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Review

Substance abuse treatment entry, retention, and outcome in women: A review of the literature[☆]

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Abstract

This paper reviews the literature examining characteristics associated with treatment outcome in women with substance use disorders. A search of the English language literature from 1975 to 2005 using Medline and PsycInfo databases found 280 relevant articles. Ninety percent of the studies investigating gender differences in substance abuse treatment outcomes were published since 1990, and of those, over 40% were published since the year 2000. Only 11.8% of these studies were randomized clinical trials. A convergence of evidence suggests that women with substance use disorders are less likely, over the lifetime, to enter treatment compared to their male counterparts. Once in treatment, however, gender is not a significant predictor of treatment retention, completion, or outcome. Gender-specific predictors of outcome do exist, however, and individual characteristics and treatment approaches can differentially affect outcomes by gender. While women-only treatment is not necessarily more effective than mixed-gender treatment, some greater effectiveness has been demonstrated by treatments that address problems more common to substance-abusing women or that are designed for specific subgroups of this population. There is a need to develop and test effective treatments for specific subgroups such as older women with substance use disorders, as well as those with co-occurring substance use and psychiatric disorders such as eating disorders. Future research on effectiveness and cost-effectiveness of gender-specific versus standard treatments, as well as identification of the characteristics of women and men who can benefit from mixed-gender versus single-gender treatments, would advance the field.

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Keywords: Gender differences; Women; Substance abuse; Treatment outcome; Predictors; Retention; Treatment entry

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[☆] A table listing the results of our search can be found by accessing the online version of this paper and Supplementary Material. Please see Appendix A for more information.

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1. Introduction

Among the most reproducible findings of studies focusing on women and substance use disorders is that of the heightened vulnerability of women to the adverse medical and social consequences of substance use, abuse, and dependence (Chatham et al., 1999; Gentilello et al., 2000; Henskens et al., 2005; Hernandez-Avila et al., 2004; Kosten et al., 1985). For substance use disorders, including alcohol, opioid, and cannabis dependence, females advance more rapidly from use to regular use to first treatment episode than do their male counterparts (Dawson, 1996; Hernandez-Avila et al., 2004; Johnson et al., 2005; Orford and Keddie, 1985; Piazza et al., 1989; Randall et al., 1999). In addition, when they enter treatment, in spite of fewer years of use and smaller quantities of substances used, their substance abuse symptom severity is generally equivalent to that of males (Hernandez-Avila et al., 2004; Piazza et al., 1989; Randall et al., 1999). Even with fewer years of substance use, at treatment entry, females average more medical, psychiatric, and adverse social consequences of their substance use disorders than males. Given the approximate equivalency of age of initiation of substance use between males and females in the younger age cohorts (Hernandez-Avila et al., 2004; Holdcraft, 1999; Holdcraft and Iacono, 2002, 2004; Johnson et al., 2005), this heightened vulnerability of females of all age cohorts gives rise to particular clinical and public health concerns (Greenfield, 2002). It also sets the stage for examining the information on predictors of treatment entry, retention, and outcomes for women with substance use disorders.

Until the early 1990s, the substance abuse treatment literature was based primarily on male samples, or mixed samples of men and women without any focus on gender differences. Women were excluded from most studies due to their child-bearing potential. As a result, findings about effective substance abuse treatments were not fully generalizable to women.

In 1993, US government guidelines highlighted the importance of expanding research to include women of childbearing potential (FDA, 1993) and in 1994, the U.S. National Institutes of Health (NIH) published its “NIH Guidelines on the Inclusion of Women and Minorities as Subjects in Clinical Research” (FDA, 1994) (Mathias, 1995; NIDA, 1999). Since these guidelines were issued, the number of published research reports examining substance abuse treatment for women has increased annually in the U.S. The goal of this report is to review systematically and critically the information from the available research literature, focusing on reports published in the period from 1990 to 2005. We examine specific characteristics associated with substance abuse treatment outcomes for women in the context of three stages of the substance abuse treatment process: (1) entry, (2) retention, and (3) post-treatment substance abuse outcomes. In order to set these results in context, the literature search that informed this critical review examined published English-language studies from 1975 to 2005. We also included literature reviews, meta-analyses, and theoretical papers. The results of our search of the literature from 1975 to 2005 are included in table format and can be found by accessing the online version of this paper and Supplementary Material (see Appendix A for more information).

Because this paper focuses on treatment outcomes, we excluded studies of general characteristics and epidemiology of women with substance use disorders that have been reported and reviewed elsewhere (Back et al., 2003; Brennan et al., 1993; Bulik et al., 2004; Grant et al., 1996a,b; Greenfield et al., 2002; Hanna and Grant, 1997; Holdcraft and Iacono, 2004; Pelissier and Jones, 2005; Regier et al., 1990). Previous reviews of the literature on women and substance abuse treatment outcomes have generally focused on gender differences and included studies of mixed-gender samples (Brady and Randall, 1999; Lex, 1991; Pelissier and Jones, 2005; Sinha and Rounsaville, 2002; Toneatto et al., 1992), or have focused on outcomes in women without a gender comparison (Ashley et al., 2003; Orwin et al., 2001). Because this review focuses on treatment outcomes for women with substance use disorders, it includes both studies that utilized women-only samples and studies involving gender comparisons reported in mixed-gender samples.

The present review focused on adult women and does not report on treatment outcomes in female adolescents, which are reviewed elsewhere (National Center on Addiction and Substance Abuse (CASA), 2003). While studies focusing on substance abuse treatment outcomes in pregnant women are included in the supplementary materials, a full review of treatment outcomes among pregnant women is beyond the scope of this report; several recent reviews of this topic exist (Brady and Ashley, 2005; Finkelstein, 1994; Greenfield and Sugarman, 2001; Grella, 1996, 1997; Howell et al., 1999). Similarly, studies of gender differences in treatment outcomes among criminal justice populations have been reviewed elsewhere (Langan and Pelissier, 2001; Pelissier, 2004; Pelissier et al., 2003) and are not included in this review. In addition, while nicotine dependence is a major public health problem among women, it is most often treated in clinical settings (e.g., primary care and other general medical care) (Ockene, 1998; Shin, 1997) that are separate from substance abuse treatment programs. Reviewing the outcomes of these nicotine treatment studies is beyond the scope of this review. Finally, this report excluded studies in which substance abuse outcomes were secondary outcomes (e.g., studies of HIV in which HIV outcomes were primary).

1.1. Search method

Using Medline and PsycInfo databases, we searched for articles published between January 1975 and September 2005. We included the following search terms and subject headings: alcohol abuse, alcoholism, alcohol drinking, drug abuse, drug dependency, opioid-related disorders, substance abuse, substance dependence, substance-related disorders, outcome, predictor, retention, gender, female, sex, human females, human sex differences, sex factors, women, substance abuse treatment, treatment, treatment entry, treatment outcomes, outcome predictor, treatment retention, outcome, predictor, retention, outcome and process assessment, cohort studies/prospective studies, therapeutics, client characteristics, and demographic characteristics. In order to eliminate non-relevant articles, search of the PsycInfo database restricted the eligible field for the search to “subjects” or headings under which PsycInfo indexed each article. The

search focused on English language literature only. The search was sensitive to the specific terms we entered and may have missed articles not categorized by these key words.

All substances except nicotine were reviewed. We also reviewed the reference lists of these articles to search for publications that did not appear in the search described above.

1.2. Search results

Using these methods, 2,474 articles from Medline and 636 articles from PsycInfo were found. Titles and abstracts were reviewed by three of the authors (S.F.G., R.K.M., and M.L.) for relevance, and articles that were not relevant to the topic or met any of the exclusion criteria were eliminated. There were then 280 relevant articles, 90% of which were published in 1990 or later; of those, 43.9% were published since the year 2000.

Only 11.8% of all studies reviewed were randomized clinical trials. An additional 7.9% were non-randomized or quasi-experimental trials. The most frequently occurring type of article (31.2%) reported on studies that used the prospective cohort design, in which a population was followed naturalistically and assessed to determine clinical outcomes.

Results of the literature search by study type and reported results (1975–2005) are presented in the [online supplementary materials](#). This review discusses the results from 1990 to 2005, focusing on studies that used randomized clinical trial, non-randomized clinical trial, quasi-experimental, or naturalistic study designs. We review characteristics associated with treatment entry, retention, and substance abuse treatment outcomes in women. We then examine substance abuse treatment outcomes for women in single-gender versus mixed-gender approaches. Finally, we discuss and summarize our findings and present implications for a research agenda on the role of gender in substance abuse treatment outcomes.

2. Gender disparities in treatment entry

2.1. Gender disparities among participants in substance abuse treatment

Many studies have reported the relatively low proportion of women in substance abuse treatment programs (Brady and Ashley, 2005; Pelissier and Jones, 2005; Schober and Annis, 1996; Weisner, 1993; Weisner and Schmidt, 1992) compared with the prevalence of these disorders among women in the general population. For example, in 1991 the ratio of men to women was 3.3:1 in alcohol treatment facilities (Dawson, 1996), while the male to female ratio of alcohol use disorders in the population for that time period was estimated to be 2.7:1 (Grant et al., 1994).

