Body Mass Index and Quality of Life: Examining Blacks and Whites With Chronic Pain

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Abstract: Obesity contributes to several chronic pain conditions, negatively affecting quality of life (QOL). However, obesity’s relationship with chronic pain is poorly understood. This prospective survey study examines obesity’s role in chronic pain and subsequent impact on QOL. Black and white patients with chronic pain (N = 183, 18–50 years of age, 64% women, 50% black) were studied to determine predictors for the presence of body mass index (BMI) information in medical records, group BMI differences, and how BMI and pain contribute to mental/physical outcomes. BMI was calculated by using medical records nearest the enrollment date. Sociodemographic data, sleep, pain, functioning, disability, and depression were measured. BMI data were available for 143 subjects (78%), with blacks having a higher BMI (P < .002). Black (P = .08), people with higher pain (P < .01), affective distress (P < .01), and post-traumatic stress disorder scores (P = .07) were less likely to have their BMI recorded. Path analysis tested relationships between sociodemographics, BMI and pain with functioning, depression, and disability. BMI was positively associated with black race and age and predicted poorer physical functioning and greater disability. Pain was not predicted by race or age but was associated with all outcomes. These findings support assessing BMI when managing chronic pain and its negative impact on QOL, especially for minority patients.

Perspective: This study examines the relationships among sociodemographic factors, BMI, and QOL in chronic pain. Our results demonstrate significant racial disparity among chronic pain patients in assessing BMI and quality of pain care. These findings support obesity’s negative impact on overall health and the importance of measuring BMI in patients with chronic pain, especially racial and ethnic minorities.

Key words: Health, obesity, pain, race, ethnicity, quality of life, body mass index, age, gender.

Obesity and chronic pain are increasing in prevalence. Both have significant public health implications in addition to negatively affecting overall health and well-being. Similarly, obesity contributes to chronic pain, whereas inactivity due to chronic pain may also lead to obesity. Recent data reveal a rise in the prevalence of overweight (body mass index [BMI] ≥25) from 55.9% to 64.5%10 and obesity (BMI ≥30) from 22.9% to 30.5%. There is also an increasing prevalence of acute, chronic, and cancer pain regardless of sex, age, race, or ethnicity.8,26,39 Racial and ethnic disparities also exist for both obesity and chronic pain, with considerable variability in severity and quality of care for these conditions.17,18

Black women have experienced larger increases in overweight and obesity rates than white or Hispanic women.10 Extreme obesity (BMI ≥40) is also most prevalent among black women and least prevalent among Asian/Pacific Islanders.29 There are also significant racial and ethnic disparities in the negative sequelae associated with obesity. Blacks are more likely to be insulin resistant with higher blood pressure and tend to be diagnosed later for risk factors associated with many chronic conditions (eg, cardiovascular disease, diabetes), yielding greater than additive risks.43 Obesity is also linked to an increased risk for heart disease, diabetes, cancer, and osteoarthritis (all are also associated with pain).19,24,36 Obesity directly increases risk and worsens outcomes for chronic kidney disease,7 yielding further disability.32 Overall, several risk factors increase the dif-
ferential negative consequences associated with obesity for blacks when compared with whites.35 There is also a direct relationship with obesity and other morbid conditions (eg, sleep problems)6,40 leading to further diminutions in health-related quality of life (HRQOL).19,25

Obese people with chronic pain suffer more depressive symptoms than normal-weight or overweight people with pain.6 Multiple obesity-depression covariations are possible.9 For example, a dose-dependent relationship appears to be present among obese women with depression, with increasing obesity yielding increased depression.41 In addition, people with pre-existing mood disorders are more likely to have obesity and obesity-related problems (eg, chronic pain, osteoarthritis, hypertension, and diabetes).11 Kabir et al22 found that higher BMI can link depression and hypertension, whereas depression symptoms influence cardiovascular disease (although depression’s direct effect on developing cardiovascular disease was only significant in blacks).

