Predictors of Successful Closure in the State-Federal Vocational Rehabilitation System: Findings From A Sample of Persons with Disability and Substance Use Disorders

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Abstract -- Numerous studies have focused on the predictors of successful closure of state-federal vocational rehabilitation (VR) applicants. However, there appears to be only one study focused solely on the predictors of employment with persons who were deemed eligible for services based on their alcohol or drug abuse diagnosis. This retrospective study examined the predictors of employment among this population. A sample of 940 persons with a primary or secondary diagnosis of alcohol or drug abuse and a closure status of 26 or 28 was randomly selected from the 2005 Rehabilitation Service Administration (RSA) 911 data. A combination of consumer characteristics, VR service variables, and work disincentives predicted employment. Knowledge of these predictors suggests ways for counselors to better serve consumers via accurate assessment, appropriate planning, and efficient case coordination.

The evolution of the managed care movement and a growing emphasis on evidence-based research in the disability and vocational rehabilitation (VR) field, has contributed to increased accountability in service delivery (Rosenthal, Chan, Wong, Kundu, & Dutta, 2005). Outcome research has focused on attempting to answer both general questions such as "What services maximize the probability of a successful outcome for every consumer?" as well as specific questions such as "What services are best for persons with psychological disabilities in terms of successful employment?" Although there has been research on the predictors of (successful) closure within the state-federal VR program, studies on the inclusion of persons with substance use disorders (SUD) as their primary or secondary diagnosis are far less common (Andrews et al., 1992; Capella, 2002; Chan, Cheing, Chan, Rosenthal, & Chronister, 2006; Foley & Woodring, 2005; Marshak, Bostick, & Turon, 1990; Robinson, 2005; Rosenthal et al., 2005).

The paucity of research focused on understanding the predictors of successful employment among persons with SUD warrants further investigation, particularly in this time of prioritized outcomes and accountability. Further, the lack of knowledge surrounding outcomes with this population poses critical challenges for VR professionals, considering the potential for negative attitudes among vocational counselors towards consumers with SUD and the stigma that exists with this disability (Brown & Saura, 1996; West & Miller, 1999). Until this information becomes available, it will not be known whether predictors of successful closure found with persons with other disabilities assimilate those for persons with SUD, or if a different set of variables influence successful employment.

Using VR nomenclature, the definition of successful closure or *status 26* includes competitive employment (including supported employment), extended (sheltered) employment, self-employment, state agency managed business enterprise, homemaker, and unpaid family worker. Unsuccessful closure or *status 28* is defined as no

employment secured after developing an Individualized Plan for Employment (IPE). Although there are seven categories of closure status, researchers typically examine these two categories, 26 and 28 (Rosenthal et al., 2005; Schwab & DiNitto, 1993). In addition, studies examining 26 and 28 closures have focused on three general categories of variables: (a) consumer demographics, (b) work disincentives and (c) vocational rehabilitation service variables (Andrews et al., 1992; Capella, 2002; Chan et al., 2006; Foley & Woodring, 2005; Marshak et al., 1990; Robinson, 2005; Rosenthal et al., 2005). The purpose of this study was to determine what predictors among these three unique categories of variables, predicts employment among persons with SUD.

Consumer Variables

Consumer demographic variables such as age, race, education and disability type have been included in past studies investigating closure and competitive employment (Hayward & Schmidt-Davis, 2002; Robinson, 2005; Rosenthal et al., 2005). For example, Robinson (2005) reported that minorities with disabilities had a higher rate of unsuccessful closure when compared to non-minority counterparts. Similarly, Capella (2002) reported that African Americans were less likely to have successful closure when compared to White consumers. With an odds ratio of 1.73, Capella concluded that whites were almost twice as likely to have a successful closure when compared to African Americans. Rosenthal et al. (2005) found Native Americans and Asian Americans to have the lowest employment rates (status 26) compared to European, Latino, and African Americans. In this study, no differences in successful closures were found between men and women or between different age ranges (Rosenthal, et al., 2005).

Hollar, Moore, & McAweeney (2006) and Hayward & Schmidt-Davis (2002) used the Longitudinal Study of the Vocational Rehabilitation Services Program (LSVRSP) data (a sub-set of the RSA-911 data), and found that disability type and education were related to closure. Those who had a significantly higher educational achievement and either a vision impairment or a traumatic brain injury (TBI) were more likely to be closed successfully when compared to those with unsuccessful closures. Additionally, Hayward & Schmidt-Davis (2002) found that age, severity or significance of disability, and disability type predicted competitive employment. Older persons who had a less significant disability were more likely to become competitively employed compared to younger persons with cognitive disabilities.