Brady and Ashley (2005) concluded that the gender ratio of 2.3:1 in U.S. substance abuse treatment facilities in 2002 was lower than would be expected by the gender ratio of prevalence of alcohol and drug use disorders in the population. For example, according to data from the 2003 U.S. National Survey on Drug Use and Health (NSDUH), the past-year male to female ratio of alcohol dependence was 1.9:1 and of any illicit

drug dependence was 1.5:1 (Brady and Ashley, 2005; SAMHSA, 2004). Similar discrepancies between the proportion of women in substance abuse treatment and gender ratios in population prevalence of substance use disorders have been reported in non-U.S. populations (Swift and Copeland, 1996). For example, the Australian National Household Survey showed a 2:1 ratio of high-risk drinking in men and women in the general population in Australia, but estimates of ratios of men to women in alcohol treatment services ranged from 3:1 to 10:1 (Swift et al., 1996).

2.2. Gender disparities in choice of treatment service sectors

While current evidence indicates that the proportion of women represented in substance abuse treatment facilities is lower than the population prevalence of these disorders in women relative to men, such data do not represent gender discrepancies in ever having received treatment for substance use disorders. Another area of research is gender differences in seeking care or entering care for substance use disorders in different service sectors, such as specialty substance abuse treatment, mental health, or general health care (Weisner, 1993; Weisner and Schmidt, 1992). For example, the relatively low prevalence of women in substance abuse treatment programs might be accounted for by women defining their substance-related problems as health or mental health problems and seeking care in physical or mental health sectors (Weisner and Schmidt, 1992). Weisner and Schmidt (1992) found that women with problem drinking were more likely than men to seek care in non-alcohol-specific settings, especially mental health treatment services. In a separate study, Weisner (1993) demonstrated that there were gender differences in factors affecting treatment entry. In creating a model to explain reasons for treatment entry, Weisner found that for women, lifetime general treatment history, ethnicity, and employment were significant factors; for men, social consequences, substance abuse treatment history, and employment were most prominent. Mojtabai (2005) found that males were less likely to use mental health, but not substance abuse, services than females.

2.3. Gender disparities in treatment entry and ever receiving treatment

A number of studies document that women with substance use disorders experience more severe medical and social consequences from use than men, which may influence the rate or likelihood of entering treatment. Despite women's shorter interval between regular drug use and treatment entry (Grella et al., 1999; Hernandez-Avila et al., 2004; McCance et al., 1999), several studies in clinical populations have found little difference in the likelihood or rate of treatment entry between women and men (Green et al., 2002; Timko et al., 2002). There are only a few studies that have directly examined gender differences in the likelihood of substance abuse treatment entry. One 8 year follow-up study of initially untreated drinkers (230 women and 236 men) found no differences in the type of services (i.e., professional, Alcoholics Anonymous, a combination of professional

plus AA, or no treatment) men and women received over 8 years (Timko et al., 2005). This study did find, however, that women had longer professional treatment in the first year (Timko et al., 2005). A cross-sectional, population-based study of 32,628 individuals, using data from the 1999 U.S. National Household Survey on Drug Use, examined past-year rates of alcohol use, alcohol dependence, and use of and perceived need for alcohol treatment services (Wu and Ringwalt, 2004). This study found that, among individuals who used alcohol, there was a 1.7:1 ratio of men to women with alcohol dependence (Wu and Ringwalt, 2004). The survey found no gender difference among alcohol-dependent individuals who attended any alcohol treatment in the previous year (12.5% for women and 12.1% for men), however, and no gender difference in the use of specialty (5.7% for women and 4.3% for men) or non-specialty (6.8% for women and 7.7% for men) services.

A retrospective cohort study of 7,359 respondents with alcohol abuse or dependence drawn from the population-based 1992 U.S. National Longitudinal Alcohol Epidemiologic Survey (NLAES) examined gender differences in the likelihood of ever having received treatment for alcohol problems. This study found that 23% of men and 15.1% of women with alcohol abuse or dependence ever received treatment for alcohol use disorders from a physician, counselor, Alcoholics Anonymous, other professional, or substance abuse treatment facility (Dawson, 1996). The study found that gender differences in treatment entry depended on the number of years elapsed from the onset of the disorder and the severity of the disorder. For example, the cumulative conditional probability of having initiated treatment by 30 years after the onset of alcohol abuse or dependence was 0.424 in men and 0.356 in women. Up to 8 years after onset of the disorder, there was no gender difference in treatment entry; between 8 and 25 years after the onset of the disorder, however, men were 13–20% more likely to initiate treatment (Dawson, 1996).

The finding of no gender difference in treatment entry up to 8 years after the onset of the disorder is consistent with the 8 year follow-up study of Timko et al. (2000) and with Wu and Ringwalt's (2004) finding of no difference in past-year alcohol treatment entry between men and women. Dawson (1996) found that in most cases men were more likely to enter treatment than women in the 25 years following onset of an alcohol disorder. The one exception was among those with the most severe alcohol dependence, where there was no gender difference in treatment entry. Among those less severely affected, the male to female ratio for treatment entry ranged from 1.75:1 (those with one symptom) to 1.24:1 (those with 15 symptoms) (Dawson, 1996).

While the two population-based studies discussed above examined gender differences in treatment entry for alcohol dependence, they did not examine gender differences in treatment entry for illicit drug abuse and dependence. Mojtabai (2005) conducted a cross-sectional study using population-based data from the 2002 U.S. National Survey on Drug Use and Health (SAMHSA, 2004). In this analysis, type of substance abused was related to entering a substance abuse treatment program in the past-year, but gender, race/ethnicity, and type of

insurance did not have a significant impact on the likelihood of using substance abuse services.

An earlier population-based survey of individuals with substance use disorders from three countries (United States, Canada, and Mexico) examined the correlates of treatment seeking for substance use disorders (Kessler et al., 2001). No gender differences were found in this survey among those who ever reported seeking treatment. One important limitation of this survey is that treatment seeking was defined as “ever telling a professional” about drug use or “seeking help at a self-help group.” Such a definition cannot be equated with treatment entry and may explain the high proportion of help seeking in this sample (50–85%) as opposed to treatment entry in other studies, as well as the lack of a gender difference.

In contrast, a smaller, community-based prospective study of a cohort of 248 inner city women in Puerto Rico who had cocaine and/or heroin dependence found that only a small proportion had received any type of substance abuse treatment (Hansen et al., 2004). In the first wave of interviews, only 36.6% had ever received substance abuse treatment, while 62.5% reported utilizing physical health services and 25% received treatment from mental health services.

2.4. *Specific barriers to treatment entry for women*

The low rates of substance abuse treatment entry among women may reflect specific barriers they face. The term “barriers” refers to reasons individuals do not utilize specialized addiction treatment services or do not modify target behaviors (Schober and Annis, 1996). Barriers to substance abuse treatment entry for women that have been documented in the past two decades (Brady and Ashley, 2005; Pelissier and Jones, 2005; Schober and Annis, 1996) include pregnancy, lack of services for pregnant women, fear of losing custody when the baby is born, or fear of prosecution (Ayyagari et al., 1999; DeAngelis, 1993; Finkelstein, 1994; Grella, 1997; Paltrow, 1998). Women may have responsibilities for children coupled with lack of childcare outside of treatment or provided as part of treatment services (Allen, 1995; Brady et al., 1993; Copeland, 1997; Finkelstein, 1994; Grella, 1997; Johnson and Meckstroth, 1998; Nelson-Zlupko et al., 1996; Schliebner, 1994; van Olphen and Freudenberg, 2004).

Lower educational attainment can lead to less-frequent employment (Green et al., 2002; Hser et al., 2003; Loneck et al., 1997; Wechsberg, 1998; Wong et al., 2002) and other economic barriers experienced by women enrolled in entitlement programs (Hammett et al., 1998; Klein and Zahnd, 1997; Montoya and Atkinson, 2002; Rosen et al., 2004).

Higher rates in females than males of certain co-occurring psychiatric disorders such as mood, eating, anxiety, and post-traumatic stress disorders may make it difficult to obtain appropriate treatment for both disorders (Brady et al., 1998; Brady and Randall, 1999; Denier et al., 1991; Fornari et al., 1994; Grella, 1996, 1997; Merikangas et al., 1998; Najavits et al., 1997; Nelson-Zlupko et al., 1995; Sonne et al., 2003). Such multiple disorders also may increase the likelihood that women will perceive their problem as specific to the psychiatric disorder

and seek treatment in mental health rather than substance abuse settings (Schober and Annis, 1996; Weisner and Schmidt, 1992).

Trauma histories, including sexual and physical assault and abuse, may make certain treatment approaches or mixed-gender treatment programs less desirable for women (Copeland, 1997; Grella, 1997; Kilpatrick et al., 1997, 1998; Najavits et al., 1997). Women may face lack of family or partner support to enter treatment (Amaro and Hardy-Fanta, 1995; Blum et al., 1998; Grella and Joshi, 1999; Henderson et al., 1994; Tuten and Jones, 2003; Woodhouse, 1992) and greater social stigma and discrimination than faced by men (Copeland, 1997; Finkelstein, 1994; Grella and Joshi, 1999; IOM, 1990; Nelson-Zlupko et al., 1995).

Women also may exhibit certain attitudes toward treatment, such as decreased likelihood of perceiving a need for substance abuse treatment (Wu and Ringwalt, 2004), less education about substance abuse treatment as a viable option (Kail and Elberth, 2002), and more negative expectations about treatment (Kline, 1996) than their male counterparts. It is likely that while all of these factors will not equally affect all women with alcohol and drug abuse and dependence, many of these factors will serve as more important barriers to substance abuse treatment entry for specific subgroups of women who have one or more of these baseline characteristics.