Overall, obesity’s role in the chronic pain experience has been poorly explored, especially in a racially and ethnically diverse population. Yet, obesity is an independent risk factor for chronic pain.5,28 Obese people are also at a higher risk for disability compared with people with normal weight, and obesity is a confounding factor in persistent low back pain.27 Nonetheless, very few studies attempted to evaluate disparities in the chronic pain population with regard to BMI. We hypothesized higher BMI has a detrimental effect on quality of life (QOL) beyond pain effects in a younger (<50 years), diverse, chronic pain population. This study aimed to (1) determine barriers to understanding obesity’s role in chronic pain by identifying predictors for the presence or absence of BMI information in a medical database, (2) identify group differences in BMI while describing sociodemographic differences among people with chronic pain who are healthy weight, overweight, and obese, and (3) determine the role obesity plays in QOL outcomes for a diverse sample living with chronic pain.

Methods

Approval for this prospective survey study was granted by the University of Michigan Health System’s (UMHS) Institutional Review Board. Written informed consent was obtained from participants to retrieve information from the medical record. All new black patients 18 to 50 years old, attending the Multidisciplinary Pain Center (MPC), a tertiary care pain center) and meeting chronic pain criteria (experiencing non-cancer pain for ≥6 months), on initial presentation for chronic pain management, were invited to participate. After each successful recruitment, the next white patient attending the MPC with like age and gender was recruited. A prospective cohort survey study of chronic pain was designed. Self-report survey data obtained from the subjects presenting to the MPC for initial evaluation and treatment included a battery of tests in addition to the standard Patient Assessment Inventory and Narrative (PAN) used by the MPC. Medical record information documented by clinical staff was also included.

Measures

Demographics

The PAN was used to assess subject characteristics: race (0 = white, 1 = black), gender (0 = women, 1 = men), age, employment status (full time, part time, unemployed, housewife), education (1 = <sixth grade, 2 = < high school, 3 = high school graduates, 4 = some college or technical training, 5 = college graduate, 6 = graduate or advanced degree), marital status (0 = other, 1 = married or in a long-term relationship), and current litigation/legal action in process (presence = 1, absence = 0).

Medical Records

Height and weight for subjects were extracted from electronic medical records from the pain clinic visit at the date nearest study enrollment to calculate [(BMI = weight (kg)/height (m)²). As per our practice, data were obtained from clinical personnel. The continuous BMI measure was used; a categorical BMI variable was created based on the Centers for Disease Control (CDC) divisions: underweight = <18.5, healthy weight = 18.5 to 24.9, overweight = 25 to 29.9, obese = 30 to 39.9, and extremely obese >40. A dummy variable was also created to indicate whether BMI information was available through electronic records (1 = presence, 0 = absence).

Pain

Pain duration in months was calculated as the difference between when the participant reported pain began and the date when the PAN was administered. Pain location was derived from four illustrations of a human body from front, back, and each side. Participants were asked to shade in the places they experienced pain and an overlaid coding sheet was then used to code “yes” or “no” for the presence of pain in ten body regions. Pain etiology was asked first as “How did your pain begin?” followed by a checklist (accident at work, accident at home, car accident, other accident, at work—not an accident, after surgery, after illness, pain just began—cannot relate it to anything) and then clarified through 2 open-ended questions (“Briefly describe the circumstances surrounding the onset of your pain” and “what do you think is the cause of your pain?”). For the current study, categories were collapsed into accident, surgery, illness and just started (which included pain caused by repetitive injuries and unknown categories).

Pain Characteristics

The McGill Pain Questionnaire (MPQ) and the West Haven Yale Multidimensional Pain Inventory (WHYMPI) evaluated pain characteristics. The Pain Rating Index (PRI) Scale of the MPQ has 78 words grouped into 20 classes of single-word pain descriptors (each word ranked by degree of intensity) to assess pain intensity. The scale is measured on 2- to 6-point scales (0 = not selected, 1 = mild intensity, highest = severe intensity). A
score was obtained by summing the intensities of all the words chosen by the respondent to obtain a single score. Repeated administration of the MPQ revealed a 70.3 rate of consistency in the total PRI score. Six questions from the WHYMPI are included in the PAN to assess pain and affective distress. This quantitative tool allows for a multidimensional look at the chronic pain’s ramifications. Means of 3 7-point Likert-type scales each were used to assess pain severity (0 = no pain, 6 = excruciating) and affective distress (0 = low, 6 = extremely high).

