

“Stigma is where the harm comes from”: Exploring expectations and lived experiences of hepatitis C virus post-treatment trajectories among people who inject drugs

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ABSTRACT

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Background: The advent of direct-acting antiviral (DAA) medications has facilitated opportunities to treat hepatitis C virus (HCV) among people who inject drugs (PWID). However, there remains a need for data about how to optimally support PWID throughout DAA post-treatment trajectories, including with regard to re-infection prevention. The objective of this study is therefore to identify how PWID with lived experience of HCV describe their expectations and experiences related to health and social outcomes, contexts, and substance use practices following completion of DAA treatment. **Methods:** We thematically analyzed data from in-depth, semi-structured interviews, conducted between January and June 2018, in Vancouver, Canada, with a purposive sample (n=50) of PWID at various stages of DAA treatment (e.g., pre, peri, post). **Results:** Our analysis yielded three themes. First, while participants had hoped to experience holistic enhancements in wellbeing following HCV cure, discussions of actual post-treatment experiences tended to be located in physical health (e.g., increased energy). Second, participants often pointed to the ways in which HCV-related and other stigmas had restricted opportunities for health and healthcare access. Participants therefore identified stigma-reduction as a key motivator of HCV cure, and while reductions in internalized stigma were sometimes achieved, participants underscored that other forms of enacted stigma (e.g., related to: substance use, HIV, poverty) had continued to feature prominently in their post-treatment lives. Third, participants described considerable knowledge about how to prevent HCV re-infection following cure, but they also expressed apprehensiveness about how socio-structural barriers, including stigma and criminalization, could interfere with harm reduction and re-

infection prevention efforts. **Conclusions:** DAAs are transforming the health and wellbeing of some PWID. Yet, HCV-related policy must extend beyond the scale-up of DAAs to include concerted public health investments, including anti-stigma efforts and improvements to the social welfare system, to meaningfully advance equity in PWID's post-treatment trajectories and outcomes.

Keywords [3-6]: Hepatitis C; Direct-acting antivirals; People who inject drugs; Substance use; Harm reduction; Re-infection

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Introduction

Hepatitis C virus (HCV) can be transmitted through the sharing of injection drug equipment (e.g., needles, syringes, filters, cookers) and thus disproportionately impacts people who inject drugs (PWID) (Falade-Nwulia et al., 2020; Public Health Agency of Canada, 2019). Globally, as of 2015, approximately 39% of people with recent (previous year) injection drug use are estimated to be living with HCV, corresponding to a population of 6.1 million people (Grebely et al., 2019). HCV has been and continues to be markedly undertreated – particularly, within populations who experience socio-structural barriers to treatment access, including PWID (World Health Organization, 2016). Left untreated, HCV has many deleterious and potentially fatal health effects, including cirrhosis, hepatocellular carcinoma, and end-stage liver disease (Botterill, 2018). As such, HCV remains a significant public health concern and a key contributor to morbidity and mortality for PWID (Cousien et al., 2016; World Health Organization, 2018).

The advent of highly effective, tolerable, and all-oral direct-acting antiviral (DAA) therapies has renewed optimism for the expansion of HCV treatment efforts to so-called “hard-to-reach” populations, including PWID (Grebely, Bruneau, Bruggmann, et al., 2017). Recent epidemiological evidence indicates that PWID have both a high degree of willingness to undergo DAA treatment and can be cured of HCV at rates comparable to other populations (>90%)

(Alimohammadi, Holeksa, Thiam, Truong, & Conway, 2018; Mah et al., 2017; Socías et al., 2017). Accordingly, a growing body of social and implementation science research has identified priorities for action to scale up DAA treatments among PWID, including through healthcare reforms (e.g., removal of clinical and regulatory barriers to treatment; implementation of integrated, decentralized, and peer-led services) and broader socio-structural interventions to address high levels of poverty and the lack of affordable housing, as well as substance use-related criminalization and stigmatization (Day et al., 2019; Ford et al., 2015; Goodyear, Ti, Carrieri, Small, & Knight, 2020; Grebely, Bruneau, Bruggmann, et al., 2017; Grebely, Bruneau, Lazarus, et al., 2017; Knight & Ti, 2019).

The evolving HCV care landscape signals a pivotal and long-awaited opportunity to reduce the inequitable burden (e.g., incidence, prevalence, impacts) of HCV among PWID. At this juncture, the growing body of quantitative literature concentrates on HCV cure as the priority marker of “successful” treatment among PWID. In contrast, the emerging qualitative literature with PWID populations in the DAA era has increasingly associated HCV cure with a breadth of health and social benefits, including improved energy levels, a more positive future outlook, reduced self-stigmatization, and improved interpersonal relationships, in addition to reductions in risk for HCV-related morbidity (Madden, Hopwood, Neale, & Treloar, 2018; Mora et al., 2020; Richmond et al., 2018). Nevertheless, some healthcare providers and policy practitioners continue to deprioritize DAA scale-up efforts with PWID because of negative assumptions made about their capacity to adhere to treatment; to reliably achieve cure; and to prevent re-infection (Asher et al., 2016; Goodyear, Ti, et al., 2020; Grebely, Bruneau, Bruggmann, et al., 2017; Litwin et al., 2019).

