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Sociodemographic Characteristics, Health Conditions, and Functional Impairment among Older Adults with Serious Mental Illness Reporting Moderate-to-Severe Pain

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Abstract

Objective: To compare adults aged ≥ 50 years with serious mental illness reporting moderate-to-severe pain to older adults with serious mental illness without pain with respect to sociodemographic characteristics, health conditions, and functional impairment.

Methods: Secondary data analyses were conducted using baseline assessments of 183 participants recruited for the Helping Older People Experience Success (HOPES) study from three community mental health centers. The primary outcome was self-reported, non-experimentally-induced, moderate-to-severe pain (referent=no-to-mild pain). Predictor variables consisted of sociodemographic characteristics, health conditions, and functional impairment. We conducted univariable and multivariable logistic regression analyses to examine the associations between these variables.

Results: Sixty-one participants (33.3%) from our sample reported pain. Pain was associated with all of the sociodemographic and health-related factors in univariable analyses. In the multivariable

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model, only older age, pain-related activity interference, and physical and emotional health-related social limitations were significantly associated with pain.

Conclusions and Implications for Practice: The presence of moderate-to-severe pain in older adults problems above and beyond the substantial functional limitations routinely experienced by this high-risk, high-need group. Given the high rates of pre-existing conditions and persistent social impairment among these older adults, our findings suggest that pain may contribute to worse overall functional outcomes. Future research and clinical interventions focused on improving outcomes should include an evaluation of pain as a contributor to decreased functioning and assess the need for early intervention, non-pharmacological pain management, or other health promotion services in psychiatric rehabilitation.

Given its prevalence, health complications, and significant functional impact in older adults, pain is a major public health concern (Institute of Medicine [IOM], 2011). Over 50% of adults aged 65 years or older are diagnosed with arthritis or another cause of moderate-to-severe pain, making pain a common ailment for older adults (Barbour, Boring, Helmick, Murphy, & Qin, 2016; Stubbs et al., 2014a). Pain is caused and maintained by biological, psychological, and social health factors, including genetic risk, disease, injury, physical deconditioning, depression, anxiety, cognitive dysfunction, and social isolation (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). Moderate-to-severe pain is also one of the most debilitating conditions in older adults, with wide-reaching influences on physical, mental health, social, and other daily life functioning (Barbour et al., 2013). These challenges are likely to worsen with the rapidly aging baby boomer population, whose diverse health histories and sociodemographic backgrounds may increase the risks of pain and pain-attributable limitations (Hootman, Helmick, Barbour, Theis, & Boring, 2016). Older adults living with serious mental illness (defined as schizophrenia, schizoaffective disorder, bipolar disorder, and major depressive disorder) are a growing and high-risk, high-need segment of the baby boomers (Bartels et al., 2014). Because of poor health behaviors such as physical inactivity, smoking, substance misuse, or unhealthy diets and long-term exposure to psychiatric medications with adverse side effects (Bartels, 2004), older adults with serious mental illness are among those with the highest likelihood for chronic health conditions that exacerbate symptoms of, are related to, or cause pain (Stubbs et al., 2014b).

Despite these health disparities and the increasing need for targeted preventive health care services in this population, little is known on the prevalence of moderate-to-severe pain among people with serious mental illness and there are heterogeneous results from the meta-analyses and large cross-sectional dataset, epidemiological studies on pain rates. Evidence suggests that 49% of adults ≥18 years with major depression report chronic pain (Ohayon & Schatzberg, 2010). Similar to national estimates (IOM, 2010), more than 1 out of 3 persons (34.7%) with schizophrenia report pain (Stubbs et al., 2014b) and more than 1 out of 4 persons (28.9%) with bipolar disorder report pain (Stubbs et al., 2015a). However, chronic pain has also been found to be more likely in persons with schizophrenia (21% increased odds), bipolar disorder (117% increased odds), and depression (161% increased odds) from the Veterans Health Administration (Birgenheir et al., 2013). Nonetheless, there is limited data on pain rates exclusive to adults 50+ years with serious mental illness. A description of biopsychosocial factors, including sociodemographic and health-related factors, among

people with serious mental illness reporting moderate-to-severe pain has also received little attention.

