

GENDER-SENSITIVE PROCEDURES IN SUBSTANCE ABUSE TREATMENT:
ASSOCIATED COSTS AND EFFECTIVENESS

By

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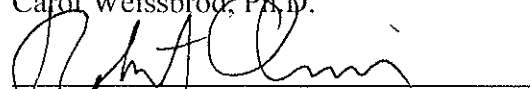
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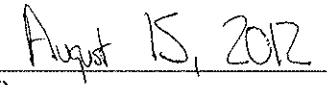

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ABSTRACT

Gender-sensitive (GS) treatment refers to specific practices that are thought to make drug treatment more helpful for women, such as parent training or trauma-focused therapy. The implementation of these practices is seen as important due to the unique challenges women face in substance abuse treatment. The current investigation examines 13 mixed-gender, intensive inpatient programs (IIPs) that varied in gender sensitivity. The costs of gender-sensitive treatment, including monetary and non-monetary resources invested, were determined. Ratios and graphical analyses compared the resources contributed by patients and providers to the outcome variable at both individual and programmatic levels. The outcome variable of interest is the number of days to treatment re-entry, assuming that more treatment-free days after discharge from IIP treatment is a positive result. It was expected that programs with greater gender sensitivity will require more patient and provider resources, while also providing more effective treatment, as measured by women's treatment re-entry. Results indicated that gender-sensitive treatment does cost more, but no differences were indicated in effectiveness or cost-effectiveness. However, the cost of providing gender-sensitive treatment services is minimal, with median values ranging from \$1.25 and \$2.99 per treatment-free day. With improvements to outcome measurement and an increased sample, further research on the cost-effectiveness of gender-sensitive treatment may arrive at different conclusions.

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CHAPTER 1

GENDER-SENSITIVE PROCEDURES IN SUBSTANCE ABUSE TREATMENT: ASSOCIATED COSTS AND EFFECTIVENESS

Feminist psychology approaches addiction as a method employed by women in an attempt to gain control over their own reality or experience (Bepko, 1991). The concept of control, in this theory, is valued since women still face gendered power differentials in interpersonal, social, and occupational realms. As an example, women with a substance use disorder are more likely than their male counterparts to have a history of abuse from others (including physical, sexual, and domestic violence). Women's histories of abuse can cause them to develop feelings of powerlessness and an inability to control their environment, which may initiate the addiction (Ashley, Marsden, & Brady, 2003). Naturally, as substance abuse is closely linked to gender in this model, feminists call for treatment interventions to include consideration of women's particular needs, including the need for empowerment (Bepko, 1991). Those within feminist psychology are not the only parties concerned about responsive treatment in this area; researchers and governmental agencies are also making gender-sensitive intervention a priority, with the realization that perhaps "one size does not fit all," or more exactly "men's sizes don't fit all," in substance abuse treatment (Ettore, 2004; Greenfield et al., 2007).

The area of gender-sensitive drug treatment and comparative costs is designated as an imperative research issue by federal organizations such as the National Institute of Drug Abuse (NIDA), which allocate special grant awards for investigation in this area. This initiative had its start in 1984 when the federal government mandated that each state set aside 5% of already allocated funding for new alcohol and drug abuse services for women (Grella, Ponlinsky, Hser, & Perry, 1999). The inclusion of gender-sensitive components of treatment, defined later in this

document, is believed to lead to better outcomes for women. With feminist theories of addiction and NIDA's objectives in mind, the primary goal of this thesis was to compare the cost and cost-effectiveness of mixed-gender, intensive inpatient programs that varied in their level of gender sensitivity.

Women and Substance Use Disorders

Substance abuse, although a disorder with higher reported incidence among males, is considered especially detrimental to women since they develop a comparatively larger number of problems associated with substance use disorders (SUDs) (Westermeyer & Boedicker, 2000). These problems include: more health issues, more co-morbid psychiatric disorders, higher associated death rates, and a faster average course of addiction (Navajits, Rosier, Nolan, & Freeman, 2007). The idea that women experience a shorter period from drug use initiation to addiction has been much researched and is often referred to as "telescoping" (Hersen, Turner, & Beidel, 2007). Further, Grupp (2006) reported that 96% of women entering gender-sensitive treatment have experienced emotional abuse, 79% physical abuse, and 51% sexual abuse at some point in their lives. Some have found that women with more severe substance abuse and residual problems are selected for specialized, gender-sensitive programs (French, McCollister, Cacciola, Durell, & Stephens, 2002). It is suggested that women with a higher level of symptomology would be harder to treat and thus may not readily show improvement (French et al., 2002). The combination of these and other factors would seem to hinder the impact of intervention and make the need for tailored treatment greater.

In general, although they have potentially greater substance-related issues, women with SUDs are less likely than their male counterparts to enter treatment across their lifetime, possibly because of barriers that only women face to treatment entry (Greenfield et al., 2007). For the

average substance abuser, entry typically occurs 6 to 10 years after the start of drug use and only 50% complete treatment after entering (Hersen, Turner, & Beidel, 2007). As an example of a specific barrier to treatment, women are disproportionately responsible for child-rearing and taking care of the family, which impairs commitment to or availability for a residential stay or even intensive outpatient services (Grella et al., 1999). Gender-sensitive programs are thought to provide for and circumvent some of these barriers, so as not to exclude primary caregivers. Removal or reduction of these barriers may lead to better outcomes in women while simultaneously allowing for the inclusion of certain subpopulations. For example, Grella et al. (1999) note that women-only inpatient programs were significantly more likely to accept pregnant women and those with HIV/AIDs. Women-only programs were also found to make economic status less of a deterrent by accepting Medicaid or other state insurance, or charge no fee at all. For these reasons, it is important that avenues be made for women to gain access to gender-sensitive treatment.

As well as delays in onset of treatment, treatment re-entry and relapse have been well documented among substance dependent individuals, including women. Treatment admissions data from 2000 indicated that 60% of publically-funded patients had previous treatment experience (Grella, Hser, & Hsieh, 2003). This pattern of cyclical service utilization has been called a “treatment career” in the literature (Hser, Anglin, Grella, Longshore, & Prendergast, 1997). Gender differences in this pattern have also been examined by Grella and Joshi (1999). Treatment re-entry in their study was associated with referral from a social worker for women, whereas men received mostly received referrals from employers or criminal justice institutions. Women in this sample were more likely to report a belief that treatment would be effective in resolving their drug dependency, possibly providing some explanation of why women with a

prior history of drug treatment were also associated with self-initiation to a follow-up treatment episode (Grella & Joshi, 1999). In following a sample in Years 2 to 6 after intake, Grella, Scott, Foss & Dennis (2008) followed changes in recovery status for women and men. They found that women were one-third less likely to transition from ‘recovery’ status to ‘using’. The number of self-help sessions attended was significantly associated with transitioning to recovery status for women, whereas the number of treatment sessions was significantly associated with recovery for men (Grella, Scott, Foss, & Dennis, 2008). While gender differences within “treatment careers” have been examined, no one has done this within the context of gender-sensitive substance abuse treatment. This study, though not looking at treatment careers specifically, hopes to take a first step by noting time to treatment re-entry for women patients after participating in gender-sensitive treatment.

It is clear that women with substance abuse and dependency issues face a host of related problems, face barriers to treatment participation, and likely face years of repeated treatment before full recovery. Defining and conducting research on what constitutes a gender-sensitive treatment model seems especially important because the etiology of substance abuse disorders differs by gender according to developmental and genetic perspectives and should consequently be addressed differently (Hodgins, el-Guebaly, & Addington, 1997). Additionally, as those from the feminist perspective would likely assert, substance dependence has different implications for women societally and this factor should also be considered in treatment (Bepko, 1991).

Defining ‘Gender-Sensitive’ Treatment

The idea of developing treatment suited for women’s needs has been examined within a wide range of health concerns, including Post-Traumatic Stress Disorder, Attention Deficit Hyperactivity Disorder, general medical care, and rehabilitation within the criminal justice

system (Bloom, Owen, & Covington, 2004; Quinn, 2005; Salgado, Vogt, King, & King, 2002; Vlassoff & Moreno, 2005). Gender-sensitive substance abuse treatment is described by Greenfield et al. (2007) and Grella et al. (1999) as including the following components:

- coping skills training
- support of women's self care/esteem
- addressing reoccurring psychiatric problems in treatment
- self-efficacy education
- provision of gynecological and other health services
- on-site childcare
- use of supportive or "empowerment" methods
- women-only groups
- family planning
- parent training
- vocational training
- trauma-focused services

These procedures are only a selected list of components that may help treatment address the specific needs of women; there are others that apply as well (Sun, 2006). It is important to note that research in the area of gender-sensitive treatment primarily began with comparison of mixed-gender and women-only programs. Investigation into elements of mixed-gender programs that give attention to female concerns is a more recent endeavor. The definition of gender-sensitive treatment utilized in the current study involves the provision, at varying amounts or levels, of gender-sensitive services provided within mixed-gender, intensive inpatient programs. It should be pointed out that some gender-sensitive services identified in the literature

are traditionally not offered in intensive inpatient (i.e. on-site childcare) and may not be appropriate for all women (i.e. family planning).

Effectiveness of Substance Abuse Treatment

Research has already concluded that typical substance abuse treatment is effective in clinical samples. Modalities such as the 12-step program and cognitive-behavioral therapy (CBT) are both considered to be effective means of treating a drug addiction, and have been shown to create an improvement in overall daily functioning (Ouimette, Finney, & Moos, 1997). In particular, it is especially helpful to the patient when comprehensive services, including counseling, psychosocial services (medical care, psychiatric care, family therapy, vocational assistance), and methadone therapy, are included in treatment (McLellan, Arndt, Metzger, Woody, & O'Brien, 1993). With this foundation, it would seem logical to target special needs groups, such as women, and attempt to improve the treatment delivered.

Effectiveness of Gender-Sensitive Substance Abuse Treatment

Historically, research has compared mixed-gender and women-only substance abuse treatment to determine which is more effective for women. As the field has advanced, the study of gender-sensitive treatment has gone beyond single-gender treatment to include extra services for women, as in the current study. In an early study, Copeland, Hall, Didicott, and Biggs (1993) compared a “specialist women’s service” and “traditional mixed-sex service” in drug treatment. Differences between these two treatments was that the “specialist women’s service” included childcare and a female-only staff. These modalities produced no significant difference in outcomes at a six-month follow-up, including drug use, social support, severity of depression, or self esteem. Within these treatment programs, Copeland and Hall (1992) did find that lesbian

women, those with dependent children, and women with a history of childhood sexual assault were less likely to leave the women-only program.

More recent research has continued the comparison of women-only versus mixed-gender programming. Niv and Hser (2006) followed females in women-only (WO) programs versus those in mixed-gender (MG) programs. Both the WO and MG programs provided gender-sensitive services, such as child and family services, although the WO programs were significantly more likely to provide childcare, children's psychological services, and HIV testing. Those in WO programs utilized more treatment services and had significantly better drug and legal outcomes at a 9-month follow-up. However, these women did not have higher retention or completion rates compared to their counterparts, despite expectations of the researchers, perhaps indicating that gender-sensitive treatment leads to better outcomes via some mechanism other than simply increasing retention over treatment as usual.

Other studies have contrasted the impacts of single- and mixed-gender outpatient groups. In randomized controlled trials, Greenfield, Trucco, McHugh, Lincoln and Gallop (2007) demonstrated that patients in a Women's Recovery Group showed significantly less substance use at a 6-month follow-up than did women assigned to mixed-gender Group Drug Counseling. Further, individuals assigned to the Women's Recovery Group reported significantly higher satisfaction with treatment than did women in the mixed-gender group. Additionally, among women who have severe psychiatric symptoms as well as a substance use disorder, those in a women-only group experienced greater decreases in depressive and other psychiatric symptoms both while in treatment (Months 1-3) and post-treatment (Months 4-9) compared to the mixed-gender group (Greenfield et al., 2008). The Women's Recovery Group treatment was a manual-

based program and did incorporate gender-sensitive elements, such as a module focused on gender-specific antecedents to substance abuse (Greenfield et al., 2008).

Others have shown that one benefit of gender-sensitive programming is keeping women in treatment. Claus, Orwin, Kissin, Krupski, Campbell, & Stark (2007) showed that the inclusion of special services in women-only programming, in comparison to mixed-gender treatment, can extend a patient's period of care. The programs in this study included gender-sensitive services and child services, including the ability for children up to the age of six to live with their mothers during treatment. Women who received specialized services during substance abuse treatment were more likely than women receiving standard treatment to continue care after residential treatment, which has positive implications for long-term outcomes (Claus et al., 2007). There is evidence that women-only treatment settings and the inclusion of gender-specific services can benefit patients. The current study aims to assess the marginal cost of adding gender-sensitive treatment services to mixed-gender treatment and find an increase in the cost-effectiveness of treating women with these services.

Cost of Substance Abuse Treatment

There are a myriad of considerations when calculating the cost of gender-sensitive treatment. Yeom and Shepard (2007) found that women are more costly to treat in outpatient substance abuse treatment. However, it is important to note that with a smaller female to male ratio per program, women-only groups conducted in mixed-gender settings are smaller than coeducational or all male groups (meaning fewer patients are seen per clinician). With fewer individuals in the group, more clinician time is devoted to each group member and therefore the cost per member is higher. Additionally, inpatient programs need to create separate living quarters (i.e. bedrooms and washrooms) for these few women patients. These factors, among

others, can lead to increased costs for mixed-gender programs, and for female patients in these programs in particular (Yates, 1994).

