Identifying components of recovery capital that support substance use disorder treatment completion

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ABSTRACT

Purpose: Individuals who do not complete substance use disorder treatment (SUDT) have similar outcomes to the untreated. Recovery capital (RC) is the collection of one's resources that contribute to the initiation and maintenance of sobriety. The aim of this paper was to identify individual measures of RC that are associated with SUDT completion.

Methods: RC data for 69 residents from a men's recovery center was obtained from questionnaires administered to residents at intake and after SUDT graduation or dismissal. Participant data was divided into two groups, Graduates (n = 39, age 35.87±10.83) and Non-Graduates (n = 30, age 34.35±14.44), and retrospectively analyzed to compare RC between groups at various points during SUDT and which RC measures are associated with SUDT completion.

Results: At baseline all participants reported limited RC and there was no significant difference in RC between groups. At graduation, Graduates reported significantly more RC in all measures when compared to baseline and Non-Graduates at dismissal. Non-Graduates reported a significant increase in Checking and Savings at dismissal but no other measure.

Conclusion: Baseline levels of RC in both groups were limited and not significantly different which limited the capacity of the study to identify measures of RC associated with SUDT completion. A lack of RC at onset of SUDT did not preclude SUDT completion and obtaining RC during SUDT was associated with completion as only Graduates reported increases in RC. Future study designs should include participants with variable amounts of RC when entering SUDT.

1. Introduction

According to the Substance Abuse and Mental Health Services Administration (SAMHSA), in 2021, 46.3 million people aged 12 or older met the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for substance use disorder (SUD) in the United States (SAMHSA, 2023). The Recovery Centers of America (RCA) estimates the direct and indirect economic burden of SUD in the US was $3.73 trillion in 2019 across multiple domains, including healthcare, civil productivity, the criminal justice system, and research and prevention (RCA, 2019). The significant burden presented by SUD is likely due to the multifactorial and longitudinal nature of the illness, which makes SUD chronic and difficult to treat (McCabe, Schulenberg, Schepis, McCabe, & Veliz, 2022; McLellan, Lewis, O'Brien, & Kleber, 2000). SUD treatment (SUDT) dropout rates in the U.S. are estimated to be between 20 and 50 % (Dutra et al., 2008; Lappan, Brown, & Hendricks, 2020; Loveland & Driscoll, 2014; McHugh et al., 2013). Addressing treatment dropout rates is critical as treatment completion is associated with reduced relapse rates and drug use over time, as well as improved physical, mental, and emotional health, compared to those who do not complete treatment (AAC, 2022; Lappan et al., 2020).

Historically, SUDT was focused on achieving abstinence (Laudet &

White, 2008); however, more recent treatment models prioritize a holistic approach aimed at optimizing an individual's recovery capital (RC) (Cloud & Granfield, 2008; Groshkova, Best, & White, 2013; Laudet & White, 2008; Vilsaint et al., 2017). RC is defined as the collection of one's resources that contribute to the initiation and maintenance of sobriety. Positive RC (PRC) encompasses factors such as high self-esteem, employment, housing, family support, etc. Inversely, negative RC (NRC) entails factors that hinder recovery, such as poor self-esteem, prior incarceration, and substance-seeking behaviors (Cloud & Granfield, 2008). SUD patients who accumulate more PRC during treatment have higher rates of treatment completion and abstinence as well as lower rates of relapse compared to patients with lower levels of PRC (Keith et al., 2022; Melvin et al., 2012; Moos & Moos, 2005, 2007; Stevens, Jason, Ram, & Light, 2015). Additionally, NRC is associated with lower levels of motivation to complete treatment and higher treatment attrition rates (Baker et al., 2020; Palmer, Murphy, Piselli, & Ball, 2009; Potter et al., 2015).

Previous research has quantified RC across 10 domains of "recovery strengths'' named the Assessment of RC (ARC) and has shown that higher ARC scores at baseline are predictive of SUDT completion (Groshkova et al., 2013; Sanchez, Sahker, & Arndt, 2020). However, there is limited literature available which analyzes the association of individual RC measures and SUDT completion and compares these relationships alongside one another. Identifying individual factors that are associated with SUDT completion may guide changes in the current SUDT model resulting in reduced treatment attrition rates and increased treatment retention and thereby improving the efficacy of SUDT. Therefore, the purpose of the present study was to evaluate the relationship between baseline levels of individual measures of RC and SUDT completion as well as identifying differences in RC between Graduates and Non-Graduates of a SUDT program in the Southeast United States.

