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AiRCare: A Naturalistic Evaluation of the Effectiveness of a Protracted Telephone-Based Recovery Assistance Program on Continuing Care Outcomes☆

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ABSTRACT

Background & Objective: Substance use disorder treatments are increasingly being contextualized within a disease management framework. Within this context, there is an identified need to maintain patients in treatment for longer periods of time in order to help them learn how to manage their disease. One way to meet this need is through telephone-based interventions that engage patients, and include more active outreach attempts and involvement of the patient's family. This study sought to evaluate the effectiveness of three formats of an intensive 12-month post-discharge telephone-based case management approach (*AiRCare*) on adherence to continuing care plans and substance use outcomes.

Methods: Data were abstracted from electronic medical records for 379 patients (59.9% male) discharged from a residential treatment program located in the southwestern U.S. from 2013 to 2015. Patients were categorized into one of three groups and received telephone contacts based on their self-selection upon admission to residential treatment (i.e., patient only, family only, and both patient and family). Outcome variables included re-engagement and re-admission rates, quality of life, abstinence rates at 6 and 12 months, and compliance with continuing care plans.

Results & Conclusions: Favorable short- and long-term outcomes were found for the majority of patients, irrespective of case management group. There appeared to be some value in the addition of family contacts to patient contacts with respect to reducing risk for 12-month re-admission to residential care. These positive but preliminary indications of the effectiveness of AiRCare require replication in a well-powered, randomized controlled trial.

1. Introduction

The treatment of substance use disorders (SUDs) is increasingly being contextualized within a disease management framework analogous to that of other chronic medical conditions such as hypertension, diabetes, and asthma (Institute of Medicine [IOM], 2006; McLellan, Lewis, O'Brien, & Kleber, 2000). Accordingly, there has been a shift in focus in recent years from the primary to secondary phase of treatment. Depending on the level of care received during the primary phase, the secondary or continuing care phase typically involves some form of less-intensive, tapered care (e.g., standard outpatient treatment, community-based self-help/support groups), which can range in duration to up to several years. Although the initial primary treatment episode and accompanying level of care may vary based on a number of factors (e.g., quantity and frequency of substance use, presence of withdrawal symptoms), an important component of any continuing care model is that the patient subsequently receives some form of protracted treatment following completion of the primary phase. The main goal of any continuing care model should be to sustain treatment gains attained in the primary phase in an effort to ultimately manage SUD and achieve remission.

In general, results from controlled trials indicate that the provision of some form of lower intensity continuing care services delivered in the context of outpatient treatment after the primary treatment phase (e.g., residential) has been associated with favorable long-term clinical outcomes (e.g., for reviews see McKay, 2009; Proctor & Herschman, 2014). As elaborated by McKay (2009), however, there is considerable between-patient variability in response to continuing care interventions,

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which can be influenced by a number of patient-level and program-level factors including most notably, retention. In response, there has been a proliferation of studies focused on the development and evaluation of interventions designed to increase patient engagement in their continuing care plans following primary treatment (e.g., Lash, 1998; Lash & Blosser, 1999; Lash, Burden, Monteleone, & Lehmann, 2004; Van Horn et al., 2011).

Similar to the approach taken for other chronic medical conditions (e.g., diabetes, hypertension, asthma), there is a push for SUD treatments of indeterminate periods with regular monitoring and modification as appropriate (McLellan, McKay, Forman, Cacciola, & Kemp, 2005). Central to this approach is the routine monitoring and management of symptoms. One such method to achieve this effort is case management. Although definitions of "case management" vary widely, for the purposes of the present study, case management will be defined as a coordinated approach to the delivery of substance use, psychiatric, medical, and social services, in which there is a linkage with appropriate services to address specific needs and achieve stated goals. According to best practice guidelines devised by the Substance Abuse and Mental Health Services Administration (2000), case management is an effective adjunctive to SUD treatment for two reasons: (1) retention and compliance with treatment is associated with better outcomes, and (2) there is a greater likelihood of treatment success when patients' co-occurring problems are addressed concurrently with substance use. Case management lends itself well to the treatment of SUDs due to its principal goal of keeping patients in treatment and moving them toward recovery, and its focus on the "whole" individual and addressing multiple aspects of a patient's life (SAMHSA, 2000). In order to enhance the scope of SUD treatment, it is crucial that case management be implemented to its fullest. Accordingly, SAMHSA has identified several elements of an effective case management approach, including providing the patient with a single point of contact, advocating for the patient, being flexible and patient-oriented, and measuring and documenting specific outcomes.

