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Characteristics associated with motivation to stop substance use and improve skin and needle hygiene among hospitalized patients who inject drugs

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Abstract

Background—Hospitalizations for people who inject drugs (PWID) are opportunities to address substance use. However, little is known about hospitalized PWIDs' motivation to stop substance use or improve skin and needle hygiene, common means for reducing injection sequelae.

Methods—We used baseline data from a randomized controlled trial of a behavioral intervention to improve skin and needle hygiene among 252 hospitalized PWID between January 2014 and June 2018. We examined motivation (scale 1–10) to stop substance use, use new needles, and clean skin and used multiple linear regression models to evaluate characteristics associated with these outcomes.

Results—PWID were recruited during injection-related (154, 61.1%) and non-injection-related hospitalizations (98, 38.9%). Motivation to stop substance use was 7.11 (SD 2.67), use new needles was 7.8 (SD 1.9) and clean skin was 6.7 (SD 2.3). In adjusted models, experiencing an injection-related hospitalization was not significantly associated (P>.05) with motivation to stop substance use (Beta −0.76, SE 0.299), use new needles (Beta 0.301, SE 0.255), or clean skin (Beta 0.476, SE 0.323). Number of past-year skin and soft tissue infections was negatively associated with motivation to use new needles (Beta −0.109, SE 0.049, P<0.05) and clean skin (Beta −0.131,

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SE 0.062, P<0.05). Greater opioid withdrawal was associated with lower motivation to use new needles (Beta −0.275, SE 0.92, P<0.01).

Conclusions—Among hospitalized PWID, motivation to stop substance use and improve skin and needle hygiene was moderately high but injection-related hospitalizations were not associated with greater motivation. Efforts to reduce injection sequelae for all hospitalized PWID are needed.

Keywords

injection drug use; hospital interventions; motivation; skin and needle hygiene

Introduction

Due to the ongoing opioid crisis, opioid-related hospitalizations increased from 164.2 per 100,000 in 2006 to 296 per 100,000 in 2016.[1] People who inject drugs (PWID) are increasingly hospitalized for complications of injection drug use including skin and soft tissue infections and deeper, systemic infections including endocarditis and osteomyelitis.[2–4] Motivation is an important step in changing substance use patterns and in engaging in treatment.[5,6] Several studies including PWID suggest medical hospitalizations are associated with heightened motivation to seek substance use treatment.[7,8] Internal (e.g. concerns about one's own health) and external factors (e.g. family concerns) have been associated with increased motivation for substance use treatment.[8] Several qualitative and pilot studies have also described how hospitalization for complications from injection drug use may be especially motivating for PWID to change substance use patterns.[7,9]

Capitalizing on this period of potentially higher motivation during medical hospitalization, investigators have tested ways to increase the reach of substance use disorder treatment, including medications for opioid use disorder (MOUD), in this setting.[10–12] These approaches prioritize withdrawal management, MOUD initiation, and linkage to longitudinal outpatient addiction care, often in collaboration with an addiction consult service. Hospital-based addiction treatment initiation has been shown to increase outpatient addiction treatment retention, reduce substance use, and among those with infections secondary to injection drug use, reduce rehospitalization.[10–15] Just as hospitalizations have been viewed as motivating moments for substance use treatment, hospitalizations may also motivate PWID to improve their skin and needle hygiene. Alongside hospital-based addiction treatment, there is growing interest in studying and incorporating evidence-based interventions to improve skin and needle hygiene among PWID in hospital settings.[16–18] Addiction clinicians or peers may provide skin and needle hygiene education and in some cases distribute sterile injection equipment to hospitalized patients.[10,16] One qualitative study of individuals with a skin abscess in the past year found that having an infection precipitated improved uptake of skin and needle hygiene practices.[19] However, motivation to improve skin and needle hygiene at the time of hospitalization has not been systematically assessed or compared with motivation to stop using substances.

For this analysis, we used baseline data from a randomized controlled trial (RCT) of a behavioral health intervention to improve skin and needle hygiene (SKIN) among hospitalized PWID to assess characteristics associated with motivation to stop using

drugs and also to improve skin and needle hygiene.[17] Primary findings from the SKIN trial demonstrated significant reduction in injection-related ED visits and uncleaned skin injections, 35% reduction in skin and soft tissue infections which did not reach statistical significance and no reduction in total hospitalizations.[17,20] Given the close link between motivation and behavior changes, we examined characteristics associated with greater motivation among study participants. The goal of this analysis was to identify modifiable characteristics that might enhance motivation and those who may be more likely to benefit from behavioral interventions. We hypothesized hospitalized PWID will be highly motivated to stop substance use and improve skin and needle hygiene and that those hospitalized with direct complications from injection drug use (injection-related hospitalization) will be more motivated than individuals hospitalized for other reasons (non-injection-related hospitalizations). Second, we hypothesized that individuals experiencing fewer withdrawal symptoms at the time of the assessment will demonstrate increased motivation to stop using substances and to improve skin and needle hygiene. Finally, we hypothesized that having had a greater number of previous infections will be associated with increased motivation to stop using substances and to improve skin and needle hygiene.

