

Article

Make Mission Impossible Feasible: The Experience of a Multidisciplinary Team Providing Treatment for Alcohol Use Disorder to Homeless Individuals

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Abstract

Aim: People experiencing homelessness are often excluded from treatment programs for alcohol use disorder (AUD). The goal of this study was to describe the impact of a multidisciplinary treatment program on alcohol consumption and social reintegration in individuals with AUD experiencing homelessness.

Methods: Thirty-one individuals with AUD experiencing homelessness were admitted to an inpatient unit for 5–6 days for clinical evaluation and to treat potential alcohol withdrawal syndrome. A group of volunteers, in collaboration with the Community of Sant'Egidio, provided social support aimed to reintegrate patients. After inpatient discharge, all patients were followed as outpatients. Alcohol intake (number drinks/day), craving and clinical evaluation were assessed at each outpatient visit. Biological markers of alcohol use were evaluated at enrollment (T0), at 6 months (T1) and 12 months (T2).

Results: Compared with T0, patients at T1 showed a significant reduction in alcohol consumption [10 (3–24) vs 2 (0–10); $P = 0.015$] and in γ -glutamyl-transpeptidase [187 (78–365) vs 98 (74–254); $P = 0.0021$]. The reduction in alcohol intake was more pronounced in patients with any housing condition [10 (3–20) vs 1 (0–8); $P = 0.008$]. Similarly, compared with T0, patients at T2 showed significant reduction in alcohol consumption [10 (3–24) vs 0 (0–15); $P = 0.001$], more pronounced in patients with any housing condition [10 (3–20) vs 0 (0–2); $P = 0.006$]. Moreover, at T2 patients

showed a significant reduction in γ -glutamyl-transpeptidase [187 (78–365) vs 97 (74–189); $P = 0.002$] and in mean cell volume [100.2 (95–103.6) vs 98.3 (95–102); $P = 0.042$].

Conclusion: Patients experiencing homelessness may benefit from a multidisciplinary treatment program for AUD. Strategies able to facilitate and support their social reintegration and housing can improve treatment outcomes.

INTRODUCTION

Alcohol use disorder (AUD) is associated with high mortality and morbidity rates. Alcohol leads to a myriad of medical consequences related to organ damage including in the liver, digestive, nervous and cardiovascular systems and also plays a key role in the susceptibility to infections and carcinogenesis (Rehm *et al.*, 2009). Besides, motor vehicle accidents (Kelly *et al.*, 2004), increased risk of suicide (Darvishi *et al.*, 2015), increased criminality rates (Okuda *et al.*, 2015) and increased transmission of sexually transmitted infections (Rashad and Kaestner, 2004; Monroe *et al.*, 2016; Williams *et al.*, 2016) significantly contribute to alcohol-related morbidity and mortality.

At present AUD accounts for ~3 million deaths worldwide each year and for a total economic burden of up to 1% of gross domestic product (GDP) in European states (Laramée *et al.*, 2013), which varies between 0.6 and 5.44% of GDP in different countries worldwide (Thavorncharoensap *et al.*, 2009). These costs are partly related to alcohol-related loss of productivity and impairment of social functioning (Rehm *et al.*, 2009).

Among several aspects that impact alcohol-related morbidity and mortality, critical factors are those related to social vulnerability (level of development of healthcare system, culture, drinking context and alcohol production, distribution and regulations), individual vulnerability factors (age, gender, familial factors) and socio-demographic features (race, ethnicity, religious affiliation and socio-economic status) (World Health Organization, 2014; Collins *et al.*, 2016).

In people experiencing homelessness, the combination of many of these factors explains the high prevalence of AUD, which can reach 60% (Koegele *et al.*, 1999; North *et al.*, 2010). In particular, individuals experiencing homelessness are more likely to be exposed to stressors, have less protective factors, live in areas where alcohol is easily available, are more likely to suffer from concomitant conditions such as mental health problems and substance use disorders (Bloomfield *et al.*, 2006). Moreover, alcohol intake seems to have worse clinical effects on this specific population cohort compared to socially integrated individuals. In general, the most disadvantaged socio-economic groups show higher levels of alcohol-related consequences and organ damage than the wealthier ones who drink the same amounts of alcohol (Stafford and Wood, 2017).

