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Do women differ from men on Alcoholics Anonymous participation and abstinence? A multi-wave analysis of treatment seekers

Jane Witbrodt, MPH^a and Kevin Delucchi, PhD^b

^aAlcohol Research Group, 6465 Christie Avenue, Suite 400, Emeryville, CA 94608, jwbrodt@arg.org, 510-597-3440 (telephone), 510-985-6459 (fax)

^bUniversity of California, San Francisco, San Francisco, CA, kdelucchi@lppi.ucsf.edu

Abstract

Background—Given the widespread use of Alcoholics Anonymous (AA) and other similar groups in the US and the increasing membership of women, the present paper compares women to men on their meeting attendance and AA-prescribed behaviors, factors associated with that AA participation, and tests how these relate to women's and men's abstinence across time.

Methods—All consecutive new admissions (age ≥ 18) from county-wide public and private alcohol and drug treatment programs representing the larger population of treatment seekers were approached to be in the study at treatment entry. Those consenting at baseline ($n = 926$) were sought for follow-up interviews 1, 3, 5 and 7 years later. Generalized linear models were used to test whether various help-seeking factors associated with AA participation differentially by gender and, controlling for AA and other confounders, whether women differ from men on abstinence.

Results—At each follow-up interview, women and men attended AA at similar rates and similarly practiced specific AA-behaviors, and they were alike on most factors associated with AA participation and abstention across time including abstinence goal, drink volume, negative consequences, prior treatment, and encouragement to reduce drinking. Relative to men, women with higher ASI drug severity were less likely to participate in AA. Though higher AA participation was a predictor of abstinence for both genders, males were less likely to be abstinent across time. Men were also more likely to reduce their AA participation across time.

Conclusion—These findings add to an emerging literature on how women compare to men on factors related to AA participation and subsequent drinking outcomes across time. Findings have clinical implications for service providers referring clients to such groups.

Keywords

gender differences; AA attendance; AA involvement; abstention; help-seeking

Many people in the United States (US) turn to Alcoholics Anonymous (AA) as a first source of help for their substance use problems (Substance Abuse and Mental Health Services Administration and Office of Applied Studies, 2008; Weisner et al., 1995). Moreover, most professional substance use treatment programs in the US are based on AA's twelve-step principles (McElrath, 1997; Slaymaker and Sheehan, 2008) and most rely on AA groups to provide important support services following treatment (Humphreys, 2003; Magura, 2007). The relationship between AA participation and improved drinking outcomes is now

documented in several well-designed outcomes studies, including prospective longitudinal studies that have followed both treated and previously untreated individuals (Tonigan, 2008). Although the relationship between AA and improved outcomes in the majority of studies has been correlational (rather than causal), more recent studies, using cross-lagged analyses and other more elaborate statistical modeling techniques, are beginning to show evidence of a causal relationship between AA participation and improved outcomes (Connors et al., 2001; Kelly et al., 2006; McKellar et al., 2003). Less well known is the role of gender in AA. Only a few studies have compared women to men on AA participation and even fewer have studied the same individuals over several years. The purpose of this paper is to add descriptive and outcome information to the existing (but limited) gender-focused research on AA participation and related drinking outcomes using a longitudinal sample of treatment seekers followed at 1-, 3-, 5- and 7- years.

Gender differences in AA participation

This research literature has variously reported that women and men participate in AA (and similar 12-step groups) equally (Kaskutas et al., 2005; Kaskutas et al., 2009a; Kelly et al., 2006), that women attend more than men (Humphreys et al., 1991; Moos et al., 2006; Weisner et al., 2003b), and that women attend less than men (Dawson et al., 2006; Kingree, 1997; Weisner et al., 1995; Zembore et al., 2009). Still other studies have found inconsistent gender differences in AA participation between study sub-samples (Del Boca and Mattson, 2001) and within a single sample across time (Archer, 2009; Timko et al., 2005; Timko et al., 2002). Most of these studies did not gather long-term prospective information and they did not examine both meeting attendance and AA-prescribed behaviors.

The lack of a consistent pattern of differences in AA participation that can be attributed to gender also extends to the benefit associated with that participation (Bogenschutz, 2008). Some of the strongest gender findings come from a collection of papers that report on a longitudinal study with 1-, 8- and 16-year follow-ups that recruited and followed previously untreated individuals who had called into an information and referral service seeking help for an alcohol-use disorder. The authors found that women were equally or more likely to participate in AA (i.e. number of meetings and duration of attendance) than men, and they benefited more from long-term involvement in terms of drinking-related outcomes (Moos et al., 2006; Timko et al., 2005; Timko et al., 2002). In contrast, a longitudinal study of treated and untreated alcohol dependent individuals drawn from the general population and treatment programs, used latent class trajectory analyses to model classes of AA meeting attendance across five interviews and then compared the emergent trajectories on abstinence (Kaskutas et al., 2009a). Among the four AA attendance classes identified (high, medium, descending, and low), no gender differences emerged by class membership. Greater AA attendance was associated with higher rates of abstinence across time.

