

Sex-specific Outcomes in a Substance Use Intervention Program.

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Original Research

Sex-specific Outcomes in a Substance Use Intervention Program☆



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ABSTRACT

Purpose: We performed an emergency department (ED)-based substance use screening, motivational interview-based intervention, and treatment referral program with the goal of determining sex-specific outcomes. Specifically, in this quality improvement project, we aimed to determine whether there was a difference among sexes in the type of substances used; the frequency of positive screening results for substance use disorder; agreeing to an intervention; the type of follow-up evaluation, participation, and referral; and attempts to change substance use after intervention.

Methods: We prospectively studied a convenience sample of patients at 3 hospitals in Northeastern Pennsylvania from May 2017 through February 2018. Inclusion criteria for participation in this study were age ≥ 18 years; ability to answer survey questions; willingness and ability (not being too ill) to participate in intervention(s); and when screened, admitting to use of alcohol, tobacco, potentially addictive prescription drugs, or street drugs. Practitioners in the ED screened patients. For those

with unhealthy substance use, a brief motivational interview was performed. Participants were each given referrals and information in accordance with the particular substance used and their assessed readiness to change. Individuals who completed the intervention were contacted by telephone for follow-up. Self-reported outcomes and the frequency of successful warm hand-off referrals were assessed.

Findings: Of the 2209 individuals screened, 976 (44.2%) were male. Overall, 547 patients screened positive for at least 1 of the unhealthy substances for a prevalence of 24.8% (95% confidence interval, 22.9%–26.6%). In this population, a greater proportion of men screened positive than women (30.5% vs 20.2%, $P = 0.01$). Although the finding was not statistically significant, men (106 [35.6%]) were more likely than women (81 [32.5%]) to agree to an ED intervention. At telephone follow-up, men were more likely to report participating in a treatment or support program than women (32.9% vs 18.2%, $P = 0.035$). Frequencies of warm hand-off referrals were 11 of 106 (10.4%) for men and 2 of 81 (2.5%) for women.

Implications: Our small study found that unhealthy substance use rates were greater overall in men than women. Overall participation differences between men

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and women who agreed to take part in substance intervention and accepted a referral for follow-up treatment were not statistically significant. At telephone follow-up, more men reported participating in a treatment program than women. Direct referral (warm hand-off) rates to treatment programs were small in both sexes but greater in men than women. (*Clin Ther.* 2020;42:419–426) © 2020 Elsevier Inc.

Key Words: alcohol, intervention, opioid, tobacco.

INTRODUCTION

Substance use disorder (SUD) is a major issue in the United States. In 2017, the Substance Abuse and Mental Health Services Administration reported that, of those ≥ 12 years old, approximately 14.5 million individuals were diagnosed with an alcohol use disorder; 7,500,000 people had a disorder of illicit drug use, and 27.8 million persons smoked cigarettes daily.¹ The National Survey on Drug Use and Health (NSDUH) reported that, of the 20.7 million people ≥ 12 years old who needed treatment for substance use, only 19% obtained treatment for substance use in the prior 12 months.¹ In addition, those with SUD have a higher rate of emergency department (ED) use than those without an SUD.^{2,3} The NSDUH also reported that between 2004 and 2011 there was a steady increase each year in the number of ED visits attributable to drug misuse, making a total increase of $>50\%$ within this period.⁴ This situation provides a unique opportunity for those working in the ED to screen and intervene in SUD.

Several studies have found the feasibility and efficacy of ED screening and intervention for substance use.^{5–9} D'Onofrio et al⁷ created Project ASSERT (Alcohol & Substance abuse Services, Education and Referral to Treatment) as a model of education and referral to treatment. This program, designed for the ED, included screening, intervention, and referral to treatment for patients with SUD and was used to determine that an urban ED can integrate this practice into their patient care.⁷ However, none of these studies were conducted with the goal of identifying sex-specific outcomes in an ED-based SUD intervention program.^{5–9}

Identifying sex-specific outcomes is important because the literature has supported that women's health, in regard to substance use, is different in almost every substance use trait, including initiation,

progression, addiction, development of health sequelae, and, subsequently, reasons for cessation.¹⁰ Women are reportedly more likely to use prescription drugs to better their appearance than men as well as self-treat mental health problems, such as depression or posttraumatic stress disorder, with alcohol or drugs.¹¹

