Cultural and Structural Competency: An Application Among Patients Awaiting Spinal Surgery

By

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DEDICATION

To my dad,

For teaching me that

We are what we repeatedly do.

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“We know what we are but know not what we may be.”

William Shakespeare

There are many people to whom I would like to express my gratitude for their guidance and support in the production of my thesis research. Firstly, I am deeply indebted to Dr. Gilbert Gonzales, who served as my advisor throughout the past year and whose wise guidance and unwavering support made this entire project possible. Likewise, I am extremely grateful to Dr. Danielle Picard, who provided invaluable insight and encouragement on written drafts and was an instrumental part of the entire academic year. Additionally, I would like to extend my sincere thanks to Dr. Kristin Archer, who granted permission and access to the included data set. I would also like to acknowledge Caleb Peart and Andriana Johnson, who provided a great amount of feedback and support throughout the entire writing process. Lastly, I would like to thank my family for their unending support, patience, and belief.

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INTRODUCTION

"I will remember that I do not treat a fever chart, a cancerous growth, but a sick human being, whose illness may affect the person's family and economic stability. My responsibility includes these related problems, if I am to care adequately for the sick." These lines, taken from the Hippocratic Oath, speak to a physician's responsibility to treat all illnesses, even those not stemming from biological causes. Physicians, therefore, are equally responsible for monitoring the biological health of those they provide care for as well as their social health. As such, recent medical research has begun to analyze how social factors may affect medical practice and health outcomes. Social factors that have been shown to influence general health and well-being have been labeled the "social determinants of health," which encompasses socioeconomic status and demographic factors that are associated with patient measures of health in clinical settings.

The social determinants of health include, but are not limited to, factors such as age, sex, race/ethnicity, employment and occupation status, educational attainment, neighborhood characteristics, access to nutrition, body mass index (BMI), smoking status, healthcare coverage, and opioid/narcotic use. These factors are known to have an impact on individual quality of health and healthcare access, though why these factors have such an impact is still theorized. Of recent, there has been a transition in medical training, specifically in American medical schools, to aid physicians in becoming more socially aware and competent when rendering biological treatments (Sorensen et al., 2017). As the United States (US) population continues to diversify, medical institutions have begun to focus on developing what has been termed as more culturally competent medical providers to help physicians navigate how culture affects patient treatment plans, adherence, healthcare access, health status, and even physician-patient communication (Flores et al., 2000).

As defined in the Association of American Medical Colleges' "Cultural Competence Education for Medical Students" handbook, cultural competency "is a set of congruent behaviors, knowledge, attitudes, and policies that come together in system, organization, or among professionals that enables effective work in cross-cultural situations" (*Cultural Competence Education*, 2005). A culturally competent physician, therefore, is better able to understand how a culture's influences on language, beliefs, and customs, affects patient conceptualizations of what it means to be healthy. Though a step in the right direction, cultural competency fails to acknowledge how deeply rooted social structures and institutionalized biases are intertwined with the quality of care that patients receive.

To critique the shortcomings of cultural competency, structural competency was developed to emphasize how large, social structures such as healthcare systems, neighborhood design, and access to food and quality education impact individual patient health. Where cultural competency focuses on the individual interaction between a physician and her patient, structural competency advocates the need for physicians to be trained to "discern how a host of issues defined clinically as symptoms, attitudes, or diseases also represent the downstream implication of a number of upstream decisions about such matters as health care and food delivery systems, zoning laws, urban and rural infrastructures, medicalization, or even about the very definitions of illness and health" (Metzl & Hansen, 2014). In short, structurally competent physicians are able to discern how large societal institutions and structures cultivate social factors that can ultimately influence health at the individual level. The social determinants of health are situated within structural competency theory, which posits that the structure of society contributes to the development of health inequalities and disparities among differing social factors. Structural competency, therefore, offers physicians a skillset to not only witness how health is cultivated outside of clinical practice but also to advocate for larger social changes that can improve health at the population and individual levels.

In order to develop a better understanding of how social factors operationalize to influence patient health, there is a need for research that demonstrates how socioeconomic and demographic factors correlate to generic measures of patient health and well-being. As such, this thesis focuses on individual sociodemographic factors and acknowledges how upstream factors regarding gender, race/ethnicity, education, and healthcare access influence patients' self-reported health. More specifically, this quantitative and descriptive analysis examines how patients' socioeconomic status and demographic factors affect self-reported health status, disability, and depression of adults awaiting spinal surgery at the Vanderbilt University Medical Center.

The primary objective of this study is to explore how sociodemographic factors are associated with subjective health measures for adults with chronic back pain. This topic combines theories in health services research as well as cultural and structural competency to provide a more holistic view of how patients internalize feelings of well-being and how these feelings intersect with medical practice. By working to develop a better apprehension of how sociodemographic factors influence health, this project works to deepen our understanding of how patient health is cultivated outside the confines of medical practice.

LITERATURE REVIEW

Medical research has begun to examine how social factors influence patient treatments and outcomes. Coined the "social determinants of health," many social factors, such as age, sex, race/ethnicity, employment and occupation status, educational attainment, body mass index, smoking status, health insurance coverage, and opioid/narcotic use have been associated with increasing or decreasing the quality of outcomes that patients achieve within clinical practice. On a global scale, the World Health Organization (WHO) has recognized the importance of social factors on health and created the Department of Social Determinants of Health in 2018 to investigate the relationship between social factors and health outcomes. As a part of their mission, the department defines the social determinants of health as the "…conditions in which people are born, grow, live, work and age. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels" (*WHO | Social Determinants of Health*, n.d.). This definition alludes to the complexity in which social factors shape an individual's idea of health and health-related experiences; however, it also demonstrates how the social determinants of health are, in part, subjected to larger social structures and power differentials.

The social determinants of health have drawn a lot of attention specifically for their influence on chronic back pain patients in the US. Back pain is a common ailment in the US, with 25% of adults reporting a day of back pain in the last 3-month period (Deyo et al., 2006). In 2016, Anna Shmagel, Robert Foley, and Hassan Ibrahim conducted a study looking into the epidemiology of back pain and found that US patients with a diagnosis of chronic low back pain had less wealth and education compared to those without a diagnosis of chronic low back pain; they also had higher rates of depression, comorbidities, prevalence of smoking, and government sponsored health insurance (Shmagel et al., 2016). While Shmagel et al.'s study identifies key associations between social factors and patients suffering from chronic back pain, it fails to conceptualize how these social factors overlap to influence and shape patient experiences with their own health and how the development of these social factors is governed by upstream factors such as healthcare coverage policies and education access and affordability.

