



Published in final edited form as:

Drug Alcohol Depend. 2021 February 01; 219: 108493. doi:10.1016/j.drugalcdep.2020.108493.

INDEPENDENT EFFECTS OF ENTERING RECOVERY AS A YOUNG VERSUS OLDER ADULT ON LONG-TERM FUNCTIONING AND QUALITY OF LIFE: RESULTS FROM A U.S. NATIONAL STUDY OF RECOVERING PERSONS

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Abstract

Background: For physical health conditions, earlier intervention typically results in better prognoses and improved quality of life (QoL). Despite some evidence that early intervention yields better subsequent functioning too for behavioral health conditions like alcohol and other drug (AOD) disorders, less is known. This study examined the relationship between the life-stage at which individuals entered AOD recovery, demographic and clinical correlates, and its relationship to a variety of indices of current functioning, QoL and well-being.

Method: Nationally representative sample of U.S. adults who resolved an AOD problem (Weighted N=1,844). Structured regression analyses tested whether life-stage at which individuals entered recovery (i.e., as a young [18-30yrs,n=746] vs. older [>30yrs,n=1098] adult), was associated with current QoL, happiness, self-esteem, distress, and recovery capital, independent of confounders. Sensitivity analyses investigated effects during the first 5-years of recovery.

Results: Young adult recovery entry was independently associated with current employment, younger age of onset for primary substance, primary substance other than alcohol, and less lifetime psychiatric comorbidity. In fully-adjusted models examining indices of functioning, no association was found between life-stage at recovery entry and current self-esteem, happiness, or distress, but an association was found between young adult recovery entry and better current functioning and QoL. This effect was even more pronounced during the first 5-years of recovery.

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Contributors: Authors Kelly and Greene designed the study. Authors Kelly and Greene managed the literature searches and summaries of previous related work. Authors Greene and Kelly undertook the statistical analyses, and authors Kelly and Greene wrote the first draft of the manuscript. Authors Bergman and Abry contributed to the overall manuscript writing and editing and contributed to the discussion of the implications of the findings. All authors contributed to and have approved the final manuscript.

Conflict of Interests: The authors have no financial interests, relationships, or affiliations relevant to this manuscript, thus no conflict exists.

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Conclusion: Irrespective of current age, duration of recovery, and clinical markers of impairment, entering recovery as a young, versus older, adult, is associated with better subsequent QoL - an advantage that appears even more discernable early in recovery.

Keywords

young adults; emerging adults; young adulthood; development; recovery; addiction; remission; quality of life; functioning; national; epidemiology

1. Introduction

For most medical diseases, disorders, and chronic illnesses, earlier detection and intervention typically is associated with a better prognosis and later functioning and quality of life (Guzman-Limon and Samuels, 2019; Necula et al., 2019; Schiffman et al., 2015). Consequently, screening, early detection, and treatment programs have been developed for a number of physical health conditions (Chatterjee et al., 2017; Siu, 2015). When it comes to behavioral health conditions, such as alcohol and other drug (AOD) disorders, similar assumptions about the benefits of early intervention might be made. Behavioral patterns and lifestyle factors may be less entrenched earlier in the clinical course of the disorder, while the maladaptive structural and functional brain changes associated with AOD exposure may also be less pervasive and pronounced (Squeglia and Gray, 2016). Early intervention has intuitive appeal as well as public health, public safety, and clinical significance, because AOD intoxication, toxicity, and disorders all can confer immediate life-threatening harms as well as the threat of long-term disease and disability that can have life-long ramifications (Mokdad et al., 2016). Such long-term consequences also can be economic in nature: compared to the U.S. general population, for example, individuals in recovery from an AOD problem are significantly less likely to be employed or retired and more likely to be unemployed and disabled reducing productivity and nations' tax revenue (Eddie et al., 2020).

Peak onset of both heavy AOD use and AOD disorders occurs during young adulthood (Bergman et al., 2016; Bouchery et al., 2011; Gore et al., 2011; National Drug Intelligence Center, 2011; Rehm et al., 2014; Smith, 2018; Substance Abuse and Mental Health Services Administration, 2013, 2014). From a human developmental theory perspective (e.g., Arnett, 2014), although exact age delineations of what constitutes "young adulthood" vary, most encompass the ages between 18 and 30 years old (e.g., Arnett, 2014; Levinson, 1986), reflecting a transitional age wherein culturally-influenced milestones are achieved and structures of life and lifestyle becomes increasingly concretized. AOD disorders during this life-stage can interrupt successful accomplishment of these developmental milestones (e.g., college attendance/work training/skills accrual, stable relationships/marriage, offspring, economic independence, social autonomy; Arnett, 2014) that can have long-term repercussions increasing biobehavioral stress. Consequently, from a public health perspective, targeting this age-group might yield important dividends acutely, and also destabilize emerging addiction patterns, lessen long-term risks, and increase the likelihood of earlier remission and successful meeting of developmental milestones. Knowledge of the effects of earlier intervention and support services use for those suffering from AOD