2.5. *Studies of demographic and clinical characteristics of women and treatment entry*

Few studies have examined whether gender differences in baseline patient characteristics are associated with gender differences in treatment entry. In one large national study (Dawson, 1996), age, divorce status, employment, education, having children under 18 years of age, positive family history of alcohol dependence, daily drinking, age of onset of alcohol use disorder, and having received drug use treatment were all significant predictors of treatment entry. None of these factors differed by gender.

A recent prospective cohort study examined 1,204 subjects in an outpatient program, identifying factors affecting initiation and engagement in a managed care outpatient program (Weisner et al., 2001). Among individuals screened and admitted for treatment, those who were drug-dependent were less likely to return to begin treatment than those who were alcohol-dependent only. Among those dependent only on alcohol, women were more likely than men to return for treatment. Among those who were drug-dependent, gender was not a predictor; rather, being employed and having higher drug severity predicted treatment initiation (Weisner et al., 2001).

Another prospective cohort study of 191 men and 102 women in outpatient and residential substance abuse treatment programs found that, while treatment initiation did not differ by gender, factors predicting initiation were different for men and women (Green et al., 2002). Women with alcohol diagnoses were more likely to initiate treatment, while women with mental health conditions were less likely to initiate treatment (Green et al., 2002). Among men, those who were unemployed, unmarried, and had less than a high school education were less likely to

initiate treatment (Green et al., 2002). In a large national study of men and women in alcohol treatment versus persons in the general population needing treatment (Weisner, 1993), treatment history and lack of employment were among the most important factors in the models predicting treatment entry for both women and men. However, ethnicity (non-minority) was also important for women, while the social consequences of drinking were important for men. In addition, only individual predisposing variables (age, education, ethnicity, and treatment history) were unique to the model predicting treatment entry for women, while need (alcohol use, dependence, and social consequences), lack of employment, and low income, as well as individual predisposing variables, were unique in the model for men.

2.6. Referral source and reasons for entering treatment

No consistent findings have emerged from studies of treatment referral source. One cross-sectional study of 355 men and 164 women in a community treatment center in Sweden (Bendtsen et al., 2002) found no gender difference in referral source. In the U.S., two studies found that men entering treatment were more likely to be referred by the criminal justice system (Fiorentine et al., 1997; Grella and Joshi, 1999), while another study found no gender difference in legal pressures (Green et al., 2002). Another found that women were more likely than men to be referred by a medical provider or social worker (Grella and Joshi, 1999).

One study of an all-female sample examined patient characteristics associated with intensity of referral and treatment entry by conducting a secondary analysis of pre-existing data on 109 women referred to an alcohol treatment program in the U.S. (Loneck et al., 1997). This study found that non-entry was associated with a high school education or less; but referral intensity (degree of coerciveness), age, psychiatric diagnosis, marital status, employment, socioeconomic status, and relapse status were not significant predictors of treatment entry.

Reasons or pressures for entering treatment do tend to differ between women and men. Work- or school-related pressures were found to be more prevalent reasons among men (Green et al., 2002), while women said the feeling that their “life was out of control” (Green et al., 2002) or that they needed services (Grella and Joshi, 1999) were the main reasons for treatment entry. Similarly, in a study of physicians with substance use problems, men were more likely to enter for work-related reasons, while women entered treatment due to subjective distress (McGovern et al., 2003). Women are less likely than men to cite spousal or family pressure or interpersonal problems as a reason for entering treatment. While child custody issues (gaining or losing) are a more prominent motivator for women entering treatment (Fiorentine et al., 1997; Grella and Joshi, 1999), fear of losing children can also prevent a woman from seeking treatment (Kail and Elberth, 2002). One study found that the effect of a confrontation with the legal or child welfare system can differ among women of different ethnicities and served as a treatment entry stimulus more often for Latina women than Caucasian or African American women (Kail and Elberth, 2002). One factor that may work

counter to women’s entry into treatment may be the degree to which women’s substance use is influenced by those in their social network. Women are more likely to report that they had family, friends, or partners who used drugs (Bendtsen et al., 2002; Grella and Joshi, 1999) or supported their continued substance use (Center for Substance Abuse Treatment, 1994; Kail and Elberth, 2002; Kelley et al., 1996; Kline, 1996).

2.7. Summary

Studies with shorter time periods following disease onset (e.g., 1–8 years), or broad definitions of treatment-entry (e.g., ever telling a professional about your problem), have generally shown a lack of gender difference in treatment entry (Kessler et al., 2001; Mojtabai, 2005; Timko et al., 2000; Wu and Ringwalt, 2004), while population-based surveys examining a longer time period from onset of disease (greater than 8 years) demonstrate a lower lifetime probability of ever entering treatment for alcohol use disorders among women compared to men (Dawson, 1996). While the gap between treatment entry and need for substance abuse treatment for both men and women is supported by low rates of having ever received treatment, the data support that this discrepancy is more pronounced over the lifetime for women than men with substance use disorders (Brady and Ashley, 2005; Dawson, 1996; Hansen et al., 2004). Women with substance use disorders are less likely over the lifetime to enter treatment than their male counterparts, and women with substance use disorders are more likely to seek treatment in non-specialty settings. While severity of drug use and level of motivation appear to be significant indicators for seeking specialty substance abuse treatment in many studies, gender-specific predictors of treatment entry, as well as barriers to treatment entry, vary depending on the population examined.

3. Characteristics associated with substance abuse treatment retention and completion

Longer substance abuse treatment episodes and successful completion of treatment are usually related to positive outcomes, but as many as 50% of patients in drug and alcohol treatment drop out of treatment within the first month (Stark, 1992). A comparison of research on predictors of treatment retention and completion is difficult due to the diverse ways in which these concepts have been defined. Retention in treatment has been defined as a dichotomous variable, such as attendance for a specific number of treatment sessions (Brady et al., 1994; Green et al., 2002) or treatment duration for a specific number of days (Arfken et al., 2001). More recently, retention has been defined as a continuous measure, such as length of stay (LOS) [e.g., months in treatment (Comfort and Kaltenbach, 2000)], and programs with good retention have been defined as those programs that can keep patients in treatment for longer time periods (Brady and Ashley, 2005). Treatment completion generally is defined as the successful completion of a course of treatment (e.g., attendance at a pre-determined number of sessions or days, or successful completion of treatment goals) (Brady and Ashley, 2005). This section describes the results of studies of gender dif-

ferences in treatment retention and completion and discusses the most commonly identified predictors for women.

3.1. Gender differences in treatment retention

The results of studies that have examined gender differences in substance abuse treatment retention and completion are inconsistent. Five studies demonstrated that women are more likely than men to drop out and not complete substance abuse treatment (Arfken et al., 2001; King and Canada, 2004; McCaul et al., 2001; Petry and Bickel, 2000; Sayre et al., 2002). Two showed that women were *less* likely than men to drop out or not complete treatment (Maglione et al., 2000; Hser et al., 2004). One showed a complex relationship between gender, language spoken, and type of treatment program (Condelli et al., 2000). Four showed no gender difference in treatment retention or length of stay (Fiorentine et al., 1997; Green et al., 2002; Mertens and Weisner, 2000; Veach et al., 2000).

For example, a retrospective review of treatment records of 1,804 men and 667 women in Detroit seeking publicly funded substance abuse treatment found that female patients had significantly lower retention and completion rates than male patients after controlling for problem severity, primary drug of abuse, and referred treatment setting (Arfken et al., 2001). A study of 165 patients in a 12-week outpatient program in Houston demonstrated that women were more likely to drop out of treatment (Sayre et al., 2002). A study of 97 patients in an outpatient addiction program in Illinois found that female gender and African-American ethnicity were independent predictors of early treatment dropout (King and Canada, 2004). A study of 268 patients with alcohol abuse or dependence in an urban hospital-based outpatient clinic showed that female gender was associated with fewer sessions attended (McCaul et al., 2001). Of 104 opioid-dependent patients enrolled in a buprenorphine treatment program, 13% of men and 25% of women were classified as early terminators from treatment (Petry and Bickel, 2000).

On the other hand, among 511 patients attending drug treatment programs (i.e., outpatient drug-free, residential, inpatient/detoxification, and methadone maintenance) in Los Angeles County, the number of months in formal treatment was significantly greater for women, whereas length of time participating in 12-step self-help programs did not differ by gender (Hser et al., 2004). Among 2,570 methamphetamine users in public residential treatment in California, men were significantly more likely to drop out of treatment before 90-day completion than women (Maglione et al., 2000). Mixed results by gender were obtained in a study of 1,573 adults accepted for admission and randomly assigned to treatment programs in New Jersey. Females in long-term co-gender and women-only English-speaking programs had less attrition than males, but no significant differences in attrition were observed between men and women in short-term English-speaking programs and short- and long-term Spanish-speaking programs (Condelli et al., 2000).

No gender differences in treatment retention or length of stay were shown in three studies (Green et al., 2002; Mertens and Weisner, 2000; Veach et al., 2000). A study of 509 patients admit-

ted to an intensive outpatient substance abuse program in North Carolina showed no gender differences in those retained (Veach et al., 2000). Among 293 HMO members in the U.S. Pacific Northwest, there were no gender differences in treatment completion or time spent in treatment (Green et al., 2002). Similarly, in a study of 317 female and 599 male HMO members in California enrolled in outpatient alcohol and drug treatment, there were no gender differences in treatment retention or length of stay (Mertens and Weisner, 2000). A study of 303 men and women in Los Angeles in outpatient substance abuse treatment found that there were no gender differences in numbers of weeks spent in treatment or attendance at 12-step meetings, but that women attended more group therapy sessions per month than did men during the time spent in treatment (Fiorentine et al., 1997).