Furthermore, when undertaking a cost assessment of substance abuse treatment, multiple perspectives can be considered (Yates, 1996). The client's perspective is often accounted for by valuing the client's time spent in treatment activities or considering the cost of transportation to treatment, for example. The client family perspective is also important and may be represented by including the client's lost wages or cost of dependent care while a caregiver is participating in treatment. Program and treatment provider perspectives are factored into the cost assessment as well. Resources tabulated from these perspectives may include a provider's time in providing a service and writing notes or the cost of facilities utilized in providing a particular service (Yates, 1999). The 'costs' noted above are not necessarily always just 'money;' rather, resources like time, space and materials are valued in a comprehensive cost assessment (Yates, 1996).

When possible, the current study attempts to incorporate each of these perspectives with attention to the issues around providing gender-sensitive treatment services to women in an inpatient setting. Information about costs from the program, provider, and patient perspectives were collected via interviews. The study aims to undertake a comprehensive cost assessment, and focus will be on the marginal, or unique, resources required to provide specific gender-sensitive services.

Cost-Effectiveness of Substance Abuse Treatment

Evaluation of effectiveness in conjunction with the associated cost of substance abuse treatment is still a limited research area. Barnett and Swindle (1997) performed a large-scale cost-effectiveness analysis of inpatient substance abuse treatment with 38,000 veterans. They discovered that the average program cost \$3,754 per admission. Findings also suggested that

treatment had a 75% chance of being effective when the outcome variable was treatment readmission or not within 6 months of discharge, indicating that one-fourth of the sample had re-entered treatment during the follow-up period. Factors determining a lower likelihood of readmission were found to be treatment in smaller programs and a longer initial prescribed length of stay; however, patient to staff ratio was not found to be significantly related (Barnett & Swindle, 1997). This type of research is very valuable as it indicates which services are not only more costly, but also which provide enough impact on effectiveness to be deemed worth the expenditure of resources.

Research examining gender differences in the cost of substance use treatment was undertaken by Yeom and Shepard (2007). They conducted a cost-effectiveness analysis of a mixed-gender outpatient, aftercare program, comparing the cost of treatment to an individual's substance use post-treatment. They found that, in this case, substance abuse treatment programs expend more resources to treat women, and women were less cost-effective to treat than men. They noted that the higher cost for women is due in part to higher gender-associated baseline characteristics upon treatment entry, such as number of baseline substance abuse days (Yeom & Shepard, 2007). Additional research has shown a conflicting result, indicating that substance abuse treatment is more cost-effective for women than men when abstinence 5 years later is the measure of effectiveness (Mannix, 2010). Specifically, outcomes indicated greater effectiveness in treating women, and women were 21% less costly than men.

The current investigation is somewhat different in that outcomes are being compared to a program's level of gender sensitivity, while Yeom and Shepard (2007) and Mannix (2010) did not consider this variable. It is thought that including more gender-sensitive treatment

procedures in a program will increase the effectiveness for women, which may offset the potentially higher cost.

Current Line of Research

Again, the aim of this project is to determine the cost and cost-effectiveness of receiving gender-sensitive treatment at varying levels of intensity. To do this, the level of gender sensitivity for each program was calculated. The process of creating an ordinal gender-sensitive variable was undertaken by the team of researchers at Westat and used in the current study for the sake of consistency. The analytical procedures and analysis details are described elsewhere (Tang, Claus, Orwin, Kissin, & Arieria, 2012). Rasch modeling, similar to and sometimes known as one-parameter Item Response Theory (IRT), assumes that the probability of endorsing an item is a function of the distance between a respondent and an item's locations on a latent variable (or trait or construct) of particular interest such as gender-sensitivity. The aim is to examine whether specified Rasch models fit observed data using a number of fit statistics, and eventually, to create measures sharing the same metric with respect to the latent trait for both items and programs (Conrad & Smith, 2004).

In this case, variables related to gender-sensitivity (the latent variable) were examined through Rasch analysis. The items used in the Rasch analysis were garnered from interviews with program directors, clinical directors, and counselors, as well as interviewer observations. These interviews and variables were originally created based on literature detailing gender-sensitive services and grouping these services into seven domains (Grella, 2008). The domains included: treatment/orientation processes, administration and staff, organization characteristics, women's services, general services, children's services, and physical environment (Grella, 2008). Before performing the Rasch analysis, the item selection process involved three phases,

the first of which was initial item usability, checking for variability across the thirteen programs and for missing data. If there was not sufficient distribution variability or less than 80% of the data present, then the variable was discarded. Of these variables, those with an item-total correlation less than .40 were discarded. The second step involved selecting items from the remaining pool based on theory and conceptual considerations. Thirdly, Rasch models were created based on a number of fit statistics and criteria. Both items and programs were ordered on the same scale for being more or less gender-sensitive. The Rasch measures from the best models for each of the subscales were used in creating gender-sensitive scales. The analyses were completed for each domain as well as combined domains, creating three subscales of gender-sensitivity and classifying programs into 4 or 5 levels (Tang et al., 2012). One subscale provided an overall gender sensitivity rating, while the other two scales focused on services and environmental factors of the program.

The current study examines 13 mixed-gender, intensive inpatient programs (IIP) that were found by Tang et al. (2012) to vary in their level of gender sensitivity. Site visits to each program allowed for staff and select female patients to be interviewed about programming and costs. Administrative databases were also available to track the interviewed patients over time, specifically pre- and post-treatment. More specifically, the databases provided substance abuse treatment information for each of the interviewed women in the two years following their participation in IIP treatment. This allowed for 'days to treatment re-entry' to be tallied as the effectiveness or outcome variable, just as Barnett and Swindle (1997) and Mannix (2010) have done in substance abuse research. The study is based upon the hypothesis that gender-sensitive treatment procedures in substance abuse treatment lead to cost-effectiveness for women patients.

Specifically, this thesis has the following expectations:

1. Women participating in treatment programs that are more gender-sensitive will cost more to treat per day than females in treatment programs that are less gender-sensitive.
2. Programs providing higher levels of gender-sensitive treatment will be more effective, as indicated by more days to follow-up treatment after discharge from IIP.
3. Programs higher in gender sensitivity will be more cost-effective for women. The current study will focus on the time to treatment re-entry in the two years following each female patient's intensive inpatient stay. Therefore, 'days to treatment re-entry' is the effectiveness or outcome variable, which will be compared to each patient's cost of gender-sensitive treatment services.

CHAPTER 2

METHOD

Participants

Interviewees ($N = 76$) were female patients enrolled in short-term, mixed-gender intensive inpatient (IIP) treatment. In addition, a larger sample ($N = 14,947$) of men and women who entered IIP treatment at one of the thirteen sites during the study period, Years 2005 through 2009, was collected. This larger sample was only used in the current study to determine the modal length of stay at each of the intensive inpatient programs examined. Data for all patients were collected over this four year period, with months 1 – 24 representing pre-treatment, the treatment episode occurring in month 25, and months 26 – 48 being the post-treatment period.

Women interviewed were required to have been participating in the program for a week or more to assure they had knowledge of the routine and practices. They received compensation in the form of \$25 gift cards to national retail establishments for participating in a group interview. Archival, deidentified data was used to examine costs and outcomes for the interviewed patients. Of the 76 interviewed women in the study, three were deceased by the end of data collection. However, two of the three had re-entered treatment before their death, so they were retained in the sample. Upon investigation, none of the 76 interviewed women had spent significant amounts of time in incarceration (the maximum was 3 days of incarceration). This variable was not thought to interfere with treatment re-entry for any of the interviewed patients. Table 1 provides additional, detailed demographic information about the sample.

Program information about gender-sensitivity and costs was gathered through on-site visits. Initially, 16 mixed-gender, intensive inpatient programs were identified as meeting criteria

Table 1. Demographic Characteristics of Interviewed Women

	<i>n</i>	Mean	Median	SD
Age	76	38.51	40.00	11.03
Years of Education	76	11.70	12.00	2.10
Number of Children	64	1.30	1.00	1.58
	<i>n</i>		%	
Race				
Caucasian	48		63.2	
African-American	9		11.8	
Multi-Racial	9		11.8	
Native American	6		7.9	
Other	2		2.6	
Asian-American	1		1.3	
Employment Status at Intake				
Unemployed	56		73.7	
Not Working- Disabled	14		18.4	
Employed Full Time	2		2.6	
Employed Part Time	2		2.6	
Homemaker	1		1.3	
Institutionalized	1		1.3	
Primary Drug of Abuse				
Alcohol	34		44.7	
Methamphetamine	16		21.1	
Other Opiates/Synthetics	16		21.1	
Cocaine	11		14.5	
Heroin	6		7.9	
Oxy/Hydro Codone	6		7.9	
Marijuana	1		1.3	
Polysubstance Abuse	63		82.9	
Mental Health Services				
Receives	14		18.4	
Does Not Receive	44		57.9	
Needs Services	18		23.7	
Psychoactive Medication				
Takes	22		28.9	
Does Not Take	53		70.0	
Needs Psychoactive Medication	1		1.3	

for participation in the study. These criteria included: provision of short-term residential (STR) treatment, a mixed-gender setting (minimum gender ratio of 1:10), and interaction between genders in the facility. Declining state budgets and funding cuts, as well as the realization that

two programs were highly segregated and providing essentially women-only treatment, led to the recruitment of only 13 programs. From these, program directors, clinical directors, and counselors were interviewed. Each participating program received a \$750 incentive for participation. Program directors also participated in a follow-up phone interview one year after the initial site visit. The program was compensated with \$100 for participation. Due to declining state budgets, two of the original 13 programs had closed in the interim year, so only 11 of program directors were interviewed at follow-up. All who participated gave informed consent, and American Psychological Association ethical guidelines for research were followed. This involved the approval of Institutional Review Boards for each research institution participating, including the state providing the data.

Measures

Data on cost variables were collected through a group interview with female patients, interviews with select program staff, and employee compensation data provided by the programs. Given the absence of formal program reports, interviews appeared to be the best and only option for obtaining this information.

Interviews

Data were collected through interviews with a) program directors, b) clinical directors, c) counselors, and d) patients. The program director interview included 102 items divided into 7 sections (program's philosophy, how patients were admitted, children's services offered, the program's challenges, program costs). As part of this, the director was given a staff matrix to complete which asked for information on each applicable staff member to be filled into the grid. Years of experience, salary, time dedicated to the IIP program, and other benefits were inserted

into the grid. One year after the initial interview, program directors were contacted again to participate in a follow-up interview. The follow-up interview re-asked many of the same questions from the original interview, and also assessed any cost-related changes that had occurred in the previous year.

The clinical director interview includes 170 items and is divided into 11 sections, asking about treatment philosophy, the patient population, assessment, treatment planning, services available to patients, services available to children and family, discharge planning, post-treatment housing services, and continuing care services. The counselor interview included 102 items, and asked questions specifically about patient access to counseling, patient access to their children, continuing care services, patient satisfaction, barriers to treatment, and general program environment details.

Questions in the Patient Interview asked patients to detail frequency and amount of time spent in individual counseling, family or couples counseling, group therapy or education (mixed or coed), group therapy or education (women only), medication management, other medical services, and other appointments (e.g., legal, child custody, housing, etc.). Space was also provided to list other treatment-related activities. Specifically, the interview asked for the time spent each day on treatment activities, how many times per week they completed each activity, and if there was transportation time or fees involved. There was also a section in which to detail any wages or benefits given up while part of inpatient treatment.

The Observation Protocol included a 5-level scale, with 1 indicating low and 5 indicating high, on 33 items detailing how institutional versus homey the facility seemed, how much privacy the women had, and gave an overall rating of gender sensitivity. This rating system

required two interviewers at each site develop their own ratings for each variable separately and then come together to reach consensus.

Databases

Information was available for the women interviewed at each program. These databases provided intake information and presenting problems to IIP, as well as the use of substance abuse services pre- and post-treatment. These governmental databases include patients who are recipients of state Medicaid. Further information was attained about interviewed patient's retention in IIP and involvement in criminal justice systems.

Procedure

Interviews

Following piloting at two additional sites in another state, a male and female interviewer visited each program. The male interviewer, who held a Ph.D. in Counseling Psychology, had 24 years of experience as a researcher and clinician in the substance abuse field. The female interviewer, who held Masters of Social Work, was an experienced qualitative researcher. The program director, clinical director, and selected staff were individually interviewed using the forms described above, taking one to two hours each. Women patients (4-10 per site, depending on population available) were interviewed in a group for one to two hours, but each filled out an individual form. Informed consent was obtained prior to each interview and all interview responses were deidentified. Immediately after the site visit, which lasted 1-1 ½ days, the on-site researchers completed an Observation Protocol giving subjective ratings of the facility. Program directors were contacted one year after the site visit about participating in the follow-up interview. The follow-up interview was conducted over the phone and required approximately 1

hour. These were conducted by a male interviewer, who holds a Ph.D. in psychology and has 38 years of experience performing research in clinical settings.

Databases

A variety of databases provided by the state were available. This information was accessed to determine the demographics and presenting characteristics of women interviewed. These databases provided treatment retention data, including the number of days the patient participated in treatment and whether the residential stay was completed. The index treatment episode occurred for each interviewed patient at an intensive inpatient program participating in the study and fell at month 25 in the four-year study period. In addition, information about their participation in substance abuse treatment in the two years following the index IIP treatment episode was available. At the time of the interview, each female participant consented to having her database information accessed.