disorders, however, is more limited but suggests benefits for earlier treatment. Dennis, Scott, Funk, Foss (Dennis et al., 2005) found that, compared to those receiving some kind of AOD treatment after their first nine years of AOD use initiation, those receiving treatment during their first nine years (which occurred during late adolescence/young adulthood) had a substantially shorter time to full remission. Similarly, an eight-year prospective follow-up among treatment naive adults with alcohol use disorder found that compared with individuals who remained untreated, individuals who entered treatment early had better short- and long-term substance use outcomes and better short-term social functioning (e.g., number and quality of friendships, participation in social recreational activities, and membership in socially-based organizations/clubs) suggesting that earlier treatment entry was more important than the overall intensity of treatment (Moos and Moos, 2003). A further nine-year longitudinal study highlighted the importance of early treatment as well as rapid early re-intervention in decreasing the odds of harm and premature mortality (Scott et al., 2011).

Little is known, however, regarding the long-term impact of successfully resolving a significant AOD problem during this critical young adult period of development (18-30 years) versus later. If, in keeping with other disorders, and while accounting for factors that may relate to more rapid AOD problem resolution (e.g., less severity and impairment), earlier remission is associated with better subsequent life functioning and quality of life, it would support and underscore the intuitive notion that a more assertive focus be made on intervening earlier in the clinical course of the illness during young adulthood. Additionally, such data would provide the impetus for developing, testing, and disseminating more age-appropriate and engaging treatment and support resource options to attract young people in the recovery process earlier, with the ultimate goal of reducing long-term harms by increasing rates of earlier remission (McKay, 2016).

To this end, the current investigation focused on answering two main research questions: 1. What are the demographic, clinical, and service use history differences between individuals who enter recovery as a young adult (18-30 years old) versus as an older adult (>30 years); and, 2. What is the independent long-term impact of resolving a significant AOD problem earlier, during young adulthood, versus later, on indices of quality of life and functioning, psychological distress, self-esteem, and global happiness.

2. Method

2.1 Procedures

The National Recovery Study (NRS) enrolled a nationally representative sample of U.S. noninstitutionalized adults who reported resolving an alcohol or other drug (AOD) problem. Individuals who resolved an AOD problem were recruited from GfK's KnowledgePanel, which uses address-based sampling to randomly select individuals from 97% of all U.S. households based on the U.S. Postal Service's Delivery Sequence File (Kelly et al., 2017). See [http://www.knowledgenetworks.com/knpanel/docs/knowledgepanel\(R\)-design-summary-description.pdf](http://www.knowledgenetworks.com/knpanel/docs/knowledgepanel(R)-design-summary-description.pdf) for more information on GfK's probability based sampling methodology.

Selected participants were screened between July and August 2016. Of the 25,228 individuals screened, 2,002 reported that they had resolved an AOD problem by responding affirmatively to the question: “Did you used to have a problem with drugs or alcohol, but no longer do?” Survey weights were constructed to produce unbiased estimates of population parameters from these respondents (Kelly et al., 2017). The survey weights were developed to also compensate for nonresponse and under-coverage. See Kelly et al. (2017) for more details. All study procedures were approved by the Massachusetts General Hospital Partners Healthcare Institutional Review Board.

2.2 Measures

Demographic characteristics: Demographic data was derived both from GfK’s existing KnowledgePanel data, which were collected prior to survey administration, as well as from NRS data for variables not assessed by GfK. Existing demographic data included: age, gender, race/ethnicity, household income, education level, and employment.

Substance use history: Participants answered a series of questions about 15 substances/classes of substances based on items from the Global Appraisal of Individual Needs (GAIN-I) (Dennis et al., 2002): 1) alcohol, 2) marijuana, 3) cocaine, 4) heroin, 5) narcotics other than heroin (e.g., pharmaceutical opioids), 6) methadone, 7) buprenorphine and its formulations (e.g., “suboxone”), 8) amphetamines (including methylenedioxymethamphetamine, or MDMA), 9) methamphetamine (“crystal meth”), 10) benzodiazepines, 11) barbiturates, 12) hallucinogens, 13) synthetic drugs (e.g., synthetic cannabinoid like “K2” and synthetic cathinones such as “bath salts”), 14) inhalants, and 15) steroids, as well as other (specified by participant). For substances used 10 or more times in the participant’s lifetime, participants were asked which was perceived as a problem, and among those which was their *primary* substance (Dennis et al., 2002). They were asked the age that they started using the substance regularly (i.e., age of onset) and when they resolved their AOD problem. For the primary predictor, life stage of recovery entry, we grouped participants by those who resolved their AOD problem during young adulthood (ages 18-30) versus those who resolved their problem during older adulthood (ages 31+). Participants were also asked whether they had ever been diagnosed with an alcohol use disorder, other drug use disorder, or other psychiatric disorder. The questionnaire assessed whether participants had received inpatient or residential treatment and outpatient addiction treatment.

