The Influence of Social Structure on Cancer Pain and Quality of Life

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Abstract

The aim of this study was to investigate whether social structure is associated with cancer pain and quality of life using the Social Structure and Personality Research Framework. This study was a secondary analysis of data from 480 cancer patients. The measurements included socioeconomic variables, self-reported cancer pain using the McGill Pain Questionnaire–Short Form (MPQ-SF), and quality of life measured using the Functional Assessment of Cancer Therapy Scale (FACT-G). The data were analyzed using moderated multiple regression. Cancer pain and quality of life differed significantly with income. The associations between income and pain and quality of life were significant only for the high education group (partial college), and these associations were greater for Caucasians than for their counterparts ($p < .05$). When developing interventions, nurses should consider the influence of socioeconomic variables on pain and quality of life while considering possible moderating factors such as education.

Keywords

neoplasms; pain; ethnic groups; income; education; moderator

Disparities exist in cancer mortality and morbidity according to income, education, and race/ethnicity (Ham, Kim, & Lee, 2008; Kondo, 2012; Long, Liu, Bristow, 2013; Warner et al., 2015). A previous study reported that the age-adjusted all-cause mortality rate (853.39/100,000) is higher in areas where more than 20% of the population lives below the poverty line; the rate is 679.39/100,000 individuals in areas where less than 5% of the population lives below the poverty line (Singh & Siahpush, 2013). Socioeconomic status may influence cancer patients' health care utilization and psychosocial stress, thus affecting their health status directly and indirectly (Williams, 1990). Others have contended that social structure (education, income, and occupation) is associated with orientation toward the self and society as well as intellectual flexibility, which enables people to control their situations

and grants them opportunities to exercise influence over themselves and others. Accordingly, people who belong to communities with more advantageous social structures experience less distress in general and have better quality of life (Kohn, Naoi, Schoenbach, Schooler, & Slomczynski, 1990; Liu, 2006).

Socioeconomic Differences in Cancer Pain and Quality of Life

Researchers have reported that socioeconomic status (SES) influences pain perception among cancer patients (Im et al., 2007). Those with a lower SES, who experience economic hardships, are exposed to more financial and environmental stressors and have fewer psychosocial resources than do their counterparts with greater financial resources, which contribute to inadequate management of stressful experiences including pain (Rios & Zautra, 2011). Also, pain and quality of life of cancer patients are reportedly influenced by household income, education level, marital status, race/ethnicity, and gender (Kats et al., 2005; Landmark et al., 2013; Paulson, Dekker, & Aguilar-Gaxiola, 2007; Rios & Zautra, 2011).

Socioeconomic status is defined as the position of an individual or family in a hierarchical structure; it is measured by variables such as education, occupation, income, and place of residence. Researchers have frequently used a single socioeconomic variable in determining socioeconomic disparities in health and disease (Calixto & Anaya, 2014). However, these variables are interdependent on each other and are closely related (Feinstein, Sabates, Anderson, Sorhaindo, & Hammond, 2006). Socioeconomic status is complex and multifactorial, and analyses and measurements of socioeconomic variables are not easy to interpret. Moreover, researchers have reported that socioeconomic factors interact with other social characteristics and influence patients' health and disease status through different causal pathways (Braveman et al., 2005). Therefore, researchers should employ multiple measurements of SES when examining socioeconomic disparities in health, and consider possible interactions between and among socioeconomic variables.

The Institute of Medicine (IOM, 2011) reported a higher prevalence of disabling pain among people with low incomes and less than a high school education compared with their counterparts. The IOM (2011) also reported that there are racial and ethnic disparities in pain and pain treatment. They further contended that African Americans and Hispanics were exposed to a higher risk of pain and pain under-treatment than for the same variables for Whites. However, the combined influences of, and/or the interrelationships among education, race/ethnicity, and income with regard to cancer pain and quality of life have all rarely been investigated.