In contrast to the inconsistent results obtained in smaller, non-population-based studies, there is a convergence of results showing few or no gender differences in treatment retention in studies using larger, population-based samples (Brady and Ashley, 2005; Hser et al., 2001; Joe et al., 1999; Simpson et al., 1997). A study of 10,010 patients admitted to 96 programs (categorized as outpatient drug-free, long-term residential, and outpatient methadone programs) in 11 U.S. cities found program differences in retention rates but very few gender differences (Simpson et al., 1997). For example, the only gender difference found in this study was that, in outpatient drug-free treatment, men were 20% less likely than women to stay 90 days or more (Simpson et al., 1997). Extending the analyses using this same dataset, a separate study found a number of individual predictors of retention-including motivation at intake, pretreatment depression, alcohol dependence, legal pressure, and frequency of cocaine use-but no gender differences (Joe et al., 1999). A study of 26,047 patients in 87 programs in Los Angeles categorized as residential, outpatient drug-free, and methadone maintenance programs found that retention rates were low in all modalities (Hser et al., 2001) and that program characteristics were associated with retention. Very few associations with gender were found, however. Where there were gender differences, women were more likely to complete treatment. For example, females were more likely to complete 360 days of methadone maintenance treatment than males; in outpatient drug-free programs, females had a higher likelihood of completing 180 days of treatment (Hser et al., 2001).

The Alcohol and Drug Services Study (ADDS) was a three-phase study conducted from 1996 to 1999 in public and private substance abuse treatment facilities (Brady and Ashley, 2005). Retention analyses were conducted with data from 4,689 patients 18 years and older, and analyses of women-only samples were based on 1,239 women. After controlling for other client and facility characteristics, gender was not associated with completion of planned treatment. Factors associated with treatment completion were education at admission, primary source of referral for treatment, primary expected source of payment for treatment, and facility type. Odds of treatment completion were lower among adults with the following characteristics: 8–11 years of education, no high school degree, primary source of referral other than the criminal justice system, and criminal justice system as the primary source of treatment payment. The

odds of completing treatment were three times higher among adult clients discharged from non-hospital residential facilities than among adult clients discharged from outpatient methadone facilities. Receiving treatment at women-only facilities or facilities offering childcare services was not associated with treatment completion among women when other client and facility characteristics were controlled.

Inconsistent results have been found in examinations of gender and number of treatment visits used or hours spent in treatment. One study found that women attended fewer treatment sessions than men (McCaul et al., 2001), while another (Green et al., 2002) found no gender difference in hours spent in treatment. The number of sessions attended may be related to a complex interaction between gender and other individual characteristics. For example, one study that found that women received more hours of treatment than men (Galen et al., 2000) also found a significant interaction between gender and antisocial personality disorder (ASPD) diagnosis. Women with ASPD had significantly more hours of treatment than women without this diagnosis or men with or without this diagnosis. This gender difference may have been accounted for by the fact that more of the women with ASPD were enrolled in intensive day treatment (80%) than were men with this diagnosis (36%).

3.2. *Individual characteristics associated with treatment retention in women*

As shown above, the preponderance of data from larger, more representative studies seems to indicate that there are no clear gender differences in treatment retention or completion. Nevertheless, there appear to be certain characteristics associated with retention and completion for both men and women, and others that may have greater significance specifically for either men or women. For example, factors related to retention and completion for both male and female patients include higher financial resources, such as income and insurance coverage (Green et al., 2002); having fewer mental health problems (Green et al., 2002) and fewer and less-severe drug problems (Maglione et al., 2000; Mertens and Weisner, 2000); greater likelihood of being employed (Veach et al., 2000); older age; less use of emotional discharge; and greater use of alternative rewards (Kohn et al., 2002). Referral from criminal justice was a strong predictor of retention for both women and men in one study of 2,570 methamphetamine-dependent individuals in treatment (Maglione et al., 2000).

Several studies examined mixed-gender samples of patients enrolled in substance abuse treatment and found predictors of retention and completion specific to men or to women (Galen et al., 2000; Green et al., 2002; Mertens and Weisner, 2000). In an outpatient insured population, predictors of treatment retention were gender-specific, with higher incomes, being married, and being unemployed as predictive factors for women (Mertens and Weisner, 2000). Predictors specific to women in an outpatient HMO-based substance abuse treatment program, however, varied by whether outcomes examined were treatment completion, failure to complete treatment, or time spent in treatment. For example, treatment completion was predicted in women by

legal or agency referral and higher income; failure to complete treatment was predicted in women by more severe substance dependence and higher employment scores; and more time spent in treatment was predicted in women by alcohol or opiate diagnoses and legal or victims' agency referrals (Green et al., 2002). One small study of 104 opioid-dependent outpatients found that there was a significant interaction between gender, hostility, and early termination, with higher levels of hostility associated with earlier treatment termination in women (Petry and Bickel, 2000).

While mixed-gender samples allow for examination of gender-specific predictors of retention, a number of studies have examined predictors of retention among women-only samples (Brown et al., 1995; Davis, 1994; Hughes et al., 1995; Huselid et al., 1991; Haller and Miles, 2004; Kelly et al., 2001; Knight et al., 1999; Loneck et al., 1997; Stahler et al., 2005; Szuster et al., 1996). Research using women-only samples has found associations between certain patient characteristics (e.g., psychological function, personal stability and social support, levels of anger, treatment beliefs, and referral source) and rates of retention and completion. Kelly et al. (2001) reported that having fewer children, higher levels of personal stability, less involvement with child protective services, and fewer family problems predicted treatment completion among 34 women in a women-centered program.

Brown et al. (1995) found that, among 203 women in residential treatment, those with a high level of burden (measured by the number and severity of psychological, cognitive, health, and substance abuse problems) had lower retention rates than those with lower levels of burden. In one sample of 80 women in outpatient drug treatment, anger was the strongest predictor of treatment dropout (Davis, 1994). A five-year study of a 12-month residential program with a sample of 41 mothers with dependent children predicted earlier dropout among those who were daily drinkers, received no support from a spouse or partner, and had more than two children in treatment with them compared to women without these characteristics (Knight et al., 1999). In a small prospective cohort study of 30 women in residential treatment, beliefs about control over one's health status and perceived helpfulness of the patient's sponsor in Alcoholics Anonymous were reported as positively associated with treatment completion (Huselid et al., 1991).

Among a large, nationally representative sample of women in substance abuse treatment, being diagnosed with drug abuse only (versus alcohol only or co-occurring alcohol and drug abuse) and referred by a source other than criminal justice was related to lower retention rates among women in minority racial groups (Brady and Ashley, 2005). In a secondary analysis of 109 women in treatment, high-intensity referral source (e.g., coerced or Johnson Intervention) compared with low-intensity referral source was also positively related to retention (Loneck et al., 1997).

3.3. *Program-related characteristics associated with treatment retention in women*

Treatment program characteristics may also be associated with retention and completion rates among women. The Alco-

hol and Drug Services Study (ADSS) examined the relationship between substance abuse treatment programming for women and both completion of planned treatment and length of stay. Study analyses controlled for additional patient and organizational characteristics associated with retention (Brady and Ashley, 2005). Results indicated that receiving treatment at women-only facilities or facilities offering childcare services was not associated with treatment completion among women, although treatment in these settings was positively correlated with length of stay. In addition, women in non-hospital residential facilities or facilities providing combined mental health and substance abuse treatment services were more likely to complete planned treatment than women receiving treatment at outpatient non-methadone facilities. However, women receiving combined substance abuse and mental health services were less likely to complete than those receiving substance abuse treatment alone. The authors note that this result may reflect the larger proportion of women with co-occurring disorders who may have a greater likelihood of dropout represented in facilities providing the combined services (Brady and Ashley, 2005).

A demonstration project randomly assigned patients to a woman-focused day treatment program or a traditional outpatient program. This project found that the women were significantly more likely to complete the women-focused intensive day program than those who attended a residential program for women and their children or a traditional residential program (Roberts and Nishimoto, 1996). Within residential programs, however, policies allowing children to accompany their mothers in treatment have been demonstrated to have a positive impact on treatment retention (Hughes et al., 1995; Szuster et al., 1996). A randomized trial of female cocaine-abusing patients assigned women to the experimental condition, in which one or two of the children joined the woman in residential treatment, or the control condition of placing the children with a caregiver outside the therapeutic community (Hughes et al., 1995). The results showed that the women who retained their children remained in residential treatment significantly longer than the other women. This finding was confirmed in a quasi-experimental study: women who participated in residential treatment with children had higher retention rates than women without children in treatment (Szuster et al., 1996).

A complex relationship between treatment setting, patient characteristics, and treatment retention was found in another quasi-experimental study. Haller and Miles (2004) examined retention patterns across types of services among 141 women in outpatient treatment; 151 women in highly structured, women-focused day treatment; 77 women in male-based residential treatment. The type of treatment program (compared with pre-treatment and patient characteristics) was the most prominent factor in predicting retention, with greatest retention in day treatment, followed by outpatient and then residential programs. While pre-treatment and patient characteristics were not significant overall, there were several specific characteristics related to retention within a specific treatment type. For example, being married was related to greater retention in outpatient treatment; previous drug treatment was related to greater retention in day treatment; severity of drug problem and anxiety were

related to retention in residential treatment (Haller and Miles, 2004).