Due to the high association between social factors and chronic pain, the analysis of social factors within medical practice has been explicitly advocated for since 1977, when George Engle developed an interdisciplinary framework called the biopsychosocial model (Engel, 1977). This model works to address the growing concern for how biological symptoms are influenced by psychological and socio-environmental factors that affect patient health outside of the medical examination room. As such, the biopsychosocial model works to associate quality medical care with treating biological, psychological, and socio-environmental factors, placing an equal emphasis on each of these three categories to monitor well-being. The model is still used in developing clinical treatment plans for diagnoses of chronic back pain, which is known to be subjected to several underlying social causes (Pincus et al., 2013).

In another epidemiological based study on back pain, authors Janna Friedly, Christopher Standaert, and Leighton Chan also work to demonstrate the importance of using the biopsychosocial model in treating chronic back pain patients (Friedly et al., 2010). The authors found that rates for depression, anxiety, and comorbidities in back pain patients were higher for those whose pain necessitated taking prescription opiates as a part of their treatment plan. This finding suggests an increased psychological and social burden for those living with chronic back pain especially for those whose pain and/or sociodemographic status creates a dependency on opioids or narcotics. If social factors such as those suggested by Shmagel et al. are linked to chronic pain symptoms, then addressing more upstream social issues such as improving public education systems or providing better healthcare access and coverage could hypothetically provide structural-level solutions for individual health problems. For instance, higher levels of education may improve patient-physician interactions, health literacy, and the ability to seek healthcare services. In a study examining the relationship between educational attainment and health outcomes, Robert Kaplan and Zhengyi Fang conclude that more highly educated patients use healthcare services more frequently and with less risk than those with lower educational attainment (Kaplan et al., 2017). Within this finding, however, it was also found that the lower educational attainment correlated with a higher likelihood of being uninsured, suggesting that health insurance status could also be playing a role in establishing this relationship.

As with most research and models analyzing the social determinants of health, the biopsychosocial examines how social factors are associated with clinical outcomes but fails to look at how and why these relationships exist. To build upon current models, research needs to examine the relationship between social factors and health outcomes by looking at how patient sociodemographic factors correlate with health experiences and internalizations of well-being. In doing so, researchers will be able to examine how cultural and structural ties influence patient narratives of health. This study argues for researchers and medical professionals to consider and examine the interconnectedness of social factors and back pain symptoms from both a cultural as well as a structural viewpoint. As such, cultural and structural competency provide excellent frameworks from which to investigate the pathway between larger, macro-level entities of socioeconomic and demographic factors and health status, disability, and depression at the individual level.

Cultural competency encourages physicians to be attentive as to how their patients' culture impacts discourse within medical examinations and how their overall beliefs about healthcare systems and well-being can impact clinical outcomes. In a literature review analyzing how cultural competency combats racial and ethnic health disparities, authors Cindy Brach and Irene Fraserirector conclude the following: “We discovered that the literature on cultural competency has, by and large, not linked cultural competency activities with the outcomes that could be expected to follow from them. We also found the literature on racial and ethnic disparities weak on identifying the sources of disparities, and almost no attention has been paid to techniques for reducing them” (Brach & Fraserirector, 2000). Likewise, in a systematic review conducted in 1996, the authors examined published literature on health interventions that focused on improving the health of specific populations or of known health disparities (Arblaster et al., 1996). The findings of their review demonstrate that interventions, though helpful, do not tackle larger social issues and structures that may impact health at the patient level. Thus, this study unknowingly touches on one of the shortcomings of clinical cultural competency and opens a gateway toward promoting structural competency.

Structural competency was developed by Jonathan Metzl, a Professor of Sociology and Medicine, Health, and Society at Vanderbilt University. In his first published paper on structural competency, Metzl writes: “Clinicians require skills that help them treat persons that come to clinics as patients, and at the same time recognize how social and economic determinants, biases, inequities, and blind spots shape health and illness long before doctors or patients enter examination rooms” (Metzl & Hansen, 2014). In practice, structural competency encourages physicians to both understand as well as to treat the very structures of society, such as healthcare systems and the existence of food deserts, that lead to the development of social inequalities.

Structural competency allows physicians to examine how social structures lead to stigmatized views regarding economic status, sex, employment and occupation, and healthcare access inequalities, all of which lead to downstream health consequences that, to a certain extent, create the social determinants of health.

This study leverages the theories of cultural and structural competency to explore how the social determinants of health are related to internalizations of health for chronic back pain patients. To demonstrate how cultural and structural competency manifest to impact patient experiences with health and their own well-being, this study uses patient reported outcome measures for health status, depression, and disability. Health status is an overarching term used to describe an individual's reported well-being in comparison to the rest of the population. In doing so, health status serves as a representation of overall patient internalizations of health and allows for biological, psychological, and social markers of health to all be measured at the same time. Relatedly, subjective measures of health are directly linked to mortality at the population-level, meaning that individuals with worse self-rated health are more likely to die earlier compared to those with excellent self-rated health (Benyamini et al., 2003; Mossey & Shapiro, 1982).

Additionally, depression and disability measures, though to a certain extent accounted for within the health status score, offer further insight into the daily lives of chronic back pain patients. For example, depression rates of patients undergoing spine surgery increased from 1990 to 2007 (Menendez et al., 2014). Within this statistic, depression and anxiety rates for patients undergoing spine surgery were predominantly female sex dominated, with females accounting for two-third of these occurrences. Such trends suggest that patient internalizations of depression and disability can be subject to social factors, including gender.

Overall, the primary objective of this study was to investigate the associations of sociodemographic factors such as age, sex, race/ethnicity, employment status, educational attainment, BMI, smoking status, health insurance status, and the use of opioids/narcotics with subjective health measures for adults with chronic back pain. The overarching themes of this study center on health services research and the social determinants of health, focusing predominantly on what cultural and structural competency theories can offer to physicians treating patients awaiting spine surgery. By working to develop a better understanding of how sociodemographic factors intersect with patient reported health, this project demonstrates how future medical research needs to advocate for structural changes that will allow health disparities to be tackled at their root.