A former study identified education level as a moderating factor in the relationship between financial status and psychological deprivation and psychological health (Galic, 2007). A moderating factor is a third variable that affects the strength and/or direction of the association between independent and dependent variables (Bennett, 2000). Galic (2007) reported that the association between income and psychological health was significant only in a group with little education (high school), while there was no meaningful relationship between income and psychological health in a high education group (university degree).

Ben-Zur, Duvdevany, and Issa (2014) reported that race/ethnicity moderated the effects of social support on quality of life among persons with mental illness.

Theoretical Framework

The theoretical framework of this study was the Social Structure and Personality Research framework (SSPR). The SSPR explains the associations between macro-social structures and an individual's feelings, attitudes, and behaviors (House, 1981). One previous study found that more economically advantaged people are more intellectually flexible, and more self-directed in their orientation to self and society, and accordingly have less of a sense of distress (feelings of psychic comfort or pain) and a better sense of well-being than their less wealthy counterparts (Liu, 2006). Liu (2006) found that educational attainment and income are associated with personality (self-directedness of orientation, intellectual flexibility, and distress) in that education and income are positively associated with self-directedness of orientation and intellectual flexibility and negatively correlated with distress. Others have contended that social structure affects psychological functioning (i.e., distress) via occupational self-direction (Kohn et al., 1990).

The assumption of the SSPR model is that social position can affect individuals' responses to external influences, which may explain the existence of social inequality in health, disease, and quality of life. Therefore, differences in morbidity and mortality could be partially due to conditions originating from individuals' positions in society (House, 1981; Williams, 1990). Although the present study did not measure self-directedness and intellectual flexibility, based on the SSPR, we think it fair to assume that differences in cancer pain are most likely associated with different levels of psychological functioning (distress), which originate from individuals' structural position (household income, education level, and race/ethnicity) and eventually affect the quality of life of cancer patients.

Purpose

The purpose of our study was to examine the differences in cancer pain and quality of life given socioeconomic variables (household income, education level, race/ethnicity, and access to health care; Aim 1), and to investigate whether education and race/ethnicity moderate the effects of household income on cancer pain and quality of life (Aim 2).

Method

Study Design

A secondary data analysis was performed using the data from a cross-sectional study on racial/ethnic differences in cancer pain. This study was approved by the institutional review board of our university.

Sample and Setting

In the original study, cancer patients were recruited from both the Internet ($n = 204$) and community settings ($n = 276$) using a convenience sampling method. The purpose of the

original study was to determine ethnic differences in cancer pain targeting four ethnic groups (Hispanics, Whites, African Americans, and Asians). To test the differences in cancer pain across the four ethnic groups, the original study recruited an equal number of participants from each ethnic group (105 Hispanics, 148 Whites, 109 African Americans, and 118 Asians).

In community settings, 10 community consultants helped to recruit cancer patients from either cancer clinics or cancer support groups across the United States. The community consultants were formal or informal leaders of community clinics and support groups and were identified through Internet searches. Those cancer patients who were recruited from the Internet were contacted via cancer support groups identified through major search engines (e.g., Google, MSN, and Yahoo). Inclusion criteria were cancer patients at least 18 years of age who could read and write in English and whose self-reported racial/ethnic identity was Hispanic, non-Hispanic White, African American, or Asian.

Among the participants of the original study ($N = 480$), some patients did not provide answers to questions on household income and/or cancer pain ($n = 37$); accordingly, this secondary analysis used the data from 443 cancer patients in the analysis of moderating effects. With an alpha of .05 and a medium effect size of $f = 0.25$, 99%, power was obtained with a total of 443 participants to test main effects and interactions in this secondary analysis.

