



Quantitative evaluation of an integrated nurse model of care providing hepatitis C treatment to people attending homeless services in Melbourne, Australia

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ABSTRACT

Background: The prevalence of hepatitis C virus (HCV) has been reported to be high among people experiencing homelessness. People who are homeless often have multiple needs that may take precedence over HCV testing and treatment. We quantitatively evaluated the outcomes of a service providing HCV treatment to people attending homeless services.

Methods: Clients attending homeless services were referred to a nurse specialising in HCV-related care. The nurse provided HCV testing, education and case-management while prescriptions were provided by an affiliated doctor. Logistic regression was used to explore factors associated with treatment commencement.

Results: Fifty-two clients referred (78%) underwent testing, thirty-nine were HCV-RNA positive among whom 18 (46%) reported sleeping rough and 29 (74%) reported injecting drug use; 66% had injected less than three months ago. Twenty-four (62%) clients commenced treatment, of whom thirteen (54%) had a sustained virological response test; all were cured. Treatment commencement was lower among people who reported sleeping rough (aOR 0.15, 95%CI 0.029–0.73). There was no difference in treatment commencement based on injecting drugs (aOR 1.06, 95%CI 0.21–5.2).

Conclusion: Most clients' commenced treatment and the majority were successfully cured using a dedicated nursing service. Clients who reported sleeping rough may still face personal and/or system level barriers to HCV treatment.

Introduction

Background

Globally the prevalence of hepatitis C virus (HCV) among people who are homeless varies however most studies have reported it to be high (Beijer, Wolf, & Fazel, 2012). The well-established association between injecting drug use and HCV infection has also been reported among people who are homeless (Strehlow et al., 2012). The relationship between homelessness, drug use and hepatitis C is complex and while difficult to quantify, evidence suggests that there is substantial overlap between homelessness and drug use with common risk factors for each (Neale, 2008).

In Australia, among 2396 people completing a survey at needle and

syringe exchange programs, 19% reported current unstable housing, 5% whom were sleeping rough. Half reported a history of residing in crisis accommodation and two-thirds reported at least one period of sleeping rough (Topp, Iversen, Baldry, & Maher, 2013). Among 923 participants who reported injecting drug use in the Australia-wide Illicit Drug Reporting System survey, 23% were homeless; a history of incarceration, injecting in public and a mental health diagnosis were significantly higher among participants who were homeless (Whittaker et al., 2015).

Availability of HCV direct acting antiviral treatments (DAAs) has led to global goals to eliminate HCV as a public health threat. Increased testing and treatment uptake through community based models of care is an important component of the response to achieve these goals (Scott et al., 2017). Evidence shows that HCV treatment in community settings

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has outcomes comparable to or better than tertiary settings (Wade, Veronese, Hellard, & Doyle, 2016) and integrating treatment with other harm reduction services can achieve high levels of treatment uptake (Morris et al., 2017). However, to date, there is limited literature regarding DAA based HCV treatment uptake among people who are homeless or at risk of homelessness with the few studies published to date primarily focusing on the outcome of sustained virological response (SVR).

A study specific to United States military veterans reported lower treatment uptake among those who were regarded as homeless. However, among those who did commence treatment, SVR was comparable between homeless veterans and non-homeless veterans (Noska, Belperio, Loomis, O'Toole, & Backus, 2017). In a study from Boston among 510 people who had experienced homelessness and were considered eligible for treatment, 300 started treatment and 255 achieved SVR, however people who were literally homeless were less likely to start treatment (Beiser, Smith, Ingemi, Mulligan, & Baggett, 2019). A study from an Australian community health clinic reported that 30% of 72 people commencing DAA treatment were homeless (Read et al., 2017). Whilst homelessness was associated with not having an SVR12 test or delayed SVR testing, of the 59 participants who had a SVR test result, 100% achieved SVR. Taken together, these studies suggest that HCV outcomes are high among people who are homeless who commence and complete treatment. Nonetheless, there remains limited literature regarding barriers to people who are homeless commencing treatment in the first place.

To better understand how to improve hepatitis C engagement, treatment and cure of people who are homeless or at risk of homelessness, we conducted a quantitative evaluation of a pilot nurse-led model of care among clients of two homeless services that aimed to increase HCV treatment uptake.

