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Comprehensive oral care improves treatment outcomes in male and female patients with high-severity and chronic substance use disorders

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Abstract

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Background—Using data from a workforce training program funded by the Health Resources and Services Administration, the authors de-identified pre- and posttreatment assessments of high-severity and chronic substance use disorders (SUDs) to test the effect of integrated comprehensive oral health care for patients with SUDs on SUD therapeutic outcomes.

Methods—After 1 through 2 months of treatment at a SUD treatment facility, 158 male self-selected (First Step House) or 128 randomly selected sex-mixed (Odyssey House) patients aged 20 through 50 years with major dental needs received integrated comprehensive dental treatment. The SUD treatment outcomes for these groups were compared with those of matched 862 male or 142 sex-mixed patients, respectively, similarly treated for SUDs, but with no comprehensive oral health care (dental controls). Effects of age, primary drug of abuse, sex, and SUD treatment facility–influenced outcomes were determined with multivariate analyses.

Results—The dental treatment versus dental control significant outcomes were hazard ratio (95% confidence interval [CI]) 3.24 (2.35 to 4.46) increase for completion of SUD treatment, and odds ratios (95% CI) at discharge were 2.44 (1.66 to 3.59) increase for employment, 2.19 (1.44 to 3.33) increase in drug abstinence, and 0.27 (0.11 to 0.68) reduction in homelessness. Identified variables did not contribute to the outcomes.

Conclusions and Practical Implications—Improvement in SUD treatment outcomes at discharge suggests that complementary comprehensive oral health care improves SUD therapeutic results in patients with SUDs. Integrated comprehensive oral health care of major dental problems significantly improves treatment outcomes in patients whose disorders are particularly difficult to manage, such as patients with SUDs.

Keywords

Drug abuse; oral health care for people with disabilities; mental disorders

Patients with substance use disorders (SUDs) typically (60–70%) have coexisting medical and emotional pathologic conditions that make managing their care difficult and expensive, thereby compromising treatment outcomes and diminishing the likelihood of long-term resolution of their drug abuse and associated medical problems.¹ If not addressed, these elevated medical burdens result in frequent costly visits to emergency facilities and compromised functions ending in debilitation and even in premature death.²

Included in the pathologic burdens for patients with SUDs are conditions related to poor oral health^{3,4} that lead to increased need for extensive oral health care.⁵ Thus, although much remains unknown regarding the mechanisms whereby drug dependence alters oral conditions, it has been recommended that addiction treatment providers consider dental and addiction problems as associated comorbidities, requiring the development of treatment programs that address the SUD and oral health problems in an integrated strategic manner.⁴

Although the lifestyles of and lack of resources linked to patients with SUDs likely contribute to a low use of comprehensive dental services and increased major oral health problems^{4–7} (the estimated incidence of oral health problems in patients with SUDs is as high as 68%), it is not clear how much of the elevated dental problems are drug specific or how they might influence the outcomes of SUD treatment. Consequently, reports of the

impact of abuse of drugs such as heroin and amphetamines vary, with some claims that methamphetamine use causes the highest incidences of oral health problems ($\approx 40\%$),⁸ whereas others suggest that opioid addiction is particularly problematic when associated with oral health problems caused by illicit drug dependence.^{9,10}

Owing to reports that comprehensive care of major medical problems integrated into standard SUD management increases the likelihood of effective SUD treatment,¹¹ our study examined the corollary hypothesis that, as with substantial medical problems,¹ proper management of major oral health problems when combined with standard SUD care will significantly improve SUD treatment outcomes in patients with SUDs. This was achieved by using standard SUD treatment outcomes described in the *Treatment Episode Data Set (TEDS) State Instruction Manual*¹² from a workforce training program funded by the Health Resources and Services Administration (HRSA) (see Methods section for description).