2. Methods

2.1. Data collection

Data for the present study comes from the records of Go Forth Recovery (GFR), a South Carolina residential addiction recovery home for men from the time period of July 2018 through December 2022. The GFR program focuses on providing a structured recovery environment in which residents participate in weekly 12-step meetings, attend life skills classes, and implement the skills learned in these courses to find employment, improve health and financial literacy, reestablish family connections, etc. While program length varies by individual, GFR requests a minimum 6-month commitment from participants prior to admission.

Residents of GFR are primarily recruited via referral from within the justice system and through word of mouth and local advertising. GFR accepts applicants regardless of substance of addiction and retains participants within the program pending compliance with program rules. While entry into the program is considered on a case-by-case basis, GFR does not accept registered sex offenders or arsonists. Program dismissal results from violating guidelines, with most dismissals resulting from substance use during treatment. Other violations that result in dismissal include but are not limited to: acts or threats of violence, stealing, possession of substances or paraphernalia, bullying, sexual harassment, use of racial or sexual slurs, destruction of property, sexual relations on the property, abuse of prescription or over the counter medications, smoking in the house, refusing to take or failing a drug test, and repeated write-ups for violations.

GFR administers a series of questionnaires at admission, and again at graduation or dismissal from the program. The questionnaires assess demographic information and various elements of RC. The following RC were assessed in our study: driver's license, access to a vehicle, health insurance, checking and savings account, stable housing, connection to family, and primary care provider (PCP). The RC measures were

analyzed as individual elements and as an aggregate. Demographic information for each participant was also collected and included: age, veteran status, prior incarceration status, race, and education level.

This research study was approved as exempt by the Edward Via College of Osteopathic Medicine Institutional Review Board. Resident information was de-identified and collated by GFR and exported to an excel document for statistical analysis. This study utilized a cross-sectional design. Data gathered from 69 residents was separated into two groups, Graduates (n = 39) and Non-Graduates (n = 30), and retrospectively analyzed.

2.2. Statistical analysis

Continuous variables were analyzed using sample means and variances. Categorical variables were summarized using proportions. Inferential procedures examined which characteristics might be associated with completion of the Go Forth program. For continuous or count variables, sample means and sample standard deviations were calculated to measure center and spread of the data distributions. Data for 69 former residents, restricted to those who graduated or were dismissed, were analyzed. Of these residents, 39 were considered Graduates and 30 Non-Graduates. Chi-square tests and Fisher's exact test were used to test for association between graduation status and categorical variables. To test for significant change in resources over time within a group, Wilcoxon Signed Rank test was used. A Type I error rate of 0.05 was used for all tests.

3. Results

3.1. Sample and baseline characteristics

Overall, the two groups were similar across all demographic variables (Table 1). In the Graduate group, the average age was 35.87 years old, with the majority racially identifying as white, and included 3 veterans, 34 individuals that were previously incarcerated, and 28 high school graduates. In the Non-Graduate group, the average age was 34.35 years old, with the majority racially identifying as white, and included 6 veterans, 23 individuals that were previously incarcerated, and 19 high school graduates.

3.2. Recovery capital

At baseline, there were no significant differences in the RC possessed between Graduates and Non-Graduates at baseline for any individual RC variable (Table 2). The individual RC variable that showed the biggest difference in possession between groups was connection to family, though the difference lacked statistical significance (Table 2). Similarly,

Table 1

Participant descriptive characteristics (n = 69, 69 M).

Characteristic	Non-Graduates (n = 30)	Graduates (n = 39)
Age (mean ± SD)	34.35±14.44	35.87±10.83
Veteran Status (%)	20.00 (n = 6)	7.89 (n = 3)
Prior Incarceration (%)	76.67 (n = 23	87.18 (n = 34
Race		
Black (%)	13.33 (n = 4)	7.69 (n-3)
Hispanic (%)	3.33 (n = 1)	0.00 (n = 0)
White/Hispanic (%)	16.67 (n = 5)	5.13 (n = 2)
White/Non-Hispanic (%)	3.33 (n = 1)	2.56 (n = 1)
White	63.33 (n = 19)	84.62 (n = 33)
Education		
Less Than High School	36.67 (n = 11)	28.21 (n = 11)
High School	46.67 (n = 14)	58.97 (n = 23)
Some College	16.67 (n = 5)	12.82 (n = 5)

Table 2
Individual measures of recovery capital possessed by Non-Graduates and Graduates prior to treatment.

