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Acculturation and Cancer Pain Experience

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Abstract

Purpose: Using a feminist perspective, the relationship between acculturation and cancer pain experience was explored.

Design: This was a cross-sectional, correlational Internet study among 104 Hispanic and 114 Asian cancer patients. The instruments included both unidimensional and multidimensional cancer pain measures.

Findings: There were significant differences in cancer pain scores by country of birth. Yet, there was no significant association of acculturation to cancer pain scores.

Discussion and Conclusions: This study indicated inconsistent findings.

Implications for Practice: To provide directions for adequate cancer pain management, further studies with a larger number of diverse groups of immigrant cancer patients are needed.

Keywords

Acculturation; Cancer Pain; Asian; Hispanic

INTRODUCTION

According to the National Cancer Institute, approximately 10.5 million Americans with a history of cancer are alive (ACS, 2007). Cancer is the second most common cause of death in the U.S., exceeded only by heart disease (ACS, 2007). In 2007, about 1.4 million new cancer cases are expected to be diagnosed, and about half a million Americans (more than 1,500 people a day) are expected to die of cancer. Numbers such as these demonstrate the enormity of this disease in terms of morbidity and mortality.

Cancer affects all aspects of patients' lives. One aspect of cancer that has received much attention from health care providers and cancer patients themselves is cancer pain (Fallon, 2008; Sun et al., 2007): up to 70% of cancer patients are expected to experience pain during their illness (Fallon, 2008). Especially, ethnic minority patients in the U.S. tend to present with later stage disease than non-minority patients, and their pain is more likely to be undertreated (Delgado-Guay & Bruera, 2008; Jacobsen et al., 2007).

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For better cancer pain management, efforts have been made to standardize the assessment, monitoring, management, and documentation of acute and chronic pain related to cancer (Alley, 2001; APS, 1995; Brookbinder, 1996; Driggers et al., 1993; Faries et al., 1991; Ferrell et al., 1993; USDHHS, 1994; WHO, 1996). With these efforts, researchers identified barriers to adequately assessing and managing cancer pain (Idell et al., 2007; Jacobsen et al., 2007; McNeill et al., 2008; Sun et al., 2007). Although currently available therapies could be effective in most cases, under-treatment is common - about 30% of cancer patients never achieve adequate relief (Delgado-Guay & Bruera, 2008; Jacobsen et al., 2007), and approximately 20% of cancer patients do not respond to the standard WHO three-step analgesic ladder approach (Fallon, 2008).

Inadequate cancer pain management for ethnic minority patients may result from many factors, including concern about potential drug abuse (leading to withholding of or abstaining from medication), fewer resources with which to pay for analgesics, greater difficulty in accessing care and filling prescriptions, and difficulty for health care providers in assessing pain in ethnic minority patients because of differences in cultural backgrounds and language barriers (Im et al., 2007a; Im, Guevara, & Chee, 2007b; Im, Lim, Clark, & Chee, 2008). Furthermore, many ethnic minorities are immigrants who may lack knowledge of resources (Oh, Koeske & Sales, 2002). Despite recent attention to ethnic minority health, little is still known about the reasons for inadequate management of cancer pain among ethnic minority cancer patients.

Acculturation, or taking on the cultural values and practices of the host population, has been considered to be a desired health-related outcome of immigration transition (Im & Yang, 2006). It has been reported to be associated with the health/illness status of immigrants (Im & Yang, 2006). Subsequently, it can be reasonably inferred that acculturation may influence the cancer pain experience of many ethnic minority cancer patients in the U.S. when considering that a number of ethnic minorities, especially Hispanics and Asians in the U.S. are immigrants from other countries. There have also been some studies on associations between acculturation and general pain experience. In the study by Palmer et al. (2007), there was a strong negative association between acculturation scores and widespread pain. Through the Study of Women's Health Across the Nation (SWAN) among a multiethnic group of women, Avis and Colvin (2007) also reported that less acculturated Hispanic women reported more bodily pain and more impaired social functioning than non-Hispanic White women; and that less acculturated Japanese women were less likely to report problems on the role-emotional scale. Escalante et al. (2000) reported that patients with rheumatoid arthritis who were partially acculturated tended to report higher symptom scores compared with those who were fully acculturated. However, virtually no study of the association between acculturation and cancer pain could be identified through PUBMED and PsychInfo database searches. Thus, further studies are needed to determine the influences of acculturation on the cancer pain experience of ethnic minority cancer patients in the U.S.

PURPOSE, AIMS, AND HYPOTHESES

Assuming that immigration transition is automatically a process in which one undergoes acculturation (Im & Yang, 2006), the relationships between acculturation and cancer pain experience were explored among Hispanic and Asian cancer patients in this study. Acculturation refers to taking on the cultural values and practices of the host population (Messias & Rubio, 2004) and is frequently equated with the incorporation of immigrants into the mainstream culture (Messias & Rubio, 2004). Despite criticism of the concept of acculturation (e.g., ethnocentric assumptions about the desirability of adopting facets of mainstream culture), level of acculturation has been regarded frequently as an indicator of successful immigration transition (Messias & Rubio, 2004).

The specific aims and hypotheses of the study were:

- To explore the association between country of birth and cancer pain experience (Aim #1);
- To explore the association between length of stay in the U.S. and cancer pain experience (Aim #2); and
- To explore the association between level of acculturation and cancer pain experience (Aim #3).