Methods

Study design and data source

This is a cross sectional analysis of baseline data of a RCT that compared motivational interviewing plus skills training for skin cleaning and needle hygiene compared to usual care to reduce bacterial infections at Boston Medical Center from January 2014 to June 2018 among PWID (N=252). Study and recruitment protocols have been previously described in detail.[17,20] The primary outcomes of the parent study were health care utilization and skin and soft tissue infections with 12 months follow up. Between January 2014 and August 2018, electronic health records were used to identify eligible participants for the RCT—hospitalized patients who were 18 years or older, reported injection drug use at least three times in the week prior to admission, understood English, were able to provide two additional contacts, and did not plan to move from the area. Data for this study were gathered during a structured 60–90 minute interview within 48 hours of admission (72 hours for those admitted over the weekend). Participants were compensated with a 20 dollar gift card. The parent study included follow up assessments at 1 week and 1, 3, 6, 9, and 12 months post-baseline to gather additional data on the primary outcomes, health care utilization and skin and soft tissue infections, as well as substance use, substance use disorder treatment, and injection and sexual risk behaviors. The current analysis solely utilizes baseline data. This study was approved by the Boston University Medical Campus Institutional Review Board.

Measures

In this study, we examined three outcomes measuring motivation for behavior change. We assessed motivation to stop using the primary injected substance based on the commitment to abstinence scale.[21] Participants selected a whole number 1 to 10 from lowest to highest expectation of stopping substance use based on current motivation (Supplement). Revised versions of common readiness rulers were used to separately assess motivation to use new

needles and motivation to change skin cleaning practices when injecting.[22] Motivation to improve skin hygiene and use new needles were both measured using visual analog scales with 1 to 10 ratings where 1 represents the participant is not ready to change and 10 is already performing the questioned behavior.

We also assessed participant age, gender, race/ethnicity, housing status, treatment with MOUD in the past 3 months, HIV status, and if the hospitalization was injection-related. Hospitalizations were categorized by the Principal Investigator as injection-related if discharge diagnosis codes were related to skin and soft tissue infections, endocarditis/sepsis, or a deep tissue bacterial infection, as has been previously described.[17] All other hospitalizations were categorized as non-injection related. Finally, we included opioid withdrawal symptoms measured using the subjective opioid withdrawal scale (SOWS) at the time of the interview but were not able to measure withdrawal management approach or timing of last opioid.[23]

Analytical Methods

We present descriptive statistics to summarize the characteristics of the sample. We used t-tests for differences in means and the $\chi 2$-test of independence to statistically compare those who entered the study with or without an injection-related hospitalization. We used multiple linear regression to estimate the adjusted association of selected covariates with motivation to stop using their injected substance of choice, motivation to use new needles, and motivation to change skin cleaning practices. Standard errors and tests of significance used the robust Huber-White variance estimator. We report 95% confidence and p-values for variables associated significantly with motivation to change.

Results

One-hundred and fifty-four (61.1%) of the participants had IDU-hospitalization and 98 (38.9%) non-IDU hospitalizations (Table 1). Mean age was 37.9 (± 10.7) years of age, 58.3% were male, 59.5% were White, 20.6% were Black, 19.8% identified other or mixed racial origins, and 15.9% were Latinx. Mean nights on the street or in a shelter was 18.6 (IQR 0, 14). Sixty-eight (27.0%) reported they had been in MOUD treatment in the 30 days prior to baseline assessment during admission. Forty (15.9) reported methadone treatment and 28 (11.1%) reported buprenorphine. The mean number of skin infections reported in the year prior to baseline was 1.58 (± 2.35, median = 1). Thirty-two (12.7%) participants were living with HIV, 227 (90.1%) reported opioids were the primary substance injected, 81.3% reported stimulant use, and the mean SOWS score was 1.95 (± 1.41).

Persons who entered the study with an injection-related hospitalization were significantly ($p = .020$) more likely to be Latinx (20.1% vs 9.2%) (Table 1). Those who entered the study with an injection-related hospitalization reported a significantly higher number of past year skin infections (2.01 vs 0.89) than those whose index hospitalization was not injection-related. Those with or without an injection-related hospitalization did not differ significantly with respect to the other characteristics reported in Table 1.

