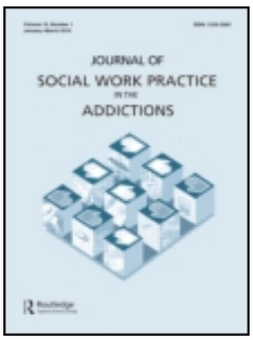

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ARTICLES

Characteristics and Outcomes of College-Age Adults Enrolled in Private Residential Treatment: Implications for Practice

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Substance use among college-age adults is of interest due to high levels of use and low levels of treatment access and engagement relative to other adults. Data collected from 1,972 clients in residential services were analyzed to investigate differences in use patterns, treatment outcomes, and other life area problems. Participants completed an Addiction Severity Index (ASI) and the University of Rhode Island Change Assessment (URICA) at baseline, and an ASI and Treatment Services Review at 1-month and 6-month postdischarge interviews. Almost a quarter (24.1%) of participants were college age (18–25 years old). They were more likely to be White and male, and less likely to complete treatment although they had a longer average length of stay. College-age adults improved on all outcome measures, and posttreatment service use shows significant difference between college-age and older participants. Implications for practice are discussed.

KEYWORDS college age, residential, substance abuse treatment, treatment outcomes, young adult

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College age adults (18–25 years old) have the highest rate of substance abuse of any age group. As young adults make the transition from adolescence to adulthood, parental and other protective influences weaken and a new level of social freedom, and responsibility, is experienced. Developmental theory suggests that younger adults have less social control and exercise higher levels of impulsivity. Thus the young adult years are defined not only by age, but also by increased risky behavior and increased social responsibilities. Living outside the parent's home, for example, has been shown to be associated with higher likelihood of marijuana and alcohol use (Gfroerer, Penne, Pemberton, & Folsom, 2003) and college students who live on campus are five times more likely to initiate marijuana use than students who live off campus (Suerken et al., 2014).

The median age of onset for substance abuse disorders in the United States is 20 years of age (Kessler et al., 2005). The rate of substance dependence or abuse among adults aged 18 to 25 (18.6%) was higher than that among youths aged 12 to 17 (6.9%) or among adults aged 26 or older (6.3%; Substance Abuse and Mental Health Services Administration [SAMHSA], 2012a). Alcohol use prevalence and episodes of heavy drinking are highest among college-age adults (Smith, Cleeland, & Dennis, 2010). In 2011, 22% of full-time college students were estimated to be current illicit drug users, similar to the rate of illicit drug use for all 18- to 22-year-olds nationally (23.4%). The rate was highest among males at 25.8% (SAMHSA, 2012a, 2012b). The 2011 rate of current marijuana use among young adults (18–25 year olds, 19%) has risen steadily and significantly from the 2006 reports (16.3%; SAMHSA, 2012a, 2012b). Initiation of cannabis use in college freshman is associated with several factors, including disposable income, other illicit substance use, living on campus and tobacco and alcohol use (Suerken et al., 2014). Cannabis is used primarily to support social functioning and interactions among college students (Beck et al., 2009). A large proportion of young adults who use cannabis do not meet *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [*DSM–IV*]; American Psychiatric Association, 2000) criteria for abuse or dependence (Degenhardt, Lynskey, Coffey, & Patton, 2002); however, significant cannabis-related problem behaviors (e.g., driving while impaired and difficulty concentrating) were identified in college students across both groups meeting and not meeting *DSM–IV* criteria (Caldeira, Arria, O'Grady, Vincent, & Wish, 2008).

Individuals with substance disorders experience mental health disorders at high rates (Compton, Thomas, Stinson, & Grant, 2007; Kessler et al., 1996). Cooccurring mental health disorders are potentially a more significant factor for college-age individuals in treatment than their older peers. Of individuals who will experience a mental health disorder during their lifetime, 75% will be diagnosed by age 24 (Park, Mulye, Adams, Brindis, & Irwin, 2006). Young adults also have triple the suicide rate of their adolescent (12–17-year-old)

counterparts (Park et al., 2006). Nearly half of all college students and their noncollege peers are estimated to have had a psychiatric disorder in the prior year (Blanco et al., 2008).