Indices of Functioning, Quality of Life and Well-being: Quality of life, happiness, self-esteem, psychological distress, and recovery capital were used to assess general wellbeing and functioning in this sample. The EUROHIS-QOL (Schmidt et al., 2006) is a widely used eight-item measure of quality of life, adapted from the World Health Organization Quality of Life – Brief Version (WHOQOL-BREF). Item responses are on Likert scales from 1 to 5 (e.g., “How satisfied are you with your personal relationships?”; 1 = *very dissatisfied* to 5 = *very satisfied*). The measure has strong psychometric properties, including good to excellent predictive validity (i.e., significant discrimination between individuals with and without a health condition), convergent validity with other measures of

health and wellness ($r_s = .4-.6$), and internal consistency ($\alpha = .83$). Its internal consistency was excellent in the current sample ($\alpha = .90$; Schmidt et al., 2006)).

Participants rated their happiness on a Likert scale from 1 = *completely unhappy* to 5 = *completely happy* (Meyers and Smith, 1995). They also rated the extent to which “I have high self-esteem” is true on a Likert scale from 1 = *not very true* to 5 = *very true* (Robins et al., 2001). The Kessler-6 (Kessler et al., 2003) is a six-item scale assessing psychological distress that asks participants to rate how often, from 0 = *none of the time* to 4 = *all of the time*, they felt each of six symptoms (e.g., nervousness and depression) during the past 30 days (current sample, $\alpha = .93$).

The survey included the Brief Assessment of Recovery Capital (BARC) (Vilsaint et al., 2016), a 10-item, abridged version of the Addiction Recovery Capital Scale (Groshkova et al., 2012). For this measure, participants reported their level of agreement, on a Likert scale from 1 = *strongly disagree* to 6 = *strongly agree*, with statements on their recovery, environmental support, and well-being (e.g., “I regard my life as challenging and fulfilling without the need for using drugs or alcohol”). The BARC has demonstrated excellent concurrent validity with the original measure of recovery capital ($r = .92$) as well as excellent internal consistency ($\alpha = .95$), and measurement invariance between treatment and non-treatment recovery samples. Its internal consistency in the current sample was also excellent ($\alpha = .93$; Vilsaint et al., 2016)).

2.3 Statistical Analysis

We compared the distribution of demographic, clinical, and treatment service use history variables among participants who entered recovery during young adulthood (18-30 years) versus older adulthood (31+ years) using unadjusted logistic regression models. To account for confounding by current age we also reported the adjusted prevalence odds ratio from logistic regression models that controlled for participant’s age at the time of the survey. We then evaluated whether life stage of recovery entry - young vs. older adult (see Measures above) - was associated with current quality of life and functioning indicators (quality of life, psychological distress, happiness, self-esteem, and recovery capital). Given that current age, time since AOD problem resolution, and historical differences in indices of clinical severity/impairment all could likely influence current estimates of quality of life, functioning and psychological well-being, we employed a stepwise model-building approach to introducing potential confounders in order to investigate whether there was an independent association between life stage at recovery entry and these quality of life outcomes and which confounders, if any, explained these associations. The models were ordered as follows: 1) unadjusted models; 2) adjusted for years since AOD problem resolution; 3) adjusted for years since problem resolution and current age; 4) adjusted for years since problem resolution, current age, and demographic differences between those who entered recovery during young vs. older adulthood; and 5) adjusted for years since problem resolution, current age, demographic differences, and clinical differences between those who entered recovery during young vs. older adulthood. Furthermore, to examine potential dynamic shifts in quality of life indices that have been shown to covary with time in recovery (Kelly et al., 2018), we replicated the aforementioned model building process among participants who

entered recovery within the past five years and past one year, respectively. Analyses were design-based and incorporated survey weights using Stata, Version 14 (StataCorp, 2015).

3. Results

3.1 Description of overall sample

In the original sample of 2,002 participants who completed the survey, 1,899 were 18 years of age or older at the time of recovery and were included in this analytic sample. After applying sampling weights, this analytic sample represented 1,844 adults in recovery from a significant alcohol or other drug problem in the United States. The majority were older adults when they entered recovery (59.54%; M age [SE] when starting recovery=43.43 [0.35]) and the remaining were young adults (18-30 years; 40.46%; M age [SE] when starting recovery=24.41 [0.21]) when they entered recovery. On average, the age at the time of completing this survey was 47.60 years (SD=14.97) and years since resolving their AOD problem was 11.86 years (SD=10.56; Table 1). The majority of participants were male (59.87%), Non-Hispanic White (61.89%), reported a household income less than \$50,000 USD per year (50.91%), had a college education (53.01%), and were employed (54.10%). Alcohol was the most common primary substance (59.04%) followed by cannabis (12.59%) and opioids (5.49%). The remaining 22.88% of the sample reported other drugs as their primary substance. On average, participants were 20.21 years old when they started using their primary substance regularly (SD=6.72). About one-third of the sample reported having been told by a clinician that they had another psychiatric disorder beside an AOD use disorder. Seventeen percent and 15.30% of the sample reported having been in outpatient or inpatient treatment, respectively.