The treatment of AUD based on harm reduction and/or abstinence-oriented interventions represents the main strategy to reduce alcohol-related morbidity and mortality. However, individuals experiencing homelessness very often have less access to AUD treatment programs. There are several reasons, including the social stigma (Volkow, 2020) that affects people experiencing homelessness coupled with the human, social and health complexity that characterizes their social milieu and at the same time the widespread prejudice that clinical response rate in this subset of the population is extremely unlikely. The differences in access to treatment programs play a critical role in creating inequalities in the prevalence of alcohol-related medical, psychological and social consequences in patients experiencing homelessness versus non-

experiencing homelessness. The actions to fill this gap should focus on the reduction of economic, geographical, social and cultural barriers to access primary care and services dedicated to the treatment of AUD. For example, programs aimed at improving employment levels can not only reduce alcohol-related harm but also improve mental health, impact on poverty and limit food insecurity (Holtyn *et al.*, 2017; Fowler *et al.*, 2019).

The ‘A. Gemelli’ Hospital at the Catholic University of Rome recently started a program for the treatment of both AUD and alcohol-related diseases in AUD patients experiencing homelessness. The program consists of both an inpatient and an outpatient treatment for AUD. This program was combined with social support provided in collaboration with social workers and volunteers from a non-profit organization named Community of Sant’Egidio, aimed to find a shelter and a job. This combined program includes an intake/assessment process for people experiencing homelessness at a centre named ‘House of Mercy’ (‘Villetta della Misericordia’ is its original name in Italian). This centre is located in proximity to the ‘A. Gemelli’ hospital in Rome and was launched on June 2016, as a joint collaborative effort among several parties involved in this mission, specifically the Gemelli Foundation (Fondazione Policlinico Universitario A. Gemelli), the Catholic University of Rome, the ‘Giuseppe Toniolo’ Institute and the Community of Sant’Egidio. This centre, the only one located in a university and hospital campus, provides food and lodging to any individuals experiencing homelessness regardless of their national origin, sex, race, colour or religion. At present, the centre can host up to 20 guests and provides several activities including night shelter, breakfast and dinner, showers and linen change, social support, management of administrative paperwork, job orientation, recreational activities and direct access to healthcare.

Aim of the present study was to describe and evaluate the impact of this multidisciplinary treatment program on alcohol consumption and social reintegration in individuals with AUD experiencing homelessness.

PATIENTS AND METHODS

Patients

The study evaluated patients experiencing homelessness followed in the period between March 2018 and May 2019, at the ‘Internal Medicine and Alcohol-Related Diseases’, Unit of the ‘A. Gemelli’ Hospital, Fondazione Policlinico Universitario A. Gemelli, Catholic University of Rome, Italy. Inclusion criteria were diagnosis of AUD according to DSM-V criteria, homeless condition and motivation to reduce alcohol consumption and/or achieve alcohol abstinence. No exclusion criteria were used.

A total of 44 patients satisfied the inclusion criteria and among them, 13 patients declined to be treated. Among the other 31 patients, 8 patients were lost during follow-up, whereas 23 patients completed the study (Fig. 1). All 31 patients gave their verbal consent to participate in the study and were finally included in the analysis, using a

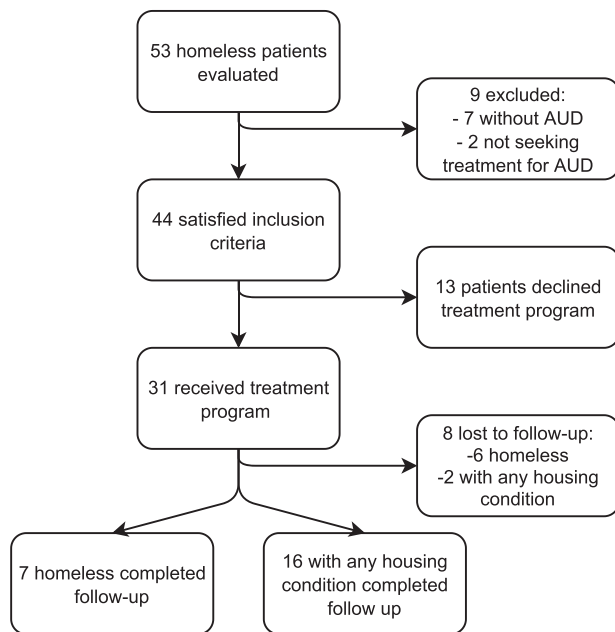


Fig. 1. Flowchart.

worst-case scenario approach. The demographic and clinical characteristics and median alcohol consumption of the patients included in the analysis are reported in Table 1.