Methods

Data collection

Between November 2016 and July 2017 clients of two sites provided services to people who are homeless or at risk of homelessness were referred to a nurse led hepatitis C integrated care service which has been described previously (Wade et al., 2015). One site primarily provided emergency accommodation while the other was a clinic within a community health service with a high caseload of clients in unstable housing. Staff from both services were provided with HCV education and training by a social worker and project coordinator to enhance identification and referral to the nurse service. Upon referral, the nurse engaged the client either face to face or by telephone to undertake HCV testing. The nurse visited these services on a weekly basis and provided HCV testing via venous blood tests and other follow up services and prescription was provided by an affiliated doctor. Of those whom were engaged and tested, a brief questionnaire was completed. Those who were diagnosed as HCV positive were contacted to inform them of results and discuss commencing treatment. The nurse attempted to retain clients in care until SVR blood test, including through phone calls and contact with health providers. Ethics for this project were approved by the Alfred Hospital Human Research Ethics Committee.

Measures

Two outcomes were considered; treatment commencement and sustained virological response at least 12 weeks following projected treatment completion date. Treatment commencement was defined as the prescription of any DAA treatment available through the Australian Pharmaceutical Benefits Scheme. Clinical records were reviewed to ascertain treatment commencement and SVR at least 12 weeks following estimated treatment completion date up to the end of December

2017.

Factors potentially associated with HCV treatment outcomes were collected via a brief questionnaire at the time of HCV screening. The questionnaire included demographic questions; age, gender, country of birth, Aboriginal or Torres Strait Islander status. Questions regarding substance use included which substances were used and how they were used; specific to injecting use, options included more than 12 months ago, more than 3 months ago but less than 12 months ago and less than three months ago. Housing prior to service engagement included the options; at risk of homelessness, boarding house or sleeping rough.

All questionnaire responses that were free text, with continuous or more than two categories were analysed as binary responses; age (less than 40 or 40 and older), injecting drug use (less than three months ago or more than three months ago/no injecting history reported) and housing status (sleeping rough or boarding house/at risk of homelessness). Factors potentially associated with treatment commencement were examined using logistic regression methods. All analyses were conducted using Stata 15 (Statacorp, College Station, Texas, United States of America).

Results

A total of 67 clients attending the services were referred to the HCV integrated nurse in the first nine months of the service, among whom 52 were tested for HCV. Of the 52 clients who were tested, 39 were HCV-RNA positive. Among the clients who were HCV-RNA positive, the mean age was 45 (range 23–74, standard deviation 11), 64% were male and approximately 90% were Australian born and non-indigenous. Sleeping rough was reported by 18 (46%) clients prior to service engagement. Among 29 people who reported a history of injecting drug use, 19 (66%) reported injecting in the previous three months.

During the study period, 24 clients (62%) initiated treatment and of those, thirteen (54%) had confirmed sustained virological response. Clinical records indicated one client had moved to a regional area and two clients were deceased. The remaining eight clients had no record of having a test for SVR. Treatment commencement was higher among male clients; clients aged 40+ and those who did not report injecting drugs within the last three months; however these differences were not significant (Table 1). Conversely, treatment commencement was lower among clients who had reported sleeping rough prior to service engagement, remaining significant adjusting for recent injecting drug use, compared to those who were in a boarding house or other temporary accommodation (Adjusted odds ratio 0.15, 95% confidence interval [95%CI] 0.029 - 0.73, $p = 0.019$). No regression analyses were attempted due to thirteen clients having a known sustained virological response with all variables having a category with five or less clients. However as shown in Table 1, among those thirteen clients, a known SVR was less-common among clients who had reported sleeping rough prior to service engagement.

Discussion

Our evaluation suggests a nurse-led model of care for HCV testing and treatment can be effective in engaging clients of homeless services in hepatitis C testing and treatment. Three quarters of those referred were tested for HCV and of those with current infection approximately two-thirds started treatment. Although SVR test results were only available for approximately 60% of clients, all cleared their infection. While our sample size is small, this level of treatment uptake and SVR is encouraging given our study was specific to people who are homeless or at risk of homelessness. The two sites included in this pilot project are now included in a network of nine community based sites visited by the Alfred Health Hepatitis C Integrated Care Service.

