



Jail and Emergency Department Utilization in the Context of Harm Reduction Treatment for People Experiencing Homelessness and Alcohol Use Disorder

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Abstract People experiencing homelessness are disproportionately affected by alcohol use disorder (AUD). Abstinence-based treatment, however, does not optimally engage or treat this population. Thus, Harm Reduction Treatment for Alcohol (HaRT-A) was developed together with people with the lived experience of homelessness and AUD and community-based agencies that serve them. HaRT-A is a compassionate and pragmatic approach that aims to help people reduce alcohol-related harm and improve quality of life (QoL) without requiring abstinence or use reduction. The parent RCT showed that HaRT-A precipitated statistically significant reductions in alcohol use, alcohol-related harm, AUD symptoms, and positive urine toxicology tests. This secondary study tested HaRT-A effects on more distal, 6-month pre-to-posttreatment changes on jail and emergency department (ED) utilization. People experiencing homelessness and AUD ($N = 168$; 24% women) were recruited in community-based clinical and social services settings. Participants were randomized to receive HaRT-A or services as usual. Over four sessions, HaRT-A interventionists delivered three components: (a) collaborative tracking of participant-preferred alcohol metrics, (b) elicitation of harm-reduction and QoL goals, and (c) discussion of safer-drinking strategies. Administrative data on jail and

ED utilization were extracted for 6 months pre- and posttreatment. Findings indicated no statistically significant treatment group differences on 6-month changes in jail or ED utilization ($ps > .23$). Exploratory analyses showed that 2-week frequency of alcohol use was positively correlated with number of jail bookings in the 12 months surrounding their study participation. Additionally, self-reported alcohol-related harm, importance of reducing alcohol-related harm, and perceived physical functioning predicted more ED visits. Future studies are needed to further assess how harm-reduction treatment may be enhanced to move the needle in criminal justice and healthcare utilization in the context of larger samples, longer follow-up timeframes, and more intensive interventions.

Keywords Alcohol use disorder · Alcohol treatment · Harm reduction · Homelessness · Jail · Emergency department · Service utilization

Introduction

Population-based studies conducted in the USA and worldwide have shown that alcohol use disorder (AUD) affects approximately 40% of people experiencing homelessness [1, 2]. This number dwarfs the 5.6% prevalence of AUD observed in the general US population [3]. This disproportionately high prevalence of AUD precipitates correspondingly high levels of health and behavioral problems in people experiencing homelessness. Studies on mortality rates have indicated that

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people experiencing homelessness and AUD are many times more likely to die of alcohol-attributable causes than the general population [4–6]. This population is also disproportionately affected by crime and violence: A USA-based study found that 77% of homeless arrestees report lifetime heavy episodic drinking [7]. To reduce this population's high criminal justice involvement and health-related problems, interventions to address AUD—among other issues—are necessary.

The extent of behavioral and health-related alcohol problems in this population results in disproportionately high utilization of publicly funded services, particularly within the criminal justice and emergency healthcare systems. Studies suggest that about one-third of people experiencing homelessness and AUD visit the ED every year [8, 9], and alcohol intoxication was cited by one of these studies as the most common reason for ED visits in this population [8]. In fact, more severe biological (i.e., breath alcohol concentration) and self-report (heavy drinking episodes) indices of alcohol use were associated with a greater likelihood for ED visits [8]. The strong and synergistic intercorrelations among homelessness, AUD, and incarceration are also well-documented [10, 11].

Given the extent of this population's use of the criminal justice and emergency healthcare systems and their associated costs, there has been a call for more engaging and effective means of addressing AUD in this population. In particular, harm-reduction approaches have been viewed favorably by people experiencing homelessness and AUD and the providers that serve them [12–18]. As applied to alcohol use, harm reduction refers to a broad spectrum of compassionate and pragmatic approaches that seek to reduce alcohol-related harm without requiring abstinence or use reduction [19, 20].

In the homeless population, harm-reduction approaches applied to date have primarily comprised community-level interventions, such as Housing First (i.e., the provision of immediate, permanent, low-barrier, non-abstinence-based housing [12, 21–25]) and managed alcohol programs (i.e., programs that prescribe and medically supervise alcohol use in the context of housing or emergency shelter [14–17, 26–30]). Research studies have shown that such community-level harm-reduction interventions are associated with decreased contacts with the criminal justice and emergency and safety-net healthcare systems [22, 24, 28, 30, 31].

Given the effectiveness of community-level harm-reduction approaches in this population, it would stand to reason that individual-level harm-reduction treatment for

AUD would be a helpful complement and could engender similar improvements in alcohol and service utilization outcomes. With this in mind, a team of researchers worked in partnership with people with lived experience of homelessness and AUD and a community-based agency serving this population to develop harm-reduction treatment for AUD (HaRT-A) [32].