Ongoing public health research and policy attention into the impacts of HCV cure is needed to address existing information gaps and to facilitate the provision of evidence-based and population-tailored HCV care (Richmond et al., 2018). Furthermore, because PWID do indeed constitute a priority “at-risk” population for HCV re-infection (Cunningham et al., 2020; Rossi et al., 2018), additional investigation into how various features and contexts of PWID’s lives influence their post-treatment lives is needed to inform the delivery of follow-up care and harm reduction programming and policy. The objective of this study is therefore to identify how a sample of PWID with lived experience of HCV describe both their expectations and lived experiences related to health and social outcomes, contexts, and substance use practices following DAA treatment. This analysis is used to inform recommendations for policy and programmatic interventions that can advance equity in HCV-related follow-up care and broader health service delivery with PWID.

Methods

Theoretical perspectives

For the reader, it is helpful to consider our motivations for undertaking this research. This qualitative study aims to identify and interpret the hopes, experiences, and circumstances of PWID with respect to DAA post-treatment trajectories, while also drawing attention to how these trajectories are situated within and influenced by the broader context of PWID’s lives. To elicit pertinent aspects of this context, we draw on critical theoretical perspectives informed by principles of equity and social justice (Browne & Reimer-Kirkham, 2014; Varcoe, Browne, & Cender, 2014), as well as a thematic analysis approach informed by social constructivist epistemology (Charmaz, 2014; Creswell & Poth, 2018). These theoretical perspectives facilitate

the exploration of how socio-structural factors (e.g., healthcare and community supports, stigma and other forms of discrimination, criminalization, poverty) influence the health and social trajectories of PWID following DAA treatment – particularly, in ways that may inequitably restrict opportunities for health and healthcare access. This interpretive approach seeks to draw attention to the self-determination, capabilities, and resilience of a sample of PWID to highlight strategies for meaningfully supporting health and wellbeing following HCV treatment.

Concurrently, this approach seeks to identify areas for equity-oriented policy interventions to improve the social and structural conditions in which such opportunities become possible.

Study setting

This research was conducted in Metro Vancouver, BC, Canada. The prevalence of HCV among PWID in certain communities of Metro Vancouver, such as the Downtown Eastside, has historically been estimated to be as high as 83-88% (Public Health Agency of Canada, 2011). Enhanced harm reduction efforts (e.g., the implementation and scale-up of: peer- and community-based in-reach and outreach services, opioid agonist therapy [OAT], supervised consumption sites) – largely implemented in response to intersecting housing and opioid overdose crises in BC (Bardwell, Fleming, Collins, Boyd, & McNeil, 2019; British Columbia Coroners Service, 2019) – have contributed to sustained reductions in HCV incidence among PWID in this setting (Kuo et al., 2015). Furthermore, BC PharmaCare’s 2018 introduction of universal access to several DAA treatment formulations, through both primary care providers (e.g., family physicians, nurse practitioners [since 2019]) and specialist physicians (e.g., hepatology, infectious diseases), has facilitated opportunities to treat PWID and other British Columbians living with HCV, regardless of liver-disease stage (Lazatin & Little, 2018).

Nevertheless, the estimated 18,609 HCV-diagnosed current or former PWID in BC represent 34.8% of the province's total HCV-seropositive population, as of 2018, and remain a priority group for HCV treatment and re-infection prevention efforts (Bartlett et al., 2019).

Sampling and recruitment procedures

Informed by a stratified purposive sampling strategy (Palinkas et al., 2015), we led targeted recruitment of specific subgroups of participants (i.e., stratified by gender identity, ethnocultural identity, human immunodeficiency virus [HIV] serostatus) to obtain a heterogeneous sample with diverse and potentially minoritized perspectives and experiences related to HCV, DAAs, and post-treatment trajectories. We also recruited participants at various stages of DAA treatment (e.g., pre-, peri-, post-treatment) to delineate comparisons and potential divergencies between expectations and experiences about life following HCV cure. Participants were sampled from three large prospective cohort studies in Metro Vancouver: the Vancouver Injection Drug Users Study (VIDUS), the AIDS Care Cohort to Evaluate access to Survival Services (ACCESS) study, and the Preservation of Sustained Virologic Response (Per-SVR) study. As described in detail elsewhere (British Columbia Centre for Excellence in HIV/AIDS, 2020; Kennedy et al., 2020), VIDUS, ACCESS, and Per-SVR are community-recruited prospective cohort studies that have led epidemiological research with HIV-negative (VIDUS) and HIV-positive (ACCESS) people who use/inject drugs, as well as people with lived experience of HCV and who have completed or who are currently undergoing treatment with DAAs (Per-SVR). Of note, research activities for these three studies include serological testing for HCV and other blood-borne infections at baseline and follow-up interviews.

