



Published in final edited form as:

Am J Drug Alcohol Abuse. 2008 ; 34(1): 47–59. doi:10.1080/00952990701764599.

Improving the Transition from Residential to Outpatient Addiction Treatment: Gender Differences in Response to Supportive Telephone Calls

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Abstract

Substance use relapse rates are often high in the first months after discharge from inpatient substance abuse treatment, and patient adherence to aftercare plans is often low. Four residential addiction treatment centers participated in a feasibility study designed to estimate the efficacy of a post-discharge telephone intervention intended to encourage compliance with aftercare. A total of 282 participants (100 women, 182 men) with substance use disorders were included in this secondary analysis. The findings revealed that women were more likely than men to attend aftercare. This 'gender effect' persisted after adjustment for a number of potential mediators.

Keywords

Gender differences; residential treatment; substance use treatment

Introduction

It is unlikely that substance abusing patients whose level of impairment requires inpatient care will remain in treatment for an adequate period of time, unless they are successful in transitioning from inpatient to outpatient services (1). In a national epidemiological study of 802 discharges from 14 residential or inpatient programs, only 14% of patients reported attending outpatient programs in the community in the first year after discharge, and less than half reported participation in self-help groups (2). Barriers within systems of care make this transition difficult. For instance, patients are likely to receive inpatient care in one location followed by outpatient care elsewhere. Additionally, aftercare is usually delivered by different staff which creates challenges of rebuilding trust and alliance.

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Although accrediting organizations require evidence of discharge planning and strategies to support continuing care, treatment providers are challenged to find interventions that help patients become engaged in aftercare treatment following inpatient treatment. Several studies suggest that patients who are provided with an outreach post-treatment intervention will have improved compliance with aftercare planning and improved outcome status(3-6).

Gender and Substance Use Disorders

Accumulating research demonstrates important gender differences regarding substance use. A recent epidemiological study confirmed the findings of many earlier studies and showed that men typically have higher rates of alcohol and drug use disorders compared to women (7). In addition, men and women have been found to be motivated to use alcohol or drugs for different reasons, have different risk factors for substance use including different genetic contributions to risk, display different patterns of using, have different rates of progression from use to dependence, and experience different social, psychological and physical adverse effects from using (8-13). With regard to comorbid psychiatric diagnoses among individuals with substance use disorders, women typically have higher rates (9,10), and the association between mood/ anxiety disorders and comorbid substance use disorders appears to be stronger for women than men (7). Thus, it is reasonable to expect that gender differences in response to telephone aftercare also might occur. If so, this would provide important information for treatment providers.

The primary research findings of this study were that individuals randomized to receive a brief telephone intervention (telephone call group; TCG) tended to have a higher rate of verified aftercare attendance. In particular, the TCG and standard care only group (SCG), respectively, had attendance rates of 56% and 45% (14); however, women were more likely than men to attend the follow-up visit. The purpose of the current study was to further examine moderating and mediating factors that may explain the 'gender effect' observed in telephone aftercare (14,15).

Methods

Study Procedures

The complete procedures of the TELE study are available (14), but briefly, participants of the TELE study included men and women age 18 years or older voluntarily admitted to one of four residential programs for rehabilitation treatment, but not admitted solely for detoxification. They were required to have a substance abuse or dependence diagnosis (determined by residential program admission information) and the capacity to understand and provide written, informed consent. Eligible participants were required to provide a telephone number where they could be contacted following discharge. Exclusion criteria included current suicide intention or recent (<30 days prior to admission) suicide attempt.

Participants had no further contact with the telephone aftercare study until just before discharge. Randomization to TCG or SCG occurred within two business days prior to the planned discharge date. Randomization was stratified by treatment site to ensure balanced treatment arms.

Telephone calls during weeks 1, 2, 4, 6, 8, 10, and 12 after discharge, by the telephone counselors for TCG, focused on participants' self-reported adherence to the continuing care plan provided to them at discharge. Participants randomized to SCG were not contacted between time of discharge and the call (made by research assistants rather than TELE counselors) to set up the follow-up visit at week 13, but their discharge plan was reviewed with

them by the TELE counselor before they left the residential center. At that time, they were encouraged to register and receive continuing care at an outpatient treatment center.