Cross-sectional studies of treated samples with shorter follow-up windows have also examined gender as related to AA participation but not drinking outcomes. A study of employed residential treatment clients found that women did not differ from men with regard to number of AA/NA meetings attended, or in having or becoming a sponsor (Slaymaker and Sheehan, 2008). Yet another study of Swedish treatment seekers found that although women and men reported similar AA attendance, women engaged in certain AA-prescribed behaviors more than men at a 1-year follow-up (Bodin, 2006). In a cross-cultural analysis of US and Swedish male and female treatment seekers followed at 1-year (Witbrodt and Romelsjö, 2010), Swedish females living with underage children were more likely to attend AA/NA/CA/other mutual-help meetings (dichotomized as yes vs. no) post-treatment than males; and males who received legal pressure to attend treatment were likely to attend these meetings. In comparison, US females who were dependent on both alcohol and drugs

were significantly more likely than males to attend meetings. In both samples, other measures were associated with meeting attendance but these did not differ by gender.

Predictors of Alcoholic Anonymous participation

Given strong indications that going to AA meetings and engaging in AA behaviors is associated with improved drinking outcomes, researchers have attempted to describe factors (moderators or active ingredients) that influence participation and outcomes related to that participation. Though differences in sampling frames and inconsistencies in how AA participation is operationalized make it difficult to identify persistent factors across studies, literature reviews (Bogenschutz, 2008; Emrick et al., 1993; Tonigan, 2008) and meta-analyses (Tonigan et al., 1996b) have identified factors that seem to replicate. Fewer studies have focused specifically on whether these influences differ by gender and most have not included large longitudinal samples (Bogenschutz, 2008; Kelly, 2003).

We are guided by the medical utilization literature on help-seeking, especially as conceptualized by the Aday model (Aday and Andersen, 1974; Aday et al., 1999) and as adapted for treatment-seeking for alcohol and drug problems (Booth et al., 1997; Padgett et al., 1990; Weisner, 1990b; Weisner and Schmidt, 2001), which incorporates components of the health belief model and emphasizes social-psychological factors associated with seeking help. This research has tended to group various measures by the roles they are hypothesized to play in the help-seeking process. These are ‘predisposing’ factors that describe the propensity of individuals to use services and usually include demographic characteristics like gender or individual traits and beliefs; ‘enabling’ factors that distinguish between available formal and informal resources that can either facilitate or impede utilization, for example social pressure to use or not use; and ‘need/severity’ factors that reflect both self-perceived and clinically evaluated substance use related problem severity.

Following on an emerging but scant research (Bodin, 2006; Del Boca and Mattson, 2001; Satre et al., 2004; Timko et al., 2005; Weisner et al., 2003a; Witbrodt and Romelsjö, 2010), we focus specifically on gender differences to address three questions. 1) Do women differ from men on their meeting attendance and practice of specific AA-prescribed behaviors at follow-up interviews? 2) Is gender differentially related to factors associated with AA meeting attendance and AA involvement across time? 3) Controlling for effects of AA participation and other confounding influences, do women differ from men on abstinence across time? Multivariate longitudinal models are used to test the latter two questions. We look separately at meeting attendance and AA involvement to see how these two measures compare in identical statistical models. AA participation has been variously defined as meeting attendance, using both frequency and duration measures (Moos and Moos, 2004), and by AA affiliation or involvement, using measures that tap into AA-prescribed behaviors and beliefs (Cloud et al., 2004; Humphreys et al., 1998; Tonigan et al., 1996a). The latter usually consists of summing items, and may or may not include meeting attendance as one of the items. Unless otherwise intended, we use the term ‘AA participation’ in this paper as a generic reference to AA meeting attendance and/or other measures of AA involvement.

METHODS

Study Sites

Individuals entering ten public and private treatment programs in a single Northern California County (US) were recruited to be in the study during the years 1995 and 1996. The county represents a socially and culturally diverse population (approximately 900,000) with a mix of both rural and urban areas, and it reflects national patterns in the relationship of substance use to other health and social problems. Private programs included two sites in

a health maintenance organization (HMO) offering long-term outpatient treatment, and two fee-for-service private hospital programs offering short-term detoxification and inpatient, as well as lengthier day treatment and outpatient programs. Public programs consisted of two detoxification sites, two residential programs (gender specific), and two outpatient programs. Although staffing and therapeutic approaches varied across all these settings, the private programs mostly followed the “Minnesota Model” philosophy, which combines professional diagnosis and treatment with the 12-steps of AA and dominates the treatment philosophy in the US (Institute of Medicine, 1990). The public programs mostly followed a so-called “social model” of treatment philosophy (Borkman et al., 1998; Kaskutas et al., 1999), which closely adheres to the 12-steps of AA and is staffed largely by non-professional persons who have achieved sobriety through AA participation (or other 12-step groups like NA or CA). Like most US treatment programs, these sites encouraged clients to attend AA or similar groups while in treatment, either onsite or in the larger community, and also encouraged attendance following treatment.

Recruitment and Follow-up Interviews

Consecutive new admissions at each program were approached to be in the study within three days after entering inpatient or residential treatment and within three visits at outpatient programs. A total of 926 clients from the ten programs agreed to be in the study (80% participation rate) and provided informed consent. One-, 3-, 5- and 7-year follow-ups were conducted using computer-assisted-telephone interviews. Follow-up response rates (based on the baseline sample) were 78%, 75%, 72% and 67% at respective follow-ups. More than two-thirds (71%) were interviewed at 3 or more follow-ups (60% at all 4). Those not interviewed at follow-ups were significantly less likely to be married/cohabitating, less educated, and more likely to be unemployed, and they reported greater alcohol severity. At analysis, study weights were constructed to account for differences in field work duration across study sites (the length of time spent interviewing in each agency to equally represent across agencies the number of individuals who would have entered during a given time period) and in sampling fraction within agencies (any differences in every “nth” client sampled). Weights adjusted for program, sex and ethnicity. These ranged from .41 (for white women in one managed care program) to 2.84 (for white males in one public detoxification program) (Kaskutas et al., 1997a; Tam, 1997; Weisner and Schmidt, 1995).

