


# Influence of Social and Health Indicators on Pain Interference With Everyday Activities Among Older Black and White Cancer Patients

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## Abstract

**Objective:** This prospective study aimed to determine the influence social and health factors have on pain interference with everyday activities among older patients receiving outpatient treatment services from a comprehensive cancer center. **Method:** Participants were surveyed on questions assessing pain interference, and social (communication), health (pain severity, comorbidities), behavioral (self-efficacy, affect), and demographic characteristics. Multivariate analyses were specified to examine determinants of pain interference, with items loading on separate cluster composites: physical interference and psychosocial interference. **Results:** Pain severity was a significant indicator for physical interference. Similarly, pain severity, education, self-efficacy, negative affect, and communication were predictors of psychosocial interference. **Discussion:** Factors defining the daily lived experiences of older adults are important in providing baseline information on functional status. This emphasizes the need to rigorously examine the association between pain, and clinical and psychosocial indicators, but more importantly indicators that contribute to the patient's ability to perform normal everyday activities.

## Keywords

pain interference, physical functioning, self-efficacy, negative affect, cancer

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## Introduction

The day-to-day lived experiences of older adults have important implications for policy, long-term care needs, and health care expenditures (Federal Interagency Forum on Aging-Related Statistics, 2012). While older adults experience a disproportionate burden of mortality and morbidities, they are also at an increased risk for experiencing disability and functional-related impairments (Centers for Disease Control and Prevention [CDC], 2013; Crimmins & Beltrán-Sánchez, 2011). Defined as the difficulty or inability to perform basic functional activities, an estimated 49 million noninstitutionalized adults report a physical impairment due to a chronic illness(es) or the aging process (CDC, 2013; Gretebeck, Ferraro, Black, Holland, & Gretebeck, 2012). This is an important observation considering the impact limitations in performing daily activities, such as walking and normal work-related tasks, have on the abilities of older adults to function within the contexts of their social environment (Federal Interagency Forum on Aging-Related Statistics, 2012).

Considering the impact pain has on daily activities acknowledges the influence functional abilities have on

the quality of life among older adults, particularly those diagnosed with a chronic medical illness such as cancer. Profound advances in cancer screening, reductions in the prevalence of risk factors, and development of more effective treatments have contributed to longer survival with the disease, with more debilitating health outcomes (pain, fatigue, mood disorders; Bruckenthal, Reid, & Reisner, 2009; Mariotto, Yabroff, Shao, Feuer, & Brown, 2011). The prevalence of older adults impacted by the deleterious outcomes of cancer proves critical as it is one of the most common and costly health conditions, and similar to that of heart disease, is one of the leading causes of death (in 2009) among adults 65+ years of age (Federal Interagency Forum on Aging-Related Statistics, 2012).

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Understanding the incidence of diminished functional capacities resulting from cancer is all the more important as the prevalence of this diagnosis among older adults is expected to increase by 67% between 2010 and 2030 (Federal Interagency Forum on Aging-Related Statistics, 2012). These data resonate the context of the many factors involved with a medical diagnosis, by which the patient must maneuver to compensate for the limitations and consequential outcomes.

There is an amalgam of data illustrating the robust association between chronic illness and the physical impairment–pain dyad (Baker, O’Connor, & Krok, 2014; Baker & Whitfield, 2006, 2014, 2015; Stubbs et al., 2013). Recognized as a common symptomatic outcome of cancer, with an increasing prevalence among older patients (Baker et al., 2014; Green, Hart-Johnson, & Loeffler, 2011), existent data establish the impact pain episodes have on the capacity to perform activities essential to maintaining an independent lifestyle (Anderson et al., 2002; Brach et al., 2003; den Ouden, Schuurmans, Arts, & van der Schouw, 2011; Stubbs et al., 2013). The (fear) avoidance model, for example, generally illustrates how pain (and distress) may lead to avoidance of certain physical activities, thus leading to muscle weakness, which then contributes to increased activity limitations (Hermsen, Leone, Smalbrugge, Dekker, & van der Horst, 2014; Holla et al., 2014; Ramírez-Maestre, Esteve, & López-Martínez, 2014). This dynamic process characterizes the multidimensionality of the pain–physical activity dyad, thereby augmenting how functional impairment and interference are defined, particularly among the aged population.

