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The Open Door Mission:
Measuring and Predicting Outcomes of One Community-Based Substance Abuse Treatment Program

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This study tracked graduates of a community-based substance abuse treatment program for homeless men in Houston, Texas. A standardized assessment instrument was developed to determine what characteristics were associated with a more favorable outcome. The authors found that abstinence was strongly predicted by employment, 12-Step work with Alcoholics Anonymous sponsors, and service with others in sobriety. In contrast to expectations, abstinence was not predicted by the programmatic goals of affiliation with a home church and/or identification of a mentor. Results support continued use of evidence-based outcome determinants for the Open Door Mission and other community-based substance abuse treatment programs.

KEYWORDS Substance abuse, treatment outcomes, community-based, Christian, 12-Step

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INTRODUCTION

A large number of studies have established the effectiveness of substance abuse treatment, including the Testing Combined Pharmacotherapies and Behavioral Interventions in Alcohol Dependence (COMBINE Study) (Anton & Randall, 2005), Matching Alcoholism Treatments to Client Heterogeneity (Project MATCH) (Project MATCH Research Group, 1998), the Rand report (Polich, Armor, & Braiker, 1981), the Baltimore Study (Johnson, Wiechelt, Ahmed, & Schwartz, 2003), and the National Institute of Drug Abuse (NIDA) Clinical Trials Network (McCarty et al., 2008). As one example, Project MATCH, a multisite clinical trial, which matched clients to one of three treatment models, demonstrated success in increasing the total number of days abstinent at 3 years' posttreatment, finding a nearly 30% abstinence rate during the final months of the study (Project MATCH Research Group, 1998). In their review of Project MATCH and six other large studies, Miller, Walters, and Bennett (2001) reported a 24.1% mean abstinence rate at one year posttreatment, as well as measurable reductions in drinking-related problems across the various studies.

Although there is a good deal of evidence for substance abuse treatment in controlled research settings, there are a number of difficulties in measuring the effectiveness of community-based substance abuse treatment, outside of research settings. From their work in developing research partnerships with community-based treatment agencies, Lamb, Greenlick, and McCarty (1998) found that most substance abuse treatment is provided in community-based settings. In a study of one community-based program for adolescents, Morral, McCaffrey, and Ridgeway (2004) were able to demonstrate the effectiveness of the program. However, they also noted several limitations, such as self-reported outcomes without collateral or biochemical verification, and lack of a comparable group or control. Other studies, such as the National Institutes of Health–funded review of treatment programs in the NIDA Clinical Trials Network (McCarty et al., 2008), noted other difficulties in applying research-based advances to actual practice in community-based programs, such as the inherently smaller study populations, and varied treatment philosophies across programs, which make generalization of study results more difficult. These difficulties have produced a dearth of scientific outcome studies for community-based treatment programs. This lack of empirical studies provides an opportunity to add to the literature through this outcomes study of a unique community-based treatment program.

In programs that do have valid and reliable results, such as Project MATCH, there is evidence that results often vary by individual characteristics but tend to be similar across bona fide treatment models (Project MATCH Research Group, 1998). Although there are numerous evidence-based treatment modalities used in research trials, including motivational enhancement therapy (MET) and cognitive-behavioral therapy (CBT), three major models
are most prevalent in community treatment practice: Minnesota model, the social model, and the therapeutic community model (Borkman, Kaskutas, & Owen, 2007). In their review of more than 8,000 posttreatment individuals, Miller et al. (2001) demonstrated that across all models, at one-year follow-up, about 25% had achieved a level of sustainable abstinence, whereas another 10% demonstrated success in controlled drinking without the previous, pretreatment negative consequences. Although average outcomes are similar across programs at a one-year follow-up, there are inconsistencies between studies that may make the results difficult to interpret. For example, though some studies measure abstinence only, others measure number of drinks consumed on a typical drinking day, or number of heavy drinking days. Further, many treatment programs also consider broader quality-of-life (QoL) elements that are related to abstinence (Longabaugh, Mattson, Connors, & Clooney, 1994; Walton, Blow, Bingham, & Chermack, 2003). Although some programs and studies include such QoL elements in their outcome measures, there is no standard for such and thus the actual outcomes are generally not comparable across programs or studies (Rudolf & Watts, 2002). In a recent editorial about the aims of substance abuse treatment, Miller and Miller (2009) discussed the most widely used QoL elements in research, including standard of living, personal health, achieving in life, personal relationships, personal safety, community connectedness, future security, and spirituality-religion.