Measures

Selection of predisposing, enabling and need/severity help-seeking variables associated with AA participation and drinking outcome was guided by scientific reviews (Groh et al., 2008; Kelly, 2003; Tonigan et al., 1996b) and published research articles describing treatment-seeking samples (Bodin, 2006; Bogenschütz, 2008; Grant, 1996; Hasin and Grant, 1995; Kaskutas et al., 1997b; Koski-Jännes, 1991; Longabaugh et al., 2005; Morgenstern et al., 2002; Timko et al., 2002; Weisner, 1993; Weisner and Matzger, 2002; Witbrodt and Romelsjö, 2010). We were also empirically guided in our selection of predictor variables. Here we relied on correlations (described below) to help inform our selection. In general, greater AA participation and positive drinking outcomes have consistently been associated with higher problem severity and with less social network support for drinking. Other reported positive factors have included older age, lower SES, prior treatment, greater readiness for change, lower psychiatric severity, White ethnicity, and greater spirituality/religiosity. These latter influences tend to vary across studies based on sampling and other methodological differences.

Predisposing Covariates—Predisposing baseline demographic factors included age (continuous), marital status (married/cohabitating), ethnicity (White, African American, Other), education (<high school, high school, > high school), and family income (>\$25,000).

Personal predisposing factors included religiosity and having an abstinence goal. Baseline religiosity was assessed using the Religious Background and Behaviors (RBB), Formal Practices Component (4 items). This RBB component uses an 8-point Likert scale that asks about the frequency of praying or meditating, reading or studying holy writings, attending religious services, and having direct experiences with God. Likert values for the four items are summed to provide a scale score (Connors et al., 1996). The component has satisfactory internal consistency (Cronbach's alpha .81 & .96 respectively) and excellent test-retest reliability. At treatment entry, individuals were asked what their treatment goal for drinking was, with six response categories ranging from 'do nothing' to 'quit.' We dichotomized this measure (quit versus else) and used it to assess agreement with AA's position on abstinence. One other predisposing factor, having underage children (<18) in the home, was also included in our analyses based on earlier work suggesting an association between it and AA participation. This is our only time-varying (i.e., collected at each interview) predisposing measure.

Enabling Covariates—Enabling covariates included the number of persons in one's social network who encouraged use of alcohol and drugs, and the number who encouraged quitting. These two measures are from the Social Network Assessment (Kaskutas, 1995). We used one other external help-seeking measure, attendance in substance abuse treatment (dichotomized as yes vs. no). At the 1-year follow-up, this included additional treatment not part of the index treatment episode. These three enabling measures were collected at every interview and asked about the prior 12 months. To control for potential baseline treatment affects on AA participation and abstinence (Humphreys et al., 1999; Kaskutas et al., 2009b; Ouimette et al., 1997; Tonigan et al., 2003), we dummy-coded our 10 study programs into five treatment categories: private hospital, private HMO, public detoxification, public residential, and public outpatient.

Need/Severity Covariates—Measures assessing need or problem severity were also collected at every interview. Addiction Severity Indices (ASI) were used to assess past-30-day problem severity in five domains: alcohol, drug, psychiatric, family/social, and medical (McLellan et al., 1992). The ASI, a valid and reliable instrument (McLellan et al., 1992), uses key items to produce a continuous composite score for each domain (0–1; higher scores designate a greater severity). Another measure of problem severity, average yearly drink volume, was calculated using questions for the Graduated Frequency (GF) Scale (Greenfield, 2000; Hilton, 1987b). Individuals were asked, "During the last 12 months, how often did you have 12 or more drinks of any kind alcoholic beverage in a single day?" The question was also asked for 8–11, 5–7, 3–4 and 1–2 drinks in a day. The summed cross-product of the frequency by quantity (using the midpoint) provides an average volume measure. GF questions are core measures used in the US National Alcohol Surveys (Alcohol Research Group, 1964–2005) conducted since 1990 to assess the nation's drinking. Lastly, we asked about the number of negative alcohol-related social consequences experienced (the sum of 8 items). These consequences cover a range of ways that individuals with alcohol problems come to the attention of others in the community (Hilton, 1987a; Weisner, 1990a; Weisner et al., 1995; Weisner and Schmidt, 1992) and include experiences such as public drunkenness, DUI or similar arrests, serious arguments with others about one's drinking, or having a health professional address the problem. Except for the ASI past 30-day measures, all others asked about the prior 12 months. DSM-IV diagnosis was not included as a potential 'need/severity' covariate because it correlated highly with other alcohol and drug measures.

