Published in final edited form as:
Am J Health Behav. 2010 ; 34(6): 788–800.

Moderators of Response to Telephone Continuing Care for Alcoholism

Kevin G. Lynch, PhD[Assistant Professor], **Deborah Van Horn, PhD[Assistant Professor]**, **Michelle Drapkin, PhD[Assistant Professor]**, **Megan Ivey, MS[Senior Research Coordinator]**, **Donna Coviello, PhD[Assistant Professor]**, and **James R. McKay, PhD[Professor of Psychology in Psychiatry]**
University of Pennsylvania, Philadelphia, PA

Abstract

Objectives—To evaluate potential moderators of the effect of adding extended telephone monitoring (TM) and telephone monitoring and counseling (TMC) continuing care to treatment as usual (TAU) for alcoholism. Continuing care was predicted to be more effective for patients with severe substance-use histories, poor initial response to treatment, and other risk factors for relapse.

Methods—Randomized study with 18-month follow-up. Outcomes were frequency of drinking and any drinking.

Results—Main effects favored TMC over TAU on alcohol outcomes. However, none of the 11 variables examined moderated these effects. Conversely, main effect and moderator analyses indicated TM was more beneficial than TAU only for women and for participants with lower readiness to change.

Conclusions—TMC improves drinking outcomes when added to standard care, regardless of alcohol use history, early response to treatment, or other risk factors for relapse. TM is recommended for women and less motivated patients.

Keywords

alcohol dependence; continuing care; telephone interventions; alcohol use outcomes; moderator effects

Recent research has indicated that individuals with substance use disorders can benefit from continuing care interventions, which extend treatment beyond the 4–8 weeks of care that is typically provided in the initial, more intensive, phase of treatment.[1–3] Continuing care helps address the chronic vulnerability to relapse experienced by most patients who enter treatment for substance use disorders, but rates of dropout tend to be high, and many patients receive little continuing care.[4] Not surprisingly, continuing care interventions that incorporate more active efforts to deliver the intervention and have a planned duration of at least 12 months are more likely to produce significant treatment effects than are continuing care interventions without these features.[5,6]

Our group has been studying the effectiveness of using the telephone to provide extended continuing care to patients with substance use disorders. In an initial study, we found that telephone-based continuing care was more effective than both treatment as usual (ie, group counseling) and individual cognitive-behavioral relapse prevention for patients with alcohol

Address correspondence to Dr Lynch, University of Pennsylvania, 3440 Market St, Ste 370, Philadelphia, PA 19104. lynch_k@mail.trc.upenn.edu.

and/or cocaine dependence who had completed 4-week intensive outpatient programs (IOPs) at a community setting and a Veterans Affairs Medical Center setting.[6,7] The outcomes in this study were self-reported abstinence rates, cocaine urine toxicology, and liver function measures obtained over a 24-month follow-up. The content of the telephone calls consisted of several cognitive-behavioral therapy (CBT) components, including monitoring of substance use status and progress toward identified goals, identification of current and anticipated high-risk situations, and development and rehearsal of improved coping behaviors.[8]

The current study evaluated a new version of the telephone continuing care protocol, which was modified in several ways to better address the chronic nature of alcohol use disorders[3] and to be more compatible with publicly funded outpatient treatment. First, the protocol was lengthened from 3 to 18 months, to provide extended recovery support. Second, each call began with a brief structured assessment of current risk and protective factors, which was used to determine the focus of the remainder of the session. As in the first version of the protocol, the intervention featured CBT techniques including monitoring of progress, identification of high-risk situations, and rehearsal of improved coping behaviors. Finally, we recruited patients after they had completed 3–4 weeks of treatment in the IOP, rather than at the point of graduation. This intervention is referred to as “telephone monitoring and counseling” (TMC).

In the study, TMC was compared to treatment as usual (TAU) (ie, up to 4 months of IOP without any telephone continuing care) and to a second telephone intervention that consisted of a brief assessment of current symptom severity and functioning plus feedback, but with no actual counseling (TM). Results from the 18-month period during which the telephone continuing care interventions were offered indicated that the best alcohol-use outcomes were in TMC.[9] With percent days alcohol use, TMC produced less frequent drinking than TAU at 12 months ($P<.02$), 15 months ($P=.0002$), and 18 months ($P=.004$), and less frequent drinking than TM at 6 months ($P=.02$). TM produced less frequent drinking than TAU at 12 and 15 months ($P=.03$). With the dichotomous measure of any drinking within each 3-month segment of the follow-up, rates of drinking were lower in TMC than in TAU across the follow-up ($P=.02$), but there were no differences between TM and TAU ($P=.42$).

The purpose of this manuscript is to determine whether these main effect results were moderated by factors assessed at intake to treatment. In the case of TMC, such analyses can be used to determine whether there are certain types of patients who are particularly likely to benefit from the intervention. Although no significant main effects were found for the TM condition, moderation analyses might identify types of patients who do benefit from this intervention.

We hypothesized that the positive effects of extended continuing care would be greater for patients with more severe histories of substance use problems, those with a relatively poor initial response to IOP, and those with other established risk factors for relapse as identified in the research literature.[8,10–13] These domains were represented with the following measures: years of regular alcohol use, years of heavy alcohol use, and number of prior treatments for alcohol problems (history); days of alcohol use, heavy alcohol use, and cocaine use during IOP (poor initial response to treatment); and craving levels, motivation for change, self-efficacy, and perceptions about the harm of continued substance use and potential benefits of treatment (additional relapse risk factors). We also examined the potential moderating effect of gender.