The hypotheses that were tested were:

- There is a statistically significant association between country of birth and cancer pain scores (Hypothesis 1);
- There is a statistically significant association between length of stay in the U.S. and cancer pain scores (Hypothesis 2);
- There is a statistically significant association between level of acculturation and cancer pain scores (Hypothesis 3); and
- Country of birth, length of stay in the U.S., and level of acculturation add significantly to the prediction of cancer pain scores after controlling for selected demographic and health factors [age, gender, education, income, cancer stage, and treatment modalities] (Hypothesis 4).

THEORETICAL BASIS

For this study, a feminist perspective has been used as a theoretical basis. Feminists assert that there could be no pure biology; rather, biology interacts with other factors within the contexts of daily lives (Young, 1990). Thus, in this study, it was assumed that inadequate cancer pain management among ethnic minorities would not result only from the inability of pain drugs to affect their pain, but also from patients' interactions with their environments (Im et al., 2007a). For example, an immigrant Hispanic woman in the U.S. for less than 1 year might appreciate any health care provided by the U.S. health care system, and so might not ask for treatment until it becomes intolerable (Im et al., 2007b). Financial concerns may be a factor; or, she may want to spare her family knowledge of her suffering (Im et al., 2007b). The result may be that her health care provider who has been trained in the U.S. health care system might think that she does not need pain medication, if she is not disclosing pain or requesting treatment. Using a feminist approach, in this study, acculturation was viewed as a significant indicator of immigration transition that circumscribes ethnic minorities' cancer pain experience, and its relationship to cancer pain experience was explored.

METHODS

Study Design

This was a cross-sectional correlational study among 218 Hispanic and Asian cancer patients (104 Hispanics and 114 Asians) in the U.S. This was a part of a larger study that aimed at development of a decision support system for health care providers for cancer pain management. More information on the larger study can be found elsewhere (Im et al., 2007a). The study presented in this paper is based on the quantitative data from the Internet survey of the larger study. The reason for using the Internet survey to collect the data was to reach and recruit an adequate number of ethnic minority cancer patients in geographically diverse areas. The number of ethnic minority cancer patients who could be recruited in a limited geographical area tends to be too small to explore the research phenomenon of this study. The data were collected from September 2003 to October 2006.

Sample and Settings

A total of 218 Hispanic and Asian cancer patients were recruited through both Internet and community settings. Among them, 73 were recruited through Internet settings and 145 were recruited through the community settings. To test Hypotheses 1, 2 and 3, for each hypothesis, we assumed a conventional effect size of .20. With alpha = 0.05, 41 participants in each ethnic group would be needed to detect a statistically significant association with a power greater than 0.80 (Cohen, 1988). According to Tabachnick and Fidell (2001), the number of subjects required to conduct multiple regression (to test Hypothesis 4) is: to have $N \geq 104 + m$, where N = sample size and m = number of independent variables. Since the number of independent variables that were included in the multiple regression analyses was 9 (3 independent variables tested + 6 independent variables controlled), the sample size needed for the multiple regression analyses was larger than 113 (104+9=113). Since 104 Hispanic and 114 Asian cancer patients were recruited, the sample size was enough to test Hypotheses 1 to 3, but possibly not for Hypothesis 4 among Hispanics.

The Internet settings for recruitment were Internet cancer support groups (ICSGs) identified through Google, MSN, and Yahoo searches. The community settings were cancer clinics and cancer support groups across the U.S. that were also identified by Internet searches. Six community consultants, who were formal or informal leaders of the community clinics and support groups identified through the Internet searches, and who had direct contact with ethnic minority cancer patients in community settings (2 Hispanic and 4 Asian community consultants), helped the recruitment process.

Only cancer patients at least 18 years old who could read and write English and whose self-reported ethnic identity was Hispanic or Asian were recruited. Because of the inherent diversity and complexities within each ethnic group, only English was used throughout the research process, and only those who could read and write English were recruited.

Instruments

The validity and reliability of the Internet and pen-and-pencil questionnaires were not significantly different. More information on psychometric properties of the Internet and pen-and-pencil formats of the questionnaire can be found elsewhere (Brown, Ho, Chee, & Im, in progress). Completing either the Internet or pen-and-pencil questionnaire took about 30-40 minutes.

Sociodemographic Characteristics—In order to describe sociodemographic characteristics of the participants, questions on age, gender, education, religion, marital status, work, family income, and access to health care were used. In addition, one question on self-reported ethnic identity was used with an open space where participants can write in their specific ethnicity. Also, one question on race was used.

Acculturation—In this study, acculturation was operationalized into (a) country of birth; (b) length of stay in the U.S.; and (c) level of acculturation. Thus, one question on country of birth was asked. When the country of birth was not the United States, one question on length of stay in the U.S. (years) was asked. Also, the participants were asked five Likert scale acculturation questions on foods, music, customs, language, and close friends (1 to 5 scale, 1 = exclusively own ethnic group, 5 = exclusively American). These five questions were adopted from the Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA) (Suinn et al., 1987; 1992), and modified to measure degree of acculturation among multiethnic groups. Validity and reliability of the original SL-ASIA have been supported among Asian populations (Suinn et al., 1992). The reliability ($0.91 < \alpha < 0.96$) of the modified five questions was also well supported in previous studies (Im & Chee, 2003; 2005).

Self-reported Health/illness Status—The questions on self-reported health/illness status included: (a) one question on perceived health status; (b) three questions about cancer (primary cancer site, stage of cancer, previous medical treatments [e.g., radiation therapy, chemotherapy, surgery and hormone therapy]); and (c) one question on usage of pain medication.

Self-reported Cancer Pain Experience: Self-reported cancer pain experience was operationalized into cancer pain, symptoms accompanying cancer pain, and functional status. To measure cancer pain, both unidimensional and multidimensional cancer pain assessment tools were used. It was expected that using both types of instruments would increase the validity and reliability of cancer pain measurement through multiple measurements (for confirmation and completeness of data).