Notwithstanding the emerging evidence on pain rates reported by people with serious mental illness, few studies have investigated the impact and management challenges of moderate-to-severe pain among middle-aged and older adults with serious mental illness. This may be due, in part, to ineffective patient-provider communication stemming from a pain insensitivity or an endogenous analgesia in people with schizophrenia (Stubbs et al., 2015b). Several decades of evidence on acute, experimentally-induced pain suggests people with schizophrenia have pain-perceptive and pain-processing abnormalities (Stubbs et al., 2015b) and new research indicates persons with bipolar disorder might also have disturbances in pain processing (Minichino et al., 2016). However, researchers caution against drawing conclusions on the causes and underlying mechanisms behind this phenomenon (Bonnot et al., 2009; Sakson-Obada, 2017). For instance, neurobiological processes, psychological factors such as cognitive impairment, psychosis, and negative symptoms, and the analgesic properties in antipsychotic medications all might interfere with pain responses and interpretation in people with schizophrenia (Seidel et al., 2010). Sociodemographic characteristics (e.g., race/ethnicity, housing issues) and other socio-contextual determinants of health (e.g., poor social skills, limited social support, inadequate health care) may also detract from the need for pain treatment.

The main purpose of the current study is to compare adults aged ≥50 years with serious mental illness reporting non-experimentally-induced, moderate-to-severe pain to older adults with serious mental illness reporting no-to-mild pain with respect to sociodemographic characteristics, health conditions, and functional impairment. We hypothesized that there will be unadjusted and adjusted associations for the measured biological/physical and psychosocial variables with moderate-to-severe pain. Addressing this gap in the existing literature is an initial step toward improvements in clinical assessment and response to pain concerns among older adults with serious mental illness. As pain can exacerbate mental and physical health symptoms and vice versa, understanding the severity, functional limitations, and context associated with pain among this population may be an important step toward preventing the worsening of health conditions and maximizing overall health-related quality of life in psychiatric rehabilitation services and other healthcare programs.

Methods

Participants

One hundred eighty-three participants from three community mental health centers (CMHCs) participated in this study. The CMHCs were located in Nashua, New Hampshire (one site) and Boston, Massachusetts (two sites). In order to be eligible to participate in the study, participants needed to be 50 years of age or older. We used the cutoff of 50 years as a designation for “older adults” in this study. Previous work related to aging adults with serious mental illness has defined the threshold for “older” to begin at age 50 or 55 to account for the early development of aging-related functional impairment in this population (Bartels et al., 2014). The following requirements also had to be met: (a) having a diagnosis of a serious mental illness (i.e., bipolar disorder, major depressive disorder, schizoaffective

disorder, or schizophrenia) based on the *Structured Clinical Interview for DSM-IV* (SCID-CV; First, Spitzer, Gibbon, & Williams, 1996); (b) exhibiting functional impairments; (c) being enrolled in the CMHC research site for a minimum of three months; and (d) being fluent in English. Individuals were deemed ineligible to participate in the study if they met the following criteria: (a) were currently residing in an inpatient institution or nursing home; (b) met criteria for significant cognitive impairment either by having a diagnosis of dementia or based on a *Mini-Mental State Examination* (MMSE; Folstein, Folstein, & McHugh, 1975) score of less than 20; (c) were diagnosed with a terminal disease with a life expectancy of less than one year; or (d) were currently diagnosed with substance dependence over the past 12 months based on the substance use disorder module of the SCID-CV (First et al., 1996).

Measures

Sociodemographic characteristics, including age, gender, race, marital status, education, living situation were ascertained by self-report through the initial screening and baseline questionnaires. Diagnostic information on health conditions were collected through medical documentation.

The Medical Outcomes Study *Short-Form Health Survey* (SF-36; Ware, Kosinski, & Keller, 1996) was utilized to measure pain-related activity interference (defined as the degree to which pain interferes with daily activities and functioning). The SF-36 is a self-report measure with 36 items, which assesses health on eight subscales covering functional status, well-being, and overall health status. One of the physical subscales from the SF-36 includes two items related to pain. In line with prior survey research among older adults using pain-related activity interference as either a predictor or outcome (Scudds and Østbye, 2001; Thomas, Peat, Harris, Wilkie, & Croft, 2004), we used the item “During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?”, which is rated on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*). The physical subscales that include pain items from the SF-36 have demonstrated factorial validity (Ware et al., 1998), relative validity from psychometric tests and clinical tests (McHorney, Ware, & Raczek, 1993), and have been used among adults ≥50 years (Hawker et al., 2011). Previous research has also provided empirical support for the use of the physical subscales from the SF-36 for individuals with serious mental illness, suggesting good internal consistency, test-retest reliability, and concurrent and discriminative validity for this group (Tunis, Croghan, Hellman, Johstone, & Obenchain, 1999).