Treatment and procedures

All patients were admitted to our inpatient program for 5–6 days during which they received a comprehensive medical evaluation, including medical history and physical examination, blood/urine laboratory work and imaging examinations as deemed clinically appropriate. In particular, alanine transaminase, total bilirubin, albumin, international normalized ratio, platelets count, test for hepatitis B virus (HBV) and hepatitis C virus (HCV) viruses and abdominal ultrasound were evaluated. Elastography (Aixplorer®-SuperSonic Imagine) was performed, when appropriate. During the inpatient hospitalization, patients received treatment for potential alcohol withdrawal symptoms, which were assessed using the Clinical Institute Withdrawal Assessment for Alcohol-revised (CIWA-Ar) score (Sullivan *et al.*, 1989). Subjects with a CIWA-Ar score ≥ 10 (defined as moderate or severe alcohol withdrawal syndrome requiring pharmacological treatment) received diazepam at the dose of 0.5–0.75 mg/kg body weight.

During hospitalization, physical comorbidities were evaluated, with particular attention to gastroenterological, cardiovascular, respiratory, renal, neoplastic and neurological disorders. Moreover, psychological and/or psychiatric comorbidities were investigated. Personal and family history of AUD, previous hospitalizations for alcohol-related diseases and abuse of other substances besides alcohol (cannabis, cocaine and other stimulants, opioids, benzodiazepine) were also collected.

After hospitalization discharge, some patients returned to their previous housing condition and some were hosted at the ‘Villetta della Misericordia’, based on both bed availability and patient’s agreement. All patients were treated as an outpatient and underwent visits every 2 weeks for the first 6 months and subsequently, patients were followed up with monthly visits.

Psychological support and counselling were provided at every visit by psychologists with expertise in motivational therapy. Specifically, 45-min individual counselling sessions were provided by the same trained professional staff. We also strongly encouraged attendance to support groups, within our unit and managed by one of the psychologists of the same professional staff or alcoholics anonymous. Finally, the off-label use of a medication for AUD (baclofen, for review see Mosoni *et al.*, 2018) was also employed.

At each outpatient control daily alcohol intake (number of drinks/day) was collected with the Timeline Followback method (Sobell *et al.*, 1988) and craving was assessed by a Visual Analogue Scale (VAS) (Sung and Wu, 2018).

Biological serum markers of alcohol use, i.e. γ -glutamyl-transpeptidase (GGT) and mean cell volume (MCV) were evaluated at 3, 6 and 12 months.

Moreover, the patient’s social status during the outpatient control was assessed, including employment status (employed/unemployed) and housing condition. The latter was classified as individuals experiencing homeless (without any housing condition) and with any housing condition, including patients with makeshift accommodations (e.g. caravan, hut) and those being resident at ‘Villetta della Misericordia’. As part of the social support integrated into this multidisciplinary treatment, a brief meeting between the volunteers of the Community of Sant’Egidio involved in helping people experiencing homelessness and the staff of the Internal Medicine and Alcohol-Related Diseases Unit was carried out at the end of each outpatient control.

The study protocol complied fully with the guidelines of the ethics committee of the Università Cattolica del Sacro Cuore in Rome, Italy, and it was approved by the ethics committee.

Statistical analysis

Demographic, clinical and laboratory parameters were evaluated with descriptive statistics and expressed as median value [interquartile range (IQR)]. Given the non-normality of the data (Shapiro–Wilk test), these parameters were compared by non-parametric methods (Spearman rank order correlations) at Time 0 (T0), 6 months (T1) and 12 months (T2). For all the analyses, comparisons between housing condition, distinguished in patients experiencing homelessness and with any housing condition were performed at T0, T1 and T2 (Mann–Whitney *U* test). Comparison between patients who have completed follow-up and those who have not was performed at T0 (Mann–Whitney *U* test). The difference in daily alcohol consumption and all clinical and laboratory parameters, at baseline (T0), at 6 months (T1) and 12 months (T2), respect to the housing condition, were evaluated using Wilcoxon matched-pairs test for paired data.