METHODS

Participants

The participants were 252 adults in 2 publicly funded IOPs in Philadelphia with DSM-IV alcohol dependence. The other criteria for eligibility were a willingness to participate in research and be randomly assigned to one of the 3 continuing care conditions, completion of 3 weeks of IOP, no psychiatric or medical condition that precluded outpatient treatment, between the ages of 18 and 65, no IV heroin use within the past 12 months, ability to read at approximately the fourth- grade level, and at least a minimum degree of stability in living situation (ie, not homeless). To facilitate follow-up, participants had to be able to provide the names, addresses, and telephone numbers of at least 3 contacts.

The participants averaged 43.0 (sd=7.4) years of age and 11.8 (sd= 1.8) years of education; and the majority of participants were male (64.3%), African American (88.9%), and not currently married (91.3%). Monthly income from employment and other legal sources averaged $560 (sd=600.7). The participants averaged 20.9 (sd=9.3) years of regular alcohol use, 11.2 (sd=8.3) years of regular cocaine use, 3.4 (sd= 3.7) prior treatments for alcohol problems, and 3.1 (sd=3.8) treatments for drug problems. All participants had lifetime alcohol dependence diagnoses, and 79.7% met criteria for current alcohol dependence in the 30 days prior to entering IOP. Seventy-nine percent of the sample carried a lifetime diagnosis of cocaine dependence, and 49.2% met criteria for current cocaine dependence at entrance to treatment. Descriptive information on participants in each condition is presented in Table 1.

Intensive Outpatient Treatment

Participants in the study were clients at one of 2 publicly funded community IOPs. These programs provided approximately 9 hours of group-based treatment per week, and clients could typically attend for up to 3–4 months. Further information on these programs is provided elsewhere.[14]

Continuing-care Treatment Conditions

Telephone monitoring (TM)—Participants in this condition had one initial face-to-face session with their counselor in the first week of the protocol (ie, week 3–4 of IOP) to orient them to the protocol and go over the assessment of risks and protective factors that they would be completing at each call. A plan was developed that clarified whether the participant would call the counselor or vice versa, and back-up plans to maintain contact were developed in case the participant's telephone number or address changed during the course of the intervention. A toll-free number was provided to the participants, to reduce financial barriers to call completion if the participant was planning to initiate the telephone calls.

Following this session, participants received brief telephone calls for up to 18 months. These 5- to 10-minute calls were offered weekly for the first 8 weeks, every other week for the next 44 weeks, and once per month for the final 6 months. Therefore, the total number of scheduled calls in the protocol was 36. Each call consisted of a structured 10-item assessment of current substance use status, other risk factors (eg, craving, low self-efficacy, depression), and protective factors (eg, attendance at self-help meetings, participation in other prorecovery social activities), which was referred to as a progress assessment. A scoring algorithm produced a single summary score, with 3 levels of risk (eg, low, medium, high), which was provided to the participant. The calls did not include any formal counseling.

Telephone monitoring and counseling (TMC)—Participants in this condition also had one initial face-to-face session with their counselor in the first week to orient them to the protocol. The call schedule was the same as in the TM condition, and participants also completed the progress assessment and were given their overall risk score at the beginning of each call. For patients at low risk, patient and counselor reviewed the goals that the patient was working on and the specific objectives that needed to be accomplished to reach each goal. Any problems identified in the risk assessment were also addressed. In addition, reinforcement of positive behaviors and further encouragement for involvement in prorecovery activities were provided. For patients at moderate or high risk, greater attention was devoted to identifying and rehearsing better coping responses to existing or anticipated risky situations.

The TMC condition also included a stepped care component, which was triggered when participants were categorized at high risk. The algorithm consisted first of more frequent telephone calls, which were provided over several weeks. If level of risk did not drop, face-to-face MI-based evaluation sessions followed by cognitive-behavioral therapy (CBT) sessions were offered via face-to-face sessions at the clinic. Patients in both conditions were told that they should contact their telephone counselor between regularly scheduled sessions if they felt that they were suddenly at heightened risk for relapse or had used drugs or alcohol.

Therapists and adherence to treatment protocols—The 2 telephone continuing care interventions were provided by 7 therapists (4 women and 3 men), each of whom delivered both interventions. All therapists had prior experience with providing outpatient treatment for substance use disorders. Five of the therapists had MA-level degrees in psychology or social work, one had a BA, and one had a PhD in clinical psychology. None had provided telephone-based counseling prior to this study.

The TM and TMC continuing care sessions were audio-taped to facilitate supervision and monitor adherence to the protocol as described in the manuals. Supervision was provided weekly by the study clinical coordinator, and one group supervision session was also held per week in which therapeutic issues were discussed with the senior clinical research staff on the project. Any deviations from the treatment protocol that were identified by the clinical coordinator were immediately addressed in the weekly supervision meetings. Coding of the audiotapes indicated that adherence to the manuals was good and that the 2 interventions could be discriminated as intended.

Procedures

Recruitment—Potential participants were screened at some point during their first 3 weeks of treatment in the 2 IOPs. Informed consent procedures were completed once a final determination of eligibility for the study had been made. The study was approved by the University of Pennsylvania Institutional Review Board.

Representativeness of the study sample—A total of 1019 patients were screened at the 2 IOPs, and of these, 252 were eligible and willing to participate and were enrolled in the study. The reasons for failure to enter the study were as follows: did not have alcohol dependence (N=181), stopped coming to IOP during the first 3 weeks of treatment (280), did not present for the screening until past the window for study enrollment (109), declined participation (64), did not complete the baseline assessment (47), was psychiatrically unstable (35), was a regular IV heroin user in the prior year (28), had no access to a telephone (15), was unable to read (3), was medically unstable (3), and had no contacts (2). Details regarding enrollment and follow-up are provided in Figure 1.