There are cumulative data describing the impact pain and other social and behavioral indicators have on physical activity and functioning among the general population, particularly those with a cancer diagnosis (Brown et al., 2014; Hair, Hayes, Tse, Bell, & Olshan, 2014; Ma & Mourtzakis, 2014). While the impact of pain among younger cancer patients has received overwhelming attention, evidence assessing how pain, and identified social and behavioral factors interfere with the daily activities of older adults (with a cancer diagnosis) is less evident. To contribute to our understanding of the complexity of cancer-related pain in older adults, this prospective study aimed to determine the significance demographic (age, race, sex, income, and education), health (pain locations, comorbidities, pain severity), behavioral (self-efficacy, affect, pain experience), and social (communication) characteristics have in pain interference with daily activities among older Black and White patients receiving outpatient cancer treatment from a National Cancer Institute (NCI)–designated Comprehensive Cancer Center.

## Method

### Participants

Analyses were conducted to determine existing social, cultural, and psychological constructs that may influence

the experience of cancer-related pain (due to diagnosis and/or treatment) in older Black and White adults receiving outpatient treatment from an NCI-designated Comprehensive Cancer Center. The first phase of the study included collecting baseline data from the patients from 2012 to 2013.

The study included a convenience sample of patients who were self-identified as Black or White,  $\geq 55$  years of age, reported in the affirmative to experiencing pain (cancer related), were able to read and understand English, and were able to provide consent. Including those 55 years of age and older was based on cutoffs used in previous studies of racially diverse adults with cancer (Krok & Baker, 2014; Laiyemo et al., 2010). Data were collected through patient interviews on measures assessing demographic, physical and behavioral health, and social indicators. All patients were approached (and recruited) by a research assistant (RA), during the patients’ medical visit (in the waiting area), to determine their interest and eligibility for study participation. Each RA received training on the proper protocol in conducting research and patient recruitment. All the RAs received Institutional Research Board (IRB) training and were certified to conduct research on human subjects. As part of the initial recruitment plan of diverse race groups, RAs themselves were from diverse race/ethnic backgrounds (East Asian, non-Hispanic Black Caribbean American, non-Hispanic White, and Hispanic White).

Each interview lasted approximately 45 min and was conducted in a private area in the clinic. Respondents were compensated for their participation in the study. This investigation was approved by the cancer center’s Protocol Review Monitoring Committee and the university’s IRB.

### Measures

**Pain interference.** A subscale of the Brief Pain Inventory (BPI), which is a 32-item quantitative measure used to assess clinical pain, was used to measure how much pain interferes with daily activities. The Pain Interference subscale includes seven items (general activity, mood, walking ability, normal work, relations with other people, sleep, and enjoyment of life) measured on an 11-point numeric summated rating scale (0–10, with high scores indicating more interference resulting from pain; Cleeland, 1989). The BPI has been validated in older adults with cancer (Cleeland, 1989; Miaskowski, 2010).

**Pain severity.** A subscale of the BPI was used to assess pain severity. For purposes of this study, only the total pain severity score (composite of four single pain items: current, average, worst, least) was included in subsequent analyses. Response choices were rated on an 11-point numeric summated rating scale (0–10), with high scores indicating greater pain severity; Cleeland, 1989).

**Self-efficacy for pain management and other symptoms.** Self-efficacy to cope with chronic pain and other symptoms was measured with the Chronic Pain Self-Efficacy Scale (CPSS). This measure consists of two subscales: Pain Self-Efficacy (PSE) and Self-Efficacy for Coping With Other Symptoms (CSE). The Self-Efficacy for Pain Management subscale was assessed with five items, with each question scored on an 11-point numeric scale (10-100; increments of 10, high scores denote greater self-efficacy for pain management). These items assessed the respondent's ability to decrease pain, to keep pain from interfering with sleep, and reducing pain by using methods other than taking extra medications. Self-efficacy for other symptoms is an eight-item subscale to determine the patient's ability to cope and control with pain and related physical symptoms (e.g., fatigue). Questions were assessed on an 11-point numeric scale (10-100; increments of 10), with high scores suggesting greater self-efficacy for coping with pain and related symptoms (Anderson, Dowds, Pelletz, Edwards, & Peeters-Asdourian, 1995). The CPSS has been validated in older adults with cancer (Porter, Keefe, Garst, McBride, & Baucom, 2008).

**Communication.** A total score was determined using the five-item Communication subscale of the Primary Care Assessment Survey (PCAS). Each item was assessed on a 6-point scale with response choices ranging from *very poor* (0) to *excellent* (5). Higher total scores suggest a more positive relationship between the patient and provider (Safran et al., 1998). The PCAS has been validated in older adults with cancer (Gordon, Street, Sharf, Kelly, & Soucheck, 2006).