Verbal Descriptor Scale (VDS): One question using a VDS consisting of simple terms (0 *no pain*, 1 = *mild pain*, 2 = *moderate*, 3 = *severe*, 4 = *very severe*, and 5 = *worst possible pain)* was used to measure self-reported cancer pain. The correlation coefficients for test-retest reliability of the VDS was 0.94 in Grossman et al.'s study (1992) among 71 cancer patients aged 18-85 years with and without pain.

Visual Analog Scale (VAS): One question from the VAS consisting of a 10-cm horizontal line with word anchors at each end (i.e., *no pain* and *worst pain possible*), which was included in the McGill Pain Questionnaire-Short Form, was used to measure self-reported cancer pain experience. In Ramer et al.'s study (1999), the VAS was found to be valid and reliable across ethnic groups.

Wong-Baker Faces Pain Scale (FS): One item of the FS consisting of six faces (Wong & Baker, 1989) was also used to measure self-reported cancer pain experience. The first face is a very happy smiling face; the last is a sad, tearful face; and the faces between the two faces indicate varying degrees of sadness (0=*a very happy face*, 5=*a sad, tearful face*). Herr, Mobily, Kohout, & Wagenaar (1998) reported that the concurrent validity, construct validity, and test-retest reliability (*r* = 0.61-0.87) of the FS were excellent.

McGill Pain Questionnaire-short form (MPQ-SF): The MPQ-SF (17 items) by Melzack (1987), a multidimensional pain assessment scale, was used to measure cancer pain experience. The MPQ-SF has a pain rating index (MPQ-SF), a visual analogue scale (VAS), and present pain intensity (PPI). The MPQ-SF includes 15 descriptors (11 sensory, 4 affective) on an intensity scale (0 = *none*, 1 = *mild*, 2 = *moderate*, or 3 = *severe*). The PPI is a 0 to 5 scale on overall pain intensity. The MPQ-SF scores were calculated by summing the ratings of all 15 items included in MPQ-SF (possible range = 0-45). Lazaro, Bosch, Torrubia, & Banos (1994) reported that validity and reliability of the MPQ-SF have been well established among cross-cultural populations. In this study, Cronbach's alpha of the MPQ-SF was 0.94.

Brief Pain Inventory-Short Form (BPI-SF): In addition to the MPQ-SF, the BPI-SF (Cleeland, 1985) was also used to measure cancer pain experience as a multidimensional scale. The BPI-SF is a scale with 15 items: (a) one global “yes” or “no” item comparing pain with other minor aches and pains; (b) four 0-10 numerical rating items on sensory components of pain; (c) one item of pain medications or treatments used; (d) one numerical scale item on the effectiveness of pain relief measures; (e) seven 0-10 numerical rating items on a reactive dimension; and (f) a body diagram on location of pain. The BPI-SF pain scores were calculated by summing the ratings of four items on intensity of pain and seven items on interferences in the patient's life of pain (possible range = 0-110). Ger, Ho, Sun, Wang, & Cleeland (1999) reported that validity and reliability of the BPI-SF have been established across cultures and languages. In this study, Cronbach's alpha of the BPI-SF was 0.96.

Data Collection Procedures

In this study, both Internet and pen-and-pencil questionnaires were used. Approval for the study was obtained from the Institutional Review Board (IRB) of the university where the researchers were affiliated. Then, a project website conforming to Health Insurance Portability and Accountability Act (HIPAA) standards, SANS/Federal Bureau of Investigation (FBI) recommendations, and the IRB policy of the institution where the researchers were affiliated was made on an independent website server dedicated only for this study. Informed consent was obtained by asking potential participants to click the “I agree to participate” button when they first visited the project website. After getting their consents, screening questions on specific diagnoses, cancer therapies, and medications were asked to check the eligibility of the potential participants. When they successfully went through the screening questions, they were automatically connected to the Internet survey web page and asked to answer the Internet survey questions.

At the same time, if the community consultants requested it, pen-and-pencil questionnaires were provided by mail to the consultants, and the community consultants would distribute the questionnaires, in person, only to those who were identified as cancer patients. In completing the pen-and-pencil questionnaires, participants were asked to read the same informed consent form that was included in the Internet format of the questionnaire. Also, the pen-and-pencil questionnaire included a sentence saying, “Filling out this questionnaire means that you are aged over 18 years old and giving your consent to participate in this survey.” The participants were asked to self-administer the questionnaires. All the completed questionnaires except 5 (that were directly mailed to the research team by the participants) were retrieved by the community consultants in person at the community settings. The consultants mailed the completed questionnaires to the research team. Using both Internet and pen-and-pencil questionnaires was necessary to recruit the target number of Hispanic and Asian cancer patients.

Data Analysis Process

Both the data from the Internet questionnaire and the pen-and-pencil questionnaire were saved in ASCII format and databases. Data from the Internet questionnaires were automatically and directly saved in the databases. One research assistant entered the data from the pen-and-pencil questionnaires into the database, and two additional research assistants double-checked the accuracy of data entry. If one of the two research assistants found an error, all three research assistants resolved the error upon the agreement of all.

When the missing data were less than 10% of the participant's total response, mean substitution was used to replace the value of the missing data. If the missing data were more than 10%, the data were not included in the analyses. This percent of missing data would have little impact on significance tests or confidence intervals (Little & Rubin, 2002). Also, excluding the data with less than 10% missing data could result in a bias toward healthier, more compliant individuals (McLaughlin & Marascuilo, 1990).