3.2 Demographic and clinical factors associated with entering recovery during young vs. older adulthood

In the unadjusted models (table 1), participants who entered recovery when they were young adults were younger in age at the time of the survey (Prevalence Odds Ratio [POR]=0.90, 95% CI: 0.89, 0.91). We found that participants who entered recovery during young adulthood were less likely to be male (POR=0.66, 95% CI: 0.50, 0.87), and more likely to be employed (POR=2.20, 95% CI: 1.65, 2.92) relative to participants who entered recovery during older adulthood. There was no difference in the prevalence odds of having been a young versus older adult when entering recovery by race/ethnicity, household income, or education level. When adjusting for current age, the only remaining significant demographic correlate of life stage when entering recovery was employment whereby those who entered recovery during young adulthood were more likely to currently be employed relative to those who entered recovery during older adulthood (POR=1.43, 95% CI: 1.04, 1.97).

In the analysis of clinical correlates of age at time of recovery we found that participants who entered recovery during young adulthood reported a younger age of starting to use their primary substance regularly (i.e., age of onset; POR=0.90, 95% CI: 0.87, 0.93), were less likely to report alcohol as their primary substance (POR=0.46, 95% CI: 0.34, 0.62), were more likely to report cannabis as their primary substance (POR=2.74, 95% CI: 1.72, 4.36), and were less likely to report having received inpatient or residential treatment for their

AOD use disorder (POR=0.56, 95% CI: 0.38, 0.83) relative to participants who entered recovery during older adulthood. After adjusting for current age, younger age of onset of regular use of primary substance (POR=0.91; 95% CI: 0.88, 0.96) and a lower likelihood of reporting alcohol as a primary substance (POR=0.68, 95% CI: 0.48, 0.97) remained associated with young adult recovery entry. In models adjusted for age, having been diagnosed with a psychiatric disorder (other than AOD use disorders) by a medical professional was less common among those who entered recovery during young adulthood relative to those who entered recovery during older adulthood (POR=0.72, 95% CI: 0.52, 0.995). The prevalence odds of inpatient treatment or reporting cannabis as one's primary substance no longer differed by life stage at recovery entry when adjusting for current age. The prevalence odds of outpatient treatment or reporting opioids and other drugs as one's primary substance did not significantly differ by life stage at recovery entry in the unadjusted or adjusted models (table 1).

3.3. Associations between young vs. older adulthood at time of recovery and current indices of functioning, quality of life, and well-being

In the full sample, the unadjusted models revealed that psychological distress was higher (Mean diff.=1.64, 95% CI: 0.89, 2.39) and self-esteem lower (Mean diff.=−0.21, 95% CI: −0.37, −0.04) among those who entered recovery during young relative to older adulthood; however the standardized mean differences (SMD) revealed small effect sizes (Psychological Distress: SMD=0.15; Self-esteem: SMD=−0.08). There were no differences in quality of life, happiness, or recovery capital by life stage at recovery entry (SMD<0.1; Model 1). After adjusting for years since problem resolution, participants who entered recovery during young adulthood appeared to have higher psychological distress, lower levels of happiness, self-esteem, and recovery capital relative to those who entered recovery during older adulthood (Model 2). However, when controlling for current age, these associations were nullified (Model 3). The fully adjusted models controlling for all the demographic and clinical correlates of life stage at recovery entry found a significant difference in quality of life such that those who entered recovery during young adulthood had significantly greater quality of life relative to those who entered recovery during older adulthood (Mean diff.=1.62, 95% CI: 0.26, 2.97; SMD=0.12; Model 5; table 2). In all models, current age appeared to be a strong, sometimes qualitative confounder of the relationship between quality of life/functioning and life stage at recovery entry.