The Dartmouth-Northern New England Primary Care Cooperative Information Project Functional Assessment Charts (COOP; Nelson et al., 1987) were used to measure several variables related to pain and functional impairment. The self-report charts include illustrations that depict a level of functioning or well-being during the past two weeks. For the current study, we used the feelings chart for bothersome emotional problems, daily activities chart for physical and emotional health-related activity restriction, social activities chart for physical and emotional health-related social limitations, and the pain chart for pain severity. The feelings chart asks “How much have you been bothered by emotional problems such as feeling anxious, depressed, irritable or downhearted and blue?” and is rated on a 5-

point rating scale ranging from 1 (*not at all*) to 5 (*extremely*). The daily activities chart asks "How much difficulty have you had doing your usual activities or tasks, both inside and outside the house because of your physical and emotional health?" and is rated on a 5-point rating scale ranging from 1 (*no difficulty at all*) to 5 (*could not do*). The social activities chart asks "Has your physical and emotional health limited your social activities with family, friends, neighbors or groups?" and is rated on a 5-point rating scale ranging from 1 (*no pain*) to 5 (*severe pain*). Finally, the pain chart prompts participants with "How much bodily pain have you generally had?" and is rated on a 5-point rating scale ranging from 1 (*no pain*) to 5 (*severe pain*). Single-item rating scales are considered psychometrically sound and standard assessments for pain severity (Hawker, Mian, Kendzerska, & French, 2011; Hoffman, Sadosky, Dukes, & Alvir, 2010). The COOP has demonstrated reliability and convergent and discriminant validity for adult and older adult populations, even when compared to multidimensional measures (McHorney et al., 1992; Nelson et al., 1987). However, this is the first known study in which the COOP was utilized among individuals with serious mental illness.

Procedures

We conducted a secondary analysis of baseline data collected before the start of the Helping Older People Experience Success (HOPES) intervention study. Prior to the intervention study, the research protocol was approved by the Committee for the Protection of Human Subjects at Dartmouth College.

Data Analysis

All statistical analyses were performed using the *Statistical Package for the Social Science* V.24 (SPSS; IBM Corp., 2016). Data for all predictor and outcome variables were screened using SPSS V.24 for accuracy, multivariate outliers, and normality. The presence of multicollinearity was assessed by examining the variance inflation factors (VIF) and tolerance. None of the VIF values exceeded 10 for any of the predictor variables in the analyses (range = 1.22 to 1.81), and none of the tolerance values were less than .10 (range = .55 to .86), suggesting that there was not multicollinearity in the data and that no large changes in the coefficients would result from adding or deleting variables from the dataset. The Pearson product-moment correlation coefficients among the outcome variable and the predictor variables ranged from small to moderate in size.

Using the COOP pain chart, pain was bifurcated into moderate-to-severe pain (1 = score of 4 or 5, which relates to *Moderate pain to Severe pain*) and no-to-mild pain (0 = score of 1, 2, or 3, which relates to *No pain to Mild pain*) based on prior research showing that moderate to higher levels of pain severity are considered to be clinically significant pain due to the consistent links with functional impairment or activity interference caused by pain (Woo et al., 2015). Potential covariates were also selected based on previous research (e.g., Sánchez, Rosenthal, Chan, Brooks, & Bezyak, 2016) and analyzed using exploratory logistic regressions on the pain severity outcome. Sociodemographic characteristics, health conditions, and functional impairment covariates producing ≥10% change in the point estimates in exploratory logistic regressions were used in the logistic regression models in Tables 2 and 3.

To examine the associations with moderate-to-severe pain (*referent=no-to-mild pain*) as the binary outcome variable, we conducted the logistic regression analyses for the selected sociodemographic characteristics, health conditions, and functional impairment measures among older adults with serious mental illness. We combined serious mental illness diagnosis groups for data analyses based on past studies on pain, health promotion, and mental health among older adults with serious mental illness and functional impairment from community-based mental health programs (e.g., Bartels et al., 2014; Brooks et al., 2018). Sociodemographic characteristics and health conditions included age (divided by 10 to improve interpretation of the findings), gender (*1=Female, 0=Male*), marital status (*1=Currently or previously married, 0=Never married*), housing situation (*1=Supervised/supported housing, 0=Independent living*), serious mental illness diagnosis (*1=Bipolar disorder or Major depressive disorder, 0=Schizophrenia or Schizoaffective disorder*), and arthritis diagnosis (1=Yes, 0=No). To produce comparable coefficient estimates for the functional impairment variables, raw scores were transformed into z-scores (M=0, SD=1) in order for each logistic regression coefficient to represent change in odds of the outcome for each standard deviation increase in functional impairment variable scores.