Despite high prevalence rates, college students are less likely to recognize the need for treatment or to seek help (Caldeira et al., 2009). Young adults are less likely to be self-motivated to enter treatment for substance abuse problems (Goodman, Peterson-Badali, & Henderson, 2001) and more likely to enter treatment as a result of external factors. In a study of young adult opiate users attending private residential treatment, the authors found the motivating factor to enter treatment was often related to intervention from a formal agency, such as law enforcement (Morse & MacMaster, 2013). Similarly, Smith et al. (2010) found that college-age adults (18–25-year-olds) are more likely to stop substance abuse behaviors as a result of external factors, such as "being in trouble," rather than as a result of damaged or diminished interpersonal relationships.

Peer groups are strong influences on young adults. Social networks can have positive or negative influences on young adult substance use patterns; however, it is more common to be influenced to drink more than it is to drink less (Astudillo, Connor, Roiblatt, Ibanger, & Gmel, 2013). Studies suggest that positive peer support is a key factor in maintaining sobriety (Caldeira et al., 2009). Delucchi, Matzger, and Weisner (2008) found that failure to attend Alcoholics Anonymous (AA) was a factor associated with greater consumption as well as binge drinking. Combining treatment with AA meeting attendance was associated with positive outcomes in college-age and young adults (Bennett, McCrady, Keller, & Paulus 1996; Kelly, Stout, & Slaymaker, 2013). Recent evidence suggests that the link between peer group and individual substance use patterns extends to online relationships (Cook, Bauermeister, Gordon-Messer, & Zimmerman, 2013).

Nearly half (46.6%) of all substance abuse treatment admissions of 18- to 24-year-olds were for alcohol use and the rate of treatment admission for alcohol use is higher for college students than for noncollege students (46.6% vs. 30.6%; SAMHSA, 2012b). Literature suggests that young adults present differently from older adults at treatment intake (Urbanski, Kelly, Hoeppner, & Slaymaker, 2012) and might require a contextually different treatment model to support the distinct developmental issues and influences they are experiencing (Arnett, 2000; Kypri, McCarthy, Coe, & Brown, 2004; Smith, Godley, Godley, & Dennis, 2011). Younger adults and college students also respond differently to substance use treatment programming when compared to older adults. Young adults are less likely to enter treatment, and those who do are likely enter treatment as a result of external factors. However, as one ages, higher levels of internal motivation, greater lengths of stay, and higher rates of posttreatment abstinence are reported (Satre, Mertens, Arean, & Weisner, 2003). Additionally, technologically based interventions are promising avenues to improve motivation and readiness to

change (Mason, Benotsch, Way, Kim, & Snipes, 2013), as well as substance abuse treatment outcomes for younger adults (Doumas, McKinley, & Book, 2009; Walters, Miller, & Chiauzzi, 2005).

Although the current literature provides knowledge about out-of-treatment populations of college-age substance users, there is limited research on the outcomes of college-age participants in substance abuse treatment, particularly as it relates to individuals in private residential treatment. Therefore, this study seeks to describe possible differences between college-age participants (18–25 years of age) and non-college-age participants in residential substance abuse and mental health treatment. This study addresses eight research questions. Specifically, are there differences between college-age and non-college-age participants in regard to (a) demographic and other personal characteristics; (b) levels of treatment motivation, completion, and engagement; (c) levels of retention in treatment; (d) levels of treatment satisfaction; (e) improvements in substance use outcomes; (f) improvements in mental health outcomes; (g) improvements in other psychosocial outcomes; and (h) rates of engagement with other posttreatment services? A community-based institutional review board approved the study protocol to assure the protection of human subjects.

METHOD

Setting

Data were collected at three residential facilities that provide integrated substance abuse and mental health treatment services in Memphis, Tennessee, Malibu, California, and Palm Springs, California. Foundations Recovery Network (FRN), a private for-profit substance abuse treatment provider offering residential and outpatient substance abuse treatment services to individuals nationwide owns and operates all three programs. Treatment recipients at all three facilities are drawn from across the United States and Canada. Admission criteria for residential-level services for the three centers are based on medical necessity determined by insurance or other third-party payers and are inclusive of substance use history and use patterns, psychiatric symptoms, and previous treatment experience, and take into account medical conditions, and the social and legal consequences of use.

Services are individualized and based on an integrated model of mental health and substance abuse services consisting of both individual and group-based interventions. Clinical staff members are routinely trained in applying integrated service techniques including motivational interviewing, readiness to change, and interventions specific to individuals with cooccurring disorders. Social support intervention included family education and participant engagement in 12-step recovery meetings. Cognitive behavioral therapy and motivational interviewing techniques were applied in all group, family, and

individual counseling. Model fidelity is assessed annually using the Dual Diagnosis Capability in Addiction Treatment (DDCAT) Toolkit (SAMHSA, 2011). All program participants are treated with individualized services tailored to their specific medical and social needs. Services typically consist of short-term medically managed detoxification followed by approximately a month of residential treatment and then recommendations for outpatient services. Master's-level clinicians complete the initial clinical assessment within the first 4 days following admission to FRN's residential programs.