Another sex difference in substance use is the phenomenon of telescoping or rapid progression from initiation to dependence. Some studies suggest that women are more susceptible to telescoping than men.¹¹ For these reasons, the ED visit might be a particularly critical opportunity to identify and intervene in female high-risk alcohol users and connect them with specific, short-term follow-up with the substance use treatment resources believed to be most appropriate.¹⁰ Prior work has also found that women in the ED setting evaluated for substance use were younger than men and were more likely to be discharged than their male counterparts.¹² One study also concluded that women were unduly affected by drug use and have less access to treatment.¹³

Using Project ASSERT as a model for our quality improvement initiative,⁷ we performed an ED-based substance use screening, motivational interview-based intervention, and treatment referral program with the goal of determining sex-specific outcomes. This initiative included reproducing the definitions of high-risk substance used in Project ASSERT⁷ (Table I). We also examined whether there was a difference among sexes in the type of substances used; the frequency of screening results positive for SUD; agreeing to an intervention; the type of follow-up evaluation, participation, and referral; as well as attempts to change substance use after intervention.

PATIENTS AND METHODS

The Lehigh Valley Health Network Institutional Review Board determined that the project (PRO00004473) was not subject to review board oversight because the program and its measures were consistent with quality improvement. Patients were approached prospectively from May 2017 through February 2018 by study team members at 3 hospitals: a suburban community hospital, an urban community hospital, and an affiliated level I trauma center. Inclusion criteria for participation in this study were age ≥ 18 years; capacity to answer survey questions; willingness and ability (not too ill to participate) to participate in intervention(s); and

Table I. Definitions of unhealthy substance use. Reprint with permission.⁷

Substance Used	Unhealthy Substance Use for Men	Unhealthy Substance Use for Women
Tobacco	Any use	Any use
Alcohol ¹⁴	4 Drinks of alcohol per occasion or 14 drinks per week	3 Drinks of alcohol per occasion or 7 drinks/per week
Opioids without a prescription	Any use	Any use
Street drugs (eg, marijuana, cocaine, methamphetamines, and heroin)	Any use	Any use

when screened, admitting to use of alcohol, tobacco, potentially addictive prescription drugs, or street drugs. Residents in emergency medicine, an addiction recovery specialist, and medical students screened patients. Logs recording the total number of potential study participants were kept by all study personnel involved in the patient screening.

The definitions used in this study for unhealthy substance use are described by substance in Table I. The definitions were reached by the study team based on National Institute on Alcohol Abuse and Alcoholism (NIAAA) guidelines¹⁴ as well as consensus of the study team to follow the Project ASSERT designations as a model.⁷ Anyone who screened positive for unhealthy substance use was offered a brief intervention, which assessed the participant's current habits and readiness to change. Participants were given referrals that ranged from informational pamphlets to a direct referral from the ED to inpatient treatment facilities. A warm hand-off referral was defined as someone being directed immediately from the ED to outpatient or inpatient rehabilitation treatment services.

Telephone follow-up was performed between 6 weeks and 6 months after intervention for those who completed the survey and intervention. The variance in timing of telephone call follow-up is attributed to the nature of the population studied and their access and willingness to answer telephones. Information on sex-specific frequency of self-reported substance use and referral completion was collected.

Descriptive and relative frequencies were used to assess the characteristics of the screened and participant populations. Participation and referral

rates were assessed as the proportion of willing participants of the total number of potential participants approached and the number of participants successfully referred of the total number of eligible participants, respectively. Exact binomial confidence intervals were estimated for participation rates, referral rates, and prevalence of patients who screened positive for at least 1 unhealthy substance. Cross-classifications of participant characteristics by participant sex were evaluated along with χ^2 statistics. Statistical tests were 2-sided with an α level of 5%. Analyses were performed with Stata software, version 16.0 (Stata Corp, College Station, Texas).