Recovery Capital	Non-Graduates (n = 30)	Graduates (n = 39)	p-value
Driver's License	20.69 %	28.21 %	0.5769
Access to Vehicle	3.45 %	7.69 %	0.6306
Health Insurance	0.00 %	5.13 %	0.5035
Checking and Savings	6.90 %	5.13 %	1.000
Stable Housing	0.00 %	2.56 %	1.0000
Connection to Family	31.03 %	12.82 %	0.0780
Primary Care Provider	3.45 %	5.13 %	1.0000

Notes: Individual recovery capital measures are expressed as the total percentage of individuals in the group with access to that recovery capital variable.

at baseline, there was no significant difference between the aggregate score for Graduates and for Non-Graduates (Fig. 1).

At the time of program completion, there were significant differences in the RC possessed between Graduates and Non-Graduates across all measured individual RC variables (Table 3). The RC variables with the statistically significant differences included possession of driver's license, health insurance, stable housing, and a primary care provider (Table 3). Similarly, at the time of completion or dismissal, there was a significant difference between the aggregate score for Graduates, and for Non-Graduates (Fig. 1).

Within the Graduate group, there was a significant increase in the RC possessed at completion compared to baseline for all measured RC variables (Table 4). Within the Non-Graduate group, there was a significant increase in possession of checking and savings accounts compared to baseline, and no significant increases for any other measured RC variables (Table 4).

4. Discussion

It is well established that accumulating RC has a significant positive impact on SUDT completion and the maintenance of sobriety in individuals with SUD (Cloud & Granfield, 2008; Groshkova et al., 2013). Additionally, when tabulated as an ARC score, RC as an aggregate has been shown to be predictive of SUDT completion (Sanchez et al., 2020). However, to our knowledge no previous studies have evaluated the relationship between individual measures of RC when entering SUDT and at SUDT completion. Accordingly, the purpose of this study was to identify measures of RC that are associated with SUDT completion, as well as to identify differences in RC between Graduates and Non-Graduates of a SUDT program. Within the constraints of this study, the results found 1) RC at baseline was limited in all participants and
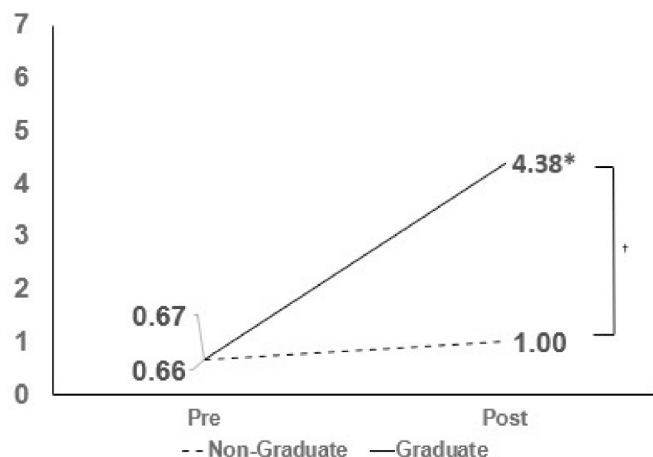

Fig. 1. Aggregate recovery capital aggregate pre- and post- treatment in Graduates and Non-Graduates.

Table 3
A comparison of recovery capital measures in Non-Graduates and Graduates at graduation or dismissal.

Recovery Capital	Non-Graduates (n = 30)	Graduates (n = 39)	p-value
Driver's License	29.17 %	82.05 %	<0.0001
Access to Vehicle	20.83 %	69.23 %	0.0003
Health Insurance	4.17 %	74.36 %	<0.0001
Checking and Savings	75.00 %	100.00 %	0.0024
Stable Housing	12.50 %	100.00 %	<0.0001
Connection to Family	54.17 %	94.87 %	0.0002
Primary Care Provider	0.00 %	69.23 %	<0.0001

Notes: Individual recovery capital measures are expressed as the total percentage of individuals in the group with access to that recovery capital variable at either graduation or dismissal from the program.