Instruments

The study instruments included questions on sociodemographic and disease characteristics, the McGill Pain Questionnaire–Short Form (MPQ-SF) for measuring self-reported cancer pain, and the Functional Assessment of Cancer Therapy Scale (FACT-G) for measuring quality of life. The sociodemographic characteristics recorded were age, gender, race/ethnicity, household income, years of education, and employment status. Subjective household income is the perception of income adequacy; each respondent identified his or her income level as belonging to one of the following four categories: more than sufficient, sufficient for essential needs, insufficient, and totally insufficient for our family. Race/ethnicity was measured using the ethnic identity question based on the National Institute of Health guidelines in which participants are identified as Hispanics, Asians, African Americans, or Whites. In this study, we classified race/ethnicity as Whites and non-Whites in the analysis of moderating effects. The questions on disease status included those on cancer diagnosis and treatment (e.g., site/type/stage of cancer, and use of pain medicine). Difficulty in obtaining health care was measured with the question, "In the past 12 months, did you experience difficulty in obtaining any type of health care, delay obtaining care, or not receive health care?" The answers were scored dichotomously (1 = *yes*, and 2 = *no*).

Self-reported cancer pain was measured using the MPQ-SF, which has three components: pain rating index (PRI), Visual Analogue Scale (VAS), and present pain intensity (Melzack, 1987). The PRI is comprised of 15 descriptor scales (11 sensory and 4 affective) that measure pain intensity, each of which is rated on a 4-point Likert-type scale (0 = *none* and 3 = *severe*), and present pain intensity is measured on a 5-point Likert-type scale (0 = *no pain* and 5 = *excruciating pain*). The total score for each respondent was calculated by adding up

all 15 items in the PRI section of the MPQ-SF (range = 0–45), and a higher score indicates more pain. The Cronbach's alpha of the MPQ-SF was .94 in this sample. The reliability and validity of the MPQ-SF in multi-ethnic groups were verified in previous studies (Lázaro, Bosch, Torrubia, & Banos, 1994; Shin, Kim, Kim, Chee, & Im, 2007).

Self-reported quality of life was measured using the FACT-G, which evaluates the quality of life of cancer patients in five domains (physical well-being, social and family well-being, relationship with the physician, emotional well-being, and functional well-being; Cella et al., 1993). Among a total of 33 items on the FACT-G, 28 items are measured with a 5-point Likert-type scale ranging from 0 (*not at all*) to 4 (*very much*), and the other five items are measured using a linear analogue scale ranging from 0 (*not at all*) to 10 (*very much*). The total FACT-G score was produced by combining the ratings on all 33 questions (range = 0–162). Reverse coded items were recoded and a higher score indicates a better quality of life. The validity and reliability of the FACT-G were verified in former studies with cross-cultural populations (Mullin et al., 2000; Yu et al., 2000), and the Cronbach's alpha value was .70 in our study.

Procedures

For the original study, a project website was developed by the research team. Data were collected online from cancer patients recruited through Internet cancer support groups who agreed to participate in the study. In this population, informed consent was obtained online. In the community setting, pen-and-pencil questionnaires were used, and community consultants distributed and collected questionnaires and informed consent forms using mail services. The collected data were saved in the American Standard Code for Information Interchange (ASCII) format and databases. The data from the Internet survey were saved automatically and directly in the databases as the participants entered the data. The data from the pen-and-pencil survey were entered by one research assistant (RA) into the database, and two additional RAs double-checked the data entries separately. A previous study found no significant differences in the psychometric properties of the study instruments between the Internet format and the pen-and-pencil format of the questionnaire ($p > .05$; Im et al., 2007). It took 30 to 40 min to complete the questionnaire. The original study was conducted from 2003 to 2009. For this secondary data analysis, participants were divided into two groups according to the moderating variables, such as high education (partial college) and low education (high school) groups, and White and non-White racial/ethnic groups, for the subgroup analysis.