Post Hoc Analysis

To examine whether the logistic regression analyses varied on the basis of separating predictor variables into ordered sets of predictors, we sequentially entered four blocks of variables: (1) age and gender, (2) sociodemographic variables (marital status, housing situation), (3) health conditions (serious mental illness diagnosis, arthritis diagnosis), and (4) functional impairment variables (pain-related activity interference, physical and emotional health-related activity restriction, bothersome emotional problems, and physical and emotional health-related social limitations).

Results

Table 1 reports findings for descriptive statistics for sociodemographic characteristics, health conditions, and functional impairment variables for the total sample and pain severity subgroups. The correlation matrix for all variables is presented in Table 2.

Table 3 shows the results of the univariable logistic regression analyses for sociodemographic characteristics, health conditions, and functional impairment variables by moderate-to-severe pain outcome (vs. no-to-mild pain). Marital status (OR 2.66, 95% CI 1.32–5.38, $p<.05$) was significantly associated with moderate-to-severe pain. Living in supervised/supported housing (OR 2.58, 95% CI 1.35–4.92, $p<.05$) and diagnosis of bipolar or major depressive disorder (OR 2.21, 95% CI 1.17–4.17, $p<.05$) were both associated with moderate-to-severe pain. As expected, diagnosis of arthritis (OR 3.49, 95% CI 1.82–6.70, $p<.05$) was associated with moderate-to-severe pain. For functional impairment variables, pain-related activity interference (OR 3.18, 95% CI 2.15–4.71, $p<.05$), physical and emotional health-related activity restriction (OR 2.21, 95% CI 1.53–3.18, $p<.05$), bothersome emotional problems (OR 1.48, CI 1.07–2.04, $p<.05$), and physical and emotional health-related social limitations (OR 2.25, 95% CI 1.59–3.17, $p<.05$) were all significantly associated with moderate-to-severe l pain.

Table 4 shows the multivariable logistic regression model for sociodemographic characteristics, health conditions, and functional impairment by moderate-to-severe pain outcome (vs. no-to-mild pain). Older age was significantly associated with moderate-to-severe pain (OR 1.89, CI 1.10–3.25, p<.05). Pain-related activity interference (OR 2.63, CI 1.64–4.22, p<.05) and physical and emotional health-related social limitations (OR 2.10, CI 1.29–3.42, p<.05) were also significantly associated with moderate-to-severe pain. Marital status, female gender, living independently, arthritis diagnosis, serious mental illness diagnosis, physical and emotional health-related activity restriction, and bothersome emotional problems were not associated with moderate-to-severe pain.

The results from the post hoc analysis are displayed in Table 5. Albeit there is an incremental increase in the variance explained by each predictor set for moderate-to-severe pain (R2: .05 to .44), only Step 3 and the Final Model included significant predictor variables. In Step 3, arthritis diagnosis was significantly associated with moderate-to-severe pain (OR 2.71, CI 1.30–5.67, p<.05). Similar to the multivariable regression model, in Step 4, older age (OR 1.96, CI 1.13–3.39, p<.05) and greater levels of pain-related activity interference (OR 2.53, CI 1.58–4.05, p<.05) and physical and emotional health-related social limitations (OR 2.14, CI 1.30–3.51, p<.05) were significantly associated with moderate-to-severe pain.

Discussion

The purpose of study was to compare older adults with serious mental illness reporting non-experimentally-induced, moderate-to-severe pain to older adults with serious mental illness reporting no-to-mild pain on sociodemographic characteristics, health conditions, and functional impairment. As expected, there were greater levels of impairment on the measured biological/physical and psychosocial variables for older adults with moderate-to-severe pain when compared to the significant functional limitations routinely experienced by older adults without pain. These results indicate that self-reported pain is present among older adults with schizophrenia and other types of serious mental illness from community-based mental health programs, with one-third (33.3%) of our sample reporting moderate-to-severe pain. Out of the subgroup of participants with schizophrenia spectrum disorders, 26.2% reported moderate-to-severe pain, 44.4% of the participants with bipolar disorder reported moderate-to-severe pain, and 40.9% of the participants with major depression reported moderate-to-severe pain. The pain rates for older adults with schizophrenia and major depression are slightly lower than prevalence rates reported from past studies (Ohayon & Schatzberg, 2010; Stubbs et al., 2014b). Yet, the rates for pain among participants with bipolar disorder are similar to a study among veterans with bipolar disorder (Birgenheir et al., 2013), which is higher than pain rates reported in a large-scale meta-analysis among people with bipolar disorder (Stubbs et al., 2015). The pain rates and impact of pain on functioning found in our study suggest that pain should be considered in the development and implementation of health care management and/or health promotion services for older adults with serious mental illness.