METHODS

Study Design

This is a sub-study of an ongoing data acquisition study at the Vanderbilt University Medical Center (VUMC) referred to as the "Spine Registry." A part of the Spinal Surgery Quality and Outcomes Lab, the original study aims to improve the quality of outcomes for patients undergoing spine operations for chronic back pain. The present study works to identify patterns between patient socioeconomic and demographic factors and self-reported measures of health status, disability, and depression. Information included in the present study was collected from October 12, 2010 to June 8, 2018 and uses the demographic and questionnaire responses of approximately 2,600 patients prior to their spine operations. Permission to use this dataset was given by Kristin Archer, PhD, DPT, who is the Principal Investigator of the Spine Registry at VUMC.

Participants

Participants (N=2600) in this study were awaiting lumbar surgery at VUMC. In order to be eligible for participation, patients were required to be 18 years of age or older, awaiting lumbar surgery at VUMC, and able to provide informed consent. Anyone who met all three of these requirements qualified to participate. A brief description of this population is detailed below in Table 1. The mean age for participants was 58 years of age (SD=13.9), with the youngest participant being 18 years old and the oldest participant being 88 years of age. Additionally, the sex distribution was relatively equal. 1,341 participants were male (51.6%) and 1,259 were female (48.4%). Patients in the parent study were scheduled to receive one of several types of lumbar surgery. Of the 2,600 patients for which information has been included in this analysis, all participants fell into 1 of 4 different surgical categories as detailed below. In summary, 1,419 (54.6) were undergoing lumbar laminectomy and fusion operations, 730 (28.1) were receiving lumbar laminectomies, 405 (15.6) were receiving lumbar microdiscectomy, and 46 (1.8) were receiving anterior or posterior lumbar fusions.

Table 1: Population Characteristics

Population Characteristic	**Mean and [SD] or Frequency and (%)**
Age, years	58 [13.9]
Sex	
Male	1341 (51.6)
Female	1259 (48.4)
Type of Operation	
Lumbar Lami + Fusion	1419 (54.6)
Lumbar Lami	730 (28.1)
Lumbar Micro	405 (15.6)
Anterior and Posterior	46 (1.8)

Source: Patients awaiting lumbar surgery at the Vanderbilt University Medical Center, 2019-2020

Sociodemographic Descriptive Measures

This sub-section describes the descriptive measures that were used to predict patient health status, depression, and disability: age, sex, race/ethnicity, employment status, highest education level attained, BMI, current smoking status, health insurance status, and opioid/narcotic use. All 2,600 patients were asked about each of these descriptive measures when completing their baseline surveys prior to surgical intervention. The subcategories for each sociodemographic measure are explained below. It is important to note, however, that participants did have the option to leave each answer blank or the option to say “prefer not to answer” for each question.

Age

Age (in years) results were grouped into one of seven categories: 18-25, 26-40, 41-50, 51-64, 65-74, 75+, or Missing. The 18-25 age grouping was used as the reference group.

Sex

Sex was defined as male or female, with male serving as the reference group.

Race/Ethnicity

Race/Ethnicity categories were reported by asking participants which race/ethnicity they identified as. The answers were grouped into one of the following seven categories: White, African American, Asian, Hispanic/Latino, American Indian, Other/Multiple Races, or Missing. White was used as the reference group.

Current Employment Status

Employment status was self-reported using a yes or no question inquiring about the participant's current state of employment at the time of completing his or her baseline surveys prior to operation. Participants were grouped into one of three categories: yes, no, or missing. "Yes," which signified being currently employed, served as the reference group.

Educational Attainment

Information regarding each participant's highest level of education was self-reported for 1,199 patients. Educational attainment responses were grouped into one of the five following categories: less than high school, high school diploma or GED, two-year college degree, four or more years of college, or missing. Level of education was not recorded as a part of the study intervention until 2014. As a result, over half of the participants (N=1407; (54.1%)) included in the present study had missing data. Four or more years of college served as the reference group for this variable.

Body Mass Index (BMI)

BMI was calculated based on participant height and weight measures at the time of study enrollment (BMI = weight (kg)/ [height (m)]^2 (CDC, 2020). The mean BMI for the study population was 31.1 (SD=6.7). BMI values were used to group participants into one of the following seven categories: underweight (BMI<18.5), normal weight (18.5≤BMI<25), overweight (25≤BMI<30), obese (30≤BMI<35), severely obese (35≤BMI<40), morbidly obese (40≤BMI<50), or super obese (50≤BMI). The normal weight category served as the reference group.

Current Smoker

Current smoking status was self-reported by participants using the following yes or no question: "Are you a current smoker (i.e., smoked in the last 30-days)?" "No," which represented not being a current smoker, served as the reference group.

Health Insurance Status

Health insurance status was collected during the participant enrollment process. This information was grouped into one of five following categories: private health insurance, Medicare/Medicaid, Veterans' Affairs (VA) or related government-sponsored health insurance, Uninsured, or Missing. Private health insurance served as the reference group.

Opioid/Narcotic Use

Participants were asked about their use of opioids and narcotics based on the following question: "Are you currently taking a narcotic/opioid pain medication?" And, if so, "How long have you been taking the above pain medication?" The use of such was categorized into 4 separate groups: never, infrequent, chronic, or missing. Participants were grouped into the "never" category if they reported never having used opioids or narcotics. "Infrequent" opioid/narcotic use was defined as the use of opioids/narcotics within the last 90-days at the time of survey completion. "Chronic" use was defined as opioid/narcotic use for over a 90-day period. "Never" was used as the reference group.

Study Outcome Measures

This sub-section describes the health outcomes examined in this study, including poor health status, moderate to severe depression, and disability status. All measures were self-reported prior to the participant's spinal surgery.

Health Status

Health status is a term used to express the overlap of patient physical, mental, and social health. For this study, health status was measured using the EQ-5D, which is a validated screening instrument for health status assessment in back pain populations (Soer et al., 2012). The EQ-5D survey is completed by the patient and asks them to consider if they have no, slight, moderate, severe, or an inability to perform actions in five key categories: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Additionally, the EQ-5D includes a visual analog scale (VAS) from 0 to 100. The prompting question for the VAS reads, “We would like to know how good or bad your health is TODAY. The line is numbered 0 to 100. 100 means the best health you can imagine. 0 means the worst health you can imagine. Please mark an X on the line that shows how good or bad your health is TODAY” (Reenen et al., 2019).