RESULTS

The total number of patients screened in our convenience sample was 2209, with 1669 (75.6%) occurring at a level I trauma center and 540 (24.5%) at 2 community hospitals. Of the 2209 patients screened, 976 (44.2%) were male. Overall, 547 patients screened positive for at least 1 of the unhealthy substances for a prevalence of 24.8% (95% confidence interval, 22.9%–26.6%). In this population, a greater proportion of men screened positive than women (30.5% vs 20.2%, $P = 0.01$). In addition, for those who screened positive, men screened positive for 1.4 substances, whereas women screened positive for 1.2 ($P = 0.02$).

In men, the most common substance for those who screened positive was tobacco (211 [70.8%]), followed by ethanol (90 [30.2%]) and opioids (75 [25.2%]). Of male substance users, 106 (35.6%) agreed to take part in the intervention. The types of substances used by

Table II. Screening, intervention, and follow-up.

Intervention	Finding	No. (%) of patients		P
		Male (n = 976)	Female (n = 1233)	
Patient screening (n = 2209)	Screened negative for unhealthy substance use	678 (69.5)	984 (79.8)	0.01
	Screened positive for unhealthy substance use	298 (30.5)	249 (20.2)	
	Reported substance used	(n = 298)	(n = 249)	
	Tobacco	211 (70.8)	193 (77.5)	0.076
	Alcohol	90 (30.2)	63 (25.3)	0.204
	Drugs ^a	75 (25.2)	38 (15.3)	0.004
Intervention interview (n = 187)	Agreed to intervention interview	(n = 106)	(n = 81)	
	Tobacco only	48 (45.3)	51 (63.0)	0.016
	Alcohol only	19 (17.9)	10 (12.3)	0.317
	Drugs only	17 (16.0)	8 (9.9)	0.220
	Tobacco and alcohol	8 (7.5)	7 (8.6)	0.785
	Tobacco and drugs	9 (8.5)	1 (1.2)	0.063
	Alcohol and drugs	1 (1.0)	2 (2.5)	0.814
	Tobacco, alcohol, and drugs	4 (3.8)	2 (2.5)	0.934
Follow-up evaluation (n = 160)	Follow-up evaluation contact result			
	Patient or facility contacted	82 (73.2)	78 (83.9)	0.213
	Could not contact (missing, wrong telephone number)	23 (20.5)	11 (11.8)	
	Died by follow-up evaluation	2 (1.8)	0 (0.0)	
	Refused to participate in follow-up	2 (1.8)	3 (3.2)	
	Other (power of attorney or family member)	3 (2.7)	1 (1.1)	
	Referral	(n = 82)	(n = 78)	
	Accepted referral	57 (50.9)	54 (58.1)	0.249
	Refused referral	22 (19.6)	21 (22.6)	
	Missing or incomplete	33 (29.5)	18 (19.3)	
	Patient participated in a follow-up program (self-report)			
	Yes	26 (32.9)	14 (18.2)	0.035
	No	53 (67.1)	63 (81.8)	
	Attempted to change substance use pattern			
Yes	16 (19.5)	17 (21.8)	0.691	

Table II. (Continued)

Intervention	Finding	No. (%) of patients		P
		Male (n = 976)	Female (n = 1233)	
	No	32 (39.0)	30 (38.5)	
	Not applicable ^b	31 (37.8)	23 (29.5)	
	Missing	3 (3.7)	8 (10.3)	

^a Includes marijuana, cocaine, methamphetamines, and narcotics without a prescription.

^b Includes patients who were in an inpatient facility during the follow-up period and those who report trying to cut down on their own.

those men who agreed to the intervention are listed in Table II.

Of the women, 249 (20.2%) had positive screening results for unhealthy substance use. Similar to men in the study, tobacco was the most common substance used (193 [77.5%]), the second most common substance was ethanol (63 [25.3%]), and the third most common was opioids (38 [15.3%]). Of female substance users, 81 (32.5%) agreed to intervention. The types of substances used by those women who agreed to the intervention are listed in Table II. Frequency of warm hand-off referrals were 11 of 106 (10.4%) for men and 2 of 81 (2.5%) for women.

A total of 160 of the 187 participants (85.6%) who agreed to follow-up evaluation were successfully contacted. Of those who could not be contacted, the biggest reason for failure to contact was an incorrect or noncurrent telephone number (34 [21.2%]). Of the 111 participants (69.4%) who accepted a referral to a treatment or support program, only 40 (25%) followed through with the referral. Men were more likely to self-report participating in a treatment or support program than women (32.9% vs 18.2%, $P = 0.035$).