HaRT-A is a client-driven approach that emphasizes accepting people “where they're at” in their motivation for change [19]. The HaRT-A mindset stems from the harm-reduction philosophy, which prioritizes clients' own goals over abstinence achievement and recognizes any movement toward reducing harm and improving QoL as positive steps on client-defined pathway to recovery [20]. HaRT-A providers embody a harm-reduction heart-set, which is a compassionate, transparent, and advocacy-oriented way of being with clients. After helping clients understand the HaRT-A rationale, providers introduce three HaRT-A components: (a) collaborative tracking of participant-preferred alcohol outcomes, (b) elicitation of participants' harm-reduction and QoL goals, and (c) discussion of safer-drinking strategies. A recent, 3-month, two-arm randomized controlled trial ($N = 168$) showed that compared to services-as-usual control participants, HaRT-A participants evinced significant and clinically meaningful reductions on peak alcohol use, AUD symptoms, and alcohol-related problems as well as increased confidence for engaging in alcohol harm reduction [32].

The aim of the present, secondary study was to further test the HaRT-A effect on criminal justice and emergency healthcare utilization as measured by number of jail bookings and ED visits, respectively. It was expected that compared to services-as-usual control participants, HaRT-A participants would evince statistically significant reductions in number of jail bookings and ED visits. Additional, exploratory analyses were conducted to test predictors (i.e., sociodemographics, substance use frequency, and indices of physical and mental health-related QoL) of service utilization.

Methods

Trial Design

The design of the parent study was a parallel, two-arm, 3-month, non-blinded, randomized controlled trial of

HaRT-A compared to a services-as-usual control condition in a sample of homeless people with AUD.

Participants

Participants were 168 people experiencing homelessness and AUD who were recruited for the parent study from three community-based healthcare and social service agencies in Seattle, Washington (for more details, see parent study [32]). Participants were at least 21 years of age, met criteria for an AUD according to the DSM-5, and met federal criteria for homelessness for at least six of the last 12 months as defined by the McKinney-Vento Act [33]. Because one person did not provide HIPAA authorization, the sample size was reduced from 168 to 167 for the analyses involving healthcare data.

Measures

Sociodemographic Questions

Single items were used to assess age, sex assigned at birth, race, and ethnicity. These items were used for sample description and as predictors in exploratory analyses.

Administrative Data for Outcomes

Total number of jail bookings for the 6 months prior and subsequent to the HaRT-A treatment period was compiled by Looking Glass Analytics using data from the King County Department of Adult and Juvenile Detention record system. The total number of jail bookings was used as an outcome in primary and exploratory analyses.

Documentation of the number ED visits was drawn from the electronic health records at a local, safety-net, level-one trauma center serving marginalized communities in a five-state area. This variable reflects the number of ED visits each participant amassed in the 6 months prior and subsequent to the HaRT-A treatment period. The total number of ED visits was used as an outcome in primary and exploratory analyses.

Self-Report Predictor Measures for Exploratory Analyses

Importance of alcohol harm-reduction was measured using one of three 10-point “readiness rulers” [34] that assessed participants’ perception of the importance of

changing drinking behavior to reduce its “negative side effects,” where 0 = not at all important and 10 = totally important. Readiness rulers have been shown to be associated with alcohol outcomes and have evinced adequate psychometric properties [35–38]. This single item was used as a predictor in exploratory analyses.

Frequency of smoking, alcohol, and other drug use was assessed using the psychometrically sound *Addiction Severity Index – 5th Edition* [39]. Participants were asked to self-aggregate and report on the total number of days on which they used alcohol, cigarettes, and other drugs in the past 2 weeks. These frequency scores were used as predictors in exploratory analyses.

The *Short Inventory of Problems* (SIP-2A) is a psychometrically reliable and valid, 15-item, Likert-scale questionnaire that measures the extent of one’s experience with social, occupational, and psychological harms related to alcohol use [40]. The summary score for the past 2 weeks served as a predictor in exploratory analyses.

The *RAND 36-Item Short Form Health Survey Version 2* (SF-36) is a psychometrically sound measure of physical and mental health QoL [41]. Scaled scores for the physical functioning and emotional well-being scales were used as predictors in exploratory analyses.