This study used both the overall EQ-5D score as well as the individual EQ-5D VAS as outcome measures. Poor health status was defined as the lower 25th percentile of scores for the total EQ-5D and EQ-5D VAS. Total scores of the EQ-5D are reported on a scale from 0 to 1, where a higher score equates to higher health status. The mean EQ-5D score for the 2600 participants included in this study was 0.6 (SD=0.2) and the lower 25th percentile of participants reported scores of less than or equal to 0.378. Additionally, the mean reported value on the EQ-5D VAS was 54.2 (SD=22.6) with the lower 25th percentile of participants scoring equal to or less than 40.0.

Depression

To measure baseline levels of depression, participants completed the 9-item screening instrument to the Patient Health Questionnaire (PHQ-9) during the enrollment process. The PHQ-9 asks nine questions for diagnosing and monitoring levels of depression in clinical settings and has been validated for back pain patients (Kroenke & Spitzer, 2002). Patients have the ability to respond “not at all,” “several days,” “more than half the days,” or “nearly every day” to questions regarding the presence of depressive thoughts or feelings during the 2 weeks prior to survey completion. 0 points are given for “not at all” responses, 1 point for “several days,” 2 points for “more than half the days,” and 3 points for “nearly every day.” Scores are generated from 0-27, where a score of ≤4 represents “minimal depression,” a score of 5-9 represents “mild depression,” a score of 10-14 represents “moderate depression,” 15-19 represents “moderately severe depression,” and a score of 20-27 represents “severe depression.”

Survey responses for the PHQ-9 were only collected for 1169 participants. For this outcome measure, analysis was conducted between sociodemographic variables and those indicating symptoms for moderate to severe depression, or scores greater than or equal to 10 on the PHQ-9.

Disability Status

Disability was measured using the Oswestry Disability Index (ODI) (Niskanen, 2002). The survey was designed for back pain patients and contains 10 questions regarding the patient’s ability to manage daily living. These questions specifically ask patients about their level of pain, ability to take care of their selves, ability to lift objects, walking ability, sitting ability, standing ability, quality of sleep, sex life, social life, and ability to travel. Each question is graded on a scale from 0 to 5, with 0 meaning no disability. Scores are then converted to a percentage by dividing by the total points available (50) and then multiplying by 100. A score of 0%-20% represents “minimal disability,” 21%-40% represents “moderate disability,” 41%-60% represents “severe disability,” 61%-80% represents “crippled,” and 81%-100% means the patient is “bed-bound.”

For this outcome measure, analysis focused on the upper 25th percentile of scores, equating to those who reported being the most disabled. The mean score for all 2600 participants was 46.7% (SD=14.2), and the upper 25th percentile of patients reported scores greater than or equal to 56.0.

Ethical Issues

The parent study received approval from the Vanderbilt University Medical Center Institutional Review Board. All patient information used for this study was deidentified.

Statistical Analysis

Data analyses were performed using Stata 16 (StataCorp. 2019. Stata Statistical Software: Release 16. College Station, TX). All outcome measures were interpreted using multivariable logistic regression models which were used to determine the relationship between socioeconomic status and demographic factors and patient reported health measures for poor health status (EQ-5D), depression (PHQ-9), and disability (ODI). All logistic regression models controlled for age, sex, race/ethnicity, employment status, educational attainment, BMI, smoking status, health insurance status, and opioid/narcotic use. Demographic and baseline characteristics were presented as mean [with standard deviations (SD)] and prevalence (percentage). The results of all logistic regression models were also presented with p-values and 95% confidence intervals (CI).

RESULTS

Sociodemographic Descriptive Factors

Table 2 presents the sociodemographic descriptive factors for the 2600 persons awaiting spinal surgery at VUMC.

Age

Most participants awaiting spinal surgery were considered older adults. 42 (1.6%) participants fell into the 18-25 age grouping, 303 (11.7%) into the 26-40 age grouping, 393 (15.1%) into the 41-50 age grouping, 873 (33.6%) into the 51-64 age grouping, 744 (28.6%) into the 65-74 age grouping, and 245 (9.4%) in the 75+ category. There were no missing data for this variable.

Sex

1341 (51.6%) of participants were male, and 1259 (48.4%) were female. There were no missing data for this variable.

Race/Ethnicity

For this variable, 2,312 participants were white (88.9%), 228 were African American (8.8%), 19 were Asian (0.7%), 16 were Hispanic/Latino (0.6%), 2 were American Indian (0.1%), 18 were other or multiple races/ethnicities (0.7%), and 5 (0.2%) participants elected to leave this category blank.

Current Employment Status

Most participants were not working. 1,518 (58.4%) participants selected "no" to currently being employed and 1,080 (41.5%) selected "yes" for being employed at the time of survey completion. There were missing data for 2 (0.1%) participants.

Educational Attainment

As previously mentioned, level of education was not recorded as a part of the study intervention until 2014. As a result, over half of the participants (N=1407; (54.1%)) included in the present study had missing data. Of the remaining participants, the highest percentage of participants fell into the category of high school diploma or GED with 524 (20.2%) persons. Additionally, 434 (16.7%) participants completed a four-year college degree or more, 175 (6.7%) reported a two-year college degree, and 60 (2.3%) completed less than high school.

Body Mass Index (BMI)

BMI groupings resulted in 17 (0.7%) participants being deemed underweight, 430 (16.5%) as normal weight, 796 (30.6%) as overweight, 687 (26.4%) as obese, 408 (15.7%) as severely obese, 228 (8.8%) as morbidly obese, and 34 (1.3%) participants as super obese. There were no missing data for this variable.

Current Smoker

2,145 (82.5%) of 2,600 participants responded "no" to being a current smoker and 455 (17.5%) responded "yes" to being a current smoker. There were no missing data for this variable.

Health Insurance Status

1,249 (48.0%) participants had private health insurance, 1,076 (41.3%) had Medicare or Medicaid, 240 (9.2%) participants had insurance coverage through the Department of Veterans Affairs or other related government-type insurance, and 35 (1.4%) participants were uninsured. There were no missing data for this variable.