METHODS

The HRSA workforce training grant, from which the data used for this study were derived, was entitled Facilitating a Lifetime of Oral Health Sustainability for Substance Use Disorder Patients and Families (FLOSS). The principal objectives of the original grant were

- “Increasing the core competencies and skills needed to work with Substance Use Disorder Patients (SUDPs) through training of the University of Utah School of Dentistry (UUSOD) dental faculty, workforce and students”;
- “Establish a unique and collaborative academic and direct service program using UUSOD-linked facilities, to provide access to high-quality oral health services to patients with SUDs and their dependents who were assisted by local First Step House and Odyssey House treatment programs.”

The outcomes for this grant were operationally defined as the acquisition of patient care management skills by dental students and attending faculty to provide comprehensive oral health care effectively integrated with SUD treatment. This outcome was to be independently assessed by each treatment program using its own measurements of SUD treatment success derived from the *Treatment Episode Data Set (TEDS) State Instruction Manual*¹² and customized to address the needs of its own specific programs. To achieve these outcomes, from 2015 through 2017 each of these SUD treatment agencies identified patients with SUDs, 20 through 50 (average 37) years of age, who would be appropriate candidates for receiving oral health care at the UUSOD as an integrated part of their SUD management. At the time of admission, the dental status of these patients with SUDs was determined either by patient self-declaration (First Step House [FSH]) or by a case worker trained in dental triage by means of direct dental screening (Odyssey House [OH]). Patients with significant dental needs (either patient-declared or staff-selected by a trained case worker) who were interested in receiving no-cost comprehensive dental treatment from trained third- and fourth-year students at the UUSOD were considered for inclusion in the HRSA program. This original group included 1,020 male patients from FSH (self-declared) and 270 male (167) and female (103) patients from OH (selected after dental screening by case worker). After 1 through 2 months of satisfactory SUD treatment and based on fund

availability, a final selection of 158 (FSH) and 128 (OH) patients for inclusion in the dental treatment (DT) group was made by either self-selection or random selection, respectively (see flowchart in Figure 1).

At the beginning of the FLOSS program, the broad improvement in treatment outcomes for patients with SUDs in the DT group reported in this present article was unexpected. It was not until 1½ years into the program that case workers from both programs started to notice a dramatic improvement in the SUD treatment outcomes in many of their DT FLOSS patients compared with traditional patients with SUDs, such as patients continuing care (days of active sequential SUD treatment from the program) much longer and patients being more likely to satisfactorily complete SUD treatment. These impressions were statistically confirmed by comparing these DT groups with those patients with SUDs from their respective original group who did not receive oral health care from the dental students (dental control [DC]). Owing to this discovery, it was determined to closely monitor deidentified patients with SUDs using the following battery of standard outcome measures from the *Treatment Episode Data Set (TEDS) State Instruction Manual*¹² for the entire duration of the grant.

For both SUD management programs, treatment duration factors were

- length of stay (number of days from admission until no longer officially receiving either SUD residential or outpatient treatment (for FSH, isolated drug use relapses did not result in discharge from the SUD or dental program if the situation could be reconciled between patient and case worker);
- discharge methods (measured as treatment completion or dropout [patients who left the program against staff recommendation]);
- treatment completion (including both residential and outpatient components).

For FSH patients only, the following were assessed at both intake and discharge:

- employment (including both full- and part-time categories);
- homelessness (residence in a setting not designed for human habitation);
- drug abstinence (determined 3 times per week and defined as not using primary or other drugs illegally within the previous month).

Of these standardized outcome measures, homelessness, employment, and drug abstinence are particularly interesting. They have been associated with a patient with a SUD's subjective view of overall well-being (or quality of life [QOL]). Because the status of these factors has been shown to reflect patients' psychiatric burden related to physical and mental health, the quality of relationships with others, and the relationship with oneself (or self-image), their improvement is believed to correlate well with SUD recovery.^{13–15}

At the time of initial entry into the SUD program, all participating patients from both the DT and DC groups had diagnoses of SUD according to *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition,¹⁶ criteria for the primary drug of choice. However, most of

these patients with SUDs also abused other drugs and may be considered polysubstance users.¹⁷

All patients from both programs were provided throughout their treatment a standard step-down continuum of SUD therapeutic services tailored to address their unique needs and to manage the care of patients with high-severity and chronic SUD.¹⁸ This treatment continuum typically began as residential care, but as the patients responded, it generally progressed to include a combination of outpatient status, recovery housing, case management, and long-term recovery management components applied according to individual progress by highly trained and licensed care providers. Because OH serves both male and female patients frequently in a family setting, the treatment strategies were influenced by the sex of the patient and took into consideration specific sex-related needs such as maternal obligations.