Randomization procedures—Separate randomized allocation schemes were used within each site. In each scheme, a blocked randomization using blocks of size 30 was used to yield a balanced allocation of patients to the 3 treatment groups.

Baseline and follow-up assessments—Baseline assessments were administered shortly after patients became eligible for the study. The follow-up assessments were conducted at 3, 6, 9, 12, 15, and 18 months post baseline. Participants received $50 for completing the baseline research sessions and $35 per session for completing the 6 follow-up sessions. The interviewers were blind to the study hypotheses but not to treatment condition.

Follow-up rates—The follow-up rates for self-report data on alcohol use were as follows: 3 months—89.6%; 6 months—86.8%; 9 months—81.9%; 12 months—81.1%; 15 months—80.6%; and 18 months—78.9%. The 3 treatment conditions did not differ on follow-up rates at any point.

Treatment Moderator Measures

The moderator variables and the measures from which each one was taken are described below.

Demographics and substance use history—The Addiction Severity Index[15,16] was used to gather demographic information and data on substance-use treatment history and severity of use at baseline (ie, during IOP). Because the sample was almost 90% African American, we were not able to examine the possible moderating effect of race. However, the sample contained sufficient numbers of women to examine gender. The ASI substance-use variables that were examined were days of alcohol and cocaine use in the 30 days prior to baseline (ie, during IOP), years of regular and heavy alcohol use, and number of prior treatments for alcohol use disorders (dichotomized to any vs no prior treatments due to skewness).

Alcohol craving—The Obsessive Compulsive Drinking Scale[17] (OCDS) was used to assess craving for alcohol. The OCDS is a 14-item, self-administered questionnaire that assesses drinking-related thoughts, urges to drink, and the ability to resist those thoughts and urges. The OCDS has sensitivity as a monitoring tool and has predictive validity for relapse drinking. In this study, the OCDS coefficient alpha= .86 (95% CI=.83, .88).

Motivation—Readiness to change was assessed with the University of Rhode Island Change Assessment Questionnaire[18] (URICA). This instrument assesses readiness to change in 4 stages: precontemplation, contemplation, action, and maintenance. A total score was calculated as the sum of the contemplation, action, and maintenance scores divided by the precontemplation score. Greater readiness-to-change scores, as calculated by this measure, predicted better alcohol-use outcomes in Project MATCH.[19] In this study, the URICA coefficient alpha= .986 (95% CI=.984, .989).

Self-efficacy—The alcohol version of the Drug-Taking Confidence Questionnaire[20] (DTCQ) was used to measure self-efficacy in 8 domains (range of 0 – 100%, indicating degree of confidence in one's ability to cope without using alcohol in that situation). This instrument has predicted substance use outcomes in prior studies.[21,22] In this study, the DTCQ coefficient alpha= .985 (95% CI=.982, .989).

Appraisal of harms and benefits—The primary appraisal measure[23] (PAM) was used to assess the participants' perceptions of the consequences of alcohol use and abstinence.

The measure assesses past harm and potential short- and long-term future harm resulting from alcohol use, and potential benefits of abstinence. The measure has excellent internal consistency reliability and has predicted drinking outcomes in prior studies.[23] A total score was derived by summing the 3 harm scales and the benefit scale (reverse scored).[23] In this study, the PAM coefficient alpha=.80 (95% CI=.75–.84).

Other Assessment Measures

Psychiatric diagnoses—The Structured Clinical Interview for DSM-IV[24] (SCID) was used to assess DSM-IV substance use disorders and major depression.

Self-reported substance use—Timeline follow-back[25] (TLFB) techniques were used to gather self-reports of alcohol use during the 6 months preceding entrance into continuing care and the 18-month follow-up period. Studies with alcoholics[26] and drug users[27] have consistently demonstrated test-retest reliability of .80 or greater. In validity studies, TLFB reports of percent days abstinent have generally correlated .80 or better with collateral reports.[28,29] Self-reports of alcohol use in the context of a research study generally have been found to have high validity and reliability.[30,31]

The primary outcome measures that were derived from the timeline data were percent days of alcohol use and a dichotomous measure of any alcohol use vs no use. These TLFB measures were computed for each 3-month segment of the follow-up. For the “percent days” measure, the scores represented the percentage of days not in a controlled environment on which the participant used alcohol. Prior to analysis, a log transformation was used with this variable to reduce skewness.

Corroborating measures of alcohol use—We attempted to obtain collateral reports on the participants’ alcohol and drug use at the 12-month follow-up. Of the 198 participants who provided data at the 12-month follow-up, data from collaterals were available in 61 cases (31%). Participants and collaterals agreed on use/no use in 50.8% of cases, and in 32.8% of the cases, the participant reported alcohol or drug use, and the collateral reported no use. In 16.4% of the reports, the patient reported abstinence, but the collateral reported at least some alcohol or drug use. Participants with and without collaterals did not differ significantly on demographic variables or baseline measures of alcohol, drug, employment, legal, family, or psychiatric problem severity.

Data Analyses

Differences between the 3 conditions at baseline were evaluated with one-way nonparametric ANOVAs (continuous measures) and chi-square tests (categorical measures). Treatment differences in weeks retained in outpatient treatment were also evaluated with one-way ANOVAs.

Generalized estimating equations (GEE; SAS PROC GENMOD) were used to compare the continuing care groups on the continuous and binary TLFB outcome measures. The TLFB data were collapsed into a pre-continuing care baseline period (6 months, including IOP) and 6 follow-up periods (months 1–3, 4–6, 7–9, 10–12, 13–15, and 16–18). A compound symmetry/exchangeable covariance structure was used for these models.