We also assessed self-perceived need for help at every interview using questions from the Addiction Severity alcohol and drug indices, "How important to you is treatment for these (alcohol / drug) problems?" The four possible response categories were recoded as

‘extremely’ versus ‘else’. This item has been used as a measure of motivation in other studies looking at treatment initiation and retention (Campbell, 1997; Weisner et al., 2001). Though several studies (but not all) have shown the ASI to be a reliable and valid instrument (Mäkelä, 2004; McLellan et al., 1985), the single item capturing self-perceived need for treatment has not been tested as a valid measure of motivation (Shen et al., 2000).

Outcome Measures—Three outcome measures collected at every interview were tested. AA measures were (1) number of meetings attended in the prior 12 months and (2) AA involvement in the prior 12 months. (3) Abstinence from alcohol was defined as no past 30-day drinking. AA involvement (AAI) was measured by totaling the number of AA activities engaged in, using a 5-item scale (*range 0–5*). These items were taken for a 9-item scale that displayed excellent internal consistency (Cronbach’s $\alpha = 0.85$). These summed activities have demonstrated internal consistency when tested in multiple health service settings with both treated and untreated populations (Humphreys et al., 1998). The five activities included have a sponsor, sponsored other(s), had a spiritual awakening, did AA service work, and read AA literature. Because scores on the AAI and number of meetings attended were skewed and kurtotic, we transformed the measures using a shifted base-10 log (plus one) to achieve more normal distributions.

Analysis Strategy

Pearson’s Chi-square and t-tests were used to compare *females* and *males* on descriptive characteristics at baseline and to describe their formal treatment utilization, AA meeting attendance, and individual AA activities engaged in at every interview. Pearson product-moment statistics were used to explore the strength of relationships between covariates at each follow-up to avoid problems with multicollinearity among the covariates. In addition, these statistics also provided empirical background information on which help-seeking covariates most consistently correlated with our outcome variables across time.

Generalized estimating equation (GEE) population-averaged regression models with linear effects for time were used to test whether help-seeking covariates were related to the AA outcomes (number of meetings and the AAI) differentially by gender across time. GEE models efficiently account for correlation between observations of repeated measures (Liang and Zeger, 1986), they work well for balanced designs with limited follow-up points, and they allow for data missing at follow-up points (Fitzmaurice et al., 2004). Rather than stratifying the sample on gender and then testing the effects of help-seeking covariates on AA participation for males and females separately, we instead created gender-by-help seeking covariate interaction terms (e.g. Gender X ASI Severity) and entered these simultaneously into each GEE model using the gender-combined sample. The advantage of the interaction approach is that it simplifies the task of testing whether the regression coefficients (main effects) for women and men differ statistically (Aiken and West, 1991). A few covariates not interacted with gender were added to each model to test for other confounding influences, including gender differences at baseline and type of treatment received at study entry.

A third GEE model was used to test whether women’s past-30-day abstinence across time differed from men’s, controlling for their AA participation and other potential confounding influences. The gender-combined sample was used in this model but with fewer interaction terms (see results). GEE models were conducted in Stata, Version 10 (Stata Corporation, 2007).

RESULTS

Baseline Gender Differences

The sample was comprised of women (n=360) and men (n=566) averaging 38–39 years of age. Among these adult, about three-quarters had obtained a high school or higher education and about a third were in a marriage/cohabitating relationship at baseline (Table 1). Both scored similarly on the RBB Formal Practices scale -- just above the median rank when compared to a normative sample (Connors et al., 1996). Some gender differences were found on baseline demographic factors. Compared to men, more women were of White ethnicity (64% vs. 48%) and more had children under the age of 18 living with them (42% vs. 23%). In terms of significant ($p < .05$) ASI severity measures, women reported higher psychiatric (0.444 vs. 0.364), medical (0.323 vs. 0.261) and social (0.355 vs. 0.241) severity than men and men reported higher alcohol severity (0.378 vs. 0.355). More men than women reported prior treatment (76% vs. 58%). Similar proportions (over half) reported that the current treatment was ‘extremely important’ to them and the majority (>70%) set quitting as a treatment goal.

AA Attendance and Involvement Measured at Every Interview

Few significant gender differences were found for AA meeting attendance and AA involvement (Table 2). At baseline, more men than women reported AA attendance in the year before entering treatment (69% vs. 59%; $p = .003$). At 5- and 7- years, over half the sample had not attended AA or treatment in the prior year. Overall, similar trends emerged for the percentages of women and men who reported any AA attendance following baseline treatment entry, starting highest at the 1-year follow-up (*respectively*, 67% & 63%) and dropping with some leveling at the remaining three interviews (42% & 40% at 7-year follow-up). Among those women and men who attended AA, the median attendance was about 1 meeting a week (e.g., 60 meetings/52 weeks) at the 1-year interview and about 2 meetings a month at the 7-year interview. The average number of AA involvement (AAI) items endorsed among attendees at the follow-up interviews remained fairly stable across time for both genders (*range* 2.5 – 2.8). Women and men were mostly similar on AA behaviors practiced. Prior to treatment entry a higher proportion of women than men reported having a sponsor (29% vs. 20%; $p = .022$); and at the 3-year interview, more women reported having had a spiritual awakening (66% vs. 54%; $p = .036$) and more men reported reading literature (95% vs. 87%; $p = .007$).