VIDUS and ACCESS research staff identified prospective participants by querying the cohort databases for participants who were living with HCV or who had been cured of HCV with DAA treatment; Per-SVR research staff identified prospective participants (all of whom had lived experience with HCV) by querying their databases for participants who inject drugs. Eligible participants lived within Metro Vancouver, were 19 years of age or older, were fluent in English, self-identified as a person who injects drugs, and had lived experience of HCV and were either (i) considering DAA treatment access, (ii) currently undergoing DAA treatment, or (iii) had recently completed treatment with DAAs. During VIDUS, ACCESS, and Per-SVR study visits, research staff informed prospective participants about the current qualitative study. Interested participants were then referred to our research team to obtain additional details regarding the study, confirm eligibility, and schedule interviews. Participants provided written informed consent prior to data collection activities and were remunerated with a CDN \$30 honorarium. Approval for this study was granted by the University of British Columbia Behavioural Research Ethics Board (#H16-02943).

Data collection

From January to June of 2018, co-authors PH and RK conducted in-depth, semi-structured interviews that ranged in length from 30-60 minutes. Interviews took place at research offices in Vancouver's Downtown Eastside. Our interview guides were tailored to participants' stages of HCV treatment status and were structured to include sections related to: (1) participant background; (2) expectations and – if treatment had been completed – experiences of health and social changes following HCV cure; (3) hopes, plans, and/or experiences related to substance use, healthcare access, and harm reduction and reinfection prevention following cure; and (4)

concluding and reflective remarks. Though fairly structured, we were flexible in our adherence to the interviews and we actively encouraged participants to discuss what was most important to them in the context of HCV, post-treatment life, and their health and social wellbeing more generally. We also drew on the aforementioned critical theoretical perspectives to facilitate a comprehensive investigation into the structurally embedded phenomena under study.

Specifically, we looked to the extant literature to delineate pertinent social determinants of health related to HCV and post-treatment life among PWID (e.g., housing, stigma, healthcare access), and we subsequently incorporated these social determinants into our interview guides and prompts. For example, we regularly prompted participants to discuss how various socio-contextual features of their lives (e.g., housing and employment conditions, day-to-day life activities, peer and sexual/romantic relationships, engagement with health services) influenced their expectations and experiences related to life following HCV cure. Participants also filled out an 8-item socio-demographic questionnaire, which included items related to age, ethnocultural identity, HIV serostatus, HCV treatment status, and gender identity.

Data analysis

Interviews were audio-recorded, transcribed verbatim, accuracy checked, and anonymized.

Interview data were uploaded to NVivo 12 software to manage the analysis. The study's research coordinator (co-author PH), co-author TG, and one other research assistant led preliminary analysis of the data by reading and re-reading participant transcripts, identifying key patterns and concepts, and then creating and assigning substantive open codes to reflect pertinent aspects of the data (Creswell & Poth, 2018). Interviews were initially coded by a single research team member, and examples of open codes used include “participant background information,” “post-

treatment health”, and “re-infection and prevention measures.” With consultation from senior co-authors RK, HB, and AJB, the lead author (TG) then used axial coding to group open codes into related concepts and categories, which provided a foundational schematic for gradually refining the analysis into key themes (Charmaz, 2014; Creswell & Poth, 2018). Throughout data analysis, we explored each key theme more fully through constant comparison techniques and by asking guiding analytic questions that stemmed from our overarching theoretical perspectives, including: (i) What do PWID perceive as the key impacts, considerations, and priorities following DAA treatment? (ii) How do various individual, healthcare, and socio-contextual features of PWID’s lives influence hopes and experiences with post-treatment re-infection prevention, as well as wellbeing more generally? (iii) What are the key challenges to equitable HCV post-treatment care with PWID, and what healthcare and community supports exist for addressing these challenges and promoting positive health and social outcomes? As our analysis evolved, we employed inductive techniques (e.g., revisiting the data for detail and context, iteratively contrasting interpretations of the data with what is documented in the relevant literature, debriefing and clarifying emerging themes at research team meetings) to develop and refine central themes, which we present below.

Findings

For this study, we interviewed a total of 60 PWID with lived experience of HCV. A final sample of 50 of these 60 individuals were included in this analysis, as we excluded 10 participants who, during the interviews, clarified that they had been cured of HCV with Interferon-based therapies several years prior (n=4), or indicated that they no longer injected drugs and had ceased doing so prior to HCV treatment (n=6). An overview of the socio-demographic characteristic of this

sample is presented in Table 1. Within this sample, 31 participants had not yet completed DAA treatment and could thus only share their expectations related to post-treatment life, whereas the 19 participants who had been cured of HCV with DAAs were able to discuss their lived experiences of life after treatment. For additional context, it is noteworthy that study participants described experiences of significant socio-economic hardship during our interviews, including instances of living on very low incomes and in inadequate housing situations (e.g., couch surfing, shelters, outside). Several participants indicated that they were employed in peer outreach work and/or sex work, and social welfare and disability payments also stood out as prominent sources of income.

Below, we offer the findings in three thematic sections: (i) health and wellbeing following HCV treatment, (ii) reducing the burden of intersecting stigmas, and (iii) navigating harm reduction and socio-structural barriers to prevent re-infection. Each participant quotation is preceded by a brief description of the participant’s socio-demographic profile and a researcher-assigned numerical identifier.

