suggest that there may be beneficiaries in this study who do not qualify for the LIS and still face financial hardship in prescription drug coverage, especially those of lower socioeconomic status.

The results of our study highlight undertreatment of emotional distress among a nationally representative sample of older adults with cancer. Beneficiaries, especially racial and ethnic minorities, who report levels of emotional distress receive inadequate pharmacologic treatment for emotional distress. These findings highlight the need for more substantial mental health treatment among vulnerable populations to improve quality of life and overall cancer survivorship.

Limitations

It is worth noting a few limitations of this study, which are typically associated with the use of survey data and administrative claims. SEER-MHOS data is limited to beneficiaries enrolled in Medicare Advantage (MA) plans and may experience differences in symptom report and treatment compared to those in traditional Medicare plans.

Our main outcome of interest was pharmacologic therapy for emotional distress through Part D Medicare claims, but it is widely known that other forms of treatment (psychotherapy, cognitive-behavioral, social support, community networks) are utilized to alleviate emotional distress. Furthermore, certain racial and ethnic minorities may rely on non-medication forms of therapy that were not measured in this study. This may show an exaggerated effect between certain racial and ethnic groups and receipt of prescription medication for emotional distress.

Despite these limitations, our study has strengths including a large population-based sample of older adults with cancer and the linkage between SEER-MHOS and Part D claims. We were able to capture self-reported emotional distress and subsequent pharmacologic therapy for the treatment of emotional distress. To our knowledge, such a study documenting the relationship between self-reported

Conclusion

In conclusion, racial and ethnic minorities were less likely to receive prescription medication for emotional distress compared to non-Hispanic whites, overall and when stratifying by levels of emotional distress. These disparities are partly due to systemic issues such as socioeconomic inequities as well as personal and cultural attitudes towards mental health treatment. Innovative approaches to mental health treatment and solutions to mitigate the effect of

institutionalized racism on health will be necessary to eliminate race and ethnic disparities in treatment for emotional distress among older adults with cancer.

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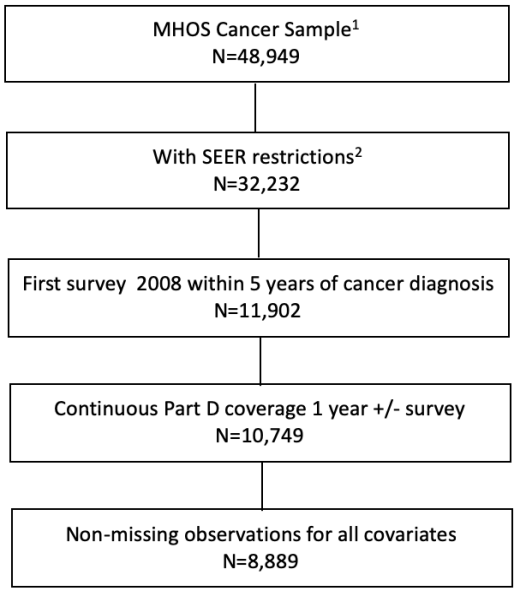
Tables and Figures

Figure 1. Sample selection criteria



[1] Linked cancer sample with known date of cancer diagnosis and cancer diagnosis not at autopsy (without ANY restriction by cancer N=49,766)

[2] Cancer sample has additional SEER restrictions: age > 65, only primary tumor and invasive disease

Table 1. Description of study sample overall and by race ethnicity (N=8,889)

Characteristic	Overall		Non-Hispanic White N=6015	Non-Hispanic Black N=884	Hispanic N=845	Asian, Other N=1145	p*
	%	8889	%	%	%	%	
Self-reported depression in the past year							<.0001
No	84.9	7547	87.9	78.3	75.2	81.6	
Yes	15.1	1342	12.1	21.7	24.9	18.4	
Functional limitations							<.0001
None/ Mild	52.1	4628	55.8	45.6	41.4	45.3	
Moderate	35.2	3132	33.4	38.9	40.7	38.3	
Severe	12.7	1129	10.9	15.5	17.9	16.4	
Emotional well-being							<.0001
Good/ Normal	54.3	4824	58.2	43.8	45.6	48.4	
Moderate	40.6	3607	37.4	50.1	45.3	46.3	
Poor	5.2	458	4.4	6.1	9.1	5.3	
Age group							<.0001
66-69	25.6	2279	24.5	34.5	28.9	22.5	
70-74	28.1	2498	27.7	29.4	31.1	27.1	
75-79	22.5	2004	23.4	18.8	20.8	22.5	
80+	23.7	2108	24.5	17.3	19.1	28.0	
Sex, n							0.15
Male	55.6	4942	55.5	53.4	58.8	55.4	
Female	44.4	3947	44.5	46.6	41.2	44.6	
Education							<.0001
< High school diploma	24.6	2187	15.9	44.6	55.5	32.2	
High school graduate	30.8	2734	32.0	31.7	23.6	28.8	
> High school diploma	44.6	3968	52.1	23.8	21.0	39.0	
Marital status							<.0001
Currently married	58.5	5203	61.1	37.7	58.9	60.7	
Formerly married	37.5	3335	35.6	54.0	36.7	35.6	
Never married	4.0	351	3.3	8.4	4.4	3.7	
Poverty rates							<.0001