RESULTS

Among the 31 patients analyzed, the mean age was 48.7 ± 7.46 years. At T0, 6 (19.35%) of them had occasional jobs, whereas 25 (80.65%) of them did not work at all. The number of alcoholic beverages consumed per day was 10 (3–24) drinks/day. Presence of craving for alcohol was reported by 16 patients [51.6%; VAS 5 (3–6.5)], whereas 15 (48.39%) did not report craving [VAS 0 (0–0)]. In total, 24 (77.4%) patients had liver steatosis and 7 (22.6%) had liver cirrhosis (5 classified as Child-Pugh score A, 2 as B). Four (12.9%) patients tested positive for HCV and three (9.8%) for HBV.

All patients spoke English or Italian, in a comprehensible way.

Table 1. Characteristics of the patients at T0, T1 and T2

Demographic and clinical characteristics	T0		
	All patients	Any housing condition	Homeless
Number (%)	31 (100%)	18 (58.1%)	13 (41.9%)
Age (year) M (SD)	48.7 (7.46)	48.9 (7.56)	48.41 (7.60)
Sex (%)	97% M, 3% F	94.5% M, 5.5% F	100% M, 0% F
Standard drinks/day	10 (3–24)	10 (3–20)	10 (5–24)
Craving (VAS)	2 (0–5)	0 (0–5)	2 (0–4)
MCV	100.2 (95–103.6)	100.65 (97.9–103.6)	98.3 (95–103)
GGT	187 (78–365)	249.5 (98–536)	153 (76–225)
Other substance use disorder (%)	6 (19.3%)	1 (5.5%)	5 (38.5%)
Housing condition (%)	31 (100%)	18 (58.1%)	13 (41.9%)
Employed (%)	4 (12.9%)	4 (22.2%)	0 (0%)
Demographic and clinical characteristics	T1		
	All patients	Any housing condition	Homeless
Number (%)	23 (100%)	16 (69.6%)	7 (30.4%)
Standard drinks/day	0 (0–8)	0 (0–6.5)	0 (0–36)
Craving (VAS)	0 (0–5)	0 (0–5)	0 (0–0)
MCV	98.9 (95.27–100.2)	98.7 (97.5–100)	99.1 (95–101)
GGT	98 (77.5–239.5)	175 (86–253)	84 (65–96)
Other substance use disorder (%)	4 (17.4%)	1 (6.2%)	3 (42.9%)
Housing condition (%)	23 (100%)	16 (69.6%)	7 (30.4%)
Employed (%)	6 (26.1%)	6 (37.5%)	0 (0%)
Demographic and clinical characteristics	T2		
	All patients	Any housing condition	Homeless
Number (%)	23 (100%)	16 (69.5%)	7 (30.5%)
Standard drinks/day	0 (0–4)	0 (0–1.5)	4 (0–18)
Craving (VAS)	0 (0–0)	0 (0–0)	0 (0–4)
MCV	98.3 (95–101)	98.95 (98–101.5)	95 (94–99)
GGT	96 (74–172)	97.5 (81–183.5)	84 (74–96)
Other substance use disorder (%)	4 (17.4%)	2 (12.5%)	2 (28.6%)
Housing condition (%)	23 (100%)	16 (69.6%)	7 (30.43%)
Employed (%)	10 (43.5%)	9 (56.2%)	1 (14.3%)

After discharge from the inpatient unit, 13 (41.94%) remained patients experiencing homelessness and 18 (58.06%) resided in any housing condition [8 (25.81%) with ‘makeshift’ conditions, 10 (32.26%) hosted at the ‘Villetta della Misericordia’].

At T0, no significant difference in alcohol consumption was found between patients experiencing homelessness and patients with any housing condition [10 (5–24) and 10 (3–20), respectively; $P = 0.53$].

Moreover, no significant difference in craving score at T0 was found between patients experiencing homelessness and patients with any housing condition [2 (0–4); 0 (0–5); $P = 0.64$]. No difference in GGT [249.5 (98–536); 153 (76–225); $P = 0.082$] or MCV [98.3 (95–103); 100.65 (97.9–103.6); $P = 0.55$] was found between patients experiencing homelessness and patients with any housing condition.

At T0, a significant correlation between craving score and daily alcohol consumption was found ($r_s = 0.54$; $P = 0.002$). Moreover, patients experiencing homelessness had a significantly increased risk to use other substances (odds ratio of 10.62; $P = 0.022$).