At intake, discharge, and throughout treatment, patients from the FSH group were evaluated for drug abstinence as described earlier. Treatments and drug screenings were administered in a similar fashion for both the DT and DC groups. Because drug testing was not used by OH in a similar fashion and would not be a useful measure of SUD treatment success as explained in our study, only the drug abstinence data from FSH groups were relevant to this study. Other conditions assessed at both intake and discharge by FSH (but not OH) on the HRSA-related patients were homelessness and employment (part- and full-time). This information is also included in this study as QOL markers and an indication of how comprehensive dental treatment affects responses to SUD treatment.¹⁹

On the basis of these criteria (self-selection in the FSH DT group and staff assessment of oral health suitability in the OH randomly assigned group), all patients assigned to the DT groups were also finally screened for dental needs by a licensed dentist and board-certified oral pathologist (B.T.), who was a UUSOD faculty member. Based on the examination by the oral pathologist, all except 3 participants (who were excluded from the study) were deemed suitable for receiving comprehensive oral health care from especially prepared third- and fourth-year dental students under faculty supervision at the UUSOD. These students and faculty were trained in managing the dental care of patients with SUDs²⁰ (including training through the Screening Brief Intervention and Referral to Treatment program). The DT patients at time of screening completed an oral health screening form to assess the extent and nature of their oral health needs as well as a consent form to perform, if necessary, health procedures and related services. Specifically, this form contained general dental information, such as condition of the teeth, including pathologies, and functionality and was used as a diagnostic aid contributing to the development of a treatment plan for the individual patient. The program was reviewed and approved by the University of Utah institutional review board (00089781).

All patients with SUDs accepted into the DT groups had major dental needs, resulting in treatments averaging 10 separate visits to the student dentist for completion of oral health care. The average oral health procedures per DT patient were

- 3.9 surgical extractions;

- 2.1 periodontal procedures such as scaling and root planing;
- 5.6 amalgam or composite restorations;
- 1 porcelain or cast metal crown;
- 1 endodontic procedure;
- 0.5 partial or full removable denture.

The average cost per patient was \$1,236 based on the UUSOD fee schedule ($\approx 50\%$ of usual and customary fees in Salt Lake City, Utah). The comprehensive oral health care provided to the DT patients improved oral functions (such as masticatory and communication), esthetics, and comfort by the following measures:

- eliminating inflammation and soft-tissue infection and damage through periodontal procedures;
- placing removable and fixed prosthesis in edentulous spaces;
- removing caries and restoring or extracting damaged teeth by operative, endodontic, or oral surgical procedures.

A graphic summary of the methodology and outcomes described in the previous list is included on the flowchart shown in Figure 1.

As mentioned above, the patients with SUDs included in the DC groups of both FSH and OH were 20 through 50 years of age corresponding with DT patients and received similar SUD treatment. Many of the DC patients in the OH randomly assigned group also had major dental problems that required attention, but because they had not been randomly selected to receive comprehensive oral health care from the UUSOD, their oral needs were managed on an emergency basis according to usual policy in various community free clinics.

Statistical analysis

Observations were divided into DT or DC groups in which the DC patients were age matched to the DT group for all outcomes analyzed. Odds ratios (OR) were estimated based on conditional logistic regressions that incorporated the age matching between the DT and DC groups. Cox proportional hazard models were used to analyze the length of stay, where the event was completion of the program. Patients were followed from admission date through the completion date (for those completed the program) or dropout date (for those who left the program against staff recommendation). These Cox models are the basis for estimated hazard ratios for completion of the program and addressed the age matching via age stratification. All models included as additional covariates dummy variables representing drug preference. For models restricted to the OH sample, a sex dummy (male versus female) was also included. For the FSH sample, 3 additional control variables were included that represented whether the person was, at admission, employed, abstaining from drugs, or homeless. Finally, for analyses that assess changes in the QOL indicators (employment, drug abstinence, or homelessness), improvement was measured by comparing these indicators at admission and discharge. All statistical analyses were conducted using the R statistical suite of programs (R Core Team).