3.4. Summary

Non-randomized clinical studies of treatment retention demonstrated inconsistent results as to whether gender is predictive of treatment retention and completion. However, larger, population-based studies provide a convergence of evidence suggesting that gender is not a significant predictor of substance abuse treatment retention or completion. However, both population-based and clinical studies indicate that there are predictors of treatment retention, and some of these are gender-specific or may vary by program type. Among women enrolled in treatment, program type or certain pre-treatment characteristics—such as referral source, psychological functioning, personal stability, and number of children—may be important predictors of length of stay or treatment completion. Gender-specific treatment programming may enhance treatment retention among certain subgroups of women. For women with children, facilities that allow women to participate in residential treatment with their children may also enhance retention compared to those that do not provide these services.

4. Characteristics associated with substance abuse treatment outcomes in women

4.1. Substance abuse outcomes versus predictors of outcomes

While concerns have been raised about the effectiveness of substance abuse treatment for women (Ferrence, 1994; Floyd et al., 1996; Hodgins et al., 1997; Schmidt and Weisner, 1995; Schober and Annis, 1996), many studies have found few or no gender differences in treatment outcome across various populations (e.g., Acharyya and Zhang, 2003; Alterman et al., 2000; Ballesteros et al., 2004; Benishek et al., 1992; Foster et al., 2000; Green et al., 2004; Greenfield et al., 1998; Hser et al., 2003; Jerrell and Ridgely, 1995; Marsh et al., 2004; McCance et al., 1999; McLellan et al., 1994; Rohsenow et al., 2000; Sterling, 2004; Toneatto et al., 1992; Wong et al., 2002). For example, one recent report (Acharyya and Zhang, 2003) found treatment-related improvements, but only minimal differences in outcomes between men and women in four substance abuse treatment modalities (methadone, non-methadone outpatient, short-term inpatient, and long-term residential). Another study (Hser et al., 2003) found no overall gender differences in 1 year drug and alcohol treatment outcomes but did find gender-specific baseline predictors of treatment outcomes, including the use of multiple drugs, readiness for treatment, and spousal drug use (Hser et al., 2003). A study of outpatient treatment (Green et al., 2004) found no gender differences in outcomes, although there were important gender differences in the predictors of those outcomes. Similar conclusions were drawn in a prospective naturalistic study of alcohol-dependent men and women following inpatient alcohol treatment (Greenfield et al., 1998). The study found that gender was not a predictor of treatment

outcomes in this population. Predictors, however, often varied by gender and included educational attainment (Greenfield et al., 2003), self-efficacy (Greenfield et al., 2000), co-occurring major depression (Greenfield et al., 1998), and a history of sexual abuse (Greenfield et al., 2002). Another study (Alterman et al., 2000) compared treatment outcomes for cocaine- or alcohol-dependent men and women receiving treatment in managed care versus fee-for-service settings and found no gender differences in outcomes. A study of gender differences in DSM-IV alcohol-dependent inpatients admitted for detoxification (Foster et al., 2000) found significant baseline gender differences: women reported being of higher social class, having been prescribed antidepressants during the prior 12 months, drinking less in a typical week, and being more likely to screen positive for psychiatric problems. However, gender did not predict 12-week outcome measures, including relapse. A recent meta-analysis of seven studies of brief interventions for hazardous alcohol consumption delivered in primary care outpatient settings demonstrated no gender difference in improved treatment outcomes (Ballesteros et al., 2004). A secondary analysis of data from the prospective U.S. National Treatment Improvement Evaluation Study including 1,123 women and 2,019 men in 59 treatment facilities (Marsh et al., 2004) found that receipt of comprehensive services, including educational, housing, and income support, were related to post-treatment outcomes for both men and women.

When gender differences have been found, adult women generally have had better outcomes than men, despite differences in populations targeted, type of treatment, problem drug, and treatment setting (Hser et al., 2005; Fiorentine et al., 1997; Jarvis, 1992; Kosten et al., 1993; Kranzler et al., 1996; McKay et al., 2003; Project MATCH, 1997; Rivers et al., 2001; Sanchez-Craig et al., 1991; Satre et al., 2004; Stephens et al., 1994; Timko et al., 2002). For example, while women had more severe family and social problems at treatment entry in a study of cocaine-dependent individuals admitted to an inpatient treatment program (Weiss et al., 1997), there were no gender differences in family and social problems at follow-up, and women were more likely than men to have remained abstinent at 6 month follow-up.

A prospective study of 567 women and 506 men with methamphetamine abuse (Hser et al., 2005) demonstrated that, at 3 and 9 month follow-up, compared to men, women had greater improvements in family and medical problem domains and similar improvements in all other domains of the Addiction Severity Index (ASI). This result was despite the fact that, at baseline, women were more likely than men to be unemployed, have childcare responsibilities, live with a partner using drugs or alcohol, have increased psychiatric symptoms, and have a history of abuse.

A randomized controlled trial of standard plus enhanced outpatient treatment versus standard treatment for 34 women and 29 men with crack cocaine dependence in The Netherlands (Henskens et al., 2005) demonstrated longer cocaine abstinence in the women than the men. In a study of brief treatment for reduction of heavy drinking, women improved considerably more than men in three different brief treatment conditions (Sanchez-Craig et al., 1991). Similarly, a recent study assess-

ing 5-year outcomes of dependent and problem drinkers found that, in both treatment and community samples, women were more likely than men to decrease drinking over time (Weisner et al., 2003a,b).

In a study of older adult alcohol-dependent men and women in outpatient alcohol treatment, Satre and colleagues (2004) found that, at 6-month follow-up, 79.3% of women, compared to 54% of men, reported abstinence from alcohol and drugs in the prior 30 days. This gender difference in the proportion abstinent at 6 months did not persist after controlling for greater length of stay in treatment. However, gender differences in the number of heavy drinking days at 6-month follow-up were found with women eliminating heavy drinking days completely, as compared to an average of 4 heavy drinking days in the past month for the men (Satre et al., 2004). In a different study of patients in an alcohol and drug treatment program, abstinence at 6 months post-treatment predicted abstinence at 5 years (Weisner et al., 2003a,b). Among those who were abstinent at 6 months, predictors of 5-year abstinence included older age, being female, 12-step meeting attendance, and having recovery-oriented social networks (Weisner et al., 2003a,b).

Several studies using relapse as a treatment outcome found better outcomes for women than men (Greenfield et al., 2000; McKay et al., 1996; Project MATCH, 1997). The Project MATCH study found that women may have slightly less severe relapse characteristics than men and be more willing to seek help following relapse (Project MATCH, 1997). Project MATCH researchers expected, but did not confirm, findings of gender by treatment modality effects on outcomes (Project MATCH, 1997). They did, however, find that, in the aftercare arm of the study, men had fewer days of abstinence and drank more per drinking day than women at follow-up (Project MATCH, 1997).

A study of patients receiving treatment for cocaine dependence (McKay et al., 1996) found that relapse episodes among men appeared to be slightly longer than those of women, and that women were more likely to seek help after initial use in the relapse period. Following relapse, men reported stronger appetitive reactions and more self-justification for use than did women; in the week prior to relapse, women reported more unpleasant affect and interpersonal problems than men (McKay et al., 1996). Related work examined the effects of self-efficacy on time to relapse following inpatient alcohol treatment, finding no gender differences in outcomes (Greenfield et al., 2000). The investigators did find a self-efficacy by gender interaction when predicting days abstinent at follow-up: men with lower self-efficacy had fewer abstinent days.

While gender itself may not be a specific predictor of substance abuse treatment outcomes, a number of characteristics associated with treatment outcomes are known, and data indicate how these predictors vary by gender. Patient characteristics associated with substance abuse treatment outcomes include co-occurring psychiatric disorders, history of victimization (e.g., sexual and physical assault in childhood and/or adulthood), treatment retention and completion, and therapist-patient gender matching. We address these characteristics and their implications for future research in the sections that follow.

4.2. Co-occurring psychiatric disorders and substance abuse outcomes following treatment

A full review of the association between co-occurring psychiatric disorders and treatment outcomes is beyond the scope of this review and is covered more comprehensively elsewhere (Kranzler and Tinsley, 2004; Sinha and Rounsaville, 2002). Because prevalence of co-occurring disorders among individuals with substance use disorders varies by gender, it is important to evaluate whether there are gender differences in associations between co-occurring psychiatric disorders and substance abuse treatment outcomes. There are a number of documented methodological difficulties inherent in this research (Greenfield et al., 1998; Grant et al., 1996a,b; Hasin et al., 1991; Hesselbrock and Hesselbrock, 1997), suggesting the need for cautious interpretation of results as well as additional research focusing on this area (Hesselbrock and Hesselbrock, 1997).