3.3.1. Sensitivity Analyses examining the relationship between age entering recovery and quality of life, functioning, and well-being among persons entering recovery during the past 5 years and past year.—

In analyses that examined the potential for dynamic changes in indices of quality of life and functioning by restricting the sample to participants who entered recovery within the past 5 years or past 1 year, a similar pattern but with larger differences between individuals who entered recovery during young versus older adulthood emerged (table 2). Among participants who entered recovery within the past 5 years (n=617; young adults=264; older adults=353), in unadjusted models, psychological distress was significantly higher and self-esteem was marginally (but not significantly) lower among those who entered recovery while a young versus older adult (Model 1). However, after adjusting for current age, those entering recovery during young

adulthood possessed greater current quality of life (Model 3), particularly after further adjustment for demographic and clinical factors associated with life stage at recovery entry (Mean diff.=3.48, 95% CI: 0.82, 6.14; SMD=0.24; Model 5). Other indicators of wellbeing including happiness, self-esteem, and recovery capital also favored those who entered recovery while young adults, but were not statistically significant and evinced small effect sizes (SMD<0.11).

Among participants who entered recovery within the past 1 year (n=224; young adults=133; older adults=91), similar patterns were observed. Although these findings were underpowered, the magnitude of the effect estimates were comparable or larger to those observed in the previous models applied to the full sample and the restricted sample of participants who entered recovery within the past 5 years. Among participants who entered recovery within the past year, adjusting for age, as well as demographic and clinical factors associated with life stage at recovery entry, those who were young adults appeared to have higher quality of life (Mean diff.=3.96, 95% CI: -0.38, 8.29; SMD=0.26), happiness (Mean diff.=0.43, 95% CI: -0.21, 1.07; SMD=0.22), self-esteem (Mean diff.=0.31, 95% CI: -0.49, 1.12; SMD=0.12), recovery capital (Mean diff.=1.94, 95% CI: -5.91, 9.79; SMD=0.09), and lower psychological distress (Mean diff.=-2.67, 95% CI: -5.90, 0.56; SMD=-0.22; table 2); however, there was substantial uncertainty in these estimates and none reached statistical significance (Model 5).

4. Discussion

This study found that approximately 40% of individuals in this national sample of recovering persons entered recovery as young adults between the ages of 18-30 years old. A number of demographic and clinical factors appeared to differentiate this group from those individuals who resolved a significant AOD problem after age 30, with some of these appearing or disappearing when accounting for differences in participants' current age. Also, intriguingly, our model building process that controlled for a variety of demographic, clinical, and recovery-related, differences between the two cohorts, suggested entering recovery as a young adult was independently associated with better long-term functioning and quality of life, and that this general overall significant benefit was even more pronounced during the first 5 years of recovery.

In terms of demographic variables, we found that women were significantly more likely than men to enter recovery as a young adult, but when controlling for current age this difference was nullified. This is because, overall, women in our sample were on average younger than men (45 vs 49), and once this was taken into account, entering recovery as a young adult was no longer associated with being female. Entering recovery as a young adult, in contrast, *was* associated with greater likelihood of current employment even when controlling for current age, indicating that irrespective of how old one was at the time of the survey, entering recovery as a young person remained associated with a higher likelihood of being currently employed. Notably, race/ethnicity, education, and income were not associated with entering recovery earlier.

In terms of clinical variables, differences were observed between the two life stages at recovery entry regarding age of onset of regular use of one's primary substance, type of primary substance, use of inpatient/residential treatment, and psychiatric comorbidity. Those entering recovery as a young adult began regular use of their primary substance at an earlier age. Although not completely clear as to how this is related to entering recovery at an earlier age, given prior work it is plausible that earlier regular use is a marker and predictor for a more florid manifestation of AOD disorder symptoms that results in greater intensity of use with its attendant greater consequences (Morean et al., 2012; Ohannessian et al., 2015). This, in turn, may produce earlier social problems and an earlier interface with legal and clinical systems that slows the momentum of AOD disorders resulting in earlier remission. This is speculative, however, and further research is needed to understand the exact nature of this relationship more fully.

Regarding type of primary substance, while alcohol was by far the most prevalent primary substance reported across both of the recovery life stages, compared to older adults, young adults entering recovery were less likely to report alcohol and more likely to report cannabis as their primary substance. The difference in cannabis as a primary substance became non-significant, however, after accounting for current age. This is because participants, overall, who were younger at the time of completing the survey were more likely to report cannabis as their primary substance irrespective of whether they entered recovery as a young or as an older adult. Consequently, after controlling for current age, entering recovery as a young adult was no longer associated with having cannabis as primary substance. This suggests also that young adult recovery is unrelated to a potentially "softer" drug use profile, that makes it easier to stop.

The young adult recovery cohort also was significantly less likely to have used any inpatient or residential treatment compared to older adults, but again, this was not the case when adjusting for current age. This reflects the fact that, in general, older age was associated with greater use of inpatient/residential care irrespective of when one entered recovery. Greater use of such inpatient/residential services among older persons independent of when they started their recovery journey, could reflect higher severity and AOD-related impairment or perhaps a health care insurance coverage-based cohort effect. Use of inpatient/residential care used to be the norm for treatment prior to the onset of U.S. managed care models and thus older generations, more generally, would have been more likely to have encountered this level of care relative to younger people.