Mean motivation to stop substance use was 7.1 out of 10 (SD 2.67). Mean motivation to use new needles was 7.8 (SD 1.9) and to clean skin was 6.7 (SD 2.3) out of 10. Motivation

to stop substance use was not associated significantly with any covariates evaluated in the multiple regression model (Table 2). Motivation to use new needles was inversely and significantly associated with the number of past year skin infections [b = −0.109, 95% Confidence Interval (95%CI) −0.206; −0.013, p = .027] and with the SOWS (b = −0.275, 95%CI −0.458; −0.093, p = .003), but was not associated significantly with other covariates in the model. The only statistically significant correlate with motivation to change skin cleaning practices was the number of past year infections (b = −0.131, 95%CI −0.253; −0.008, p = .037).

Discussion

In this cohort of 252 hospitalized PWID, we found that motivation to stop using a substance of choice and improve skin and needle hygiene was moderately high, confirming the basis upon which many hospital-based interventions for PWID are predicated. The finding that motivation to improve skin and needle hygiene was high adds to the limited literature on hospitalized PWIDs' motivation to change skin and needle hygiene practices which has largely focused on acceptability of hospital-based syringe distribution and overdose prevention sites and not behaviors after hospitalization.[16,24,25] Our study also confirms previous research that hospitalized PWID were motivated to stop substance use despite not specifically seeking substance use treatment at time of admission, which we suspect differs from outpatient PWID not engaged in treatment.[7,8] Leveraging this motivation for change in substance use is a promising means to reducing injection sequelae.

Based on previous studies, we expected that PWID hospitalized with direct complications from injection drug use would have heightened motivation to quit drugs and improve skin and needle hygiene.[7,8] However participants with an IDU-related hospitalization or other health consequences from injection drug use (e.g., HIV diagnosis or more skin and soft tissue infections) were not more motivated to improve skin and needle hygiene or to stop using substances compared to those PWID with non-IDU hospitalizations (e.g., asthma). Moderately high levels of motivation among all PWID points to hospitalizations as a unique, potentially motivating moment for PWID, but may also be reflective of social desirability bias or a ceiling effect in our data collection. Though IDU-hospitalizations have been heralded as special opportunities, these findings suggest that interventions should be broadly offered and not narrowly targeted for those with injection-related hospitalizations.

Many hospitalized PWID do not desire substance use treatment and those who initiate treatment may not continue long-term.[14,26] The fact that participants in this cohort were relatively motivated to change needle and skin hygiene practices supports delivering promising interventions to improve skin and needle hygiene, which have been shown to improve the health of PWID in the community.[17,27] In this cohort, however, we found that greater number of skin and soft tissue infections in the past year were associated with significantly *less* motivation to use new needles or to clean skin prior to injection, which conflicts with the prevailing idea that health consequences from injection drug use are necessarily motivating. Future studies should further examine this paradoxical finding. We speculate that individuals with more skin and soft tissue infections may be more confident in their ability manage complications when they arise, may experience a normalization of

injection-related harm, or feel hopeless in their ability to change their behaviors or health outcomes and therefore are more willing to continue their current drug-related behaviors and activities.[28,29] It is also possible they are less aware that skin cleaning and new needle use can lower risk of infection. These findings may help clinicians and investigators design and implement interventions especially targeted for this extremely high-risk group facing multiple competing priorities.[30,31]

Motivation is a dynamic process and there are complex individual, psychological, and social factors that lead to changing motivation and behaviors like using substances, injecting with sterile syringes or cleaning one's skin prior to injection.[7,8,32–34] The success of hospital-based addiction treatment programs (e.g., addiction consult services) suggests that hospital interventions can increase motivation, an important step in behavior change, though this requires further study.[10–12] Yet identifying additional modifiable characteristics that can be leveraged to enhance motivation is especially relevant for improving clinical outcomes for PWID.[6,35] In this analysis, we found that more severe opioid withdrawal was associated with decreased motivation to use clean needles. Withdrawal is a complex neurobiological phenomenon which may dampen motivation and shift an individual's attention to relieving uncomfortable symptoms. Fear of withdrawal has been linked to treatment delay, avoidance, and premature discharge from the hospital for PWID.[36–38] Effect estimates for motivation to stop using substances or to clean skin were also negative but were not statistically significant. Though the cross-sectional nature of this data precludes causal interpretation, aggressive control of opioid withdrawal during the hospitalization may improve motivation, at least, for using sterile syringes.