Rationale for Outcome Variable

Given that detailed information was available about interviewed women's substance abuse treatment utilization following the index treatment, days to treatment re-entry was the chosen outcome variable. Other variables were considered as potential outcomes or measures of treatment effectiveness. For example, participation in continuing care, IIP treatment completion, and a dichotomous variable, 'treatment re-entry or not' were all discussed by the research team. Days to treatment re-entry was chosen because it seemed the most informative of the available options, was a continuous variable, and allowed for examination of the entire two-year follow-up period. Also, as mentioned previously, Barnett and Swindle (1997) and Mannix (2010) both used time to treatment readmission or simply treatment readmission as their outcome variable in

examining the cost-effectiveness of substance abuse treatment. When tallying the days to treatment re-entry, it should be noted that step-down treatment (outpatient services or long-term residential) beginning within a month of a patient's discharge from IIP was considered continuing care and the same treatment episode as the IIP. In other words, any contact with substance abuse treatment services (including outpatient, long-term residential, or intensive inpatient) occurring one month or later after discharge from IIP was considered entry into a new treatment episode.

Gender Sensitive Cost Assessment

The amount and the value of resources related to providing gender-sensitive care were estimated for each of the 13 programs. The services or activities determined to be important to gender sensitivity through Rasch analyses (described in detail previously) were divided into costable and not-costable categories (see Table 2).

Table 2. List of Costable and Not-Costable Gender Sensitive Activities

Costable	Not-Costable
• Percent women who receive relationship counseling • Percent women who receive sex education • Percent women who participate in spiritual/cultural activities • Provides treatment to women with acute psych condition • How many women share a bathroom when they are in IIP? • Percent women who receive trauma counseling • Percent women who receive assertiveness/self-efficacy training • Percent women who receive women's health information	• IIP mission statement addresses behavioral health • Rate IIP facility overall for cleanliness • Rate livable- dining area(s) • Rate livable- lounge and recreational area(s) • Rate livable- women's bathrooms and showers • Rate livable- women's bedrooms • Rate IIP facility- safety and security related to its neighborhood and accessibility • Percent clinical staff with training in women's issues • Percent clinical staff with training in culture issues

Costable	Not Costable
• Percent women who participate in physical activities • Percent women who participate in social/recreation activities • Parenting skills addressed during assessment • Social support addressed during assessment • Grief/loss addressed during assessment • Domestic violence addressed during assessment • Safety addressed during assessment • Sexuality addressed during assessment • Stage of change addressed during assessment • Life skills addressed during assessment • Vocational needs addressed during assessment • Housing needs addressed during assessment • Spirituality/religion/culture addressed during assessment • Women connected to social supports by time of discharge • Number of hours each staff spends on training related to women's recovery per year • Percent women with concrete post-treatment housing plan	• Percent clinical staff with training in trauma/PTSD • The extent to which co-occurring disorders in women is addressed in training • The extent to which cultural issues for women is addressed in training • The extent to which women's sexuality is addressed in training • The extent to which the effect of sex trading on women is addressed in training • The extent to which issues of re-traumatizing women is addressed in training • The extent to which issues of sexual abuse is addressed in training • The extent to which issues of family violence is addressed in training • The extent to which community supports for women is addressed in training • The extent to which the role of parenting/caretaking is addressed in training • Assessment sensitive to re-traumatization • Rating of the safety of the location of the IIP Program • Rate privacy-showers (Are there individual showers with curtains?) • Rate privacy-toilets (Do the toilets have doors?) • Rate privacy-meeting with visitors • Rate separation-residential areas, particularly sleeping and bathing quarters • Rate IIP facility- safety and security for women (i.e. isolated areas) and the level of supervision as it relates to women's safety • Counselor availability

Costable	Not Costable
	• Rate privacy-meeting with counselor or other clinical staff • Percent treatment plans strengths-based • Rate liveable-in its clinical rooms • Other medical services available onsite • Rate liveable- overall • Extent to which unique characteristics of women's substance abuse and mental health issues is addressed in training

Activities were deemed costable if they required identifiable and quantifiable resources from providers, patients, or treatment facilities; for example, relationship counseling requires patient time, counselor time, and use of facility space. Not-costable activities were intangible or had no identifiable resources, such as a program's mission statement mentioning behavioral health.

After organizing activities into categories, the list was examined and the potential for costing each variable was discussed. For instance, 'Other medical services available onsite' was originally listed in the costable column. However, once the data was examined, this dichotomous variable (responses were 'yes' and 'no') did not seem appropriate for costing because there was deemed to be too much unknown, potential variability in the meaning of a 'yes' response. As an example, one program's comments indicated that they provided HIV testing while another noted having an emergency room on-site. Without detailed comments for each program cost estimation could potentially reach errant conclusions. Following discussion of each variable in this manner, the list was then finalized by the entire research team.

Those activities considered costable were valued according to the different resources utilized in providing them. This information was gathered from the interview data in addition to consultation with state officials familiar with the provision of substance abuse services. As an example, provision of sex education was determined by a state official familiar with gender-

sensitive services within substance abuse treatment to require approximately an hour and a half of time within an IIP stay for counselors, patients, and facility costs. Combining these components, the cost of each gender-sensitive activity was then totaled, and the cost of all activities was totaled, to arrive at the cost of gender-sensitive treatment per patient, per IIP stay.

As part of the comprehensive cost assessment, resources are either classified as direct costs, such as clinician face-to-face time with patients, or as indirect service costs, such as time spent preparing for treatment sessions. Indirect costs also include aspects like facility costs. The resources required for the program's facility were calculated using the monthly rent expenditures reported by program directors. When this was not reported during the original interview, which was the case for 9 programs (see Appendix E), the cost reported in the follow-up interview was used. Facility overhead (utility costs, maintenance, cleaning services, etc.) was accounted for by multiplying the facility cost by the utilities-to-rent ratio calculated from program director reports. Peripheral costs from the client family perspective were considered in this assessment as well. These included the cost of childcare to the family while the primary caregiver is in treatment or wages lost by the patient as a result of participation in treatment.

For each gender-sensitive activity or service, patient resources contributed to that service or activity were estimated. Calculating the patient resources invested in each gender-sensitive treatment activity focused on the opportunity costs of participating in treatment. It was assumed that there was an opportunity cost for each of the women participating in IIP treatment (French, 1997), even though few women reported employment at intake. Others conducting cost assessment have similarly used minimum wage rates to value the time of patients who were students, homemakers, or unemployed (Fleming, Mundt, French, Manwell, Stauffacher, & Barry, 2000). Data from the patient interview detailed the wages each woman lost as a result of

participating in treatment, as well as the cost of dependent care paid while they were out of the home. These values were averaged for all women interviewed in each program. Calculated as hourly costs, their time spent in each activity could then be valued. Overall, women reported losing little or no income due to of their participation in treatment and these hourly costs were quite low. As a result, the Washington State minimum wage (\$8.67/hour) was used to calculate the opportunity cost of treatment participation for women patients. Of these two values, reported lost wages and minimum wage, the highest value was used in the total cost of the activity.

In addition, the cost of dependent care needed while a primary caregiver is out of the household was considered in the cost assessment. Participating patients reported the amount they were paying for dependent care while in treatment. These monthly values were averaged for each program and calculated as hourly costs so that the amount required for each activity could be estimated. An example of the patient resources utilized while participating in sex education is given in Figure 1. Patient resources are detailed in Figure 1 below the corresponding heading.

In determining the provider resources contributed to a particular treatment activity, it first had to be determined which providers were involved. This was done by consulting with Washington State's Department of Behavioral Health and Recovery (DBHR) and the team at Westat. In a few cases, the interviewed individual actually indicated in their comments which provider delivered a particular service or activity. Once the provider was pinpointed, each program's staff matrix was consulted to calculate the hourly pay for that individual. When multiple individuals held the same position, as was often the case with counselors, an average pay rate for that program was used in the calculation of provider's direct resources devoted to the activity. Resources required for each activity at the patient-level were calculated by entering values into a Gender-Sensitive Activity x Resource matrix, such as the one seen in Figure 1,

where there is a space for the time invested by the counselor in the individual. This was done, for example, by entering the counselor's cost per hour for a service, and multiplying this value by the total number of hours for individual sessions. As for indirect provider resources, it was difficult to ascertain the administrative overhead that each program devoted to these gender-sensitive activities. With no reports from the programs and no information from DBHR, it was decided to use the administrative overhead derived by Sorenson (2010) for Washington State's Division of Alcohol and Substance Abuse. As part of this study, the administrative overhead rate had been calculated for 3 of the 13 programs in the current cost assessment. Those specific rates were used to calculate the provider's indirect resource cost for the 3 respective programs, and the median value of those 3 rates was used for the remaining 10 programs (.1646). This administrative overhead rate was multiplied by the calculated direct provider cost to arrive at an indirect cost. The example matrix, Figure 1, has provider resources detailed for the provision of sex education.

The program director interview and follow-up interview also provided information about facility and utility costs. Facility costs, in this case, were determined using the program's mortgage cost per square foot of group therapy space utilized, in addition to overhead costs, such as utilities. It should be noted that overhead space, such as counselor office space, was not included in this assessment. When the program's square footage value was not provided by program directors in either the initial or follow-up interview, which was the case for four of the thirteen programs, interpolation was used to estimate a value. Available data was entered into a simple linear regression model of square feet against number of beds for the reporting programs. The regression equation was used to estimate the square footage of these four programs using the number of beds reported, which contributed to the facility cost. As described before, facility

overhead costs were accounted for by multiplying the facility cost by the utilities-to-rent ratio calculated from program director reports. When this ratio was not reported, the median value from other program reports was used instead. If the activity was conducted in a group format, the provider and facility costs were divided by the number of beds reserved for female patients, a

	Percent women who receive sex education	Rationale/reasoning
% women receiving sex education	0.95	Program indicated a response of "5" or 95%
# hours	1.5	Estimated time
Provider resources:		
Counselor pay per hour	27.57	Average of male and female counselor salary= \$37,500/ 2040 hrs = \$18.38/hr. x 1.5 hours=
Counselor administrative time	4.54	Using median value for administrative overhead; \$27.57 x .1646 =
Subtotal	\$4.59	(\$27.57 + 4.54) /7 patients =
Patient resources:		
Patient wages-minimum wage	\$13.01	\$8.67 (minimum wage in WA) x 1.5=
Patient wages-reported	\$0.69	Reported average lost pay for women interviewed (n=6); \$0.46/ hr; \$0.46 x 1.5 =
Dependent care cost	\$0.51	Reported average spending on dependent care (n=5); \$0.34/hour x 1.5=
Subtotal	\$13.52	\$13.01 + \$0.51 =
Facility resources:		
Facility Cost	\$0.42	\$0.28 per hour for group room; 0.28 x 1.5hours =
Other overhead	\$0.22	using this program's reported facility rent to utilities ratio, \$.42 x .53=
Subtotal	\$0.09	\$0.64 / 7 patients=
TOTAL	\$18.20	
Weighted Total	\$17.29	\$18.20 x .95=

Figure 1. Gender-Sensitive Activity x Resource Matrix Completed for Sex Education.

proxy variable for the number of females participating in these gender-sensitive activities. This calculation allowed for examination of service costs at the single patient level. The sample

matrix in Figure 1 shows the facility resources for sex education services in the cells beneath the header ‘Facility resources’.

Provider, patient, and program gender-sensitive resources were totaled, incorporating each of the multiple perspectives already described in detail. Overhead and facility costs were added to patient, provider and program resources to arrive at the cost of providing gender-sensitive services for the entire treatment period. Using the modal length of stay for each particular program (ranging from 21 to 30 days), the total cost was divided by the length of stay to arrive at a cost per day of providing gender-sensitive treatment services.

The total cost of providing gender-sensitive treatment services was assessed in two different ways. First, an “all-inclusive-treatment” total was calculated, assuming that all female patients in a program received all gender-sensitive services. This was calculated simply by adding the total values of all gender-sensitive services. Second, a “treatment as-needed” total was calculated. Many of the items deemed costable from the Rasch analysis (seen in Table 2) were reported in terms of service delivery rates by program directors. For example, they were asked to report the “Percent women who receive relationship counseling” and were given the options: 5, 25, 50, 75 or 95%. Their choice was then multiplied by the calculated total cost of each applicable service. So, supposing relationship counseling cost a program \$3 per patient, and the program director indicated a 50% service delivery rate, the “weighted total” would be \$1.50. Figure 1 shows how this was done to calculate the weighted total for the provision of sex education to 95% of female patients. The weighted totals of all gender-sensitive services in a program were added to reach the “treatment-as-needed” total.

Cost-effectiveness ratios for each interviewed, female patient were constructed after the cost per patient, per treatment stay was calculated. This was done by first dividing each

program's "treatment-as-needed" cost by that program's modal length of stay to arrive at per patient, per day cost of gender-sensitive services. As mentioned previously, the program's modal length of stay was determined using the larger, database sample (N=14,497). The daily cost of gender-sensitive treatment was then multiplied by the number of days each woman participated in IIP treatment to calculate costs at the individual level. To calculate the cost-effectiveness ratio the outcome variable for each patient, number of days until treatment re-entry, was divided by that patient's IIP treatment cost. The result is a ratio that conveys the number of treatment-free days per dollar spent on gender-sensitive services.