Separate analyses were done for each moderator variable with each of the 2 alcohol-use outcome measures. The independent variables that were included in these analytic models were treatment condition, moderator variable, site, and time. Covariates included the baseline value of the outcome measure and any measures on which the groups differed at baseline and were related to outcome. The analyses examined treatment condition main

effects, treatment condition × time interactions, moderator variable main effects, moderator × treatment condition interactions and 3-way interactions. When treatment condition by moderator interaction effects at the level of a trend or better were obtained, follow-up analyses were done to determine the nature of the interaction effect. Finally, pattern mixture analyses[32] were conducted to evaluate the potential effects of non-ignorably missing TLFB data. These analyses found no evidence of bias due to missing data.

The study was powered to detect main effects and moderator effects. However, power was not sufficient for a full correction of alpha for the number of interactions examined (11 variables × 2 outcome measures). Therefore, the moderator analyses were considered secondary, in order to allow for tests of a number of theory-driven potential moderators.

RESULTS

Comparison of Treatment Conditions at Baseline

Participants in the 3 treatment conditions were compared on the 21 demographic, diagnostic, treatment, and problem-severity level variables assessed at baseline and presented in Table 1. There were no significant differences between the treatment conditions.

Participation in Outpatient Treatment

Over the first 6 months of the follow-up, patients attended an average of 36 IOP or OP treatment sessions (range 0 to 98, sd=22.58). With 3 IOP sessions scheduled per week, this was equivalent to about 12 weeks in treatment. There were no differences between the 3 treatment conditions on number of sessions attended [F(2,223)= .17, P=.84].

Participation in Continuing Care

Of the 83 patients randomized to TM, 64 (77.1%) completed the orientation session and were eligible to receive telephone calls in the protocol. In the TMC condition, 63 of 84 (75.9) patients completed orientation. The total number of continuing care sessions received by participants who completed their orientation to the protocol was 11.5 in TM and 9.1 in TMC. Although 88% of the calls were completed in the first year of the protocol, 25 TM and 23 TMC patients had at least one call between months 12 and 18.

Analyses of Moderator Effects in Comparison of TMC to TAU

Percent days of alcohol use—None of the 11 potential moderator variables that were examined interacted significantly with treatment condition to predict frequency of alcohol use over the 18-month follow-up (all interaction P≥.16, with all but 2 P>.60).

Any alcohol use—Similarly, none of the 11 potential moderator variables interacted significantly with treatment condition to predict any alcohol use vs abstinence over the 18-month follow-up (one interaction P=.11, all others P>.60).

Analysis of Moderator Effects in Comparison of TM to TAU

Percent days of alcohol use—No evidence of moderation was found with years of alcohol use, years of alcohol use to intoxication, days of alcohol use in prior 30 days, days of alcohol intoxication in prior 30 days, days of cocaine use in prior 30 days, self-efficacy, craving, appraisal of harms and benefits, or commitment to abstinence.

Conversely, there were significant moderation effects for gender [interaction chi-square (1)=7.37, P=.007] and readiness for change [interaction chi-square (1)=4.24, P=.04]. With regard to gender, there was a significant effect favoring TM over TAU in women [beta=

1.04, se=0.35, chi-square (1)=8.91, P= .003], whereas there was no effect for TM in males [beta=−0.19, se=0.27, chi-square (1)=.48, P=.48]. With regard to readiness to change, lower motivation predicted more frequent alcohol use [beta=−0.72, se =0.32, chi-square (1)=5.04, P=.02] in TAU, whereas in TM motivation did not predict alcohol use [beta=0.16, se=0.30, chi-square (1)= 0.28, P=.60]. As a result, TM produced better outcomes than TAU for those with lower readiness to change, but not for those with high readiness. These results are displayed in Figures 2 and 3.

Prior treatment for alcohol use disorders also moderated response to treatment at the level of a trend [interaction chi-square (1)=2.83, P=.09]. In patients with one or more prior treatments, TM produced less frequent drinking than TAU [beta=−0.51, se=0.24, chi-square (1)=4.30, P=.04]; whereas in those with no prior treatments, there was no difference between TM and TAU [beta=0.53, se=0.54, chi-square (1)=.96, P=.33).

Any alcohol use—Similar results were obtained with a dichotomous alcohol use outcome measure. A significant moderation effect was obtained with gender [interaction chi-square (1)= 9.65, P=.002]. In women, TM produced a lower likelihood of any alcohol use than TAU [beta=−1.26, se=0.45, chi-square (1)=7.70, P=.006], whereas in men TM produced slightly worse outcomes than TAU [beta=0.50, se =0.34, chi-square (1)=2.13, P=.14] (Figure 4).

A moderation effect was also obtained with readiness for change [interaction chi-square (1)=3.91, P=.048]; as was the case with the alcohol frequency outcome, TM produced better drinking outcomes than TAU for those with lower readiness to change (beta=−0.74, se=0.39, chi-square (1)=3.56, P=0.06), but the effect was reversed in those with high readiness (beta=0.73, se=0.38, chi-square (1)= 3.75, P=0.05). (Figure 5).

Moderation at the level of a trend was again obtained with prior alcohol treatments [interaction chi-square (1)=2.93, P=.09]. Patients with one or more prior treatments were less likely to drink if they received TM rather than TAU [beta= −0.45, se=0.30, chi-square (1)=2.27, P= .13], whereas the opposite was true for those with no prior treatments [beta= 0.77, se=0.65, chi-square (1)=1.42, P=.23]. Finally, a treatment condition × commitment to abstinence × time interaction at the level of a trend was obtained [chi-square (5)=10.17, P=. 07]. In patients committed to abstinence, TM did better than TAU at all time points other than month 6, although none of the within-time comparisons was statistically significant. Conversely, in those not committed to abstinence, TAU had better outcomes in all time periods other than at the 6- and 9-month time points. Again, these differences within time point were not significant, with the exception of month 9 (beta=−1.26, se=0.61, P=0.04).