**Knowledge and experience with cancer pain.** The Patient Pain Questionnaire (PPQ) is a validated 16-item (ordinal) scale measuring the knowledge and experience in managing cancer pain. For purposes of this study, only the Experience subscale consisting of seven items measuring pain relief, distress, and control of pain was included in subsequent analyses. Response choices were rated on an 11-point numeric scale, with high scores endorsing less knowledge of cancer pain on the Knowledge subscale and more experience with pain on the Experience subscale. While it is suggested that each subscale be assessed as total scores, it is also recommended to analyze the individual questions of each subscale, as they similarly have important implications to assessment (Ferrell, Grant, Padilla, Vemuri, & Rhiner, 1991; Ferrell & Rivera, 1997). The PPQ has been validated in older adults with cancer-related pain (Cohen, Musgrave, Munsell, Mendoza, & Gips, 2005).

**Affect.** Positive and negative affect were measured using the 20-item Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). Each scale consists of 10 mood-related adjectives (e.g., attentive, upset, determined), rated on a 5-point Likert-type scale (1 = *very*

*slightly* or *not at all* to 5 = *extremely*), assessing frequency over a 4-week time period. Scores were totaled for each subscale, with high scores indicating a higher affective type (positive or negative; Watson et al., 1988). The PANAS has been validated in older adults with cancer (Pinquart, Fröhlich, & Silbereisen, 2007).

**Health indicators.** A checklist of physical comorbidities assessed the presence of common medical illnesses. Type of cancer was assessed with a single-item question asking participants their cancer diagnosis. The total number of pain locations was assessed by asking participants if they experienced pain in one of the following locations: knees, ankles, hips, shoulders, back, wrists, elbows, and hands.

**Demographic characteristics.** Five demographic variables were included in the analyses: age, race, sex, income, and education. Age was scored in a continuous format. Education was assessed as the total number of years of formal schooling. Monthly income was coded as a categorical variable. Race was examined via nominal categories, with those who identified as Black/African American or White/Caucasian being included in subsequent analyses.

### Statistical Analyses

One hundred sixty-nine patients were initially recruited and consented for this study and due to missing data, 150 participants were included in the analyses. Descriptive analyses were calculated to provide a profile of the sample's demographic, health, behavioral, and social characteristics. To evaluate predictors of different aspects of pain interference, the individual pain interference items from the BPI (general activity, mood, walking ability, normal work, relationships, sleep, and enjoyment of life) were first examined as separate outcome variables. To rule out issues of multicollinearity, bivariate Pearson correlations were calculated for associations between each pain interference item, and each pain interference item and predictor variables (pain severity, pain locations, comorbidities, affect, pain experience, self-efficacy for pain, self-efficacy for other symptoms, communication). Only significantly correlated predictors, with at least one pain interference item, were included in subsequent analyses. Hierarchical multiple regression models were then estimated for each pain interference item. Demographic and health predictors were entered in Step 1, with the social and behavioral indicators entered in Step 2.

A principal components analysis was conducted on the seven items of the Pain Interference subscale. A two-component solution was extracted and rotated via varimax with Kaiser normalization, and accounted for 72.3% of the variance. For the current study, general activity, walking ability, and normal work loaded predominantly on one component ("physical interference").

**Table 1.** Social and Behavioral Variable Descriptives for Older Blacks and Whites ( $N = 150$ ).

Variable	<i>M</i> ( <i>SD</i> )	Range
Pain severity	16.01 (7.63)	0-36
Pain locations	2.28 (2.36)	0-22
Comorbidities	2.64 (2.20)	0-13
Self-efficacy for pain	23.12 (9.47)	0-45
Self-efficacy for other symptoms	39.85 (15.47)	2-72
Negative affect	7.65 (6.67)	0-26
Positive affect	25.29 (7.91)	6-40
Communication	21.90 (4.12)	7-25
Pain interference items		
General activity	5.31 (3.03)	0-10
Normal work	5.23 (3.30)	0-10
Mood	4.69 (2.88)	0-10
Walking ability	4.52 (3.28)	0-10
Relationships	3.66 (2.97)	0-10
Sleep	4.94 (3.32)	0-10
Enjoyment of life	5.00 (3.23)	0-10
Pain interference—Physical composite	15.11 (8.35)	0-30
Pain interference—Psychosocial composite	18.07 (10.25)	0-40

The other component (“psychosocial interference”) consisted of mood, relationships, sleep, and enjoyment of life. Cronbach’s alphas were .83 and .85 for physical interference and psychosocial interference, respectively. The items representing each component were totaled into composites.