One delivery vehicle for case management interventions is the telephone, which is a low-burden, low-cost method relative to traditional face-to-face approaches (McCollister, Yang, & McKay, 2016). Previous research testing the effect of adding telephone follow-up contacts to standard continuing care practices has found this strategy to be associated with improved clinical outcomes (McKay et al., 2010), particularly among more severe, high-risk patients (McKay et al., 2013). Despite generally positive findings regarding telephone-based continuing care interventions, there remains some evidence suggesting that they are no more effective than treatment as usual (Connors, Tarbox, & Faillace, 1992; Hubbard et al., 2007). Potential reasons for the lack of clear evidence of efficacy include the limited number of contacts for the intervention condition. Although there is mounting evidence for the effectiveness of telephone-based continuing care, many programs limit contact to the initial 3 months following the primary treatment episode (Horng & Chueh, 2004; McKay, Lynch, Shepard, & Pettinati, 2005), and even continuing care programs designed to provide protracted telephone follow-up have demonstrated limited phone contacts (Cacciola et al., 2008; McKay et al., 2010). Research suggests that greater participation in telephone-based continuing care interventions yields more positive outcomes, such that patients who were more involved (i.e., 5+ contacts) typically reported greater rates of recovery-oriented behaviors (i.e., frequent 12-step group attendance, having a sponsor, contact with program alumni, and abstinence) than those who were less involved (Cacciola et al., 2008). Thus, if treatment programs and all relevant stakeholders aspire to favorable long-term clinical outcomes, interventions with a longer planned duration of contact, coupled with more active outreach attempts appear to be a requisite for these efforts (McKay, 2009).

Another shortcoming of current continuing care models is their near exclusive focus on the patient and resultant lack of family involvement. Considerable research shows that involvement of family members or significant others in substance use treatment is associated with a number of favorable outcomes (Beattie, 2001; Carroll, 1997; Edwards & Steinglass, 1995; Longabaugh, Beattie, Noel, Stout, & Malloy, 1993; McKay, Merikle, Mulvaney, Weiss, & Koppenhaver, 2001; Sisson & Azrin, 1986). Although many accepted and evidence-based substance use treatment models recognize the importance of family involvement and promote fellowship (Moos, 2007; Rowe, 2012; SAMHSA, 2004), inclusion of family members in continuing care approaches is often absent or secondary due presumably to the limited resources with which many treatment programs operate. Still, primary treatments are increasingly acknowledging the value of family involvement at some level (SAMHSA, 2006), as evidenced by the incorporation of family-focused activities and elements (e.g., "family day," weekly visitation, basic education for family members) into standard program practices (Gifford, 2013; Moos, 2007; SAMHSA, 2004). There are also community-based self-help groups dedicated specifically to the provision of support to patients' families (Al-Anon Family Groups, 1995). However, these groups are offered exclusively to family and friends, and do not involve the patient. Further investigation of continuing care protocols that explicitly include both patients and their family members is warranted.

Despite accumulating evidence supporting the use of telephone-based continuing care approaches, there is an identified need for interventions with a longer planned duration of contact, more active outreach attempts, and involvement of the patient's family. The current investigation presents a novel, protracted case management approach (i.e., *AiRCare*), which addresses these issues and features the use of a low-burden service delivery system (i.e., telephone contacts). This study evaluates the impact of three formats of a 12-month telephone-based recovery assistance program on adherence to continuing care plans and various clinical outcomes using data from a naturalistic treatment population. The rationale for providing 12 months of case management post-discharge from primary treatment is consistent with the research literature, which shows that continuing care over a protracted period of up to 12 months appears to be essential if a reasonable expectation of robust recovery is desired (Proctor & Herschman, 2014).