Post-Traumatic Chronic Pain Test

The Post-Traumatic Chronic Pain Test (PCPT) is a screening test for people at risk for post-traumatic stress disorder (PTSD); a syndrome characterized by the development of a phobic reaction to environmental and ideational stimuli associated with the original traumatic event. It is a 7-item, paper-and-pencil instrument with a 70% true discrimination power and a test-retest reliability of $r^2 = .90$ that has been established as useful among patients with chronic pain. Only people for whom pain originated from trauma (eg, accident, injury, surgery) provided responses. For all others, PCPT was coded as 0. The 6 questions were scored (0 = not at all, 6 = very much) and responses were summed for the current analyses. Reliability data for respondents with accident-related pain suggest good internal consistency in our sample ($\alpha = .81$).

Outcomes

The Pain Disability Index (PDI) evaluated the impact of chronic pain on the individual via summation of 7 11-point subscales representing 7 life domains (family, occupation, recreation, social, sexual, life-support, and self-care) and the amount of impairment (0 = no disability, 10 = total disability, 70 = maximum disabilities). PDI was weighted, allowing for up to 2 missing items.

Beck Depression Inventory

The Beck Depression Inventory (BDI) is a 21-item screening tool assessing depressive symptoms. It measures emotions, behavioral changes, and somatic symptoms specific to people with depression. The score range possible is 0 to 63, with 63 being maximum and 17 being the recommended cutoff identifying depression. A weighted sum allowing for up to 5 missing values was used in analyses.

Multidimensional Short Form 36

The Multidimensional Short Form 36 (SF-36) is a well-validated measure of HRQOL allowing for simultaneous physical and mental health qualification. As recommended, responses were computed to create 8 subscores (general health, physical functioning, role-physical, bodily pain, mental health, role-emotional, social functioning, and vitality). They were then summed to create 2 global scores for the physical component score and the mental component score. Norm-based scoring was used to make the scores comparable to the general American population (mean ± SD; 50 ± 10).

Other Health Issues

A checklist of 5 stress-related comorbidities (ie, high blood pressure, asthma, colitis, irritable bowel syndrome and gastric ulcer) were summed to assess comorbidities (presence = 1, absence = 0, maximum = 5). Sleep trouble was assessed with a sum of scaled items representing time to fall asleep, times woken up in the night, reverse of how long stayed asleep before waking for the first time, fatigue felt in the morning, and the reverse of how rested in the morning.

Data Analyses and Statistical Methods

All statistical analyses were performed by using SPSS 14.0 and AMOS 6.0 (SPSS, Inc., Chicago, IL). Statistical significance was determined with the probability of a Type I error ($P < .05$). Descriptive statistics were computed to characterize the subjects’ demographics. Analysis of variance (ANOVA) and $\chi^2$ analysis were used first to determine if there were differences between participants with height and weight data in their electronic medical record and those without. ANOVA was also used to identify race and gender group differences in BMI with Bonferroni paired comparisons used to test the 4 group differences in the case of the 4 race $\times$ gender groups. Third, path analysis using AMOS was used to examine the role that BMI might play in conjunction with race, age, and pain in relation to outcomes for people with chronic pain. Path analysis was chosen to allow for the removal of nonsignificant paths while also allowing for multiple outcomes to be examined in a single analysis, thereby reducing additive error. Path analysis also allows for evaluation of direct and indirect relationships, such that the more complex role of race and age in conjunction with BMI and pain outcomes could be examined. Evaluation began with a saturated model with paths of least significance being removed one at a time. At each iterative step, the changes in $\chi^2$ were evaluated to test whether the fit of the model had significantly improved. Correlations between outcomes were allowed because the variables have been shown to be correlated in past work. Nested tests, as outlined by Baron and Kenny and updated by Holmbeck, using the procedures recommended by Brown, were used to test for mediation between race and BMI and between age and BMI for the outcomes significantly related to BMI. Parallel models were also run by race to test whether BMI and pain relationships with outcomes were the same for blacks as whites. This test requires paths to be set as equal in the 2 models as recommended by Hu and Bentler and compares this model to a model in which paths are free to vary. To test goodness of fit of the various models, we examined the following fit indices: $\chi^2$, a measure of likelihood that the actual predictive model is significantly different from the one specified, the Comparative Fit Index (CFI) where a value $> .95$ is desirable, and the root mean squared error of approximation (RMSEA), in which a value of $\leq .05$ is desirable. AMOS was permitted to estimate missing data (that is, <10% of the data matrix values).
Results