## Results

### Sample Characteristics

The sample included older Black and White patients, with a mean age of  $65.4 \pm 7.72$  years. A little less than half of the sample was male ( $n = 65$ , 43%). Patients self-identified as non-Hispanic White/Caucasian ( $n = 123$ , 82%) and non-Hispanic Black ( $n = 27$ , 28%). Breast ( $n = 26$ , 17%), hematologic ( $n = 20$ , 13%), and lung ( $n = 17$ , 11%) were the most common cancer diagnoses. Medication(s) taken for pain was recorded, with more than half of the sample taking oxycodone/oxycotin ( $n = 92$ , 61%), followed by morphine ( $n = 23$ , 15%), hydrocodone ( $n = 14$ , 9%), and fentanyl ( $n = 14$ , 9%). Participants reported living with an average of two ( $2.68 \pm 2.21$ ) chronic medical conditions (in addition to cancer). Other social and behavioral characteristics are provided in Table 1.

### Association of Pain Interference Items

Correlation coefficients were calculated between the seven pain interference items. With the exception of the correlation between general activity and normal work, all correlations were below .7, the cutoff for multicollinearity. Therefore, only six of the items (excluding general activity due to its strong associations with normal work and enjoyment of life) were analyzed as separate outcomes (Table 2).

Results from the bivariate analyses showed that self-efficacy for pain, self-efficacy for other symptoms, pain experience, and pain severity were significantly correlated with all of the pain interference items. In addition, at least one pain interference variable was significantly correlated with negative affect, number of pain locations, comorbidities, positive affect, and communication. To ensure consistency, each of these variables was included as a predictor in the regression models. Because of multicollinearity with pain severity, pain experience ( $r = .65$ ) was excluded from subsequent analyses (Table 3).

### Multivariate Analyses for Pain Interference Items

Hierarchical regression models were calculated for each pain interference item. Step 1 included the demographic and health (pain locations, pain severity, comorbidities) variables, with the social (communication) and behavioral (affect, self-efficacy) indicators entered in Step 2. Results for each pain interference item are presented in Table 4.

The final regression model for normal work was statistically significant,  $R^2 = .21$ ,  $p < .05$ ,  $\Delta R^2$  from Step 1 to Step 2 = .02, with pain severity being the only significant indicator. For the walking ability pain interference item, the final model was significant,  $R^2 = .35$ ,  $p < .001$ ,  $\Delta R^2$  from Step 1 to Step 2 = .09. Significant predictors of pain interference with walking ability included greater pain severity ( $p < .001$ ), lower self-efficacy for other symptoms ( $p < .05$ ), and greater negative affect ( $p = .01$ ). There were trends for comorbidities and sex (females;  $ps < .10$ ). The final model for relationships with other people was also significant,  $R^2 = .39$ ,  $p < .01$ ,  $\Delta R^2$  from Step 1 to Step 2 = .06. In this model, greater



**Table 2.** Association of Pain Interference Items for Total Sample.

Pain interference	1	2	3	4	5	6	7
1. General activity	—						
2. Mood	.58**	—					
3. Walking ability	.59**	.42**	—				
4. Normal work	.69**	.52**	.60**	—			
5. Relationships	.55**	.60**	.47**	.49**	—		
6. Sleep	.49**	.55**	.46**	.47**	.61**	—	
7. Enjoyment of life	.64**	.60**	.58**	.57**	.61**	.58**	—

\*\* $p < .01$ , two-tailed.

**Table 3.** Significant Correlations Between Pain Interference Items and Other Psychosocial and Physical Factors.

Variable	1	2	3	4	5	6	7	8	9
Pain interference									
Normal work	.24**	.40**	-.25**	-.30**	.20*	.18*	.38**	-.11	-.04
Mood	.32**	.44**	-.22**	-.38**	.17*	.14	.37**	-.17*	-.19*
Walking ability	.06	.43**	-.28**	-.39**	.28**	.32**	.43**	-.22**	-.15
Relationships	.32**	.38**	-.29**	-.36**	.21*	.21*	.44**	-.09	-.14
Sleep	.31**	.47**	-.46**	-.41**	.10	.24**	.46**	-.13	-.09
Enjoyment of life	.37**	.47**	-.40**	-.42**	.07	.16*	.46**	-.23**	-.16
Other variables									
1. Negative affect	—								
2. Pain experience	.34**	—							
3. Pain self-efficacy	-.34**	-.45**	—						
4. Other self-efficacy	-.36**	-.48**	.53**	—					
5. Pain locations	-.01	.25**	-.21*	-.20*	—				
6. Comorbidities	.19*	.27**	-.20*	-.22*	.14	—			
7. Pain severity	.20*	.65**	-.25**	-.34**	.19*	.36**	—		
8. Positive affect	-.35**	-.32**	.33**	.39**	-.23**	-.15	-.08	—	
9. Communication	-.01	-.19*	.09	.29**	-.07	-.07	-.11	.16	—