In the univariable analyses, moderate-to-severe pain was associated with being previously or currently married, living in supervised/supported housing, diagnosis of bipolar or major

depressive disorder, arthritis diagnosis, pain-related activity interference, physical and emotional health-related activity restriction, bothersome emotional problems, and physical and emotional health-related social limitations. Persons who were married were more likely to report moderate-to-severe pain, which is in contrast to previous findings on the positive social support effects of "non-distressed marriage" on pain severity and disability among older adults (Reese, Somer, Keefe, Mosley-Williams, & Lumley, 2010). However, it has been documented that marital satisfaction is lower among individuals with psychiatric disorders (Whisman, Uebelacker, & Weinstock, 2004), which may explain the current study's findings. Alternatively, as older adults with bipolar disorder or depression were more likely to be married than those with schizophrenia-spectrum disorders, it is likely that this finding may reflect the well-known association between pain and affective disorders (Magni et al., 1990; Murphy et al., 2012).

Our finding that living in supervised/supported housing is negatively associated with moderate-to-severe pain may suggest that persons living independently and without supervision and other supports, such as assistance with household cleaning, diets and meal planning, medication adherence, and paying bills, are more vulnerable to the effects of pain. As expected due to higher pain rates among people with affective disorders (Currie & Wang, 2004), older adults with schizophrenia-spectrum disorders were less likely to report moderate-to-severe pain when compared to those with bipolar disorder or major depression. This is in line with past biopsychosocial assessment and treatment research (Gatchel et al., 2007) that has documented the common factors of clinic pain, including the physical factors such as pain severity and psychosocial factors such as depressive symptoms (Keefe, Smith, Buffington et al., 2002), which often interact and negatively influence one another to worsen health outcomes in older adults (Furner, Hootman, Helmick, et al., 2011). Similar to pain research in the general population (Barbour et al., 2013), participants with arthritis were also more likely to experience moderate-to-severe pain. Of the individuals in the current study, 42.6% reported that they were currently living with an arthritis diagnosis. These rates are consistent with those reported by the general population for this age group, which range from 29.3 to 49.6% (CDC, 2017), but not as high as previously reported for a sample of older individuals with mental health conditions (Coughlin and Shang, 2011). All of the functional impairment variables were associated with moderate-to-severe pain, which is consistent with previous research on the impact of pain and its interference with overall functioning and day-to-day activities (Goldstein, Houck, & Karp, 2009; Wong et al., 2011).

After adjusting for other variables in the multivariable model, only older age, pain-related activity interference, and physical and emotional health-related social limitations were independently associated with moderate-to-severe pain. The association between older age and pain is consistent with epidemiological data from the general population (Barbour et al., 2016). The association of moderate-to-severe pain with pain-related activity interference and with physical and emotional health-related social limitations is also consistent with previous findings on the high levels of functional impairment among persons with pain from the general population (Thomas, Peat, Harris, Wilkie, & Croft, 2004). Additionally, we deliberately performed a post hoc analysis to determine whether the regression analyses varied on the basis of separating predictor variables into ordered sets of predictors. Overall, the pattern of findings was relatively stable across sequential steps, with incremental

variance accounted for by each predictor set. Most associations between predictor variables and moderate-to-severe pain attenuated by the final model. However, age showed a stronger association with moderate-to-severe pain when all variables were entered in the final model in comparison to other steps, which might suggest that age is most relevant to pain in the presence of functional impairment variables. A possible explanation for such results might be that pain-related activity interference and physical and emotional health-related social limitations might influence the relationship between age and pain.

Implications for Practice

The number of older adults with serious mental illness will disproportionately increase among the baby boomer population in the United States (Bartels et al., 2014). These results suggest that mental health clinicians may, in turn, observe an increasing trend in clients with schizophrenia and other serious mental illness diagnoses reporting pain and should be prepared to assist with identifying and managing pain-related issues. It may also be equally important to closely monitor older adults with serious mental illness experiencing pain for the exacerbation of perceived stress and psychiatric symptoms. It is known that persons with chronic pain are more likely to experience psychological distress, anxiety, depression, and other mild-to-moderate mental health disorders (Keefe et al., 2002). For a population with an inherent susceptibility to psychological problems, it is possible that older individuals with serious mental illness may be at greater risk for the psychiatric repercussions of physical pain, which may further limit functioning.