A less comprehensive version of these results was presented at the 2007 American Pain Society annual meeting. For the 226 people who were eligible for the study, 183 were recruited (81%). The majority of those who were not recruited could not be contacted (n = 30; 13%) due to appointment changes and nonresponse to follow-up, whereas 12 declined consent (5%). Study participants were not different from the clinical population, meeting eligibility criteria overall in age, marital status, or pain levels, although they were slightly less likely to have less than a high school education. The diverse sample (N = 183) included whites (n = 92), blacks (n = 91), men (n = 68), and women (n = 115). The age range for the sample was 31 to 46 years old, and the majority of the sample (64%) completed at least some college or technical school. Blacks were less likely to be married or to have a significant other (P < .001) and were less likely to be employed (P = .02) when compared with whites. Gender, age, and education did not differ by race. Men were older than women (40 ± 6 years vs 37 ± 8 years, P = .01), more likely to be married or have a partner (67% vs 44%, P = .01), more likely to be employed (55% vs 41%, P = .08), and had fewer comorbidities (0.56 vs 0.80, P = .06). Table 1 summarizes sociodemographic data for the sample. Blacks had more comorbidities (P = .01), more PTSD symptoms (P < .001), and more pain-related disability at a trend level (P = .06) than did whites. Table 2 provides means for all study scales and racial comparisons.

Pain Descriptives

Subjects experienced pain on average for 60.0 ± 82.4 months and had pain in 3.1 regions of the body. There were no racial differences in either duration or number of pain locations. The pain location most often marked was leg/foot (62.7%) and hip/pelvis (53.8%). If back pain is examined as a single location rather than spine (34.9%) and nonmidline back (41.4%), then 55.6% of participants experienced some sort of back pain. The only racial difference in pain location was abdominal pain with blacks reporting it twice as frequently (23.2% vs 11.5%) as whites. Leg/foot pain and anal pain were both associated with higher BMI. Other pain locations and causes were not significantly associated.

Height and Weight Information

Most participants (n = 143; 78%) had complete BMI data. Blacks (n = 66) were less likely to have complete height and weight data (72.5% vs 83.7%, P = .08) than were whites (n = 77). There were no gender differences in height and weight information availability in the chart. Four race-by-gender group comparisons were ex-

Table 1. Sample Sociodemographic Information by Race (N = 183)

<table>
<thead>
<tr>
<th>Sociodemographic Characteristics</th>
<th>Total</th>
<th>Whites</th>
<th>Blacks</th>
<th>Difference Statistic*</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% women)</td>
<td>183</td>
<td>63.0%</td>
<td>62.2%</td>
<td>0.01</td>
<td>.91</td>
</tr>
<tr>
<td>Age (mean years ± SD)*</td>
<td>38.2 ± 7.5</td>
<td>38.1 ± 7.3</td>
<td>38.3 ± 7.7</td>
<td>0.04</td>
<td>.84</td>
</tr>
<tr>
<td>Marital status (% married/significant other)</td>
<td>51.7%</td>
<td>67.0%</td>
<td>35.7%</td>
<td>16.90</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% less than high school</td>
<td>12.9%</td>
<td>11.5%</td>
<td>14.3%</td>
<td></td>
<td>.30</td>
</tr>
<tr>
<td>% high school graduates</td>
<td>22.8%</td>
<td>23.0%</td>
<td>22.6%</td>
<td></td>
<td>.86</td>
</tr>
<tr>
<td>% more than high school education</td>
<td>64.3%</td>
<td>65.5%</td>
<td>63.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment status (% full- or part-time employed)</td>
<td>46.3%</td>
<td>55.4%</td>
<td>36.4%</td>
<td>5.84</td>
<td>.02</td>
</tr>
<tr>
<td>Litigation status (% yes)</td>
<td>18.5%</td>
<td>14.3%</td>
<td>22.6%</td>
<td>1.94</td>
<td>.16</td>
</tr>
</tbody>
</table>

*F for age; χ² for other sociodemographic variables.