Participants in each group were assessed for treatment effects at a follow-up visit which occurred at three months after discharge from the residential setting. After completion of the three-month follow-up visit, a research assistant verified the patient's attendance/participation in the assigned program identified on the discharge plan. Verification was attempted on all participants completing the follow-up visit. If the follow-up visit was missed (the participant was a 'no-show'), research staff used release forms signed at the pre-discharge interview to attempt to verify attendance and participation in the continuing care activities identified in the discharge plan. The verified aftercare attendance served as the primary outcome measure for this analysis. Verification of aftercare attendance also included verification of the components of the discharge plan. Failure to confirm attendance at the aftercare program resulted in missing data.

Study procedures were reviewed and approved by the National Institute on Drug Abuse Clinical Trials Network Data Safety and Monitoring Board and the Institutional Review Board on record for the participating sites prior to study initiation.

Statistical Analysis

The primary study findings (14) revealed that women were more likely to attend aftercare visits. A comprehensive analysis of potential mediating factors was designed to further examine this finding. Candidate moderating and mediating variables included baseline characteristics (e.g., race, transportation access), physical and mental history, and variables obtained from the ASI-Lite (16). To minimize the potential for an inflated Type 1 error rate, the research team reviewed variables *a priori* to determine 'biologic plausibility' before the variable was identified as a candidate variable.

Mediation analyses were conducted using nested logistic regression models. Two sets of adjusted logistic regression models were considered. The first model included main effects of gender and the potential mediator. The second model expanded the analysis to include treatment group (TCG or SCG) and clinical site. The magnitude of the mediation effect was summarized by percent change in the estimated gender parameter in the mediation models relative to the unadjusted logistic regression model (i.e., a model consisting of only the gender variable). Gender by covariate associations were assessed by chi-square tests (Fisher's exact when 25% or more table entries contained expected counts less than 5) and two-sample t-tests.

Propensity scoring was used to combine the collective effects of all potential mediators into a single scalar that represented the probability of being classified as female (17). The propensity score was included as a predictor in a multiple logistic regression model containing the main effects of TELE random assignment and gender. This method can significantly reduce bias that may result from confounding.

For the purpose of the initial screening for potential mediators, the Type I error rate was set at $\alpha=0.05$ (two-sided), but p-values less than 0.05 should be interpreted cautiously because of the secondary nature of this examination and multiple hypothesis testing. For the final assessment of the gender parameter estimate, the $\alpha=0.01$ level of significance was used. P-values between 0.05 and 0.01 were interpreted as trends. All analyses were conducted using SAS v9.1.3.

No formal power calculations were included in the design of the original TELE study (consistent with the feasibility objective of the study); however, for this secondary analysis, power was estimated using the N=282 subjects (35.5% women) for which the primary outcome

measure was available. A secondary analysis using a Type I error rate of 0.05 (two-sided) will have approximately 80% power to detect an effect size of 0.35 when the sample size ratio of men to women is approximately 1.8. This calculation is based on a two-sample t-test with equal variances. For dichotomous outcomes, greater than 75% power to detect an odds ratio of 2.0, using a Type I error rate of 0.05 (two-sided), was available, if the underlying binomial probabilities were 0.40 and 0.57 (a region where the binomial variance is typically large) and the same 1.8 men to women ratio.

Results

A total of 339 participants were randomized to TCG (N=169) and SCG (N=170). Of these, 241 completed the 13-week post discharge follow-up and provided a self-report for aftercare attendance; however, inclusion of the program verification increased availability of the primary efficacy outcome to 282. The study consisted of 56.4% Caucasian and 28.7% African American participants. The remaining 14.9% were classified by more than one racial category or did not respond. Overall, 64.5% of the participants were men, with mean (standard deviation) age of 37.1 (9.4) years. After adjusting for treatment group, the odds of aftercare attendance for women were 1.91 times higher than men (95% CI: [1.2, 3.2]; $p=0.007$). The odds ratio in TCG tended to be higher (OR=2.4; 95% CI: [1.1, 5.0]); however, no treatment by gender interaction was found ($p=0.49$).