Once again, there were no moderation effects for years of alcohol use, years of alcohol use to intoxication, days of alcohol use in prior 30 days, days of alcohol intoxication in prior 30 days, days of cocaine use in prior 30 days, self-efficacy, craving, or appraisal of harms and benefits.

DISCUSSION

In an analysis of main effects from this study, an extended telephone-based continuing care intervention that provided standardized monitoring of current symptoms and status, feedback, and CBT-based counseling linked to the monitoring results (ie, TMC) produced significantly better alcohol use outcomes over an 18-month period than did standard care. Conversely, a second telephone continuing care intervention that provided monitoring and feedback only (ie, TM) was not significantly better than standard care.[9] The study participants were patients with alcohol use disorders who were receiving treatment in

publicly funded programs and who had achieved initial engagement in IOP, as evidenced by regular attendance for 3 weeks.

In this article, we examined potential moderating effects in this study, to determine which patients were most likely to benefit from these interventions. A total of 11 variables were examined, which assessed severity of substance-abuse history, initial response to IOP, and other established risk factors for relapse.

The results indicated that the hypotheses concerning TMC were not supported, as none of the variables included in the analyses was a significant moderator of the main effects favoring TMC over standard care. This suggests that the effects of this intervention are fairly robust and that it can be recommended for patients regardless of patient characteristics such as gender, substance use history, early treatment response, craving levels, motivation for change, appraisals of harms and benefits, and self-efficacy.

Although the TM intervention did not generate treatment main effects when compared with TAU,[9] some evidence for moderation effects was obtained. TM clearly produced much better drinking outcomes than TAU for women, whereas it conferred no apparent benefit for men. In addition, interaction effects indicated that TM was also more beneficial than TAU for patients with low readiness to change their drinking behavior. There was also some evidence, at the level of trends, that TM was more effective than TAU for participants with one or more prior treatments for alcoholism. A more complicated treatment condition × abstinence commitment × time interaction at the level of a trend was also obtained, but it is difficult to interpret due to the time effects. However, there was some suggestion that TM might produce better drinking outcomes than TAU for patients committed to total abstinence as a treatment goal.

Overall, these findings suggest that the TM intervention is likely to be beneficial relative to standard care for women and for patients with relatively low motivation for changing their drinking behavior at treatment entrance. Moreover, TM may improve outcomes over standard care for patients with a history of prior treatment for alcoholism. Therefore, there was some evidence in support of the hypothesis that TM would be differentially effective for patients who had risk factors for relapse at entrance to treatment. However, the results did not support hypotheses concerning the potential moderating effects of substance use history and early treatment response.

Study Limitations

About three-fourths of the patients who were screened for the study were excluded from participation, primarily due to a lack of alcohol dependence, early dropout from treatment, or not being screened within the recruitment window. It is possible that the early dropouts may be the patients most in need of extended monitoring and support. It is not clear whether the results obtained would generalize to the patients with the characteristics of those who were excluded from the study. In addition, most patients received a relatively small amount of continuing care, given the number of sessions that were offered, despite the fact that the intervention was designed to reduce burden on patients and thereby increase rates of extended participation.

Although the collateral reports we obtained on alcohol use generally substantiated those obtained from the patients, we were able to obtain such reports for less than 50% of the patients. On the other hand, a number of reviews have substantiated the validity of self-reports of alcohol use in treatment samples, particularly when the data are collected with calendar methods such as the TLFB in the context of research studies.[30] Finally, we did not adjust alpha levels for the number of comparisons that were made. Therefore, the results of

this study should be considered exploratory and in need of confirmation in a future study. However, it should be noted that the gender moderation effect on the comparison of TM and TAU was large enough to have remained significant even with a fairly severe alpha correction.

CONCLUSIONS

The findings reported in this article provide important information on which individuals are likely to benefit from the 2 models of telephone-based continuing care that were evaluated. The telephone-monitoring and counseling (TMC) intervention produced the best overall alcohol-use outcomes,[9] and those results were not moderated by any of the measures examined in this study. This suggests that the TMC intervention should be recommended for alcohol-dependent patients starting outpatient treatment, if the resources are available to provide it.

The telephone-monitoring intervention requires fewer resources to implement, because it can be provided by paraprofessionals and, in our study, took less time to deliver than TMC (average of 8 vs 16 minutes per call[9]). Although TM was not more effective than TAU for the full sample, it was highly beneficial for women and also conferred some benefit to patients with low levels of motivation for change and also possibly those with prior alcohol treatments. Therefore, a cost-effective strategy for continuing care, when resources are limited and cannot support implementation of TMC, might be to offer TM to these individuals.

Acknowledgments

This research was supported by R01AA14850, R21AA017117, and K02DA00361.