Table 2. Descriptive Statistics at Baseline by Race (N = 183)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total</th>
<th>Whites</th>
<th>Blacks</th>
<th>F</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress-related comorbidities</td>
<td>0.71 ± 0.85</td>
<td>0.56 ± 0.79</td>
<td>0.88 ± 0.88</td>
<td>6.45</td>
<td>.01</td>
</tr>
<tr>
<td>Sleep trouble</td>
<td>15.58 ± 4.28</td>
<td>15.30 ± 4.46</td>
<td>15.87 ± 4.09</td>
<td>0.77</td>
<td>.38</td>
</tr>
<tr>
<td>Post-traumatic Chronic Pain Test</td>
<td>6.62 ± 10.32</td>
<td>3.83 ± 7.43</td>
<td>9.60 ± 12.05</td>
<td>13.07</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>West Haven–Yale Multidisciplinary Pain Index–Pain Severity</td>
<td>3.66 ± 1.09</td>
<td>3.56 ± 1.03</td>
<td>3.76 ± 1.15</td>
<td>1.45</td>
<td>.23</td>
</tr>
<tr>
<td>West Haven–Yale Multidisciplinary Pain Index–Affective Distress</td>
<td>3.34 ± 1.29</td>
<td>3.24 ± 1.34</td>
<td>3.44 ± 1.24</td>
<td>1.02</td>
<td>.31</td>
</tr>
<tr>
<td>McGill Pain Total Score</td>
<td>34.28 ± 14.01</td>
<td>33.54 ± 13.74</td>
<td>35.05 ± 14.33</td>
<td>0.50</td>
<td>.48</td>
</tr>
<tr>
<td>SF-36 Physical Component Score</td>
<td>26.02 ± 16.18</td>
<td>27.73 ± 16.20</td>
<td>24.23 ± 16.05</td>
<td>1.94</td>
<td>.17</td>
</tr>
<tr>
<td>SF-36 Mental Component Score</td>
<td>40.75 ± 22.02</td>
<td>41.73 ± 21.74</td>
<td>39.72 ± 22.41</td>
<td>0.34</td>
<td>.56</td>
</tr>
<tr>
<td>Beck Depression Inventory</td>
<td>20.15 ± 13.30</td>
<td>19.42 ± 11.72</td>
<td>20.85 ± 14.71</td>
<td>0.45</td>
<td>.50</td>
</tr>
<tr>
<td>Pain Disability Index</td>
<td>43.04 ± 15.63</td>
<td>40.72 ± 15.51</td>
<td>45.37 ± 15.50</td>
<td>3.66</td>
<td>.06</td>
</tr>
</tbody>
</table>

Abbreviation: SF-36, Multidimensional Short Form 36.
NOTE. The items scale with adequate reliability (α = 0.65–0.74 in this study). The scale provided trouble sleeping (range, 2.0–25.0, μbaseline = 15.6 ± 4.3) from multiple dimensions.
Examined (Fig 1). White women were most likely to have their BMI data present, whereas black men were the least likely ($P = .07$). Legal action, marital status, employment status, and comorbidities did not predict the absence of height and weight data.

Important differences were found in pain, mental health, healthcare, and sleep among the subjects with missing BMI information. The group missing BMI data had higher pain severity via WHYMPI (4.1 vs 3.5), MPQ total pain (39.0 vs 32.7, $P = .01$), affective distress scores (3.8 vs 3.2, $P = .007$), and sleep trouble (16.7 vs 15.2, $P = .05$). Participants missing BMI data had significantly fewer health system visits (4.5 vs 9.5, $P = .003$) during the study period.

BMI Group Differences

The average BMI was higher for blacks than whites (31.6 vs 27.6, $P = .002$). There were no differences in BMI by gender, marital status, or educational achievement. Unemployed subjects had higher BMI when compared with part-time workers (31.7 vs 25.2, $P = .05$), although full-time workers and homemakers did not statistically differ from other groups. Table 3 shows the distribution of blacks and whites into the CDC-defined BMI categories.