Table 1: Characteristics of participants

Participants	50
Age (average, range)	49 (31-66) Years
Ethnocultural identity¹	
<i>First Nations</i>	26 (52%)
<i>Métis</i>	3 (6%)
<i>Black</i>	1 (2%)

<i>White</i>	17 (34%)
<i>Declined to answer</i>	3 (6%)
HCV treatment status	
<i>Pre-treatment²</i>	20 (40%)
<i>Peri-treatment</i>	11 (22%)
<i>Post-treatment</i>	19 (38%)
HIV serostatus	
<i>Positive</i>	24 (48%)
<i>Negative</i>	26 (52%)
Gender identity	
<i>Man³</i>	26 (52%)
<i>Woman⁴</i>	23 (46%)
<i>Two-Spirit⁵</i>	1 (2%)

¹This category includes the ethnocultural identities described by participants themselves. The terms listed here are not intended to imply race-based categories; rather, these terms are intended to capture notions of self-identity and group identification.

²This category includes one participant whose completed DAA treatment regimen did not result in cure, one participant who prematurely ceased DAA treatment due to adverse side effects, and one participant who re-acquired HCV after being cured with Interferon-based therapies several years prior. All of these participants expressed intent to (re)access DAA treatment.

³All men who participated in this study identified as cisgender.

⁴One woman who participated in this study identified as transgender, whereas the remaining women identified as cisgender.

⁵“Two-Spirit” is an umbrella term intended to encapsulate a range of Indigenous gender diverse identities and non-normative sexual orientations (Carrier, Dame, & Lane, 2020). There is no singular definition of this term, as its use varies across and within Indigenous Peoples and communities.

Health and wellbeing following HCV treatment: “It’s a big stress off your shoulders”

Across our interviews, participants described how the implementation and scale-up of DAAs presented renewed potential for an improved quality of life following years to decades of living with HCV and, in many cases, other chronic illnesses (e.g., HIV, cardiovascular disease, renal disease). Participants who were still living with HCV pointed to how DAAs and the related prospect of a more attainable HCV cure signified hope for a longer and “better” life, which was frequently contrasted against the perceived dread of living with chronic and potentially fatal illness. As one 42-year-old woman, who had recently obtained access to HIV treatment and who was now seeking access to DAAs, described:

It [potential HCV cure] is a big stress off your shoulders. If you have a big stress off your shoulders, your whole mental health gets better. It would just make me feel like I wouldn't think about my mortality as much as I do. It's always based around, can I be here for my parents, or is it going to be the other way around? What's it going to be like? If I don't have to worry about that then that's just a big stress off. [. . .] Who would want to not think about that? [Interviewer: “Is this something that is on your mind a lot?”]. Oh yeah. Every day, every day, every day. . . Every day (Participant_22).

The above participant and others who were pre- and peri-DAA treatment often expressed hope that being cured of HCV could yield reductions in the perceived mental burden of HCV

infection. Yet, for participants who had completed DAA treatment, descriptions about life following cure tended to be located in *physical* wellbeing, including having improved energy, sleep, and appetite, with only occasional reference to improved psychological and emotional wellbeing, such as improved day-to-day cognition. Participants who had been cured of HCV often described having more energy to complete everyday activities, which, in many cases, related generally to managing their lives alongside a backdrop of substance use, poverty, and/or inadequate housing. Less often, participants cured of HCV described benefits related to social wellbeing, including having increased energy and motivation to connect with peers and loved ones, pursue sexual and romantic relationships, and obtain employment (if unemployed or underemployed). Partly constitutive of their descriptions of these positive changes were the contrasts with their quality of life and symptom burden while living with HCV (e.g., fatigue, nausea, lack of appetite, musculoskeletal pain). For example, one participant described:

I feel more energy. I'm not as tired. Yeah, it's just a lot better. I'm able to do more. I wake up early in the morning instead of like sleeping in all day, right? My eating was better, getting better. [. . .] I'd like to get a job and, you know, maybe. [Interviewer: "And do you think that was possible before you got cleared?"]. Not really, because the way I felt was just like, you know, all the time I was just no energy or anything, right? So, now I feel better! (Participant_06; 42-year-old woman, also living with HIV, completed DAA treatment).

Some participants who had completed DAA treatment also described having experienced minimal to no favourable changes in their lives following HCV cure. Rather, these participants underscored that HCV was only one of many health and social issues that they and their communities were facing (e.g., HIV, substance use, stigma, housing, overdoses, grief and loss). One 54-year-old man, who had completed DAA treatment and who was living with HIV, described:

You know, I still have problems. [. . .] You know, like things are not rosy in life. [. . .] So, the hep C [cure], that was one more monkey off my back. That's all it is (Participant_26).