\* $p < .05$ , two-tailed. \*\* $p < .01$ , two-tailed.

pain severity was a significant predictor ( $p < .001$ ), as was years of education ( $p < .01$ ).

For sleep, the final model was significant,  $R^2 = .47$ ,  $p < .001$ ,  $\Delta R^2$  from Step 1 to Step 2 = .12. Significant predictors included increased pain severity ( $p < .001$ ), lower self-efficacy for pain ( $p < .01$ ), more years of education ( $p < .01$ ), and race ( $p < .05$ ). Blacks reported that pain interfered with their sleep more than Whites. The model for enjoyment of life was significant,  $R^2 = .38$ ,  $p < .001$ ,  $\Delta R^2$  from Step 1 to Step 2 = .14, with pain severity ( $p < .001$ ) and pain self-efficacy ( $p < .05$ ) as significant indicators. For the mood item, the final model was significant,  $R^2 = .32$ ,  $p < .001$ ,  $\Delta R^2$  from Step 1 to Step 2 = .09. Increased pain severity was a significant predictor ( $p < .001$ ).

### Pain interference Composites

Separate hierarchical regression models were calculated for the two pain interference composites (physical and psychosocial). Similar to the individual pain interference item models, the demographic and health variables were entered in Step 1, with the social and behavioral indicators entered in Step 2.

As shown in Table 5, the final model for physical interference was significant,  $R^2 = .30$ ,  $p < .001$ ,  $\Delta R^2$  from Step 1 to Step 2 = .04, with pain severity as the only significant predictor variable. The final model for the psychosocial pain interference composite was also significant,  $R^2 = .51$ ,  $p < .001$ ,  $\Delta R^2$  from Step 1 to Step 2 = .13. In this case, pain severity ( $p < .001$ ), education ( $p < .05$ ), self-efficacy for pain ( $p < .05$ ), negative affect ( $p < .05$ ), and communication with health care providers ( $p < .05$ ) were significant indicators for this composite pain interference variable.

### Discussion

This study aimed to explore how various social, behavioral, and health factors may be differentially related to pain interference among a sample of older adults with a cancer diagnosis. Findings showed the complexity of the pain experience and importance of accounting for a range of factors that may influence the adequate management of pain.

Data showed pain severity to be consistently associated with each predictor variable as well as the physical and psychosocial interference composites. Previous

Table 4. Final Regression Models for Predictors of Individual Pain Interference Items.