2. Material and methods

Data for the present study were derived from patient records utilizing the management information system of AiR Healthcare Solutions, a large behavioral health care management services provider. Patients were initially identified from the management information system based on specified inclusionary criteria: (1) discharge from the same residential substance use treatment program during the period of December 8, 2013 to January, 17, 2015; and (2) admission to the chemical dependency track as opposed to one of the other four available tracks (i.e., mood, trauma, pain, or eating disorder). Of the 404 patients initially identified based on the aforementioned inclusionary criteria, 25 patients were excluded given they elected to not participate in the case management program and subsequently did not receive any telephone follow-up contact; which resulted in a net sample of 379 patients. Patients were studied through retrospective electronic record review for 12 months following discharge from primary treatment. All personal identifiers were removed by the care management services provider prior to release of the data. Release of the de-identified data set was approved by the provider for use in secondary analyses and permission to use the data set was approved by the Institutional Review Board of Albizu University.

2.1. Participants

Demographic and clinical characteristics for the total sample at baseline, stratified by case management category, are detailed in Table 1. The study sample was comprised of 379 patients (59.9% male) with an average age of 39.6 years ($SD = 14.05$). The racial composition of the sample was predominately Caucasian (91.8%). Almost half (45.6%) indicated that they were single at the time they were admitted

Table 1
Baseline Demographic and Clinical Characteristics of the Total Sample, Stratified by AiRCare Format.

Variable	AiRCare format		
	Patient only (n = 99) %	Family only (n = 72) %	Patient + Family (n = 208) %
Demographic			
Age$^{M\ (SD)}$ (years)*	43.9 (*13.81*)	36.6 (*14.51*)	38.5 (*13.58*)
Sex			
Male*	48.5	65.3	63.5
Race/Ethnicity			
Caucasian	92.9	90.3	91.8
African American	0.0	0.0	0.0
Hispanic	2.0	0.0	0.5
Asian	1.0	0.0	0.5
Other	0.0	1.4	2.9
Missing	4.0	8.3	4.3
Employment status*			
Employed	54.6	41.7	55.3
Unemployed	35.4	45.8	33.2
Retired	7.1	4.2	4.3
Student	3.0	8.3	7.2
Marital status			
Single	37.4	54.2	46.6
Married/Significant other	49.5	41.7	40.4
Divorced	9.1	4.2	9.6
Separated	4.0	0.0	2.4
Widowed	0.0	0.0	1.0
Payment method			
Private pay	67.7	61.1	69.7
Insurance	23.2	27.8	20.2
Payer mix	9.1	11.1	10.1
Clinical			
Primary substance use disorder			
Alcohol	64.6	54.2	63.9
Opioids	15.1	19.4	17.3
Stimulants	5.0	9.8	9.6
Cannabis	4.0	2.8	4.8
Other	11.3	13.8	4.4
Co-occurring psychiatric disorder			
Mood disorder	25.2	32.0	29.7
Posttraumatic disorder	14.1	4.2	9.6
Anxiety disorder	9.1	6.9	13.9
Other	6.1	6.9	9.3
None	45.5	50.0	37.5

Note. Percentages may not total 100% due to rounding. Mood disorder category includes major depressive disorder, bipolar I disorder, and bipolar II disorder. Anxiety disorder category includes generalized anxiety disorder, social anxiety disorder, and panic disorder.
* $p < .01$.

to the program, while nearly as many (43.0%) were married or in a romantic relationship. The balance of the cases were divorced, separated, or widowed. With respect to employment status and payment method, approximately half (52.5%) were employed and two-thirds (67.5%) of patients were classified as private self-pay. All patients received a comprehensive biopsychosocial and diagnostic evaluation upon admission to residential treatment. Psychiatric diagnostic determinations were assigned by trained clinical staff in accordance with the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; American Psychiatric Association [APA], 1994), and were subsequently verified by the staff psychiatrist. In terms of the clinical characteristics of the sample, alcohol was the primary SUD for 62.3% of patients, followed by opioids (i.e., heroin or prescription pain relievers; 17.2%) and stimulants (i.e., cocaine or amphetamines; 8.4%). Over half (58.0%) had a co-occurring non-SUD mental health condition.