After dealing with missing data, descriptive statistics were run to check errors or inconsistency in the data. The data were analyzed using descriptive statistics including frequency, percentage, mean, standard deviation, and range to describe socio-demographic profiles, health/illness status, acculturation, and self-reported cancer pain.

To test Hypothesis 1 (the association between the country of birth and the cancer pain scores), five single *t*-tests were conducted. However, conducting multiple *t*-tests simultaneously may increase type II error. Therefore, the Bonferroni adjustment was implemented by taking the significance level and dividing that number by the number of tests (i.e. .05/5=.001 in this study).

To test Hypothesis 2 (the association between length of stay in the U.S. and cancer pain scores), Pearson correlation coefficients were calculated. To test Hypothesis 3 (the association between the level of acculturation and cancer pain scores among only those who were born outside the U.S), the data were analyzed using the Pearson correlation coefficients.

In addition, hierarchical multiple regression analyses among each ethnic group (Hispanics and Asians) were conducted in order to identify the associations of the country of birth, length of stay in the U.S and the level of acculturation to the cancer pain scores while controlling for age, gender, education, income, stage of cancer and treatment modalities. For these analyses, demographic factors including age, gender, education, and income satisfaction were entered first; health/disease factors including cancer stage and treatment modalities were entered second; and acculturation factors (country of birth, length of stay in the U.S., and level of acculturation) were entered last. The increase in $R^2(\Delta R^2)$ was computed to determine the relative contributions of each set of variables. Standard coefficients (β) were computed to compare the relative importance of each variable in the model. The data were checked for multicollinearity, using tolerance and the variance inflation factor (VIF). VIF values greater than 10 and tolerance values smaller than .10 may indicate multicollinearity. There were no signs of multicollinearity in any of the regression models. All analyses were performed with the SAS/9.1.3 program.

RESULTS

Sociodemographic Characteristics of the Participants

Sociodemographic characteristics of the participants are summarized according to ethnicity in Table 1. Although a gender-balanced sample was the aim, women were inadvertently over-sampled. One possible reason might be that women outnumber men in the cancer population (American Cancer Society, 2006) and in the Internet population (Fallows, 2005). Among 218 participants, 141 (49 Hispanics and 92 Asians) used the pen-and-pencil questionnaires. The mean age of the participants was 53.06 years old (SD = 13.41), and the mean family income was 33,144.64 dollars (SD = 63621.94).

Cancer Pain Scores

The mean VDS score of the participants was 1.45 (SD=1.28); the mean VAS score was 32.20 (SD=30.67); the mean FS score was 2.94 (SD=1.52); the mean MPQ-SF score was 8.20 (SD=10.19); and the mean BPI score was 35.38 (SD=28.26). The cancer pain scores are also summarized in Table 2 according to ethnicity; there were significant differences between the Hispanic and Asian participants in the VDS, VAS, FS, MPQ-SF, and BPI scores (see Table 2).

Associations of the Country of Birth, the Length of Stay in the U.S., and the Level of Acculturation to the Cancer Pain Scores

There were significant differences in the cancer pain scores ($p < .05$) by the country of birth (please see Table 3). Those who were born outside the U.S consistently reported lower VDS, VAS, FS, MPQ-SF and BPI scores than those born in the U.S. The average length of stay in the U.S was 227.46 months (SD = 240.38). The correlation coefficients between the length of stay in the U.S and the cancer pain scores were not statistically significant (see Table 4). The average level of acculturation was 9.89 (SD = 2.78). The correlation coefficients between the level of acculturation and the cancer pain scale scores were not statistically significant (see Table 5).

The findings from the hierarchical multiple regression analyses are summarized in Tables 6 to 10. Among the Hispanic participants, when age, gender, education, income, stage of cancer and the treatment modalities were controlled, the acculturation variables accounted for 5% of the VDS score variances, 6% of the VAS score variances, 4% of the FS score variances, 6% of the MPQ-SF score variances, and 3% of the BPI score variances, none of which were statistically significant. In addition, in each group, significant predictors of cancer pain experience were different (see Tables 6 to 10). Among the Asian participants, when age, gender, education, income, stage of cancer and the treatment modalities were controlled, the acculturation variables (country of birth, length of stay in the U.S., and level of acculturation) accounted for 4% of the VDS score variances, 4% of the VAS score variances, 2% of the FS score variances, 1% of the MPQ-SF score variances, and 5% of the BPI score variances, none of which were statistically significant. Among Hispanic participants, gender was a significant predictor of the VDS scores ($p < .05$; step 1), FS scores ($p < .05$; step 1), MPQ-SF scores ($p < .05$; step 1), and BPI scores ($p < .05$; step 1); and age was a significant predictor of the MPQ-SF scores ($p < .05$; step 1). Among the Asian participants, income was a significant predictor of the FS scores ($p < .05$; step 1) and BPI scores ($p < .05$; steps 1 & 3); and the length of stay in the U.S. was a significant predictor of the BPI scores ($p < .05$; step 3).

DISCUSSION

The results of the study indicated mixed findings on associations of the acculturation variables (country of birth, length of stay in the U.S., and level of acculturation) to the cancer pain scores. There were significant differences in the cancer pain scores by country of birth. However, correlation analyses and hierarchical multiple regression analyses indicated non-significant associations of the acculturation variables to the cancer pain scores when controlling other predictors of the cancer pain scores. Furthermore, the findings from the multiple regression analyses indicated differences in significant predictors of cancer pain experience between Hispanics (gender) and Asians (income and length of stay in the U.S.), which supported that not only the acculturation variables, but also other factors influenced cancer pain experience.

