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Substance Use and Mental Health in Emerging Adult vs. Older Adult Men and Women with Opioid Use Disorder

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Abstract

Background and Objectives: We examined age differences across gender in clinical characteristics in emerging adult (25 years) versus older adult patients (26+ years) with opioid use disorder (OUD).

Methods: Participants (N=570; 30% female) entering a comparative effectiveness medication trial of buprenorphine versus extended-release naltrexone.

Results: Differences in clinical characteristics in emerging adult versus older participants were similar across gender. However, women 26+ years reported more mental health problems compared to women 25, while men 25 years reported more mental health problems compared to men 26+ years.

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Disclosure Statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

Discussion and Conclusion: Different strategies for emerging adult and older patients seeking OUD treatment may be necessary to address psychiatric comorbidities that differ across gender in this population.

Scientific Significance: Comprehensive psychiatric assessment should be systematically included in OUD treatment for all genders. Treatment should focus on the emerging adult developmental phase when appropriate, with psychiatric treatment tailored for women and men, separately, across the lifespan.

Keywords

Opioids; Young Adults; Gender Differences

1. Introduction

Approximately 115 people die every day in the United States due to an opioid overdose¹ with the gender gap closing on opioid overdose mortality. Between 1999 and 2017, the rate of deaths from prescription opioid overdoses increased 642% among women, compared to an increase of 439% among men. While prescription opioid misuse is widespread in young adults (18–25),² the distinct developmental age group referred to as “emerging adulthood”,³ the 26–44 year age group presents the largest increase in opioid overdose death rates.⁴ Additionally, emerging adults in buprenorphine treatment more often continue to use illicit opioids during treatment and have lower levels of buprenorphine treatment retention due to relapse or dropout compared to older adults.⁵ This pattern of opioid use maps onto the theoretically and empirically distinct developmental phase of emerging adulthood.⁶ Emerging adulthood is focused on ages 18–25 because this developmental phase denotes the period where individuals have left the dependency of adolescence yet have not typically taken on the full range of responsibilities of adulthood.³

During emerging adulthood, individuals have the highest rates of residential instability compared to other age groups and do not identify as adolescents nor entirely as adults.³ These characteristics may contribute to continued illicit opioid use during treatment and lower levels of buprenorphine treatment retention, however not all studies have found buprenorphine treatment outcomes differ between emerging and older adults.⁷ Large studies have demonstrated that emerging adults have inferior treatment retention and outcomes when compared to other age groups in multiple contexts, for example with treatment outcomes for alcohol in comparison to older adults⁸ and adolescents,⁹ as well as higher rates of drug dependence and higher psychiatric symptoms compared to older adults.¹⁰ Related to opioid use disorder, emerging adults enter treatment with more severe employment, legal, and psychiatric problems compared to older adults.⁷

Previous research has also noted that older women had the highest prevalence of long-term opioid use compared to any of the other age-gender groups.¹¹ Between 1999 and 2014, prescription opioid overdose deaths increased >1,000% among women 55–64 years of age.¹² In addition, opioid-related hospital stays for women with an opioid abuse/dependence diagnosis decreased with age, while opioid hospital stays for women with an opioid adverse event increased with age.¹³

Despite previous research examining age differences on sociodemographic and drug related variables among opioid users, several important gaps remain. First, some studies only examined age differences among women.^{8–10} Second, those studies that included both men and women did not examine gender differences.^{3–7} This study contributes to the existing work by examining age differences (i.e., emerging vs. older adults) separately for men and women across a range of sociodemographic and clinical variables. Moreover, this study also adds to the existing research by examining whether any gender differences are similar (or different) between emerging and older adults. While the opioid overdose death rate is higher for older adults,⁴ emerging adults in buprenorphine treatment appear to have unique characteristics and treatment needs.^{5,7} Therefore, the aim of the present study was to explore gender differences in baseline demographic and clinical characteristics in emerging adult versus older adult individuals with opioid use disorder (OUD).

2. Material and Methods

2.1. Participants

Participants were women ($n = 169$; 27% were ≤ 25 years of age, 73% were 26+ years) and men ($n = 401$; 16% were ≤ 25 years of age, 84% were 26+ years) with OUD enrolled in the National Drug Abuse Treatment Clinical Trials Network 24-week open-label randomized comparative effectiveness trial of Extended-Release Naltrexone vs. Buprenorphine.^{14,15} Participants were seeking treatment from 8 community treatment programs across the U.S. that provided inpatient detoxification services and community follow-up.