RESULTS

The Table shows the distribution of patients with SUDs in both FSH (all men) and OH (men and women) according to the use of heroin, methamphetamine, alcohol, marijuana, and other drugs as their primary substances of choice. The size of the group of patients with heroin preference was greater than that of other groups in each population from the SUD treatment agencies with the exception of the DC population from FSH and the DT women from OH. The groups who preferred methamphetamine were typically the second largest in each category, with the exceptions of the DC group from FSH and the DT female group from OH populations. For the OH patients, alcohol followed by marijuana tended to be less likely identified as the primary drugs of choice. The reasons for the popularity of heroin and methamphetamine in the DT population likely reflect the facts that in Utah these substances are 2 of the most popular illicit drugs, and findings that suggest that people who abuse these drugs also tend to have a greater incidence of oral health problems than other drug groups.^{8,9}

There were similarly significant mean differences in factors related to treatment duration between the DT and DC groups in both FSH and OH studies, respectively, when measured by the following:

- length of stay ($P < .0001$) (Figure 2A): FSH study, 256 versus 143 days; OH randomly assigned study: men 273 versus 92 days and women 316 versus 83 days;
- percentage of those who dropped out of SUD treatment against recommendation (Figure 2B): FSH study, 28% versus 50%; OH study, male 24% versus 39% and female 21% versus 62%;
- those who completed SUD treatment (Figure 2B): FSH study, 72% versus 50%; OH study, male 76% versus 61% and female 79% versus 38%.

The DT versus DC hazard ratios (95% confidence intervals) for completion of SUD treatment had a P value of .0001 and were as follows:

- FSH only 3.60 (2.40 to 5.40%);
- OH only 3.39 (1.84 to 6.26%);
- combination 3.24 (2.35 to 4.46).

These results, shown in Figure 2, suggest that comprehensive oral health care helped members of the DT group, whether self-declared (FSH) or randomly assigned and from a demographically similar pool (OH), to engage in SUD treatment much longer and were more likely to complete treatment than patients with SUDs in the DC group who did not receive integrated comprehensive oral health care. As shown in Figure 2, these benefits appeared to be sex independent. This was confirmed by a sex dummy (male versus female) for all OH sample calculations (see Statistical Analysis in the Methods section).

The differences from intake to discharge in 3 other measures, which are considered QOL markers,¹⁴ associated with the FSH patients with SUDs, also demonstrated that the comprehensive oral health care given to the patients in the DT group significantly improved

SUD treatment outcomes compared with the corresponding DC group. Thus, the DT versus DC ORs (95% confidence intervals) of being employed, drug abstinent, or homeless at the time of discharge were 2.44 (1.66 to 3.59), 2.19 (1.44 to 3.33), and 0.27 (0.11 to 0.68), respectively. Associated with these significant outcomes was the observations that in the DT versus DC groups improvement of these outcomes were also significantly greater at discharge ($P < .01$) in the categories of employment (460% versus 130% improvement, Figure 3), drug abstinence (257% versus 138% improvement, Figure 4), and homelessness (84% versus 52% improvement, Figure 5).

The data presented in this study demonstrate for the first time that comprehensive oral health care integrated with the management of SUD problems improves SUD treatment outcomes. However, there are several factors that could also contribute to the effects of comprehensive oral health care on our reported SUD treatment outcomes. Thus, a conditional logistic regression model stratified by age was used to assess this possibility. It was concluded from these multivariate analyses that first age, within the range of 20 through 50 years, did not alter the SUD treatment outcomes response to oral health care. Second, similar OR outcomes improvement in the DT were observed when outcomes were assessed with all the primary drugs of abuse combined or individually (Table). Third, similar OR outcomes in the DT group were observed when measuring completion of treatment regardless of the SUD treatment provider. Fourth, SUD treatment outcomes such as length of stay and completed treatment were similarly improved in the DT group regardless of sex in the OH findings (Figure 2).