Numerous candidate covariates were associated with gender (Table 1) and were examined. Notable gender differences were observed with respect to history of sexual abuse (20% men vs. 67% women; $p<0.001$) and physical abuse (45% men vs. 78% women; $p<0.001$). Furthermore, women had a trend for higher ASI psychiatric composite scores ($p=0.022$), which is consistent with the high proportion of women with a history of physical or sexual abuse. This could be attributable to the number of (past 30) days experiencing psychological and emotional problems (13.1 ± 11.9 days men vs. 17.3 ± 12.5 days women; $p=0.006$) which is one of the components used in calculating the composite score. In terms of access to transportation to attend the follow-up care, no gender differences were observed. In particular, approximately 45% of both men and women had a valid driver's license, and 33% of men and 36% of women had access to an automobile.

Content of discharge plans also was examined and revealed some important differences. Women were prescribed medications more frequently than men as part of the discharge plan (22% vs. 11%; $p=0.01$) and were encouraged more often to incorporate faith and/or prayer into the recovery process (74% vs. 57%; $p=0.007$). Discharge plans for male participants included higher rates of recommendation for abstaining from alcohol ($p=0.009$) and other drug use ($p=0.03$) and seeking employment ($p=0.009$). The vast majority of discharge plans included provisions for contacting and participating in AA/NA programs, but no differences were observed with respect to gender. Interestingly, 95% of women's discharge plans included enrollment in community treatment program, yet only 84% of plans for men did ($p=0.005$). There were significant site-to-site variations in this component of the discharge plan ($p<0.001$) and a significant interaction by gender. The percentages for recommendation for aftercare ranged from 60% to 100%.

For the subset of the 282 patients whose data were verified, 204 returned for the follow-up visit, enabling data collection on some subjective aspects of the discharge plan. On a 1 to 5 scale, with 1 being "strongly agree" and 5 being "strongly disagree", women tended to report slightly higher levels of satisfaction with the plan (1.6 ± 0.66 women vs. 1.8 ± 0.68 men; $p=0.07$). No gender differences were observed with respect to the helpfulness of the plan ($p=0.76$), learning about the importance of the plan ($p=0.89$), recognition that alcohol and drugs could not be safely used ($p=0.17$), or that sobriety would require lifestyle changes ($p=0.13$).

Mediation Results

Table 2 presents the results of the mediation analysis. As illustrated, significant confounding of the gender effect was observed; however, the 'gender effect' persisted. In particular, while the unadjusted odds ratio was 1.9, the estimated odds ratio grew to as large as 2.2 after adjusting for history of physical abuse, and it shrunk to 1.8 after adjusting for using faith/prayer. All estimated log odds ratios for gender remained statistically significant at $\alpha=0.05$, and many remained statistically significant at $\alpha=0.01$. The only potential mediator associated with aftercare attendance was prescribing medication; however this variable had a minor effect on the gender parameter estimate.

The analysis with propensity score yielded comparative results. In particular, the gender main effect remained highly significant ($p=0.006$), and after adjustment for treatment assignment and propensity score, the odds of aftercare attendance were 2.6 (95% CI (1.3, 5.2)) times higher for women than men. However, due to missing values, the propensity score was estimated for only 232 of the subjects.

Discussion

In this study, women were more likely to attend aftercare than men. The gender effect persisted after adjusting for potential mediators and study design variables. The lack of significance of the treatment by gender interaction suggests that women in both intervention and control groups were more likely to attend aftercare than men.

The mediating factors of history of sexual or physical abuse, ASI psychiatric composite score, prescribed medications, and psychological/emotional problems in the last 30 days, all of which were more common in women, suggest that comorbidity is an important factor to consider in future studies. Women may have more complex comorbid combinations of conditions that mitigate against success in recovery without additional treatment or attention.

Telephone interventions have been effectively used in other areas of medicine to enhance attendance at follow-up appointments and to improve patient outcome (18-23). Studies on telephone reminders have shown variable results at improving attendance at appointments, most of which have shown decreases in the 'no-show' rate, with improvements up to 50%. Most telephone reminders mentioned previously were short clerical interventions focusing on whether the patient was coming to the appointment.