This study's findings also indicate there might be causal processes for the associations between moderate-to-severe pain and functional impairment, sociodemographic characteristics, and health conditions. Given the results from the post hoc analysis, potential moderating and mediating factors between pain and sociodemographic characteristics (e.g., age) or health conditions (e.g., arthritis) might include pain-related activity interference and physical and emotional health-related social limitations. These results suggest the need to target health services for older adults with serious mental illness toward providing assistance with daily and social activities affected by pain and associated health problems within community-based mental health programs. It is well-documented that individuals with serious mental illness are more likely to experience social problems due to illness-related, personal, and socioenvironmental factors (Tschopp & Frain, 2009), therefore, social isolation and loneliness might be key factors related to pain and disability (Jaremka et al., 2014). The findings of this study might, then, also suggest that clinicians should evaluate pain as an independent factor affecting diminished involvement in activities and social functioning among middle-aged and older adults with serious mental illness who already experience substantial physical and emotional health-related social limitations. Overall, psychiatric rehabilitation practitioners might consider using evaluations and methods addressing pain and related functional impairment for older adults with serious mental illness through brief screening tools, comprehensive assessments, non-pharmacological pain management, and health promotion interventions.

Limitations and Future Research

This is one of the few studies to describe self-reported, non-experimentally-induced, moderate-to-severe pain and related health and contextual factors among older adults with serious mental illness. However, several limitations should be taken into account when interpreting our findings. First, this study was conducted using secondary data, which restricted the sample to older adults meeting the eligibility criteria set in the original study. For instance, persons with significant cognitive limitations and substance dependence were excluded from participation. However, older adults with pain may be more likely to have cognitive impairment or substance use disorders such as prescription opioid misuse (Gfroerer et al., 2003; Weiner et al., 2006), which may have impacted the current study's ability to assess pain and related factors in other subpopulations. Using secondary data also limited our dataset to the variables selected for the original study. For example, we assessed pain-related activity interference and pain using the SF-36 and COOP charts, and although 1-item rating scales are routinely used in pain survey research (Herr & Garand, 2001), the SF-36 item and COOP chart have limited response ranges. Moreover, pain-related activity interference was specific to work performed inside and outside of the home; therefore, generalizability to non-work-related activities such as social and community engagements or recreation and leisure activities may be limited. In addition, neither pain chronicity nor pain duration were assessed. Next, causality could not be determined due to the cross-sectional study design. It is possible that associations among the variables are bidirectional or that diminished functioning might contribute to greater perceived pain. We also understand that our subsample of individuals with moderate-to-severe pain is small and that we may have restricted statistical power and may have limited our ability to identify variables associated with pain compared to those with no-to-mild pain. Third, we recruited participants from CMHCs; thus limiting the generalizability of our results only to older adults with serious mental illness who participate in CMHCs. Finally, although we attempted to exclude participants from our study who had cognitive disorders or substance dependence, we utilized self-report data, which are susceptible to affective bias, poor insight, and recent life events (Atkinson, Zibin, & Chuang, 1997).

Despite these limitations, the study findings are largely consistent with biopsychosocial models of pain and related disability (Gatchel et al., 2007; World Health Organization, 2001). Subsequent work would benefit from exploring other biomedical/physical factors (e.g., pain duration, prescription opioid use), psychological factors (e.g., anxiety, anger, trauma, personality traits, or psychosis), or social factors (e.g., specific forms of social support, including family, friend, and significant other support) relevant to pain. Future research should investigate how these factors may interact and influence pain in older adults with serious mental illness.

Impact

This is one of the first investigations of the associations of self-reported, non-experimentally-induced, moderate-to-severe pain with biopsychosocial limitations and pain-related functional impairment among a group of older adults living with serious mental illness. The presence of moderate-to-severe pain in older adults with serious mental illness is

associated with pain-attributable impairment of activities and social problems above and beyond the significant functional limitations typically experienced by adults with schizophrenia, schizoaffective disorder, bipolar disorder, and major depressive disorder aged.≥50 years. Given the high rates of pre-existing conditions and persistent social impairment among older adults with serious mental illness, our findings suggest that pain may contribute to worse overall functional outcomes. Future research and clinical interventions focused on improving outcomes for older adults with serious mental illness should include an evaluation of pain as a contributor to decreased functioning and assess the need for early intervention, non-pharmacological pain management, or other health promotion services in psychiatric rehabilitation.