Data Analysis

The SPSS 21.0 for Windows was used for data analysis (SPSS, Inc., IBM, Chicago, Illinois, USA). Descriptive statistics (mean, standard deviation, frequencies, and percentages) were used to describe the general and disease-related characteristics of the participants. To compare mean scores of pain intensity and quality of life according to the socioeconomic characteristics (Aim 1), *t* tests and ANOVAs were conducted. Post hoc tests were performed using Scheffe's method. Moderated multiple regression analysis was performed using the Process by Hayes (2015; Aim 2). The MPQ-SF and FACT-G scores were entered as dependent variables. Household income, years of education, and the product of income and

years of education were entered as independent variables after mean-centering the product (Pillai, Goldsmith, & Geibelhausen, 2011). Then, we performed subgroup analyses for high and low education groups, separately using simple regression analyses. The same procedures were performed for household income (independent variable), race/ethnicity (moderating variable), and MPQ-SF and FACT-G (dependent variables). The null hypothesis of no difference was rejected if the *p* values were less than .05.

Results

Sociodemographic and Disease Characteristics of the Participants

The mean age of the participants was 51.92 years ($SD = 12.27$), and 79.4% were females. Twenty-two percent identified their race/ethnicity as Hispanics, 22.5% as African Americans, 24.6% as Asians, and the remaining 31.0% as Whites. Sixty-two percent had at least a partial college education, and 29.4% reported that their subjective household income was very insufficient. Forty-five percent of all patients were diagnosed with breast cancer, and 25.4% were at cancer Stage II. Thirty-seven percent of the patients were taking pain medication, and 20.8% had difficulty in obtaining health care (Table 1).

Differences in Cancer Pain and Quality of Life According to Socioeconomic Characteristics (Aim 1)

Self-reported cancer pain (MPQ-SF) and quality of life (FACT-G) were significantly different according to race/ethnicity, subjective household income, employment status, and access to health care ($p < .05$), whereas the differences were not significant by level of education or gender ($p > .05$). The mean scores for cancer pain were significantly lower in the group that reported sufficient income, in those who were employed, in those who did not have difficulty getting health care, and in African Americans and Asians versus their respective counterparts ($p < .05$; Table 2).

Moderating Effects of Education on the Relationship Between Household Income and Cancer Pain and Quality of Life (Aim 2)

Multiple regression analyses revealed that the interaction between income and education was significant for both MPQ-SF and FACT-G, indicating that years of education moderated the effects of household income on cancer pain (MPQ-SF) and quality of life (FACT-G). To understand these moderating effects clearly, we split the participants into high education (partial college) and low education (high school) groups for a subgroup analysis, and found that the direction of associations between household income, and MPQ-SF and FACT-G differ between the high education and low education groups. The results revealed that household income was negatively associated with MPQ-SF and positively associated with FACT-G in the high education group only ($p < .001$), while these associations were not significant for the low education group (Table 3).

Moderating Effects of Race/Ethnicity on the Relationship Between Household Income and Cancer Pain and Quality of Life (Aim 2)

The moderating effect of race/ethnicity (Whites/non-Whites) was significant on the relationship between household income and MPQ-SF and FACT-G, as indicated by the

significant interaction between income and race/ethnicity for both MPQ-SF and FACT-G. To understand these moderating effects clearly, we split the participants into two racial/ethnic groups (Whites and non-Whites) for a subgroup analysis, and found that the strength of associations between household income and MPQ-SF and FACT-G differ between White and non-White racial/ethnic groups. Subgroup analyses indicated that household income was negatively associated with MPQ-SF for the White group ($p < .001$), while the association was not significant for the non-White group ($p > .05$). Regarding FACT-G, household income was positively associated with FACT-G for both the White and non-White groups ($p < .001$), but the association was stronger for Whites ($B = 9.04$) than non-Whites ($B = 4.92$; Table 4).

Discussion

This secondary analysis supported the assumption of the SSPR that differences in cancer pain would originate from individuals' structural position and in turn affect the quality of life of cancer patients (Kohn et al., 1990; Liu, 2006). Consistent with the assumption of the SSPR, our study found significant differences in cancer pain and quality of life according to socioeconomic variables (race/ethnicity, household income, employment, and access to health care) and significant moderating effects of education and race/ethnicity were identified.