Table 4
Changes in recovery capital in Non-Graduates and Graduates at entry and exit of treatment.

Recovery Capital	Non-Graduates (n = 30)			Graduates (n = 39)		
	Entry	Exit	p-value	Entry	Exit	p-value
Driver's License	16.67 %	29.17 %	0.3750	28.21 %	82.05 %	<0.0001
Access to Vehicle	0 %	20.83 %	0.0625	7.69 %	69.23 %	<0.0001
Health Insurance	0 %	4.17 %	1.0000	5.13 %	74.36 %	<0.0001
Checking and Savings	8.13 %	75.00 %	<0.0001	5.41 %	100.0 %	<0.0001
Stable Housing	0 %	12.50 %	0.2500	2.50 %	100.0 %	<0.0001
Connection to Family	37.50 %	54.17 %	0.2891	12.82 %	94.87 %	<0.0001
Primary Care Provider	4.35 %	0 %	1.0000	5.13 %	69.23 %	<0.0001

Notes: Individual recovery capital measures are expressed as the total percentage of individuals in the group with access to that recovery capital measure at either graduation or dismissal from the program.

there was no significant difference in any measure of RC between Graduates and Non-Graduates when entering treatment, 2) at graduation from SUDT, Graduates reported significant increases in all measures of RC while residents in the Non-Graduates group only reported a significant increase in checking and savings at dismissal from SUDT, and 3) Graduates reported significantly more RC in all measures at graduation when compared to Non-Graduates at dismissal. These results indicate that accumulating RC during SUDT is likely associated with improved SUDT retention and completion in men with SUD.

Consistent with current literature, the present study found that accumulation of RC during SUDT supported SUDT completion as Graduates reported significant increases in RC when compared to baseline and to Non-Graduates. Although the RC assessment in the present study is limited, each RC measure is associated with improved SUDT outcomes, motivation to remain in SUDT, or both. Previously completed research has shown that provision of car, van or contracted transportation services improves SUDT retention (Friedmann, Lemon, & Stein, 2001) and is strongly correlated to SUDT completion (Abreu Minero, Best, Brown, Patton, & Vanderplasschen, 2022) as reliable transportation reduces barriers involved in accessing social, vocational and health opportunities (Guidry, Aday, Zhang, & Winn, 1997) and allows individuals to function within society and travel to employment, appointments, etc. (Cano, Best, Edwards, & Lehman, 2017). Attaining health insurance and a PCP has been shown to increase health care utilization (Wu & Ringwalt, 2005) and improve addiction severity (Saitz, Horton, Larson, Winter, & Samet, 2005). A poll of individuals going through SUDT identified that social support, stable housing,

financial and money management skills (Jones-Sanpei & Nance, 2021), and good health and employment, were perceived as vital factors to treatment completion (Duffy & Baldwin, 2013). Stable housing is recognized as a key factor for successful SUDT completion and recovery (Duffy & Baldwin, 2013), while unstable housing has been identified as a modifiable risk factor for SUDT attrition (Baker et al., 2020). The cumulative positive effects of obtaining RC on SUDT retention and completion likely explains the differences in outcomes between Graduates and Non-Graduates, as Non-Graduates only reported significant increases in checking and savings.

Large scale assessments of RC in the form of ARC scores have been shown to be predictive of SUDT completion (Sanchez et al., 2020). The ARC assessment measures fifty RC items across ten domains, quantifying the amount of RC an individual in recovery possesses (Groshkova et al., 2013). While the ARC score is predictive, the large scale of the assessment limits its clinical practicality. Previous studies have developed abbreviated RC assessments that have been shown to have high internal validity (Vilsaint et al., 2017); however, the utility of these assessments as a predictive measure for SUDT completion remains to be tested. Identifying individual measures of RC that are predictive of SUDT completion may aid in the development of an RC assessment that is a clinically friendly, reliable measure of RC. If individual RC variables are found to be predictive, more focus could be dedicated to them on the abbreviated assessments. While our study was unable to identify any RC variables that were predictive at baseline, future studies should consider exploring this topic, as identification of such could help to improve treatment models. An abbreviated assessment of RC that is both valid and predictive of SUDT completion could be a powerful tool to guide SUDT protocols and result in lower SUDT attrition and higher completion rates.