Data Analysis

Descriptive statistical measures depicted the demographics of patients involved in each program, as well as the number of patient days in treatment, retention rates and treatment re-entry after index treatment. Program descriptors included the level of gender sensitivity of each program, as determined by Tang et al. (2012). Overall costs for individuals, specific procedures and programs were tabulated in order to determine whether gender-sensitive treatment is more costly.

The program cost of gender-sensitive services was depicted using descriptive means, graphical representations, and through a Kruskal-Wallis one-way analysis of variance. Spearman rho correlations were used to examine the relationship between gender sensitivity and outcome. The Kruskal-Wallis test also determined if there are, in fact, differences in the cost-effectiveness ratios of women who participated in different levels of GS treatment. We chose this nonparametric test in particular because of the small number of women receiving each level of the gender-sensitive treatment, unequal number of women in the different gender-sensitivity groupings (n 's ranging from 9 to 34 across the five gender-sensitive treatment levels), and, as

will be seen shortly, the non-normal distribution of cost-effectiveness indices across levels of gender sensitivity. Figure 2 shows the slightly right skewed distribution.

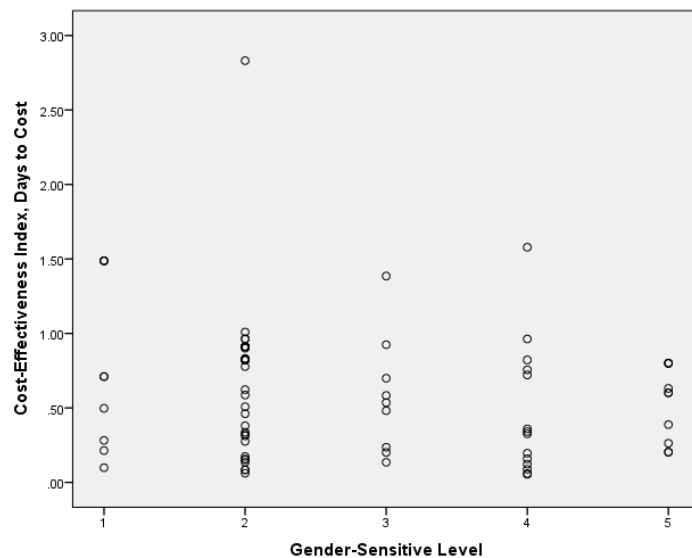


Figure 2. Scatterplot Comparing the Gender Sensitivity Level of Programs and the Cost-Effectiveness Ratios of Individual Women.

Survival analysis compares the duration of time until an event occurs for two more groups (Wright, 2008). In the current study, time to treatment re-entry will be examined for women receiving different levels of gender sensitivity. Several different covariates, including alcohol problem days in the past month, age, and number of treatment episodes in the two years preceding index treatment, were considered. Pearson correlations were performed to examine the relationship of these potential covariates to the outcome variable, and a Kruskal-Wallis ANOVA was used to examine differences between groups. Cox regression analysis was utilized to ensure that covariates were not important to the survival model. Kaplan-Meier survival analyses illuminated whether the amount of time to treatment re-entry, using days to treatment re-entry and cost-effectiveness ratios as outcome variables, was significantly different for women receiving more gender-sensitive treatment (Wright, 2008).

CHAPTER 3

RESULTS

Cost Assessment

As mentioned previously, the marginal cost of gender-sensitive treatment services was assessed at patient and provider levels. This was done by totaling the cost of resources invested by each party into separate gender-sensitive activities. The total cost was calculated in two ways, either by assuming that all services were accessed by all patients (all-inclusive treatment) or by using the reported service delivery rate reported by program directors (treatment as-needed).

Cost of All-Inclusive Treatment

Table 3 highlights the cost of providing all gender-sensitive treatment services to all female patients enrolled in the program, regardless of need, and is considered the total cost of “all-inclusive” treatment. Referring back to Figure 1, the cost of “all-inclusive” treatment for sex education is seen in the row labeled “TOTAL.” As shown in Table 3, patient and provider resources are added to reach the total cost of providing gender-sensitive treatment services. It is evident that patient resources or costs exceed the provider resources in most programs. As detailed previously, a patient’s time was valued using the minimum wage rate and then this value was added to the average reported cost of dependent care to arrive at total patient resources.

The cost findings were compared to each program’s level of gender sensitivity, using the 5-level subscale calculated, by Tang et al. (2012), to reflect gender sensitivity in the treatment services domain where 1 indicates the lowest level of gender sensitivity. This subscale was chosen rather than the overall scale mentioned previously because the majority of the costable interview items (detailed in Appendix A) fell within the treatment services domain. As the

patient and provider costs are proportional to the total costs of gender-sensitive treatment, Figure 3 only highlights the total cost per female patient.

Table 3. Resources Invested in Gender-Sensitive Treatment Services Per Patient Per Month: Assuming All Patients Participated in All Gender-Sensitive Services

GS Level	Program	Patient Resources	Provider Resources	Total
GS I	Program A	\$635.21	\$ 331.42	\$ 966.63
GS II	Program B	\$608.69	\$ 410.89	\$1019.58
	Program C	\$594.92	\$ 362.56	\$ 957.48
	Program D	\$602.14	\$ 352.65	\$ 954.78
	Program E	\$533.42	\$ 459.26	\$ 992.68
	Program F	\$566.87	\$ 341.44	\$ 908.32
GS III	Program G	\$636.11	\$ 433.22	\$1069.33
	Program H	\$523.40	\$ 186.42	\$ 709.81
	Program I	\$581.92	\$ 890.92	\$1472.84
GS IV	Program J	\$629.49	\$ 571.26	\$1200.75
	Program K	\$527.73	\$ 417.18	\$ 944.41
	Program L	\$514.73	\$ 602.97	\$1117.70
GS V	Program M	\$654.93	\$ 243.94	\$ 898.87

A nonparametric correlation was computed to examine the relationship between a program's level of gender sensitivity and the costs of treatment as-intended. A nonparametric test was used here on account of the non-normal distribution of the data and because Spearman's rank order correlation is useful with ordinal data (Siegel, 1956). A Spearman's rank order correlation (Spearman's rho) revealed that this relationship was not significant $r_s(13) = .05, p = .867$. Spearman's rho correlations revealed no significant relationships between level of gender

sensitivity and the patient level costs of treatment as-intended $r_s(13) = .10, p = .753$ or the provider level costs of treatment as-intended $r_s(13) = .16, p = .606$.

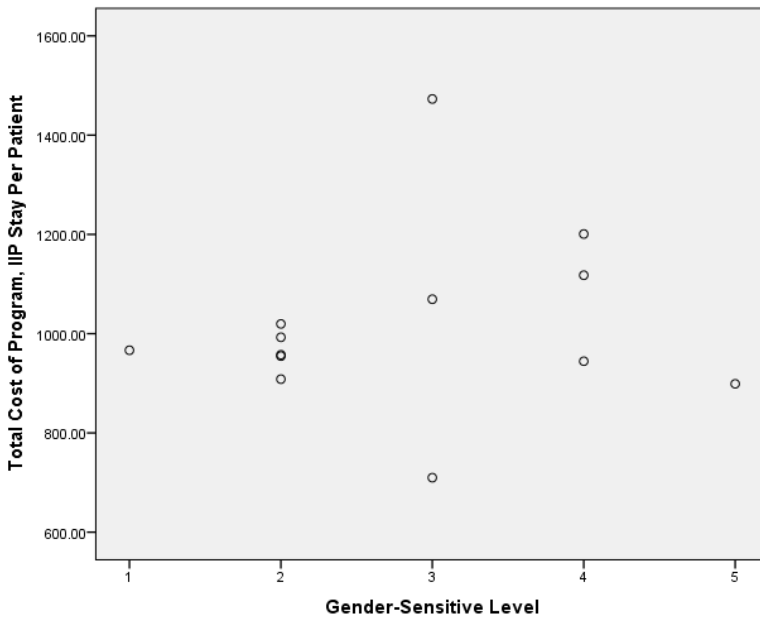


Figure 3. Scatterplot of Program's Level of Gender Sensitivity Compared to the Total Cost of All-Inclusive Treatment.

Cost of Treatment As-Needed

Program directors from each program reported the number or percentage of female patients that received each gender-sensitive service and this percentage was used to calculate the cost of “treatment-as-needed.” Returning to Figure 1, the “treatment-as-needed” cost is shown in the row labeled “Weighted Total.” As shown in Table 4, the weighted cost of all gender-sensitive services is shown in the right column. The patient and provider resources shown in the table were calculated by applying the patient to total ratios in the “all-inclusive treatment” cost to the total value and then using simple arithmetic to calculate the center columns. We see in Table 4 that patient resources, again, were greater than the provider resources required in providing gender-sensitive treatment services.

Table 4. Resources Invested in Gender-Sensitive Treatment Per Patient Per IIP Stay, Total of Treatment Services Needed

GS Level	Program	Patient Resources	Provider Resources	Total
GS I	Program A	\$301.18	\$155.16	\$ 456.34
GS II	Program B	\$494.90	\$329.94	\$ 824.84
	Program C	\$462.18	\$283.27	\$ 745.45
	Program D	\$497.52	\$292.20	\$ 789.72
	Program E	\$362.59	\$308.87	\$ 671.46
	Program F	\$465.89	\$285.55	\$ 751.44
GS III	Program G	\$572.54	\$397.87	\$ 970.41
	Program H	\$392.29	\$137.83	\$ 530.12
	Program I	\$416.98	\$625.46	\$1042.44
GS IV	Program J	\$581.15	\$536.44	\$1117.59
	Program K	\$502.10	\$394.50	\$ 896.60
	Program L	\$433.05	\$574.05	\$1007.10
GS V	Program M	\$617.30	\$228.32	\$ 845.62

Again, as the patient and provider costs are proportional to the total costs of gender-sensitive treatment, Figure 4 only highlights the total as-delivered cost.

The Spearman's rho correlation between the programs' level of gender sensitivity and the cost of treatment as-needed revealed that higher gender sensitivity was associated with greater cost, $r_s(13) = .70, p = .007$ (two-tailed). Likewise, a significant correlation revealed that delivery of more gender sensitive treatment was associated with higher patient, but not higher provider, costs, $r_s(13) = .59, p = .033$ and $r_s(13) = .39, p = .189$, respectively.

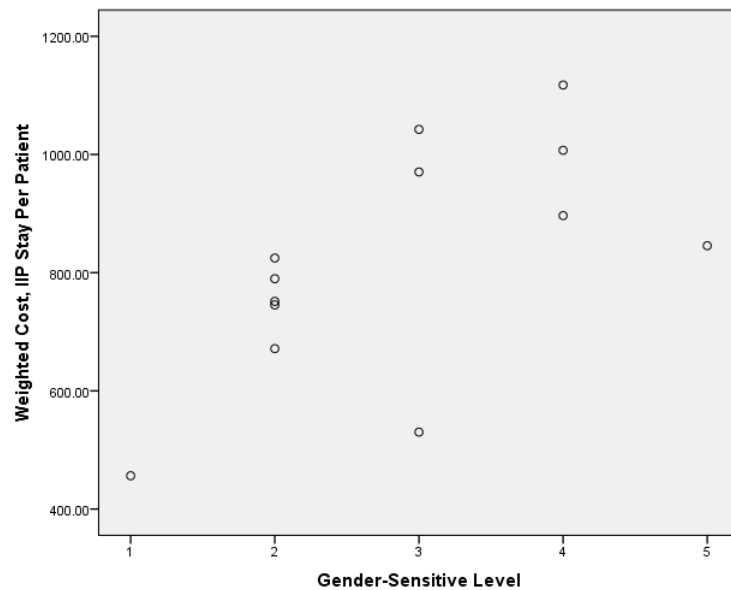


Figure 4. Scatterplot of program's level of gender sensitivity compared to cost of treatment as-needed.

The cost of treatment as-delivered per patient, per month was divided by the modal length of days for each program (calculated using the larger, database sample, not exclusively those interviewed women), arriving at the cost per patient, per day. These modal values are displayed in Table 5.

Table 5. Modal Length of Stay for Each Intensive Inpatient Program

Program	Mode (number of days inpatient)
Program A	30
Program B	28
Program C	30
Program D	28
Program E	21
Program F	30
Program G	30
Program H	28
Program I	21

Program	Mode (number of days inpatient)
Program J	29
Program K	21
Program L	21
Program M	21

The cost of gender-sensitive services per day was then multiplied by the number of days each female patient actually spent in IIP treatment to produce a specific cost of gender-sensitive treatment for each interviewed female patient. The mean and median costs per patient, per IIP stay are seen below in Table 6 by program and overall GS level.

Table 6. Mean and Median Values for Cost of Gender-Sensitive Treatment As-Needed Per Patient, by Program

GS Level	Program	(n)	GS Treatment Cost (per patient, per day)	Median (per patient, per IIP stay)	Mean
GS I	Program A	9	\$15.21	\$ 471.51	\$ 449.54
GS II	Program B	6	\$29.46	\$ 854.34	\$ 854.34
	Program C	10	\$24.85	\$ 770.35	\$ 775.32
	Program D	9	\$28.20	\$ 846.00	\$ 820.93
	Program E	5	\$31.97	\$ 671.37	\$ 594.64
	Program F	5	\$25.05	\$ 776.55	\$ 811.62
GS III	Program G	4	\$32.35	\$1035.20	\$1051.38
	Program H	3	\$18.93	\$ 492.18	\$ 454.32
	Program I	2	\$49.64	\$1265.82	\$1265.82
GS IV	Program J	6	\$38.54	\$1136.93	\$ 963.50
	Program K	7	\$42.70	\$ 939.40	\$ 860.10
	Program L	0	\$47.96	-----	-----
GS V	Program M	10	\$40.27	\$ 885.94	\$ 998.69

Note. No individual patient data was available for Program L. The female patients at this site declined participation in the interview and to have information about their stay at the IIP or in future substance abuse services accessed.