In this study, the telephone calls had personalized content based on the continuing care plan and the current condition of the patient's addictive illness. Telephone call fidelity was conducted on approximately half of calls. It was of interest to compare the content and fidelity of TCG interventions by gender, but due to masking of participant information, fidelity could not be linked to individual participants. In addition, all telephone counselors were women, so testing impact of gender of the caller was not possible, and the impact of gender matching for treatment is not clear (13).

Another limitation of this study is that information pertaining to a patient's insurance coverage for aftercare attendance was not measured. If women had greater access to insurance, this could potentially explain some of the 'gender effect'. Furthermore, not all of the sites in this study required all patients to enroll in aftercare; however, the between-site variation was not found to strongly affect the observed gender trend. Even though this analysis was a planned secondary analysis, the results should be interpreted with caution. Future studies are needed to better understand the observed gender effect, and the development of novel methodology to improve the aftercare attendance for males may be warranted.

Acknowledgements

This study was funded by the following grants from the National Institutes of Health: DA0013727, DA013711, DA013045, and DA013710. The consortium performing this study was a part of the Clinical Trials Network (CTN) established by the National Institute on Drug Abuse (NIDA).

References

1. Fiorentine R, Anglin MD. Does increasing the opportunity for counseling increase the effectiveness of outpatient drug treatment? *Am J Drug Alcohol Abuse* 1997;23(3):369–382. [PubMed: 9261486]
2. Etheridge RM, Hubbard RL, Anderson J, Craddock SG, Flynn PM. Treatment structure and program services in the Drug Abuse Treatment Outcome Study (DATOS). *Psychology of Addictive Behaviors* 1997;11(4):244–260.
3. Koumans AJ, Muller JJ, Miller CF. Use of telephone calls to increase motivation for treatment in alcoholics. *Psychol Rep* 1967;21(1):327–8. [PubMed: 6078383]
4. Intagliata J. A telephone follow-up procedure for increasing the effectiveness of a treatment program for alcoholics. *J Stud Alcohol* 1976;37(9):1330–5. [PubMed: 185468]
5. Lash SJ, Blosser SL. Increasing adherence to substance abuse aftercare group therapy. *J Subst Abuse Treat* 1999;16(1):55–60. [PubMed: 9888122]
6. McKay JR, Lynch KG, Shepard DS, Ratichek S, Morrison R, Koppenhaver J, Pettinati HM. 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(6):967–979. [PubMed: 15612844]
7. Conway KP, Compton W, Stinson FS, Grant BF. Lifetime comorbidity of DSM-IV mood and anxiety disorders and specific drug use disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry* 2006;67(2):247–257. [PubMed: 16566620]
8. Blume, S. Addictive disorders in women. In: Frances, R.; SI, M., editors. *Clinical textbook of addictive disorders*. Guilford Press; New York: 1998. p. 413-429.
9. Brady KT, Randall CL. Gender differences in substance use disorders. *Psychiatr Clin North Am* 1999;22(2):241–252. [PubMed: 10385931]
10. Canturbury, R. Alcohol and other substance abuse. In: Kornstein, S.; Clayton, A., editors. *Women's mental health: A comprehensive textbook*. Guilford Press; New York: 2002. p. 222-243.
11. Randall CL, Roberts JS, Del Boca FK, Carroll KM, Connors GJ, Mattson ME. Telescoping of landmark events associated with drinking: A gender comparison. *J Stud Alcohol* 1999;60(2):252–260. [PubMed: 10091964]
12. Gomberg, ESL.; Nirenberg, TD., editors. *Women and Substance Abuse*. Ablex Publishing; Norwood, NJ: 1993.
13. Greenfield SF, Brooks AJ, Gordon SM, Green CA, Kropp F, McHugh RK, Lincoln M, Hien D, Miele GM. Substance abuse treatment entry, retention, and outcome in women: a review of the literature. *Drug Alcohol Depend* 2007;86(1):1–21. [PubMed: 16759822]
14. Hubbard RL, Leimberger JD, Lucas K, Haynes LF, Holter J, Liepman MR, Tyson B, Day T, Thorpe EA, Faulkner B, Hasson A. Telephone Enhancement of Long-term Engagement (TELE) in Continuing Care for Substance Abuse Treatment. *The American Journal on Addictions*. in press
15. Haynes, LF.; Back, SE.; Leimberger, JD.; Hubbard, RL. *College on Problems of Drug Dependence*. Orlando, FL: 2005. Improving the transition from residential to outpatient addiction treatment: Gender differences in response to supportive telephone calls.
16. McLellan AT, Luborsky L, Woody GE, O'Brien CP. Addiction Severity Index - Lite. *Journal of Nervous and Mental Disorders* 1980;168(1):26–33.
17. Agostino RD. Propensity score methods for bias reduction in the comparison of a treatment to a non-randomized control group. *Statistics in Medicine* 1998;17(19):2265–2281. [PubMed: 9802183]
18. Riegel B, Carlson B, Kopp Z, LePetri B, Glaser D, Unger A. Effect of a standardized nurse case-management telephone intervention on resource use in patients with chronic heart failure. *Arch Intern Med* 2002;162(6):705–712. [PubMed: 11911726]
19. Koren ME, Bartel JC, Corliss J. Interventions to improve patient appointments in an ambulatory care facility. *J Ambul Care Manage* 1994;17(3):76–80. [PubMed: 10136097]