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Table 1

Descriptive Statistics for Sociodemographic Characteristics, Health Conditions, and Functional Impairment in the Total Sample and Pain Severity Subgroups

	Total Sample (*N*=183)	Moderate-to-Severe Pain (*n*=122)	No-to-Mild Pain (*n*=61)	*p*-value
Sociodemographic Characteristics				
Age, *M* (±*SD*)	60.2 (7.9)	59.4 (7.5)	61.7 (8.6)	>.05
Gender, n (%)				>.05
Female	106 (57.9)	66 (54.1)	40 (65.6)	
Male	77 (42.1)	56 (45.9)	21 (34.4)	
Race, n (%)				>.05
White	157 (85.8)	106 (86.9)	51 (83.6)	
Non-White	26 (14.2)	16 (13.1)	10 (16.4)	
Marital status, n (%)				<.05
Never married	65 (35.5)	51 (41.8)	14 (23.0)	
Ever married	118 (64.5)	71 (58.2)	47 (77.0)	
Education, n (%)				>.05
High school graduate	134 (73.2)	91 (74.6)	43 (70.5)	
Less than high school	49 (26.8)	31 (25.4)	18 (29.5)	
Housing situation, n (%)				<.01
Independent living	94 (51.4)	54 (44.3)	40 (65.6)	
Supervised/supported housing	89 (48.6)	68 (55.7)	21 (34.4)	
Health Conditions				
Serious Mental Illness diagnosis, n (%)				<.05
Schizophrenia spectrum disorders	103 (56.3)	76 (62.3)	27 (44.3)	
Major depressive disorder	44 (24.0)	26 (21.3)	18 (29.5)	
Bipolar disorder	36 (19.7)	20 (16.4)	16 (26.2)	
Arthritis Diagnosis, n (%)				<.001
Yes	78 (42.6)	40 (32.8)	38 (62.3)	
No	105 (57.4)	82 (67.2)	23 (37.7)	
Functional Impairment				
Pain-related activity interference, *M* (±*SD*)	2.5 (1.3)	2.1 (1.1)	3.3 (1.2)	<.001
Physical and emotional health-related activity restriction, *M* (±*SD*)	2.5 (1.1)	2.2 (.95)	3.0 (1.1)	<.001
Bothersome emotional problems, *M* (±*SD*)	2.7 (1.2)	2.5 (1.1)	3.0 (1.2)	<.05
Physical and emotional health-related social limitations, *M* (±*SD*)	2.3 (1.3)	2.0 (1.1)	3.0 (1.5)	<.001

Note. For the functional impairment measures, a 5-point rating scale was used, with a score of "5" indicating the most severe impairment. Pain-related activity interference=SF-36 pain interference item; physical and emotional health-related activity restriction=daily activities COOP chart; bothersome emotional problems=feelings COOP chart; and physical and emotional health-related social limitations=social activities COOP chart.

Table 2

Correlations, Means, and Standard Deviations for Variables Used in Logistic Regression Analyses

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Moderate-to-severe pain (vs. no-to-mild pain)		--									
2. Age/10	.14*	--									
3. Female gender (vs. Male gender)	.14*	.16*	--								
4. Previously or currently married (vs. Never married)	.20**	.25**	.27**	--							
5. Supervised/supported housing (vs. Independent living)	−.21**	−.07	−.29**	−.21**	--						
6. Affective disorders (vs. Schizophrenia spectrum)	.18*	−.07	.27**	.27**	−.28**	--					
7. Arthritis diagnosis (vs. No arthritis diagnosis)	.29**	.08	.36**	.31**	−.19**	.26**	--				
8. Pain-related activity interference	.48**	.00	.23**	.18*	−.21**	.28**	.32**	--			
9. Physical and emotional health-related activity restriction	.34**	−.04	.14*	.23**	−.27**	.21**	.21**	.48**	--		
10. Bothersome emotional problems	.18**	−.09	.03	.31**	−.25**	.26**	.12	.32**	.53**	--	
11. Physical and emotional health-related social limitations	.36**	−.16*	.07	.22**	−.19	.12	.12	.39**	.54**	.54**	--
Mean	.35	6.01	.56	.63	.49	.73	.42	2.49	2.49	2.71	2.33
Standard Deviation	.48	.80	.50	.48	.50	.44	.50	1.29	1.07	1.18	1.30

* $p < .05$

** $p < .01$

Table 3

Univariable Logistic Regression Analyses of Sociodemographic Characteristics, Health Conditions, and Functional Impairment by Pain Severity Outcome

	Moderate-to-Severe Pain OR (95% CI)
No-to-Mild Pain	**Referent**
Age/10	1.46 (0.99–2.16)
Female gender (vs. Male gender)	1.87 (0.98–3.56)
Previously or currently married (vs. Never married)	2.66 * (1.32–5.38)
Supervised/supported housing (vs. Independent living)	0.42 * (0.22–0.79)
Affective disorders (vs. Schizophrenia spectrum disorders)	2.21 * (1.17–4.17)
Arthritis diagnosis (vs. No arthritis diagnosis)	3.49 * (1.82–6.70)
Pain-related activity interference	3.18 * (2.15–4.71)
Physical and emotional health-related activity restriction	2.21 * (1.53–3.18)
Bothersome emotional problems	1.48 * (1.07–2.04)
Physical and emotional health-related social limitations	2.25 * (1.59–3.17)

Note.