References

1. Dennis ML, Scott CK. Managing addiction as a chronic condition. Addiction Science and Clinical Practice. 2007 December.:45–55. [PubMed: 18292710]
2. McKay, JR. Treating Substance Use Disorders with Adaptive Continuing Care. Washington DC: American Psychological Association; 2009.
3. McLellan AT, Lewis DC, O'Brien CP, et al. Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. JAMA. 2000; 284:1689–1695. [PubMed: 11015800]
4. Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Discharges from Substance Abuse Treatment Services, DASIS Series: S-41, DHHS Publication No. (SMA) 08-4314. Rockville, MD: 2008. Treatment Episode Data Set (TEDS): 2005.
5. McKay JR. Continuing care research: what we've learned and where we're going. J Subst Abuse Treat. 2009; 36:131–145. [PubMed: 19161894]
6. McKay JR, Lynch KG, Shepard DS, et al. The effectiveness of telephone-based continuing care in the clinical management of alcohol and cocaine use disorders: 12 month outcomes. J Consult Clin Psychol. 2004; 72:967–979. [PubMed: 15612844]
7. McKay JR, Lynch KG, Shepard DS, et al. The effectiveness of telephone based continuing care for alcohol and cocaine dependence: 24 month outcomes. Arch Gen Psychiatry. 2005; 62:199–207. [PubMed: 15699297]
8. Marlatt, GA.; Gordon, JR., editors. Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviors. New York: Guilford; 1985.
9. McKay JR, Long M, Lynch KG, et al. Effectiveness of extended telephone continuing care: 18 month outcomes. Alcohol Clin Exp Res. 2009; 33(Sp. Iss. S1):197A-197A.
10. Connors GJ, Maisto SA, Zywiak WH. Understanding relapse in the broader context of post-treatment functioning. Addiction. 1996; 91:S173–S190. [PubMed: 8997791]

11. McKay J. Studies of factors in relapse to alcohol and drug use: a critical review of methodologies and findings. J Stud Alcohol. 1999; 60:566–576. [PubMed: 10463814]
12. McKay JR, Franklin TR, Patapis N, et al. Conceptual, methodological, and analytical issues in the study of relapse. Clin Psychol Rev. 2006; 26:109–127. [PubMed: 16371242]
13. Miller WR, Westerberg VS, Harris RJ, et al. What predicts relapse? Prospective testing of antecedent models. Addiction. 1996; 91:S155–S172. [PubMed: 8997790]
14. McKay JR, Alterman AI, McLellan AT, et al. Treatment goals, continuity of care, and outcome in a day hospital substance abuse rehabilitation program. Am J Psychiatry. 1994; 151:254–259. [PubMed: 8296899]
15. McLellan AT, Luborsky L, Woody GE, et al. An improved diagnostic evaluation instrument for substance abuse patients: The Addiction Severity Index. J Nerv Ment Dis. 1980; 168:26–33. [PubMed: 7351540]
16. McLellan AT, Luborsky L, Cacciola J, et al. New data from the Addiction Severity Index: Reliability and validity in three centers. J Nerv Ment Dis. 1985; 173:412–423. [PubMed: 4009158]
17. Anton RF, Moak DH, Latham P. The Obsessive Compulsive Drinking Scale: A self-rated instrument for the quantification of thoughts about alcohol and drinking behavior. Alcohol Clin Exp Res. 1995; 19:92–99. [PubMed: 7771669]
18. Prochaska, JO.; DiClemente, CC. The Transtheoretical Approach: Crossing Traditional Boundaries of Therapy. Homewood, IL: Dow Jones, Irwin; 1984.
19. Project Match Research Group. Matching alcoholism treatments to client heterogeneity: Project MATCH posttreatment drinking outcomes. J Stud Alcohol. 1997; 58:7–29. [PubMed: 8979210]
20. Annis, HM.; Martin, G. Drug-Taking Confidence Questionnaire. Toronto, Canada: Addiction Research Foundation; 1985.
21. McKay JR, Merikle E, Mulvaney FD, et al. Factors accounting for cocaine two years following initiation of continuing care. Addiction. 2001; 96:213–225. [PubMed: 11182866]
22. Mensinger JL, Lynch KG, TenHave TR, et al. Mediators of telephone-based continuing care for alcohol and cocaine dependence. J Consult Clin Psychol. 2007; 75:775–784. [PubMed: 17907859]
23. Morgenstern J, Labouvie E, McCrady B, et al. Affiliation with Alcoholics Anonymous following treatment: a study of its therapeutic effects and mechanisms of action. J Consult Clin Psychol. 1997; 65:768–778. [PubMed: 9337496]
24. First, MB.; Spitzer, RL.; Gibbon, M., et al. Structured Clinical Interview for DSM-IV Axis I Disorders—patient edition (SCID-I/P, version 2.0). Biometrics Research Department, New York State Psychiatric Institute; NY: 1996.
25. Sobell LC, Maisto SA, Sobell MB, et al. Reliability of alcohol abusers' self-reports of drinking behavior. Behav Res Ther. 1979; 17:157–160. [PubMed: 426744]
26. Sobell LC, Sobell MB, Leo GI, et al. Reliability of a timeline method: assessing normal drinkers' reports of recent drinking and a comparative evaluation across several populations. Brit J Addict. 1988; 83:393–402. [PubMed: 3395719]
27. Ehrman RN, Robbins SJ. Reliability and validity of six-month timeline reports of cocaine and heroin use in a methadone population. J Consult Clin Psychol. 1994; 62:843–850. [PubMed: 7962889]
28. Maisto SA, Sobell LC, Sobell MB. Comparison of alcoholics' self-reports of drinking behavior with reports of collateral informants. J Consult Clin Psychol. 1979; 47:106–122. [PubMed: 429642]
29. Stout RL, Beattie MC, Longabaugh R, et al. Factors affecting correspondence between patient and significant other reports of drinking [abstract]. Alcohol Clin Exp Res. 1989; 12:336.
30. Babor TF, Steinberg K, Anton R, et al. Talk is cheap: measuring drinking outcomes in clinical trials. J Stud Alcohol. 2000; 61:55–63. [PubMed: 10627097]
31. Babor TF, Stephens RS, Marlatt GA. Verbal reports methods in clinical research on alcoholism: response bias and its minimization. J Stud Alcohol. 1987; 48:410–424. [PubMed: 3312821]
32. Hedeker D, Gibbons R. Applications of random-effects pattern-mixture models for missing data in longitudinal studies. Psychol Methods. 1997; 2:64–78.