Opioid/Narcotic Use

1,237 (47.6%) participants reported never having used opioids or narcotics. 530 (20.4%) participants reported infrequent opioid/narcotic use or having only used narcotics within the last 90-days at survey completion. 814 (31.1%) participants were categorized as chronic opioid/narcotic users, meaning that they had been using narcotics for longer than a 90-day period at survey completion. There were missing data for 19 study participants.

Table 2. Sociodemographic Characteristics of Patients Awaiting Spinal Surgery

Descriptive Factor		Sample Size (N)	Percent (%)
Age, years			
	18-25	42	1.6
	26-40	303	11.7
	41-50	393	15.1
	51-64	873	33.6
	65-74	744	28.6
	75+	245	9.4
	Missing	0	0.0
Sex			
	Male	1341	51.6
	Female	1259	48.4
Race/Ethnicity			
	White	2312	88.9

African American	228	8.8
Asian	19	0.7
Hispanic/Latino	16	0.6
American Indian	2	0.1
Other/Multiple Races	18	0.7
Missing	5	0.2
Currently Employed		
No	1518	58.4
Yes	1080	41.5
Missing	2	0.1
Educational Attainment		
Less than high school	60	2.3
High school diploma/GED	524	20.2
Two-year college degree	175	6.7
Four or more years of college	434	16.7
Missing	1407	54.1
Body Mass Index		
Underweight	17	0.7
Normal weight	430	16.5
Overweight	796	30.6
Obese (Class I)	687	26.4
Severely Obese (Class II)	408	15.7
Morbidly Obese (Class III)	228	8.8
Super Obese (Class IV)	34	1.3
Missing	0	0.0
Current Smoker		
No	2145	82.5
Yes	455	17.5
Missing	0	0.0
Health Insurance Status		
Private	1249	48.0
Medicare/Medicaid	1076	41.3
VA	240	9.2
Uninsured	35	1.4
Missing	0	0.0
Opioid/Narcotic Use		
Never	1237	47.6
Infrequent (<90 days)	530	20.4
Chronic use (90+ days)	814	31.1
Missing	19	0.7

Health Status Based on the EQ-5D

Table 3 presents the multivariable associations for poor health status after controlling for sociodemographic characteristics. The models indicate that females (p<0.001 [95% CI: 1.18; 1.73]) were more likely than males to report poor health status. Likewise, African Americans (p<0.001 [CI: 1.39; 2.55]) and Hispanics/Latinos (p=0.038 [95% CI 1.07; 8.77]) were more likely than white persons to report poor health status. Those not currently employed (p=0.001 [95% CI: 1.18; 1.91]), with less than a high school education (p=0.013 [95% CI: 1.178; 3.97]), and super obese (p=0.017 [95% CI: 1.18; 5.42]) were more likely to have poor health status than those employed, with four or more years of college, and of normal weight, respectively. Additionally, those with Medicare/Medicaid coverage (p=0.024 [95% CI: 1.04; 1.82]) had poorer reported health status than those with private health insurance, and participants who reported infrequent (p<0.001 [95% CI: 1.85; 3.04), chronic (p<0.001 [95% CI: 1.93; 3.01]), or missing (p=0.003 [95% CI: 1.68; 12.90]) opioid/narcotic use had worse health status than those who reported never having used them.

Table 3. Multivariable Association of Sociodemographic Factors and Health Status (EQ-5D)

Descriptive Factor	**Odds Ratio**	**Std. Err.**	**P-value**	**95% Confidence Int.**	
Age, years					
18-25	Reference				
26-40	1.703	0.733	0.216	0.733	3.959
41-50	1.998	0.849	0.103	0.869	4.594
51-64	1.512	0.630	0.321	0.668	3.422
65-74	0.916	0.392	0.837	0.396	2.119
75+	0.628	0.288	0.310	0.255	1.542
Sex					
Male	Reference				
Female	1.428	0.140	<0.001*	1.178	1.732
Race/Ethnicity					

White	Reference				
African American	1.880	0.291	<0.001*	1.388	2.546
Asian	2.509	1.262	0.068	0.936	6.727
Hispanic/Latino	3.058	1.643	0.038*	1.067	8.769
American Indian	2.467	3.773	0.555	0.123	49.420
Other	1.340	0.752	0.602	0.446	4.026
Missing	1.267	1.344	0.823	0.148	10.133
Currently Employed					
Yes	Reference				
No	1.504	0.183	0.001*	1.184	1.910
Missing	0.888	1.459	0.942	0.035	22.248
Educational Attainment					
Four or more years of college	Reference				
Less than high school	2.161	0.670	0.013*	1.177	3.968
High school diploma/GED	1.270	0.207	0.143	0.923	1.748
Two-year college degree	0.815	0.190	0.380	0.516	1.287
Missing	1.031	0.147	0.827	0.781	1.363
Body Mass Index					
Normal weight	Reference				
Underweight	1.067	0.583	0.906	0.366	3.113
Overweight	1.293	0.194	0.088	0.963	1.736
Obese	1.063	0.167	0.698	0.782	1.445
Severely Obese	1.142	0.197	0.441	0.815	1.600
Morbidly Obese	1.437	0.281	0.064	0.980	2.109
Super Obese	2.532	0.984	0.017*	1.181	5.415
Current Smoker					
No	Reference				
Yes	1.182	0.148	0.183	0.924	1.512
Health Insurance Status					
Private	Reference				
Medicare/Medicaid	1.376	0.195	0.024*	1.043	1.816
VA	1.167	0.206	0.381	0.826	1.648
Uninsured	1.883	0.708	0.092	0.901	3.935
Opioid/Narcotic Use					
Never	Reference				
Infrequent (< 90 days)	2.366	0.301	<0.001*	1.845	3.035
Chronic (90+ days)	2.406	0.274	<0.001*	1.925	3.006
Missing	4.661	2.421	0.003*	1.684	12.903

Source: Logistic regression analysis of 2600 participants awaiting spinal surgery at the Vanderbilt University Medical Center.