Social stratification is a multidimensional typology; therefore, measuring an individual's position in a social structure in diverse societies is complicated (Kohn et al., 1990). However, our study elucidated the interrelationship among multiple socioeconomic variables and identified a relationship between income and health (pain) and quality of life of cancer patients. Another assumption of the SSPR is that people in higher social positions have more opportunities to be self-directed and a greater degree of intellectual flexibility; thus, they are less distressed and enjoy a better quality of life. These personality characteristics (self-directedness and intellectual flexibility) enable greater control over one's situation and more opportunities to exercise influence in relation to others (Kohn et al., 1990; Liu, 2006). Even though we did not measure self-directedness and intellectual flexibility, more socioeconomically advantaged people would logically have less cancer pain because they have more control over pain management and a better overall sense of well-being, which is consistent with the results of our study.

A former study utilizing the SSPR framework incorporated objective monetary income in the measurement of social structure (Kohn et al., 1990), however, our study used subjective income in categorizing social class. Operario, Adler, and Williams (2004) investigated that self-reported measure of subjective SES revealed reliability and utility and association with self-reported health after controlling for objective income. They contended that people's subjective beliefs about their social status can be more strongly associated with overall health and accurately capture subtle aspects of social status (Operario et al., 2004). Others also found that both subjective household income and subjective social class were significantly associated with health-related quality of life (Kim & Park, 2015). Indeed, those living in metropolitan areas and urban areas would perceive their subjective income differently even though they were in similar income brackets.

Researchers in a former study contended that no single measure of socioeconomic position (SEP) will be ideal for all studies (Howe et al., 2012). They introduced alternative measures of SEP including asset-based measures and consumption expenditure. Among those, consumption expenditure attempts to measure a household's ability to meet its material needs. They contended that consumption expenditure is more stable over time than income, and individuals base their consumption decisions primarily on their long-term income expectations. They also argued that there is consensus about the value of measuring consumption expenditure rather than income (Howe et al., 2012). Therefore, use of income adequacy, whether a participant's income was sufficient or insufficient to meet his or her family's essential needs (consumption expenditure), could be a valid method in measuring the SES in our study. Also, in our previous studies, we found that ethnic minorities did not want to answer the question on the amount of family income and frequently skipped the question because of cultural reasons. However, the question on the adequacy of family income has been used for ethnic minorities without any problems or issues.

There are complicated relationships among race/ethnicity, SES variables, and pain, and it is difficult to disentangle those between racial/ethnic and SES effects on pain and quality of life (Green & Hart-Johnson, 2012). They also suggested that race/ethnicity and SES are interactive and that ethnic minorities do not gain the same health benefit from increasing SES as Whites. Another study reported that low neighborhood SES is associated with more pain (Fuentes, Hart-Johnson, & Green, 2007). Differences in health care access, the support system, and communication style, clinician variability in decision-making based upon sociodemographic factors, and disparate allocation of resources contributed to disparities in pain and quality of life in terms of race/ethnicity and SES (Fuentes et al., 2007; Green, Hart-Johnson, & Loeffler, 2011; Green & Hart-Johnson, 2012).

Although associations between social structure and pain and quality of life have been identified in former studies (Ben-Zur et al., 2014; Kats et al., 2005; Landmark et al., 2013; Paulson et al., 2007; Poghosyan et al., 2015; Rios & Zautra, 2011), the ways in which cancer patients perceive pain and quality of life have rarely been studied. Our study found that the moderating effects of education and the influence of income on pain and quality of life were significant only in the high education group. It has been reported that education enables and empowers individuals to protect their health and manage diseases, while it also changes the way individuals behave and the choices they make (Feinstein et al., 2006). Thus, this finding could be interpreted as an indication that those with fewer years of education, possibly because of low health literacy, may have utilized monetary resources unwisely and enjoyed less benefit from economic wealth, thereby not achieving advancements in health and quality of life.