As mentioned above, so far, very few studies have been conducted to explore the association of acculturation to pain experience, especially cancer pain experience, and those studies indicated that there was a strong negative association between acculturation scores and pain scores (Avis & Colvin, 2007; Escalante et al., 2000; Palmer et al., 2007). However, there has been virtually no study that indicated non-significant association of acculturation to pain experience. Thus, the mixed findings reported in this study suggest the need for further studies on the association of acculturation to cancer pain experience, with a larger number of cancer patients from diverse immigrant groups, especially, given that this study's participants tended to be a selected group of cancer patients (low-income, less acculturated, and first-generational immigrants).

As mentioned above, from a feminist perspective, there is no pure biology (Young, 1990), and cancer pain experience is circumscribed by interactions with the environment (Im et al., 2007a). One possible reason for the mixed findings on association of acculturation to cancer pain experience reported in this study could be: more than half of the participants were new immigrants who had lived in the U.S. for less than 1 year. Consequently, the participants may not reflect diverse groups of immigrants in the U.S. Furthermore, the participants tended to be of lower socioeconomic status because many of them were recruited through a cancer clinic and cancer support groups, both for low-income cancer patients. In addition, because of their lack of English skills (and in spite of study criteria which tried to exclude non-English speakers), some measures on cancer pain in English may not be equivalently interpreted in their own language, which raises a question about the validity of the measures in English among them.

Another possible reason for mixed findings could be, that because composite scores were used, some properties of the individual responses might have been lost in the data analysis process. For example, as described above, the BPI-SF is a scale with 15 items including one global “yes” or “no” item comparing pain with other minor aches and pains, four 0-10 numerical rating items on sensory components of pain, one item of pain medications or treatments used, one numerical scale item on the effectiveness of pain relief measures, seven 0-10 numerical rating items on a reactive dimension, and a body diagram on location of pain (Cleeland, 1985). Yet, the BPI-SF pain scores were calculated by summing only the ratings of four items on intensity of pain and seven items on interferences of pain in the patient's life. Thus, some properties of the individual responses from different subscales might have been lost in the data analysis process.

From a feminist perspective, researchers need to respect diversities in cancer pain experience (Im et al., 2007a). From this perspective, it is problematic to measure cancer pain experience of ethnic minority cancer patients using the instruments developed mainly with White cancer patients. As Table 2 shows, there were big differences in specific cancer pain scores between Hispanics and Asians. The differences possibly came from genuine differences in cancer pain experience between the two ethnic groups or from sociodemographic differences between Hispanics and Asians. Yet, these findings may also imply that some instruments worked better with Hispanics than compared to Asians. Indeed, some cross-cultural researchers began to question the adequacy of existing cancer pain measurement scales for ethnic minority cancer patients because the existing scales were developed only among Whites. Closs and Briggs (2002) even argued that the MPQ that was developed in Canada might not adequately measure cancer pain even in other English-speaking countries.

A third possible reason would be: acculturation might not be adequately measured by the questions used in the study. From a feminist perspective, the idea of acculturation itself has often been equated with de-ethnicizing (the incorporation of immigrants or minorities into the mainstream) (Baskauskas, 1981). Thus, the inherent ethnocentric essence of the concept of acculturation has been critiqued by feminists, and questions on the adequacy of existing scales measuring acculturation have been raised (Im & Yang, 2006). Relatively recently, a multidimensional model of acculturation was suggested, and the multidimensional model emphasizes that immigrants' choice as to which of these acculturation strategies they will use seems neither entirely independent nor consistent across areas of daily life (Berry, Kim, Power, Young, & Bujaki, 1989). For example, some individuals would use the assimilation strategy in a work environment, but they would use the separation strategy with their choice of friends or food (Im & Yang, 2006). Because the acculturation questions that were used in this study included questions on adopting foods, music, customs, language, and close friends, the questions might not adequately reflect the multidimensionality of acculturation, and subsequently might not adequately measure acculturation of the cancer patients, especially because more than 50% of the participants were new immigrants who had stayed in the U.S. for less than 1 year.

CONCLUSION AND IMPLICATIONS

In this study, the relationship between acculturation and cancer pain experience was explored, and the study reported mixed findings on the association of acculturation to cancer pain experience. There were significant differences in the cancer pain scores by the country of birth while correlation analyses and hierarchical multiple regression analyses indicated non-significant associations of the acculturation variables (country of birth, length of stay in the U.S., and level of acculturation) to the cancer pain scores. In addition, the hierarchical multiple regression analyses indicated non-significant contributions of the acculturation variables to the variance of all the cancer pain scores. Based on these findings, the paper concludes with the following suggestions for future research on associations between acculturation and cancer pain experience.

First, further studies with a larger number of diverse groups of ethnic minority cancer patients are needed. As mentioned above, because the participants of this study tended to be a selected group of ethnic minority cancer patients, the study might have indicated mixed findings on the association between acculturation and cancer pain experience. Moreover, a limitation of the study is that there were differences in some sociodemographic characteristics between the Hispanic and Asian participants, which could raise a concern of potential selection bias. To explore the associations between the acculturation variables and the cancer pain scores, some variables of sociodemographic characteristics were controlled through hierarchical multiple regression analyses during the data analysis process. However, the differences in sociodemographic characteristics between Hispanics and Asians could limit the generalizability of the findings. Thus, further studies with a larger number of diverse groups of immigrant cancer patients that generate more generalizable findings on the association between acculturation and cancer pain experience are needed. Also, the findings indicated that different predictors influenced the cancer pain experience of each ethnic group, which suggests a need for further studies on predictors of cancer pain experience in both groups with a larger number of participants who are homogeneous. Through these studies, the reasons for inadequate cancer pain management of ethnic minority cancer patients could be further disclosed.