Longitudinal model results

Table 3 displays results for the two GEE models predicting AA involvement and AA meeting attendance respectively. To obtain gender-specific statistics, gender was first dummy coded ‘one’ for male (indicator group) and ‘zero’ for female (reference group). Under this coding scheme, the ‘*main effect*’ of help-seeking on AA participation is that for women only. The respective interaction coefficient (i.e., Male X Abstinence Goal) tests the added (or decreased) effect of the help-seeking covariate on AA participation for men relative to that of women. As in simple regression analysis, summing a coefficient for women to the respective *interaction coefficient* yields the ‘*main effect*’ for men (but provides no other statistics).

To statistically test whether each of the time varying help-seeking covariates were related to AA participation for men, the gender variable was reverse coded (‘one’ for female & ‘zero’ for male). These estimates (for males) are displayed in italics and enclosed in parentheses in the tables. Coefficients (and p-values) for the *interaction terms* remain the same under both coding schemes, but the sign changes (+ or –) with the recoding. This holds whether the interaction is significant or not. A significant interaction indicates that the magnitude of

effect differs by gender. This can either signify that a help-seeking predictor is related to the outcome for one gender and not the other, or it can signify that a help-seeking predictor is significantly related to the outcome for both genders but the strength of relationship is significantly greater (or lesser) for one gender than the other (an important question in this paper). Coefficients for other measures not interacted by gender remain the same under both coding schemes.

Factors Associated with AA Participation—Nearly half the help-seeking factors tested (5 of 11) were associated with an *increase* in AA involvement and AA attendance similarly for women and men. Differences in the magnitude of these coefficients were not statistically different (as indicated by p-values for the interaction terms). These included having an abstinence goal at study entry, and among the time-varying covariates, reporting a ‘reduction’ in drinks per year, experiencing more negative alcohol-related consequences, prior year formal treatment seeking, and having more persons encouraging reduction. Refer to Table 3 for these coefficients and p-values (see bold text). Moreover, reduced ASI alcohol severity (time varying) was associated with greater AA attendance (but not AAI) for both women and men (Table 3, *coefs.* = $-.689$ & $-.995$ respectively).

Other help-seeking covariates predicted AA participation for only one gender. For females, higher ASI psychiatric severity was associated with increased AA involvement (*coef.* = $.071$), but higher ASI drug severity was associated with both decreased AA involvement (*coef.* = $-.185$) and decreased attendance (*coef.* = -1.56). Though the male-by-ASI drug severity interaction term was significant, the *coefficient* for males was not significant, as is sometimes the case when multiple comparisons like these are carried out (Draper and Smith, 1966). For males, increased baseline religiosity and less network support to use were associated with increased AA involvement (*coefs.* = $.006$ & $-.003$ respectively) and with AA attendance (*coefs.* $.041$ & $-.019$ respectively). As well, higher ASI alcohol severity was associated with decreased AA involvement (Table 3, *coef.* = $-.097$) and living with children with decreased attendance (Table 4, *coef.* = $-.282$). Male’s AA involvement (*Time coef.* = $-.008$) and AA attendance (*Time coef.* = $-.083$) decreased significantly across time.

Abstinence

Because our AA measures were highly correlated at concurrent data points (r^2 values ranged between .66 and .87), AA involvement and number of AA meetings were tested in separate models predicting abstinence. The model with number of meetings attended resulted in very similar findings, thus, only the AAI results are displayed in Table 5. Help-seeking covariates were not interacted with gender in this third GEE model. The intention here was to test for the gender-specific influence of AA participation on abstinence across time, after controlling for other potential confounders. Results showed that greater AA involvement was similarly associated with abstinence for females (*coef.* = $.251$) and males (*coef.* = $.294$). However, males were less likely than females to be abstinent overall (*male vs. female coef.* = $-.057$). This gender effect remained stable across all 7 years, as indicated by the non-significant male gender-by-time interaction effect (*coef.* = $.007$) and main effects (*coef.* = $-.006$ & $.001$). Some help-seeking covariates that predicted AA participation (especially the severity measures) continued to be independently related to abstinence.

DISCUSSION

AA attendance and Involvement

Looking at our first research question, “Do women differ from men on their meeting attendance and practice of AA-prescribed behaviors at follow-up interviews?”, few significant differences were found. Because no corrections were made to adjust for the

number of bivariate tests conducted, those differences may be due to chance. These purely descriptive data, nonetheless, provide some interesting background information as related to women's and men's patterns of AA participation across time. A relatively high number had attended AA in the year prior to initiating their index treatment, and, as might be expected following treatment entry, attendance was highest in the first year and then declined after that. Among those who reported any meeting attendance at follow-ups, involvement (as defined by summed AA-prescribed behaviors) remained mostly constant on average, suggesting that though individuals reduce their attendance across time, they continue to practice behaviors acquired from involvement in a 12-step recovery program. Extending well beyond study enrollment, at the 5- and 7-year follow-ups more individuals reported AA-only attendance (about 25%) than combined treatment and AA (about 15%) or treatment-only (<10%) attendance. Still, a high percentage of the individuals (about half) reported no AA or formal treatment involvement at the year 3 and subsequent follow-ups. These results are supported by treatment careers research; some treatment seekers never connect with AA, others connect briefly, and still others maintain involvement (Kaskutas et al., 2009a; Moos and Moos, 2005).