A noteworthy finding in the present study is that no RC when entering USDT did not preclude residents form completing SUDT. These findings further support a holistic approach to SUDT as the reported increases in RC during SUDT in the present study are likely explained by the treatment model utilized by the recovery center in our study. GFR's model utilizes aspects from various established models for SUDT. Like sober living homes and transitional homes which utilize social support models, GFR residents live on the premises until SUDT completion or dismissal. It has been previously reported that individuals with SUD living among each other facilitates camaraderie and social connection which result in collective goal development and increased motivation to participate in SUDT (de Guzman, Korcha, & Polcin, 2019; Mericle, Mahoney, Korcha, Delucchi, & Polcin, 2019; Polcin, Mericle, Braucht, & Wittman, 2023). Additionally, GFR focuses on a holistic approach to SUDT as the residents are mandated to attend 12 step meetings and educational life skills classes which include, but are not limited to, interpersonal skills, sexual health, nutrition and fitness, financial skills, and money management. Treatment models similar to GFR's utilizing didactic education have been shown to increase transferable skills and aid in establishing long term goals past sobriety in individuals with SUD (Kaskutas, Marsh, & Kohn, 1998). The results of the present study support the notion that a holistic approach to SUDT and the attainment of RC promotes SUDT retention and completion.

While this study provides evidence of the relationship between RC and SUDT outcomes, there were a few limitations that should be considered. First, our study population consists of mostly formerly incarcerated individuals. Prior incarceration status is considered NRC (Cloud & Granfield, 2008) as these individuals are known to lack RC (Lewis, Garfinkel, & Gao, 2007; Wilson & Davis, 2006). Incarceration status likely explains the limited baseline RC reported for both groups, affecting the capacity of this study to identify baseline RC measures that might be predictive of SUDT completion. Additionally, incarceration status in conjunction with our population being all male, limits the generalizability of our results to the general population experiencing substance use disorder. Second, the study was completed using a pre-existing data set assembled by the staff of GFR without oversight or partnership with an academic body. The admission and graduation, or dismissal, questionnaires from which the data is derived are not standardized or validated and assess a limited number of RC measures; however, the measures assessed are known elements of RC and are commonly assessed in other validated assessments of RC (Groshkova et al., 2013; Vilsaint et al., 2017). Furthermore, as the data is drawn from a preexisting data set the participant sample size is limited to the number of residents who have matriculated into GFR. The limited sample size weakens the power of the present study and future studies should include larger sample populations that allow for greater statistical power. Lastly, the substance of choice is not uniform among the residents of the recovery home. Previous studies have shown that treatment outcomes may be significantly affected by substance of choice and route of administration (Moore et al., 2007; Rosenblum et al., 2007; Weiss et al., 2011). Additionally, the analysis performed did not control for substance of choice and thus did not evaluate the relationship between treatment, RC, and each substance of choice. To further analyze the effect RC has on treatment completion, a population with variable baseline amounts of RC should be recruited and the RC measures assessed in each group should be expanded. Further research to identify RC measures that are associated with SUDT completion should implement broad, validated assessments of RC in a diverse population of individuals entering SUDT.

5. Conclusion

RC encompasses a broad spectrum of sociological, economical, and psychological factors that impact recovery from SUD. When comparing baseline RC possessed by individuals in both the Graduate and Non-Graduate groups, our study was unable to find significant differences between the two groups. Therefore, we are unable to make the claim that possession of the measured elements at baseline is associated with treatment completion. However, when comparing the increase in RC obtained during treatment, we observed a significant difference in the RC gained by those in the Graduate group compared to the Non-Graduate group. This further supports the claim that successful completion of SUDT is associated with the accumulation of RC. Additionally, Graduates entered SUDT with no RC indicating the treatment model supported the accumulation of RC which further supports the trend towards a holistic approach to SUDT. Therefore, based on the results of the study, similar to GFR, it is recommended SUDT centers should include efforts to help individuals build and maintain RC in effort to combat SUD and successfully complete SUDT.

CRediT authorship contribution statement

Ronald J. Headid: Writing – review & editing, Writing – original draft, Resources, Methodology, Data curation, Conceptualization. **Trevor C. Doane:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **Brett D. Cohen:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **Emma C. Smith:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **David Redden:** Writing – review & editing, Methodology, Formal analysis. **Alexis M. Stoner:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Data curation, Conceptualization.

Data availability

The authors do not have permission to share data.

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