Low (0 to <5%)	25.0	2219	29.6	6.2	12.2	24.4	
5 to < 10%	26.6	2367	29.5	11.7	18.7	29.0	
10 to < 20%	30.0	2666	29.0	28.5	36.5	31.4	
High (20 to 100%)	18.4	1637	11.9	53.6	32.7	15.2	
Part D LIS							<.0001
Yes	20.7	1838	11.8	46.7	41.1	32.4	
No	79.3	7051	88.3	53.3	58.9	67.6	
Plan type◦							0.0002
HMO	92.2	8191	92.1	93.4	94.7	89.6	
PPO/ PDP	7.9	698	7.9	6.6	5.3	10.4	
Region							<.0001
Northeast	13.8	1228	14.4	21.6	12.3	6.0	
South	9.4	838	12.0	8.4	2.1	2.3	
Midwest-Central	23.0	2047	23.2	54.6	5.6	10.7	
West	53.7	4776	50.5	15.4	80.0	81.0	
MHOS Survey year							<.0001
2008	19.5	1730	20.1	15.8	16.8	20.8	
2009	25.7	2288	26.3	21.6	23.8	27.3	
2010	20.7	1839	19.9	23.8	24.0	19.9	
2011	18.5	1641	18.3	21.2	19.3	16.7	
2012	15.7	1391	15.3	17.7	16.1	15.4	

*p-value for $\chi 2$ test (categorical variable)

◦ Plan type includes health maintenance organization (HMO), preferred provider organizations (PPO), and prescription drug plans (PDP)