**p<0.05*

Visual Analog Scale (VAS)

Table 4 presents the multivariable associations of descriptive factors for the EQ-5D VAS after controlling for sociodemographic characteristics. Females (p=0.001 [95% CI: 0.62; 0.89]) were more likely than males to report poor health status on the VAS, as were those with no current employment (p<0.001 [95% CI: 1.43; 2.25]) in comparison to currently employed participants. Participants with missing or unreported education levels (p=0.003 [95% CI: 0.53; 0.88]) were also more likely to qualify as having poor health status via the VAS in comparison to participants who had completed four or more years of college. Lastly, participants with reported chronic opioid/narcotic use (p=0.013 [95% CI: 0.18; 2.23]) had significantly poorer health status than those who had reported never using opioids/narcotics.

Table 4. Multivariable Association of Sociodemographic Factors and the EQ-5D VAS

Descriptive Factor	**Odds Ratio**	**Std. Err.**	**P-value**	**95% Confidence Int.**	
Age, years					
18-25	Reference				
26-40	1.204	0.475	0.638	0.556	2.608
41-50	1.180	0.459	0.671	0.550	2.530
51-64	1.102	0.418	0.797	0.524	2.318
65-74	0.978	0.380	0.954	0.456	2.096
75+	0.555	0.233	0.160	0.244	1.262
Sex					
Male	Reference				
Female	0.741	0.070	0.001*	0.616	0.892
Race/Ethnicity					
White	Reference				
African American	1.142	0.181	0.403	0.837	1.558
Asian	0.587	0.375	0.405	0.168	2.056

Hispanic/Latino	1.068	0.641	0.913	0.329	3.462
American Indian	NA				
Other	0.320	0.243	0.133	0.072	1.416
Missing	0.988	1.162	0.992	0.099	9.908
Currently Employed					
Yes	Reference				
No	1.794	0.207	<0.001*	1.431	2.249
Missing	NA				
Educational Attainment					
Four or more years of college	Reference				
Less than High school	1.215	0.362	0.514	0.677	2.179
High school diploma/GED	1.111	0.163	0.473	0.833	1.482
Two-year college degree	1.352	0.265	0.123	0.921	1.985
Missing	0.681	0.088	0.003*	0.529	0.877
Body Mass Index			.		
Normal weight	Reference				
Underweight	2.026	1.048	0.172	0.735	5.583
Overweight	1.174	0.170	0.268	0.884	1.561
Obese	1.169	0.174	0.296	0.873	1.565
Severely Obese	1.121	0.186	0.490	0.810	1.552
Morbidly Obese	1.316	0.252	0.152	0.904	1.915
Super Obese	1.767	0.688	0.143	0.825	3.788
Current Smoker					
No	Reference				
Yes	0.850	0.108	0.201	0.662	1.091
Health Insurance Status					
Private	Reference				
Medicare/Medicaid	0.863	0.115	0.271	0.664	1.122
VA	0.839	0.142	0.300	0.603	1.169
Uninsured	0.652	0.275	0.311	0.285	1.492
Opioid/Narcotic Use					
Never	Reference				
Infrequent (< 90 days)	1.099	0.135	0.444	0.863	1.399
Chronic (90+ days)	1.305	0.140	0.013*	1.058	1.610
Missing	0.626	0.406	0.470	0.176	2.231

Source: Logistic regression analysis of 2600 participants awaiting spine surgery at VUMC
**p<0.05*
***NA: participants in these categories did not of symptoms of poor health status based off the EQ-5D VAS*

Depression Based on the PHQ-9

Table 5 presents the multivariable associations of descriptive factors for depression after controlling for sociodemographic characteristics. The regression results indicate that participants whose highest educational attainment was a two-year college degree (p=0.009 [95% CI: 1.15; 2.64]) were more likely to have moderate to severe depression than those who had completed four or more years of college. Additionally, current smokers (p=0.021 [95% CI: 1.06; 2.14]) were more likely than non-smokers to have moderate to severe depression as were infrequent (p=0.022 [95% CI: 1.06; 2.17]) and chronic opioid/narcotic users (p<0.001 [95% CI: 1.46; 2.70]) in comparison to those who reported never having used opioids/narcotics.

Table 5. Multivariable Association of Sociodemographic Factors and Depression (PHQ-9)

Descriptive Factor	Odds Ratio	Std. Err.	p-value	95% Confidence Int.	
Age, years					
18-25	Reference				
26-40	0.513	0.292	0.241	0.168	1.565
41-50	0.607	0.339	0.372	0.203	1.816
51-64	0.525	0.287	0.239	0.179	1.534
65-74	0.411	0.232	0.115	0.136	1.243
75+	0.307	0.189	0.055	0.092	1.028
Sex					
Male	Reference				
Female	1.228	0.173	0.145	0.931	1.619
Race/Ethnicity					
White	Reference				
African American	1.259	0.278	0.297	0.817	1.941
Asian	NA				
Hispanic/Latino	0.681	0.568	0.645	0.133	3.493
American Indian	NA				
Other	2.802	1.849	0.118	0.769	10.212
Currently Employed					
Yes	Reference				

No	1.281	0.212	0.136	0.925	1.773
Educational Attainment					
Four or more years of college	Reference				
Less than High school	0.681	0.257	0.309	0.325	1.428
High School Diploma/GED	1.222	0.203	0.226	0.883	1.691
Two-year college degree	1.740	0.371	0.009*	1.145	2.644
Missing	1.289	0.330	0.321	0.781	2.128
Body Mass Index					
Normal weight	Reference				
Underweight	3.283	2.558	0.127	0.713	15.114
Overweight	0.806	0.169	0.303	0.534	1.216
Obese	1.092	0.228	0.675	0.725	1.645
Severely Obese	1.055	0.245	0.818	0.669	1.664
Morbidly Obese	1.219	0.330	0.463	0.718	2.072
Super Obese	1.054	0.662	0.933	0.308	3.609
Current Smoker					
No	Reference				
Yes	1.509	0.270	0.021*	1.063	2.143
Health Insurance Status					
Private	Reference				
Medicare/Medicaid	0.910	0.188	0.649	0.606	1.366
VA	0.781	0.180	0.282	0.497	1.226
Uninsured	1.569	1.005	0.482	0.447	5.505
Opioid/Narcotic Use					
Never	Reference				
Infrequent (< 90 days)	1.518	0.276	0.022*	1.062	2.168
Chronic (90+ days)	1.986	0.312	<0.001*	1.460	2.702
Missing	0.869	0.689	0.859	0.184	4.112