2.2. Intervention

AiRCare was the case management approach evaluated in the present study. AiRCare involves the provision of 12 months of individualized, telephone-based support to patients and/or patients' families following discharge from the residential level of care in an effort to maintain treatment gains from primary treatment and continue treatment gains through increased adherence to continuing care plans and engagement in treatment. It is important to note that AiRCare is an integrated part of the residential treatment phase in that all patients are automatically enrolled in AiRCare upon admission to residential treatment and it is included in the total cost for residential care. Patients must explicitly request in writing not to participate in AiRCare (i.e., opt out) if they wish not to receive follow-up telephone contacts post-discharge. This feature is particularly salient given that research has identified a program's lack of information about incentives for providing continuing care as a significant barrier to successful implementation of evidence-based continuing care interventions (Lash, Timko, Curran, McKay, & Burden, 2011). Patients and/or their families receive AiRCare in one of three available formats based on their specified preference upon admission to residential treatment: (1) patient only, (2) family only, or (3) both patient and family.

Prior to discharge from the residential level of care, the patient and multi-disciplinary treatment team from the residential program collaboratively construct a continuing care discharge plan, which includes a detailed list of stated goals and expectations regarding continuing care. Although continuing care plans may be variable—given they are personalized to the patient's unique needs—all plans include, at a minimum, regular attendance at some form of continuing care (e.g., community-based self-help groups such Alcoholic Anonymous/Narcotics Anonymous, standard outpatient treatment) and an in-person appointment with a local provider in their home community within 7 days of discharge. Discharge plans may also include random urine toxicology screenings, or non-SUD elements such as regular attendance at appointments with a psychiatrist for medication management. Subsequent to discharge from primary treatment, patients receive a minimum of 23 planned telephone contacts by master's level, licensed clinicians with the first contact attempt occurring within 48 hours post-discharge. All patients were assigned an individual clinician, who was responsible for conducting all telephone contacts. Patients are also able to contact their individual clinician directly outside of planned telephone contacts. In the context of the current study, 25 clinicians were responsible for delivering the intervention and patients answered an average of 23.06 (SD = 3.97) contacts for the patient only group and 23.83 (SD = 1.80) contacts for the patient + family group. All clinicians participated in a mandatory 3-week training prior to patient contact and the delivery of AiRCare. Following successful completion of the training period, all clinicians received ongoing clinical supervision consisting of a minimum of one hour of individual supervision and three hours of group supervision per week.

Telephone contacts do not involve counseling, per se, but rather care plan management with a focus on whether the patient is compliant with his/her personalized discharge plan. One of three possible compliance ratings are assigned by the clinician based on the extent to which the patient follows his/her continuing care plan. During each telephone contact, the clinician asks the patient a series of "yes" or "no" questions corresponding directly to the patient's continuing care plan. For example, a clinician may ask the patient whether he/she attended a 12-step meeting, attended outpatient therapy with their local counselor, took their prescribed medication as directed, etc. If the patient responds "yes" to all continuing care discharge plan elements, the clinician assigns a "fully-compliant" rating. If the patient responds "yes" to more than 50% but less than all of his/her continuing care plan elements, the clinician assigns a "partially-compliant" rating. Completing less than 50% of continuing care plan elements results in a "non-compliant" rating. Telephone contacts also include a standardized set of questions assessing patients' recent substance use and quality of life. Based on the patients' self-reported needs, referrals to local providers are coordinated if indicated. The primary goals of AiRCare are to provide patients support, direction, and personal accountability as they transition from the acute phase of treatment. Planned telephone contacts initiated by clinical staff allow the opportunity for exchanging information, monitoring

progress and patient compliance with continuing care plans, recognizing complications and barriers to recovery early, and providing reassurance to patients throughout the continuing care treatment phase.