DISCUSSION

It has been reported that SUD increases major oral health functional and esthetic problems associated with periodontal disease, caries, oral infections, and tooth loss, combined with a history of reduced oral health care.^{3,21} Owing to a lack of financial resources, these dental problems typically go untreated until the severity of medical or functional consequences require emergency management.²¹ Consequently, there are no known reports addressing the critical question of how comprehensive management of these oral health needs affects the outcomes to SUD treatment. To this end, our study examined commonly used evidence-based SUD management strategies to determine the added value of including comprehensive oral health care (principally by trained third-year and fourth-year dental students under the supervision of licensed faculty members) on SUD outcomes. This objective was accomplished by evaluating standard outcome assessments from the *Treatment Episode Data Set (TEDS) State Instruction Manual*¹² most likely to predict success in managing SUDPs in 2 separate SUD treatment programs.^{22–24} To this end, all qualifying patients with SUDs entering the FSH or OH programs from 2015 through 2017 were informed of the FLOSS study supported by HRSA to train dental and SUD treatment workforces to work cooperatively in the management of SUDs (see Methods section for details).

During the first 1 through 2 months of treatment, identified patients with SUDs from FSH were able to become part of the DT group of the FLOSS program by volunteering and maintaining a good standing with the SUD-prescribed therapy (158 patients). Of the original group (1,020), those who did not self-select to be included in the DT group became part of

the DC group (862) for comparison as described in the Methods section. In contrast, the selection of patient groups by OH was based on routine oral examinations conducted by trained OH staff at the time of admission, resulting in the identification of 270 male and female consenting patients with severe major oral health needs who volunteered to be a part of the FLOSS project. After 1 through 2 months SUD treatment like that described previously for those patient-selected, these people were randomly (after ensuring their suitability for treatment by UUSOD dental students) assigned to the DT group (128). It was determined later that the remaining patients would be used to form the DC group (142) (Figure 1). After 1½ years into the FLOSS project, case workers reported that many of the DT patients demonstrated substantial improvement in their SUD treatment outcomes. These claims were confirmed by comparing the treatment duration outcomes between the patients with SUDs in the DT and DC (those in the original FLOSS groups not selected to receive oral health care as part of the SUD management) groups. It was hypothesized at this time that comprehensive oral health care had an important enhancing effect on the response of patients with SUDs to their treatment. Our results include the findings in patients with SUDs from the first one-half of the FLOSS project combined with subsequent patients who participated in the program during the second half. All of the de-identified SUD treatment outcomes derived from the *Treatment Episode Data Set (TEDS) State Instruction Manual* were similarly gathered throughout the FLOSS program and are reported together.

From the complete 3-year FLOSS project, it was observed that DT patients 79% (patient-selected), 196% (randomly selected males), or 281% (randomly selected females) experienced increases in the mean length of stay in SUD treatment compared with the corresponding DC patients (Figure 2A), suggesting that the effect of comprehensive oral health care on these patients improved the outcomes in both self-declared and randomly selected groups in a nonsex-dependent manner.¹¹ The increased length of stay in the treatment programs for the DT groups in both patient-selected and randomly assigned (staff-selected) groups corresponded with a significantly reduced likelihood of dropping out and increased the likelihood of SUD treatment completion for the DT groups (Figure 2B). These improvements in positive outcomes were associated with the observation that DT patients from FSH were also significantly more likely to be employed at time of discharge (Figure 3), more likely to be abstinent from their preferred drug of abuse (Figure 4), and less likely to be homeless (Figure 5).