20. Reekie D, Devlin H. Preventing failed appointments in general dental practice: a comparison of reminder methods. *Br Dent J* 1998;185(9):472–474. [PubMed: 9854344]
21. O'Brien G, Lazebnik R. Telephone call reminders and attendance in an adolescent clinic. *Pediatrics* 1998;101(6):E6. [PubMed: 9606248]
22. Hashim MJ, Franks P, Fiscella K. Effectiveness of telephone reminders in improving rate of appointments kept at an outpatient clinic: a randomized controlled trial. *J Am Board Fam Pract* 2001;14(3):193–196. [PubMed: 11355051]
23. Kim HS, Oh JA. Adherence to diabetes control recommendations: impact of nurse telephone calls. *J Adv Nurs* 2003;44(3):256–61. [PubMed: 14641395]

Study characteristics and potential mediators

Table 1

Domain	Variable	Level	Total Sample (N=282)		Male (N=182)		Female (N=100)	
			N	%	N	%	N	%
Demographics								
	Age	Mean (SD)	37.1 (9.4)		37.7 (9.4)		36.0 (9.5)	
	Ethnicity	Hispanic Origin	7	2.5	7	3.9	0	0.0
	Race	White	159	56.4	98	53.9	61	61.0
		Black	81	28.7	55	30.2	26	26.0
		Other / Multi-racial / Not Specified	42	14.9	29	15.9	13	13.0
	Married		61	21.6	43	23.6	18	18.0
Access to Care								
	Driver's License		127	45.2	82 [†]	45.3	45	45.0
	Access to Auto		96	34.3	60 [†]	33.3	36	36.0
Medical History								
	Prior hospitalizations		200	71.2	129	70.9	71 [†]	71.7
	Length of Stay Prior to TELE	Mean (SD)	19.7 (7.7)		19.5 (7.4)		20.0 (8.1)	
	Drug Use - 30 Days	Heroin/Opioids	82	29.2	45 [†]	24.9	37	37.0 *
		Cocaine	142	50.4	89	48.9	53	53.0
		Barbituate/Sedative	61	21.6	33	18.1	28	28.0
		Amphetamines	33	11.7	19	10.4	14	14.0
		Marijuana	116	41.1	71	39.0	45	45.0
	Alcohol to Intoxication		151	53.9	101 [†]	56.1	50	50.0
	Prior Alcohol Admissions		186	66.7	130 [†]	72.2	56 [†]	56.6 **
	Prior Drug Admissions		195	69.4	121 [†]	66.9	74	74.0
	Chronic Medical Condition		125	44.3	75	41.2	50	50.0
	Attempted Suicide Lifetime		97	34.4	56	30.8	41	41.0
	History of Sex Abuse		102	36.3	36	19.8	66 [†]	66.7 **
	History of Physical Abuse		158	56.2	81	44.5	77 [†]	77.8 **
	ASI Psychological Composition Score	Mean(SD)	0.406(0.236)		0.381(0.237)		0.449(0.23)	*