Factors Associated with AA Participation across Time

Moving to our second research question, "Is gender differentially related to factors associated with AA meeting attendance and AA involvement across time?", we once again found more gender similarities than differences. Moreover, the degree of influence that these common help-seeking factors exerted on AA participation was similar for both genders, with problem severity playing a strong role. Lower past 30-day ASI alcohol severity and lower past 12-month drink volume was associated with increased AA participation, as we might hope. However, here we caution that changes found in severity or in frequency of heavy drinking may have differential relationships with changes in AA participation across time that cannot be captured by the longitudinal models used here. Consistent with prior AA literature (Bogenschutz, 2008), we found in preliminary analyses (results not shown) that baseline severity and heavy drinking were positively associated with AA participation but by year 5 this association was negative. This suggests that higher alcohol severity and heavy drinking gets individuals into AA but it is continued participation that brings about problem reduction across time. In contrast, our time varying alcohol-related consequences measure, which was more social in nature, had a positive association with AA participation across time, suggesting a strong role for external pressures in keeping individuals involved with AA. Along this line, greater social network encouragement to reduce/quit drinking was also associated with greater AA participation for both genders. We do not know if this support came from AA peers or family and friends. Social support in AA comes through fellowship, working with a sponsor, and doing service.

Other ASI severity results were significant but these were gender specific. For women (but not men) higher psychiatric severity was associated with higher AA involvement, but higher day drug severity was associated with lower AA participation across time. Following on results from a 5-year follow-up study of residential drug treatment clients that found NA attendance was more common than AA attendance (Gossop et al., 2008), we ran a post hoc analysis to see if drug-dependent women were more likely than drug-dependent men to be attending Narcotics Anonymous meetings at any interview. No gender differences emerged. This drug severity result for women warrants further examination. Both these findings have clinical relevance for aftercare planning.

Our findings for men are equally informative for clinicians. Males with higher baseline RBB scores participated in AA more. The relationship between spirituality/religiosity and AA has been documented elsewhere (Bogenschutz, 2008). Our gender results add to this literature. Although atheists and agnostics are less likely to initiate and sustain AA attendance, those

who try AA seem derive similar benefit to those who are more religious (Tonigan et al., 2002). Clinicians working with clients, especially male clients who are adverse to AA's spiritual focus, may need to provide other alternatives. Treatment programs with a 12-step orientation might also consider facilitating engagement in AA in a way that clients do not feel coerced into accepting certain beliefs (Kaskutas et al., 2009b).

Abstinence

Regarding our third research question, "Controlling for effects of AA participation and other potential confounding influences, do women differ from men on abstinence across time?", we found that even though the influence of AA involvement on abstinence was equally strong for both genders, women were more likely than men to be abstinent across time. These results are consistent with what Timko and others (2002) found in their longitudinal study of help-seeking problem drinkers, that is, that women participate in AA as much or more than men and they seem to get more out of that participation. Most help-seeking factors associated with AA participation in our GEE models continued to be independently associated with abstinence.

Strengths and Limitations

Because of clear evidence that the type of treatment an individual receives can influence AA participation, we added dummy variables to our longitudinal models to control for treatment effects. We grouped the 10 treatment sites by funding source and broadly by the level of care provided. Philosophically, the *public* programs were more social-model oriented and the *private* programs were more "Minnesota-model" oriented. Factors, for example unique program features or staff qualities, as well, as characteristics of clients attending the programs, are lost in this type of regrouping. Other potential confounding influences that were added to our longitudinal models (but not the focus of this paper, e.g. ethnicity) were also associated with AA participation. These are left for further examination.

One concern with prior cross-comparison analyses has been the inconsistent manner in which AA participation has been operationalized. We purposely separated number of meetings attended from AA involvement to see how the two compared in our longitudinal models. Neither of these measures addresses duration or pattern of attendance, known correlates of AA participation and outcomes (Moos et al., 2006). Another limitation with this work is that at each follow-up, we collected prior 12-month information on AA attendance, thus, we have gaps in the data for interviews spaced more than a year apart. The same is true for our drinking outcome, which only captures past 30-day abstinence at each interview. Further, our study included treatment clients drawn from a single Northern California county; hence, our findings may not generalize to a larger population of treatment seekers.

Because of the size of this treatment sample, we were able to examine gender differences using a multivariate approach that simultaneously tested the effects of several predictor variables. A priori, we chose to use an interaction model to explain gender differences in our analyses. An alternative approach would have been to stratify the sample on gender and then conduct our multivariate analyses. This approach has a disadvantage: when a predictor variable is related to the outcome for both genders, the relative difference between the effects cannot be directly measured. An interaction model allowed us to test differences in the effect sizes. Though we ended with few gender differences, these null findings provide important information. AA appears equally appropriate for women and men; and, controlling for other influences, both genders seem to get benefit out of their participation. Further, we did not add interaction terms to our time-varying help-seeking covariates to test whether their effect changed across time (e.g., Time X Gender X Covariate). Though

interesting, this 3-way interaction would have added complexity to the discussion. Last, our longitudinal models may have oversimplified the relationships between help-seeking and AA participation. GEE modeling effectively averages a number of cross sectional relationships and it provides a single parsimonious overall summary of behaviors across time, which can be interpreted as a longitudinal effect. Further methodological work may be needed to ascertain whether estimates produced here are valid in longitudinal samples.