Consistent with our findings, a former study identified moderating effects of education on the relationship between financial deprivation and psychological health (Galic, 2007). Education is directly associated with health literacy, and those with less than a high school degree are more likely to have lower health literacy (IOM, 2004; Kang, Lee, Kim, & Lee, 2012). Health literacy is defined as the ability to obtain, understand, and process health-related information in diverse situations. Compared with their counterparts, patients with lower health literacy are less healthy in general and utilize fewer preventive health

services (IOM, 2004), which may explain the insignificant relationship between household income, and cancer pain and quality of life among those in the low education group in our study.

The findings on significant associations between income and cancer pain and quality of life are consistent with those of previous studies; detrimental effects of economic hardship on daily pain and quality of life have been reported (Im et al., 2007; Rios & Zautra, 2011). Indeed, previous studies found that those with lower SES were more likely to be exposed to financial and environmental stressors and less likely to have the resources to grant them psychological, economic, and emotional support, which would negatively influence cancer patients' degree of pain and quality of life (Im et al., 2007; Rios & Zautra, 2011). Similarly, low SES and lack of access to health care could cause delays in cancer treatment, which may explain socioeconomic disparities in cancer mortality and morbidity and the severity of the disease at the time of diagnosis (Long et al., 2013).

This study also supported the moderating effects of race/ethnicity on the associations between cancer pain and quality of life and household income. The findings are consistent with those of a former study that reported a moderating effect of race/ethnicity on the associations between resources (social support and involvement in decisions) and quality of life among those with mental illness (Ben-Zur et al., 2014). One unique finding of this study is that White people benefited more from having sufficient income than did non-White people in terms of cancer pain and quality of life. Similar to our study, former studies also reported that racial/ethnic minorities often do not gain the same health advantages as Whites with increasing SES (Fuentes et al., 2007; Green & Hart-Johnson, 2012). One possible reason involves differences in cultural views and values related to wealth, health, and disease (Spector, 1996). Cultural differences may uniquely affect the contributions of income to cancer pain and quality of life according to individuals' racial/ethnic backgrounds.

A former study investigated ethnic and racial differences in pain perceptions among multiple racial/ethnic groups (Im et al., 2007). Other studies also reported that racial and ethnic disparities exist in the prevalence of pain and pain treatment, and described that minority patients (Asians, African Americans, and Hispanics) are at risk for severe pain due to inadequate management and treatment of cancer pain (Anderson, Green, & Payne, 2009; Mossey, 2011). Although there is heterogeneity within racial/ethnic minority groups, even the White population is hardly homogeneous (Anderson et al., 2009). Nickens (1995) contended that racial/ethnic minorities tend to be lower in terms of social class than for Whites. Therefore, instead of differentiating cancer pain among multiple racial/ethnic groups, our study categorized race/ethnicity as Whites and non-Whites to determine disparities in pain perception between racial/ethnic minority and non-minority groups.

This study also identified associations between employment and cancer pain and quality of life; unemployed patients were more likely to report severe pain and worse quality of life than were employed patients. A former study reported that unemployment has an adverse effect on psychological health (Galic, 2007). Employment provides two types of benefits: manifest (income) and latent benefits (regular shared experiences, contact outside family, and personal identity), and unemployment leads to both financial and psychological

deprivation (Galic, 2007). Thus, financial and psychological deprivations associated with unemployment might have negatively influenced self-reported cancer pain and quality of life in our study.

Former studies reported disparities in the prevalence of pain according to gender and education level (Kats et al., 2005; Landmark et al., 2013; Paulson et al., 2007), however, our study found that pain was not significantly different according to gender or education. Most of our study sample was recruited in the community setting, thus prevalence of cancer pain was lower than a former study performed with oncology patients recruited in a hospital setting (Paul, Zelman, Smith, & Miaskowski, 2005). Cancer pain research has been conducted less in community settings. As patients with cancer pain spend most of their time in the community, an understanding of factors associated with cancer pain among patients in the community is important for developing services and interventions for these patients (Raphael et al., 2010).