Table 7 displays the median gender-sensitive services cost values across levels of gender-sensitive treatment. The categories include all interviewed women from all programs in each level of gender-sensitive treatment. Again, these were calculated by multiplying the cost per day of providing gender-sensitive services within a particular program by the number of days each patient participated in IIP treatment.

Table 7. Median Values for Cost of Gender-Sensitive Treatment Services As-Needed Per Patient, by Gender Sensitivity Level

GS Level	(<i>n</i>)	Median
GS I	9	\$ 471.51
GS II	35	\$ 776.55
GS III	9	\$1002.85
GS IV	13	\$ 939.40
GS V	10	\$ 885.94

In addition to the descriptive values given above, Figure 5 displays a comparison of level of gender sensitivity and the cost of index treatment for each interviewed patient. A Spearman's rho correlation was utilized to examine the relationship between each individual female patient's estimated cost and the level of gender-sensitive treatment received in each program. A significant relationship was uncovered $r_s(76) = .65, p < .001$, indicating that patients receiving more gender-sensitive treatment had higher related costs. Because the number of days each female patient spent in the index IIP treatment was multiplied by the program's cost per day, and a correlation was run between the number of days in IIP and level of program gender sensitivity. The Spearman's rho correlation in this case revealed a significant, negative relationship $r_s(76) = -.46, p < .001$.

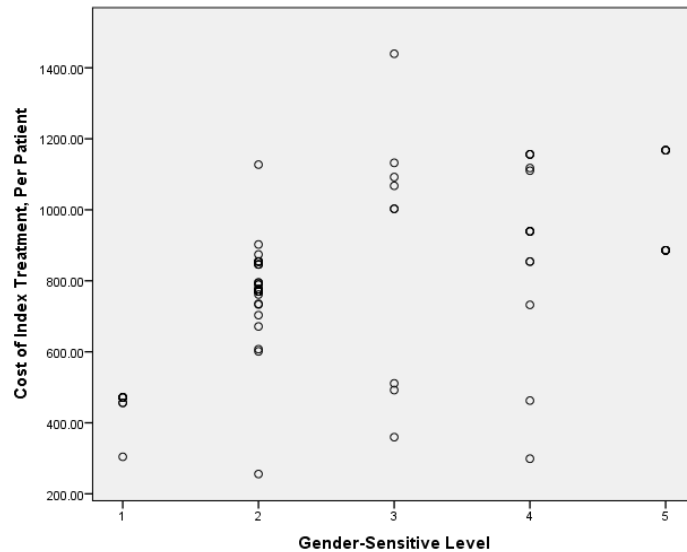


Figure 5. Scatterplot of Level of Gender-Sensitive Treatment Compared to Each Female Patient’s Cost of Treatment Services As-Needed.

A Kruskal-Wallis one-way analysis of variance was conducted to evaluate the differences among five levels of gender-sensitive treatment for “treatment-as-needed” cost. The results indicate a statistically significant difference among the levels of treatment gender-sensitivity, $X^2(4, n = 75) = 35.59, p < .001$. Pairwise comparisons were conducted using Mann-Whitney U tests and indicated that GS Level 1 was significantly less costly than all other levels ($p < .05$). Also, GS Level 2 cost significantly less than GS Level 5 ($p < .05$).

Effectiveness Analysis

To compare the effectiveness of the five levels of gender-sensitive treatment, a survival analysis was utilized with number of days to treatment re-entry as the outcome variable. Table 8 displays the median, mean, and standard deviation of days to treatment re-entry by GS Level, and also gives the percentage of interviewed women who had returned to treatment at the end of the two year follow-up period.

Table 8. Days to Treatment Re-entry and Percentage of Female Patients Who Did Not Re-enter Treatment, by Gender Sensitivity Level

GS Level	(n)	Median (in days)	Mean (in days)	SD	Percentage not re-entering, (%)
GS I	9	335	360.4	275.3	33.3
GS II	35	701	481.2	260.3	50.0
GS III	9	572	467.3	254.6	22.2
GS IV	13	246	359.1	281.3	28.6
GS V	10	631	514.3	223.1	50.0

Before undertaking the survival analysis, several variables were explored as potential covariates. Based on the literature and discussion with the research team, variables that were thought to potentially impact treatment re-entry were: days of alcohol use in the past month (preceding the index treatment), days of drug use in the past month, number of mental health problem days in the past month, number of treatment episodes in the past two years, number of substance abuse treatment days in the past two years, index IIP treatment completion or not, and age. None of these potential covariates was found to be significantly related to the outcome variable, days to treatment re-entry, after Pearson correlations were performed. The correlation coefficients from these exploratory analyses are shown in Table 9.

Next, a Kruskal-Wallis ANOVA was completed to look for differences in covariates among the levels of gender-sensitive treatment. Results indicated a significant difference among the treatment levels in age, $X^2(4, n = 75) = 11.87, p < .05$, and reported alcohol problem days before entering IIP, $X^2(4, n = 75) = 10.32, p < .05$. Specifically, women in GS level 3 were revealed to be significantly older than those participating in GS level 5 ($p < .01$). Women participating in GS level 1 reported more alcohol problem days before entering IIP than those in

GS levels 2 and 5 ($p < .05$). Additionally, women in GS level 3 reported significantly more alcohol problem days at baseline than those in GS levels 2, 4, and 5 ($p < .05$).

Table 9. Pearson Correlation Coefficients, Potential Covariates with the Outcome Variable ‘Days to Any Treatment’

Variable Name	<i>r</i>	<i>p-value</i>
Alcohol problem days in last month	-.02	.847
Drug problems days in last month	-.04	.736
Mental health problem days in last month	-.03	.828
Number of previous treatment episodes	-.07	.543
Number of days of previous treatment	.07	.570
Treatment completion	.14	.223
Age	.07	.548

Finally, a Cox regression or proportional hazards analysis was performed. This type of survival analysis allows for covariates to be entered and accounted for. In this model, the covariates used were age and number of reported alcohol problem days at baseline since both were identified as significantly different among treatment levels. The level of program gender sensitivity was used as a stratifying variable. The Cox regression, where days to treatment re-entry was the outcome variable, revealed neither age ($p = .494$) or number of reported alcohol problem days ($p = .794$) to be significant covariates in the model.

Once it was apparent that a simplified model would likely be sufficient, a Kaplan-Meier survival analysis was conducted using number of days until treatment re-entry as the outcome variable. Figure 6 below shows the survival curves for interviewed women participating in gender-sensitive treatment, levels 1 through 5.

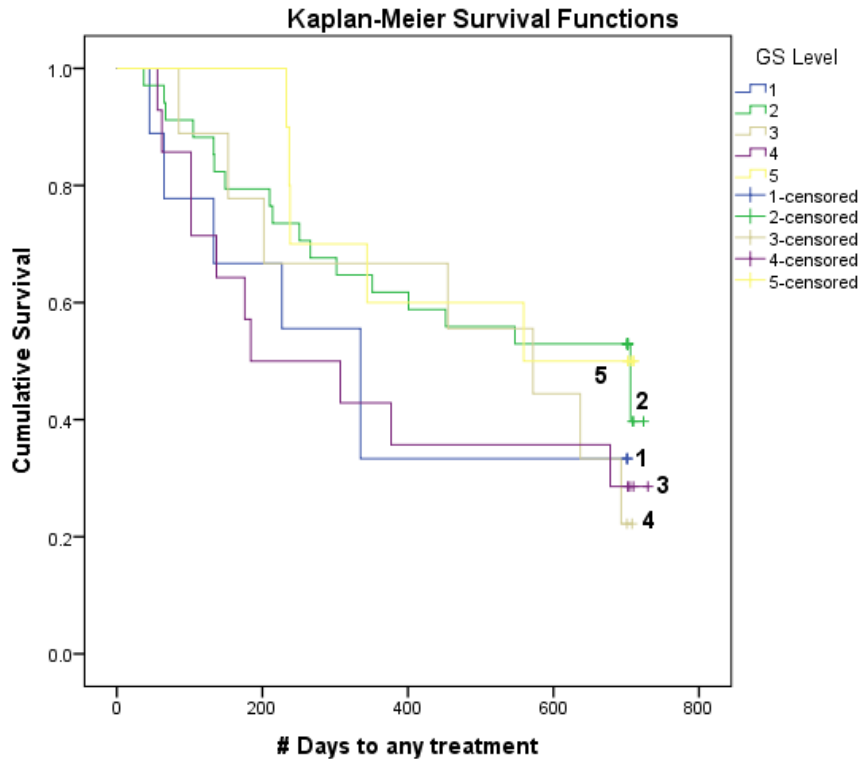


Figure 6. Kaplan-Meier Survival Curves Representing Each Level of Gender-Sensitive Treatment, with Days to Treatment Re-Entry as the Outcome.

It is apparent that the survival curves are closely grouped. Censored cases are indicated by a hash mark on the survival curve. The data, in this case, are right-censored which indicates that some individuals did not re-enter treatment during the two-year follow up period (Jones, Rice, Bago D’Uva, & Balia, 2007). Results revealed, after a Mantel-Cox Log Rank comparison analysis, no significant differences between the groups $\chi^2(4, n=75) = 4.20, p = .380$.

Cost-Effectiveness Analysis

To examine potential cost-effectiveness differences among these 13 programs with varying levels of gender sensitivity, cost-effectiveness ratios were first calculated by dividing the number of days to treatment re-entry by the cost of gender-sensitive services received in each female’s IIP stay (daily cost of the program multiplied by each individual’s length of stay).

Figure 7 shows the scatter plot comparing the cost of providing gender-sensitive services in IIP with the outcome variable, days to treatment re-entry.

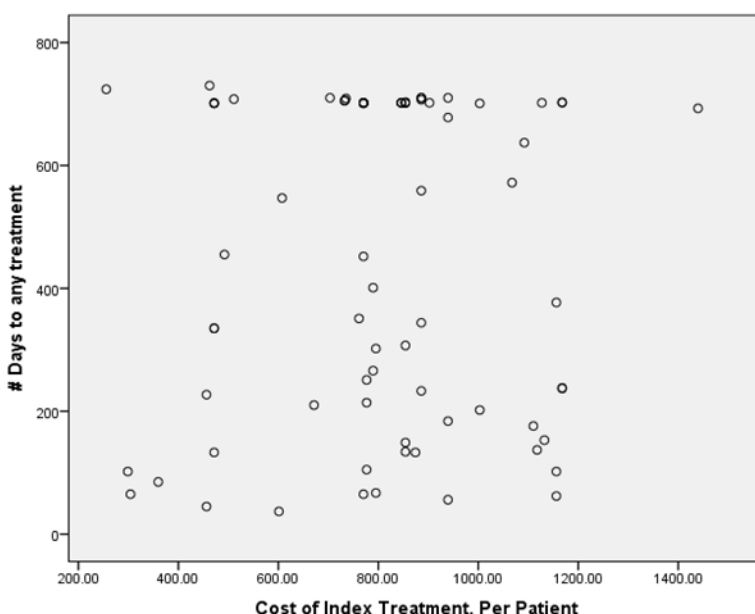


Figure 7. Scatterplot Comparing the Cost of Gender-Sensitive Services During the Index Treatment to the Number of Days until Treatment Re-Entry.

Cost-effectiveness ratios could also be constructed by dividing the cost of each female's IIP stay by the number of days to treatment re-entry. We chose the method used in previous analyses because it can be more easily thought of as units of time, "treatment-free days per dollar." Ultimately, these ratios were entered as the outcome variable of a survival analysis, where the goal is to examine time until an event occurs. The calculated cost-effectiveness ratios are summarized in Table 10 by program and number of interviewed female patients, median, mean, and standard deviation are detailed. When appraising cost-effectiveness ratios, a higher value indicates a better outcome (e.g. more treatment-free days following IIP per dollar spent on gender-sensitive services).

Table 10. Mean and Median Values of Cost-Effectiveness Ratios by Program, Treatment- Free Days to Dollar

GS Level	Program	(n)	Median (per patient, per month)	Mean	SD
GS I	Program A	9	0.77	0.71	0.57
GS II	Program B	6	0.59	0.53	0.33
	Program C	10	0.91	0.66	0.35
	Program D	9	0.78	0.63	0.28
	Program E	5	0.96	1.20	0.95
	Program F	5	0.28	0.28	0.22
GS III	Program G	4	0.37	0.39	0.27
	Program H	3	0.92	0.85	0.58
	Program I	2	0.53	0.53	0.07
GS IV	Program J	5	0.22	0.52	0.62
	Program K	7	0.34	0.44	0.32
	Program L	0	-----	-----	-----
GS V	Program M	10	0.60	0.53	0.26

Note. No individual patient data was available for Program L. The female patients at this site declined participation in the interview and to have information about their stay at the IIP or in future substance abuse services accessed.