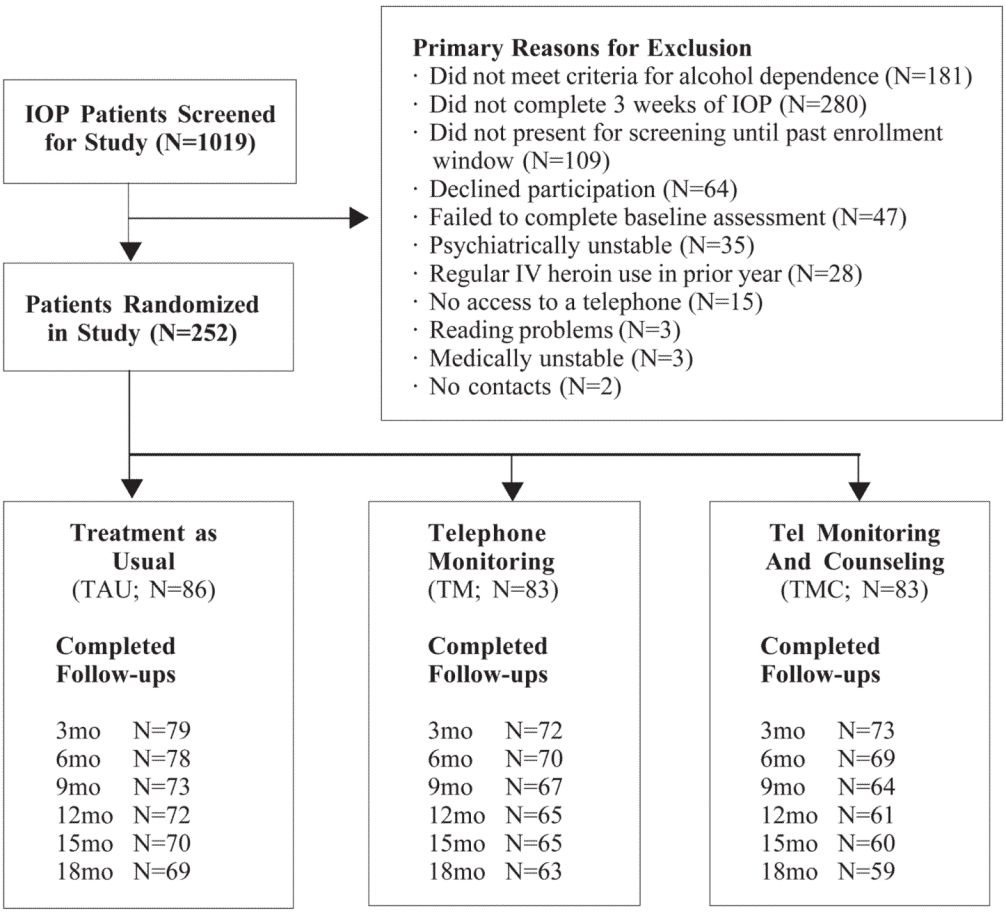

Figure 1.
CONSORT Diagram
Notes. Participants who died during the course of the study or asked to withdraw from the study: TAU=2, TM=3, TMC=5

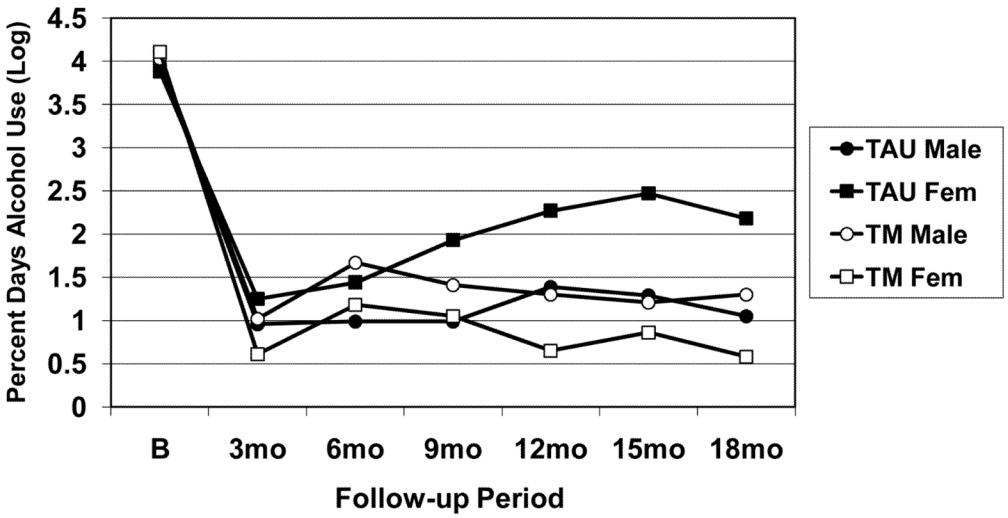

Figure 2.
Interaction of Gender by Continuing-Care Condition (TM vs TAU)[a]
Notes. a Outcome is percent days of alcohol use (log transformed)

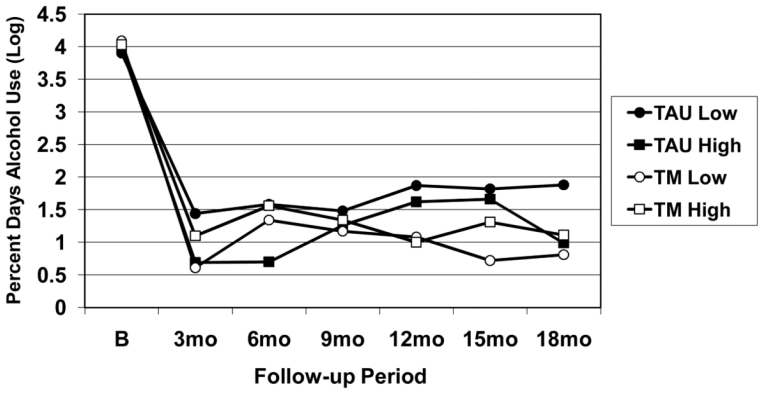

Figure 3.