Implications

Though AA participation may not be needed to aid recovery for all treatment seekers (Kaskutas et al., 2005), for example those with low problem severity and greater social capital to draw upon, it is free and it is accessible for most individuals. Anyone with the 'desire to stop drinking' can attend. Our findings offer substantial justification for referring both female and male adults to AA. Clinicians should feel confident about making AA referrals to clients who are open to such groups. ASI results showing that women with higher drug severity are less likely to participate in AA and those with higher psychiatric severity are more likely to become involved provide valuable information for clinicians. As well, there is clinical relevance in the finding that men who are less religiously oriented and those with social networks supportive of drinking are less likely to attend. Individuals who are ambivalent or reluctant about participating in AA might respond well to one of the 12-step facilitation approaches available (Donovan and Floyd, 2008; Kaskutas et al., 2009b; Nowinski et al., 1992; Timko and Debenedetti, 2007). While treatment programs encourage clients to attend meetings, further efforts are often needed to get them to engage long enough to gain any benefit.

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Table 1

Baseline characteristics of treatment seeking females and males.

<i>N (interviewed)</i>	Females (360)		Males (566)	
	% Mean	(<i>se</i>)	% Mean	(<i>se</i>)
Age groups				
<30	21		16	
30–44	57		56	
45+	22		28	
Age	38	(.61)	39	(.43)
Married/cohabitating	33		29	
Ethnicity				
White	a 64		48	
Black	26		36	
Other	10		16	
Income >25K	42		40	
Educational status				
<High school education	20		24	
High school education	53		50	
>High school	27		27	
Live with children	a 42		23	
RBB practices score	8	(.37)	9	(.27)
Index treatment extremely important	64		59	
Index treatment goal to quit	77		73	
ASI alcohol severity	a .355	(.019)	.378	(.013)
ASI drug severity	.126	(.007)	.138	(.005)
ASI psychiatric severity	a .444	(.013)	.364	(.010)
ASI medical severity	a .323	(.021)	.261	(.015)
ASI social severity	a .355	(.018)	.241	(.012)
Average drinks per day	a 4.0	(.20)	4.8	(.14)
# Alcohol related events	1.0	(.07)	1.2	(.06)
Addictions treatment, ever	a 58		76	
# encourage use	0.5	(.22)	0.2	(.050)
# encourage reduction	4.2	(.24)	4.0	(.360)

^a p-value < 0.05(bolded values); (se)=standard error; impt.=important; weighted results

Table 2

Female's and male's formal treatment utilization and AA participation at each follow-up interview.

	Baseline		1-Year		3-Year		5-Year		7-Year	
	F	M	F	M	F	M	F	M	F	M
<i>N (interviewed)</i>	(360)	(566)	(271)	(414)	(257)	(411)	(243)	(391)	(225)	(362)
AA and treatment, past year										
AA only (%)	25	32 ^a	30	34	27	28	25	23	29	23
Treatment only (%)	6	6	6	8	6	11	4	8	3	3
Both AA & treatment (%)	34	37	33	33	21	18	15	15	12	18
No AA or treatment (%)	34	25	31	25	47	43	56	54	56	55
Attended AA, past year	59	69 ^a	63	67	47	46	40	38	40	42
Among AA attendees, past year										
# meetings (mean)	46	48	96	101	82	75	74	82	58	77
# meetings (median)	18	15	50	60	40	36	30	50	22	30
AAI scale (mean)	1.9	1.8	2.6	2.5	2.7	2.6	2.8	2.7	2.7	2.5
Have sponsor (%)	29	20 ^a	50	44	57	52	58	49	50	44
Read literature (%)	85	80	94	94	87	95 ^a	93	94	94	90
Spiritual awakening (%)	39	37	54	51	66	54 ^a	66	62	59	58
Did service (%)	49	54	44	46	67	69	63	75	63	66
Sponsored others (%)	2	1	7	8	15	11	18	15	18	13

^a p-value < 0.05 comparing males (M) and females (F); weighted results

Table 3

Summary of GEE regression models predicting AA involvement and meeting attendance, with main effects (coefficients) for females and males and gender-by-help seeking interaction effects.

Covariates	AA involvement			Attendance		
	Coef.	(se)	sign.	Coef.	(se)	sign.
Private hospital vs. public outpt.	.001	(.033)	.968	.187	(.222)	.401
Private HMO vs. public outpt.	-.059	(.033)	.076	-.283	(.217)	.192
Public detox vs. Public outpt.	.029	(.035)	.409	.462	(.244)	.058
Public residential vs. public outpt.	.057	(.036)	.116	.511	(.246)	.038
African American vs. White	-.040	(.015)	.008	-.387	(.119)	.001
Other vs. White	-.009	(.020)	.647	.046	(.152)	.761
Treatment need extreme vs. else ^t	.043	(.013)	.001	.207	(.105)	.048
ASI family/social severity ^t	-.013	(.023)	.581	-.082	(.170)	.627
ASI medical severity ^t	-.021	(.015)	.149	-.214	(.107)	.045
Female gender	-.015	(.039)	.690	-.170	(.291)	.559
(Male gender)	.015	(.039)	.690	.170	(.291)	.559
Abstinence goal vs. else for females	.069	(.023)	.003	.366	(.162)	.024
Male X Abstinence Goal	-.011	(.028)	.689	.036	(.202)	.859
(Abstinence goal vs. else for males)	.058	(.016)	<.001	.401	(.121)	<.001
RBB score for females	.003	(.002)	.093	.019	(.012)	.130
Male X RBB Score	.003	(.002)	.091	.022	(.015)	.134
(RBB score for males)	.006	(.001)	<.001	.041	(.009)	<.001
Live w/ children vs. not for females ^t	-.028	(.017)	.099	-.159	(.118)	.179
Male X Live W/ Children	-.002	(.023)	.933	-.123	(.174)	.478
(Live w/ children vs. not for males)	-.030	(.016)	.059	-.282	(.128)	.027
ASI psychiatric severity for females ^t	.071	(.031)	.023	.430	(.240)	.073
Male X ASI Psychiatric	-.044	(.047)	.349	-.316	(.349)	.366
(ASI psychiatric severity for males)	.027	(.036)	.452	.114	(.269)	.670
ASI alcohol severity for females ^t	-.054	(.038)	.154	-.689	(.296)	.020
Male X ASI Alcohol	-.043	(.047)	.364	-.306	(.368)	.405