2.2. Procedures and Measures

Prior to randomization, a 2-hour self-report baseline visit was conducted with all participants assessing demographic/psychosocial variables (marital status, living arrangement, employment, health insurance, legal, financial support, family and friends using heroin), substance use, prior treatment history, motivation for medications for OUD, mental health and psychiatric history (anxiety and panic disorders, attention-deficit/hyperactivity disorder, bipolar disorder, major depressive disorder), and chronic medical problems.^{14,15} In the present study, a selection of essential patient characteristics from baseline assessments were selected that were relevant to our study aims of assessing age differences by gender. All sites obtained Institutional Review Board approval and all participants provided informed consent prior to taking the baseline assessment.

2.3. Data Analysis

We present focused results for age and gender differences for demographic, medical, psychiatric, drug use, treatment history, quality of life and current health status measures. Descriptive analyses were conducted for measures of interest using the total randomized sample, stratified by gender and age groups. Data are presented as means and standard deviations for continuous measures and percentages for categorical measures. Logistic regression models were used to test differences between emerging adults vs. older adults (≤ 25 years vs. 26+ years) by gender (women vs. men) for each baseline measure, and for each baseline measure, gender comparison Wald χ^2 tests were reported. All hypothesis tests

were two-sided with a significance level of 5%. As this was an exploratory analysis, corrections for multiple comparisons were not utilized.

3. Results

Table 1 presents gender differences in baseline demographic and clinical characteristics for participants 25 years of age (emerging adults) vs. 26+ years (older adults), by gender. The median and interquartile range (IQR) of ages across groups are as follows: emerging adult women=23 years (IQR=[23, 25]), emerging adult men=23 (IQR=[22, 24]), older women=34 (IQR=[29, 39]), older men=34 (IQR=[29, 43]).

Shared Age Differences by Gender

Results indicate that for both women and men, emerging adults were significantly more likely to have never been married (25 vs. 26+; women: 93.3% vs. 50.8%, $p<.001$; men: 89.4% vs. 63.3% $p<.001$), had the majority of substances supplied by someone else (25 vs 26+; women: 80.0% vs. 54.0%, $p=.003$; men: 65.2% vs. 40.0% $p<.001$), and to live with family or friends (25 vs 26+; women: 24.4% vs. 37.9% with partner, 2.2% vs. 12.1% with children alone, 37.8% vs. 32.3% with family, 15.6% vs. 4.0% with friends, 17.8% vs. 7.3% alone, $p=.015$; men: 7.6% vs. 33.1% with partner, 0% vs. 0.9% with children alone, 57.6% vs. 31.9% with family, 10.6% vs. 9.3% with friends, 13.6% vs. 14.6% alone, $p=.002$) compared to older adults.

For both men and women, differences across age were also found for number of family and friends that use heroin (25 vs 26+; women: 26.7% vs. 37.4% had 0 family/friends, 40.0% vs. 21.1% had 1–2, and 33.3% vs. 41.5% had >2 , $p=.051$; men: 28.8% vs. 42.9% had 0, 18.2% vs. 21.8% had 1–2, and 53.3% vs. 35.3% had >2 , $p=.026$), although the difference was only marginally significant for women.

Non-shared Age Differences by Gender

Women participants 26+ years were more likely to report a successful previous opioid treatment (43.5% vs. 26.7%, $p=.049$) compared to emerging adult women. This variable did not differ across age groups for men.

Men 26+ years had higher rates of alcohol consumption (48.4% vs. 34.8%, $p=.046$), and chronic medical problems (28.4% vs. 13.6%, $p=.015$) compared to emerging adult men. Emerging adult men were more likely to have health insurance (81.8% vs. 68.1%, $p=.028$), be on probation (25.8% vs. 10.7%, $p=.010$), be a current smoker (97% vs. 82.4%, $p=.009$), and use cannabis (66.7% vs. 42.1% $p<.001$) compared to men 26+ years. Emerging adult men also reported greater positive feelings from opioids in the past month ($M=91.2$ ($SD=15.3$) vs. $M=85.2$ ($SD=21.7$), $p=.041$; range=0–100) and were more likely to endorse a preference for buprenorphine (47.0% vs. 32.5%, $p=.026$) compared to men 26+ years. Age groups did not differ in the above variables for women.

For psychiatric comorbidities, emerging-adult men were more likely to have anxiety (50.0% vs. 36.7%, $p=.045$), major depression (39.4% vs. 26.9%, $p=.042$), and report more poor mental health days in the last 30 days ($M=13.8$ days ($SD=10.9$) vs. $M=10.4$ ($SD=10.7$),

$p=.022$) compared to older men. Women 26+ years were more likely to have major depression (41.9% vs. 24.4%; $p=.040$) compared to emerging adult women.