Predictor	Normal work		Mood		Walking ability		Relationships		Sleep		Enjoyment of life	
	B (SE)	$\beta$	B (SE)	$\beta$	B (SE)	$\beta$	B (SE)	$\beta$	B (SE)	$\beta$	B (SE)	$\beta$
Sex	1.00 (0.62)	.15	-0.13 (0.51)	-.02	0.98 <sup>†</sup> (0.55)	.15	0.75 (0.49)	.13	0.17 (0.50)	.03	-0.08 (0.54)	-.01
Age	-0.01 (0.04)	-.01	-0.01 (0.03)	-.03	0.01 (0.04)	.02	-0.03 (0.03)	-.08	-0.04 (0.03)	-.08	0.02 (0.04)	.05
Race	-0.61 (0.81)	-.07	0.56 (0.63)	.63	-0.19 (0.68)	-.02	0.66 (0.60)	.09	1.42* (0.61)	.17	-0.35 (0.66)	.04
Education	0.03 (0.15)	.02	0.05 (0.11)	.04	0.20 (0.12)	.14	0.35** (0.11)	.27	0.32** (0.11)	.22	0.07 (0.12)	.05
Income	0.30 (0.82)	.04	-0.85 (0.64)	-.12	-0.85 (0.70)	-.11	0.12 (0.62)	.02	-0.50 (0.64)	-.06	-0.40 (0.69)	-.05
Pain severity	0.13** (0.05)	.27	0.12** (0.04)	.30	0.14** (0.04)	.30	0.15** (0.04)	.35	0.16** (0.04)	.35	0.17** (0.04)	.37
Pain locations	0.09 (0.12)	.07	0.11 (0.10)	.10	0.11 (0.11)	.09	0.10 (0.10)	.09	-0.10 (0.10)	-.08	-0.07 (0.11)	-.05
Comorbidities	0.08 (0.14)	.06	0.01 (0.12)	.01	0.24 <sup>†</sup> (0.13)	.17	0.03 (0.11)	.02	0.10 (0.11)	.07	-0.11 (0.12)	-.08
Pain self-efficacy	-0.02 (0.04)	-.05	0.02 (0.03)	.06	-0.01 (0.03)	-.03	-0.04 (0.03)	-.13	-0.10** (0.03)	-.28	-0.07* (0.03)	-.21
Other self-efficacy	-0.03 (0.03)	-.13	-0.03 <sup>†</sup> (0.02)	-.18	-0.05* (0.02)	-.23	-0.02 (0.02)	-.10	-0.01 (0.02)	-.04	-0.02 (0.02)	-.09
Negative affect	0.03 (0.06)	.05	0.08 <sup>†</sup> (0.04)	.19	-0.11* (0.05)	-.22	0.05 (0.04)	.11	0.06 (0.04)	.11	0.08 <sup>†</sup> (0.05)	.16
Positive affect	0.03 (0.04)	.08	0.02 (0.04)	.05	-0.03 (0.04)	-.09	0.01 (0.03)	.04	-0.01 (0.04)	-.02	0.01 (0.04)	.01
Communication	-0.01 (0.07)	-.02	-0.10 <sup>†</sup> (0.06)	-.15	-0.04 (0.07)	-.06	-0.06 (0.06)	-.09	-0.07 (0.06)	-.09	-0.12 <sup>†</sup> (0.06)	-.16

Note. The reference category for sex was males, the reference category for race was Whites, and the reference category for income was "less than US\$1,000 a month."

<sup>†</sup>Trend,  $p < .01$ , two-tailed. \* $p < .05$ , two-tailed. \*\* $p < .01$ , two-tailed.

**Table 5.** Final Regression Models for Predictors of Pain Interference Composites.

Predictor	Physical interference		Psychosocial interference	
	B (SE)	$\beta$	B (SE)	$\beta$
Sex	2.20 (1.45)	.14	1.08 (1.55)	.05
Age	0.01 (0.10)	.01	-0.04 (0.10)	-.03
Race	0.24 (1.87)	.01	3.17 (1.89) <sup>†</sup>	.12
Education	0.34 (0.34)	.09	0.73 (0.35)*	.16
Income	-1.19 (1.89)	-.06	-1.73 (1.96)	-.07
Pain severity	0.41 (0.11)**	.36	0.61 (0.12)**	.42
Pain locations	0.27 (0.28)	.09	0.09 (0.30)	.77
Comorbidities	0.28 (0.33)	.08	0.01 (0.35)	.01
Pain self-efficacy	-0.04 (0.09)	-.05	-0.19 (0.10)*	-.17
Other self-efficacy	-0.07 (0.06)	-.12	-0.08 (0.06)	-.11
Negative affect	-0.04 (0.13)	-.03	0.27 (0.13)*	.17
Positive affect	-0.02 (0.10)	-.02	0.03 (0.11)	.03
Communication	-0.17 (0.17)	-.09	-0.37 (0.18)*	-.16

Note. The reference category for sex was males, the reference category for race was Whites, and the reference category for income was "less than \$1,000 a month."

<sup>†</sup>Trend,  $p < .10$ , two-tailed. \* $p < .05$ , two-tailed. \*\* $p < .01$ , two-tailed.

studies (Black et al., 2011; Dalton, Higgins, Miller, Keefe, & Khuri, 2015; Novy & Aigner, 2014) have found similar results. For example, Dalton and colleagues (2015) found that individuals with higher pain intensity coupled with higher levels of pain interference had higher psychosocial interference. This study also supports the theoretical biopsychosocial model of pain, which posits that pain is a complex interaction between physiological, psychological, cognitive, social, and other factors (Zaza & Baine, 2002). Furthermore, this study illustrates that physical and psychosocial interference are clearly two different domains that should be measured independently. Thus, assessing pain severity, as a separate domain, does not provide a comprehensive assessment of the pain experience among individuals diagnosed with multiple morbidities.