In summary, participants at all stages of HCV treatment expressed hope at the prospect of a more attainable cure, particularly with regard to its expected potential for immediate (e.g., symptom alleviation) and long-term (i.e., with respect to social capital) improvements in health and wellbeing. Yet, participants cured of HCV tended to focus their descriptions of post-treatment life more exclusively on the physical changes they had experienced, which, at times, fell short of expectations for the more holistic health and social transformations they had hoped to realize.

Reducing the burden of intersecting stigmas: “People think I’m some foreign object who’s got hep C”

Almost all participants described stigma-reduction as a key motivator of HCV treatment. Across the interviews, participants described shame and internalized stigma associated with HCV – an issue that was distinctly prevalent among those who face intersecting stigmas related to other aspects of their health and/or social locations (e.g., HIV serostatus, substance use, ethnocultural identity, gender, sexuality). Here, participants who were pre- or peri-DAA treatment perceived that HCV cure could alleviate the inequitable burden of stigma and “othering” they had experienced, and thereby positively impact one’s personal identity and experiences of social belonging. At the same time, several participants who were still living with HCV described how being cured could abate concerns of inadvertently passing HCV onto others (e.g., peers, loved ones), including through blood-borne practices (e.g., sharing of injection supplies, razors, and other personal hygiene items). For example, one participant described:

My hepatitis C and my HIV really affects me. Makes me feel really gross inside. It doesn't make me feel like a human being, usually. I don't like having them. Makes me feel really uncomfortable around other people that aren't HIV, you know. Makes me feel like I don't want to, you know, pollute the atmosphere, or whatever it is. . . That's the way I feel sometimes. So, it's really hard on me sometimes, on myself. I'm the worst critic of all, usually. [. . .] It is quite hard, yeah. So, that's why I don't like going out and about, usually. [. . .] I feel like I'll probably do a little bit more [after HCV cure]. Not [feel] so toxicated [sic] or dirty (Participant_48; 42-year-old Two-Spirit person, had not yet accessed HCV treatment).

Among participants who were cured of HCV, several described a clear sense of pride and achievement in having accessed and completed DAA treatment. These participants often described feeling more hopeful about their futures without HCV, which, for some, included “letting go” of stigmatizing internalized identities. For instance, one of the aforementioned participants described his mindset following HCV treatment:

I'm feeling good about myself! It's empowering to know that I'm doing something for myself. I'm feeling better about myself and I'm getting healthier. Quit beating myself up, you know. Start looking and feeling like I'm worth it. So, let's get this body back in shape! (Participant_26).

Participants at all stages of HCV treatment had also expressed hope that being cured of HCV could reduce the overt stigmas they faced in various socio-structural and service-related contexts. Here, participants frequently recounted instances of facing HCV-related judgment and mistreatment, including during hiring procedures (e.g., the self-reporting of pertinent medical histories for new employment), workplace injuries (e.g., manual labour causing bleeding), searches for roommates and/or housing programs (i.e., which may involve disclosure of one's HCV serostatus), and medical care (e.g., accessing primary care and emergency services). As one participant who was peri-treatment for HCV stated, “[people] think you're some foreign object who's got hep C.” Accordingly, participants across treatment stages described feeling

hopeful that being cured of HCV could (or would have) improve(d) the ways in which they tended to be treated by peers and service providers.

Looking ahead to life following HCV cure, participants who had completed DAA treatment did affirm that they had experienced reduced internalized stigma. Unfortunately, participants cured of HCV also underscored that experiences of enacted stigma had continued to occur in their post-treatment lives. Specifically, these participants often indicated that although they no longer faced HCV-specific stigma, they nonetheless continued to encounter other intersecting stigmas in their lives following cure. Indeed, after the aforementioned participant expressed his sense of inner pride in being free from HCV, he went on to share that:

*I've been beaten around and kicked around, and society sucks today. [. . .] **[Interviewer: And has that changed since you were cured?]** It's starting to. It's still, you know, that stigma – you're a drug user, piece of shit, HIV [-positive] person. And I think a lot of people [that I encounter] still unfortunately have that attitude. (Participant_26).*

As the above quotation illustrates, interviews with participants who had completed DAA treatment often pointed to the connections between HCV-related stigma and other sources of stigma – particularly, in this study sample, the stigmas related to injection drug use, HIV, and socioeconomic hardship, including poverty and homelessness. These participants and those who had not yet completed DAA emphasized that – regardless of HCV serostatus – stigma featured prominently in their day-to-day contexts, in their relationships with others, and in their access of health and social supports. For instance, one 51-year-old woman who had completed DAA treatment and who was also living with HIV described how she continues to face stigma in healthcare spaces:

I feel they really have a lot of problems with drug addicts [at the inner-city hospital I go to]. It's like they have a revolving door, so they're kind of not really good at dealing with addicts. [. . .] It's a prejudice. People keeping you down, people putting you in certain places. They won't let you rise up and they don't want you to be successful, I guess. That's just the way people are. (Participant_49).

In summary, participants emphasized how hopes and experiences related to HCV, post-treatment life, and healthcare are deeply intertwined with and constrained by stigmatization. In considering the proposed challenges participants face in navigating stigma, we continue our analysis below by identifying the ways in which stigma and other socio-contextual forces may influence healthcare access and health-related practices following HCV cure and with respect to re-infection prevention.