Overall, the presence of co-occurring additional psychiatric disorders has been shown in many studies to have a negative impact on substance abuse treatment response (Greenfield et al., 1998; Hasin et al., 1991, 1996; Hesselbrock, 1991; Kranzler et al., 1996; Mueller et al., 1994). One follow-up study of alcohol-dependent men and women found that histories of lifetime coexisting psychiatric disorders generally predicted poorer outcomes for both men and women. Such outcomes include total number of drinking days, greater intensity of drinking, greater craving, increased likelihood of having a pathological pattern of alcohol use, and greater withdrawal symptoms. Association of coexisting disorders with substance abuse treatment outcomes did not differ by gender, however (Kranzler et al., 1996). Similarly, a prospective study (Greenfield et al., 1998) examined the effects of depression on drinking outcomes among individuals hospitalized for alcohol dependence. It found shorter time to first drink among those with a diagnosis of major depression (but not depressive symptoms) at the time of hospitalization, but no gender differences in the relationship between depression and time to first drink. Similarly, two studies of the relationship between ASPD and treatment outcomes showed that co-occurring ASPD was associated with worse treatment outcomes for both men and women (Galen et al., 2000; Hesselbrock, 1991). In one study, both females and males with alcohol dependence and ASPD reported poorer 1-year treatment outcomes than alcohol-dependent individuals without ASPD (Hesselbrock, 1991). In a sample of patients in outpatient treatment (Galen et al., 2000), prevalence rates for ASPD were similar for men and women, although women had greater substance-related and psychiatric severity than men (this was also true for the individuals with ASPD). Six-month outcomes showed that both male and female patients with ASPD fared worse than those without the disorder, with no gender differences in overall outcomes, and that prior gender differences in psychiatric severity had disappeared.

In contrast, several studies have demonstrated differences in the prognostic significance of psychiatric disorders in men and women. For example, Benishek et al. (1992) found that a global measure of psychopathology was predictive of more alcohol problems 6 months post-treatment for women, but not

for men. In related work, a follow-up study of 1-year outcomes of 61 men and 57 women with alcohol dependence following inpatient treatment in Germany (Mann et al., 2004) found similar relapse rates among men with and without psychiatric comorbidity, but a lower proportion of relapse among women with co-occurring psychiatric disorders than women without. It has been suggested by some authors that women with co-occurring alcohol dependence and depression may present with less-severe alcohol dependence and more-severe depression compared with men with both disorders, which may account for some gender differences in substance abuse treatment outcomes (Pettinati et al., 2000). A separate study showed that men with psychiatric disorders generally, and with major depression or antisocial personality disorder specifically, had worse 1-year substance abuse treatment outcomes (Compton et al., 2003), whereas women with co-occurring phobic disorders had better outcomes. In contrast, women with substance-related and major depressive disorders demonstrated shorter mean durations of abstinence than women with a substance-related disorder alone, while men with comorbid depression had longer abstinence durations than men without depression (Westermeyer et al., 1997). Results from these studies demonstrates that the relationship between gender, co-occurring psychiatric disorders, and substance abuse treatment outcomes is complex and may vary depending upon the population studied, the specific substance of abuse, and the co-occurring psychiatric disorders under study.

A number of studies have examined substance abuse treatment outcomes among women with co-occurring other psychiatric disorders using female-only samples (Brady et al., 1994; Brown, 2000; Ingersoll et al., 1995). Brown (2000) found that, among women with diagnoses of alcohol or substance abuse and at least one additional Axis I diagnosis (most were affective or anxiety disorders), greater baseline severity of post-traumatic stress disorder (PTSD) predicted alcohol and drug relapses during 6-month follow-up. Other work found similar results (Ingersoll et al., 1995). It may be that women with PTSD are less likely to complete aftercare (Brady et al., 1994), thus negatively affecting treatment outcomes.

Although high rates of co-occurring eating disorders among treatment-seeking women with alcohol use disorders have been reported over the past two decades (Beary et al., 1986; Lacey and Mourel, 1986; Peveler and Fairburn, 1990; Taylor et al., 1993), there are no studies of treatment outcomes and few treatment programs equipped to treat both disorders. One compilation of treatment studies found that 30–50% of individuals with bulimia and 12–18% with anorexia had a concurrent diagnosis of an alcohol or drug use disorder (CASA, 2003). There are currently no reports of specific treatments for this special population or treatment outcome studies of women with co-occurring substance use and eating disorders (CASA, 2003; Sinha and O'Malley, 2000).

4.3. History of victimization

An examination of histories of sexual and physical abuse among men and women in inpatient alcohol treatment

(Greenfield et al., 2002) found an association between sexual abuse history and shorter time to first drink and relapse for both genders. This relationship disappeared after controlling for other factors (e.g., marital status, education, employment, psychiatric disorder) in analyses, however. History of physical abuse was not related to treatment outcomes.

Related work (Messina et al., 2000) found that history of physical abuse predicted positive urine drug screens at follow-up for women, but not for men. Conversely, Fiorentine et al. (1999) found few differences in men's and women's outcomes when examining history of abuse; when they did find a difference, abuse predicted only men's outcomes (Fiorentine et al., 1999). Similarly, being a victim of domestic violence predicted greater numbers of hours in treatment for men but not women (Green et al., 2002). In a study of treatment outcomes among the same group, however, being a victim of forced sex predicted worse psychiatric outcomes for women (Green et al., 2004).

A 1-year follow-up study found that abuse history may be differentially associated with specific outcome measures (Pirard et al., 2005). For example, among 700 individuals with substance use disorders (47.3% with histories of abuse), abuse history was not a predictor of missing treatment sessions or of improvements in most domains of the ASI at 1-year follow-up. However, abuse histories were associated with worse ASI scores in the psychiatric domain, increased number of psychiatric hospitalizations, and increased use of outpatient treatment services. Other work provides some indication that women abused as children may have worse psychological adjustment and more problems related to drug use following drug treatment (Kang et al., 1999), and that having a violent partner over the lifetime (Comfort et al., 2003) leads to worse treatment outcomes.

Outcomes from the Women, Co-occurring Disorders, and Violence Study (WCDVS), a multi-site cooperative study, provide some evidence that comprehensive integrated services may provide more effective treatment for women with co-occurring substance and psychiatric disorders and histories of victimization (Cocozza et al., 2005; Markoff et al., 2005; McHugo et al., 2005; Morrissey et al., 2005). Six-month outcomes of this nine-site quasi-experimental study compared 1,023 women in comprehensive, integrated, trauma-informed, and consumer/survivor/recovering services with 983 women in usual care (Cocozza et al., 2005; McHugo et al., 2005; Morrissey et al., 2005). The study found that person-level variables such as drug use problem severity, alcohol use problem severity, mental health status, lifetime and current exposure to interpersonal abuse and other stressful events predicted outcomes independent of intervention condition, and to a small extent, moderated intervention and program effects. However, in sites where intervention conditions provided more integrated counseling than did comparison conditions, there were improved effects on mental health and substance abuse outcomes. These effects were partially mediated by person-level variables (Morrissey et al., 2005). Overall, the treatment condition (e.g., comprehensive, trauma-informed services) did demonstrate improved PTSD symptoms as well as improved drug use and problem severity compared with usual care (Cocozza et al., 2005).

4.4. *Effects of treatment retention and completion on substance abuse outcomes*

Messina et al. (2000) examined outcomes among a sample of primarily African American men and women with heroin or cocaine dependence, the majority of whom also had co-occurring psychiatric disorders (mostly depression or ASPD). The study was conducted in two therapeutic communities—one with 10 months of inpatient treatment and 2 months of outpatient treatment, the other with 6 months inpatient and 6 months outpatient. Those of either gender who completed treatment in either of the 12-month programs had significant reductions in drug use and arrests and increased likelihood of being employed, when compared to those who did not complete the program. Women were found to benefit from longer residential treatment, with reduced likelihood of arrests and greater employment rates.

In a study within a large HMO, women who completed treatment were more than nine times as likely to be abstinent for 30 days at 7-month follow-up compared to other women, while men completing treatment were only about three times as likely to be abstinent as men who did not complete (Green et al., 2004). In a study of patients recruited from drug treatment programs in Los Angeles County (Hser et al., 2003), longer treatment retention was associated with drug abstinence and crime desistance for both men and women at 1-year follow-up. A study of older adult men and women in outpatient alcohol treatment found that greater length of stay in treatment predicted abstinence at 6 months for both men and women (Satre et al., 2004).

4.5. *Matching treatment and counselor: gender and outcomes*

In work matching client to counselor gender, several studies found no effects of gender matching on outcomes (McKay et al., 2003; Sterling et al., 2001), while another (Fiorentine and Hillhouse, 1999) found that matching clients to empathic counselors, regardless of gender or ethnicity, led to more favorable treatment outcomes. Although matching on gender and ethnicity was generally associated with greater perceptions of counselor empathy, such matching did not affect treatment engagement.

There is, however, some evidence that clients matched with a gender-congruent counselor may have had better abstinence outcomes (Fiorentine and Hillhouse, 1999; Sterling et al., 1998, 2001). Two studies (Sterling et al., 1998, 2001) evaluated the effects of gender congruence between therapists and clients on substance abuse treatment outcomes. The first, conducted with outpatient group therapy participants, found that women who were paired with women therapists were retained in outpatient treatment for a significantly longer period of time. However, for both men and women in this study, participants who were paired with a same-gender therapist participated significantly less in Narcotics Anonymous (NA) groups than did mixed-gender pairings (Sterling et al., 1998).