Figure 2. Distribution of emotional distress by race/ ethnicity

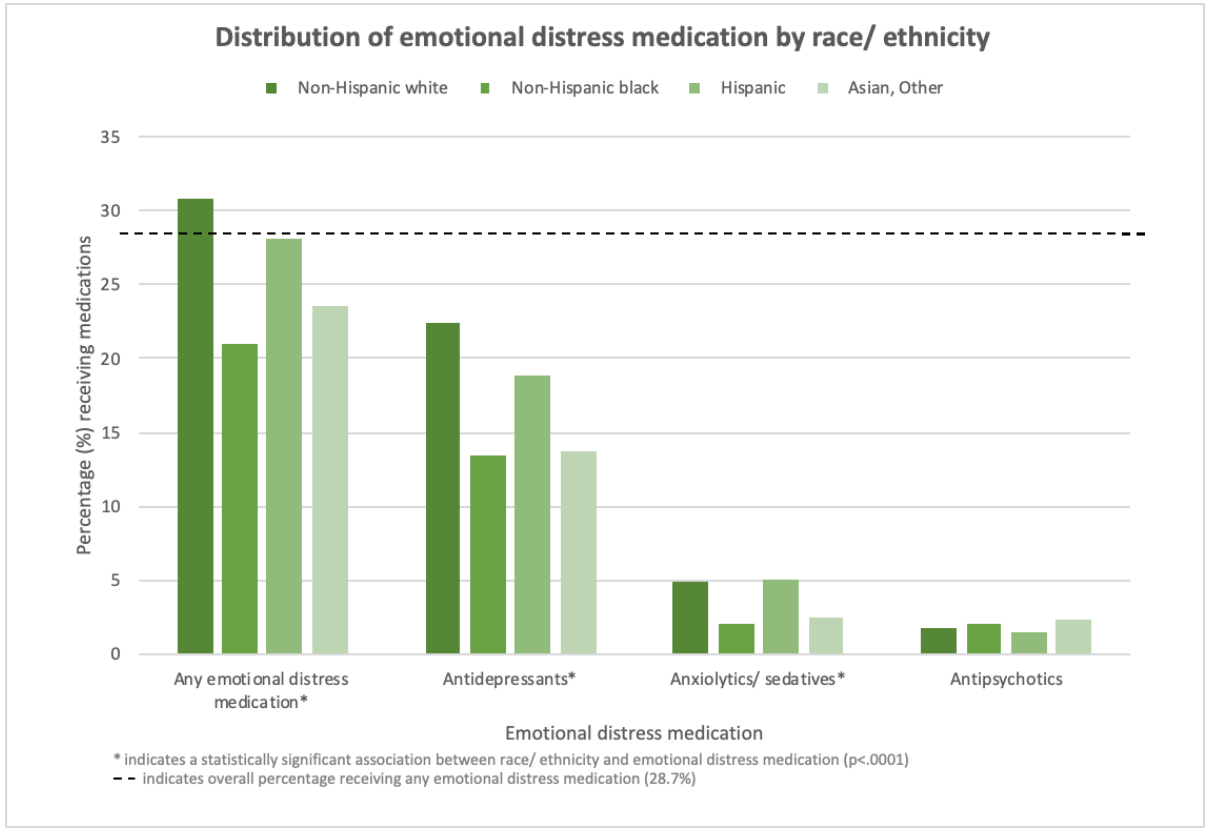


Table 2. Percent of sample receiving medications for emotional distress by reported emotional distress and race/ ethnicity

Characteristic	Non-Hispanic White	Non-Hispanic Black	Hispanic	Asian, Other	Overall, %	p*
	%	%	%	%		
	72.9	7.3	9.3	10.6		
Self-reported depression in the past year						<.0001
No	27%	18%	20%	19%	25%	▲
Yes	56%	33%	51%	42%	50%	▲
Functional limitations						<.0001
None/ Mild	22%	15%	17%	15%	20%	▲
Moderate	38%	23%	32%	27%	34%	▲
Severe	53%	34%	46%	37%	47%	▲
Emotional well-being						<.0001
Good/ Normal	22%	11%	18%	14%	20%	▲
Moderate	41%	28%	32%	31%	37%	▲
Poor	62%	33%	57%	48%	56%	

*p-value for $\chi 2$ test (categorical variable)

▲ indicates statistical significance ($p<0.001$)

Table 3. Bivariate and multivariate associations and predicted probabilities between emotional distress and medication for emotional distress

Characteristic	Crude			Adjusted*			Margins			
	Unadjusted OR	(95% CI)	p ▲	Adjusted OR	(95% CI)	p ▲	Mean	Standard Error	Lower Mean	Upper Mean
Self-reported depression in the past year										
No	1.00	-	-	1.00	-	-	0.21	0.01	0.19	0.23
Yes	2.95	(2.62, 3.33)	<.0001	2.89	(2.55, 3.28)	<.0001	0.43	0.02	0.39	0.47
Functional limitations										
None/ Mild	1.00	-	-	1.00	-	-	0.16	0.01	0.14	0.18
Moderate	2.01	(1.81, 2.22)	0.16	2.07	(1.86, 2.30)	<.0001	0.29	0.01	0.26	0.32
Severe	3.48	(3.04, 4.00)	<.0001	3.58	(3.09, 4.15)	<.0001	0.41	0.02	0.37	0.45
Emotional well-being										
Good/ Normal	1.00	-	-	1.00	-	-	0.16	0.01	0.14	0.18
Moderate	2.35	(2.13, 2.59)	0.55	2.37	(2.14, 2.63)	<.0001	0.31	0.02	0.28	0.34
Poor	5.14	(4.22, 6.26)	<.0001	4.87	(3.96, 5.99)	<.0001	0.48	0.03	0.43	0.54

▲ p-value for $\chi 2$ test (categorical variable)

* Adjusted for all covariates

Table 4. Multivariable logistic regression with and without adjustment for socioeconomic factors

Characteristic	Adjusted			Margins		Excluding Part D LIS, Poverty, Education			Margins	
	Adjusted OR*	(95% CI)	p ▲	Mean	Standard Error	Adjusted OR**	(95% CI)	p ▲	Mean	Standard Error
Race ethnicity										
Non-Hispanic White	1.00	-	-	0.42	0.02	1.00	-	-	0.40	0.02
Non-Hispanic Black	0.40	(0.33, 0.49)	<.0001	0.22	0.02	0.46	(0.38, 0.55)	<.0001	0.23	0.02
Hispanic	0.64	(0.53, 0.76)	<.0001	0.32	0.02	0.746	(0.63, 0.89)	0.0008	0.33	0.02
Asian, Other	0.55	(0.47, 0.65)	<.0001	0.29	0.02	0.617	(0.53, 0.72)	<.0001	0.29	0.02

▲ p-value for $\chi 2$ test (categorical variable)