PWID frequently face contradictory messages about skin and needle hygiene while in the hospital. PWID are counseled to use sterile injection equipment and clean skin prior to injection. However, in the hospital, drug use is typically prohibited and sterile injection equipment may even be confiscated, which the literature and our experience suggests leads to riskier use, undermines motivation, and can lead to patient directed discharges.[36,39] Hospital-based behavioral interventions to improve skin and needle hygiene, which have been shown to reduce uncleaned injections but not skin and soft tissue infections or healthcare utilization, could be pursued, perhaps by addiction consult services or peers, at the same time as clinicians recommend MOUD treatment following hospital discharge.[20]

Nonetheless, this analysis has several limitations. First, this analysis is based on data from a single site trial at an urban, safety net hospital and may not be generalizable to other settings. Second, though this study uses validated assessments, historical questionnaires are subject to recall bias and social desirability bias which may result in overestimates of motivation in this cohort. We were unable to include additional psychological (e.g., impulsivity, injection-specific cues, or aspects participants liked about injecting) and social characteristics (e.g., social support, experience with incarceration) in this analysis. We were also unable to assess motivation to stop injecting a substance and use through another less risky route (e.g., intranasal). Third, though we report SOWS scores, we are unable to assess opioid withdrawal management in the hospital. Baseline surveys were performed within the first 48 hours of hospital admission, but at different durations of last opioid use and unclear recency of withdrawal symptom treatment. Fourth, this analysis focused only on single item

measures of motivation collected at the time of study enrollment. However, past research has shown that single item motivation scales demonstrate concurrent and predictive validity.[40] Future analyses should investigate how motivation to change substance use patterns fluctuate over time, if the behavioral intervention in this study impacted motivation post-discharge amidst other competing demands, as well as if motivation was associated with other subsequent substance use or clinical outcomes like infection and healthcare utilization.[31]

Conclusion

In this cohort of hospitalized PWID, motivation to stop using substances and improve skin and needle hygiene was moderately high at an urban medical center with high rates of homelessness and complications from substance use. Motivation was not associated with experiencing a hospitalization for direct complications of injection drug use but experiencing more skin and soft tissue infections in the previous year was associated with less motivation to improve skin and needle hygiene. Thus, efforts to reduce consequences of substance use are needed for all hospitalized PWID.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Characteristics of participants with and without injection-related hospitalization

	Total	IDU-hospitalization	Non-IDU hospitalization	P value
n (%)	252 (100%)	154 (61.1%)	98 (38.0%	
Age, mean (sd)	37.9 (10.7)	37.8 (10.4)	38.2 (11.2)	0.772
Male, n (%)	147 (58.3)	94 (61.0)	53 (54.1)	0.276
Race				
White, n (%)	150 (59.5)	94 (61.0)	56 (57.1)	
Black, n (%)	52 (20.6)	27 (17.5)	25 (25.5)	
Other, n (%)	50 (19.8)	33 (21.4)	17 (17.3)	0.286
Latinx, n (%)	40 (15.9)	31 (20.1)	9 (9.2)	0.020
Nights Homeless	18.6 (37.0)	15.7 (33.7)	23.2 (41.4)	0.115
MOUD in past 30 days, n (%)	68 (27.0%)	41 (26.6)	27 (27.6)	0.872
Infections in past year, mean (sd)[a]	1.6 (2.35)	2.0 (2.5)	0.9 (2.0)	0.000
HIV+	32 (12.7)	23 (14.9)	9 (9.2)	0.181
Stimulant use, n (%)	205 (81.3)	127 (82.5)	78 (79.6)	0.729
SOWS[b]	3.7 (1.7)	3.7 (1.72)	3.64 (1.69)	0.780

*** p<.001

** p<.01

* p<.05

[a] Skin and soft tissue infections in past year

[b] SOWS was only assessed in individuals who reported opioid withdrawal symptoms. Those who reported no opioid withdrawal symptoms were not assessed with SOWS. These individuals were assigned a SOWS score of 0.

Table 2.

Multiple linear regression models estimating the adjusted association of hospitalization for complications from injection-related hospitalization and selected covariates with three measures of motivation to change behaviors.

	Motivation		
	Stop Substance Use[a]	**New Needles**[b]	**Clean Skin**[c]
Current Age	.013	.018	.027
	(.016)	(.015)	(.015)
Male	−.145	−.269	−.611
	(.312)	(.268)	(.319)
White, non-Latinx	.057	−.36	−.392
	(.292)	(.277)	(.31)
Nights Homeless	−.001	0	−.008
	(.003)	(.004)	(.005)
MOUD in past 30 days	.198	.4	.036
	(.278)	(.245)	(.319)
Injection-related hospitalization	−.076	.301	.476
	(.299)	(.255)	(.323)
Skin and soft tissue infections in past year	−.033	−.109 *	−.131 *
	(.057)	(.049)	(.062)
HIV positive	.271	−.241	−.62
	(.378)	(.425)	(.508)
SOWS score	−.129	−.275 **	−.119
	(.089)	(.092)	(.095)
Intercept	8.345 ***	7.918 ***	6.668 ***
Observations	252	250	251
R-squared	.021	.085	.061

Robust standard errors are in parentheses

*** p<.001

** p<.01

* p<.05

[a] Motivation to stop using primary injected drug of choice.

[b] Motivation to use new needles.

[c] Motivation to change skin cleaning practices.