Source: Logistic regression analysis of 2600 participants awaiting spine surgery at VUMC
**p<0.05*
***NA: participants in these categories did not of symptoms of depression based off the PHQ-9*

Disability Based on ODI

Table 6 presents the multivariable associations of descriptive factors for disability after controlling for sociodemographic characteristics. Females (p=0.001 [95% CI: 1.14; 1.68]) were more likely than males to be considered disabled, as were Asians (p=0.008 [95% CI: 1.42;

10.56]) in comparison to white persons. Non-employed participants (p<0.001 [95% CI: 1.87; 3.02]) were more likely to report being disabled than those who were currently employed. Additionally, those with a BMI that categorized them as morbidly obese (p=0.02 [95% CI: 1.08; 2.30]) were more likely to be disabled than those with a normal weight. Current smokers (p=0.002 [95% CI: 1.08; 2.29]) and those with VA health insurance (p=0.04 [955 CI: 1.02; 2.01]) or no insurance (p=0.01 [95% CI: 1.32; 6.12]) also reported increased disability in comparison to non-smokers and those with private health insurance respectively. Lastly, infrequent (p<0.001 [95% CI 2.19; 3.58), chronic opioid/narcotic users (p<0.001 [95% CI: 1.68; 2.62]), and those with missing opioid/narcotic information (p=0.007 [95% CI: 1.49; 12.28]) were more likely to report higher disability in comparison to those who reported never having used opioids/narcotics.

Table 6. Multivariable Association of Sociodemographic Factors and Disability (ODI)

Descriptive Factor	**Odds Ratio**	**Std. Err.**	**p-value**	**95% Confidence Int.**	
Age					
18-25	Reference				
26-40	1.447	0.603	0.375	0.629	3.277
41-50	2.023	0.832	0.087	0.903	4.531
51-64	1.287	0.518	0.531	0.585	2.932
65-74	0.745	0.208	0.476	0.331	1.676
75+	0.455	0.202	0.077	0.190	1.088
Sex					
Male	Reference				
Female	1.382	0.136	0.001*	1.141	1.675
Race/Ethnicity					
White	Reference				
African American	1.330	0.213	0.075	0.972	1.819
Asian	3.868	1.982	0.008*	1.417	10.558
Hispanic/Latino	1.282	0.786	0.685	0.386	4.261
American Indian	1.737	2.591	0.711	0.093	32.325

Other	0.588	0.297	0.431	0.157	2.208
Missing	1.521	1.712	0.709	0.168	13.815
Currently Employed					
Yes	Reference				
No	2.375	0.292	<0.001*	1.866	3.024
Missing	NA				
Educational Attainment					
Four or more years of college	Reference				
Less than High school	0.914	0.302	0.785	0.479	1.746
High school diploma/GED	0.769	0.130	0.120	0.553	1.071
Two-year college degree	0.779	0.180	0.279	0.496	1.224
Missing	1.208	0.169	0.176	0.919	1.590
Body Mass Index					
Normal weight	Reference				
Underweight	1.078	0.579	0.889	0.276	3.091
Overweight	1.172	0.173	0.284	0.877	1.566
Obese	0.912	0.142	0.551	0.672	1.236
Severely Obese	1.095	0.186	0.590	0.786	1.527
Morbidly Obese	1.573	0.303	0.019*	1.078	2.294
Super Obese	2.167	0.863	0.052	0.993	4.728
Current Smoker					
No	Reference				
Yes	1.481	0.184	0.002*	1.161	1.889
Health Insurance Status					
Private	Reference				
Medicare/Medicaid	1.294	0.181	0.064	0.984	1.701
VA	1.433	0.248	0.038*	1.021	2.013
Uninsured	2.846	1.111	0.007*	1.324	6.117
Opioid/Narcotic Use					
Never	Reference				
Infrequent (< 90 days)	2.800	0.250	<0.001*	2.191	3.578
Chronic (90+ days)	2.097	0.239	<0.001*	1.678	2.621
Missing	4.277	2.302	0.007*	1.489	12.283

Source: Logistic regression analysis of 2600 participants awaiting spine surgery at VUMC
**p<0.05*
***NA: participants in these categories did not of symptoms of disability based off the ODI*

DISCUSSION

The results of this study demonstrate the need for medical providers to improve their cultural and structural competence. All sociodemographic factors included in the multivariable logistic regression models—except for age—had significant associations with at least one health outcome measure, showing just how strongly social factors can influence internalizations of well-being. Sex and employment status were linked to both poor health status outcome measures as well as disability. Race/ethnicity, BMI, and health insurance status were associated with the entire EQ-5D for health status as well as disability. Educational attainment was linked to both measures of poor health status and depression. Additionally, smoking status was linked to outcome measures for depression and disability. Interestingly, the use of opioids/narcotics was associated with all health outcome measures.

Thinking explicitly in terms of outcome measures, the entire health status and disability questionnaires appear to be the most influenced by patient social measures, with both of these outcomes showing associations with 7 of the 9 sociodemographic categories. The VAS component of the EQ-5D for health status demonstrated the third highest susceptibility, with 4 of the 9 sociodemographic categories having a variable of significant association. Depression showed the fewest associations of the outcome measures with only 3 of the 9 sociodemographic categories showing associations. Therefore, all of these outcome measures were demonstrated to be susceptible to cultural and structural factors beyond the biological scope of medical practice.

The overlapping cultural and structural components of these results are best exemplified through the race/ethnicity sociodemographic category. Persons who identify their race/ethnicity as African American, Hispanic/Latino, or Asian have been shown to experience health disparities in the US, though these disparities are attributed to different causes. (Brach & Fraser, 2002; Lee et al., 2009; National Center for Health Statistics (US), 2016). For example, Lee et al. theorizes that such disparities exist as a result of provider discrimination, which ultimately results in patients using healthcare services less frequently; however, Brach and Fraser attribute minority health disparities to the disproportionate minority representation in “the poor, the unemployed, and the undereducated…”. Both studies focus on the importance of physicians using culture competency techniques in order to combat these disparities; however, a structural competency perspective would allow physicians to see how upstream structural decisions develop inequalities that lead to racism, poverty, and insufficient access to healthcare services.