DISCUSSION

In our study, nearly 1 in 4 patients screened in the ED setting had positive results for unhealthy substance use. We also found that the prevalence of men who screened positive for at-risk substance use was higher than that of women, which is consistent with the findings reported by Cannon et al.¹²

The NIAAA defines low-risk drinking for women as ≤ 3 drinks on any day and ≤ 7 drinks per week.¹⁴ For men, it is defined as ≤ 4 drinks on any day and ≤ 14 drinks per week.¹⁴ Alcohol use disorder occurs in only 2% of people who use alcohol within these limits.¹⁴ Using these definitions for both women and men in our screening, we found no significant difference between sexes in at-risk use. This finding, in part, may be related to the perception that women may have of greater social sanctions for imbibing. Traditionally, women have been less likely to have features associated with drinking in excess, including aggressiveness or behavior control issues.¹⁵

Commensurate with the historical data,¹⁶ the most common substance used in this study was tobacco. No significant difference was found between the sexes in reported tobacco use. Interestingly, although overall there was no statistical difference between the sexes in intervention participation, tobacco was the only substance in our study that, with statistical significance, more female patients agreed to the intervention than men. On the basis of our study findings, an ED-based intervention may have more effect on female smokers than male smokers.

Among substance users, a higher percentage of male patients agreed to participate in the intervention than female patients, although this comparison was not statistically significant. Similarly, but with statistical significance, men were more likely to report participating in a treatment or support program than women. This finding is consistent with prior reports

that women participated in treatment programs less often than men.^{17,18}

The overall rates of warm hand-off referrals were very low, but notably they were higher in men than women. A potential explanation for this might be that women are concerned that they could not directly go to treatment services because of childcare or family responsibilities. This finding highlights that willingness to participate in treatment options may differ based on sex and perceived roles and responsibilities. This study notes the differences between patterns between men and women not only in substance use but also in successes in intervention and ability to go immediately to treatment services.

Although warm hand-off referrals, which include psychosocial support, are more successful than medical treatment alone, the breakdown between barriers to treatment for men vs women has never been defined.¹⁹ Men and women may perceive different barriers to their care, which must be addressed when considering treatment options. Future studies may specifically look at successes and barriers for women in participating in warm hand-off referral strategies.

Several limitations deserve mentioning. Because this study design was based on a convenience sample (with resource limitations), the number of patients who participated in this study was small. Despite the sample size, we were still able to highlight the importance of differentiation between outcomes in women and men. In addition, we enrolled only English-speaking patients, and our study was performed at a network in Northeastern Pennsylvania. Considering this, it is unknown whether our findings are geographically generalizable.

CONCLUSIONS

Our small study found unhealthy substance use rates overall were greater in men than women. Overall participation differences between men and women who agreed to take part in a substance intervention and accepted a referral for follow-up treatment were not statistically significant. At telephone follow-up, more men reported participating in a treatment program than women. Direct referral (warm hand-off

referral) rates to rehabilitation were low in both sexes but higher in men.

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DISCLOSURES

The authors have indicated that they have no conflicts of interest regarding the content of this article.

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Alexandra M. Amaducci: Conceptualization, Data curation, Investigation, Methodology, Writing - original draft, Writing - review & editing. **Marna Rayl Greenberg:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Writing - original draft, Writing - review & editing. **Andrew W. Sheen:** Data curation, Investigation, Methodology, Writing - review & editing. **Hanna R. Warren:** Data curation, Investigation, Methodology, Writing - review & editing. **Pratik M. Parikh:** Data curation, Investigation, Methodology, Writing - review & editing. **Paige Roth:** Conceptualization, Data curation, Investigation, Methodology, Project administration, Writing - review & editing. **Kevin R. Weaver:** Conceptualization, Data curation, Investigation, Methodology, Resources, Supervision, Writing - review & editing. **David M. Richardson:** Conceptualization, Investigation, Methodology, Project administration, Resources, Supervision, Writing - review & editing. **David B. Burmeister:** Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Writing - review & editing. **Jennifer L. Stephens:** Conceptualization, Funding acquisition, Investigation, Methodology, Resources, Writing - review & editing. **Robert D. Cannon:** Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Writing - review & editing.

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