Participants

All program participants who enter residential services are offered an opportunity to participate in the ongoing study during the initial phase of treatment. A trained intake person located at each facility describes the evaluation, reviews and obtains informed consent, and collects the locator information for postdischarge interviews.

Data for this study are drawn from the baseline, 30-day, and 6-month interviews. The participants were 1,972 individuals who voluntarily sought residential treatment at one of the three treatment centers. All participants received an intake assessment by a multidisciplinary team, which provides the basis for an individual treatment plan to address substance use, psychiatric disorder, and medical and social service needs—at this time the baseline evaluation data were collected for those individuals who were willing to consent to participating in the evaluation process. Retention was measured through a review of discharge records, which are also included in the evaluation database.

Design

The study is based on a multisite, retrospective, naturally occurring quasi-experimental design. Analyses were made to measure differences between individuals 18 to 25 years of age at baseline with a comparison group of individuals older than 25 years of age at baseline (individuals who were age 26–78). Comparisons were made at baseline and follow-up measures taken at 30 days (1 month) and 6 months postdischarge.

Instruments

At baseline, participants completed interviews that included three scales; the Addiction Severity Index (ASI), the Treatment Service Review (TSR), and the University of Rhode Island Change Assessment (URICA). A satisfaction measure was completed at program discharge. At the 1- and 6-month follow-up interviews, participants completed the ASI and the TSR.

Addiction severity

The scalable questions that make up the composite scores of the ASI were used to measure addiction severity. The ASI was developed to measure problem severity in each of seven areas: alcohol use, drug use, medical health, psychiatric health, employment/self-support, family relations, and illegal activity (McLellan, 2006). To ensure that each question within a given problem area is given the same weight in calculation of the composite score, each item in a subscale is divided by its maximum value and by the total number of questions in a composite. This scoring yields a score from 0 to 1 in each composite measure (McGahan, 1986).

Readiness for change

The URICA is a measure of readiness to change that has been studied with a range of different populations. The instrument consists of 32 statements that subjects endorse on a 5-point Likert-type scale from strongly agree to strongly disagree. The URICA yields scores on each of four scales—Precontemplation, Contemplation, Action, and Maintenance (Allen, 2003)—that approximate four of the five stages of change described by Prochaska, DiClemente, and Norcross (1992). Additionally, the scores from these subscales are used to calculate a Readiness to Change composite score. The Readiness to Change score was derived for this study in the same manner used in Project MATCH (Project MATCH Research Group, 1997, 1998). Taking the sum of the average of the Contemplation, Action, and Maintenance scores and subtracting the average of the Precontemplation score from the subtotal determined the calculation of the score.

Treatment Service Review

Items measuring the types and frequencies of service use were drawn from the TSR. The TSR was used in concert with the ASI to evaluate service usage during and after substance abuse treatment and covers a host of professional and peer support services (McLellan, 1992). Participants recorded their service usage in all follow-up interviews related to informal support group meetings, as well as professional medical, substance use, and mental health services.

Satisfaction

The satisfaction scale used in the study was developed by FRN to collect data on all aspects of the participants' perceptions of the treatment experience. The 36-item scale was developed through an extensive process that combined items from existing instruments, accreditation standards, and participant feedback. Items tapping satisfaction with clinical services

were initially based on a review of items found in the Client Satisfaction Questionnaire (CSQ–18; Attkisson, 1982). Items on satisfaction related to facilities and support services were added to correspond to the areas identified by the Commission on Accreditation of Rehabilitation Facilities accreditation standards. Additional items were included through extensive formal and informal feedback from patients and staff that identified areas of possible satisfaction not covered by the initial piloted instrument. Individuals record their satisfaction on a 5-point scale from *poor* to *excellent*.

Sample

Data were available for nearly 2,000 individuals (1,972) who entered treatment during a 2.5-year period of time between January 2008 and June 2010. All participants had received residential services; average length of stay was 32 days ($SD = 19.5$). Participants were predominately male (59.3%), White (89.0%), and drawn from nearly every state and Canadian territory. All participants were adults ranging in age from 18 to 78 years of age; average age was 37.04 ($SD = 12.3$).