For the most part, the patients from both self-declared and staff-selected or randomly assigned populations identified heroin and methamphetamine as their preferred illicit drugs of choice. This likely reflects the fact that these are the 2 most popular illicit substances in the state of Utah.²⁵ Based on this observation, it is also likely that the use of these drugs as the drug of preference does not account for the improvement in SUD treatment outcomes associated with the comprehensive oral health care in the DT versus DC patients from both FSH and OH populations. This was confirmed by finding no significant change in the outcomes when the conditional logistic regression model was adjusted for preferred drug of choice; that is, the benefits for SUD treatment outcomes were similar when examining the effects of all drug groups together or each drug group separately.

Although we were not able to examine specific reasons for differences in SUD treatment outcomes associated with comprehensive oral health care, a compelling explanation for our observation that comprehensive oral health care improves SUD treatment outcomes includes the possibility it relates to a patient's subjective view of overall well-being or QOL factor. The QOL assessments have been used in medicine (including SUD treatment) since the 1960s¹³ and reflect patients' psychiatric burden, such as physical and mental health and relationships with self and others. In 2008 and 2013, the concept of QOL has been applied directly to oral health.^{14,15} Thus, according to the US surgeon general, oral disease can "... undermine self-image and self-esteem, discourage normal social interaction and cause other health problems and lead to chronic stress and depression as well as incur great financial cost. They may also interfere with vital functions such as breathing, food selection eating, swallowing and speaking, and with activities of daily living such as work, school, and family interactions."²⁶

Based on conclusions such as those published by the US surgeon general, an oral health-related QOL assessment has been developed to evaluate the specific role of oral health care regarding functional, psychological, and social factors as well as patients' self-esteem and satisfaction with their oral health.¹⁴ As would be expected, these associated factors have been shown to directly contribute to overall QOL.¹⁵ Although the QOL measures are not necessarily disease specific, they have been shown to be especially important in the outcomes of SUD treatment when integrated with comprehensive medical and psychiatric hospital care.^{13,27} Particularly relevant to our observations, it has been suggested that the QOL measures in patients with SUDs are directly related to important elements of recovery such as employment, drug abstinence, and homelessness. Consequently, it is likely that dental procedures described in the Methods sections would help the QOL factors cited earlier by improving employment, housing, and drug abstinence (Figures 1, 3–5) owing to enhancement of physical and mental health and function, the quality of relationships with others, and the relationship with oneself (self-image).¹⁵

The clinical relevance of these findings specifically demonstrates for the first time that integrated comprehensive oral health care markedly elevates the success of SUDP treatment as measured by factors strongly associated with long-lasting recovery from SUD. The abuse of different drugs such as heroin, methamphetamine, alcohol, and marijuana was associated with the patients with SUDs from both FSH and OH evaluated in this study. To determine if the benefits of oral health care for SUD treatment are drug selective, the use of a conditional logistic regression model to calculate outcomes was adjusted for preferred drug choice, revealing that the improvement in management outcomes in the DT group is likely to work equally well regardless of preferred drug and would be an important tool to address SUD problems, such as the opioid drugs (heroin), that are major contributors to the current drug crisis in the United States.²⁸

Finally, the QOL factors that appeared to contribute to these successful SUD treatment consequences have been shown to also improve therapeutic outcomes for other long-term serious medical disorders often linked with major dental problems,²⁹ such as diabetes.^{14,30} Consequently, our findings appear to confirm previous suggestions that management of oral health-related QOF factors¹⁴ should be considered as a fundamental strategy to improve

positive therapeutic outcomes for other chronic conditions often associated with poor oral health and diminished sense of well-being,¹⁵ underscoring the importance of integrating comprehensive oral health care with treatment for many serious long-term disorders. ■

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ABBREVIATION KEY

DC	Dental control
DT	Dental treatment
FSH	First Step House
FLOSS	Facilitating a Lifetime of Oral Health Sustainability for Substance Use Disorder Patients and Families
HRSA	Health Resources and Services Administration
OH	Odyssey House
QOL	Quality of life
SUD	Substance use disorder
UUSOD	University of Utah School of Dentistry

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Figure 1.

Flowchart of the methodology and outcomes for the patient population in this study according to their substance use disorder (SUD) treatment provider (First Step House or Odyssey House), mode of selection (self-declared or staff-selected or randomized) to dental treatment (DT) and dental control (DC) groups, and the SUD treatment-related outcomes (treatment duration and quality-of-life factors). The numbers represent total patients in the indicated category.