While any person who is homeless or in unstable housing may have adverse health issues, those who are currently or have recent experience of sleeping rough may have increased health and other social

Table 1

Characteristics of clients who were HCV positive (n = 39) and treatment outcomes; Odds Ratio (OR), adjusted Odds Ratio (aOR) 95% confidence interval (95%CI).

	n (%)	Commenced	Known SVR ^a	Commenced OR (95%CI)	aOR (95%CI)
< 40	11 (28.2)	6 (54.5)	3 (50.0)	REF	
≥ 40	28 (71.8)	18 (64.3)	10 (66.7)	1.5 (0.36-6.18)	–
Sex					
Female	14 (35.9)	8 (57.1)	5 (62.5)	REF	
Male	25 (64.1)	16 (64.0)	8 (61.5)	1.3 (0.35-5.08)	–
Country of birth ^b					
Australia	35 (92.1)	22 (62.9)	11 (57.9)	N/A	
Other	3 (5.9)	2 (66.7)	2 (100.0)		
Indigenous status ^b					
Non-Indigenous	36 (92.3)	22 (61.1)	12 (60.0)	N/A	
Indigenous Australian	2 (5.1)	2 (100)	1 (50.0)		
Injecting history					
More than 3 months/no injecting	20 (51.3)	14 (70.0)	8 (61.5)	REF	REF
≤ 3 months	19 (48.7)	10 (52.6)	5 (62.5)	0.47 (0.13-1.77)	1.06 (0.21-5.2)
Accommodation type					
Risk of homelessness/boarding house	21 (53.8)	17 (80.1)	11 (73.3)	REF	REF
Sleeping rough	18 (46.2)	7 (38.9)	2 (33.3)	0.15 (0.035-0.63)	0.15 (0.029-0.73)

^a Among 21 of 24 clients who commenced treatment; two clients passed away and one moved to regional Victoria before SVR was obtained and are not included.^b Missing for one client.

needs. Therefore, in our evaluation we compared sleeping rough to other forms of homelessness. We found that clients who reported sleeping rough prior to service engagement had lower uptake of HCV treatment which aligns with findings from a study in Boston where people who were literally homeless were less likely to start treatment (Beiser et al., 2019). All clients who had a SVR test had cleared their infection however approximately one third had no SVR test and SVR testing was also less common among clients who reported sleeping rough. Given our specific aim of providing HCV treatment to clients of homeless services, it is not surprising that testing for SVR was sub-optimal as homelessness has been associated with no or delayed SVR previously (Read et al., 2017).

Our findings support the suggestion by Read et al. and Beiser et al. that specific strategies are needed for people who are homeless or at risk of homelessness for both treatment commencement and follow-up particularly among those who report sleeping rough. Rapid point-of-care testing has been shown to be broadly acceptable to people who inject drugs with no significant differences based on housing status (Bajis et al., 2018). Combining rapid point-of-care testing with same day treatment prescription, may overcome at least one barrier to treatment uptake for people who are homeless and need to re-locate on a regular basis. Furthermore, multidisciplinary programs have been shown to have a positive impact on non-HCV related outcomes relevant to people who are homeless; a study from Canada reported that although HCV treatment uptake was only 19%, there were significant increases in stable housing and government income support (Mason et al., 2015). Qualitative research has suggested that for many participants HCV was the least of their concerns however once treated they felt better equipped to handle issues regarding unemployment, finances, mental illness and drug use (Goutzamanis et al., 2018). Although further research is needed, this suggests there may be considerable benefits by further developing synergies between HCV treatment and homeless services.

There are limitations to our evaluation, and due to the small sample nature of this pilot program, our findings may need to be interpreted with some caution. We have reported on a small number of clients and adjusted analyses were only performed for treatment commencement. Data related to housing status following service engagement, which is likely to influence continued service engagement, including treatment initiation and SVR testing, was not available. Similarly, we did not have data related to the mental health status of clients which may influence initial housing status, subsequent housing status and understanding of

HCV testing and treatment. Due to small numbers it was not possible to examine the impact of other factors on treatment commencement including country of birth and Aboriginal or Torres Strait Islander status. Furthermore, these data are specific to clients attending two inner-city services and therefore may not be generalisable to those attending services in other locations or those not attending services at all.

Conclusion

Our evaluation supports a nurse-led model of care for HCV treatment among people who are homeless or at risk of homelessness who historically have been poorly engaged in hepatitis C related care. Previously few of these clients would have been expected to be tested and start treatment and fewer still to re-test for cure. While more than half of clients who were HCV diagnosed commenced treatment, of whom the majority had a known SVR, these data suggest that more tailored approaches may be needed to engage all people who are homeless in HCV treatment and follow-up. In particular, implementation of point of care testing and same day treatment prescription is likely to be of critical importance among these people. Further research, including qualitative approaches, among both service providers and clients, is required to further understand and overcome barriers to HCV treatment uptake among people who are homeless or at risk of homelessness and particularly among those who have recent or current experiences of sleeping rough.

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