* indicates p value < .05. Affective disorders=diagnosis of bipolar disorder or major depressive disorder. Pain-related activity interference=SF-36 pain interference item; physical and emotional health-related activity restriction=daily activities COOP chart; bothersome emotional problems=feelings COOP chart; and physical and emotional health-related social limitations=social activities COOP chart. OR=Odds Ratio; CI=Confidence Interval.

Table 4

Multivariable Logistic Regression Analysis of Sociodemographic Characteristics, Health Conditions, and Functional Impairment by Pain Severity Outcome

	Moderate-to-Severe Pain OR (95% CI)
No-to-Mild Pain	**Referent**
Age/10	1.89 * (1.10–3.25)
Female gender (vs. Male gender)	0.61 (0.25–1.53)
Previously or currently married (vs. Never married)	1.25 (0.46–3.38)
Supervised/supported housing (vs. Independent living)	0.61 (0.26–1.43)
Affective disorders (vs. Schizophrenia spectrum disorders)	1.39 (0.57–3.41)
Arthritis diagnosis (vs. No arthritis diagnosis)	2.03 (0.86–4.79)
Pain-related activity interference	2.63 * (1.64–4.22)
Physical and emotional health-related activity restriction	1.24 (0.73–2.11)
Bothersome emotional problems	0.62 (0.36–1.07)
Physical and emotional health-related social limitations	2.10 * (1.29–3.42)

Note.

* indicates p value <.05. Affective disorders=diagnosis of bipolar disorder or major depressive disorder. Pain-related activity interference=SF-36 pain interference item; physical and emotional health-related activity restriction=daily activities COOP chart; bothersome emotional problems=feelings COOP chart; and physical and emotional health-related social limitations=social activities COOP chart. OR=Odds Ratio; CI=Confidence Interval.

Table 5

Hierarchical Multivariable Logistic Regression Analysis of Sociodemographic Characteristics, Health Conditions, and Functional Impairment by Pain Severity Outcome

		At Entry into Model	Final Model
	R^2	Moderate-to-Severe Pain OR (95% CI)	Moderate-to-Severe Pain OR (95% CI)
No-to-Mild Pain		**Referent**	
Step 1	.045*		
Age/10		1.39 (0.93–2.06)	1.96* (1.13–3.39)
Female gender (vs. Male gender)		1.65 (0.86–3.19)	0.61 (0.25–1.53)
Step 2	.110*		
Age/10		1.28 (0.85–1.94)	----------
Female gender (vs. Male gender)		1.19 (0.58–2.41)	----------
Previously or currently married (vs. Never married)		1.93 (0.91–4.11)	1.33 (0.50–3.50)
Supervised/supported housing (vs. Independent living)		0.48 (0.24–0.96)	0.61 (0.26–1.44)
Step 3	.176*		
Age/10		1.38 (0.89–2.14)	----------
Female gender (vs. Male gender)		0.80 (0.36–1.74)	----------
Previously or currently married (vs. Never married)		1.45 (0.66–3.23)	----------
Supervised/supported housing (vs. Independent living)		0.53 (0.26–1.08)	----------
Affective disorders (vs. Schizophrenia spectrum disorders)		1.64 (0.68–3.96)	1.35 (0.47–3.86)
Arthritis diagnosis (vs. No arthritis diagnosis)		2.71* (1.30–5.67)	2.05 (0.87–4.83)
Step 4	.435*		
Pain-related activity interference		----------	2.53* (1.58–4.05)
Physical and emotional health-related activity restriction		----------	1.24 (0.73–2.11)
Bothersome emotional problems		----------	0.63 (0.37–1.08)
Physical and emotional health-related social limitations		----------	2.14* (1.30–3.51)

Note.

* indicates p value <.05. Affective disorders=diagnosis of bipolar disorder or major depressive disorder. Pain-related activity interference=SF-36 pain interference item; physical and emotional health-related activity restriction=daily activities COOP chart; bothersome emotional problems=feelings COOP chart; and physical and emotional health-related social limitations=social activities COOP chart. OR=Odds Ratio; CI=Confidence Interval.