It seems plausible that consumers classified as having a more significant disability or multiple disabilities would have less successful closures than those with a less significant disability, single disability or with SUD alone. However, there are mixed results reported in the literature regarding the impact of significance of disability on VR outcomes (Andrews et al., 1992; Hayward & Schmidt-Davis, 2002; Marshak et al., 1990; Rosenthal et al., 2005).

This may be due in part to the Rehabilitation Act of 1973 and its amendment, mandating that VR services be made more available to individuals with more severe disabilities (Andrews et al., 1992). Andrews, et al., (1992) found that the number of people having severe disabilities with successful case closures increased during an 8-year period after the enactment of the 1973 Rehabilitation Act. This study further reported that those with physical disabilities increased at a higher rate than those with psychiatric disabilities. Unfortunately, those with the disability code 'alcoholism' or 'drug addiction' were excluded from the analysis. Consequently, the rate of successful closure for those with a SUD as a primary or secondary classification was not determined.

Work Disincentives

Work disincentives include any financial support that acts as a deterrent to employment such as Supplemental Security Income (SSI), Social Security Disability Insurance (SSDI), or family support. Work disincentives such as SSI and SSDI have been found to negatively influence closure status among consumers with various types of disabilities (Chan et al., 2006; Foley & Woodring, 2005; Hayward & Schmidt-Davis, 2002; Rosenthal et al., 2005). Chan et al. (2006) and Hayward & Schmidt-Davis (2002) found that consumers who received general assistance, SSI or SSDI benefits, had significantly lower employment rates when compared to consumers without such work disincentives. Chan et al. (2006) reported that 45% of consumers who received financial assistance became employed as opposed to almost 60% of those without such work disincentives. These researchers concluded that receipt of various forms of financial assistance (i.e., support from family or friends; receipt of general assistance) increased the likelihood of unsuccessful closure (Hayward & Schmidt-Davis, 2002).

Vocational Rehabilitation Service Variables

The last general category of variables included in many closure studies is service variables. Variables such as the number of services provided, type of services, length of time involved in VR and case expenditures have been reported as influencing successful employment (Chan et al., 2006; Rosenthal et al., 2005; Schwab & DiNitto, 1993). Aggregated, these studies tend to suggest that successful employment is associated with the delivery of more services, a shorter rehabilitation period, individually targeted services, and an overall higher case cost. For example, Rosenthal et al. (2005) found that case cost (higher cost associated with employment) and job placement services were the most important predictors of employment. To illustrate this point, the odds ratio reported for job placement was 2.45 meaning that those who received job placement were approximately two and one half times more likely to have a successful closure compared to those who had not received job placement.

As mentioned above, there is a dearth of studies focusing on predictors of successful closure among persons with SUD. One such study, Schwab & DiNitto (1993), found that persons with SUD who were successfully closed (54% successful closure rate) received more services (i.e., diagnostic and evaluation, miscellaneous training, successful job referral, adjustment training), received services for a shorter period of time, and were more costly to rehabilitate when compared to persons with SUD who were unsuccessfully closed. Specifically, those with a successful closure received on average nearly 9 services over a period of 10 months, costing on average $1,385. Those with an unsuccessful closure averaged receiving 6 services spanning 13.5 months, costing on average $945.

More recently, a study by Rosenthal et al. (2005) included persons with SUD and found that they had the third highest successful closure rate, a rate slightly lower than those with sensory and developmental disabilities yet slightly higher than the overall closure rate of 54%. However, the study did not examine the exact nature of how consumer characteristics, VR factors, and work disincentives influence closure status for consumers with SUD. The only study to do so was Schwab & DiNitto (1993), nearly 14 years ago. In sum, although there have been other studies that have provided a glimpse of the VR service predictors of employment for persons with SUD, little research has focused on examining all the potential predictors of employment with persons with SUD.

Using the available literature on predictors of employment from other disability groups, as well as the limited evidence available in the SUD field, a model that included three categories of predictor variables was considered: demographic variables, work disincentive variables, and VR service variables. The question which guided our hypothesis was "What demographic, work disincentive, or VR service related factors are associated with persons with SUD having a successful closure?" We hypothesized that consumers with SUD who had a successful closure would have more education, more likely be older White males, have fewer work disincentives, be involved in the VR system for a shorter time, receive more services, and receive more funding towards their rehabilitation when compared to persons with SUD who had an unsuccessful closure. Figure 1 represents the model for predicting employment.