Interaction of Readiness to Change by Continuing-Care Condition (TM vs TAU)[a]

Notes. a Readiness to change is dichotomized to present the data, with “low” indicating a readiness score below the median and “high” indicating a score above the median. Outcome is percent days of alcohol use (log transformed).

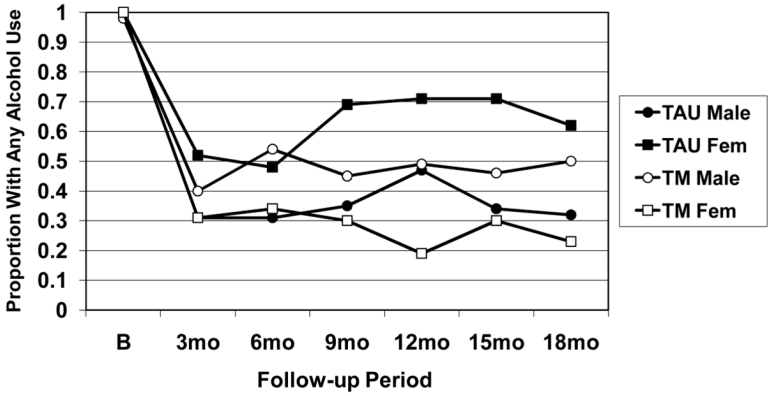

Figure 4.
Interaction of Gender by Continuing-Care Condition (TM vs TAU)[a]
Notes. a Outcome is any alcohol use vs no alcohol use.

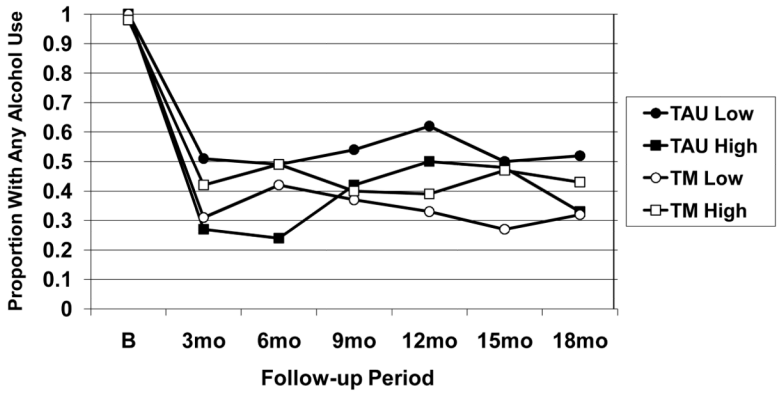

Figure 5.

Interaction of Readiness to Change By Continuing-Care Condition (TM vs TAU)[a]

Notes. a Readiness to change is dichotomized to present the data, with “low” indicating a readiness score below the median and “high” indicating a score above the median. Outcome is any alcohol use vs no alcohol use.

Table 1

Characteristics of Sample at Baseline

	TAU N=86	TM N=83	TMC N=83	F test or chi- square	P Value
Demographics					
Race - % (N)				2.18	.34
African American	84.9 (73)	90.4 (75)	91.6 (76)		
Other	15.1 (13)	9.6 (8)	8.4 (7)		
Marital Status - % married (N)	8.1 (7)	6.0 (5)	12.1 (10)	1.94	.37
Gender - % male (N)	60.5 (52)	59.0 (49)	73.5 (61)	4.61	.10
Age – mean (SD)	42.75 (7.72)	43.79 (7.35)	42.36 (7.16)	1.97	.37
Education – mean (SD)	11.86 (1.85)	11.55 (1.95)	12.01 (1.52)	2.85	.24
Income- mean (SD)	593 (680)	555 (589)	530 (525)	.24	.79
Substance Use – mean (SD)					
ASI alcohol composite	.30 (.20)	.30 (.20)	.26 (.18)	1.98	.37
ASI drug composite	.09 (.08)	.11 (.09)	.09 (.08)	2.25	.32
Alcohol – years regular use	20.94 (9.48)	21.73 (9.32)	20.18 (8.98)	1.65	.49
Cocaine – years regular use	10.69 (8.08)	11.19 (8.01)	11.75 (8.88)	.72	.70
Prior treatments for alcohol abuse	3.35 (3.94)	3.29 (3.70)	3.42 (3.47)	.52	.77
Prior treatments for drug abuse	2.98 (3.87)	3.14 (4.22)	3.05 (3.22)	.87	.65
Axis I Diagnoses					
Substance dependence					
Alcohol – current	86.6 (71)	77.1 (64)	78.3 (65)	.85	.65
Cocaine – current	51.2 (44)	44.6 (37)	51.8 (43)	1.07	.59
Cocaine – lifetime	76.7 (66)	79.5 (66)	80.7 (67)	.43	.81
Major Depression – current	12.8 (11)	15.7 (13)	8.4 (7)	2.04	.36
Co-occurring Problems – mean (SD)					
ASI medical composite	.44 (.36)	.37 (.36)	.40 (.36)	1.75	.42
ASI employment composite	.84 (.20)	.86 (.20)	.80 (.24)	2.12	.35
ASI legal composite	.09 (.15)	.05 (.11)	.07 (.13)	3.97	.14
ASI family/social composite	.21 (.22)	.16 (.20)	.17 (.19)	3.05	.22
ASI psychiatric composite	.27 (.23)	.25 (.24)	.24 (.24)	1.35	.51