* Adjusted for all covariates

** Adjusted model excluding Part D LIS, education, and poverty rates

Table 5. Multivariable logistic regression and predicted probabilities for the association between race ethnicity and emotional distress medication stratified levels of emotional distress

Depression	**Depression = No**					**Depression = Yes**				
Characteristic	**Adjusted OR***	**(95% CI)**	**p ▲**	**Mean**	**Standard Error**	**Adjusted OR***	**(95% CI)**	**p ▲**	**Mean**	**Standard Error**
Race ethnicity										
Non-Hispanic White	1.00	-	-	0.30	0.02	1.00	-	-	0.55	0.03
Non-Hispanic Black	0.424	(0.34, 0.53)	<.0001	0.16	0.02	0.361	(0.25, 0.53)	<.0001	0.31	0.04
Hispanic	0.552	(0.44, 0.69)	<.0001	0.19	0.02	0.937	(0.65, 1.34)	0.724	0.54	0.05
Asian, Other	0.546	(0.45, 0.66)	<.0001	0.19	0.02	0.587	(0.42, 0.83)	0.002	0.42	0.05

Emotional Well-Being	**Good/ Normal**					**Moderate**					**Poor**				
Characteristic	**Adjusted OR***	**(95% CI)**	**p ▲**	**Mean**	**Standard Error**	**Adjusted OR***	**(95% CI)**	**p ▲**	**Mean**	**Standard Error**	**Adjusted OR***	**(95% CI)**	**p ▲**	**Mean**	**Standard Error**
Race ethnicity															
Non-Hispanic White	1.00	-	-	0.22	0.02	1.00	-	-	0.43	0.02	1.00	-	-	0.70	0.06
Non-Hispanic Black	0.38	(0.27, 0.54)	<.0001	0.10	0.02	0.437	(0.34, 0.57)	<.0001	0.25	0.03	0.242	(0.12, 0.51)	2E-04	0.36	0.09
Hispanic	0.668	(0.50, 0.90)	0.008	0.16	0.02	0.611	(0.47, 0.79)	2E-04	0.31	0.03	1.114	(0.61, 2.05)	0.727	0.72	0.08
Asian, Other	0.494	(0.38, 0.65)	<.0001	0.12	0.02	0.604	(0.49, 0.75)	<.0001	0.31	0.03	0.557	(0.30, 1.04)	0.066	0.56	0.09

Functional Limitations	**None/ Mild**					**Moderate**					**Severe**				
Characteristic	**Adjusted OR***	**(95% CI)**	**p ▲**	**Mean**	**Standard Error**	**Adjusted OR***	**(95% CI)**	**p ▲**	**Mean**	**Standard Error**	**Adjusted OR***	**(95% CI)**	**p ▲**	**Mean**	**Standard Error**
Race ethnicity															
Non-Hispanic White	1.00	-	-	0.25	0.02	1.00	-	-	0.38	0.02	1.00	-	-	0.57	0.04
Non-Hispanic Black	0.525	(0.38, 0.72)	<.0001	0.15	0.02	0.363	(0.27, 0.49)	<.0001	0.18	0.02	0.32	(0.20, 0.51)	<.0001	0.29	0.05
Hispanic	0.599	(0.44, 0.82)	0.002	0.16	0.02	0.626	(0.47, 0.83)	0.001	0.27	0.03	0.709	(0.47, 1.06)	0.096	0.48	0.06
Asian, Other	0.553	(0.42, 0.72)	<.0001	0.15	0.02	0.547	(0.43, 0.70)	<.0001	0.25	0.03	0.522	(0.36, 0.75)	5E-04	0.40	0.05

▲ p-value for $\chi 2$ test (categorical variable)

* Adjusted for all covariates

Appendix

Table A. Correlations between emotional distress variables

	Functional Limitations			
Depression	**None/ Mild**	**Moderate**	**Severe**	*Marginal*
	%	*%*	*%*	*%*
No	97.1	80.7	46.6	84.9
Yes	2.9	19.4	53.4	15.1
Marginal (%)	52.1	35.2	12.7	

	Emotional Well-Being			
Depression	**Good/ Normal**	**Moderate**	**Poor**	*Marginal*
	%	*%*	*%*	*%*
No	97.7	75.8	22.5	84.9
Yes	1.3	24.2	77.5	15.1
Marginal (%)	54.3	40.6	5.2	

	Functional Limitations			
Emotional Well-Being	**None/ Mild**	**Moderate**	**Severe**	*Marginal*
	%	*%*	*%*	*%*
Good/Normal	74.6	23	2.5	54.3
Moderate	27.9	52	20.1	40.6
Poor	5.5	32.5	62	5.2
Marginal (%)	52.1	35.2	12.7	