Method

Participants

Our initial sample was the 2005 Rehabilitation Services Administration (RSA) 911 data set including over 600,000 persons. Sample selection was determined by a series of steps and is described in the Procedure section. The final sample of N=940 consumers with SUD comprised 513 consumers (55%) with a successful closure and 427 consumers (45%) with an unsuccessful closure. The mean age was 37 and the sample was 39% Black, 51% White, 7% Hispanic and 3% other. Thirty-two percent of the sample had less than a high school education, 45% had a high school degree or GED, and 23% had some post secondary education. Eighty-six percent of the primary disabilities were either categorized as a psychosocial or mental impairment. Of those with a secondary diagnosis (n=674, n=266 no secondary disability), 81% were either categorized as a psychosocial or mental impairment.

Procedure

From the RSA-911 data set (2005), we selected those individuals with a primary or secondary diagnosis of alcohol abuse or drug abuse. Then we chose only those persons with a 26 or 28 closure. While there are other types of closure status, only 26 and 28 closures were of interest because they are the most comparable groups; having been accepted and participating in their rehabilitation program. This sub-set amounted to approximately 40,000 consumers, much too large to include in the final analysis. As Glass and Hopkins (1996) have discussed, large samples can lead to statistically significant results, though the results may not be of clinical or practical significance. Using STATA (2005), we randomly selected a sample that provided us with sufficient statistical power to detect meaningful differences (Cohen, 1988; Glass & Hopkins, 1996). Others using RSA databases have used similar procedures to circumvent the sensitivity issues associated with extremely large samples (Capella, 2002; Schwab & DiNitto, 1993; Wilson, 2004). The total sample of N=940 was compared with the original database of SUD consumers who had a 26 or 28 closure to ensure that the random sample closely matched the population demographics. Distributions were similar across all variables. The dependent variable in this study is dichotomous, either successful or unsuccessful employment.

Results

Table 1 presents statistics on selected demographic characteristics and includes the results of bivariate analyses of group differences between those who had a successful

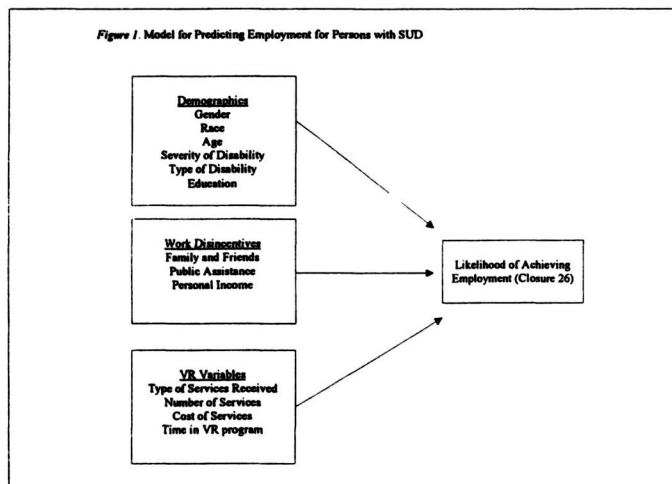*Figure 1.* Model for Predicting Employment for Persons with SUD

Demographics
Gender
Race
Age
Severity of Disability
Type of Disability
Education

Work Disincentives
Family and Friends
Public Assistance
Personal Income

VR Variables
Type of Services Received
Number of Services
Cost of Services
Time in VR program

Likelihood of Achieving Employment (Closure 26)

Table 1

Selected Consumer Characteristics of Successfully and Unsuccessfully Closed Applicants

Demographics and other Variables	Combined groups: Successful and Unsuccessful (n = 940)	Successful Closure (n = 513) 55%	Unsuccessful Closure (n = 427) 45%
Gender	Males (n=613, 65%)	57%	43%
	Females (n=327, 35%)	49%	51%
Ethnicity	African Am (n=367, 39%)	57%	43%
	Hispanic (n=65, 7%)	46%	54%
	White (n=481, 51%)	54%	46%
	Other (n=27, 3%)	52%	48%
	Other (n=81, 9%)	48%	52%
*Primary Disability	*Cognitive (n=47, 5%)	34%	66%
	Psychosocial (n=423, 45%)	54%	46%
	Other mental (n=389, 41%)	55%	45%
Age	Mean = 37.34	37.45	37.21
Severity of Disability	Not severe (n=73, 8%)	64%	36%
	Severe (n=867, 92%)	54%	46%
**Amount of time in VR	Mean Days = 624	512	757
Education	Less than HS (n=296, 32%)	52%	48%
	HS or GED (n=427, 45%)	55%	45%
	Post HS (n=217, 23%)	58%	42%
*Major Source of Income at Application	Personal Income (n=119, 13%)	64%	36%
	Family/Friends (n=408, 43%)	57%	43%
	*Public Support (n=270, 29%)	44%	56%
	Other (n=143, 15%)	62%	38%