Navigating harm reduction and socio-structural barriers to prevent re-infection: “I don’t want to end up in a vicious cycle”

Across our interviews, participants detailed their expectations and experiences regarding HCV re-infection prevention following DAA treatment. Participants who had not yet completed DAA treatment postulated that being cured of HCV could potentially catalyze efforts to stop and/or reduce their use of substances, including alcohol, as they anticipated that they would want to be diligent in their re-infection prevention efforts following treatment (e.g., through the cessation of injection drug use). Noteworthy, however, is that only one participant indicated that being cured of HCV had led them to stop injecting drugs. This singular experience of injection drug use cessation stood in contrast to the recovery-oriented hopes and expectations of several participants who had yet to complete DAA treatment. For example, one 35-year-old man expressed plans to reduce his use of injectable speed following HCV treatment, which he had not yet accessed:

It's one more reason to go in the right direction, right? Like it's – you know, when you say you have like hep C and HIV, or hep C and cellulitis, or hep C and whatever, it's just like, you know, you feel like you're deteriorating and you may as well just keep going on the path. But you know, if you clear up like one thing of say five things on your list of, you know, you want to get healthy or you want to, you know, stop using speed or – if I could, you know, clear up one of those things, like you know, get hep C treatment out of the way, that would definitely be like motivation to, you know, keeping going, right?
(Participant_27).

Participants at all stages of DAA treatment shared that their lived experiences with HCV and the knowledge gained throughout their HCV-related care trajectories (e.g., diagnosis, treatment, cure, follow-up care) had led to an enhanced awareness and uptake of substance use- and sexual health-related harm reduction practices, particularly in the context of HCV and/or HIV transmission. Looking ahead to their lives following HCV cure, pre- and peri-treatment participants generally described expectations that harm reduction would also feature prominently in efforts to prevent HCV reinfection. For instance, these participants described their plans to prevent re-infection by using condoms during sex, not sharing drug equipment (e.g., needles, syringes, cookers, pipes), not reusing injection drug equipment, and using some configurations of substances exclusively at supervised consumption sites (i.e., which provide sterile drug equipment). Overall, participants described being well-informed about strategies they could use to prevent HCV transmission and potential re-infection – a knowledge level which was described as being shared amongst participants' communities, given the perceived high prevalence and awareness of HCV and harm reduction within participants' networks. One participant, who had previously acquired HCV while incarcerated in a federal prison, where sterile injection supplies are largely not accessible (van der Meulen, Claivaz-Loranger, Clarke, Ollner, & Watson, 2016), described his knowledge level and community advocacy related to HCV prevention:

Now, I have more education on harm reduction and the importance of harm reduction. All this information that I know, now that I am a peer support worker and work in harm reduction, I've got lots of knowledge to pass on, so hopefully there won't be a lot of hep C being spread or HIV or any types of these diseases being spread, with education now (Participant_56; 35-year-old man who had not yet accessed HCV treatment).

Participants who had been cured of HCV attested that they remained committed to harm reduction following DAA treatment. Yet, while these participants described being highly knowledgeable and resourceful in terms of individual strategies one could use to prevent HCV re-infection, they also expressed concern that they could inadvertently reacquire HCV through various occupational and environmental risks. Among participants who disclosed current or previous engagement in sex work, many described concerns that they could reacquire HCV through sexual activities with clients. Meanwhile, participants who were employed as peer harm reduction workers (e.g., in-reach and outreach services, including opioid overdose response efforts and needle and syringe distribution programs) described unease and little control over the potential to experience needlestick injuries, which could mean exposure to HCV and other blood-borne viruses. For example, one 42-year-old woman who had completed DAA treatment participant described how she had limited options for safe employment as an outreach worker:

Because of the job I do, right, and the people that I work with are always flailing with their rigs, and you know, I pick up dirty rigs, so it's kind of scary. [. . .] I wear gloves a lot. A lot! [Laughs] Yeah. That's about all I can do, really (Participant_02).

Similarly, participants at all stages of DAA treatment expressed apprehensiveness about the ways in which social and structural barriers constrained opportunities for harm reduction, and, in doing so, hindered HCV transmission and re-infection prevention efforts. For example, participants described how, within the context of a worsening housing crisis in the study setting (Bardwell et al., 2019), poverty and substandard housing (e.g., single room occupancy units,

which often are small bedrooms with communal bathrooms and kitchens) create undue risks for HCV exposure. In emphasizing the role of high-quality housing in preventing HCV re-infection, one participant described how the lack of safe, sterile, and accessible spaces to inject drugs led him to use substances in his shared and unkept bathroom, which, looking ahead to post-treatment life, could inadvertently expose him to HCV (i.e., because of injection drug equipment used by other tenants being left in the bathroom):

I keep living in these single room occupancy things. Like I said, you go use the washroom, it's dirty. I go clean it, and when I go to the kitchen to use it, it's dirty, you know! If I clear it up... when I clear hepatitis C and I'm still living in a single room occupancy and I have to go to the washroom to use [substances], and I end up cleaning, I have to clean it, and if I catch hepatitis C again, I'm going to be beside myself! I don't know what I'll end up doing. Because, it's just, I don't want it to end up in a vicious cycle. I've been in those cycles. I don't want to be there anymore. So, that's why I say, I think it's highly important that when a person starts these programs [DAA treatment], that they get immediately taken out of their single room occupancy and put into a self-contained unit (Participant_58; 54-year-old man who was undergoing DAA treatment).