Contacts in which one or more of the patient's family members are involved (i.e., family only format, or patient plus family format) include psychoeducation such as selected readings on topics relevant to the patient's presenting problems (co-dependency, setting boundaries, anger, communication, parenting skills, grief, trauma, chronic pain, gambling, sexuality, co-occurring disorders, etc.) as well as resources regarding local and national support groups/organizations. In instances in which a release of information is signed by the patient, updates on the patient's progress and compliance with his/her continuing care plan are also provided. Participating family members also receive a minimum of 23 planned contacts during the initial 12-month period post-discharge.

2.3. Outcomes

Primary outcomes included past 30-day abstinence at 12 months, and continuous abstinence through the entire 12-month period post-discharge. A number of secondary outcome variables were also examined: re-admission rate at 30 days, re-admission rate at 12 months, re-engagement rate, quality of life, continuous abstinence rate at 6 months, and patient compliance with continuing care plans at 6 and 12 months. Re-admission rates were calculated by determining the number of patients who were re-admitted to any residential level of care within the initial 30 days and 12 months following discharge from primary treatment. Re-admission rates considered both re-admission to the same residential treatment program from which patients were discharged as well as additional residential programs. Telephone contacts with patients and/or their families assessed whether patients had sought residential care at any time during the study observational period, and patients' records were updated accordingly. Re-engagement rate was calculated by determining the number of patients who attended their first scheduled in-person aftercare appointment within 7 days of discharge from residential treatment. Quality of life was dichotomously assessed via a single item, which asked patients about their perceived quality of life at the time of the 12-month telephone follow-up contact. Past 30-day abstinence rate at 12 months was based on self-report at the 12-month telephone follow-up contact, but was also corroborated by collateral sources or urinalysis findings, if available. Continuous abstinence at 6 and 12 months refers to patients' ability to maintain abstinence throughout the entire 6- and 12-month follow-up period post-discharge from residential treatment. Continuous abstinence rates were calculated by examining patients' abstinence based on all previous telephone contacts throughout the initial 6- and 12-month period. Clinician-assigned compliance determinations (i.e., non-compliant, partially-compliant, and fully-compliant) at 6 and 12 months were assigned based on the aforementioned protocol described in the Intervention section.

All patient self-report data were confirmed by one or more collateral sources, which included at least one source beyond a member of the patient's family. Given that all patients' continuing care discharge plans included a local provider, it was possible for the same AiRCare clinician to contact the provider for verification. Findings from regular urinalysis drug screening (UDS) were also used for verification of self-reported abstinence rates. Among patients who provided 12-month outcomes data, 17.4% participated in monthly UDS ($M = 12.85$, $SD = 4.40$) as part of AiRCare and approximately one-fourth (26.7%) of immunoassays were positive. Most patients who did not participate in AiRCare-ordered UDS, however, were still required to participate in routine screening administered through an alternative provider (outpatient provider, "sober living home," etc.) as part of their continuing care discharge plan. Therefore, in instances in which UDS was not ordered as a component of AiRCare but patients participated in screening administered by their local service provider, it was possible to verify patient self-report data with UDS findings obtained from the local service provider.

2.4. Data analyses

Patients were categorized into one of three groups based on their self-selection upon admission to residential treatment (i.e., patient only, family only, and patient + family). Pearson's chi-square tests of independence were conducted to explore the relationships involving the three AiRCare formats with the primary outcome variables. Crosstabulations involving the three groups were utilized to ascertain whether type of AiRCare format was more strongly associated with outcomes. Separate hierarchical binary logistic regression models were also fitted to the data to test the general hypothesis that the addition of family contacts to patient contacts would be associated with better outcomes relative to patient contacts only after controlling for relevant demographic and clinical characteristics. Goodness-of-fit statistics were examined to assess the fit of each respective logistic model against actual outcome. One inferential test (i.e., Hosmer-Lemeshow) and two additional descriptive measures of goodness-of-fit (i.e., R^2 indices defined by Cox & Snell and Nagelkerke) were utilized to determine whether the various models fit to the data well. Given that outcomes for the family only group were derived from family report and not patient self-report (as was the case for the other two AiRCare groups), logistic regressions only included the patient only and patient + family groups.