Procedures

The parent study featured a randomized controlled trial of HaRT-A to test its effectiveness in improving alcohol and quality-of-life outcomes compared to a services-as-usual control group. Potential participants were initially approached by research agency staff at three community-based agencies that provide clinical and social services to marginalized and homeless populations. Those who qualified to participate engaged in a baseline interview and were then randomized to either the HaRT-A or services-as-usual control conditions. HaRT-A participants then attended a 3-week treatment course with a 1-month booster session. All participants were scheduled for follow-up assessments at the posttest, 1-month and 3-month follow-ups. Participants were paid \$20 for each assessment session. Please see parent study [32] for more details on the overall study methods and specific HaRT-A content. Administrative data were collected from the respective agencies for the 6 months prior and subsequent to the period allotted for HaRT-A delivery.

Data Analysis Plan

All analyses were conducted using SPSS 19. Preliminary analyses were conducted to describe the sample and determine the distribution shapes of the outcome variables. Analyses indicated that outcome variables were positively skewed, overdispersed counts. Mann-Whitney U tests are nonparametric tests conducted to detect potential group differences at baseline and to assess treatment effects on pre-to-posttreatment differences in jail bookings and ED visits. Negative binomial regressions, a type of generalized linear model that accommodates overdispersed and skewed count outcomes, were used to test the effects of a set of predictors (i.e., group assignment, age, birth sex, ethnicity, race, frequency of smoking, alcohol and other drug use, physical functioning and emotional well-being) on jail bookings and ED visits. To enhance interpretability of the effects, exponentiated coefficients (e.g., incident rate ratios [IRRs]) are presented for negative binomial models, where $IRR < 1$ indicates an inverse association, $IRR = 1$ indicates no association, and $IRR > 1$ indicates a positive association. IRRs serve as effect sizes for the negative binomial models, whereas r is provided as an effect size (0.1 = small, 0.3 = medium, 0.5 = large) for Mann-Whitney U tests in primary analyses.

Results

Sample Descriptive Statistics

The average age of participants was 47.9 years (SD = 9.6). Over three-fourths of participants were male (24% female). Rounding the percentages, 58% identified as Black/African American, 22% as White/European American, 12% as American Indian/Alaska Native/First Nations, 5% as Multiracial, 1% as Native Hawaiian/Pacific Islander, and 3% as "Other." Of the 168 participants, 8% identified as Hispanic/Latinx. In addition, 33% of participants had some high school education, 36% had GED or graduated high school, 2% had vocational school education, 22% had some college education, 5% had graduated college, and 1% had some postgraduate education.

Baseline Group Differences

There were no significant group differences on baseline number of ED visits, $U(N = 167) = 3558.5$, $p = .79$, or jail bookings, $U(N = 168) = 3385.5$, $p = .61$.

Primary Outcome Analyses

There were no significant group differences on 6-month pre-to-posttreatment differences in ED visits, $U(N = 167) = 3410.5$, $p = .80$, $r = .02$, or jail bookings, $U(N = 168) = 3232.5$, $p = .23$, $r = .09$. See Table 1 for descriptive statistics at baseline and posttest.

Exploratory Analyses

Variables associated with ED visits for the year. The negative binomial model predicting past-year ED visits was significant, $\chi^2(12, N = 162) = 22.29$, $p = .03$. Alcohol-related harm, importance of reducing alcohol-related harm, and physical functioning were significant predictors of total ED visits. For each one-point increase on the alcohol-related harm scale, participants had a 3% greater number of ED visits ($IRR = 1.03$, $p = .04$). For each one-decile decrease in physical functioning, participants had an 11% greater number of ED visits ($IRR = 0.89$, $p = .02$). For each one-point increase in importance of reducing alcohol-related harm, participants showed a 10% greater number of ED visits ($IRR = 1.10$, $p = .047$). No other variables were significant predictors of ED visits (all $ps > .07$).

Variables associated with jail bookings for the year. The omnibus model was significant, $\chi^2(12, N = 163) = 23.59$, $p = .02$. Only one variable, however, was significantly associated with jail bookings: frequency of alcohol use ($IRR = 1.11$, $p = .02$). Specifically, participants had an 11% greater number of jail bookings for each

Table 1 Raw descriptive statistics for outcome variables by group over time M (SD)/%.

Variables	HaRT-A ($n = 85$)		Control ($n = 83$)	
	Baseline	Posttest	Baseline	Posttest
Jail bookings	0.14 (0.47) 11%	0.34 (0.84) 20%	0.27 (0.75) 18%	0.25 (0.64) 18%
Emergency department visits	1.05 (1.83) 41%	0.94 (1.95) 35%	1.10 (2.13) 40%	1.02 (1.94) 41%

additional day they reported drinking in the past 2 weeks. No other variables were significant predictors of jail bookings (all p s > .05).

Discussion

The aim of this secondary study was to test the HaRT-A effects on utilization of emergency healthcare and criminal justice services. Further, exploratory analyses were conducted to test the relative contributions of sociodemographic, substance use, and physical and mental health-related QoL variables to the prediction of service utilization.