The authors suggested that the modest positive effect for gender matching in this study may have been due in part to the group

treatment modality itself, and that the impact of gender congruence might be more potent in an individual therapy setting. To evaluate this, their second study included a similar evaluation of therapist/participant gender matching in an outpatient individual treatment program for cocaine abuse. The results of this study failed to find any positive outcome effects for matched-gender pairings. In fact, the one significant effect found for gender matching suggested that both male and female participants with gender-congruent therapists reported significantly more psychological symptoms at a 9 month follow-up (Sterling et al., 2001).

Another study (Fiorentine and Hillhouse, 1999) explored the effects of therapist/participant gender matching on treatment effectiveness and perceived therapist empathy for participants entering outpatient drug-free treatment programs. Findings indicated that gender congruence was associated with higher levels of perceived therapist empathy for both men and women, and that pairing women participants with women therapists was associated with increased abstinence in the 6 months prior to an 8-month post-intake follow-up.

4.6. Summary

A large body of evidence shows that both men and women benefit from substance abuse treatment, and that gender alone is not a predictor of outcome. However, important characteristics of individuals, subgroups of individuals, and treatment approaches may differentially affect treatment-related outcomes by gender. Thus, clinicians and researchers should begin to work together to identify means of directly addressing common predictors of poor outcomes for subgroups of women and men, and to enhance strategies and characteristics of individuals, subgroups, and programs that are associated with better outcomes.

5. Gender-specific versus mixed-gender treatment services

Many programs have developed gender-specific and gender-sensitive programs and services for women, but the effects of these changes on treatment outcomes remain unclear (LaFave and Echols, 1999; Nelson-Zlupko et al., 1995; Schliebner, 1994; Smith and Weisner, 2000; Wilke, 1994). A meta-analysis examining effectiveness of single-gender substance abuse treatment for women (Orwin et al., 2001) concluded that single-gender treatment was effective, but that its strongest impact was on pregnancy outcomes. Psychological well-being, attitudes/beliefs, and HIV risk reduction were also substantially improved by treatment, but psychiatric outcomes improved only modestly (Orwin et al., 2001). Across studies, treatment resulted in only small improvements in alcohol use, other drug use, and lowered criminal activity (Orwin et al., 2001). However, few studies in this meta-analysis compared gender-sensitive or gender-specific treatment to mixed-gender programs, making conclusions tentative and suggesting the need for additional research on women's outcomes (Orwin et al., 2001).

5.1. Rationale for gender-specific treatment for women

Several authors have suggested that gender differences in interaction styles and men's traditional societal dominance may negatively affect women in mixed-gender groups (LaFave and Echols, 1999; Hodgins et al., 1997; Nelson-Zlupko et al., 1995; Schliebner, 1994; Welle et al., 1998; Wilke, 1994). Females with substance use disorders differ significantly from males with substance use disorders in terms of the risk factors for, and natural history of, substance use problems, reasons for relapse, presenting problems, and motivations for treatment (Davis, 1994; Hodgins et al., 1997; Hughes et al., 1995; Pelissier et al., 2003; Saunders et al., 1993). As a result, it is generally asserted that substance abuse treatment for women, particularly pregnant women and women with dependent children, must differentially address these complex psychosocial issues (Jansson et al., 1996; Knight et al., 1999; Nelson-Zlupko et al., 1995; SAMHSA, 1993; Volpicelli et al., 2000).

5.2. Comparisons of women-only versus mixed-gender treatment settings

Gender-specific treatment for women may be found in nearly every modality, and may be organized as either female-only programs or as female-only interventions within a mixed-gender program (Hodgins et al., 1997). Unfortunately, few randomized trials have examined the relative effectiveness of comparable women-only (WO) versus mixed-gender (MG) settings. One study (Condelli et al., 2000) randomized first-time women patients to WO or MG treatment programs. Based on treatment refusals and attrition during the first 25 days of treatment, it found no significant difference between the women assigned to WO and those assigned to MG settings.

In contrast, another study (Strantz and Welch, 1995) that randomly assigned crack cocaine-dependent women with infants who were prenatally exposed to drugs to either an intensive, specialized day treatment program (WO) or to a traditional outpatient program (MG) found that overall retention rates were significantly higher for the former.

A 2001 study analyzed outcome data from an agency that switched from providing mixed-gender treatment to providing treatment in gender-specific groups (Bride, 2001). Data was compared for men and women participants during both the mixed-gender period and the gender-specific periods. The treatment structures used for the mixed-gender program remained essentially unchanged from the two single-gender programs, except that the content of groups became more gender-specific, and the women-specific treatment program was staffed exclusively by women, while the other two programs had both male and female staff members. No significant differences were found for either treatment completion or retention (Bride, 2001).

Another study in Australia (Copeland et al., 1993) compared the outcomes of women attending treatment in a WO residential unit with women attending treatment in two different MG settings, one of which was a residential program and the other an inpatient detoxification unit. The only major difference between the WO program and the MG programs was the women-only

environment and the availability of residential childcare. The study failed to demonstrate a significant difference in outcomes between the WO setting and the MG settings. An earlier comparison of the characteristics of the participants in the above study (Copeland and Hall, 1992), however, found that the women attending the WO program were significantly more likely to be women with dependent children, women who had been sexually abused in childhood, lesbian, and/or women who had a maternal history of substance dependence. In light of this, the study team suggested that the lack of outcome difference in the later study may be due in part to the WO group's higher concentration of more "difficult" patients, who may have done significantly worse if they had been in a non-gender-specific setting.

Comparisons of data from patients treated in publicly funded residential WO and MG drug treatment programs indicated that women in single-gender treatment programs averaged significantly more days in treatment and were more likely to complete treatment than women in MG programs (Grella, 1999). Women in WO programs were significantly more likely to have more complex problems than women in MG programs, including being pregnant, on probation, or homeless, and to have a longer duration of primary drug use.

In a randomized controlled trial (Kaskutas et al., 2005), investigators compared outcomes and costs of outpatient women's treatment to mixed-gender programs. Women were randomized to a WO program with gender-specific programming or one of three standard MG programs. All four programs were day treatment programs; of the MG programs, two were community-based and one was hospital-based. The study found the only significant differences in outcomes were between the WO program and the hospital-based MG program: total abstinence was higher during the follow-up period in the hospital-based MG program than in the WO program. The hospital-based program emphasized the Minnesota model; was implemented by a multi-disciplinary staff, including on-site medical personnel; cost twice as much per week as the women's program. The study was limited by its small sample size and focus on only day treatment programs. The findings suggest that women may be equally well-served by high-quality MG and WO day treatment programs (Kaskutas et al., 2005).

5.3. *Potential effective elements in women-only treatment: the role of patient satisfaction and treatment choice*

Several authors have suggested that determining the most effective approach to women's treatment should take into account more than the issue of gender (Copeland et al., 1993; Nelson-Zlupko et al., 1996; Swift and Copeland, 1996). A quasi-experimental study aimed at ascertaining the treatment needs of women (Swift and Copeland, 1996) found that while there was a general positive endorsement of WO programs among women who had attended them, 42% of the women surveyed did not have strong feelings for or against MG programs. On the other hand, some women felt uncomfortable or unsafe in MG programs (11%), felt male clients were arrogant or sexist (10%), and/or felt harassed or dominated in MG programs (6%). A 1996 study (Nelson-Zlupko et al., 1996) interviewed women

who were attending a comprehensive, gender-specific treatment program to gather information pertaining to their present and past treatment experiences. Five major themes emerged: (1) individual counseling may be the most important service in determining women's treatment retention; (2) sexual harassment is often present in non-gender-specific treatment programs; (3) childcare is essential for recovery in women with children; (4) MG treatment groups are not conducive to the open expression of women's needs and experiences; (5) the effectiveness of gender-sensitive services is reduced in the context of non-gender-specific treatment (Nelson-Zlupko et al., 1996).

Another potentially effective element within women-only treatment may be the greater likelihood of gender-matching between patients and clinicians. Fiorentine and Hillhouse (1999) explored the effects of therapist/participant gender-matching on treatment effectiveness. They found that gender congruency was associated with higher levels of perceived therapist empathy for both men and women and that pairing women participants with women therapists was associated with increased abstinence in the 6 months prior to an 8-month post-intake follow-up.

While the current body of evidence comparing women-only versus mixed-gender treatment does not provide strong support for differential outcome, studies of women's attitudes toward their treatment experiences and patient preferences suggest that a subgroup of women with substance use disorders may perceive women-only treatment more positively than mixed-gender treatment. In particular, women-only treatment may be viewed by some women as providing a safer atmosphere. Women with substance use disorders are heterogeneous; therefore, access to women-only treatment may be perceived as an important factor for a subgroup of women who might otherwise be hindered in seeking or freely participating in treatment within a mixed-gender setting.

5.4. *Gender-specific treatment and its relationship to special needs of women with substance use disorders*

A number of studies have demonstrated the effectiveness of gender-specific treatment as it relates to the specialized needs of substance-using women (Elk et al., 1995; Hien et al., 2004; Jansson et al., 1996; Kelly et al., 2000; Linehan et al., 1999; Luthar and Suchman, 2000; Najavits et al., 1998; Reynolds et al., 1995; Volpicelli et al., 2000; Washington, 2001; Welle et al., 1998). These studies have examined services to address psychosocial needs that are more prevalent in women, as well as certain subpopulations, or specialized interventions for a particular subgroup of women. For example, mixed-gender programs are less likely to adequately address women's barriers to treatment, such as childcare needs and financial concerns (Grella et al., 1999; Hodgins et al., 1997). An analysis of drug treatment programs serving women in Los Angeles County (Grella et al., 1999) found that WO programs were more likely to have a treatment priority for pregnant substance abusers; to provide prenatal, post-partum, and well-baby services; and to provide psychosocial services, such as job training (intensive outpatient programs only), life-skills training, client advocacy, transporta-

tion, and assistance with housing. They also were more likely to provide peer support groups, on-site 12-step meetings, and social outings. The WO programs in this analysis more frequently provided special programming for pregnant women, Latinas, Native Americans, and heroin users.