At the time that data were analyzed, 1,495 (75.8%) individuals had provided follow-up data. Individuals who did not participate in the follow up were not included in further analyses. Their data were similar to the study population on all measures, with the exceptions of the following statistically significant differences. Individuals who did not participate in the follow-up reported fewer average days of alcohol use in the last 30 days (10.6 vs. 12.4 days), more average days of other sedative use (5.1 vs. 3.8 days), and more average days of other opiate use (6.8 vs. 5.5 days) at baseline. Individuals who did not follow up also had lower average ASI alcohol composite scores and higher average ASI drug composite scores at baseline. Among individuals who did not follow up there were higher proportions of men (42% vs. 36%), opiate users (45% vs. 38%), and heroin users (15% vs. 11%). Although there was no statistically significant difference in the number of days of treatment completed, individuals who did not follow up completed 3 weeks of treatment at a lower rate (74% vs. 83%).

RESULTS

Demographic and Personal Characteristics at Baseline

Approximately a quarter (24.1%), of all program participants were college age (i.e., 25 years old or younger). These individuals were more likely to be White (94.4% vs. 87.4%) and male (61.9% vs. 58.3%) than other program participants (see Table 1). Statistically fewer college-age participants reported being employed (43.1% vs. 54.8%). The percentage of college-age participants (43.1%) who were working at entry into treatment was substantially

TABLE 1 Baseline Demographics and Substance Use

	College Age	Noncollege Age	
Age in years			$t = 11.8, p \leq .000$
M	21.4	41.9	
SD	2.2	9.8	
Gender			
Females	37.9%	41.8%	
Males	62.1%	58.2%	*ns*
Race/ethnicity			
White	94.4%	87.4%	$p \leq .000$
African American	2.3%	9.3%	$p \leq .000$
Other	3.3%	3.3%	*ns*
Employment	43.1%	54.8%	$p \leq .000$
Number of days worked in past 30 days			$t = 6.1, p \leq .000$
M	7.8	11.3	
SD	10.1	11.5	
Received money from illegal activities in past 30 days	23.4%	5.1%	$p \leq .000$
Substance use in past 30 days			
Alcohol use (days)			$t = 10.7, p \leq .000$
M	7.6	13.4	
SD	9.6	11.8	
All drug use (days)			$t = 10.8, p \leq .000$
M	18.7	11.8	
SD	11.4	12.4	
Cocaine (days)			$t = 4.5, p \leq .671$
M	2.6	2.8	
SD	6.3	7.1	
Heroin			$t = 8.5, p \leq .000$
M	5.5	1.2	
SD	10.3	5.4	
Nonprescription methadone			$t = 0.6, p \leq .521$
M	0.9	0.8	
SD	4.5	4.3	
Other opiates			$t = 3.9, p \leq .000$
M	7.5	5.3	
SD	11.1	10.0	
Marijuana (days)			$t = 11.9, p \leq .000$
M	9.9	2.9	
SD	11.6	7.6	
Barbiturates (days)			$t = 0.7, p \leq .475$
M	0.6	0.5	
SD	3.7	3.4	
Sedatives (days)			$t = 2.3, p \leq .017$
M	4.9	3.8	
SD	8.8	8.7	
Amphetamines (days)			$t = 0.1, p \leq .995$
M	1.1	1.1	
SD	4.6	4.7	
Substance use expenditure in past 30 days	$1,379	$903	$t = 3.3, p \leq .001$

lower than the national average for similarly aged adults (50.7%; U.S. Department of Labor, 2013). College-age individuals also reported a lower number of average days working and more involvement in illegal activities for money. However, there were not statistically significant differences in legal or illegal income (however, due to the skewing of the data there were large differences in illegal income, $813 vs. $282, and legal income, $806 vs. $3,546). College-age participants were less likely to have access to an automobile, but just as likely to have a license than their older peers.

Substance Use at Baseline

In the 30 days prior to treatment, in comparison to older participants, college-age participants reported a significantly higher number of days of drug use (18.7 vs. 11.8 days), and a significantly lower number of days of alcohol use (7.5 vs. 13.3 days). They also reported more money spent on substance use, and more frequent use of marijuana, heroin, other opiates, hallucinogens, and sedatives. There were no statistical differences found in the frequency of cocaine, methadone, barbiturates, inhalants, and methamphetamine use (see Table 1).