Age, Race, BMI, Pain, and Outcomes

In the path analysis model, both black race and age significantly and positively predict BMI. Fig 2 shows the best-fitting model ($\chi^2 = 5.19$, df = 13, CFI = 1.00, RMSEA <.01). Black race is positively associated with BMI and not directly associated with any other outcomes. Due to the BMI association, black race is indirectly associated with lower physical functioning and higher pain-related disability. Mediation tests were negative (when the paths from BMI to physical functioning and to pain disability were held at 0, one at a time, black race was still not associated with those items). Thus, the racial association was only indirect. Older age was associated with higher BMI and better physical functioning. However, age is associated with poorer physical functioning indirectly through BMI. Neither relationship changes significantly if the other age/functioning relationship is set at zero. Age is also associated indirectly (through BMI) with more pain disability. Since the age relationships did not change when mediation tests were performed, age is not mediated by BMI. Pain level is associated independently

Table 3. Body Mass Index Classification for Blacks and Whites

<table>
<thead>
<tr>
<th></th>
<th>UNDERWEIGHT (&lt;18.5)</th>
<th>OPTIMAL WEIGHT (18.5–24.9)</th>
<th>OVERWEIGHT (25–29.9)</th>
<th>OBSE (30–39.9)</th>
<th>EXTREMELY OBSE (≥40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>1</td>
<td>33</td>
<td>19</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1.30%</td>
<td>42.86%</td>
<td>24.68%</td>
<td>27.27%</td>
<td>3.90%</td>
</tr>
<tr>
<td>Black</td>
<td>2</td>
<td>13</td>
<td>20</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>3.03%</td>
<td>19.70%</td>
<td>30.30%</td>
<td>30.30%</td>
<td>16.67%</td>
</tr>
</tbody>
</table>

NOTE: Higher levels of obesity, especially those of obese and extreme obesity, were found in the black population in the study ($\chi^2 = 12.88$, $P = .01$).
with all the outcomes examined (poorer mental and physical functioning, higher depression, and higher disability). When a split group analysis was used to test whether the paths were the same by race, the path directly from age to physical functioning was no longer significant for either group, but all other paths were significant for blacks. Although 2 paths were not significant for whites (age to BMI and BMI to disability), the paths were not significantly different from blacks. Although there were individual paths that were insignificant when groups were split, tests between groups showed no significant differences, showing relationships between variables in the model are the same for blacks and whites. Lack of significance of paths in the split group probably is attributable to the decreased sample size.

Discussion

In a diverse and aging society, the increasing prevalence (and burden) of obesity and chronic pain are escalating public health problems. The literature supports racial and ethnic differences in BMI, increased morbidity due to obesity, and larger increases in rates of overweight and obesity for blacks in comparison with whites or Hispanics. The current investigation describes the relationship among race, chronic pain, BMI, mental and physical health, and disability. We found that blacks were less likely to have BMI assessed, whereas black race was positively associated with BMI. Although not directly associated with other outcomes, black race is indirectly associated with lower physical functioning and higher pain-related disability through the BMI relationship. Our findings demonstrate blacks with chronic pain have a higher risk for obesity compounded by increased morbidity than whites with chronic pain. When combined with Flegal’s work demonstrating an increasingly obese American population as well as evidence for racial and ethnic disparities in health, our results are very concerning. These results also support the need for health professionals to assess patient height and weight during all clinical encounters.

Although of marginal significance \((P = .08)\), it remains unclear why blacks in our study were less likely to have their BMI assessed. This is particularly important when considering blacks are also more likely to have an unhealthy BMI and subsequently more obesity-related risks. It is possible the borderline significance observed is due to the relatively small sample sized and future studies should attempt to recruit a larger ethnically diverse sample. Nonetheless, our findings are concerning, as they were in wheelchairs (an obstacle to measuring height and weight as well as an indicator of disability). Another consideration is healthcare utilization (ie, number of health system visits), since each visit presents an opportunity to measure height and weight. This variability may partially explain why blacks as well as the unemployed and uninsured (each group having fewer physician visits) are less likely to have their BMI documented. We did not assess whether the negative consequences associated with obesity were discussed with the patient, although patients are receptive to having a discussion about their weight with their physician. For instance, Potter and Vu reported obese and overweight patients in primary care clinics in California wanted assistance with their weight management, but few patients reported their physician discussed these issues, unless the patient had both higher BMI and comorbidities. In Scott’s observational study, neither physicians nor overweight patients mentioned weight during the majority of clinical encounters. Hence, the failure to calculate and document BMI to monitor outcomes and tailor therapies or interventions is surprising and may reflect lesser quality care. Similar to studies focusing on physician variability in assessing other sensitive topics (eg, obesity, abuse), efforts designed to improve assessment and treatment for obesity and pain as well as multidisciplinary care to improve the quality of care may decrease the burden of disease. Nonetheless, considering the public health toll of obesity and chronic pain, BMI calculations, at regular intervals, represent an important clinical quality metric for all patients, especially among populations at increased risk for morbidity.