Importantly, participants also cautioned that broader experiences of stigma and violence could, at times, deter themselves and others from accessing harm reduction services (e.g., supervised consumption sites, needle and syringe distribution programs) – services that were described as essential for lowering one's risk of (re)acquiring blood-borne infections, including HCV. Many participants described instances in which stigma, criminalization, and extreme levels of poverty and substandard housing had prevented them from using substances more safely and from otherwise being well, despite their intentions of doing so. The structurally embedded nature of HCV transmission and re-infection risk was depicted by one of the aforementioned participants:

It's a bummer with that kind of stigma, what's going on in the world. Because that [stigma] is where the harm comes from, too, what people hide. And they may not go to a

place to get [sterile] needles because they don't want people to know that they're using, or someone might see them there (Participant_56).

A 31-year-old man undergoing DAA treatment further elaborated on the tensions that exist between societal and state violence and access to harm reduction services:

I had a safe injection [supply] box a block from my house. Some dude saw it and came out and blindsided – struck me in the head and threw me into a ditch – and said, “Don't do drugs in my fucking alley!” Then, he stomped on the box. I'm like, “What the fuck?!” And then I called the police, and the police were more interested in taking pictures of my track marks [and] saying that I assaulted him. So, I'm like, “Why the fuck do I call the police for it?”. I guess, as a known drug addict or whatever, they're like, “How can we get this guy now?” (Participant_55).

Throughout the data, participants illustrated their expectations and lived experiences of evolving health and social wellbeing, including with regard to substance use and harm reduction practices, as they navigated HCV diagnosis, treatment, cure, and the broader social contexts of their lives. Although participants had hoped to achieve significant improvements in symptom burden and overall quality of life following DAA treatment, many of those cured of HCV described experiencing limited meaningful changes in their post-treatment lives. Here, participants at all stages of HCV treatment expressed palpable concern regarding the need for broader socio-structural intervention (e.g., improved housing, anti-stigma efforts) to more fulsomely support PWID throughout and following HCV treatment, including with respect to harm reduction and re-infection prevention.

Discussion

The advent of DAAs and concomitant healthy public policy efforts to scale up access to these medications in many settings, including BC, Canada, signal a pivotal opportunity to decrease

HCV-related morbidity and mortality among PWID and others living with HCV. This study identifies a series of considerations for an equity-oriented approach to HCV care that accounts for contextual influences on DAA post-treatment trajectories among PWID. Participants in the current study described a series of expectations and – to a lesser extent – lived experiences related to improved health and social wellbeing following HCV cure, including HCV-related symptom alleviation, positive changes in identity, and reductions in internalized stigma. At the same time, participants tended to describe how life with HCV had precipitated enhanced motivations to oversee one’s health and potential risks, which included the operationalization of harm reduction strategies to prevent HCV re-infection. Participants’ accounts also illustrated the ways in which various socio-structural barriers impede safer substance use and wellbeing more generally, thereby increasing HCV transmission and re-infection risk.

Findings from this study complement the extant literature on the biomedical effects of HCV cure, and also align with but identify potential limitations in the emerging qualitative evidence on cure-related psychosocial outcomes, including with regard to identity changes and social reconnection (Harris, 2017; Madden et al., 2018). For example, while participants in this study described a range of expectations related to “lifestyle” and social changes associated with HCV cure, including revitalized energy and motivation to be more active, seek out employment, and pursue peer and romantic/sexual relationships, the lived experiences of participants cured of HCV tended to be more exclusively located in physical wellbeing.

The primary health care sector is optimally suited to support PWID to achieve holistic improvements in health *and* social wellbeing following HCV treatment. Indeed, since many models of primary care draw extensively on the expertise of interdisciplinary service providers

(e.g., nurses, social workers, dietitians), such an approach to care is well poised to provide integrated, client-tailored and context-sensitive care to PWID with lived experience of HCV – a population who, in this study, emphasized the evolving nature and complexity (e.g., changes in interpersonal dynamics and activities of daily living) of expectations and experiences related to their post-treatment lives. And while HCV treatment has traditionally been located with specialist care providers (e.g., hepatologists), primary care providers (e.g., family physicians, nurse practitioners) are known to be safe, effective, and more feasible alternatives for the provision of decentralized and accessible HCV care (Goodyear, Ti, et al., 2020; Kattakuzhy et al., 2017). Already, health-system reforms to decentralize HCV care are being championed globally and include, for example, efforts to implement and scale-up DAA treatment access in community pharmacies, community health centres, housing programs, and various harm reduction centres, such as supervised consumption sites and needle exchange programs (Castro et al., 2020; Goodyear, Ti, et al., 2020). As described in detail elsewhere (Browne et al., 2018; Ford-Gilboe et al., 2018), however, for primary health care approaches to meaningfully resource and sustain improvements in health, they must integrate accessible, high-quality services with concomitant policy changes that enhance access to social determinants of health. Further research to develop, test, and optimize such interventions, particularly in the context of HCV care with PWID populations, is urgently needed.