3. Results

Several analyses were conducted to determine whether there were preliminary descriptive differences on demographic and clinical characteristics between the three AiRCare groups (i.e., patient only, family only, and patient + family). Comparisons on continuous variables were examined using a one-way between-groups analysis of variance, and a chi-square analysis was conducted for all categorical variables. As can be seen in Table 1, groups were comparable on all baseline demographic and clinical characteristics with the exception of sex, age, and employment status. Specifically, the patient only group included significantly fewer male patients [X^2 (2, $N = 379$) = 7.336, $p = .026$, $V = .139$], and the average age for the patient only group was higher than that of the other two AiRCare formats [F (2, 376) = 7.213, $p = .001$]. Furthermore, the composition of the family only group included a larger proportion of employed patients compared to the patient + family group [X^2 (1, $N = 280$) = 3.975, $p = .046$, $\varphi = .119$].

Descriptive data for the primary outcome variables at the various assessment points, stratified by AiRCare format, are presented in Table 2. The response rates at 6 and 12 months were 92.1% and 91.0%, respectively. In general, the majority of patients appeared to demonstrate favorable outcomes, irrespective of AiRCare format, in that there

Table 2
Study Outcomes by AiRCare Format.

Outcome	AiRCare format		
	Patient Only	[a]Family Only	Patient + Family
Re-engagement at 7 days	80.7%	74.6%	83.2%
Quality of life at 12 months	95.4%	88.4%	90.9%
Continuous abstinence at 6 months	91.4%	90.3%	91.8%
Past 30-day abstinence at 12 months	88.2%	89.9%	87.5%
Continuous abstinence at 12 months	69.1%	76.8%	67.8%
Re-admission within 30 days	0%	0%	0%
Re-admission within 12 months*	13.2%	2.9%	5.8%
Fully compliant at 6 months*	85.5%	73.2%	87.4%
Fully compliant at 12 months*	48.4%	39.5%	58.0%

[a] Outcomes for the "Family Only" group are per family report and not patient self-report.
* $p < .05$.

were few observed differences between the three groups on the various studied outcomes. However, the re-admission rate to any residential level of care in the initial 12 months post-discharge from primary treatment was significantly higher for the patient only (13.2%) group compared to both the family only (2.9%) group [$X^2(1, N = 137) = 4.955$, $p = .026$, $\varphi = .190$] and the patient + family (5.8%) group [$X^2(1, N = 276) = 4.064$, $p = .044$, $\varphi = .121$]. The only other significant findings between groups involved the clinician-assigned patient compliance ratings with continuing care plans at 6 and 12 months. Patients in the patient + family (87.4%) group evinced better 6-month compliance ratings (i.e., "fully-compliant") relative to patients in the family only (73.2%) group [X^2 $(1, N = 278) = 7.858$, $p = .005$, $\varphi = -.168$)]. Patients in the patient + family (58.0%) group also continued to demonstrate greater compliance at 12 months compared to patients in the family only (39.5%) group [X^2 $(1, N = 250) = 4.886$, $p = .027$, $\varphi = -.140$).

Results from the separate logistic regressions revealed that the only outcome for which AiRCare format was found to be a significant predictor, after controlling for age, sex, and compliance, was re-admission rate through 12 months [Wald's $X^2(1) = 4.404$, $p = .036$, $R^2 = .02$ (Cox & Snell), $R^2 = .04$ (Nagelkerke)]. Further, the Hosmer-Lemeshow goodness-of-fit test was insignificant [$X^2(7) = 4.601$, $p > .05$], suggesting that the model was fit to the data well. Specifically, patients in the patient only group were 2.68 times (95% CI: 1.01–7.08) more likely to be re-admitted to any residential level of care in the initial 12-month period following discharge from primary treatment compared to patients in the patient + family group.