Figure 2.

Factors related to substance abuse disorder (SUD) treatment duration for dental control (DC) and dental treatment (DT) groups for both First Step House (FSH) and Odyssey House (OH) patients. The mean (standard error) days of the mean treatment duration for each group (A). These data demonstrate that patients in the DT group from FSH and OH stayed in treatment significantly longer than those in the DC group regardless of sex ($P < .001$). Circumstances at time of discharge from treatment by patients with SUDs in the DT and DC groups expressed as percentages (B). Thus, regardless of sex, the percentage (Table) of those patients who left both the FSH and OH treatment programs against recommendation (dropped out) was significantly less in the DT group than in the DC group ($P < .001$), whereas for those who successfully completed treatment, it was greater ($P < .001$).

Figure 3.

The employment differences between intake and discharge expressed as percentages (Table) are compared in the DT and DC groups. The percentage increases between the intake and discharge values are shown on the right side of the respective columns for each group. The increase in employment at discharge was significantly higher in the DT group than in the DC groups from First Step House (460% versus 130%; $P < .01$).

Figure 4.

The differences in abstinence from drugs of abuse between intake and discharge (regardless of the recreational drug) expressed an increase in percentage in the dental treatment (DT) and dental control (DC) groups from First Step House (FSH). The calculated percentage (Table) increases between the intake and discharge values are shown on the right side of the respective columns for each group. The increase in drug abstinence at discharge was significantly higher in the DT group than in the DC group (257% versus 138%; $P < .01$).

Figure 5.

The reduction in homelessness expressed as percentage in the dental treatment (DT) and dental control (DC) groups from First Step House (FSH). The calculated percentages (Table) of decreases between intake and discharge values are shown on the right side of the respective columns for each group. The decrease in homelessness at discharge was significantly lower in the DT group than in the DC group (84% versus 52%; $P = .006$).

Table.

Primary drug of choice at 1 through 2 months after intake into substance use disorder treatment for patients receiving or not receiving comprehensive dental care in both programs.

TREATMENT PROVIDER	DRUG PREFERENCE GROUP	PATIENTS (%) [*]
First Step House (Self-Declared Men), n = 1,020	Dental control population	862 (85)
	■ Heroin preference	207 (24)
	■ Methamphetamine preference	241 (28)
	■ Alcohol preference	241 (28)
	■ Marijuana preference	67 (8)
	■ Other	106 (12)
	Dental treatment population	158 (15)
	■ Heroin preference	75 (47)
	■ Methamphetamine preference	39 (25)
	■ Alcohol preference	30 (17)
	■ Marijuana preference	6 (3)
	■ Other	8 (5)
Odyssey House (Staff-Selected or Randomized Men/Women), n = 270	Dental control population	142 (52)
	Males	97 (68)
	■ Heroin preference	36 (37)
	■ Methamphetamine preference	31 (32)
	■ Alcohol preference	11 (12)
	■ Marijuana preference	7 (7)
	■ Other	12 (12)
	Females	45 (32)
	■ Heroin preference	25 (56)
	■ Methamphetamine preference	7 (15)
	■ Alcohol preference	6 (13)
	■ Marijuana preference	2 (4)
	■ Other	5 (11)
	Dental treatment population	128 (48)
	Males	70 (54)
	■ Heroin preference	30 (43)
	■ Methamphetamine preference	22 (31)
	■ Alcohol preference	6 (9)
	■ Marijuana preference	4 (6)
	■ Other	18 (12)
	Females	58 (44)
	■ Heroin preference	20 (34)
	■ Methamphetamine preference	24 (41)
	■ Alcohol preference	4 (7)
	■ Marijuana preference	3 (5)
	■ Other	7 (12)

* The total number of patients with substance use disorders in each primary drug-preference category are expressed as a percentage of the total number of patients for each corresponding group. The percentage of patients in each category tended to be highest in the heroin group.

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