4. Discussion

We sought to test differences across gender and age in baseline demographic, substance use, and mental health characteristics in emerging-adult vs. older patients with OUD participating in a comparative effectiveness medication trial of buprenorphine versus extended-release naltrexone. We found that age groups differed mostly on opioid-related variables, where older participants (26+ years) used other (non-heroin) opioids, had longer duration of opioid use, and were more likely to have been treated with methadone in the past compared to emerging adult participants (< 25 years). These differences were seen across women and men and are clinically expected in the older participants. Emerging adults were more likely to not be married, to live with family or friends, and have the majority of substances supplied by someone else, mapping on to emerging adult developmental theory.^{3,6}

While older men were more likely to use alcohol in the past 30 days, emerging adult men were more likely to report using cannabis. Recent research with young adults demonstrated that treatment retention, initiation, and engagement was similar across young adults who primarily used opioids compared to those whose primary use was marijuana or alcohol, but decrease in opioid use was not sustained at the same level when compared with decreases among the marijuana or alcohol groups.¹⁶ As not all OUD medication treatment programs screen for alcohol or cannabis use, co-occurring substance use is more difficult to identify and address. Yet, identifying and addressing such co-occurring use is imperative for treatment success because treatment engagement and adherence may be influenced by these other factors. Additional research is needed to fully examine these co-occurring issues, especially given the variability in cannabis laws across states.

Emerging adult men also had a stronger preference for buprenorphine compared to older men. This is consistent with research demonstrating low-barrier buprenorphine treatment as an effective and acceptable treatment for emerging adults,⁷ however a comparison of rates of relapse between emerging and older adults is needed in the current trial in order to assess potential implications of preference. Preference for buprenorphine in emerging adult men may also indicate a need for better education on the availability of buprenorphine, better research on patient understanding of treatment options or perceptions of different medications for OUD, as well as research on provider perception of patient characteristics suited to medications for OUD (e.g., providers may be less likely to prescribe buprenorphine to older patients or patients who have previous treatment episodes or have other concerns or preferences).

Of note is that emerging adult men had more poor mental health days and anxiety and depression compared with older men whereas older women were more likely to have major depression compared to younger women. While psychiatric co-morbidity is typically high among this population compared to the general population, especially among women, younger men may be more vulnerable to using opioids to cope with negative psychiatric

symptoms at greater rates. Previous research with emerging adults with OUD has demonstrated that emerging adults enter treatment with more severe psychiatric problems compared to older adults, but they also demonstrate significant improvements in psychiatric and psychosocial (employment and legal) functioning during buprenorphine treatment.⁷ This developmental phase of emerging adulthood is a critical period where substance use and mental health issue onset and exacerbation may occur.⁶ As this population ages, we may see increased overall psychological comorbidities. Health policies and treatment guidelines should include comprehensive psychiatric assessment and treatment systematically included in OUD treatment across genders. A focus on the emerging adult developmental phase and how it may impact substance use and mental health may prove helpful in OUD treatment engagement and ongoing care, particularly in specialized clinics that see emerging adult patients. The Institute of Medicine and the National Research Council recommend the following policies related to emerging adults: coordinated policies and programs for emerging adults, a focus on the specific developmental needs of this population, and growth in the evidence base on interventions, policies, programs, and services that are effective for young adults.¹⁷ In addition, gender-specific interventions for OUD should be considered. For women, comprehensive treatment of OUD with co-occurring depression, anxiety, post-traumatic stress disorder, and suicide prevention efforts is critical, and this may need to be tailored for emerging and older adult phases. This paper extends findings and recommendations to consider treatment recommendations that take into account both gender and age.

Our results can only be generalized to treatment seeking women and men with access to inpatient facilities. Moreover, since the number of racial/ethnic minorities in this sample was low, the applicability of these findings to specific racial/ethnic minority groups remains an unanswered question. Nevertheless, the current clinical trial is one of the largest randomized controlled trials comparing buprenorphine and extended-release naltrexone and is geographically diverse.

In order to successfully treat patients with OUD, including enhancing adherence to medication and retention in care, gender- and age-specific issues must be addressed by providers. Our findings have the potential to influence treatment and improve treatment success for women and men across the lifespan.

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Table 1.