A Kruskal-Wallis ANOVA was used to compare median cost-effectiveness ratios across levels of gender-sensitive treatment. Results indicated no significant differences in cost-effectiveness across all five treatment levels, $X^2(4, n = 75) = 3.71, p = .447$. In order to further test for significant differences in the time-to-dollar ratios in each level of gender sensitivity, a second Kaplan-Meier survival analysis was performed. Again, the outcome variable was the cost-effectiveness ratio defined previously and level of program gender sensitivity was entered as the strata variable. Results revealed, after a Mantel-Cox Log Rank comparison analysis, no significant differences between the groups $\chi^2(4, n = 75) = 3.570, p = .467$. Figure 8 displays survival curves derived from this analysis and, again, censored cases are indicated by a hash

mark on the survival curve. Findings of the Kaplan-Meier survival analysis and the Kruskal-Wallis ANOVA revealed that there are no differences in cost-effectiveness across levels of gender-sensitive treatment.

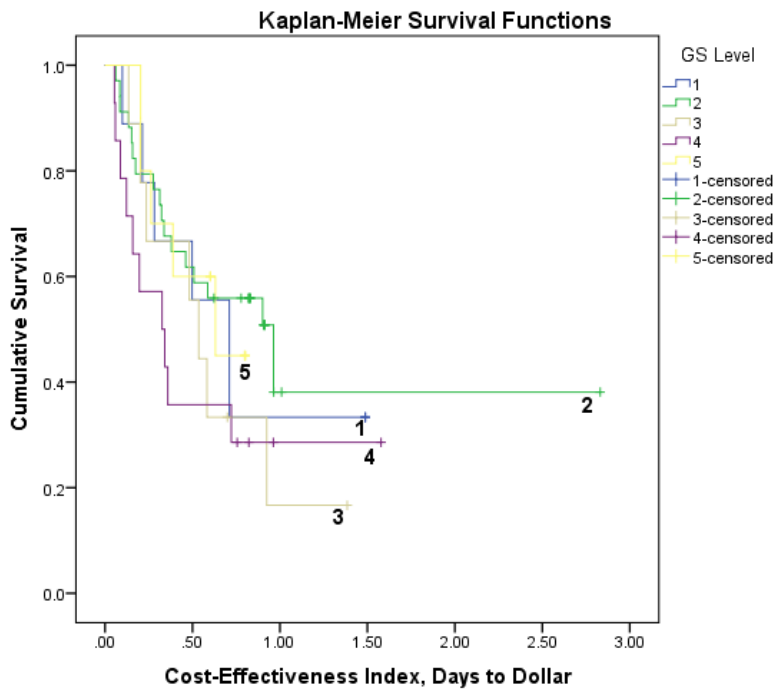


Figure 8. Kaplan-Meier Survival Curves Representing Each Level of Gender-Sensitive Treatment, with Cost-Effectiveness ratios as the Outcome Variable.

CHAPTER 4

DISCUSSION

There have been numerous previous efforts on the part of researchers and clinicians to improve the effectiveness of substance abuse treatment. However, as mentioned before, there continues to be high rates of treatment re-entry following inpatient treatment (Ashley, Marsden, & Brady, 2003). One means of potentially increasing effectiveness is to address the needs of particular populations. In the current study, women's needs are specifically considered. There are multiple ways to define "gender-sensitive treatment," and here it has been defined as the provision of women-focused services within traditional, mixed-gender substance abuse treatment. As described by Greenfield et al. (2007) and Grella et al. (1999), and supported by Tang et al. (2012) through Rasch analysis, these services include: relationship counseling, self-efficacy training, trauma counseling, assessment of parenting skills, etc. The primary aim of the present study was to determine whether inclusion of these gender-sensitive procedures in mixed-gender intensive inpatient treatment increases the costs and the cost-effectiveness of substance abuse treatment for women. Specifically: 1) Does GS treatment cost more? 2) Is gender-sensitive treatment more effective? and 3) Is gender-sensitive treatment more cost effective?

In determining whether gender-sensitive treatment costs more, descriptive and graphical analyses seem to suggest that higher levels of gender-sensitive treatment services are more costly. While the "all inclusive" cost of providing gender-sensitive services was not significantly correlated with level of gender-sensitivity, the "treatment as-needed" cost was significantly related. Specifically, the marginal or unique cost of providing gender-sensitive treatment services increased as level of program gender-sensitivity increased. This was to be expected because, as explained previously, the program director ratings that were entered into Rasch analysis to

determine gender sensitivity were used again to weight the “treatment as-needed” cost.

Therefore, programs that delivered services to a higher percentage of patients were rated as more gender-sensitive, and a higher amount of the services’ total cost was retained in the weighted cost.

Either way the total cost of providing gender-sensitive treatment was estimated, the patient costs exceeded provider costs. One reason this might occur is that many of the gender-sensitive services contributing to the cost assessment were performed in a group setting (i.e. relationship counseling). As such, the provider resources were then divided among a certain number of female participants. Patient resources like lost wages or money spent on dependent care, on the other hand, apply only to that particular individual. When totaled at the per-patient level, it seems intuitive that patient contributions at an individual level may exceed the provider resources expended.

To further explore the relationship between gender sensitivity and cost, Figure 2 shows that a positive, linear relationship can be inferred from the plot comparing level of treatment gender sensitivity and monthly, per patient marginal cost of gender-sensitive treatment services. The Kruskal-Wallis test pointed to statistically significant differences in “treatment as-needed” cost among levels of gender sensitivity. Post-hoc analyses determined that all programs were significantly more costly than Program A and GS Level 1. Again, these per patient, total values were calculated by multiplying the daily cost of gender-sensitive treatment by the number of days each female patient participated in IIP.

While not significant, Table 6 shows a somewhat different trend in the relationship between cost and the provision of gender-sensitive services. Here, GS Level 3 has the highest per-patient median cost for gender-sensitive services received in IIP, while Levels 4 and 5 appear

to demonstrate a tapering effect. One hypothesis for this trend is that the modal length of stay for programs in GS levels 4 and 5 was lower (around 21 days, see Table 5). This was supported by the Spearman's rho correlation showing a significant, negative relationship between days in IIP treatment and GS level. It is possible that these programs may balance the higher cost of gender-sensitive services by prescribing shorter patient stays. Regardless, it is intuitive that the provision of more services or specialized services will require more resources. In addition, each of the 13 programs examined had large numbers of male patients in addition to female patients. To provide a separate living space and to provide single-gender group services to the smaller, female population is more taxing on staff and program resources. There is a paucity of literature as yet that explores the cost of providing gender-sensitive treatment in a mixed-gender setting. These findings suggest that adding or providing certain services within traditional substance abuse treatment requires extra staff time, monetary contributions, and extra physical space. However, it should also be noted that the measure of gender sensitivity was created from interview data and it is not known whether adding or providing these gender-sensitive services was a conscious decision.

A second question this research attempted to answer is whether gender-sensitive treatment is more effective. Results of the Kaplan-Meier analysis suggest that there are no significant differences in days to treatment re-entry among the five levels of gender-sensitive treatment. Although this was not the expected finding, it is aligned with the French et al. (2002) finding that women referred to gender-sensitive programs have greater substance abuse issues and residual problems. The suggestion that women referred to more gender-sensitive programs are harder to treat given there are more problems to address could at least partially explain the finding of no difference in effectiveness between groups. However, this is only a hypothesis

given that the data in this study does not include information about referral decisions. While some baseline variables were explored in this sample, there are many other patient characteristics that were not measured or accounted for.

Thirdly, this study asked whether gender-sensitive treatment is more cost-effective for women participating in higher levels of gender-sensitive treatment. A Kruskal-Wallis ANOVA found no significant differences in median cost-effectiveness among the five levels of gender sensitivity. Likewise, Kaplan-Meier survival analyses suggest that there are no significant differences between levels of gender-sensitive treatment in cost-effectiveness. This finding opposed initial hypotheses, but was not an unexpected result since high levels of gender-sensitive treatment had already been demonstrated to be more costly and equally as effective as lower levels of gender-sensitive treatment.

The aforementioned findings bring about concerns regarding the use of days to treatment re-entry as the primary effectiveness variable. Although it has been examined by others as an outcome of interest in substance abuse research, there are questions about its meaning (Barnett & Swindle, 1997). It could be thought of as an indicator of relapse, but not all patients returning to treatment have necessarily re-initiated drug use – it is possible some patients are simply seeking preventative help. Another possibility is that some relapsing clients may have not sought treatment and are counted in the ‘censored’ group alongside successfully recovering women. In this project, the goal was to find differences in cost-effectiveness, with longer delays to treatment re-entry assumed to be positive. It is possible that returning to treatment could be an indicator of self-efficacy and positive help-seeking behavior, which are both aims of gender-sensitive treatment. Along the same lines, a delay in treatment services could mean that patients are not receiving treatment when needed and are returning to treatment in a more severe condition,

which would presumably be a negative outcome. It should also be noted that “treatment re-entry” included returning to outpatient as well as higher levels of residential care, and following up in outpatient treatment suggests a lower level of symptomology. Again, the goal of this study was to simply look for differences in cost-effectiveness using the effectiveness variable available, but it brought about interesting questions about the meaning of treatment re-entry.

Besides concerns surrounding the chosen effectiveness variable, there are several other potential limitations of this study. One issue is the sample size and accompanying power issues associated with the statistical tests undertaken. With only thirteen programs interviewed, GS levels 1 and 5 only represented one program each. This was an obvious confound. Although each program director was asked, “What percentage of female patients receive...?” a particular service, it was suggested by one interviewer that program directors could have been reporting these rates based on their impressions of the population’s need for particular GS services, rather than the services’ actual availability. This would create a problem in the validity of cost measurements. Furthermore, a program’s level of gender sensitivity was dependent on interview data provided by program staff. Since there were no validity or reliability checks in place to examine the staff responses, it is possible that impression management or human error produced inaccuracies in the data.

Additionally, only 76 women were interviewed and they were distributed unevenly throughout the programs and GS levels. Concerns about the representativeness of the sample are also present. Women were not randomly assigned to programs after intake, so self-selection or other factors may have contributed to IIP assignment. Also, demographically speaking, the population is more diverse than might be expected when making comparisons with census data (U.S. Census Bureau, 2010). For example, as all programs were located in Washington state,

the proportion of Native Americans in the sample is disproportionate to the general population of the United States. As mentioned previously, women were selected for interview only if they had been in IIP treatment for at least a week. This suggests that the perspective of women who were discharged shortly after treatment entry was likely not captured. Interviewing women after completing IIP treatment may have provided a different perspective as well, presuming that they had been exposed to all gender-sensitive services available by the time of discharge. Specifically, there is concern that women interviewed after only a week of participation had not yet been exposed to the full range of gender sensitive services offered by a program.

Another potential issue with this study was that the interview items were not originally intended for use in a cost-inclusive evaluation (Yates, 2009). State substance abuse treatment officials and the team at Westat provided great help in providing time estimates and further information about the specifics of providing certain services. However, it would have been most valid to receive this information from each program itself and less estimation would have been necessary. In a similar vein, the data were not always complete (see Appendix E for further details). This required estimation of certain variables and interpolation in the case of square footage. It should also be noted that no items from the Observation Protocol were classified as costable (see Table 2) and included in the cost assessment. These variables were often too abstract or intangible to assign a monetary value to (i.e. IIP mission statement mentions behavioral health). This was the only measure completed by researchers and provided objective ratings of gender sensitivity as opposed to relying on staff reports.

The study of gender-sensitive treatment and its associated cost is still a growing area of scientific inquiry. Future research in this area should strive to increase the overall number of programs and patients interviewed. This could eradicate some of the problems of the current

study, including having only one program in GS levels 1 and 5. Clearly, with the work completed by Westat, it is more evident now which services/procedures are important in the provision of gender-sensitive treatment (Tang et al., 2012). As such, further research may also aid in the construction of new measures or interviews aimed towards gathering cost information on these specific services.

Overall, we can draw from this research that the provision of gender-sensitive treatment services does require additional resources. However, it seems that this cost may be somewhat negligible. For instance, the median cost-effectiveness ratios suggest that each treatment-free day after the IIP stay required between \$1.25 and \$2.99. Continued study of this treatment modality could provide clarification regarding the effectiveness of gender-sensitive treatment and whether the seemingly minimal costs of providing specialized care to women is worth it.

APPENDIX A

GENERAL COST ASSESSMENT

As detailed previously, items from the program director, clinical director, and counselor interviews were determined to be related to gender-sensitive treatment through Rasch analysis. For the purposes of cost assessment, these items were divided into categories as ‘costable’ and ‘not costable’. The items and their placement are indicated below.