When assessed as two domains of pain interference, the only significant predictor of physical interference was greater pain severity. This finding corroborates with recent data suggesting the impact pain severity has on the day-to-day functioning of chronically ill patients (Atkinson et al., 2012; Hwang, Chang, & Kasimis, 2002; Ramirez-Maestre et al., 2014). Data further showed pain severity, self-efficacy, education, negative affect, and communication as indicators of psychosocial interference. This suggests the multidimensionality of how pain can interfere with various aspects of a patient's life. Finding communication as a significant predictor further confirms this complex relationship. Studies highlight the importance of the patient-provider interaction on patient satisfaction (communication) and the contributing influences that define the relationship (Baker, O'Connor, Roker, & Krok, 2013). The extent to which the importance of treatment goals is expressed by the health care provider is often contingent on the patient's trust and confidence in issues surrounding how

effective that information is communicated, along with the level of comfort the patient has in presenting his or her concerns (Coelho & Galan, 2012; Janssen & Lagro-Janssen, 2012). Studies show that older adults, who are often perceived as not being able to effectively communicate with their provider (Lewis, 2012; Wroth & Pathman, 2006), are less likely to be satisfied with their health care treatment if they do not value the relationship they have with their provider. Song, Hamilton, and Moore (2012) suggested an increased need for information during diagnosis and treatment, thereby showing the impact an effective patient-provider (communication) relationship has in the management of cancer-related symptoms. This addresses the importance communication, dialogue, and interpretation of medical information have among older adult population.

Interesting results were also shown when each pain interference item was assessed. Sleep disturbance was found to be associated with a variety of psychosocial and demographic variables, including pain severity, self-efficacy, race, and education. This finding supports the previous categorization of sleep interference as a result of both personal activity and affect (Cleeland, 2009). Epidemiological studies show greater sleep disturbances among older adults, with frequency being dependent on existing chronic diseases (cancer, bodily pain; Chen, Hayman, Shmerling, Bean, & Leveille, 2011; Liu, Wheaton, Chapman, & Croft, 2013).

The findings of this study corroborate with previous findings that racial minorities report more sleep disturbance than Whites (Baldwin et al., 2010; Pranathiageswaran, Badr, Severson, & Rowley, 2013), but evidence from large epidemiologic studies contends that Black participants are less likely to complain of sleep disturbances than Whites (Hale & Do, 2007; Palesh et al., 2010). Overall, it has been shown that

sleep disturbance compromises quality of life, daily functioning, and may result in increased morbidities, mortality, and health care utilization (Magee, Caputi, & Iverson, 2011; McMillan, Tofthagen, & Morgan, 2008). Although cases of sleep problems are found across all age groups (Valrie, Bromberg, Palermo, & Schanberg, 2013), older adults are more likely to experience sleep-related disorders (e.g., restless leg syndrome, insomnia, sleep-disordered breathing; Roepke & Ancoli-Israel, 2010), outcomes resulting from sleep disorders (e.g., cognitive impairment; Gamaldo, Allaire, & Whitfield, 2008), and poor physical health (Baker & Whitfield, 2014, 2015) than their younger-aged counterparts. An estimated 50% to 88% of patients with chronic nonmalignant pain report significant sleep disturbance, multi-site pain, and restless sleep (Chen et al., 2011; Lopez-Torres Hidalgo et al., 2011). Consequences of poor sleep habits (disturbances) are frequently associated with existing chronic (and painful) medical illnesses (Garcia, 2008) such as cancer (McMillan et al., 2008), hypertension, depression, diabetes mellitus, and arthritis (Chen et al., 2011; Zimmerman, Bigal, Katz, Derby, & Lipton, 2013).

Specific to race, there has been an increase in the number of studies focusing on sleep quality among older adults (Liu et al., 2013; Magee et al., 2011; Zimmerman et al., 2013), yet few have provided a template for examining the association of health (e.g., health status, physical functioning) and behavioral (e.g., depression) indicators with sleep quality in older Blacks (Durrence & Lichstein, 2006; Jackson, Redline, Kawachi, & Hu, 2013). In a recent study, Baker and Whitfield (2015) found that pain intensity and age (being younger) were indicators of sleep difficulty among Black adults diagnosed with multiple chronic illnesses. In a similar study of older Black women, decreased physical functioning was associated with sleep difficulty (Baker & Whitfield, 2014). Of concern, however, is the impact this dyad has among diverse race populations. This study's results and findings from previous studies clearly show the need for more relevant data to augment our knowledge in how to better assess and treat sleep difficulty among aging and diverse population.