Domain	Variable	Level	Total Sample (N=282)			Male (N=182)			Female (N=100)		
			N	%		N	%		N	%	
Living Environment	ASI Drug Composition Score	Mean(SD)	0.189(0.148)		0.184(0.145)		0.197(0.154)				
	Employed last 30 days		118	42.0	80 [†]	44.2	38	38.0			
	Family counseling important last 30 days		85	34.0	45 [†]	28.3	40 [†]	44.0 *			
	On Probation/Parole		90	32.0	65 [†]	35.9	25	25.0			
Treatment Plan	Going to a community based facility		247	87.6	152	83.5	95	95.0 **			
	Participating in AA, NA, or other self help groups		277	98.2	180	98.9	97	97.0			
	Taking any prescribed medicines for substance abuse problems		42	15.0	20 [†]	11.1	22	22.0 *			
	Using faith, prayer or other spiritual involvement to deal with daily living		177	63.2	104 [†]	57.5	73 [†]	73.7 **			
	Abstaining from alcohol use		264	94.0	176	96.7	88 [†]	88.9 **			
	Abstaining from other kinds of drug use		270	95.7	178	97.8	92	92.0 *			
Treatment Plan - Getting Help in	Psychological or emotional health		140	49.7	83	45.6	57	57.0			
	Education or training		38	13.5	29	15.9	9	9.0			
	Finding a job or going back to work		81	28.8	62	34.1	19 [†]	19.2 **			

[†] missing values

* significant at 0.05

** significant at 0.01

Table 2

Log odds ratios for gender after adjustment for potential mediators and trial design factors. The reported percent changes represent the percent difference of the unadjusted gender estimate (log OR =0.646) relative to the adjusted gender effect. A negative percent change is indicative of an attenuation of the 'gender effect'.

Model	Equation 1			Equation 2			Equation 3		
	β	SE	p-value	β	SE	Percent Change	β	SE	Percent Change
Gender only	0.646	0.253	0.011						
Gender &: Family counseling important last 30 days	0.675	0.273 *		0.633	0.286 *	4.50%	0.633	0.286 *	-1.97%
Heroin/opioid use last 30 days	0.663	0.257 **		0.644	0.266 *	2.69%	0.644	0.266 *	-0.32%
Prior alcohol admissions (yes or no)	0.677	0.260 **		0.652	0.269 *	4.88%	0.652	0.269 *	1.01%
History of sex abuse	0.667	0.288 *		0.620	0.297 *	3.36%	0.620	0.297 *	-3.98%
History of physical abuse	0.809	0.273 **		0.782	0.284 **	25.31%	0.782	0.284 **	21.07%
ASI psych component	0.639	0.261 *		0.600	0.273 *	-1.10%	0.600	0.273 *	-7.04%
Going to community treatment	0.637	0.257 *		0.618	0.266 *	-1.36%	0.618	0.266 *	-4.37%
Taking any prescribed medicines	0.594	0.257 *		0.603	0.264 *	-7.96%	0.603	0.264 *	-6.63%
Using faith or prayer	0.695	0.259 **		0.567	0.279 *	7.67%	0.567	0.279 *	-12.15%
Abstaining from alcohol use	0.624	0.258 *		0.640	0.266 *	-3.45%	0.640	0.266 *	-0.98%
Abstaining from other kinds of drug use	0.619	0.256 *		0.615	0.264 *	-4.12%	0.615	0.264 *	-4.81%
Finding a job or going back to work	0.635	0.257 *		0.580	0.267 *	-1.63%	0.580	0.267 *	-10.26%

Equation 1: gender only

Equation 2: gender and potential mediator

Equation 3: gender, potential mediator, site, and treatment group

* significance at 0.05

** significance at 0.01