Note. *Significant chi-square p<.003, **Significant t-test p<.003

closure (55%) and those who had an unsuccessful closure (45%). To account for multiple statistical tests, a Bonferroni procedure was calculated, resulting in an adjusted á-level of .003. Three variables were significantly different between the groups: those with an unsuccessful

Table 2

Service Characteristics of Successfully and Unsuccessfully Closed Consumers

Services Provided	Successfully rehabilitated (26 closures) n=513 55% %	Unsuccessfully rehabilitated (28 closures) n=427 45% %
Services Received by VR or Other Agencies		
Assessment Services (n=582)	55	45
*Diagnosis & Treatment (n=412)	62	38
*Counseling (n=590)	60	40
College/University training (n=95)	50	50
Occupational & Voc training (n=121)	51	49
On the job training (n=26)	85	15
Remedial training (n=11)	55	45
Job Readiness (n=136)	62	38
Disability related augmented skills (n=28)	66	34
Miscellaneous training (n=101)	60	40
*Job Search (n=391)	69	31
*Job Placement (n=307)	75	25
*On-the-job support (n=129)	72	28
Transportation (n=395)	55	45
Maintenance (n=217)	61	39
Rehabilitation Tech (n=21)	76	24
Tech Assistance (n=25)	72	28
**Average Number of Services Received	12	9
**Average cost of Services Received	$2777.73	$1963.04

Note. *p<.003 significance level, chi-square tests, **Significant t-test p<.003

closure were more likely to receive public assistance, have a cognitive disability, and be involved in VR longer.

Table 2 summarizes VR services: average number of services received, average total cost of services, and the percentages of services received by the two groups. The two variables, number of services received and the total case cost of services, were non-normally distributed (bi-modal). Thus, the Wilcoxon rank-sum nonparametric test was used to test the differences between the median number of services received and the median total cost of services. Tests of proportions, or X^2-tests, were used to compare the proportion of services received between the two groups. The consumers in the successfully closed group were significantly more costly ($2777 vs. $1963), received more services (12 vs. 9), and were significantly more likely to receive the following services: diagnosis and treatment, counseling, job placement, on-the-job support, and job search.

Prediction of Successful Closure

Successful closure was predicted using a forward entry procedure in logistic regression. Variables that were not statistically significant were removed from the model. Interactions between variables were tested and none were found to be significant, and were therefore dropped. The full model was significant, correctly classifying 66% of the sample and accounting for 12% of the total variance. There were eight significant predictors, four having a negative relationship with successful employment and four having a positive relationship with successful employment. Results indicate that consumers are more likely to have a successful closure if they have a disability other than a cognitive one, if they do not receive financial support from family and friends or public assistance, if they are involved in VR for a short time, if they receive more services which are more costly when compared to those with an unsuccessful closure, and if they receive job placement and diagnosis and treatment services.

The odds ratio expresses the increase in odds of successful closure per each unit increase or unit provided in the independent variable when all other independent variables are held constant. For example, if a consumer receives job placement services from VR (1.93), he/she has nearly double the chance of having a successful closure. An odds ratio of less than 1.0 indicates a negative relationship with the dependent variable. To better interpret this, the reciprocal or inverse can be calculated resulting in values greater than 1.00; leading to a more intuitive interpretation (Pedhazur, 1997). As mentioned above, there were four such variables. For example, the relationship between successful closure and receiving financial support from family and friends was negative (i.e., odds ratio .609). The reciprocal of .609 is 1.65. Interpreted this way, if a consumer *does not* receive financial support from family and friends, the odds of successful closure were 1.65 times greater. Receipt of public assistance or funds from family and friends

reduced the likelihood of obtaining a successful employment outcome following VR services.