Mental Health Status at Baseline

There were fewer differences at baseline for mental health measures than substance use measures for the two groups. As a group, college-age individuals were less likely to have experienced depression and more likely to have experienced trouble controlling violent behaviors in the 30 days prior to treatment entry. There were not any statistically significant differences in the levels of anxiety, hallucinations, thinking problems, thoughts of suicide, attempted suicide, and prescribed medication in the 30 days prior to treatment entry. There were not any differences in the level of the perception of being troubled by psychological problems or the importance of services for psychological problems.

Legal, Family, and Medical Statuses at Baseline

College-age participants had significantly more legal problems at baseline than other program participants. As a group, they were more likely to be awaiting trial or sentencing, and they reported more days involved in illegal activity. They also reported a higher level of seriousness of their legal problems, and perceived a greater importance of counseling for legal problems as part of treatment.

In terms of family issues, college-age participants were also more likely to report disturbances in their family relationships than other participants. They reported higher levels of serious family conflict, and reported that they

were more troubled by family problems. As a group, they reported higher levels of significant recent conflict with parents, siblings, other family members, close friends, and neighbors; and lower levels of conflict with children, significant others, and co-workers. However, there was not a statistically significant difference in the perceived importance of family counseling.

College-age participants were less likely to have medical problems. They reported lower levels of experiencing trouble from medical problems, and lower levels of perceived importance for counseling for medical issues.

Addiction Severity at Baseline

Comparisons of the baseline ASI composite scores found statistically significant differences between the two groups (see Table 2). There were statistically significant lower scores for college-age participants on the alcohol and medical composite scores compared to non-college-age participants. Statistically significant higher scores were found on the drug, employment, and legal composite scores for college-age participants as compared to older non-college-age participants. Statistically significant differences were not found on comparisons between family and psychiatric composite scores.

Treatment Motivation, Completion, and Engagement

Levels of treatment motivation and engagement were lower for college-age participants. Levels of readiness for change as measured by the URICA at baseline were significantly lower for college-age participants (10.6 vs. 11.0, $t = 3.52$, $p < .000$). There was also a significant difference in completion rates between college-age and non-college-age participants (87.4% vs. 91.0%, $p < .007$). However, significant differences were also found in comparisons of length of stay. College-age participants had a longer average length of stay by an average of more than 3 days (34.3 vs. 31.2 days, $t = .273$, $p < .006$).

TABLE 2 Comparisons of Mean ASI Composite Scores

	College Age			Noncollege Age		
	Baseline	1-month	6-month	Baseline	1-month	6-month
Medical[a,c]	.149[b]	.092	.094	.339[b]	.175	.194
Employment[a]	.459[b]	.515	.411	.394	.446	.384
Alcohol[a,c]	.247[b]	.075	.094	.487[b]	.088	.104
Drug[a,c]	.250[b]	.041	.052	.147[b]	.021	.022
Legal[a,c]	.191[b]	.110	.010	.084[b]	.055	.034
Family	.321[b]	.115	.139	.313[b]	.151	.133
Psychiatric	.473[b]	.281	.249	.492[b]	.276	.253

[a]Statistically significant difference between groups based on repeated measures analysis. [b]Statistically significant difference between baseline and 6 months based on bivariate analysis. [c]Statistically significant change from baseline to follow-up based on repeated measures analysis.

Service Satisfaction

Participants recorded their satisfaction on the 36 different aspects of their treatment. Younger participants recorded lower satisfaction scores than older participants on 32 of the 36 items. There were not statistically significant differences in universal measures of satisfaction. There were, however, statistically significant differences in the following 10 items with college-age participants being less satisfied than those individuals who were older on all 10 items: availability of medical staff appointments ($p < .000$), availability of psychiatric nurse practitioners ($p < .000$), availability of staff in an emergency situation ($p < .024$), availability of daily physical activities ($p < .027$), level of respect with which I was treated ($p < .002$), professionalism of the staff ($p < .003$), communication between staff and patients ($p < .044$), communication among staff ($p < .009$), usefulness of residential handbook ($p < .009$), and meals ($p < .030$).