Compared with T0, at T1 a significant reduction in the number of drinks/day [10 (3–24) vs 2 (0–10), respectively; $P = 0.015$] (Fig. 2) and a significant of reduction of GGT [187 (78–365) vs 98 (74–254), respectively; $P = 0.0021$] were found in all patients. MCV values showed a trend of reduction [100.2 (95–103.6) vs 98.9 (95.7–101), respectively; $P = 0.092$].

The analysis of data by subgroup showed a significant reduction of alcohol consumption in patients with any housing condition [10 (3–20) vs 1 (0–8); $P = 0.008$]. Although not statistically significant, a trend-level reduction in alcohol intake was also found in patients experiencing homelessness group [10 (5–24) vs 2 (0–24); $P = 0.084$] (Fig. 3). Among patients with any housing condition, six (37.5%) of them had occasional or a relatively stable job, whereas no patients experiencing homelessness had a job.

Furthermore, compared with T0, at T2 a significant reduction in the number of drinks/day [10 (3–24) vs 0 (0–15), respectively; $P = 0.001$] (Fig. 2) and a significant reduction of GGT [187 (78–365) vs 97 (74–189), respectively; $P = 0.002$] and MCV values [100.2 (95–103.6); 98.3 (95–102); $P = 0.042$] were found. A trend-level reduction in craving levels was also found [VAS 2 (0–5) vs 0 (0–3); $P = 0.086$]. A significant correlation between reduction of alcohol intake and reduction of serum GGT was found ($r_s = 0.35$; $P = 0.053$).

At T2, the analysis of data by subgroup showed a significant reduction of alcohol consumption in patients with any housing condition [10 (3–20) vs 0 (0–2), respectively; $P = 0.0057$]. The reduction of alcohol intake was not significant in patients experiencing homelessness [10 (5–24) vs 7 (0–18), respectively; $P = 0.081$] (3). Among patients with any housing condition, nine (56.2%) of them had occasional or a relatively stable job, whereas one (14.3%) individual experiencing homelessness had an occasional job.

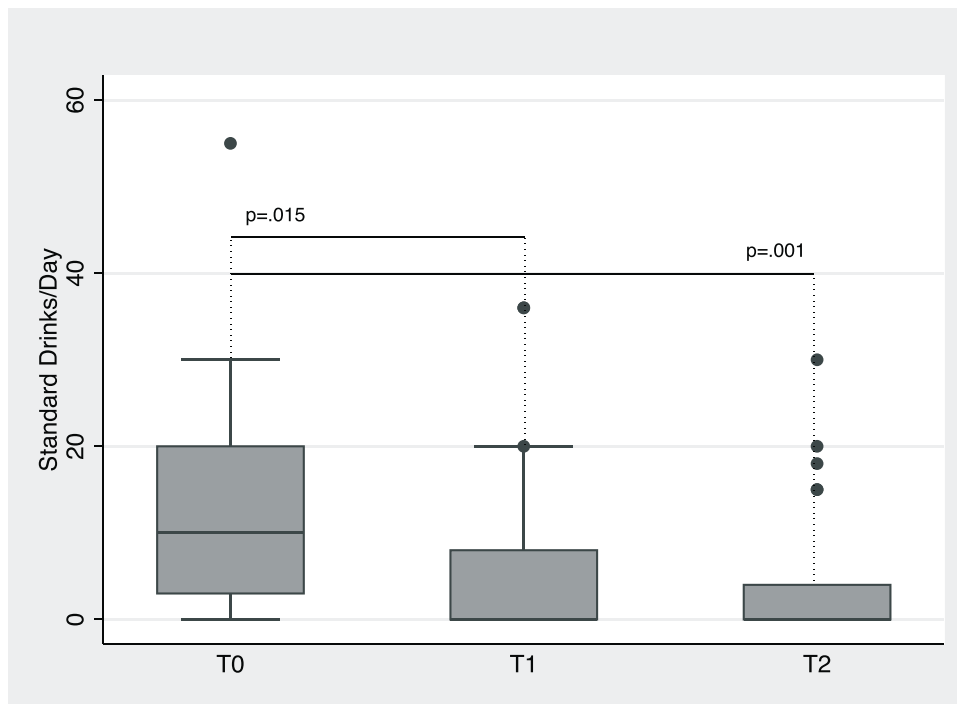


Fig. 2 Box plot of alcohol consumption (drinks/day) of treated patients at T0, T1 and T2. Comparison of drinks/day between T0 (enrollment) and T1 (6 months) and T0 and T2 (12 months) was performed by the Wilcoxon matched-pair test, and *P* values are presented above the box plots. Median, IQR and range are graphically presented in the graph.