Table 3

Logistic Regression Analysis Predicting Successful Closure

Predictors	Odds Ratio exponentiated b weights (ExpB)	SE B	p Value	95% Confidence Interval
Demographic				
Cognitive Disability	(.400) 2.51[R]	.026	.026	.178 .896
VR Service				
Time in VR	(.565) 1.78[R]	.045	.000	.483 .661
Cost of Services	1.93	.513	.013	1.14 3.25
Number of Services Received	1.40	011	.000	1.26 1.54
Diagnosis and Treatment	1.78	.326	.002	1.24 2.55
Job Placement in VR	1.93	.313	.000	1.12 2.71
Disincentive				
Family and Friends	(.609) 1.65[R]	.142	.024	.385 .962
Public Support	(.540) 1.85[R]	.137	.015	.328 .889

Note. The model (X^2=15.9) was significant; 66% correctly classified; R^2 = .12% [R] denotes reciprocal calculated

Discussion

This research identified a set of predictors for successful closure among a sample of VR consumers with SUD and co-occurring disabilities. The findings show that a complex web of demographic, work disincentives and VR service variables contribute to this outcome. These variables included having a disability other than cognitive; two work disincentive factors (supporting oneself without the aid of family and friends or public assistance); and five VR variables (shorter time in VR, higher cost of services, receiving more services, receiving diagnosis and treatment, and receiving job placement). Indeed, these findings are consistent with other VR closure studies that included persons with a broad range of disabilities (Andrews et al., 1992; Hayward & Schmidt-Davis, 2002; Marshak et al., 1990; Rosenthal et al., 2005) and studies that included only persons with SUD (Schwab & DiNitto, 1993).

It is interesting that the predictors in our model have consistently been identified in previous studies spanning nearly 15 years. Over this period of time, consumer characteristics which are relatively fixed (consumer demographics, disability types, benefits/work disincentives), as well as the malleable VR service characteristics (time in VR, cost of services, number and types of services received) have also remained constant. The stability of these predictors provides a basis for generating meaningful discussion on a national scale pertaining to developing more effective policies and practices within the scope of VR service delivery for persons with SUD.

Schwab and DiNitto (1993) found a 54% successful closure rate, 1% lower than this study (55%). Rosenthal et al. (2005) found a 56% successful closure rate, 1% higher than this study. In addition, the proportion of correct classification in our model was 66%, similar to the rate Rosenthal et al. (1997) found of 68%. Schwab and DiNitto (1993) correctly classified 83% of their sample, reasonably higher than this study or the Rosenthal et al. (1997) study. However, this higher rate may in part be due to the fact that their sample was consisted of a group of consumers with only a SUD diagnosis. Subjects with co-occurring disabilities were not included whereas our sample included persons with co-occurring disabilities.

Implications for Practice

This study found that the more services received the better. However, it is not that simple. What seems important to recognize is not only the amount of services but the *type* of services that are associated with successful employment. Five services were significant at the bivariate level: counseling, diagnosis and treatment, job search, job placement and on-the-job support. Job placement and diagnosis and treatment were also significant in the logistic regression model. Two VR services were of a psychological nature (counseling, diagnosis and treatment), and the other three were specific to the job site (search, placement and on-the-job support). These three service variables are consistent with an approach that recognizes the persisting functional limitations associated with SUD, including the need for workplace supports for persons in recovery (Brown & Saura, 1996; Crews et al., 2005). The services of a psychological nature, counseling and diagnosis and treatment, may be critical as early stage interventions.

Simply put, the success rate (55%) for persons diagnosed with SUD suggests that VR can be a very effective and necessary step to successful employment for persons with SUD. Based on the commonly held cost/benefit ratio in VR of 7:1 ($7 saved for every $1 spent), the results of this study represents a sound fiscal investment for supporting the additional "up front" costs and services required to generate successful VR closures for persons with SUD (Shepard & Reif, 2004). The cost savings potential for states considering on-going outlays of funds related to chronic SUD (e.g., treatment, criminal justice, Medicaid match funds, mental health services) needs to be recognized. This cost saving has more recently received attention at the federal level in recent Substance Abuse and Mental Health Services (SAMHSA) publications promoting the linkage of SUD treatment with employment services (SAMHSA, 2000; *TIP 38: Integrating Substance Abuse Treatment and Vocational Services*). Providing appropriate and adequate services for those with SUD appears to be a *cost-effective* means of rehabilitating those with SUD and co-occurring disabilities. Calculating the actual budgetary potential monetary impact of reducing the overall costs associated with SUD as a function of increasing successful VR outcomes begs attention and would require additional research inquiry.