Table B. Unadjusted and adjusted associations between study variables and receipt of prescription medication for emotional distress (N=2,549)*

Characteristic	Unadjusted OR	95% CI	p ▲	Adjusted OR**	(95% CI)	p ▲
Race ethnicity						
Non-Hispanic White	1.00	-	-	1.00	-	-
Non-Hispanic Black	0.60	(0.50, 0.71)	0.0001	0.40	(0.33, 0.49)	<.0001
Hispanic	0.87	(0.74, 1.02)	0.06	0.64	(0.53, 0.76)	<.0001
Asian, Other	0.69	(0.59, 0.80)	0.05	0.55	(0.47, 0.65)	<.0001
Self-reported depression in the past year						
No	1.00	-	-	1.00	-	-
Yes	2.95	(2.62, 3.33)	<.0001	2.89	(2.55, 3.28)	<.0001
Functional limitations						
None/ Mild	1.00	-	-	1.00	-	-
Moderate	2.01	(1.81, 2.22)	0.16	2.07	(1.86, 2.30)	<.0001
Severe	3.48	(3.04, 4.00)	<.0001	3.58	(3.09, 4.15)	<.0001
Emotional well-being						
Good/ Normal	1.00	-	-	1.00	-	-
Moderate	2.35	(2.13, 2.59)	0.55	2.37	(2.14, 2.63)	<.0001
Poor	5.14	(4.22, 6.26)	<.0001	4.87	(3.96, 5.99)	<.0001
Age group						
66-69	1.00	-	-	1.00	-	-
70-74	0.79	(0.70, 0.90)	0.02	0.75	(0.66, 0.86)	<.0001
75-79	0.83	(0.72, 0.94)	0.26	0.74	(0.64, 0.85)	<.0001
80+	0.86	(0.76, 0.98)	0.87	0.65	(0.57, 0.75)	<.0001
Sex, n						
Male	1.00	-	-	1.00	-	-
Female	1.87	(1.70, 2.05)	<.0001	1.76	(1.59, 1.95)	<.0001
Education						

< High school diploma	1.00	-	-	1.00	-	-
High school graduate	0.88	(0.78, 1.00)	0.84	0.87	(0.76, 1.00)	0.0491
> High school diploma	0.79	(0.71, 0.89)	0.0004	0.87	(0.76, 0.99)	0.0377
Marital status						
Currently married	1.00	-	-	1.00	-	-
Formerly married	1.39	(1.27, 1.53)	0.0001	1.08	(0.97, 1.20)	0.1801
Never married	1.17	(0.92, 1.48)	0.74	0.95	(0.74, 1.23)	0.7009
Poverty rates						
Low (0 to <5%)	1.00	-	-	1.00	-	-
5 to < 10%	1.27	(1.12, 1.45)	0.038	1.19	{1.04, 1.37)	0.0119
10 to < 20%	1.26	(1.11, 1.42)	0.063	1.10	(0.96, 1.26)	0.1858
High (20 to 100%)	1.17	(1.02, 1.35)	0.96	1.02	(0.87, 1.21)	0.8029
Part D LIS						
No	1.00	-	-	1.00	-	-
Yes	1.54	(1.38, 1.71)	<.0001	1.37	(1.20, 1.56)	<.0001
Plan type						
HMO	1.00	-	-	1.00	-	-
PPO/ PDP	1.01	(0.85, 1.19)	0.94	0.91	(0.76, 1.09)	0.3213
Region						
Northeast	1.00	-	-	1.00	-	-
South	1.30	(1.07, 1.59)	0.38	1.27	(1.03, 1.57)	0.0253
Midwest-Central	1.42	(1.21, 1.66)	0.002	1.40	(1.18, 1.67)	0.0001
West	1.26	(1.09, 1.46)	0.59	1.26	(1.08, 1.47)	0.0042
MHOS year						
2008	1.00	-	-	1.00	-	-
2009	1.11	(0.96, 1.27)	0.75	1.17	(1.01, 1.36)	0.033
2010	1.09	(0.94, 1.27)	0.56	1.07	(0.91, 1.24)	0.4202
2011	1.18	(1.01, 1.37)	0.33	1.18	(1.00, 1.38)	0.0439
2012	1.25	(1.07, 1.46)	0.03	1.25	(1.06, 1.47)	0.0076

* Adjusted models report OR for functional limitations model and AORs did not vary drastically between models.

▵ p-value for $\chi 2$ test (categorical variable)

** Adjusted for all covariates

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