Gender differences in baseline demographic and clinical characteristics in 25 years of age vs. 26+ years in patients with opioid use disorder (N=570)

	Women (n=169)			Men (n=401)		
	25 (n=45)	26+ (n=124)	Difference among Women	25 (n=66)	26+ (n=335)	Difference among Men
Measures	Mean (SD) or n (%)	Mean (SD) or n (%)	$\chi^2(df)$, p-value	Mean (SD) or n (%)	Mean (SD) or n (%)	$\chi^2(df)$, p-value
Demographics/ Psychosocial						
Never Married (% yes)	42 (93.3%)	63 (50.8%)	$\chi^2(1)=16.98$, $p<.001$	59 (89.4%)	212 (63.3%)	$\chi^2(1)=14.44$, $p<.001$
Living Arrangement			$\chi^2(5)=14.09$, $p=0.015$			$\chi^2(5)=18.40$, $p=0.002$
With Sex Partner	11 (24.4%)	47 (37.9%)		5 (7.6%)	111 (33.1%)	
Children Alone	1 (2.2%)	15 (12.1%)		0 (0%)	3 (0.9%)	
With Family	17 (37.8%)	40 (32.3%)		38 (57.6%)	107 (31.9%)	
With Friends	7 (15.6%)	5 (4.0%)		7 (10.6%)	31 (9.3%)	
Alone	8 (17.8%)	9 (7.3%)		9 (13.6%)	49 (14.6%)	
Other	1 (2.2%)	8 (6.5%)		7 (10.6%)	34 (10.1%)	
Employment			$\chi^2(1)=0.17$, $p=0.681$			$\chi^2(1)=0.03$, $p=0.863$
Working Now/Temp Leave	10 (22.2%)	24 (19.4%)		19 (28.8%)	100 (29.9%)	
Other	35 (77.8%)	100 (80.6%)		47 (71.2%)	235 (70.1%)	
Health Insurance (% yes)	35 (77.8%)	97 (78.2%)	$\chi^2(1)<0.01$, $p=0.950$	54 (81.8%)	228 (68.1%)	$\chi^2(1)=4.83$, $p=0.028$
Current Parole/Probation			$\chi^2(2)=0.23$, $p=0.892$			$\chi^2(2)=9.17$, $p=0.010$
None	37 (82.2%)	107 (86.3%)		49 (74.2%)	284 (84.8%)	
Yes, Parole	1 (2.2%)	0 (0%)		0 (0%)	15 (4.5%)	
Yes, Probation	7 (15.6%)	16 (12.9%)		17 (25.8%)	36 (10.7%)	
Majority Support from Someone else (% yes)	36 (80.0%)	67 (54.0%)	$\chi^2(1)=8.75$, $p=0.003$	43 (65.2%)	134 (40.0%)	$\chi^2(1)=13.30$, $p<.001$
Fam/Friends use Heroin			$\chi^2(2)=5.93$, $p=0.051$			$\chi^2(2)=7.32$, $p=0.026$
0	12 (26.7%)	46 (37.4%)		19 (28.8%)	142 (42.9%)	
1–2	18 (40.0%)	26 (21.1%)		12 (18.2%)	72 (21.8%)	
>2	15 (33.3%)	51 (41.5%)		35 (53.0%)	117 (35.3%)	
Substance Use						
Current Tobacco Use			$\chi^2(1)=1.50$, $p=0.220$			$\chi^2(1)=6.90$, $p=0.009$
No Tobacco Use	3 (6.7%)	17 (13.7%)		2 (3.0%)	59 (17.6%)	
Tobacco Use	42 (93.3%)	107 (86.3%)		64 (97.0%)	276 (82.4%)	