One limitation of this study is that cancer stage was not considered in the analyses. Also, subjective household income was used as a socioeconomic variable. Subjective income, which measures the feeling of relative material deprivation, is reportedly associated with financial strain and stress, which subsequently influences individuals' health (Arber, Fenn, & Meadows, 2014). Thus, rather than using objective household income (e.g., a quantitative measure of monthly income), we used respondents' perception of income adequacy. Social structural position is the hierarchical ordering of society as indexed by formal education, employment status, and income. Because we did not record occupation category, we could not analyze cancer pain and quality of life according to job category (managers vs. manual workers), which is one limitation of the secondary data analysis method. Finally, because we used existing data, variables that could possibly have confounding effects on the relationships between income and the dependent variables could not be controlled.

Despite the limitations of our study in using the secondary data, our study is significant in that this study investigated how multiple socioeconomic variables that determine individuals' position in social structure interact and influence cancer pain and quality of life of cancer patients utilizing the SSPR. We found that cancer pain and quality of life differed significantly by income, employment status, and race/ethnicity, and moderating effects of education and race/ethnicity were identified. The associations between household income, and cancer pain and quality of life were significant only in the high education group. Also, the associations were stronger for Whites than non-Whites.

Based on these findings, we can draw certain conclusions and suggest directions for future research and practice. First of all, researchers and health care providers need to consider multiple factors including race/ethnicity and SES that may influence differing pain perception among cancer patients. Health care providers need to be aware of the racial/ethnic and socioeconomic disparities that exist in cancer pain and quality of life, and prioritize disenfranchised groups when providing health education, disease monitoring, and symptom management. Accordingly, in designing interventions for pain management and/or quality of life, high risk groups of individuals such as non-Whites and those with fewer years of education and/or inadequate financial resources need to be targeted

(Klein, Rock, & Evans, 1968). Finally, according to the SSPR, social structure affects self-directedness (one's feelings of control over a situation), which is related to the concept of empowerment. Thus, future studies are needed that examine whether an individual's level of self-directedness or degree of empowerment can offset the influence of adverse social structural position on health and quality of life.

Funding

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Table 1.

Sociodemographic and Disease-Related Characteristics of the Participants ($N = 480$).

Characteristics	Distribution	n (%)
Gender	Male	97 (20.2)
	Female	381 (79.4)
Race/ethnicity	African Americans	108 (22.5)
	Asians	118 (24.6)
	Hispanics	105 (21.9)
	Whites	149 (31.0)
Education	Elementary	27 (5.6)
	High school	156 (32.5)
	Partial college	297 (61.9)
Household income	Very insufficient	136 (29.4)
	Insufficient	115 (24.8)
	Sufficient	212 (45.8)
Employment	Yes	190 (39.6)
	No	290 (60.4)
Cancer site	Breast	217 (45.2)
	Gastrointestinal	46 (9.6)
	Female reproductive organs	39 (8.1)
	Head and neck	32 (6.7)
	Lung	30 (6.3)
	Hematologic	14 (2.9)
	Lymph nodes	11 (2.3)
	Prostate	10 (2.1)
	Combined	42 (8.8)
	Others	35 (7.2)
Cancer stage	0	23 (4.8)
	I	79 (16.5)
	II	122 (25.4)
	III	72 (15.0)
	IV	61 (12.7)
	Recurrent	24 (5.0)
	Not staged	5 (1.0)
	Unknown	24 (5.0)
Pain medication	Yes	179 (37.3)
	No	298 (62.5)
Difficulty to get health care	Yes	93 (20.8)
	No	355 (79.2)

Note. Unanswered questions were excluded from the analysis.

Table 2.

Differences in Cancer Pain and Quality of Life According to Socioeconomic Characteristics ($N = 480$).