Covariates	AA involvement			Attendance		
	Coef.	(se)	sign.	Coef.	(se)	sign.
(<i>ASI alcohol severity for males</i>)	-.097	(.032)	.002	-.995	(.240)	<.001
ASI drug severity for females ^t	-.185	(.080)	.020	-1.56	(.571)	.006
Male X ASI Drug	.204	(.104)	.050	1.58	(.761)	.038
(<i>ASI drug severity for males</i>)	.019	(.076)	.804	.024	(.542)	.925
Average drinks per year for females ^t	-.016	(.003)	<.001	-.110	(.024)	<.001
Male X Ave. Drinks	-.001	(.005)	.826	-.015	(.035)	.667
(<i>Average drinks per year for males</i>)	-.017	(.003)	<.001	-.125	(.025)	<.001
# Alcohol rel. conseq. for females ^t	.038	(.008)	<.001	.302	(.060)	<.001
Male X # Alc. Related Consequences	-.006	(.010)	.595	-.035	(.078)	.648
(<i># Alc. related conseq. for males</i>)	.032	(.007)	<.001	.266	(.051)	.001
Prior Treatment vs. not for females ^t	.157	(.170)	<.001	1.05	(.126)	<.001
Male X Prior Treatment	-.027	(.024)	.255	-.104	(.178)	.559
(<i>Prior Treatment vs. not for males</i>)	.130	(.018)	<.001	.943	(.127)	<.001
# who encourage use for females ^t	-.002	(.003)	.365	-.028	(.015)	.058
Male X # Who Encourage Use	-.001	(.003)	.850	.009	(.017)	.584
(<i># who encourage use for males</i>)	-.003	(.001)	.047	-.019	(.007)	.010
# encouraging reduction for females ^t	.003	(.001)	.015	.036	(.014)	.010
Male X # Encouraging Reduction	-.001	(.002)	.631	-.017	(.016)	.269
(<i># encouraging reduct. for males</i>)	.003	(.001)	.022	.018	(.009)	.039
Time for females	-.001	(.003)	.651	-.040	(.023)	.081
Male X Time	-.006	(.004)	.112	-.043	(.030)	.158
(<i>Time for males</i>)	-.008	(.003)	.003	-.083	(.020)	<.001

Coef.=coefficient; se=standard error; sign.=significance;

^ttime-varying ; outpt.=outpatient; male estimates in italics; weighted data.

Table 4

Summary of GEE regression analyses predicting past 30 day alcohol abstention, controlling female's and male's AA involvement and for other influences.

Covariates		Coef.	(se)	sign.
	Private hospital vs. public outpt.	.013	(.041)	.754
	Private HMO vs. public outpt.	.011	(.041)	.787
	Public detox. Vs. public outpt.	-.006	(.044)	.886
	Public residential vs. public outpt.	.034	(.044)	.431
	African American vs. White	-.015	(.019)	.438
	Other vs. White	-.023	(.027)	.411
	Treatment need extreme vs. else ^t	.007	(.023)	.752
	ASI family/social severity ^t	-.152	(.032)	<.001
	ASI medical severity ^t	.035	(.021)	.095
	Male vs. female	-.057	(.026)	.032
Predisposing	Abstinence goal vs. else	.064	(.021)	.002
	RBB score ^t	-.000	(.001)	.779
	Live with children vs. not ^t	-.019	(.017)	.277
Need/severity	ASI psychiatric severity ^t	.067	(.038)	.074
	ASI alcohol severity ^t	-.543	(.045)	<.000
	ASI drug severity ^t	-.461	(.091)	<.000
	Average drinks per year ^t	-.075	(.004)	<.000
	# Alcohol related consequences ^t	.054	(.008)	<.000
Enabling	Prior Treatment vs. not ^t	.045	(.017)	.008
	# who encourage use ^t	-.001	(.001)	.396
	# encouraging reduction ^t	-.000	(.001)	.825
Informal help	AAI Score for females ^t	.251	(.044)	<.000
	Male X AAI Score	.044	(.051)	.392
	(AAI Score for males)	.294	(.036)	<.000
	Time for females	-.006	(.004)	.170
	Male X Time	.007	(.005)	.216
	(Time for males)	(.001)	(.004)	.876

Coef.=coefficient; se=standard error; sign.=significance;

^t time-varying; outpt.=outpatient; male estimates (in parentheses & italicized); weighted data