Dennis, Foss, and Scott (2007) measured outcome rates of community-based outpatient and residential programs based on current period of abstinence at 8-year posttreatment follow-up. This study demonstrated that only 20% of the original cohort were abstinent more than one year, 11% were abstinent for more than 3 years, and 6% had abstained for 5 years or greater. Although this study measured various QoL factors and discussed associations of such factors with abstinence, the authors’ goal was focused on using such factors to predict future abstinence (Dennis et al.). When considering gender differences, the authors found that women had significantly greater odds of sustaining abstinence than men. Other studies demonstrate that individual factors can also predict success, such as the absence of coercion to enter treatment (Burke & Gregoire, 2007) and marriage stability (Hartmann, Sullivan, & Wolk, 1991).

In addition, there is a broader base of individual factors that predict outcome, including biological predisposition, past history of use, and external factors, such as social or geographic environment (Walton et al., 2003). Some studies have identified factors within the individual's locus of control, whereas others demonstrate the importance of environmental factors (Longabaugh et al., 1994; Pagano, Zemore, Onder, & Stout, 2009). For instance, involvement in treatment or aftercare self-help groups has been found to contribute to a more favorable outcome. There are numerous studies that demonstrate the effectiveness of participation in 12-Step recovery programs, such as Alcoholics Anonymous (AA). In one study, Pagano et al. (2009), in their analysis of Project MATCH data, analyzed various levels of
involvement in AA, such as meeting attendance, sponsorship, step work, and 12-Step facilitation with treatment, as potential predictors of successful outcomes. This study demonstrated that greater levels of involvement and, more specifically, helping others (by sponsoring newcomers and providing service to the group), was associated with more successful outcomes (Pagano et al., 2009). A more recent study by Pagano and colleagues (2010) also found a significant relationship between service-related behaviors and abstinence. The literature also demonstrates an association between spiritual growth (via religion or other means) and improved outcomes (Miller, 1998; Montgomery, Miller, & Tonigan, 1995), which is inherent to greater involvement with AA sponsorship, step work (working and practicing the 12 steps of AA), and service to others. In their study, Montgomery et al. (1995) found that simply attending AA meetings was not associated with better outcomes, whereas there was a measurable improvement with actually getting involved with the fellowship and “working the steps” as AA members.

This study sought to measure outcomes and identify predictors of success for individuals who received treatment through the Open Door Mission (ODM), a community-based, Christian substance abuse treatment program in Houston, Texas. Specifically, we tracked various levels of 12-Step program involvement, as well as other social and spiritual activities, such as church affiliation and engagement in recovery support. Based on the results of the follow-up interviews, we identified associations of these indicators with posttreatment substance abuse outcomes.

We identified behavioral factors and indicators of success as they apply to the men of ODM to develop an instrument for tracking the men in the cohort specific to these outcome measures at baseline and over time. We developed a framework for measuring and testing each of the variables at follow-up. The goal was to identify direct associations of specific variables and combinations of these variables with better treatment outcomes. Our cohort included the Mission’s clients who completed initial treatment between June 2009 and March 2010, which created a rolling interview schedule. Follow-up interviews and data collection were conducted at the following points: (1) upon completion of the 9-month initial treatment program, and (2) 3 to 6 months following the initial interview, and (3) 9 to 12 months following the initial interview, for those who had completed treatment in the first 6 months of the study. Thus, the study cohort measures outcomes at 12 to 21 months following initiation of treatment, or 3 to 12 months posttreatment.