Finally, the young adult recovery cohort was less likely to have a lifetime psychiatric diagnosis, irrespective of current age. In clinical samples, individuals with co-occurring psychiatric disorders tend to have poorer treatment and recovery support service response relative to those with only AOD disorder (Brown et al., 2004; Compton et al., 2003; Grella et al., 2001; McKay and Weiss, 2001; Rounsaville, 1987; Timko et al., 2010), pointing to added burden when engaging in change to initiate or sustain recovery. This suggests, conversely, that a *lower* psychiatric burden might facilitate a greater likelihood for a shortened course of AOD problems (from less need to mitigate psychiatric distress from a self-medication hypothesis perspective, for example) and increased chances of earlier remission. It also suggests that, given these are lifetime diagnoses, entering recovery as a

young adult may protect individuals from later development of psychiatric complications. For example, the elimination of neurotoxic psychoactive substance exposure may reduce further neurological damage that can catalyze or cause additional psychiatric disorder; or that individuals develop and cultivate coping skills during this earlier recovery process, which they can deploy when faced with psychosocial stress, preventing psychiatric symptom escalation [e.g., (Blanco et al., 2014)]. Alternatively, given that presence of psychiatric diagnosis in this study was assessed by asking if a professional had ever told participants they had a particular diagnosis, this effect may also have been an artifact of lower levels of intensive service utilization among those with young adult recovery entry. Future research is needed to unravel the relationship between young adult recovery entry and lower likelihood of lifetime psychiatric diagnosis.

When examining the relation between life stage at recovery entry and indices of current functioning, quality of life, and psychological well-being using our model-building approach some intriguing findings emerged. Perhaps most notably, we found that if one entered recovery as a young adult versus as an older adult, current quality of life and functioning was significantly better. This effect held in our fully controlled model analyses, suggesting that the observed positive functioning and quality of life benefits related to young adult recovery initiation held true irrespective of how many years it had been since entering recovery, current age, sex, current employment status, or how impaired one was historically by one's AOD or psychiatric problems. Furthermore, this independent benefit attributable to earlier recovery initiation during young adulthood appeared to be amplified during the early recovery years (i.e., 1-5 years) where the functional and life quality gains were even more pronounced.

These subsequent independent functioning and quality of life benefits related to earlier recovery initiation could be due to greater neural plasticity and brain-based rebound effects that would be more likely to occur more readily among younger people, in general, and also as neurotoxic drug exposure slows and stops (Squeglia and Gray, 2016). Also, given that entering recovery as a young adult was associated also with more years since recovery initiation in our sample, it could mean that these individuals have not just less residual damage and impairment leading to higher functioning, but also more time and ability to adjust and adapt to the demands of recovery and catch up more quickly on meeting psychosocial developmental milestones leading to enhanced quality of life (Kelly et al., 2018). Considering the average age of recovery initiation in the young adult vs older adult recovery cohorts (i.e., 24 vs 43 years old, respectively) it may just be more challenging to regain lost ground as an older adult because older adults will be more out of sync with social norms and social contexts (e.g., returning to finish a college degree as a 43-year old may be more challenging than as a 24 year-old).

Somewhat surprisingly, the same kinds of relationships observed with functioning and quality of life were not observed on other indices of well-being, such as psychological distress, happiness, and self-esteem. This was unexpected, but suggests that early adulthood recovery initiation may confer certain specific types of advantages, but not others.

4.1 Limitations

Any conclusions or generalizations drawn from the current set of findings should be made following careful consideration of a number of important limitations. The study is cross-sectional, thus any inferences relating to dynamic temporal relationships among variables are tentative pending corroboration from longitudinal studies. We chose ages 18-30 years old as our demarcation for “young adults”; while informed by developmental theoretical positions (e.g., Arnett, 2014), the age-range is somewhat arbitrary. Also, the study relies on retrospective recall of many variables which can be prone to recall bias and temporal telescoping. Also, the measurement instruments were in many cases not ideal being somewhat coarse and conducted at a macro level. The multivariate models revealed that age was an important confounder of the association between life stage at recovery entry and current quality of life/functioning. This finding highlights the importance of parsing out age, period, and cohort effects when examining long-term recovery outcomes.

4.2 Implications and Conclusions

In sum, findings from this study help to clarify the type, magnitude, and dynamic nature of the benefits that might be gained from entering recovery earlier in the clinical course of an AOD disorder and lend empirical support to the intuitive notion that earlier intervention and remission is associated with long-term benefits. Given that a protracted course of AOD problems has major public health and safety consequences as well increases the likelihood of becoming disabled and unemployed, from broad public health, public safety, and economic perspectives, the implications are that more assertive outreach models and/or the development of more innovative attractive and engaging interventions are needed to positively affect more young people earlier in the clinical course. Doing so may facilitate earlier remission that, in turn, produces better long-term functioning and quality of life outcomes that can benefit those individuals, their families, and society at large.