Primary Analyses

HaRT-A did not precipitate significant reductions in ED or jail use. Although contrary to hypotheses, this finding is understandable given the relatively short, 6-month pre-to-posttreatment timeframe paired with the statistically rare utilization of emergency healthcare and criminal justice systems, which necessarily limit variability and power [42]. Despite these limitations, however, these analyses provide an important first step toward assessing HaRT-A treatment effects on high-cost publicly funded services. Better-powered cost analyses conducted within the context of larger and longer subsequent RCTs of harm-reduction treatments are needed to definitively establish potential HaRT-A effects on service utilization.

The null finding also stands in contrast to studies that have shown associations between community-level harm-reduction approaches (e.g., Housing First, managed alcohol programs) and reductions in publicly funded service utilization [22, 24, 28, 30, 31]. That said, such community-level interventions entail a multitude of clinical and social services embedded within shelter or housing provision. With that context, the current finding is not surprising: A four-session behavioral intervention is not as powerful as wraparound clinical service and housing/shelter provision. Future studies might test whether provision of HaRT-A is able to further ameliorate utilization findings when administered within the infrastructure of a community-level intervention.

Exploratory Analyses

As people experiencing AUD and homelessness are rarely represented in clinical trials in which more detailed self-report data are collected, we conducted additional exploratory analyses to test potential sociodemographic, substance use frequency, and physical and mental health-related QoL variables as predictors of utilization. We found that alcohol-related variables comprised three of the four significant predictors of jail and ED service utilization. For every additional day of drinking in the 2 weeks prior to participation in the study, participants evinced an 11% higher frequency of jail bookings that year. Further, for each one-point increase on a validated measure of alcohol-related harm, the Short Inventory of Problems (range 0–45), frequency of ED visits was 3% higher. Relatedly, each one-point increase on participants' perceived importance of changing their drinking to decrease alcohol-related harm was associated with a 10% higher frequency of ED visits. This latter finding is similar to a prior study in this population, which indicated that recognition of a need to change can serve as a proxy of recognition of a greater experience of alcohol-related problems [23], which could plausibly result in more health-related issues that need attention in emergency healthcare settings.

Prior studies have indicated that the presence of AUD or co-occurring disorders more generally predicted more hospitalizations and incarcerations [9, 43, 44]. The present study added to this literature by providing information on specific alcohol-use patterns that predict systems utilization: frequency of use, alcohol-related harm, prioritization of change to reduce this harm, and experience of its physical sequelae were significant predictors of greater jail and ED use, respectively.

These findings are relevant for clinicians and others working with this population. First, the prevalence of high-cost ED and jail service utilization is much higher in this population than in the general population. Second, findings indicated that participants who reported being more severely affected by alcohol-related harm were indeed seen more often in the ED and that these participants also reported feeling more motivated than others to take steps to reduce their alcohol-related harm. Thus, the ED and jail systems present ideal points for opportunistic intervention. While the primary outcomes indicated that 4 sessions of harm-reduction counseling

are not enough to impact change on high-cost systems utilization, if such counseling were consistently offered each time this population made contact with these systems, its effects could build. Future studies are needed to explore more integrated, opportunistic treatment approaches to supporting alcohol harm reduction in this population.

Limitations

Several limitations of this secondary study deserve mention. Although HaRT-A had a statistically significant and clinically meaningful impact on proximal outcomes (i.e., alcohol use, alcohol-related harm, experience of AUD symptoms, positive urine toxicology tests [32]), the brief nature of the four-session treatment might have limited its ability to impact the more distal variables measured in this study (i.e., criminal justice and healthcare utilization). Further, the relatively small sample sizes and short timeframes typical of such clinical pilot studies limit power for detecting significant group differences for—even in high-utilizing populations—statistically rare outcomes (e.g., incarceration, ED visits) [42]. It should also be noted that the parent study was powered to detect significant group differences on more proximal alcohol outcomes and not more distal and statistically rare utilization outcomes.

Conclusions and Future Directions

Findings did not show an effect of HaRT-A on ED visits or jail bookings. However, exploratory analyses did detect other significant predictors of utilization outcomes: (a) reports of poorer physical functioning were associated with greater ED utilization, (b) alcohol-related harm and the importance of reducing alcohol-related harm were both associated with greater utilization of emergency services, and (c) frequency of alcohol consumption was associated with a greater number of jail bookings. Future studies are needed to further assess how harm-reduction treatments may move the needle in reducing criminal justice and healthcare utilization in the context of larger samples, longer follow-up timeframes, more intensive treatment courses, or more comprehensive community-level interventions.

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Compliance with ethical standards The Institutional Review Board at the University of Washington approved all participant procedures.

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