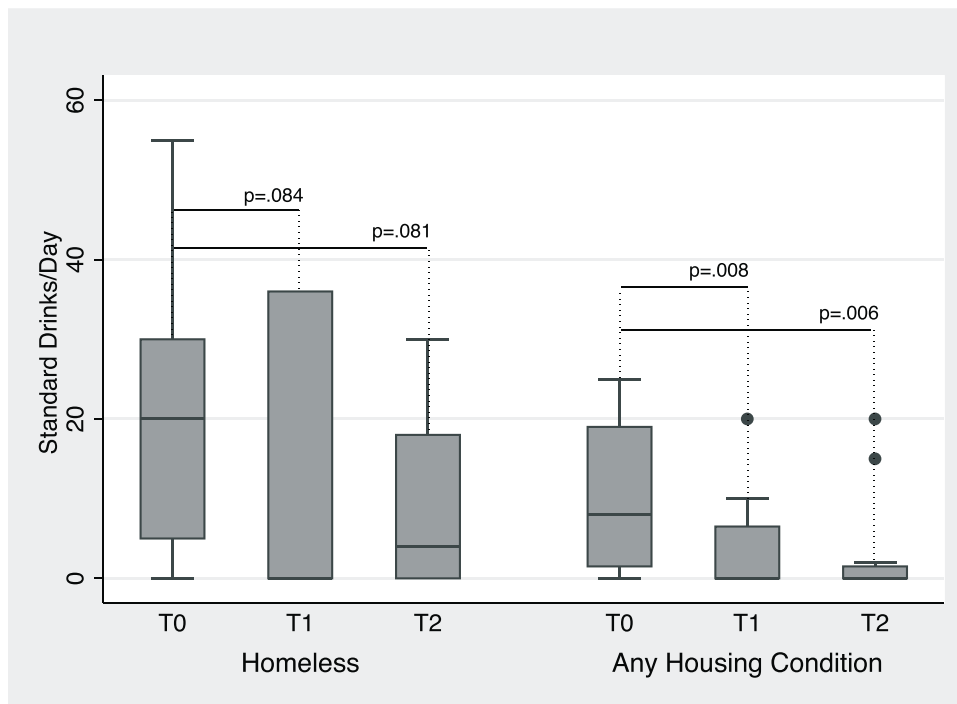


Fig. 3 Box plot of alcohol consumption (drinks/day) of treated patients at T0, T1 and T2 in homeless and patients with any housing condition. Comparison of drinks/day between T0 (enrollment) and T1 (6 months) and T0 and T2 (12 months) was performed by the Wilcoxon matched-pair test, and *P* values are presented above the box plots. Median, IQR and range are graphically presented in the graph.

No significant modification at T2 compared with T1 was found.

DISCUSSION

The present study shows that in patients with AUD experiencing homelessness, a multidisciplinary approach managed by a team of specialists with expertise in addiction medicine, psychology, and social workers and volunteers of a supportive community led to a decrease in alcohol consumption and an improvement in both living and working conditions.

The involvement of different professional providers appears to be crucial in the management of these patients, given their complex social and health status. The absence of an adequate housing condition could reflect multifaceted scenarios in which several social factors as work, health, education, legal status, social barriers and family intersect (Mabhala *et al.*, 2017). The loss of a stable job together with the isolation from the family members seem to be the most relevant events in the path of progressive marginalization that leads to homelessness (Christian *et al.*, 2016). Furthermore, a large number of people experiencing homelessness has experienced social problems and traumatic events during childhood, including poverty, school dropout, sexual violence, emotional abuse, dysfunctional family environment (Mabhala *et al.*, 2016). All these factors may lead to a progressive loss of resilience in facing the adversities of life, with maladaptive behaviours and legal problems (Mabhala *et al.*, 2016).