Addiction Severity Outcomes

Comparisons between college-age and non-college-age participants at the 6-month postdischarge point in time were measured using a series of repeated measures analyses utilizing a parameter estimates table. Comparisons of the changes from baseline to follow-up between college-age and non-college-age participants were measured based on analyses using tests of within-subjects contrasts; that is, repeated measures analyses with contrast specified as simple contrast with baseline as the reference category using factor as the variable. Results are presented in Table 2. All ASI composite score measures are statistically significant for changes between baseline and the 6-month measures for both groups, with the exception of employment. As seen in Table 2, all changes are positive, with the lone exception being the baseline to 6-month measure of employment composite scores for individuals over the age of 25. Statistically significant differences existed between college-age and non-college-age participants on baseline measures of five composite scores (medical, legal, alcohol, drug, and employment). College-age participants had significantly worse scores on legal, drug, and employment measures. At 6 months, statistically significant differences were found among three composite scores (medical, drug, and legal). College-age participants again, had significantly worse scores on drug and legal scores.

Substance Use Outcomes

All substance use measures are statistically significant for changes between baseline and both the 1-month and 6-month measures for both groups for 30-day measures of use. There were no differences between the two groups on any measures of cocaine use, nonmedical methadone use, sedative use,

or amphetamine use. Differences were found in the rates of change for both alcohol use measures, and measures of marijuana, heroin, and other opiate categories, at both the 1-month and 6-month measures. College-age participants had higher rates of change for all three of the drug categories, and non-college-age participants had higher rates of change for both the alcohol measures.

Abstinence Rates

Thirty-day and 6-month abstinence rates were determined for both groups at the 6-month time period. At 6 months posttreatment, significant portions of college-age participants remained alcohol free (59.5%) and drug free (72.5%) for the prior 30 days, whereas non-college-age participants remained alcohol (75.2%) and drug free (91.5%) at higher rates for the prior 30 days. Six-month abstinence rates posttreatment were slightly lower. The majority of college-age participants had remained alcohol free (52.0%) and drug free (65.8%) since their discharge, but these rates were slightly lower than for non-college-age participants, with 68.0% remaining alcohol free and 88.7% drug free since their discharge. All differences in abstinence rates between college and non-college-age participants were statistically significant (see Table 3).

TABLE 3 Comparisons of Mean Number of Days Experiencing Substance Use and Rates of Psychological Symptoms

	College Age			Noncollege Age		
	Baseline	1-month	6-month	Baseline	1-month	6-month
Substance use						
Alcohol[a,c]	7.8[b]	1.3	2.8	14.1[b]	1.2	2.5
Alcohol to intoxication[a,c]	6.1[b]	0.6	1.5	10.1[b]	0.7	1.4
Any drug[a,c]	18.7[b]	1.1	3.2	11.0[b]	0.5	1.1
Cocaine	2.9[b]	0.1	0.1	2.6[b]	0.1	0.1
Cannabis[a,c]	9.7[b]	0.3	0.7	2.8[b]	0.1	0.1
Heroin[a,c]	5.4[b]	0.1	0.2	0.8[b]	0.1	0.1
Nonmedical methadone	0.5[b]	0.0	0.1	0.8[b]	0.1	0.1
Other opiates[a,c]	7.4[b]	0.1	0.2	4.7[b]	0.1	0.2
Sedatives	4.3[b]	0.1	0.2	3.8[b]	0.1	0.1
Amphetamines	0.9[b]	0.1	0.1	1.1[b]	0.1	0.1
Psychological symptoms						
Depression	.668[b]	.390	.326	.758[b]	.359	.345
Anxiety	.828[b]	.543	.484	.805[b]	.489	.436
Cognitive	.535[b]	.330	.308	.515[b]	.283	.245
Days experiencing symptoms	20.4[b]	11.8	9.6	21.8[b]	11.9	10.7

[a]Statistically significant difference between groups based on repeated measures analysis. [b]Statistically significant difference between baseline and 6 months based on bivariate analysis. [c]Statistically significant change from baseline to follow-up based on repeated measures analysis.

Psychological Outcomes

All psychological measures are statistically significant for changes between baseline and both the 1-month and 6-month measures for both groups. There were no differences between the two groups on any of these measures at 1-month and 6-month postdischarge measures.

Posttreatment Service Use

All participants self-reported service use within the last 30 days at both 1- and 6-month time points. There were not any statistically significant differences in the use of emergency room services or overnight hospitalizations for medical, mental health, or substance-use-related reasons at either time point. At 1 month, college-age participants reported more days of halfway house services (9.3 vs. 3.2, $p < .000$), outpatient substance abuse treatment (5.2 vs. 3.4, $p < .023$), and outpatient mental health services (5.0 vs. 3.1, $p < .026$) than non-college-age participants. At 6 months college-age participants reported more days of residential substance abuse treatment (3.9 vs. 1.8, $p < .037$), halfway house services (2.7 vs. 1.2, $p < .039$), and outpatient substance abuse treatment (12.5 vs. 9.1, $p < .023$) than non-college-age participants.