Acknowledgments

Role of Funding Source: Funding for this study was provided by the MGH Recovery Research Institute and the National Institute of Alcohol Abuse and Alcoholism (NIAAA) grant K24AA022136. The NIAAA had no role in study design, in the collection, analysis and interpretation of data, in the writing of the report, or in the decision to submit the paper for publication. Opinions are those solely of the authors and do not reflect those of the funding agency.

Funding: The study was supported in part by funding from the MGH Recovery Research Institute, the National Institute of Alcohol Abuse and Alcoholism (NIAAA) under grants K24AA022136 (JFK) and K23AA025707 (BGB). MCG was supported by the National Institute of Mental Health (T32MH096724).

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Highlights

- Earlier intervention is associated with better subsequent functioning for most physical health conditions
- Little is known about effects on functioning and quality of life for early intervention and remission from alcohol and drug (AOD) disorders
- Entering recovery as a young adult (18-30) vs older adult (>30) was independently associated with later improved functioning and quality of life.
- Sensitivity analysis found benefits of young adult recovery entry was even more pronounced during the first five years of recovery
- More assertive AOD intervention during young adulthood and creating more engaging and attractive young adult recovery resources could yield personal and public health dividends

Table 1.

Demographic and clinical correlates of age at time of recovery

	Full sample (Weighted n=1844)	Age at time of recovery		Young adult (ref=older adult), pOR (95% CI)	
		Young adults, 18-30 years (40.46%)	Older adults, 31+ years (59.54%)	Unadjusted	Adjusted for current age
Age, M(SE)	47.60 (0.50)	37.11 (0.67)	54.72 (0.45)	0.90 (0.89, 0.91)	--
Age at time of recovery, M(SE)	35.74 (0.37)	24.41 (0.21)	43.43 (0.35)	--	--
Years Since Entering Recovery, M(SE)	11.86 (0.30)	12.70 (0.59)	11.29 (0.33)	1.01 (1.00, 1.02)	--
Gender, n(%)					
Female	740 (40.13)	344 (46.07)	396 (36.10)	REF	REF
Male	1104 (59.87)	402 (53.93)	702 (63.90)	0.66 (0.50, 0.87)	0.92 (0.67, 1.26)
Race Ethnicity, n(%)					
White, Non-Hispanic	1141 (61.89)	449 (60.24)	692 (63.01)	REF	REF
Black, Non-Hispanic	248 (13.43)	92 (12.28)	156 (14.22)	0.90 (0.58, 1.41)	0.82 (0.49, 1.38)
Hispanic	318 (17.22)	145 (19.49)	172 (15.69)	1.30 (0.87, 1.94)	0.75 (0.48, 1.18)
Other, Non-Hispanic	137 (7.45)	60 (7.99)	78 (7.08)	1.18 (0.66, 2.11)	0.72 (0.38, 1.35)
Household Income, n(%)					
Less than 50,000 USD	939 (50.91)	376 (50.36)	563 (51.29)	REF	REF
50,000 USD or greater	905 (49.09)	370 (49.64)	535 (48.71)	1.04 (0.79, 1.36)	1.12 (0.82, 1.54)
Employment, n(%)					
Unemployed	846 (45.90)	257 (34.50)	589 (53.64)	REF	REF
Employed	998 (54.10)	489 (65.50)	509 (46.36)	2.20 (1.65, 2.92)	1.43 (1.04, 1.97)
College Education, n(%)					
No College	866 (46.99)	341 (45.74)	525 (47.84)	REF	REF
College	978 (53.01)	405 (54.26)	573 (52.16)	1.09 (0.82, 1.44)	1.15 (0.83, 1.60)
Age of onset (primary substance), M(SE)	20.21 (0.21)	18.15 (0.23)	21.61 (0.31)	0.90 (0.87, 0.93)	0.91 (0.88, 0.96)
Primary Substance: Alcohol, n (%)	959 (59.04)	310 (47.74)	650 (66.54)	0.46 (0.34, 0.62)	0.68 (0.48, 0.97)
Primary Substance: Cannabis, n (%)	205 (12.59)	126 (19.39)	79 (8.08)	2.74 (1.72, 4.36)	1.66 (0.91, 3.03)
Primary Substance: Opioids, n (%)	89 (5.49)	46 (7.07)	43 (4.44)	1.64 (0.90, 3.00)	0.80 (0.36, 1.76)
Primary Substance: Other Drug, n(%)	372 (22.88)	167 (25.80)	204 (20.95)	1.31 (0.93, 1.85)	1.29 (0.87, 1.91)
Outpatient addiction treatment, n(%)	315 (17.07)	120 (16.14)	195 (17.71)	0.89 (0.62, 1.29)	0.67 (0.45, 1.02)
Inpatient or residential treatment, n(%)	282 (15.30)	83 (11.08)	199 (18.16)	0.56 (0.38, 0.83)	0.69 (0.45, 1.06)
Psychiatric diagnosis (excluding AUD/SUD), n(%)	610 (33.09)	249 (33.34)	362 (32.93)	1.02 (0.77, 1.35)	0.72 (0.52, 0.99)

Note: all reported values are weighted to account for the survey sampling design

Table 2.