To our knowledge, no previous study investigated obesity rates and consequences in a young, racially diverse, chronic pain population as we did. Differences between blacks and whites were examined in our path model (a method uniquely suited to examine correlated outcomes), allowing for different relationships among the predictor and outcome variables. Both black race and older age predicted higher BMI but not pain. These findings describing the relationship between race and BMI are consistent with other studies. Flegal et al demonstrated that general rates of obesity in the American population were increasing with blacks having higher BMI than whites, more members in the super morbid range, and more quickly increasing numbers of obese. Seo also demonstrated higher rates of obesity (measured by BMI) in blacks, less concern regarding personal obesity, and higher rates of super morbid obesity. In contrast to our previous findings, black race was not directly associated with higher pain levels or pain-related outcomes in this study. Earlier work showed a direct relationship between race and pain, with chronic pain directly adversely affecting the QOL and health of blacks more so than whites. However, these studies did not examine the role of overweight and obesity on these health consequences.

As expected and consistent with Green, we found pain level was related to all outcomes in the path analysis: Mental and physical functioning, depression, and dis-
ability. BMI was related only to poorer physical functioning and higher disability. Our results reveal only an indirect racial relationship to disability and poorer functioning (due to the higher BMI levels associated with race). Likewise, age was only indirectly associated with disability through BMI. Thus, the next logical investigation of obesity in a racially diverse population should seek to examine obesity’s effect on chronic pain and commonly associated comorbidities (eg, osteoarthritis).

Despite our many important findings, there are study limitations. Self-reported surveys can yield report and self-selection bias. It is conceivable that patients had their height and weight documented and not incorporated in the electronic medical record. Since subjects were recruited through a tertiary care pain center, potential neighborhood effects could not be examined and only people with access to medical care and the ability to travel to the clinic were included. The study included people 18 to 50 years old, and thus we can only speculate on the generalizability of these findings to an older population, and age relationships in particular need to be understood within this limited frame. Since weight and the number of chronic conditions tend to increase with age, these findings may be prophetic as the baby boomers (ie, those born between 1946 and 1964) age. Blacks represent the largest minority population (nearly 90%) seen at the University of Michigan, the small numbers of other ethnic or racial groups seen in the pain center limit potential statistical analysis. In fact, many of the associated marginal findings may be due to our relatively small sample size and present a potentially important limitation to consider when evaluating our results. Nonetheless, these results provide multiple new directions for investigation: (1) The effect of race and BMI on chronic pain in an aging population and other minority groups at risk for obesity, (2) the role of neighborhood, socioeconomic, and psychosocial factors on the relationship between BMI and pain outcomes, and (3) examining longitudinally the relationship among BMI, depression, and disability in minorities across the lifespan while determining the effect of obesity on emotional distress in a racially diverse chronic pain population.

Overall, obesity and chronic pain are epidemic in the United States. These results reveal that blacks with chronic pain have higher obesity risk and are less likely to have their BMI measured. Indirectly (through BMI), blacks have more disability and lower physical functioning compared with whites. These study results have critically important implications for clinical practice, public health, health policy, and extend the literature by exploring the effect of BMI on mental and physical health in a racially diverse chronic pain population. Our results demonstrate significant racial disparity among chronic pain patients, especially regarding BMI assessment, BMI differences, and BMI effects on physical functioning and disability. Although the literature suggests increased BMI is associated with poorer mental health, it was not associated with mental health outcomes in our population. Thus, further studies to clarify whether emotional distress associated with increased BMI is hidden by the chronic pain experience or whether the relationship is not linear, as suggested by our findings. We identified variability in the quality of pain care (assessment and management) and provided new information on racial disparities in healthcare while presenting a model for future population research, addressing racial and ethnic disparities. This study also emphasizes the need for health professionals to understand the dynamic relationship between BMI, comorbidities, depression, QOL, and chronic pain when developing a multidimensional assessment and treatment plans. This study also emphasizes the importance of consistently monitoring BMI trends in people at risk for adverse sequelae associated with either chronic pain or obesity.

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