METHOD

Participants

Participants were the alumni members, or graduates of ODM’s 9-month, faith-based therapeutic community substance abuse treatment program in
Houston, Texas. The Mission’s program is exclusive to men who have limited financial resources: some participants are homeless, whereas others are dependent on parents or other family members for basic living needs. Generally speaking, these men do not have private insurance, sustainable income or housing, and therefore do not have access to treatment centers that require individual or third-party payment. Because of this, and because of the Mission’s history of having an “open door” program, as well as its faith-based exemption status, which promotes a lay, rather than professional counseling approach, the admission or intake process does not include a formal substance abuse dependence diagnosis, or any addiction severity assessment. If beds are available, most who express a desire to participate in the Mission’s 9-month program are accepted, regardless of severity of current or past substance abuse history. About 200 to 250 men, ages 18 and older, enter the Mission’s treatment program each year, and on average 25% complete the 9-month residential program. Of those who enter the program, the mean age is 45. On average, 48% of the men are Black, 38% are White, 13% are Hispanic, and 1% Asian, Native American, or other heritage. ODM, which is funded exclusively by private donations, provides treatment at no charge to the men in its treatment programs. The Mission’s treatment program cannot be classified as any of the three major treatment models described above (Borkman et al., 2007). However, many of the Mission’s practices are similar to those found in the social and therapeutic community models, which, unlike the Minnesota model, are generally long term in duration. Longer treatment is associated with improved outcomes for some populations, particularly those in need of housing, or medical or mental care, and those with more severe substance abuse histories (McLellan et al., 1996; Prendergast, Podus, Chang, & Urada, 2002; Simpson, Joe, & Brown, 1997; Walker, 2009). However, there is a paucity of evidence for the effectiveness of specific treatment durations. One analysis of two randomized controlled trials (RCTs) that stratified by treatment duration found effectiveness for treatment durations of up to 6 months (McCusker & Bigelow, 1997). Interestingly, the Mission’s rationale for the 9-month program duration is simply that it is symbolic of the normal human gestation period, and the Mission emphasizes the importance of the Christian concept of being “reborn.”

Data Collection

Interviews were conducted with men as they graduated or completed the 9-month treatment program. The questionnaire instrument was completed during the interview, and assessment scores were assigned to each behavioral factor to quantify the level of progress each client took toward the potential behavioral predictor or abstinence-related factor. Data were collected at the following intervals:
• At graduation, as a graduation requirement
• Three to 6 months follow-up after graduation
• Nine to 12 months follow-up, for those who graduated in the earlier cycles
• Upon reentry to the Mission (for recent relapers).

Specific substance use, social and behavioral factors were assessed by the interviewer, based on self-reported information and rating criteria. When available, self-reports were verified through the Mission’s files and staff reports. These factors included those currently used by ODM to measure successful outcomes, as well as additional factors as previously discussed. Each factor was rated as one of three possible scores. Generally, 0 (no action or involvement), 1 (some or partial action), and 2 (full action). These factors or variables and their respective rating criteria include:

1. Current state of abstinence: In most recent interview (or any contact), the participant was rated as either 0 (if currently in relapse), 1 (if had a slip or relapse since graduation but had been abstinent for the most recent 30 days), and 2 (if no posttreatment relapse).
2. Employment: No employment was rated 0; part-time, seasonal or casual employment was rated as 1; full-time, permanent employment was rated 2.
3. Absence of criminal activity (no posttreatment arrests or convictions): If the ODM security staff identified any posttreatment criminal activity (arrests or convictions) or if the participant self-reported any such activity, a 0 rating was assigned. If no such activity was identified, the participant rating was 1. If the participant reported specific actions toward resolving pretreatment legal problems, a 2 was assigned.
4. Home church affiliation and fellowship: If no home church was identified, or if the participant reported no regular attendance (less than once a month), a 0 rating was assigned. If a home church was identified, and attendance was once a month or greater, the participant was rated 1. If a participant reported a home church and was actively involved with the fellowship (attendance more than once a month and actively involved with the fellowship), a rating of 2 was assigned.

Behavioral and social factors beyond ODM’s definition of success, which may be predictors of better outcomes (Miller, 1998; Montgomery et al., 1995), were rated as follows:

5. Attendance at 12-Step meetings or other recovery-specific groups: If a participant reported no meeting attendance, a 0 was assigned. A participant who occasionally (once a week or less) attended 12-Step meetings (AA, Narcotics Anonymous, Cocaine Anonymous, or Celebrate Recovery)
or aftercare or relapse prevention group discussions was assigned a 1. Those who reported attendance frequency of greater than once a week were assigned a 2.

6. Recovery home group affiliation and fellowship (AA, NA, CA, or Celebrate Recovery): A home group is a weekly meeting group which the person in recovery identifies as his primary recovery fellowship group (e.g. “the Tuesday breakfast group”). If no home group was identified, or if the participant reported no regular attendance at a specific group (less than twice a month), a 0 rating was assigned. If a home group was identified, and attendance was twice a month or greater, the participant was rated 1. If a participant reported a home group and was actively involved with the fellowship (social or recovery-specific activities beyond meeting attendance, as well as attendance more than twice a month), a rating of 2 was assigned.