	MPQ-SF		FACT-G	
	M (SD)	*F* or t (*p*)	*M (SD)*	*F* or t (*p*)
Gender				
Male	7.27 (9.23)	1.63 (.103)	78.31 (19.85)	−0.91 (.362)
Female	9.22 (10.35)		76.25 (19.81)	
Race/ethnicity				
AA	5.99 (7.84)[a]	15.15 (<.001)	87.27 (17.03)[b]	15.66 (<.001)
Asians	5.16 (8.76)[a]		75.53 (17.55)[a]	
Hispanics	10.86 (10.49)[b]		73.99 (20.65)[a]	
Whites	12.11 (10.90)[b]		71.62 (20.04)[a]	
Household income				
Very insufficient	9.76 (10.70)[ab]	6.37 (.002)	72.23 (19.18)[a]	18.17 (<.001)
Insufficient	11.32 (11.81)[b]		71.14 (21.54)[a]	
Sufficient	7.25 (8.58)[a]		82.45 (17.64)[b]	
Education				
High school	8.90 (10.06)	0.17 (.869)	74.72 (18.29)	−1.65 (.099)
Partial college	8.74 (10.22)		77.79 (20.61)	
Employment				
Yes	7.19 (8.55)	−2.94 (.003)	83.64 (18.46)	6.56 (<.001)
No	9.88 (10.97)		72.02 (19.31)	
Difficulty to get health care				
Yes	13.88 (11.23)	4.86 (<.001)	65.46 (20.91)	−6.49 (<.001)
No	7.62 (9.55)		79.83 (18.49)	

Note. Post hoc tests were performed using Scheffe's method (a   ab   b). MPQ-SF = McGill Pain Questionnaire–Short Form; FACT-G = Functional Assessment of Cancer Therapy Scale; AA = African American.

Table 3.

Moderating Effects of Education on the Relationship Between Household Income and Cancer Pain and Quality of Life ($n = 443$).

	B	SE	t	p	R²	F (p)
MPQ-SF						
Total sample						
Income	−1.30	0.55	−2.35	.019	.034	6.08 (<.001)
Years of education	−0.09	0.17	−0.55	.584		
Income × Education	−0.43	0.15	−2.88	.004		
Education (high school)						
Income	0.47	0.89	0.524	.601	.002	0.28 (.601)
Education (partial college)						
Income	−2.43	0.63	−3.84	<.001	.051	14.73 (<.001)
FACT-G						
Total sample						
Income	5.09	0.99	5.13	<.001	.087	16.31 (<.001)
Years of education	0.31	0.29	1.08	.282		
Income × Education	0.82	0.26	3.17	.002		
Education (high school)						
Income	0.23	1.59	0.15	.885	.000	0.21 (.885)
Education (partial college)						
Income	8.04	1.22	6.59	<.001	.137	43.47 (<.001)

Note. MPQ-SF = McGill Pain Questionnaire–Short Form; FACT-G = Functional Assessment of Cancer Therapy Scale.

Table 4.

Moderating Effects of Race/Ethnicity on the Relationship Between Household Income and Cancer Pain and Quality of Life ($n = 443$).

	B	SE	t	p	R^2	F (p)
MPQ-SF						
Total sample						
Income	−1.84	0.47	−3.89	<.001	.088	11.17 (<.001)
Race/ethnicity[a]	5.68	1.11	5.13	<.001		
Income × Ethnicity	−2.78	1.09	−2.56	.011		
Ethnicity (Whites)						
Income	−3.72	0.92	−4.06	<.001	.105	16.519 (<.001)
Ethnicity (non-Whites)						
Income	−0.94	0.56	−1.68	.094	.009	2.831 (.094)
FACT-G						
Total sample						
Income	6.25	0.89	6.97	<.001	.130	21.18 (<.001)
Race/ethnicity[a]	−10.32	1.99	−5.19	<.001		
Income × Ethnicity	4.11	1.89	2.17	.030		
Ethnicity (Whites)						
Income	9.04	1.60	5.65	<.001	.184	31.88 (<.001)
Ethnicity (non-Whites)						
Income	4.92	1.11	4.44	<.001	.062	19.74 (<.001)

Note. MPQ-SF = McGill Pain Questionnaire–Short Form; FACT-G = Functional Assessment of Cancer Therapy Scale.

[a.]Race/ethnicity is categorized as Whites and non-Whites.