There were also not any statistically significant differences in the rates of access to, or engagement with, 12-step recovery meetings. College-age and non-college-age participants reported attending groups at about the same rates at both 1 and 6 months postdischarge; 86.0% for college-age participants and 81.7% for non-college-age participants at 1 month, and 76.0% for college-age participants and 73.4% for non-college-age participants at 6 months. There were interesting differences between the groups in measures of engagement with 12-step recovery groups at the 6-month time period. More than half of both groups reported attending meetings weekly or more frequently, although college-age participants reported statistically significant lower rates of attendance (51.1% for college age and 60.0% for non-college age) and reported lower rates of obtaining a sponsor (44.4% for college-age participants and 50.1% for non-college-age participants).

DISCUSSION

The findings from this study can be used to improve our knowledge base on the treatment of college-age individuals with substance abuse and mental health treatment needs. Based on all of the results, it is clear that positive change occurred for the entire sample on all outcome measures. The individuals who participated in the study showed significant improvements in all rates of substance use, as well as in substance abuse and mental health symptoms, and improvement in all other related life areas. These results

support the idea that abstinence-based residential treatment can be equally effective for both groups within this population. The results also demonstrate that although college-age individuals entered treatment with higher levels of impairment and lower levels of motivation, they were just as successful in treatment outcomes as their older peers, suggesting that treatment can be just as effective as a form of treatment for young adults as it is for older adults. Findings also suggest that there is more commonality observed among all program participants regardless of their age than would be expected after a review of existing literature to date. Each research question that assumed differences between the groups is addressed next.

Are There Differences in Demographic and Other Personal Characteristics?

The only significant differences observed were that younger participants were more likely to be White than their non-college-age peers and less likely to be employed. Typically younger users are assumed to be a more challenging population for substance abuse treatment services. There were significant differences in the array of both substance abuse and mental health symptoms. College-age participants reported spending more money on their use; less use of alcohol; and more use of marijuana, heroin, other opiates, hallucinogens, and sedatives; experiencing less depression and more trouble controlling violent behaviors; and experiencing higher levels of legal and family issues and lower levels of medical issues. Given these differences, we expected to see significant differences in levels of motivation and treatment outcomes. This was found in response to the second research question.

Are There Differences in Levels of Treatment Motivation and Engagement?

There were differences found on both treatment motivation and completion rates. Moreover, there were significant differences initially found in the length of stay, with college-age participants staying on average approximately 3 days longer in treatment. The lower levels of readiness for change and motivation among younger people underscore the importance of stage-wise programming that includes motivation-enhancing interventions. These differences appeared to affect satisfaction with treatment, as found in our next research question.

Are There Differences in Levels of Treatment Satisfaction?

Although no differences were observed with global satisfaction, college-age participants were on average significantly less satisfied with 10 specific

aspects of services: availability of medical staff appointments, availability of psychiatric nurse practitioners, availability of staff in an emergency situation, availability of daily physical activities, level of respect with which I was treated, professionalism of the staff, communication between staff and patients, communication among staff, usefulness of residential handbook, and meals. As a group, these service dissatisfactions were not clinically oriented, but tended to focus on how they were treated by the staff or the availability of the staff. Although equally engaged, older participants were more satisfied on 32 of the 36 treatment satisfaction measures than their college-age counterparts.

Are There Differences in Improvement in Substance Use Outcomes?

All substance use measures are statistically significant for changes between baseline and follow-up. There are differences in the rates of change on the two alcohol use measures and cannabis, heroin, and opiate measures, but ultimately at 6 months following treatment, use patterns are very similar, with both groups experiencing very low and nearly identical levels of substance use in almost every category.

Are There Differences in Mental Health Outcomes?

All psychological measures demonstrated statistically significant improvement for both groups and there were no significant between-group differences. Importantly, improvements continued not only from baseline to 1 month, but also improved from the 1-month to the 6-month measure.

Are There Differences in Improvement in Other Psychosocial Outcomes?

It is important to note that both groups demonstrated significant positive change following treatment. College-age participants as a group at baseline were significantly more impaired when compared to older participants in the areas of employment, legal, and drug.