Homelessness is usually characterized by a worsening in health conditions including chronic diseases, disabilities and addiction diseases (Stafford and Wood, 2017), hence further contributing to the increased morbidity and mortality in this population. Access to health care treatments and support for AUD is critical among individuals experiencing homelessness, given that alcohol-related consequences have a wider impact on these individuals than in the general population (Stafford and Wood, 2017). Also, difficult access to care increases emergency department access rates, with a high economic and social cost (Holtyn *et al.*, 2017).

Social inequalities in alcohol-related harm are based on some factors as economic status, education, gender, ethnicity and housing condition. People experiencing homelessness are more likely to be exposed to stressors, have less protective factors and are more likely to suffer from concomitant conditions including medical and mental health comorbidities (Bloomfield *et al.*, 2006).

The present study shows that financial, geographical and cultural barriers to accessing care may be overcome by a multidisciplinary team of motivated clinicians and volunteers and this approach may improve patients' clinical outcomes. Indeed, the reduction in alcohol intake in these patients proves that providing treatment for AUD to individuals experiencing homelessness is not a 'mission impossible'. Specifically, in our sample, the average of drinks/day consumed at the time of the first outpatient visit (~13.7 drinks/day) was reduced by at least three times at 12-month follow-up (~4.65 drinks/day). This observation was also corroborated by the improvement of some serum biomarkers of alcohol use during the follow-up period, in particular GGT and MCV.

Both at the 6- and 12-month follow-up, the decrease of alcohol consumption was greater in patients with any housing condition in comparison to those who remained without any housing condition. This aspect indicates having a house condition facilitated better clinical outcomes and facilitated social integration. Indeed, among those patients who had a housing condition, a large percentage became more compliant with the recovery process and more inclined to seek stable housing arrangements.

This observation is supported by a recent study that showed that housing availability is one of the main social determinants of health and how health facilities are directly responsible for providing the initial finding of home for people experiencing homelessness (Kuehn, 2019). Having a stable house condition, therefore, seems like an essential element for a good quality of life and mental stability, becoming the starting point to plan a different future. Indeed, some of the patients followed by this treatment program were also able to find at least a part-time job. Notably, our results have also potential relevant translational value, given recent work in rodents suggesting a role of social reward in addiction (Venniro *et al.*, 2018; Venniro *et al.*, 2019).

Our study has some limitations. First, the lack of a long-term follow-up limits our ability to draft definitive conclusions on how sustained the beneficial effects of this multidisciplinary treatment approach in patients experiencing homelessness affected by AUD could be. Second, the small sample size is an important limitation, although it is also important to keep in mind that it is challenging to engage such a population and significant efforts are needed.

In conclusion, although the present data are preliminary and in need to future replications in larger samples followed for longer periods, the present experience is promising as it shows that it is possible to overcome the prejudice that patients experiencing homelessness cannot be engaged in treatment programs for AUD and alcohol-related medical, psychological and social consequences.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

- Bloomfield K, Grittner U, Kramer S *et al.* (2006) Social inequalities in alcohol consumption and alcohol-related problems in the study countries of the EU concerted action "gender, culture and alcohol problems: a multinational study". *Alcohol Alcohol Suppl* 41:i26–36.
- Christian, J., Abrams, D., Clapham, D., Nayyar, D. and Cotler, J. (2016) Intentions to move from homelessness to social inclusion: the role of participation beliefs, attitudes and prior behaviour. *Social Inclusion* 4(4): pp. 16–27.
- Collins SE, Jones CB, Hoffmann G *et al.* (2016) In their own words: content analysis of pathways to recovery among individuals with the lived experience of homelessness and alcohol use disorders. *Int J Drug Policy* 27:89–96.
- Darvishi N, Farhadi M, Haghtalab T *et al.* (2015) Alcohol-related risk of suicidal ideation, suicide attempt, and completed suicide: a meta-analysis. *PLoS One* 10:e0126870.
- Fowler PJ, Hovmand PS, Marcal KE *et al.* (2019) Solving homelessness from a complex systems perspective: insights for prevention responses. *Annu Rev Public Health* 40:465–86.
- Holtyn AF, Jarvis BP, Subramaniam S *et al.* (2017) An intensive assessment of alcohol use and emergency department utilization in homeless alcohol-dependent adults. *Drug Alcohol Depend* 178:28–31.