4. Discussion

The findings contribute to the extant empirical base regarding the benefit of telephone-based case management services to long-term clinical outcomes following discharge from residential treatment. In terms of the primary study outcomes related to abstinence—which is arguably one of the most important distal outcomes—findings indicate that two-thirds or more of patients maintained continuous abstinence through 12 months and approximately 87% or more of patients evidenced past 30-day abstinence at the 12-month follow-up. The 12-month abstinence rates observed in the present study for the total sample are encouraging given that they are higher than those reported in the extant SUD treatment literature, which suggest that only about 40% to 60% of discharged patients are continuously abstinent at 12 months (for review see McLellan et al., 2000). Comparisons with studies investigating the impact of post-discharge telephone contacts on abstinence are difficult given methodological differences in the measurement of abstinence, but the observed abstinence rates in the present study are generally higher than 12-month abstinence rates reported in other studies (McKay et al., 2005, 2010). Specifically, previous studies evaluating telephone-based disease management protocols demonstrated that about 55% to 65% of patient were abstinent at the 12-month follow-up. However, these estimates cover only the previous 3 months (i.e., 9- to 12-month interval) and not the entire 12 month post-discharge period as was the procedure used in the present study. Thus, the telephone-based approach evaluated in the present study appears to be associated with favorable long-term substance use outcomes.

In addition to methodological differences, potential reasons for disparate findings between the present study and prior research include the planned duration and frequency of contacts involved in AiRCare. That is, many programs limited the duration of telephone contacts to the initial 3 months following primary treatment discharge (Horng & Chueh, 2004; McKay et al., 2005), and even programs designed to provide protracted follow-up demonstrated few actual telephone contacts (Cacciola et al., 2008; McKay et al., 2010). AiRCare, on the other hand, was much more intensive in that 12 months of protracted follow-up care was provided in which patients completed, on average, 23 individual telephone contacts over the course of the initial 12-month post-discharge period. Given previous research in this area suggests that greater participation in telephone-based continuing care interventions is associated with more positive outcomes (Cacciola et al., 2008), it is possible that the observed differences in abstinence rates may be attributed to important differences in service delivery between AiRCare and previously studied telephone-based disease management protocols.

It is also important to highlight the findings for our proximal outcome—re-engagement within one week following residential treatment discharge. Results revealed that nearly three-fourths or more of AiRCare patients attended their first scheduled aftercare appointment within 7 days of discharge. Given that many patients are likely to encounter a variety of high-risk situations immediately following discharge as they return to their pre-treatment home environment, attendance at their first scheduled aftercare appointment is a priority and may be considered a behavioral proxy for patient motivation and engagement in their continuing care plans. Considerable evidence supports a link between patient adherence and positive SUD treatment outcomes (Carroll, 1997; Moos, Finney, & Cronkite, 1990; National Institute on Drug Abuse, 2012; Project Match Research Group, 1998). Unfortunately, consistent aftercare attendance is often low (Ouimette, Moos, & Finney, 1998), which underscores the need for specific interventions designed to increase patient adherence to prescribed continuing care plans and effectively manage SUDs. Findings suggest that AiRCare was associated with positive short-term outcome.

With respect to our general hypothesis regarding the potential incremental value of family involvement, there was some evidence, albeit limited, that the addition of family contacts was associated with better outcome. Patients in the patient + family group demonstrated a significantly lower 12-month re-admission rate relative to the patient only group (5.8% vs. 13.2%, respectively). Patients in the patient only group were also over 2.5 times more likely to be re-admitted to any residential level of care in the initial 12 months following primary treatment discharge compared to patients in the patient + family group. However, even the re-admission rate for the patient only group was low. These findings suggest that the addition of family contacts to patient contacts may improve long-term outcome, at least with respect to 12-month re-admission rate post-discharge. There were no further differences between the patient + family and patient only groups on any of the remaining outcomes.

In general, rates of patient compliance across all AiRCare formats at both 6 and 12 months were high. Among groups that included patient involvement (i.e., patient only and patient + family), clinician-assigned compliance ratings at 6 months were 85% or greater. Furthermore, at 12 months, nearly half or more of these same patients were fully compliant with their continuing care plans. Interestingly, there was limited evidence of increased patient compliance with continuing care plans when family contacts were conducted in addition to patient contacts compared to patient contacts only. Although the patient + family group evidenced better compliance at 6 and 12 months relative to the family only group, all compliance estimates were still promising. Again, it is noteworthy to mention that family only compliance ratings were derived from family report only and not the patient (as was the case for the patient + family group). As such, family report of patient compliance may not be a valid indicator of patients' actual compliance with their continuing care plans.