	Women (n=169)			Men (n=401)		
	25 (n=45)	26+ (n=124)	Difference among Women	25 (n=66)	26+ (n=335)	Difference among Men
Measures	Mean (SD) or n (%)	Mean (SD) or n (%)	$\chi^2(df, p\text{-value})$	Mean (SD) or n (%)	Mean (SD) or n (%)	$\chi^2(df, p\text{-value})$
Age of Onset (Any opioid)	17.3 (2.7)	22.6 (7.2)	$\chi^2(1)=16.73, p<.001$	17.0 (2.8)	22.3 (7.6)	$\chi^2(1)=27.29, p<.001$
Duration of Opioid Use	6.1 (2.8)	13.1 (8.9)	$\chi^2(1)=20.71, p<.001$	6.0 (2.4)	14.5 (9.4)	$\chi^2(1)=42.47, p<.001$
<i>Days of Use (30d) TLFB</i>						
Heroin	26.6 (6.6)	24.5 (8.8)	$\chi^2(1)=1.63, p=0.202$	25.1 (8.0)	25.0 (7.4)	$\chi^2(1)<0.01, p=0.987$
Other Opiates	11.6 (10.5)	17.5 (11.9)	$\chi^2(1)=3.86, p=0.049$	7.7 (9.9)	13.0 (11.3)	$\chi^2(1)=4.60, p=0.032$
Cannabis (% yes)	23 (51.1%)	45 (36.3%)	$\chi^2(1)=2.98, p=0.084$	44 (66.7%)	141 (42.1%)	$\chi^2(1)=12.74, p<.001$
Alcohol (% yes)	18 (40.0%)	47 (37.9%)	$\chi^2(1)=0.06, p=0.804$	23 (34.8%)	162 (48.4%)	$\chi^2(1)=3.99, p=0.046$
How much you liked feeling from opiate in the past month (0–100)	90.6 (16.6)	89.2 (20.4)	$\chi^2(1)=0.18, p=0.671$	91.2 (15.3)	85.2 (21.7)	$\chi^2(1)=4.16, p=0.041$
Prior Treatment History						
<i>Opiate Treatment History</i>						
Buprenorphine (% yes)	16 (35.6%)	45 (36.3%)	$\chi^2(1)=0.01, p=0.930$	29 (43.9%)	135 (40.3%)	$\chi^2(1)=0.30, p=0.583$
Methadone (% yes)	8 (17.8%)	54 (43.5%)	$\chi^2(1)=8.75, p=0.003$	6 (9.1%)	113 (33.7%)	$\chi^2(1)=13.46, p<.001$
Oral Naltrexone (% yes)	4 (8.9%)	3 (2.4%)	$\chi^2(1)=3.04, p=0.081$	6 (9.1%)	12 (3.6%)	$\chi^2(1)=3.63, p=0.057$
Injectable Naltrexone (% yes)	0 (0%)	4 (3.2%)	$\chi^2(1)<0.01, p=0.952$	6 (9.1%)	16 (4.8%)	$\chi^2(1)=1.91, p=0.167$
Any Past Tx Successful (% yes)	12 (26.7%)	54 (43.5%)	$\chi^2(1)=3.86, p=0.049$	23 (34.8%)	135 (40.3%)	$\chi^2(1)=0.68, p=0.408$
Motivation for Medications						
Prefer Buprenorphine			$\chi^2(1)=0.16, p=0.688$			$\chi^2(1)=4.96, p=0.026$
Disagree/Neutral	33 (73.3%)	87 (70.2%)		35 (53.0%)	226 (67.5%)	
Agree/Strongly Agree	12 (26.7%)	37 (29.8%)		31 (47.0%)	109 (32.5%)	
Prefer Naltrexone			$\chi^2(1)=2.84, p=0.092$			$\chi^2(1)=0.13, p=0.716$
Disagree/Neutral	29 (64.4%)	96 (77.4%)		47 (71.2%)	231 (69%)	
Agree/Strongly Agree	16 (35.6%)	28 (22.6%)		19 (28.8%)	104 (31%)	
Mental Health						
# days MH not good (30 days)	14.6 (11.9)	13.5 (11.3)	$\chi^2(1)=0.32, p=0.571$	13.8 (10.9)	10.4 (10.7)	$\chi^2(1)=5.27, p=0.022$
<i>Psychiatric History</i>						
Anxiety/Panic (% yes)	23 (51.1%)	78 (62.9%)	$\chi^2(1)=1.89, p=0.169$	33 (50%)	123 (36.7%)	$\chi^2(1)=4.03, p=0.045$

	Women (n=169)			Men (n=401)		
	25 (n=45)	26+ (n=124)	Difference among Women	25 (n=66)	26+ (n=335)	Difference among Men
Measures	Mean (SD) or n (%)	Mean (SD) or n (%)	$\chi^2(df)$, p-value	Mean (SD) or n (%)	Mean (SD) or n (%)	$\chi^2(df)$, p-value
ADHD (% yes)	8 (17.8%)	26 (21%)	$\chi^2(1)=0.21$, p=0.648	13 (19.7%)	53 (15.8%)	$\chi^2(1)=0.60$, p=0.439
Bipolar (% yes)	7 (15.6%)	27 (21.8%)	$\chi^2(1)=0.79$, p=0.375	6 (9.1%)	39 (11.6%)	$\chi^2(1)=0.36$, p=0.550
Major Depression (% yes)	11 (24.4%)	52 (41.9%)	$\chi^2(1)=4.20$, p=0.040	26 (39.4%)	90 (26.9%)	$\chi^2(1)=4.14$, p=0.042
Physical Health/QoL						
Chronic Medical Problems (% yes)	9 (20.0%)	42 (33.9%)	$\chi^2(1)=2.94$, p=0.086	9 (13.6%)	95 (28.4%)	$\chi^2(1)=5.89$, p=0.015

Note. Statistically significant differences (p<.05) are bolded