Second, the instruments measuring the level of acculturation need to be further examined for whether they can reflect the level of acculturation adequately. As discussed above, the questions on the level of acculturation that were used in this study tend to be limited to only several dimensions of acculturation related to foods, music, customs, language, and close friends. However, as pointed out above, the questions might not adequately represent the multidimensionality of acculturation because acculturation itself is not well enough defined yet and may be so variable that there is perhaps more than one process related to the relationships between acculturation and the outcome of pain management. Also, the level of acculturation in different dimensions could be different depending on the situations where immigrants are living (Berry et al., 1989; Im & Yang, 2006).

Third, the adequacy of using composite scores to represent cancer pain experience needs to be further examined. As discussed above, using composite scores could obscure some properties of the individual responses in the data analysis process, which might result in non-significant findings in the study reported in this paper. Furthermore, as the findings suggest, some instruments measuring cancer pain might work better among a specific ethnic group than other ethnic groups. Thus, cultural competence of the measurement scales needs to be carefully examined, especially when used among ethnic minority cancer patients.

Finally, because the study used the Internet for data collection, the study may have limitations such as potential selection bias and authenticity issues. In the study presented in this paper, to minimize the selection bias, the participants were recruited through both Internet and community settings. To ensure authenticity of the participants, specific screening questions and random questions to check the consistency of the participants' answers were adopted in the data collection process. However, there was no 100% assurance that these limitations of Internet research were prevented. Since the use of the Internet in research in general is at its beginning stage, further methodological studies are essential for future research.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Sociodemographic characteristics of participants

characteristics	Asian n (%)	Hispanic n (%)	Total n (%)
Total	114	104	218
Gender			
female	93 (82.30)	81 (77.88)	174 (80.18)
male	20 (17.70)	23 (22.12)	43 (19.82)
missing	1 (0.88)	0 (0.0)	1 (0.4)
Education			
No school	0 (0.0)	3 (2.88)	3 (1.38)
Elementary school	9 (7.89)	14 (13.46)	23 (10.55)
Middle school	9 (7.89)	18 (17.31)	27 (12.39)
High school	21 (18.42)	44 (42.31)	65 (29.82)
College(partial)	13 (11.40)	14 (13.46)	27 (12.39)
College(graduate)	35 (30.70)	8 (7.69)	43 (19.72)
Graduate degree	27 (23.68)	3 (2.88)	30 (13.76)
Missing	0 (0.0)	0 (0.0)	0 (0.0)
Religion			
Muslim	1 (0.88)	0 (0.0)	1 (0.46)
Buddhist	29 (25.66)	0 (0.0)	29 (13.36)
Catholic	4 (3.54)	75 (72.12)	79 (36.41)
Protestant	24 (21.24)	6 (5.77)	30 (13.82)
No religion	31 (27.43)	15 (14.42)	46 (21.20)
Others	24 (21.24)	8 (7.69)	32 (14.75)
Missing	1 (0.88)	0 (0.0)	1 (0.4)
Employed			
Yes	33 (28.95)	28 (26.92)	61 (27.98)
No	81 (71.05)	76 (73.08)	157 (72.02)
Missing	0 (0.0)	0 (0.0)	0 (0.0)
Income level			
Total insufficient	27 (25.00)	56 (54.90)	83 (39.52)
Somewhat insufficient	35 (32.41)	14 (13.73)	49 (23.33)
Sufficient	41 (37.96)	29 (28.43)	70 (33.33)
More than sufficient	5 (4.63)	3 (2.94)	8 (3.81)
Missing	6 (5.26)	2 (1.92)	8 (3.67)
Country of birth			
United States	4 (3.51)	62 (59.62)	66 (30.28)
Outside U.S	110 (96.49)	42 (40.38)	152 (69.72)
Missing	0 (0.0)	0 (0.0)	0 (0.0)
Stage of cancer			
0	1 (1.02)	0 (0.0)	1 (0.63)
1	32 (32.65)	12 (20.00)	44 (27.85)
2	38 (38.78)	21 (35.00)	59 (37.34)

characteristics	**Asian** **n (%)**	**Hispanic** **n (%)**	**Total** **n (%)**
3	16 (16.33)	8 (13.33)	24 (15.19)
4	10 (10.20)	14 (23.33)	24 (15.19)
5	0 (0.0)	0 (0.0)	0 (0.0)
6	1 (1.02)	5 (8.33)	6 (3.80)
Missing	16 (14.04)	44 (42.31)	60 (27.52)
Treatment			
Radiation therapy	2 (1.79)	3 (2.91)	5 (2.33)
Chemotherapy	9 (8.04)	29 (28.16)	38 (17.67)
Surgery	12 (10.71)	6 (5.83)	18 (8.37)
Hormone therapy	0 (0.0)	1 (0.97)	1 (0.47)
Others	89 (79.46)	64 (62.14)	153 (71.16)
Missing	2 (1.75)	1 (0.96)	3 (1.38)
Medicine usage			
Yes	26 (23.01)	52 (50.49)	78 (36.11)
No	87 (76.99)	51 (49.51)	138 (63.89)
Missing	1 (0.88)	1 (0.96)	2 (0.92)
Regular access to health care			
Yes	105 (92.11)	102 (98.08)	207 (94.95)
No	9 (7.89)	2 (1.92)	11 (5.05)
Missing	0 (0.0)	0 (0.0)	0 (0.0)
Place for seek medical help			
Clinic or health center	71 (73.96)	77 (76.24)	148 (75.13)
Hospital outpatient dept.	13 (13.54)	1 (0.99)	14 (7.11)
Emergency room	4 (4.17)	17 (16.83)	21 (10.66)
Others	8 (8.33)	6 (5.94)	14 (7.11)
Missing	18 (16.04)	3 (2.88)	21 (9.63)