One of the most surprising aspects of this study was the finding that no race/ethnicity group had a more significant association with depression than white persons. This could be attributed to a gap in effective communication between physicians and minority groups, specifically when discussing highly stigmatized diseases and illnesses, such as depression. I hypothesize that this results from the fact that in many cultures, dictating that oneself has depressive symptoms could result any number of negative structural consequences and that patients could directly withhold their symptoms to avoid harsh social ramifications. However, minority racial/ethnic populations might also be subject to a large number of protecting factors such as large families, strong social networks, and religions that protect them from depression and other psychological stresses. From a structural competency perspective, these results could also be attributed to the over diagnosis of white persons, namely women due to gender norms and conceptualizations of how women are supposed to behave. Future research needs to balance cultural and structural perspectives to further examine the relationship between race/ethnicity and depression symptoms as determined by the PHQ-9.

Additionally, it is also worth examining how patient language and belief symptoms impact the validity of patient reported outcome measures. For example, patient language and beliefs have a direct impact on the PHQ-9 because it inherently relies on patients self-reporting their own mental health. I believe that the reliance on self-report means that, while its focus is on quantifying depressive symptoms, the PHQ-9 is also testing how different cultures define and explore depression and how accepting and open cultures are to mental illness. In terms of cultural and structural competency, this finding ultimately works to demonstrate that the way different cultures (here, limited by definition to racial and ethnic groups) conceptualize health and well-being can affect diagnoses and treatments. Additionally, the ODI survey which measured self-reported disability demonstrates deeper structural limitations in conceptualizations of disability that hints at stigmatization. For example, the label of "crippled," which is given to persons scoring within the 61-80% range on the survey could result in any number of downstream social consequences and thus impact how patients report their own scores. Future research should not only look at how culture affects patients reporting their own health symptoms but should also examine how social structures and the fear of social consequences impacts these surveys.

Another important finding is the fact that opioid/narcotic use, whether infrequent or chronic, had significant associations with all four outcome measures. This result speaks to the need for increased structural competency in healthcare, specifically in terms of health policy. Narcotics and opioids have been subject to many structural level changes in the last decade, as policy makers have encouraged physicians to limit their prescriptions for opioids and other pain relievers. Additionally, these changes have been put in place due to the downstream health effects that result from opioid/narcotic use, such as increased psychological and environmental stresses. However, as it is impossible to determine a causal pathway with the given data, it is important to note that patients who are receiving opioids/narcotics from their medical providers could have much more severe chronic pain that influences their health status, depression, and disability status more so than those whose diagnosis does not necessitate opioid/narcotic use. More research is needed to analyze the relationships between opioid/narcotic use and health status, depression, and disability.

Lastly, the language and labels used when discussing pain varies based on many of the sociodemographic factors examined in this study, such as educational attainment and employment status. Much of this variation is centered around language and how definitions and the consequences of "pain" vary for different people, especially when looking at the potential downstream social effects that having pain might create for certain subpopulations. For example, people who are employed in fields that require the use of their bodies, such as landscapers, roofers, or construction workers, face a different set of structural consequences from having pain than people who are able to work from home or who have desk jobs. For those whose employment requires them to be on their feet all day, having pain can result in explicit health consequences as well as financial burdens. Not only can the need for employment impact how readily patients seek care, but the US reliance on employer-based health insurance means that many patients might fear receiving a diagnosis that puts them out work at the same time that it removes the affordability of their care. As such, I think it is important for researchers and physicians to keep in mind how deeply entangled employment status is to patient narratives of health.

The findings of this study are not without limitations. One limitation to this study is that the included data is from one healthcare facility in Nashville, TN and that the population was predominantly white. As such, the results run the risk of not being generalizable to the larger population. Additionally, all persons were chronic back pain patients whose pain required surgical intervention, meaning that the results might not be generalizable in this regard as well.

Additionally, there were limitations within the data set itself. These limitations result from the high number of missing data for some of the sociodemographic factors (i.e., educational attainment and income) as well as the limitations in the variables themselves. To combat this having more information on additional sociodemographic variables, such as ZIP code and availability of social and emotional support, would have facilitated further examinations. Zip code information could have been very significant in exploring structural competency more thoroughly. Learning where patients live would have provided powerful insight into food access and other structural level variables that could impact health at the individual level. Likewise, questions examining social and emotional support could have also further contributed to my results. Learning about what types of support these patients had access to could have deepened my understanding of their health status, depression, and disability scores.

CONCLUSION

Analyzing the socioeconomic and demographic factors of chronic back pain patients awaiting surgery demonstrates how social inequalities and disparities can influence patient health narratives long before and long after physicians examine patients. As such, it is important that clinicians work to understand how sociodemographic factors operationalize and influence patient health status, depression, and disability status. Within this study, sociodemographic factors of sex, race/ethnicity, employment status, educational attainment, BMI, smoking status, health insurance status, and opioid/narcotic use were associated with at least one outcome measure for poor health status, depression, or disability status. Therefore, it is reasonable to assume that physicians who are trained to become culturally and structurally competent can administer better care to the patients they serve through a heightened ability to effectively communicate with their patients and by developing a better understanding as to how structural policy affects health at the individual level.

Future research should look at the broader effects of the findings resulting from this study. The present research only examined a small subset of patients undergoing spinal surgery at one medical center and only focused on one type of patient population. It is vital to also examine how socioeconomic and demographic factors influence health status, depression, and disability in non-surgical and non-back pain populations.

The results of this study advocate for health policy changes that encourages physicians to become more culturally and structurally aware and competent when diagnosing and treating their patients. From an academic perspective, medical schools should be training future physicians to be aware of how cultural and structural factors influence patient internalization of well-being and, in the grand scheme, health outcomes. For instance, physicians should be expected to become more aware of how race/ethnicity can impact the presentation of depression symptoms in clinical settings or of how gender roles and the use of opioids/narcotics impact how patients perceive their own health. Additionally, physicians should be encouraged to take courses on structural competency and health policy so that they can have a deeper understanding as to how factors such as health insurance status, access to quality education, or food deserts influence patient health and outcomes.

Overall, this project makes headway into understanding how cultural and social inequalities operationalize to impact internalizations of health. Cultural and structural competency ask physicians to understand how individual social and cultural factors as well as larger social structures influence narratives of health and healing. The results of this study demonstrate that specific sociodemographic factors are significantly associated with self-reported patient health status, depression, and disability, showing the need for continued improvement in the cultural and structural competence of the physicians we produce.

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