7. Working with a sponsor in a specific program of recovery (AA, NA, CA, or Celebrate Recovery): Participants who reported no sponsor were assigned a 0. Participants who reported having a sponsor but were not actively working with the sponsor toward progress in their program were assigned a 1. A participant who reported actively working with a sponsor toward completing the 12 Steps (i.e. “working the steps”) in a program of recovery was assigned a 2.

8. Working with a mentor: Participants who reported no mentor were assigned a 0. Participants who reported having a mentor but were not actively working with the mentor were assigned a 1. A participant who reported actively working with a mentor toward a spiritual, personal development or employment-related goal was assigned a 2.

9. Financial means for self-sustainability: This measurement point was developed specifically to account for those who may have had a disability and could not work or may have been pursuing higher education and did not have capacity to work full-time. It accounts for the element of being self-sustainable through state, Veteran’s Affairs, or federally awarded disability, education grants, or student loans and not dependent on charity or welfare. Participants were assigned a 0 if they had no qualified disability income, loans, or grants. If there was some income, but it was not sufficient for self-sustainability, the participant was assigned a 1. If such income was sufficient for independent living, which was a primary aim of ODM’s program, a 2 was assigned.

10. Personal development (vocational or general education): Participants who reported no structured personal development plan were assigned a 0. A participant who reported some action toward a specific personal development program, such as General Equivalency Diploma, higher education, or vocational training was assigned a 1. Participants who report posttreatment completion of such structured programs were assigned a 2.
11. Supportive social networks: A participant who did not report having a support network of others in recovery was assigned a 0. Participants who reported active fellowship with others in recovery, but the fellowship was limited to those who had similar time in recovery were assigned a 1. Participants who reported active involvement with a support network, which included people who had demonstrated long-term success in recovery, were assigned a 2.

12. Voluntary service work with others in recovery or community: A participant who reported no active service to others in recovery or the community was assigned a 0. A participant who reported active service work specific to a 12-Step recovery group, a church, or other community organization was assigned a 1. Participants who reported such involvement, as well as active sponsorship of others in recovery were assigned a 2.

In March 2010, ODM developed and implemented an intensive aftercare program. Detailed attendance records were maintained since implementation, which enabled us to include aftercare participation as an additional variable for tracking and measurement for this study. If a participant reported no aftercare attendance, a 0 was assigned. A participant who occasionally (less than once a week) attended aftercare functions was assigned a 1. Those who regularly attended once a week or more were assigned a 2.

Data Analysis
To meet our study objectives of determining average outcomes of ODM’s 9-month community drug and alcohol treatment program, as well as to identify social and behavioral predictors of better outcomes, we first examined the number of men who met the criteria for desired outcomes, as established by ODM. This desired outcome is extremely rigid, in that it does not allow for any slips or relapse, and further requires men to meet three other requirements: (1) full-time employment, (2) no posttreatment arrests or convictions, and (3) affiliation with a home church. Because of this rigidity, our scoring methodology was applied to this multifaceted outcome objective to identify progress toward such objectives, rather than perfection in all criteria. To achieve the second goal of identifying predictors of better outcomes, we conducted pairwise analyses of the various posttreatment factors to identify which of these factors, or which combinations of factors were associated with better outcomes. Due to the limited number of study participants, we lacked a large enough sample for using multiple target variables; therefore, we used a single target (outcome) variable: sobriety or abstinence. We started with an application of a multivariate modeling data analysis method (see following) that allowed simultaneous handling of nonindependent (or partially redundant) discrete (categorical, but not necessarily ordinal or interval) predictive
variables, and followed up with the standard statistical analyses of various hypotheses suggested by the researchers and treatment staff at ODM. An advantage of this small cohort is that we could observe and manually handle the data to test multiple hypotheses. Although there were numerous potential hypotheses that could have been tested for our cohort, we identified and tested five key hypotheses, which were focused on identifying behavioral factors most strongly associated with better outcomes.

This project was approved by the Institutional Review Board of the University of Texas Health Science Center at Houston. All participants provided informed consent.