Costable

Percent women who receive relationship counseling
Percent women who receive sex education
Percent women who participate in spiritual/cultural activities
Provides treatment to women with acute psych condition
How many women share a bathroom when they are in IIP?
Percent women who receive trauma counseling
Percent women who receive assertiveness/self-efficacy training
Percent women who receive women’s health information
Percent women who participate in physical activities
Percent women who participate in social/recreation activities
Parenting skills addressed during assessment
Social support addressed during assessment
Grief/loss addressed during assessment
Domestic violence addressed during assessment
Safety addressed during assessment
Sexuality addressed during assessment
Stage of change addressed during assessment
Life skills addressed during assessment
Vocational needs addressed during assessment
Housing needs addressed during assessment
Spirituality/religion/culture addressed during assessment
Women connected to social supports by time of discharge
Number of hours each staff spends on training related to women’s recovery per year
Percent women with concrete post-treatment housing plan

Not Costable

IIP mission statement addresses behavioral health
Rate IIP facility overall for cleanliness
Rate livable- dining area(s)
Rate livable- lounge and recreational area(s)
Rate livable- women’s bathrooms and showers
Rate livable- women’s bedrooms
Rate IIP facility- safety and security related to its neighborhood and accessibility

Not Costable (continued)

Percent clinical staff with training in women's issues
Percent clinical staff with training in culture issues
Percent clinical staff with training in trauma/PTSD
The extent to which co-occurring disorders in women is addressed in training
The extent to which cultural issues for women is addressed in training
The extent to which women's sexuality is addressed in training
The extent to which the effect of sex trading on women is addressed in training
The extent to which issues of re-traumatizing women is addressed in training
The extent to which issues of sexual abuse is addressed in training
The extent to which issues of family violence is addressed in training
The extent to which community supports for women is addressed in training
The extent to which the role of parenting/caretaking is addressed in training
Assessment sensitive to re-traumatization
Rating of the safety of the location of the IIP Program
Rate privacy-showers (Are there individual showers with curtains?)
Rate privacy-toilets (Do the toilets have doors?)
Rate privacy-meeting with visitors
Rate separation-residential areas, particularly sleeping and bathing quarters
Rate IIP facility- safety and security for women (i.e. isolated areas) and the level of supervision as it relates to women's safety
Counselor availability
Rate privacy-meeting with counselor or other clinical staff
Percent treatment plans strengths-based
Rate liveable-in its clinical rooms
Other medical services available onsite

Those gender-sensitive activities listed as costable above were broken down into resources involved in delivery so that each resource utilized could be accounted for in the overall cost of providing the activity. One group of activities fell under the category of treatment procedures, including relationship counseling, sex education, cultural/spiritual activities, other medical services, trauma counseling, trauma counseling, self-efficacy/assertiveness training, physical activities, and social/recreation activities. The following grid is an example of how the cost to provide sex education was derived.

	6.10 - Percent women who receive sex education	Rationale/Reasoning
% women receiving sex education	0.95	Program indicated a response of "5"
# hours	1.5	Estimated time, per Sue Green and other programs reports of one time class/lecture
Counselor pay per hour(direct)	\$29.30	Assuming that counselor is involved- this program did not indicate bringing in outside resources, $1.5 \times 19.53 =$
Counselor resources(indirect)	\$4.82	Median value of administrative overhead costs, as reported by Sorenson, $29.30 \times .1646 =$
SUBTOTAL	\$3.79	$29.30 + 4.82 = 34.12/9$ patients or beds =
Patient resources (indirect)	\$13.01	\$8.67 (minimum wage in WA) $\times 1.5 =$
	\$2.51	Reported average lost pay for women interviewed (n=4); $0+0+0+2000 = 2000/4 = \$500/\text{month}$; $\$500/300$ hrs. (based on Sue's info that women participate in treatment 10 hrs./day, for approximately 30 days) = $\$1.67/\text{hr}$; $\$1.67 \times 1.5 =$
	\$0.00	Reported average spending on dependent care (n=4); $0+0+0+0 = -0$
Facility Cost	\$0.29	Size of group room, $12 \times 20 = 240$ sq. ft.; facility cost $\$5833/10,000$ sq. ft = $\$0.58$ per sq. ft. monthly; $(.58/504 \text{ useable hrs. in a month}) \times 240$ sq. ft. = $\$0.19$ per hour for room; $0.19 \times 1.5 \text{ hours} =$
Other overhead	\$0.16	using the avearge of reported facility rent to utilities ratio, $\$0.29 \times .481 =$
SUBTOTAL	\$0.05	$(.29 + .16)/9$ patients or beds=
TOTAL	\$16.85	
Weighted TOTAL	\$16.00	$\$16.85 \times 0.95 =$

Several questions were phrased as, “Percent women receiving...” a particular service.

Interviewees answered on a Likert-scale, from 0 to 95%. In the cost assessment, this was

accounted for by multiplying the total cost of the service by the percentage endorsed so that the cost reflects the appropriate ratio. This is labeled the “weighted total” above.

A second group of activities could be classified as assessment procedures. The grid below details how the cost of assessing parenting skills was developed. The format for these questions was answered on a 1 to 5 Likert scale, with responses ranging from “Not at all” to “Very much”. The percentages used previously, from 0 to 95%, were applied to the responses in this scale to calculate the adjusted total. So, the response of “3” below corresponds to 50%.

	4.10 - Parenting skills addressed during assessment	
Parenting addressed?	3	CD answered midway between "not at all" and "very much" on a scale from 1-5
# Minutes	2	number of minutes likely spent, as estimated by research team
Counselor pay per hour(direct)	\$0.66	19.53 per hour/60 minutes = \$0.33 x 2 minutes =
Counselor resources(indirect)	\$0.05	Median value of administrative overhead costs, as reported by Sorenson, 0.66 x .1646=
SUBTOTAL	\$0.71	
Patient resources (indirect)	\$0.29	\$8.67 wage/60 minutes = 0.14 per minute x 2 minutes =
Facility Cost	\$0	(\$0.58 per square foot monthly/ 504 usable hours in a month)/ 60 for minute rate= .000018 x 75 sq. ft. (average office space in US) = .001 x 2 minutes =
Other overhead	\$0	using the avearge of reported facility rent to utilities ratio, \$0.29 x .481=
TOTAL	\$1.00	
Weighted TOTAL	\$0.50	Response of '3' corresponds to 50% on the likert scale previously used, 1.00 x .5=

Finally, all other activities fell under program characteristics. These included whether the program provided treatment to patients with an acute psychiatric condition and how many women shared a bathroom.

The cost of most activities was calculated in the way just described. However, there were a few exceptions. For instance, cultural/spiritual activities often occurred off-site.

Transportation costs were estimated and included driver time and fuel costs. First, the nearest place of worship was located using a mapping search engine. This distance was multiplied by 8 to indicate weekly visits to and from the IIP, and then the distance was multiplied by Washington state's mileage reimbursement rate for 2008. Estimated driving and waiting time was multiplied by the driver's reported pay rate per program, and patient resources were estimated as usual. No facility costs were included as the service occurs off-site. The item regarding patient's access to physical activity was assumed to require extra materials, estimated by the research team as a weight set, yoga mat, and exercise ball. These items were researched and the minimum cost of materials was included in the physical activity cost. All other elements of this activity were calculated as usual.

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APPENDIX B

PROVIDER RESOURCES

In determining the provider resources contributed to a particular treatment activity, it first had to be determined which providers were involved. This was done by consulting with Washington State's Department of Behavioral Health and Recovery (DBHR) and the team at Westat. In a few cases, the interviewed individual actually indicated in their comments which provider delivered a particular service or activity. Once the provider was pinpointed, each program's staff matrix was consulted to calculate the hourly pay for that individual. When multiple individuals held the same position, as was often the case with counselors, an average pay rate was used in the calculation of provider's direct resources devoted to the activity. As for indirect resources, it was difficult to ascertain the administrative overhead that each program devoted to these gender-sensitive activities. With no reports from the programs and no information from DBHR, it was decided to use the administrative overhead derived by James Sorenson, Ph.D. for Washington state's Division of Alcohol and Substance Abuse. As part of this study, the administrative overhead rate had been calculated for 3 of the 13 programs in the current cost assessment. Those specific rates were used to calculate the provider's indirect resource cost for the 3 respective programs, and the median value of those 3 rates was used for the remaining 10 programs (.1646). The example chart below highlights the provider resources involved in providing women with a post-treatment housing plan.

	9.1 - Percent women with concrete post-tx housing plan	
# Minutes	60	most likely amount of time allocated to this service, per DBHR and team estimate
Counselor pay per hour(direct)	\$19.53	19.53 per hour x 1 hour=
Counselor resources(indirect)	\$3.21	Median value of administrative overhead costs, as reported by Sorenson, 19.53 x .1646=
SUBTOTAL	\$22.74	

APPENDIX C

PATIENT RESOURCES

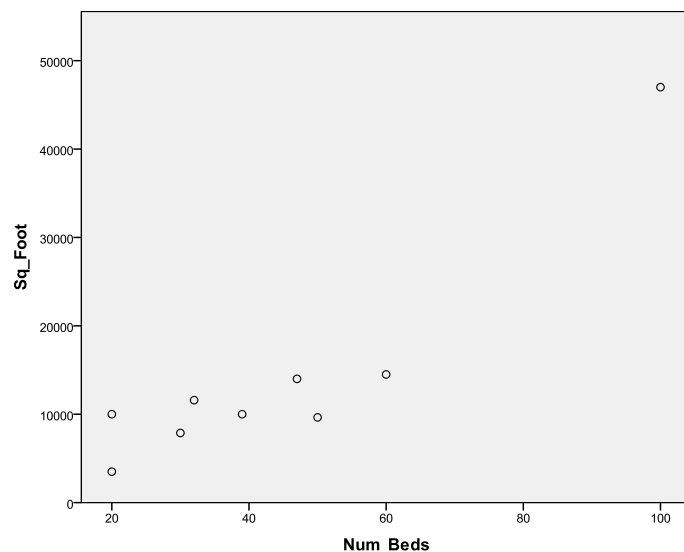
Calculating the patient resources invested in each gender-sensitive treatment activity focused on the opportunity costs of participating in treatment. Data from the patient interview detailed the wages each woman lost as a result of participating in treatment, as well as the cost of dependent care paid while they were out of the home. These values were averaged for all women interviewed in each program. Calculated as hourly costs, their time spent in each activity could then be valued. Often women reported losing little or no income as a result of their participation in treatment and these hourly costs were quite low. In these situations, the Washington State minimum wage (\$8.67/hour) was used to calculate the opportunity cost of treatment participation for these women as well. Of these two values, reported lost wages and minimum wage, the highest value was used in the total cost of the activity. An example of this is seen on the following page in the calculation of providing women with a post-treatment housing plan.

	9.1 - Percent women with concrete post-tx housing plan	
# Minutes	60	most likely amount of time allocated to this service, per DBHR and team estimate
Patient resources (indirect)	\$8.67	\$8.67 wage x 1 hour=
"	\$1.60	Reported average lost pay for women interviewed (n=4); $0+1000+0+926= 1926/4 = \$481.5/\text{month}$; $\$500/ 300 \text{ hrs. (based on DBHR info that women participate in treatment 10 hrs./day, for approximately 30 days)} = \$1.60/ \text{hr}$; $\$1.60 \times 1 =$
Patient resources	\$0.02	Reported average spending on dependent care (n=6); $0+0+0+0+0+40= \$6.67/ 300 \text{ hrs (based on DBHR estimate of time in treatment)} = .022 \times 1 =$

APPENDIX D

FACILITY AND OVERHEAD RESOURCES

Facility and overhead costs were also calculated as part of deriving the cost of each gender-sensitive treatment activity. Each program reported monthly facility costs and most gave the square footage of the treatment facility. However, several programs did not provide square footage for their facility. In order to interpolate these values, a simple linear regression was performed with number of beds in each program as the independent variable and square footage as the dependent variable. The scatter plot of these variables is seen below.



Despite the obvious outlier, the plot shows a linear relationship. The regression equation allowed for interpolation of square footage where missing and is provided here:

$$\text{Square Footage} = 466.7 (\# \text{ Beds}) - 6405.6$$

From these facility cost and square footage, the cost per square foot was determined. The cost per square foot monthly was then converted to an hourly rate so that this cost could be applied to the space utilized in each activity. In order to do this, an estimate of the space used had to be developed. For activities performed in a group, the estimate developed with the team

at Westat was that a 12 x 20 space was the minimal space needed. For individual patient activities, the average size of an office in the United States was researched and determined to be 75 sq. ft. Using the amount of time the activity required, the cost per hour of each square foot, and the number of square feet used the facility cost per activity was calculated.

Other overhead related to facility costs was calculated here to account for utilities and accompanying costs like laundry, security and cleaning costs. Only two of the thirteen programs reported these costs explicitly in addition to the monthly rental cost. The facility cost to utility cost ratio was calculated for these two programs and came to .429 and .533. These ratios were used to calculate ‘Other overhead’ for these two programs, and an average (.481) was used to calculate ‘Other overhead’ for all other programs. An example of how facility costs were calculated is highlighted below in the chart detailing the cost of providing women with a post-treatment housing plan.

	9.1 - Percent women with concrete post-tx housing plan	
# Minutes	60	most likely amount of time allocated to this service, per DBHR and team estimate
Facility Cost	\$0.06	(\$0.58 per square foot monthly/ 540 usable hours in a month)/ 60 for minute rate= .000018 x 75 sq. ft. (average office space in US) = .001 x 60 minutes =
Other overhead	\$0.03	using the average of reported facility rent to utilities ratio, \$0.06 x .481=

APPENDIX E

SUMMARY OF MISSING DATA

The table below provides a detailed view of the variables used in the cost assessment that contained missing data points. As described in the main body of the document, missing values for square footage were estimated using a regression equation. When gender-sensitive interview variables were missing, the median value of other programs in the same level of gender sensitivity was used. The table below displays the percentage of missing data for each item and the number of programs that did not report on the item out of 13 programs.