Table 2

Differences in the cancer pain scores by self-reported ethnic identity

	Asian		Hispanic				Total	
measures	***M***	***SD***	***M***	***SD***	***t* (216)**	***p-value***	***M***	***SD***
VDS	1.11	1.16	1.82	1.31	4.21	0.000	1.45	1.28
VAS	23.25	28.96	42	29.61	4.72	0.000	32.20	30.67
FS	2.53	1.45	3.40	1.46	4.45	0.000	2.94	1.52
MPQ-SF	5.72	9.33	10.92	10.43	3.89	0.000	8.20	10.19
BPI	27.62	25.88	43.89	28.42	4.42	0.000	35.38	28.26

Note: *N* (Asian) = 114; *N* (Hispanic) = 104

Table 3

Differences in the cancer pain scores according to the country of birth

	Outside the U.S		In the U.S			
	M	***SD***	***M***	***SD***	***t* (216)**	***p-value***
VDS	1.29	1.30	1.82	1.15	2.85	.0047
VAS	28.36	31.12	41.03	27.89	2.85	.0048
FS	2.78	1.59	3.33	1.27	2.52	.0124
MPQ-SF	6.97	10.31	11.03	9.37	2.74	.0066
BPI	32.01	28.11	43.15	27.25	2.71	.0072

Note: *N* (born outside the U.S) = 152; *N* (born in the U.S) = 66

Table 4

Correlations between the length of stay in the U.S and the cancer pain scores

	length	**VDS**	**VAS**	**FPS**	**PRI**	**BPI**	***M***	***SD***
length	1.00						227.46	240.38
VDS	−.11	1.00					1.29	1.30
VAS	−.06	$.86^{***}$	1.00				28.36	31.12
FS	−.02	$.80^{***}$	$.80^{***}$	1.00			2.78	1.59
MPQ-SF	−.08	$.65^{***}$	$.67^{***}$	$.62^{***}$	1.00		6.97	10.31
BPI	.01	$.73^{***}$	$.75^{***}$	$.80^{***}$	$.67^{***}$	1.00	32.01	28.11

Note:

$^{***}p<.001$

Table 5

Correlations between the level of acculturation and the cancer pain scores

	Level of Acculturation	**VDS**	**VAS**	**FS**	**MPQ-SF**	**BPI**	***M***	***SD***
Level of Acculturation	1.00						9.89	2.78
VDS	−.003	1.00					1.29	1.30
VAS	.031	.86***	1.00				28.36	31.12
FS	.040	.81***	.80***	1.00			2.78	1.59
MPQ-SF	.003	.65***	.67***	.62***	1.00		6.97	10.31
BPI	.03	.73***	.75***	.80***	.67***	1.00	32.01	28.11

*** $p<.001$

Table 6

Hierarchical multiple regression analyses: the VDS scores

	Asian						Hispanic				
Predictors	***β***	***p*-value**	**ΔR^2**	**F_{change}**	***p*-value**	**Predictors**	***β***	***p*-value**	**ΔR^2**	**F_{change}**	***p*-value**
Step 1			.032	.85	.50	Step 1			.053	1.33	.263
Age	−.004	.706				Age	−.006	.507			
Gender	−.043	.891				Gender	−.651	.048			
Education	−.126	.627				Education	−.182	.579			
Income	−.201	.145				Income	−.016	.914			
Step 2			.038	1.70	.189	Step 2			.052	1.04	.361
Age	.0007	.944				Age	−.006	.617			
Gender	−.187	.605				Gender	−.663	.162			
education	−.142	.630				education	−.361	.247			
Income	−.146	.351				Income	−.006	.967			
Cancer stage	.088	.499				Cancer stage	.080	.464			
Treatment	−.774	.113				Treatment	−.614	.232			
Step 3			.035	1.06	.372	Step 3			.049	.92	.440
Age	.004	.739				Age	−.002	.849			
Gender	−.134	.718				Gender	−.781	.108			
education	−.301	.331				education	−.387	.232			
Income	−.180	.264				Income	.011	.946			
Cancer stage	.137	.330				Cancer stage	.076	.490			
Treatment	−.873	.110				Treatment	−.759	.169			
Country	−.369	.630				Country	−.088	.812			
Length of stay	.0008	.370				Length of stay	−.001	.112			
Level of Acculturation	.062	.258				Level of Acculturation	−.002	.966			

$\Delta R^2 = R^2$ change; $F_{ch} = F$ change

Table 7

Hierarchical multiple regression analyses: the VAS scores

Asian						Hispanic					
Predictors	β	***p*-value**	ΔR^2	F_{change}	***p*-value**	**Predictors**	β	***p*-value**	ΔR^2	F_{change}	***p-value***
Step 1			.054	1.44	.226	Step 1			.037	.92	.458
Age	−.132	.595				Age	.046	.826			
Gender	5.828	.460				Gender	−13.043	.085			
Education	−3.046	.638				Education	−6.550	.386			
Income	−6.495	.060				Income	−.213	.949			
Step 2			.011	.80	.453	Step 2			.038	.86	.428
Age	−.070	.810				Age	−.005	.987			
Gender	3.584	.696				Gender	−2.159	.856			
education	−3.399	.651				education	−9.872	.213			
Income	−5.840	.141				Income	−2.376	.536			
Cancer stage	.592	.857				Cancer stage	2.221	.425			
Treatment	−14.889	.228				Treatment	−12.995	.318			
Step 3			.040	1.22	.308	Step 3			.057	1.05	.379
Age	−.004	.990				Age	.087	.780			
Gender	4.850	.606				Gender	−4.754	.695			
education	−7.398	.345				education	−10.852	.186			
Income	−7.123	.082				Income	−1.366	.734			
Cancer stage	1.372	.698				Cancer stage	2.129	.444			
Treatment	−17.548	.203				Treatment	−16.818	.228			
Country	−11.986	.537				Country	2.215	.814			
Length of stay	.029	.208				Length of stay	−.034	.093			
Level of Acculturation	1.078	.435				Level of Acculturation	.410	.738			