A final theme generated from this study pertains to issues surrounding the dynamics attributed to public assis-

tance/benefits. Consumers in this study who received public assistance and/or funds from family and friends were less likely to have a successful closure than those who did not receive such funds. This finding should alert counselors to the idea that consumers receiving outside funds may be concerned about losing their benefits if they work or, may in fact, be even less motivated to work than others who do not receive such funding (Hayward & Schmidt-Davis, 2002). Although it is recognized that VR counselors typically receive initial and booster trainings on SSI, SSDI, and other benefits programs, the results of this study further magnifies the importance of VR counselor expertise in this area. Continued education regarding the evolving logistics of SSI and SSDI is imperative for counselors working in VR, and further illuminates the importance of providing such education and counseling to VR consumers with SUD on aspects of benefits and employment. In order to render such expertise, additional opportunities for providing VR counselor training surrounding the practical implications of SSI or SSDI benefits as well as family and friends' funds is needed.

In conclusion, there is ample evidence to support the belief that those with SUD can be as successful in VR as anyone else. To this end, VR counselors and indeed the VR service delivery system as a whole, has the ability to implement such qualitative improvements in service delivery for persons with SUD. Promoting such services would assist with defining acceptable work behaviors that promote abstinence, creating an environment that is well-structured, offers stable employment, a predictable work setting, and accountability.

Limitations

The variables we have identified may be used to predict successful closure, but some limitations are noted. The data are archival and retrospective in nature, and lack details about consumers in recovery. Indicators of recovery such as treatment completion or attendance at alcoholics anonymous (AA) would have provided valuable information in the prediction of successful employment. It would have been useful to assess the content and process of treatment for those who received formal treatment. Information about the content of care, especially if approaches such as 12-step groups were encouraged, would have enabled us to examine whether some of the predictors changed more or less because they were not addressed adequately in treatment. Finally, the study assumes the primary and secondary diagnoses are accurate, however, reliability checks on the accuracy of diagnoses was never investigated.

Future Directions

We suggest two areas of continued research, one being longitudinal in nature and the other being qualitative in nature. First, an in-depth longitudinal study replicating the predictors in this study would provide information regarding the variables that are associated with *maintaining successful employment* over time. Second, a better under-standing of what drives successful employment at the individual level (i.e., qualitative research) may assist clinicians in understanding and helping those who choose to drop out of VR but find employment through other means.

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Journal of Applied Rehabilitation Counseling (JARC)
Continuing Education Credit (CEU) Study Guide

Please read the article by M. McAweeney, J. Keferl, D. Moore, & J. Wagner included in the current issue of JARC. The title is *"Predictors of Successful Closure in the State-Federal Vocational Rehabilitation System: Findings from a Sample of Persons with Disability and Substance Use Disorders"* The following steps must be completed to obtain 3 CEUs credit.

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Multiple Choice Questions

1. Research shows that the more money that VR spends on services for a consumer the more likely they are to have a successful closure.
    a. True
    b. False

2. The unique sets of variables included in the prediction model for successful closure were:
    a. Consumer variables
    b. Work disincentives
    c. Vocational rehabilitation service variables
    d. All of the above

3. This study found that if a consumer receives job placement services from VR, he/she has nearly three times the likelihood of having a successful closure?
    a. True
    b. False

4. The following variables were found to predict successful closure:
    a. Shorter time in VR
    b. Higher cost of services
    c. Receiving more services
    d. Receiving job placement
    e. All of the above

5. State VR programs have two types of closures, either successful or status 26, or unsuccessful or status 28.
    a. True
    b. False

6. This is true statement "What seems important to recognize is not only the amount of services but the *type* of services that are associated with successful employment."
    a. True
    b. False

7. Work environment is an important consideration for a rehabilitation counselor working with someone in recovery form SUD. Environments should include:
    a. Behaviors that promote abstinence
    b. Creating an environment that is well-structured
    c. A predictable work setting
    d. All of the above

8. This study used a sub-sample of the RSA 911 data from 2005 because large samples can lead to statistically significant results that are not clinically relevant.
    a. True
    b. False

9. Which of the following was significant at the bi-variate level at predicting successful closure:
    a. Diagnosis and treatment
    b. Transportation
    c. Job search
    d. A & C

10. Work disincentives include:
    a. Lack of family support
    b. Lack of education
    c. Supplemental security income or social security disability insurance
    d. All of the above

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