A randomized clinical trial to examine the effect of enhanced case management services (Volpicelli et al., 2000) compared a standard case management approach to addressing psychosocial problems with a Psychosocially Enhanced Treatment (PET) in an outpatient, gender-specific, group therapy-based treatment setting. The case management condition provided referrals to outside providers as needed, while the PET condition gave participants access to parenting classes, GED classes, a staff psychiatrist, and an individual therapist onsite. No difference was found in utilization of outside resources or group therapy, and psychosocial outcomes did not improve differentially between groups. However, women in the PET condition reported less cocaine use at a 12-month follow-up, and the PET condition improved retention in women with more-severe psychological symptoms. The authors concluded that the significant outcomes for PET may have been due primarily to the availability of individual therapy, which was the most extensively utilized PET-only service, and suggested that other PET services such as parenting classes and GED might be more effectively utilized later in the recovery process.

Substance-using women have a higher incidence of sexual and physical traumatic victimization than their male counterparts (Green et al., 2002; Greenfield et al., 2002; O'Hare, 1995; Wallen, 1992). A study that examined the specialized treatment needs of substance-abusing women with PTSD (Najavits et al., 1998) reviewed outcome data for Seeking Safety, a cognitive-behavioral group intervention designed specifically for this population. Psychosocial assessments found significant improvements post-treatment and at follow-up in a variety of domains, including increased substance abstinence, decreased subtle trauma symptoms, decreased depression, and decreased suicidal thoughts and risk (not assessed at follow-up). In another study, two kinds of cognitive-behavioral therapy (Seeking Safety and Relapse Prevention) were compared with community standard treatment for women with PTSD co-occurring with substance use (Hien et al., 2004). Both types of cognitive-behavioral therapies equivalently improved PTSD and substance abuse outcomes at 6 months post-treatment compared with the community standard treatment.

Treatment interventions for other specific subpopulations of women with substance use disorders include reduction of alcohol use among pregnant women (Reynolds et al., 1995), contingency management to increase abstinence from cocaine in pregnant women (Elk et al., 1995), a comprehensive services model for pregnant women (Jansson et al., 1996), parenting skills for methadone-maintained mothers (Luthar and Suchman, 2000), relapse prevention for women with PTSD co-occurring with substance use (Hien et al., 2004; Najavits et al., 1996, 1998), relapse prevention for women with marital distress and alcohol dependence (Kelly et al., 2000), dialectical behavior therapy for patients with co-occurring borderline personality disorder and drug dependence (Linehan et al., 1999), and prison-based

single-gender drug treatment for women offenders (Pelissier et al., 2003), among others (Washington, 2001). While these interventions are in the early stages of clinical investigation (e.g., pilot testing, open trials, non-randomized controlled trials), results of these studies hold promise for effectively treating specific subgroups of women with substance use disorders.

5.5. Summary

Gender-specific treatment has been recommended for substance-abusing women, particularly pregnant women and women with dependent children. Studies comparing treatments differing primarily on the issue of gender have yielded mixed results, although some women with substance use disorders may perceive single-gender treatment more positively than mixed-gender treatment. Some greater success has been demonstrated by treatments that address problems more common to substance-abusing women and treatments designed for specific subgroups of this population. Further randomized studies are necessary to assess treatment outcomes for women-only programs that have gender-specific programming or services, compared with mixed-gender treatment.

6. Summary of findings and implications for research on gender differences and substance abuse treatment outcomes

Nearly 90% of the studies investigating gender differences in substance abuse treatment outcomes were published since 1990, and of those, about 40% were published since the year 2000. Only about 12% of these studies were randomized clinical trials. Much of the available information is derived from cross-sectional, descriptive, quasi-experimental, and observational studies. We are in the very earliest stage of establishing our base of valid and reliable information. Certain findings have been replicated in a number of studies across different populations, however, and areas where results are conflicting point the way to where future research may be most illuminating.

A convergence of evidence suggests that women with substance use disorders are less likely than their male counterparts to enter treatment over their lifetime. Complex socio-cultural and socioeconomic factors are associated with women's entry into substance abuse treatment. In the past, perceived social stigma may have hindered women's help-seeking patterns for substance abuse treatment and contributed to their under-diagnosis, under-detection, and lower rates of referral to treatment. Changes in the treatment system and social attitudes related to alcohol and drug use, as well as increased acceptability of treatment seeking, may have influenced help-seeking patterns among women over the past 20 years, but little is currently known about these changes. There is evidence that economic disparities, lower educational attainment, and fewer social supports among women compared to men influence access to substance abuse treatment and treatment entry. Addressing heightened need among women for vital ancillary services such as childcare, perinatal treatment, and family services could enhance access to substance abuse treatment for many women.

Evidence demonstrates that gender is not necessarily a significant predictor of retention, completion, or outcome once an individual begins treatment. Retention and longer length of treatment have been positively associated with substance abuse treatment outcomes for both women and men. Certain characteristics that are associated with treatment retention appear to vary by gender. For example, greater levels of psychological functioning and lower levels of psychiatric symptoms; socioeconomic status, such as higher income, employment, and educational attainment; social support; and personal and social stability are all associated with treatment retention. Many of these predictors vary by gender and have been found to be associated with women's retention in substance abuse treatment. Importantly, certain lines of evidence indicate that specific programming designed to address some of these circumstances, such as the negative effects of social instability, can enhance satisfaction with treatment and increase retention.

With respect to the outcomes of substance abuse treatment, an older literature reflected a belief that women would have worse substance abuse treatment outcomes than men. The literature reviewed here does not substantiate this. In fact, there are a number of studies that demonstrate better treatment outcomes for women than men with substance use disorders. This review would suggest that examining gender as a dichotomous independent predictor of treatment outcome is no longer the most effective line of investigation for substance abuse treatment research. Conversely, the interaction between certain baseline characteristics and gender has not been ascertained in many instances. For example, there are few treatment outcome studies that have had adequate sample sizes to test gender as it interacts with race, ethnicity, or age (e.g., adolescence, young adult, older adult).

The results of this review suggest that there are a number of target characteristics that are associated with treatment outcomes that often vary by gender. For example, treatment outcome may be affected by socioeconomic characteristics (e.g., educational attainment, employment, dependent children), co-occurring psychiatric disorders, history of victimization (e.g., sexual and physical assault in childhood and/or adulthood), type of services used and number of hours in treatment, relapse patterns, and therapist-patient gender matching. Each of these patient- or service-level characteristics varies by gender and can therefore be seen as potentially modifiable gender-specific predictors of treatment outcomes.

The findings of this review also underscore the point that merely changing a treatment program from mixed-gender to women-only does not necessarily affect treatment outcomes for women with substance use disorders. Rather, we found that gender-specific treatment programming and interventions have been demonstrated to enhance treatment entry, retention, and outcomes among only certain *subgroups* of women with substance use disorders. A number of specific interventions focused on subgroups of women with substance use disorders have demonstrated feasibility and in some instances efficacy. These studies have often had small samples or have not yet benefited from a randomized controlled trial of the intervention, however. Additional research is needed to help design effective substance abuse treatment interventions for subgroups of women.

The state of our knowledge would benefit from Stage I trials of new therapeutic interventions focused on specific populations of women, as well as rigorous testing in randomized clinical trials of gender-specific interventions. Studies that compare gender-specific interventions in both women-only and mixed-gender programs would also be useful. In addition, existing studies indicate that certain combinations of treatment modalities (e.g., the addition of individual psychotherapy) or ancillary services (e.g., childcare) improve treatment outcomes for women. Rigorous testing of these research questions for women and men would illuminate gender similarities and differences.

A comprehensive research agenda would include two major domains: (1) development and testing of effective treatment for specific subpopulations of women, and (2) randomized controlled trials testing the effectiveness of mixed-gender versus gender-specific treatments and treatment programs. For a number of subpopulations of women, there is a gap in the treatment research for the development and testing of effective treatments. These subpopulations include (a) older women with substance use disorders, especially those with alcohol and prescription drug use disorders, and (b) women with co-occurring substance use and eating disorders. There is also a dearth of research examining the interaction between gender and ethnicity in treatment process and clinical outcomes.

Finally, research on mixed-gender versus gender-specific treatments and treatment programs often has not been able to randomly assign patients or control for program or treatment-level characteristics. Future research should include: (a) a Stage II randomized controlled trial of a single standard substance abuse treatment approach (e.g., group drug counseling, relapse prevention) in single-gender male, single-gender female, and mixed-gender treatment groups; (b) investigation of gender-specific versus standard treatment content and the interaction of this content with different gender-specific groups; (c) identification of characteristics of women and of men who can benefit from mixed-gender versus single-gender treatments or treatment programs; (d) cost-effectiveness of delivering single-gender versus mixed-gender treatments to different subgroups of women with substance use disorders.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org> by entering doi:10.1016/j.drugalcdep.2006.05.012.

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