Mean difference in quality of life/functioning by age at time of recovery (younger vs. older adults), Mean Diff (95% CI)

OUTCOME	Model 1 Unadjusted	Model 2 Model 1 + years since recovery	Model 3 Model 2 + current age	Model 4 Model 3 + demographic correlates	Model 5 Model 4 + clinical correlates
Full sample (n=1844)					
Quality of life	-0.01 (-0.95, 0.93)	-0.22 (-1.13, 0.70)	1.23 (-0.11, 2.57)	1.36 (0.10, 2.63)	1.62 (0.26, 2.97)
Psychological distress	1.64 (0.89, 2.39)	1.87 (1.16, 2.58)	0.04 (-0.93, 1.02)	-0.03 (-0.99, 0.93)	0.34 (-0.63, 1.30)
Happiness	-0.11 (-0.24, 0.02)	-0.14 (-0.26, 0.01)	0.01 (-0.17, 0.20)	0.02 (-0.16, 0.20)	0.05 (-0.14, 0.25)
Self-esteem	-0.21 (-0.37, 0.04)	-0.24 (-0.40, 0.08)	0.04 (-0.18, 0.26)	0.05 (-0.17, 0.27)	0.07 (-0.16, 0.30)
Recovery capital	-1.16 (-2.59, 0.28)	-1.50 (-2.90, 0.11)	0.04 (-1.96, 2.03)	0.11 (-1.86, 2.08)	-0.25 (-2.26, 1.77)
Persons who entered recovery within past 5 years (n=617)					
Quality of life	-0.07 (-2.00, 1.85)	-0.22 (-2.14, 1.71)	2.32 (-0.44, 5.07)	2.68 (0.10, 5.27)	3.48 (0.82, 6.14)
Psychological distress	2.41 (0.95, 3.87)	2.50 (1.06, 3.93)	0.19 (-1.82, 2.21)	0.03 (-1.97, 2.03)	1.09 (-0.81, 2.98)
Happiness	-0.06 (-0.31, 0.20)	-0.07 (-0.32, 0.18)	0.12 (-0.23, 0.47)	0.15 (-0.20, 0.50)	0.22 (-0.16, 0.60)
Self-esteem	-0.22 (-0.54, 0.09)	-0.24 (-0.55, 0.07)	0.10 (-0.32, 0.52)	0.15 (-0.26, 0.56)	0.12 (-0.29, 0.52)
Recovery capital	-1.84 (-4.62, 0.94)	-2.02 (-4.78, 0.74)	1.45 (-2.59, 5.50)	1.81 (-2.10, 5.72)	1.71 (-2.00, 5.43)
Persons who entered recovery within past year (n=224)					
Quality of life	-1.13 (-4.59, 2.34)	-0.78 (-4.04, 2.49)	1.72 (-2.59, 6.03)	1.90 (-2.49, 6.30)	3.96 (-0.38, 8.29)
Psychological distress	1.67 (-0.69, 4.04)	1.81 (-0.41, 4.03)	-1.88 (-5.43, 1.67)	-2.08 (-5.66, 1.51)	-2.67 (-5.90, 0.56)
Happiness	-0.11 (-0.54, 0.32)	-0.07 (-0.47, 0.34)	0.24 (-0.35, 0.82)	0.26 (-0.33, 0.86)	0.43 (-0.21, 1.07)
Self-esteem	-0.36 (-0.93, 0.22)	-0.30 (-0.87, 0.27)	0.13 (-0.59, 0.85)	0.19 (-0.54, 0.91)	0.31 (-0.49, 1.12)
Recovery capital	-4.75 (-9.81, 0.31)	-4.78 (-9.75, 0.20)	-0.89 (-8.07, 6.30)	-0.73 (-7.98, 6.52)	1.94 (-5.91, 9.79)

Model 1: Unadjusted association between age at time of recovery (young adult, ref=older adult) and outcome

Model 2: Association between age at time of recovery and outcome controlling for years since entering recovery

Model 3: Association between age at time of recovery and outcome controlling for years since entering recovery and current age

Model 4: Association between age at time of recovery and outcome controlling for years since entering recovery, current age, and demographic correlates (sex, employment)

Model 5: Association between age at time of recovery and outcome controlling for years since entering recovery, current age, demographic correlates (sex, employment), and clinical correlates (age of onset, primary substance, psychiatric diagnosis, inpatient treatment history)