Measure	Missing Variable	Percentage (%) Missing	Number Missing
<i>Program Director Interview</i>	Number of hours each staff spends on training related to women's recovery per year	62	8
	Approximate total square footage of IIP facility	62	8
	Costs of IIP facilities	69	9
<i>Counselor Interview</i>	Social support addressed during assessment	7	1
	Stage of change addressed during assessment	7	1
	Percent women who receive sex education	7	1
	Percent women who receive trauma counseling	7	1
	Percent women who receive assertiveness/self-efficacy training	7	1
	Women connected to social supports by time of discharge	15	1

REFERENCES

- Ashley, O. S., Mardsen, M. E., & Brady, T. M. (2003). Effectiveness of substance abuse treatment programming for women: A review. *The American Journal of Drug and Alcohol Abuse*, 29(1), 19-53.
- Barnett, P. G. & Swindle, R. W. (1997). Cost-effectiveness of inpatient substance abuse treatment. *Health Services Research*, 32(5), 615-629.
- Bepko, C. (1991). *Feminism and addiction*. London: The Haworth Press.
- Bloom, B., Owen, B., & Covington, S. (2004). Women offenders and the treatment effects of public policy. *Review of Policy Research*, 21(1), 31-47.
- Claus, R. E., Orwin, R. G., Kissin, W., Krupski, A., Campbell, K., & Stark, K. (2007). Does gender-specific substance abuse treatment for women promote continuity of care? *Journal of Substance Abuse Treatment*, 32, 27-39.
- Cochran, S. V. & Rabinowitz, F. E. (2003). Gender sensitive recommendations for assessment and treatment of depression in men. *Professional Psychology: Research and Practice*, 34(2), 132-140.
- Cook, L. S., Epperson, L., & Gariti, P. (2005). Determining the need for gender-specific chemical dependence treatment variables. *The American Journal on Addictions*, 14, 328-338.
- Conrad, K. J. & Smith, E. V. (2004). Applications of rasch analysis in health care. *Medical Care*, 42, 1-6. doi: 10.1097/01.mlr.0000103527.52821.1c
- Copeland, J. & Hall, W. (1992). A comparison of predictors of treatment drop-out of women seeking drug and alcohol treatment in a specialist women's and two traditional mixed-sex treatment services. *British Journal of Addiction*, 87(6), 883-890.
- Copeland, J., Hall, W., Didcott, P., & Biggs, V. (1993). A comparison of a specialist women's alcohol and other drug treatment service with two traditional mixed-sex services: Client characteristics and treatment outcome. *Drug and Alcohol Dependence*, 32(1), 81-92.
- Covington, S. (2007). Working with substance abusing mothers: A trauma-informed, gender-responsive approach. *The Source*, 16(1), 1-11.
- Erdfelder, E., Faul, F., & Buchner, A. (1996). G*Power (Version 3.0) [Computer Software]. Dusseldorf, Germany: Heinrich-Heine-University. Retrieved May 3, 2009. Available from <http://www.psych.uni-duesseldorf.de/abteilungen/aap/gpower3/download-and-register>
- Ettore, E. (2004). Reinvisioning women and drug use: Gender sensitivity, embodiment, and reducing harm. *International Journal of Drug Policy*, 15, 327-335.

- Fleming, M. F., Mundt, M. P., French, M. T., Manwell, L. B., Stauffacher, E. A., & Barry, K. L. (2000). Benefit-cost analysis of brief physician advice with problem drinkers in primary care settings. *Medical Care*, 38(1), 7-18.
- French, M. T., Dunlap, L. J., Zarkin, G. A., McGeary, K. A., & McLellan, A. T. (1997). A structured instrument for estimating the economic cost of drug abuse treatment: The Drug Abuse Treatment Cost Analysis Program (DATCAP). *Journal of Substance Abuse Treatment*, 14(5), 445-455.
- French, M. T., McCollister, K. E., Cacciola, J., Durell, J., & Stephens, R. L. (2002). Benefit-cost analysis of addiction treatment in Arkansas: Specialty and standard residential programs for pregnant and parenting women. *Substance Abuse*, 23(1), 31-51.
- Greenfield, S. F., Brooks, A. J., Gordon, S. M., Green, C. A., Kropp, F., McHugh, R. K., Lincoln, M., Hien, D., & Miele, G. M. (2007). Substance abuse treatment entry, retention, and outcome in women: A review of the literature. *Drug and Alcohol Dependence*, 86, 1-21.
- Greenfield, S. F., Trucco, E. M., McHugh, R. K., Lincoln, M., & Gallop, R. J. (2007). The women's recovery group study: A stage I trial of women-focused group therapy for substance use disorders versus mixed-gender group drug counseling. *Drug and Alcohol Dependence*, 90, 39-47.
- Greenfield, S. F., Sharpe-Potter, J., Lincoln, M. F., Popuch, R. E., Kuper, L., & Gallop, R. J. (2008). High psychiatric symptom severity is a moderator of substance abuse treatment outcomes among women in single vs. mixed gender group treatment. *The American Journal of Drug and Alcohol Abuse*, 34, 594-602.
- Grella, C. E. & Joshi, V. (1999). Gender differences in drug treatment careers among clients in the national Drug Abuse Treatment Outcome Study. *American Journal of Drug and Alcohol Abuse*, 25(3), 385-406.
- Grella, C. E., Polinsky, M. L., Hser, Y., & Perry, S. M. (1999). Characteristics of women-only and mixed-gender drug abuse treatment programs. *Journal of Substance Abuse Treatment*, 17, 37-44.
- Grella, C. E., Joshi, V., & Hser, Y. (2000). Program variation in treatment outcomes among women in residential drug treatment. *Evaluation Review*, 24(4), 364-383.
- Grella, C. E., Hser, Y., & Hsiao, S. (2003). Predictors of drug treatment re-entry following relapse to cocaine use in DATOS. *Journal of Substance Abuse Treatment*, 25, 145-154.
- Grella, C. E. (2008). From generic to gender-responsive treatment: changes in social policies, treatment services, and outcomes of women in substance abuse treatment. *Journal of Psychoactive Drugs*, 5, 327-343.

- Grella, C. E., Scott, C. K., Foss, M. A., & Dennis, M. L. (2008). Gender similarities and differences in the treatment, relapse, and recovery cycle. *Evaluation Review*, 32(1), 113-137.
- Grimm, L. G. & Yarnold, P. R. (Eds.). (1994). *Reading and understanding multivariate statistics*. Washington, D.C.: American Psychological Association.
- Grupp, K. (2006). Women one year following gender-specific treatment for alcohol and/or other drug dependency. *Journal of Addictions Nursing*, 17, 5-11.
- Hersen, M., Turner, S. M., & Beidel, D. C. (2007). *Adult psychopathology and diagnosis* (5th ed.). Hoboken, NJ: John Wiley & Sons, Inc.
- Hodgins, D., El-Guebaly, N., & Addington, J. (1997). Treatment of substance abusers: Single or mixed gender programs? *Addiction*, 92(7), 805-812.
- Hser, Y., Anglin, M. D., Grella, C. E., Longshore, D., & Prendergast, M. L. (1997). Drug treatment careers: A conceptual framework and existing research findings. *Journal of Substance Abuse Treatment*, 14(6), 543-558.
- Jones, A. M., Rice, N., Bago D'Uva, T., & Balia, S. (2007). *Applied health economics*. Routledge: New York, NY.
- LaBrie, J., Pedersen, E., & Earleywine, M. (2005). A group-administered timeline followback assessment of alcohol use. *Journal of Studies on Alcohol*, 66, 693-697.
- Ledgerwood, D. M., Goldberger, B. A., Risk, N. K., Lewis, C. E., & Rice, R. K. (2008). Comparison between self-report and hair analysis of illicit drug use in a community sample of middle-aged men. *Addictive Behaviors*, 33, 1131-1139.
- McLellan, A. T., Arndt, A. O., Metzger, D. S., Woody, G. E., & O'Brien, C. P. (1993). The effects of psychosocial services in substance abuse treatment. *Journal of Addictions Nursing*, 5(2), 38-47.
- Maisto, S. A., McKay, J. R., & Connors, G. J. (1990). Self-report issues in substance abuse: State of the art and future directions. *Behavioral Assessment*, 12(1), 117-134.
- Mannix, D. D. (2010). Gender Differences in the Costs, Benefits, Cost-Effectiveness, and Cost-Benefit of Substance Abuse Treatment: A Study in Four Treatment Settings (Unpublished doctoral dissertation). American University, Washington, D.C.
- Marsh, J. C., D'Aunno, T. A., & Smith, B. A. (2002). Increasing access and providing social services to improve drug abuse treatment for women with children. *Addiction*, 95(8), 1237-1247.

- Mincer, J. & Polachek, S. (1974). Family investments in human capital: Earnings of women. *Journal of Political Economy*, 82(2), 76-111.
- Najavits, L. M., Rosier, M., Nolan, A. L., & Freeman, M. (2007). A new gender-based model for women's recovery from substance abuse: Results of a pilot outcome study. *The American Journal of Drug and Alcohol Abuse*, 33, 5-11.
- Newman, C. (2003). Prime II gender sensitivity assessment tool for FP/RH curricula. Chapel Hill, NC: Intrahealth.
- Niv, N. & Hser, Y. (2006). Women-only and mixed-gender drug abuse treatment programs: Service needs, utilization, and outcomes. *Drug and Alcohol Dependence*, 87, 194-201.
- Ouimette, P. C., Finney, J. W., & Moos, R. H. (1997). Twelve-step and cognitive behavioral treatment for substance abuse: A comparison of treatment effectiveness. *Journal of Consulting and Clinical Psychology*, 65(2), 230-240.
- Quinn, P. O. (2005). Treating adolescent girls and women with ADHD: Gender-specific issues. *Journal of Clinical Psychology*, 61(5), 579-587.
- Vlassoff, C. & Moreno, C. G. (2002). Placing gender at the centre of health programming: Challenges and limitations. *Social Science and Medicine*, 54, 1713-1723.
- Salgado, D. M., Vogt, D. S., King, L. A., & King, D. W. (2002). Gender Awareness Inventory-VA: A measure of ideology, sensitivity, and knowledge related to women veterans' health care. *Sex Roles*, 46, 247-262.
- Saxena, S. & Sharan, P. (2006). Services and treatment for depression: International perspectives and implications for a gender-sensitive approach. In Keyes, C.L & Goodman, S.H. (Ed.), *Women and Depression: A Handbook for the Social, Behavioral, and Biomedical Sciences* (pp. 417-449). New York, NY: Cambridge University Press.
- Schoenfeld, D. A. (2001). Statistical considerations for a study where the outcome is time to failure [Software]. Retrieved from: http://hedwig.mgh.harvard.edu/sample_size/time_to_event/para_time.html
- Scott, C. K., Dennis, M. L., & Foss, M. A. (2005). Utilizing recovery management checkups to shorten cycle of relapse, treatment reentry, and recovery. *Drug and Alcohol Dependence*, 78, 325-338.
- Seigel, S. (1956). *Nonparametric statistics for the behavioral sciences*. McGraw-Hill Book Company: New York, NY.
- Sorenson, J. (2010). *Fair accounting for alcohol and other substance abuse services: Unit of Service study using fair values*. Washington Department of Social and Human Services, Division of Alcohol and Substance Abuse.

- Sun, A. (2006). Program factors related to women's substance abuse treatment retention and other outcomes: A review and critique. *Journal of Substance Abuse Treatment*, 30, 1-20.
- Tang, Z. (August, 2010). *Creating a valid and reliable gender-sensitive (GS) measure(s)*. Paper presented at the meeting of Division of Behavioral Health and Recovery, Olympia, WA.
- Tang, Z., Claus, R. E., Orwin, R. G., Kissin, W. B., & Alier, C. (2012). Measurement of gender-sensitive treatment for women in mixed-gender substance abuse treatment programs. *Drug and Alcohol Dependence*, 123, 160-166.
- U.S. Census Bureau. (2010). *State and county quickfacts*. Retrieved from: <http://quickfacts.census.gov/qfd/states/00000.html>
- Wetherington, C. L. (2007). Sex-gender differences in drug abuse: A shift in the burden of proof? *Experimental and Clinical Psychopharmacology*, 15(5), 411-417.
- Westermeyer, J. & Boedicker, A. E. (2000). Course, severity, and treatment of substance abuse among women versus men. *American Journal of Drug and Alcohol Abuse*, 26(4), 523-535.
- Wright, R. E. (2008). Survival analysis. In Grimm, L.G. & Yarnold, P.R. (Eds.). *Reading and understanding more multivariate statistics* (pp. 363-407). Washington, D.C.: American Psychological Association.
- Yates, B. T. (1994). Toward the incorporation of costs, cost-effectiveness analysis, and cost-benefit analysis into clinical research. *Journal of Consulting and Clinical Psychology*, 62(4), 729-736.
- Yates, B. T. (1996). *Analyzing costs, procedures, processes, and outcomes in human services*. Sage Publications, Inc.: Thousand Oaks, CA.
- Yates, B. T. (1999). *Measuring and improving cost, cost-effectiveness, and cost-benefit for substance abuse treatment programs*. Bethesda, MD: National Institute on Drug Abuse.
- Yates, B. T. (2009). Cost-inclusive evaluation: A banquet of approaches for including costs, cost-effectiveness and cost-benefit analyses in your next evaluation. *Evaluation and Program Planning*, 32, 54-56.
- Yeom, H. S. & Shepard, D. S. (2007). Cost-effectiveness of a mixed-gender aftercare program for substance abuse: Decomposing measured and unmeasured gender differences. *The Journal of Mental Health Policy and Economics*, 10, 207-219.