In addition to finding race as a significant indicator for pain interference with sleep, education was found to be associated with sleep interference. This finding corresponding with a number of studies has shown lower education attainment to be significantly associated with an increased risk of patients experiencing chronic pain and less likely to receive adequate cancer treatment (including pain management; Krok & Baker, 2014; Simone, Vapiwala, Hampshire, & Metz, 2012).

Aside from the physical indicators, there is much need to understand the impact social determinants of health have on overall health and general well-being. Determinants such as economic status and race are noted to dictate the quantity and quality of health care service, rates of health disparities, and associated inequities related

to health outcomes across a continuum of population groups. Yet, there is a need to further understand whether these factors attribute to disease etiology and symptom duration, or to the existence of other health, behavioral, or social factors.

As with race and economic status (education), pain severity, self-efficacy, and negative affect were indicators of interference on walking ability. It was not surprising finding pain severity as a significant predictor of this pain interference item. However, finding self-efficacy and negative affect as significant indicators was unexpected. These results suggest the connection between the physical and behavioral factors that influence the pain experience among the adult population. Results from this study corroborate with findings from other investigations showing that patients reporting decreased self-efficacy are more likely to experience higher pain levels, fatigue, cancer-related symptoms, depression, and anxiety (Porter & Keefe, 2011; Porter et al., 2008; Shelby et al., 2014). Results further showed that the same patients also reported significantly worse physical and functional well-being (Hosoi et al., 2010; Porter et al., 2008). These findings suggest that interventions targeted at self-efficacy may improve the patients' pain experience across a variety of domains, as evidenced in this study, rather than targeting identified symptoms with specific interventions (Porter et al., 2008; te Boveldt et al., 2013). Yet, by discussing both pharmaceutical and nonpharmaceutical options regarding cancer-related pain with patients, health care providers can individualize treatment plans and possibly increase the patient's perception of control, hence improving self-efficacy of health outcomes and adequate pain management.

### *Study Limitations*

Although this study demonstrated unique associations between pain interference and psychosocial factors among older Black and White cancer patients, there were some limitations that must be acknowledged. First, this was a cross-sectional study; therefore, changes over time or established causal associations in reported pain interference could not be determined. Another limitation was the lack of racial diversity within the sample. The majority of the sample was White and well educated; thus, our ability to generalize these findings to other cancer populations and the general older adult population is limited. Furthermore, our criterion for study participation was not limited to a specific cancer diagnosis, prognosis, or treatment regimen (e.g., pharmacological, radiation, chemotherapy); therefore, we cannot definitively compare our findings with other studies examining specific cancer diagnoses. Future efforts should focus on diversifying the sample. Finally, the data were collected via self-reports, which may result in potential reporting bias such as social desirability. In our sample, social desirability may have yielded responses that were favorable to that of



the patients. Similarly, asking patients to rate their pain based on a cancer diagnosis may be difficult, particularly for those experiencing pain resulting from multiple physical etiologies (e.g., arthritis, diabetes). Despite these limitations, our finding makes a significant contribution to the literature as it explores trends (and heterogeneity) of older adult patient population from an NCI-designated Comprehensive Cancer Center in how, despite all effort, pain remains as a significant deterrent to optimal functioning among the growing adult population.

## Conclusion

This study sought to determine the significance demographic, behavioral, and social characteristics have in pain interference with daily activities among older Black and White patients receiving outpatient cancer treatment from an NCI-designated Comprehensive Cancer Center. Pain severity was a significant indicator for physical interference. Similarly, pain severity, education, self-efficacy, negative affect, and communication were predictors of psychosocial interference.

The study findings suggest that there is an amalgam of data underscoring the role social and behavioral factors have on the pain experience. Future research is needed to explore the implications of these variables among older adults in general and those from diverse race populations in particular. Recognizing the importance of addressing the underlying mechanisms of pain, while acknowledging the influence of demographic and social factors, may dictate the need and importance of more comprehensive and continued education on how to adequately manage pain across multiple levels of care. Without proper training, it may be perpetuated that pain is being appropriately treated and is no longer seen as a priority in patient care. In addition, both patients and providers must be aware of the myriad of psychosocial factors that act as personal triggers of pain, observed gaps in their management, and areas for improvement. Utilizing a multidimensional approach to understanding and treating cancer pain and pain interference is important considering the detriment it has in achieving and maintaining optimal quality of life.

## Declaration of Conflicting Interests

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