RESULTS

Of the 69 participants (all program graduates from June 2009 through March 2010), three were removed due to missing information either at the initial interview, follow-up, or both. Of the 66 participants remaining in the study, 40 reported no slip or relapse, resulting in a reported 61% abstinence rate. Of those who reported relapse, most were “hard” relapses, or long periods of relapse for which the participants returned to pretreatment levels of substance abuse, and had not returned to recovery. For purposes of this study, we defined recovery as more than 30 days of abstinence and participation in a program of recovery, either through 12-Step meetings and sponsorship or through a formal treatment program. When using ODM’s more inclusive success criteria, 24 of the 66 participants (36%) met the requirements for success. Specific to this success criteria, 54 (82%) reported affiliation with a home church, 26 (39%) reported full-time employment, 61 (92%) did not report (or were not identified as having) any posttreatment arrests or incarceration, and 40 (61%) reported continuous abstinence from drugs and alcohol. Table 1 shows the aggregate results for each of the primary variables. For all of the evidence-based recovery activity variables, including 12-Step meeting and aftercare attendance, home group affiliation, having a sponsor, supportive social networks, and service with others, the 0 rating was most prevalent, with a range of 46% to 79% and a 67% mean. The 1 rating ranged from 10% to 40% with a 23% mean, and the 2 rating ranged from 2% to 12% with an 8% mean.

To determine predictors of outcome, we applied nonparametric descriptive modeling using B-Course software (Myllymäki, Silander, Tirri, & Uronen, 2002), a standard implementation of the Bayesian network modeling analysis ( Heckerman, 1995), and visualized the resulting networks to identify direct associations of certain variables with the desired outcomes. The Bayesian network modeling also quantifies the strengths of associations via a likelihood ratio test that compares the marginal likelihood of a model with a certain feature (association between potentially predictive variable and the outcome
TABLE 1 Behavioral Factor Scoring Results

<table>
<thead>
<tr>
<th>Behavioral factors</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>1. Current state of abstinence</td>
<td>37%</td>
</tr>
<tr>
<td>2. Employment</td>
<td>36%</td>
</tr>
<tr>
<td>3. Absence of criminal activity</td>
<td>8%</td>
</tr>
<tr>
<td>4. Home church affiliation</td>
<td>12%</td>
</tr>
<tr>
<td>5. Attendance at recovery groups</td>
<td>66%</td>
</tr>
<tr>
<td>6. Recovery home group</td>
<td>74%</td>
</tr>
<tr>
<td>7. Working with a sponsor</td>
<td>79%</td>
</tr>
<tr>
<td>8. Working with a mentor</td>
<td>80%</td>
</tr>
<tr>
<td>9. Financial sustainability</td>
<td>39%</td>
</tr>
<tr>
<td>10. Personal development</td>
<td>72%</td>
</tr>
<tr>
<td>11. Supportive social networks</td>
<td>46%</td>
</tr>
<tr>
<td>12. Voluntary service work</td>
<td>71%</td>
</tr>
<tr>
<td>13. Aftercare participation</td>
<td>73%</td>
</tr>
</tbody>
</table>

Ratings of “0” represent no action or the lowest possible score, “1” represents some action, and “2” represents the maximum, or best rating for a given factor.

variable) present to that without the feature. Although it is difficult to directly quantify the ratio in terms of $p$ values, a large number signifies a stronger dependency. Throughout the figures depicting the reconstructed networks, lines and arrows are used to illustrate the dependencies: the stronger the dependency, the darker the line. Although the arrows demonstrate one-way associations throughout the figures, the actual dependency relationships can point in either direction (the arrows being largely a mathematical convenience artifact).

From visualizing the resulting networks and the interplay of the behavioral and social variables and their associations with both abstinence and ODM’s success criteria, we identified several important dependencies throughout these analyses. Figure 1 shows the dependency relationships with each of the variables, as they relate to abstinence, whereas Figure 2 relates the dependencies to both abstinence and ODM’s success criteria.

The most important predictor of abstinence was employment. Ninety-five percent of those who reported full-time employment also reported continuous posttreatment abstinence, whereas 50% of those working part-time were abstinent, and 29% of those with no employment were abstinent. Important social predictors of abstinence included having a recovery support network and/or a recovery home group affiliation and fellowship. Twelve-step–related predictors of abstinence included working with a 12-Step sponsor, attending aftercare, and service with others. Contrary to expectations, home church affiliation was not a predictor of abstinence, nor was any of the measured behavioral or social factors predictors of home church affiliation or fellowship. We further found no association of home church affiliation
Note. The Home Church variable is independent of all other variables in this model and was represented as a separate variable with no connections.