- Kelly E, Darke S, Ross J (2004) A review of drug use and driving: epidemiology, impairment, risk factors and risk perceptions. *Drug Alcohol Rev* 23:319–44.
- Koegel P, Sullivan G, Burnam A *et al.* (1999) Utilization of mental health and substance abuse services among homeless adults in Los Angeles. *Med Care* 37:306–17.
- Kuehn BM (2019) Hospitals turn to housing to help homeless patients. *JAMA* 321:822–4.
- Laramée P, Kusel J, Leonard S *et al.* (2013) The economic burden of alcohol dependence in Europe. *Alcohol Alcohol* 48:259–69.
- Mabhala MA, Ellahi B, Massey A *et al.* (2016) Understanding the determinants of homelessness through examining the life stories of homeless people and those who work with them: a qualitative research protocol. *Diversity Equality Health Care* 13:284–9.
- Mabhala MA, Yohannes A, Griffith M (2017) Social conditions of becoming homelessness: qualitative analysis of life stories of homeless peoples. *Int J Equity Health* 16:150.
- Monroe AK, Lau B, Mugavero MJ *et al.* (2016) Heavy alcohol use is associated with worse retention in HIV care. *J Acquir Immune Defic Syndr* 73:419–25.
- Mosoni C, Dionisi T, Vassallo GA *et al.* (2018) Baclofen for the treatment of alcohol use disorder in patients with liver cirrhosis: 10 years after the first evidence. *Front Psych* 9:474.
- North CS, Eyrich-Garg KM, Pollio DE *et al.* (2010) A prospective study of substance use and housing stability in a homeless population. *Soc Psychiatry Psychiatr Epidemiol* 45:1055–62.
- Okuda M, Olfson M, Wang S *et al.* (2015) Correlates of intimate partner violence perpetration: results from a National Epidemiologic Survey. *J Trauma Stress* 28:49–56.
- Rashad I, Kaestner R (2004) Teenage sex, drugs and alcohol use: problems identifying the cause of risky behaviors. *J Health Econ* 23:493–503.
- Rehm J, Mathers C, Popova S *et al.* (2009) Global burden of disease and injury and economic cost attributable to alcohol use and alcohol use disorders. *Lancet* 373:2223–33.
- Sobell LC, Sobell MB, Leo GI *et al.* (1988) Reliability of a timeline method: assessing normal drinkers' reports of recent drinking and a comparative evaluation across several populations. *Br J Addict* 83:393–402.
- Stafford A, Wood L (2017) Tackling health disparities for people who are homeless? Start with social determinants. *Int J Environ Res Public Health* 14:1535.
- Sullivan JT, Sykora K, Schneiderman J *et al.* (1989) Assessment of alcohol withdrawal: the revised Clinical Institute Withdrawal Assessment for Alcohol scale (CIWA-Ar). *Br J Addict* 84:1353–7.
- Sung Y-T, Wu J-S (2018) The Visual Analogue Scale for Rating, Ranking and Paired-Comparison (VAS-RRP): a new technique for psychological measurement. *Behav Res Methods* 50:1694–715.
- Thavorncharoensap M, Teerawattananon Y, Yothasamut J *et al.* (2009) The economic impact of alcohol consumption: a systematic review. *Subst Abuse Treat Prev Policy* 4:20.
- Venniro M, Zhang M, Caprioli D *et al.* (2018) Volitional social interaction prevents drug addiction in rat models. *Nat Neurosci* 21:1520–9.
- Venniro M, Russell TI, Zhang M *et al.* (2019) Operant social reward decreases incubation of heroin craving in male and female rats. *Biol Psychiatry* 86:848–56.
- Volkow ND (2020) Stigma and the toll of addiction. *N Engl J Med* 382:1289–90.
- Williams EC, Hahn JA, Saitz R *et al.* (2016) Alcohol use and human immunodeficiency virus (HIV) infection: Current knowledge, implications, and future directions. *Alcohol Clin Exp Res* 40:2056–72.
- World Health Organization (2014). *Global status on report on alcohol and health 2014*. Geneva, Switzerland: WHO. https://www.who.int/substance_abuse/publications/alcohol_2014/en/ (26 May 2020, date last accessed).
- World Health Organization (2018). *Global status report on alcohol and health 2018*. Geneva, Switzerland: WHO. <https://apps.who.int/iris/handle/10665/274603> (26 May 2020, date last accessed).