Interestingly, ASI employment composite scores for both groups were worse (reflecting greater severity) at the 1-month interview than at baseline; however, by the 6-month outcome interviews, both groups had both improved beyond baseline levels and equalized such that there were no significant differences observed. This could reflect participant changes in attitudes and perceptions as life-appropriate responsibilities are undertaken in the early period following treatment. This finding also highlights the importance of providing life skills-based interventions during treatment and connecting patients with continuing or follow-up support during early recovery.

Are There Differences in Posttreatment Service Use?

Similar to the results of our other research questions, there were differences found. Service use was similar on almost all measures of services for medical and mental health professional services, but college-age participants reported higher levels of use of professional substance abuse services and lower levels of access and engagement with 12-step programs.

Data collected in this study suggest that there are important significant differences in the two populations on entering treatment. College-age participants were less engaged and motivated for treatment and less satisfied with important nonclinical aspects of their treatment experience. Despite higher levels of impairment and greater social challenges than non-college-age participants, college-age participants experienced significant positive outcomes similar to the rest of the population, suggesting a high degree of resiliency in college-age individuals (Shumway, Bradshaw, Harris, & Baker, 2013). This finding also suggests that existing abstinence-based, residential treatment models that include dual diagnosis fidelity, stage-wise monitoring, and clinical interventions are as effective in treating younger college-age individuals with addiction as they are in treating other older individuals with addictions.

Our sample parallels results found in Smith et al. (2010) in that college-age adults were not troubled or bothered, nor did they feel they needed counseling any more than the older adults who had significantly fewer family and relationship issues. College-age adults in our sample also had significantly greater levels of legal issues and lower readiness for change scores, suggesting external motivation for treatment, also similar to Smith et al. (2010).

These results support others' findings that older age has been found to be associated with higher levels of mental health service satisfaction as well as perceived benefit of mental health services (Ford, Bryant, & Giyeon, 2012). This lower level of satisfaction among college-age participants could affect the level of engagement, which would correspond to lower completion rates. However, the specific items that recorded dissatisfaction were not directly related to the clinical aspects of services, but instead appear to be related to the level of staff interactions or staff availability, possibly indicating that these younger participants felt they should have had higher levels of individual attention. In terms of implications for practice, college-age participants enter treatment at a significantly diminished readiness compared to their older counterparts and this needs to be considered in treatment planning and group counseling strategies. The relevance of tailored motivational interviewing and enhancement techniques to enhance engagement and support treatment retention is demonstrated, similar to results found by other researchers (Carroll et al., 2006; Shumway et al., 2013).

Study Limitations

It is important to note that the study population was drawn from private, for-profit residential treatment centers. This is a population of individuals who generally do not typically enroll in substance abuse treatment research. Historically, research on young adults or college-age individuals is usually conducted on clients in public treatment facilities, therefore on those with lower income, and possible lower educational levels. This aspect of the study is both a strength, as it broadens our understanding of addiction treatment to a population underrepresented in the literature, and a limitation, as it might limit the external validity of the study to other similar well-resourced populations.

This study is not without other limitations. Participants in the study were not randomly sampled; thus the generalizability of these findings is limited, as there was no control group, and the results from our study are only applicable to the individuals who participated in the research interviews. Studies based on this type of sampling run the risk of sampling bias, as individuals who were in the sample might not have accurately represented the pool of potential service recipients. For example, in our study, the number of participants who provided follow-up data ($n = 1{,}495$) represented 75.8% of the total number of all service recipients. Although the sample did represent the majority of all eligible participants, it is important that the results of this study are viewed with this limitation in mind. Specifically, individuals who did not participate in the follow up reported fewer average days of alcohol use in the last 30 days, more average days of other sedative use, and more average days of other opiate use at baseline, in addition to lower average ASI alcohol composite scores and higher average ASI drug composite scores at baseline. Among individuals who did not follow up, there were also higher proportions of men (42% vs. 36%), opiate users (45% vs. 38%), and heroin users (15% vs. 11%). The lack of a counter factorial, a control group that was randomly sampled, further weakens the generalizability of these results. We used a nonexperimental design with only a comparison group. Despite these limitations, the results are important, as they provide insight into a population that has typically been understudied.

CONCLUSION

This study demonstrated that a continuum of intensive residential abstinence-based substance abuse and mental health treatment services could be effective for the target population. Results presented here are important in providing insight into a less studied population as well as one that has historically been described as more resistant to treatment entry. All of the outcome

measures indicated significant improvements for the individuals involved in the study, and with few exceptions there were limited differences between college-age and non-college-age participants. The results can be used to further develop and enhance services to other groups of similar individuals in other areas.

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