$\Delta R^2 = R^2$ change; $F_{ch} = F$ change

Table 8

Hierarchical multiple regression analyses: the FS scores

	Asian						**Hispanic**				
Predictors	β	*p*-value	ΔR^2	F_{change}	*p*-value	**Predictors**	β	*p*-value	ΔR^2	F_{change}	*p*-value
Step 1			.047	1.27	.288	Step 1			.064	1.65	.169
Age	.010	.404				Age	.002	.850			
Gender	−.012	.975				Gender	−.858	.021			
Education	.103	.751				Education	−.426	.248			
Income	−.361	.038				Income	.051	.754			
Step 2			.010	1.07	.349	Step 2			.101	2.84	.068
Age	.010	.505				Age	−.005	.735			
Gender	−.012	.979				Gender	−.173	.757			
education	.075	.843				education	−.630	.093			
Income	−.235	.238				Income	−.156	.388			
Cancer stage	.116	.485				Cancer stage	.208	.114			
Treatment	−.721	.246				Treatment	−1.026	.096			
Step 3			.019	.55	.652	Step 3			.040	.81	.496
Age	.008	.627				Age	−.003	.824			
Gender	.089	.852				Gender	−.200	.728			
education	−.026	.947				education	−.586	.132			
Income	−.296	.156				Income	−.083	.664			
Cancer stage	.152	.399				Cancer stage	.201	.129			
Treatment	−.597	.393				Treatment	−.979	.139			
Country	.228	.817				Country	.375	.400			
Length of stay	.001	.236				Length of stay	.0009	.287			
Level of Acculturation	.006	.935				Level of Acculturation	−.021	.716			

$\Delta R^2 = R^2$ change; $F_{ch} = F$ change

Table 9

Hierarchical multiple regression: the MPQ-SF scores

	Asian						Hispanic				
Predictors	***β***	***p*-value**	**ΔR^2**	**F_{change}**	***p*-value**	**Predictors**	***β***	***p*-value**	**ΔR^2**	**F_{change}**	***p*-value**
Step 1			.006	.14	.965	Step 1			.1139	3.09	.020
Age	−.012	.888				Age	−.146	.041			
Gender	.426	.870				Gender	−5.297	.037			
Education	1.490	.486				Education	−1.706	.500			
Income	−.422	.710				Income	.818	.463			
Step 2			.030	.62	.543	Step 2			.005	1.19	.312
Age	−.011	.902				Age	−.097	.410			
Gender	−1.581	.582				Gender	−5.744	.216			
education	2.930	.214				education	−2.372	.436			
Income	.052	.966				Income	−.805	.587			
Cancer stage	1.020	.322				Cancer stage	.483	.652			
Treatment	−1.316	.733				Treatment	−7.262	.151			
Step 3			.009	.25	.862	Step 3			.063	1.22	.312
Age	−.018	.854				Age	−.056	.642			
Gender	−1.561	.602				Gender	−6.920	.142			
education	2.818	.259				education	−3.320	.291			
Income	−.175	.893				Income	−.543	.726			
Cancer stage	.842	.456				Cancer stage	.483	.651			
Treatment	−1.421	.745				Treatment	−9.800	.070			
Country	−1.409	.819				Country	.097	.979			
Length of stay	.005	.518				Length of stay	−.013	.092			
Level of Acculturation	−.191	.663				Level of Acculturation	.514	.277			

$\Delta R^2 = R^2$ change; $F_{ch} = F$ change

Table 10

Hierarchical multiple regression analyses: the BPI scores

	Asian						Hispanic				
Predictors	***β***	***p*-value**	**ΔR^2**	**F_{change}**	***p*-value**	**Predictors**	***β***	***p*-value**	**ΔR^2**	**F_{change}**	***p*-value**
Step 1			.080	2.22	.072	Step 1			.085	2.22	.072
Age	.133	.542				Age	−.083	.670			
Gender	2.782	.687				Gender	−18.613	.008			
Education	−.916	.871				Education	2.129	.760			
Income	−7.981	.009				Income	−2.235	.467			
Step 2			0.0	.14	.869	Step 2			.026	1.26	.292
Age	−.013	.957				Age	−.287	.348			
Gender	−1.643	.831				Gender	−4.364	.714			
education	3.238	.608				education	2.719	.730			
Income	−6.290	.061				Income	−5.271	.172			
Cancer stage	1.052	.704				Cancer stage	2.696	.333			
Treatment	−3.204	.757				Treatment	−15.623	.231			
Step 3			.049	1.49	.224	Step 3			.025	.46	.712
Age	−.136	.604				Age	−.211	.506			
Gender	1.626	.836				Gender	−6.725	.586			
education	1.642	.802				education	1.262	.879			
Income	−7.989	.021				Income	−5.113	.215			
Cancer stage	1.980	.505				Cancer stage	2.679	.344			
Treatment	3.336	.772				Treatment	−20.012	.159			
Country	16.046	.324				Country	−2.322	.808			
Length of stay	.040	.044				Length of stay	−.023	.261			
Level of Acculturation	−.506	.661				Level of Acculturation	.615	.621			

$\Delta R^2 = R^2$ change; $F_{ch} = F$ change