**FIGURE 1** Dependency relationships for all measured variables and abstinence.

**FIGURE 2** Dependency network with combined assessment score and ODM success.
with other measured variables, including the employment variable. Finally, working with a personal mentor was not a predictor of abstinence.

**DISCUSSION**

This study tracked graduates of a 9-month community-based, Christian substance abuse treatment program for homeless men in Houston, TX. When using a relatively stringent measure of outcome, we found relatively low rates of success for programmatic goals, including aftercare participation, service work, and working with a sponsor or mentor. Specific to our first goal of measuring average outcomes, we found that 27% of men who entered the program completed the program. Of those who completed the program, 61% remained abstinent for 3 to 12 months following completion of treatment, and 36% met ODM’s full requirements for success, resulting in a total success rate of 9.7% at 3 to 12 months follow-up. However, when considering broader QoL measures, we found relatively high rates of affiliation with a home church, avoidance of arrests or incarceration, at least part-time employment, and at least some progress toward sustained abstinence. With regard to our second goal of identifying predictors of success, the simple combined assessment methodology (Bayesian networks used as a naïve Bayesian classifier) predicted 70% of relapses and 95% of abstainers throughout the duration of the study and is generalizable to similar posttreatment populations. Outcome was strongly predicted by employment, 12-Step work with AA sponsors, and service with others in sobriety. We did not find that outcome was related to affiliation with a home church and/or identification of a mentor.

The strengths of this study primarily relate to the community setting of ODM, and the applicability of our results to similar “real-world” programs. Although conducting research in community-based settings is generally difficult, these factors helped to obtain more accurate follow-up information from the study participants, as well as certain supporting information from ODM’s staff and community members. Limitations of this study include the relatively short and variable follow-up periods. Specifically, at the conclusion of the study, more than one half (53%) of the participants had been assessed at 6 months or fewer posttreatment. From the literature, as well as data from this cohort, abstinence levels tend to be higher during the initial 6 months following treatment than further out in time. Thus, it is likely that the segment of this cohort with follow-up from 6 to 12 months represents more accurate posttreatment outcomes, with greater external validity. Because of our small sample size, tracking subgroups by posttreatment duration would greatly diminish the study’s robustness. Further, because the study was conducted along with ongoing follow-up conducted by ODM, it is possible that participants may not have been revealing of certain information, such as slips and relapses, as ODM has strict policies for those who relapse. To reduce
this effect, the interviewer also reviewed ODM records for urinalysis results and asked various staff members of ODM about the participants’ behavior. Another limitation is that ODM does not conduct an assessment of addiction severity upon intake, or at any point during treatment. Thus, it is likely that some study participants did not meet criteria for alcohol or drug dependence when they entered treatment. Such a confounder has an impact on outcomes that likely inflates the observed recovery rates. Also, when discussing certain variables, such as employment, as being predictors of abstinence, we cannot simply assume directional causation. For instance, though we have stated that employment is a predictor of abstinence, we could also infer that abstinence is predictive of employment.

With regard to predictors of outcome, it is well established that employment tends to be associated with better outcomes (Roll, Prendergast, Richardson, Burdon, & Ramirez, 2005), and we found a strong relationship between employment and outcome. This finding might be related to the characteristics of this study population specific to pretreatment employment status. For most participants, gainful occupation preceding treatment was infrequent. The recovery support variable, which is a social and behavioral factor, has been demonstrated through the literature, primarily in studies of sober living facilities and programs that are more aligned with the social model of substance abuse treatment. Recovery home group affiliation and fellowship variables were found, through testing, to be associated with engagement in ODM’s aftercare program. These, along with the 12-Step sponsor, step work, and service to others variables are consistent with the literature. However, we observed that few of the participants in this study actively worked with 12-Step sponsors, were engaged with the aftercare fellowship, or service work with others in recovery.

The home church variable findings, which showed no association with abstinence or other recovery-specific variables, were somewhat unexpected, because home church affiliation is a primary component of ODM’s treatment program. In fact, for many of the participants, church attendance and fellowship are the exclusive components of their personal recovery. To test the validity of this finding, we manually analyzed the home church variable as follows: From the assessment results specific to this variable, we observed that 54 (82%) of the participants reported affiliation with a home church. However, abstinence rates remained constant at 60% across all three ratings within this variable. This confirmed that there was no association between church attendance and abstinence. The study further found no association of home church affiliation with other measured variables, including the employment variable. These results suggest that though home church affiliation may be an outcome objective for the Mission, there is no indication that home church affiliation has any association with improved abstinence, or the behaviors or social factors that are predictive of abstinence. Similarly, abstinence levels remained constant across the three variables for
mentorship, although few participants actually reported measurable activity with mentors.