The present study included a number of strengths, including most notably, the use of a naturalistic treatment sample. Clinical research conducted in applied, "real world" settings affords researchers with valuable opportunities to evaluate interventions and address traditional barriers to translating laboratory-based efficacy research to clinical practice (Atkins, Frazier, & Capppella, 2006; DeFife et al., 2015). The findings from such naturalistic research also allow for immediate applications that can have important clinical implications for routine practice. It is also important to note that observational studies of naturalistic treatment settings, in which individuals exercise a considerable degree of control over their treatment, have the potential to offer

important evidence about intervention effectiveness not readily available from randomized clinical trials.

4.1. Limitations

The findings from the present study should be considered in light of several limitations, which suggest the need for further research in this area. First, the present study utilized a convenience sample comprised exclusively of patients discharged from a single residential treatment center in the United States, which warrants caution in generalizing the findings to other patients given the disparate practices and treatment philosophies that often accompany different programs. Second, the observation that close to two-thirds of the total sample were private pay (i.e., funded their own treatment) represents another potential limitation pertaining to the generalizability of the findings. Third, the research design did not include a control group, nor were patients randomly assigned to the three available AiRCare formats. Instead, group composition was determined by the patients' preference upon admission to residential treatment, and as such, this procedure may have introduced several biases. The lack of a control group is particularly salient in that the study design precludes the ability to draw any conclusions regarding whether participation in AiRCare may result in better outcomes relative to patients who do not receive protracted care plan management. Fourth, the quality of life estimate at 6 and 12 months was based on responses to a single item. Fifth, although the use of UDS to verify patients' self-reported abstinence rates is a strength of the present study, immunoassay findings were not available for all patients. An additional limitation includes the lack of a formalized protocol to quantitatively evaluate clinician adherence. Although all clinicians participated in a mandatory 3-week training prior to delivering AiRCare and subsequently received weekly individual and group supervision, future research evaluating AiRCare would likely benefit from a more formalized adherence procedure in which clinical supervisor ratings are used in order to ensure treatment integrity. Finally, conclusions derived from the comparisons involving the family only group with the other two AiRCare formats are difficult to interpret given the studied outcomes for the family only group were based on the designated family member's report as opposed to patient self-report, and were not subjected to collateral verification. However, previous research has shown there to be fairly good agreement between patient and collateral informant reports of substance use (Fals-Stewart, O'Farrell, Freitas, McFarlin, & Rutigliano, 2000; Maisto, Sobell, & Sobell, 1979).

5. Conclusions

Previous research indicates that long-term treatment regimens in particular are inherently susceptible to issues of non-adherence (Dunbar-Jacob & Dwyer, 1991; Griffith, 1990). Given that SUDs are increasingly being recognized as a chronic disorder requiring protracted disease management—similar to other chronic medical conditions (e.g., hypertension, asthma, diabetes)—this suggests that interventions designed to enhance patient adherence to their continuing care plans are of paramount importance. In fact, review studies of the vast substance use treatment literature suggest that long-term care strategies involving continued monitoring produce lasting benefits for individuals with an SUD (McLellan et al., 2000; Proctor & Herschman, 2014). Despite the aforementioned study limitations, the current findings do suffice to demonstrate that the studied intensive telephone-based intervention was associated with high rates of patient adherence and may have the potential to lead to successful short- and long-term outcomes. Perhaps most noteworthy was the finding that all three groups evidenced similarly positive outcomes on nearly all of the outcome variables. However, the relatively small group sizes for certain AiRCare formats and lack of randomized assignment suggest that conclusions can only be made tentatively at this time. These positive but preliminary indications of the effectiveness of AiRCare require replication in a well-powered, randomized controlled trial.

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