Since the initial development of this study, various scoring methodologies have been considered and discussed with ODM. In this communication, we demonstrated predictability of abstinence using a combined assessment score that takes into account all the social and behavioral variables included in the study. These results showed that though ODM’s success determination is associated with abstinence, the combined assessment score (CAS) has an even closer association with abstinence. In considering the strength of this CAS as a predictor of success, we further refined our methodology to include only those variables that were associated with abstinence. This resulted in removal of the home church and mentor variables. Although this data-driven approach did not result in any measurable change to the assessment score’s association with abstinence, it revealed a new important finding (see Figure 3). By making these minor changes of removing two seemingly insignificant variables, the Bayesian network model suggested the second strongest variable dependency relationship seen throughout our data analysis: a relationship between the modified CAS score and the service with others variable. Service with others was identified in our literature review to be one of the strongest behavioral elements associated with long-term sobriety (Cloud, Ziegler, & Blondell, 2004; Miller, 1998; Montgomery et al., 1995; Pagano et al., 2009; Pagano et al., 2010; Tonigan, Connors, & Miller, 1996). This one variable, not coincidentally, is the central focus of the 12th Step of AA, “Having had a spiritual awakening as the result of these steps we tried to carry this message to other alcoholics and practice these principles in all of our affairs” (Alcoholics Anonymous, 2001, p. 60).

![FIGURE 3 CAS dependencies after removal of home church and mentor variables.](image)
Even more, AA’s spiritual principle underlying “service” step is repeatedly emphasized in AA literature as the primary element that keeps alcoholics sober after working the steps. Service with others, as any long-time AA member will attest, is the cornerstone of the long-term success of AA. Perhaps most important to ODM is the fact that service with others, though not specifically stated as such, is arguably the primary outcome objective of its faith-based program. Figure 4 provides the complete dependency network of all variables included in this study. This comprehensive Bayesian network model positioned the modified CAS as the central variable.

Importantly, our combined assessment methodology might be useful as an outcome assessment as well as a way to match clients to services. For example, counselors might be able to identify their client’s risk level based on the client’s combined assessment score, and then coach the client toward taking action along the lines of the various behavioral factors that appear to be deficient. This may help direct the client toward a more successful outcome. As discussed above, previous studies demonstrate that variables such as working with a sponsor, step work, greater involvement with the recovery fellowship, and sponsoring others have strong associations with long-term abstinence (Miller, 1998; Montgomery et al., 1995; Pagano et al., 2009; Pagano et al., 2010). Similarly, our analysis demonstrates association of 12-Step recovery variables with better outcomes. Figure 2 identifies the dependencies of the 12-Step recovery variables, recovery home group, 12-Step meeting attendance, service with others, and 12-Step sponsor. The edges in the network identify the association of these variables with the primary outcome objectives: abstinence and ODM’s success criteria. Although some of these dependencies are stronger than others, this study demonstrates that associations with abstinence and the ODM success criteria are not simply based on one social or behavioral factor. Rather, these relationships are interdependent and show that abstinence is achieved through a combination of many 12-Step and other action-oriented recovery variables. This is consistent with the literature of AA, which emphasizes ongoing engagement with the recovery fellowship, daily spiritual growth practices as described in the 12 Steps, and selfless giving of one’s time toward helping others to recover.

The results of this study provide evidence, specific to a community-based treatment program, of the predictive capability of a simple assessment methodology, as well as the ability to measure outcomes with reasonable validity in a community-based setting. This study yielded many benefits for ODM that may be helpful for other community-based substance abuse treatment programs. The uniqueness of this study principally stems from the fact that the community setting of ODM allows for a quasi-clinical approach to ongoing research at very little expense. Continuing to follow the same cohort (as well as adding new participants) as they complete treatment will likely improve the robustness, internal validity and external validity of the
FIGURE 4 Comprehensive dependency model for all variables in the study.
study, which will bring more conclusive results to ODM, and will strengthen the case for generalization to other populations.

REFERENCES