Findings from this study situate the reduction of enacted stigma as a key motivator for HCV treatment among PWID. The post-treatment expectations voiced by participants in this study corroborate recent evidence describing how PWID cured of HCV are sometimes able to forge new identities and enhance social connections following treatment with DAAs (Madden et al., 2018), and also align with previous research into the occurrence and effects of HCV-related

stigmatization in healthcare spaces accessed by PWID (Harris & Rhodes, 2013; Harris, Rhodes, & Martin, 2013; Hopwood, Nakamura, & Treloar, 2010). Importantly though, study participants who had been cured of HCV emphasized that intersecting stigmas – related to substance use, HIV, and socioeconomic hardship – had continued to feature prominently in their lives following DAA treatment, despite their hopes of otherwise. As such, while it is encouraging that DAA treatments can effectively cure PWID of HCV and thereby reduce the potential harms of HCV-specific stigmatization, HCV care that continues to be offered while leaving pertinent socio-structural barriers (e.g., substance use- and HIV-related criminalization and stigmatization; poverty, homelessness) intact will do little to address the remaining stigmas described in this study. As the lived experiences of PWID cured of HCV in this study indicated, there appears to be limited meaningful impact in “curing” a singular stigma within a multi-stigmatized life. Equity-oriented research and policy efforts to redress the structural drivers of intersecting stigmas experienced by PWID populations therefore remain urgently needed.

Participants in the current study described being confident and knowledgeable about how to employ harm reduction strategies to prevent HCV re-infection following cure. Given that recent research from this study setting has indicated that some subpopulations of PWID (e.g., people with recent injection drug use; PWID *not* receiving daily OAT) may be at higher risk of HCV re-infection and are likely to benefit from expansions in harm reduction services (Rossi et al., 2018), these findings are promising. However, as described elsewhere (Goodyear, Mniszak, Jenkins, Fast, & Knight, 2020; Moore & Fraser, 2006), while the use of various harm reduction practices can certainly lower the risk of adverse health outcomes, including HCV transmission, the effective operationalization of harm reduction requires the social spaces, population health policies, healthcare settings, and sociopolitical contexts that allow for risk-mitigation practices to

be taken up. Yet, participants in this study indicated that socio-structural barriers (e.g., stigma, violence, criminalization, precarious housing) and occupational and environmental hazards (e.g. potential exposure to HCV through sex work and peer outreach work) actively presented barriers to HCV re-infection prevention. It is beyond the scope of this study to fully generate strategies for overcoming these barriers; nonetheless, these findings do underscore the need for research and policy attention to extend beyond curing HCV and, in doing so, to comprehensively attend to the structural drivers of HCV and related inequities (Goodyear, Ti, et al., 2020; Knight & Ti, 2019; Rhodes & Treloar, 2008). Thus, drawing on Rhodes' seminal work in the context of HIV research (2002), we urge for a concerted paradigm shift toward the "risk environment" – rather than individual characteristics and practices – as the central unit of analysis and change with HCV (re)infection prevention efforts. For example, findings from this study suggest that enhanced access to safe housing and more adequate income support, bettered working conditions and supports (e.g., safer sex supplies, personal protective equipment) for PWID involved in sex work and peer outreach, and concerted efforts to curtail violence and criminalization could facilitate access to harm reduction and thereby reduce the population-level burden of HCV, including with regard to re-infection.

This study has strengths and limitations that should be noted. This study captured highly contextualized descriptions of HCV post-treatment trajectories from the standpoints of a diverse sample of PWID. Nonetheless, social desirability bias may have contributed to inaccurate or incomplete reporting of the stigma-laden topics under study (e.g., substance use, blood-borne infections). Further, participants in this study were involved in existing research activities in a large urban centre, and their experiences may differ from PWID populations who are less engaged in research and/or healthcare, or who are in other contexts and locations (e.g., rural and

remote communities, prisons). This study also did not focus on examining how experiences of HCV treatment may vary across and within subpopulations of PWID. Given distinct inequities faced and the intersecting stigmas described by participants in this study, future research is needed to explore how PWID's positionalities (e.g., with respect to: socio-economic status, age, ethnocultural identity, gender) interact with various contexts and systems of oppression in ways that may influence HCV post-treatment trajectories and broader health and social experiences.

Conclusion

The contemporary era of highly efficacious DAA treatments has animated global efforts to eliminate HCV as a major public health threat. At this juncture, however, findings from the current study emphasize the need for public health responses to HCV among PWID to incorporate *social* as well as biomedical approaches. Indeed, while the advent of DAAs has eased access to and tolerability of HCV treatments for this priority population, the significance and impact of these biomedical advances continue to be undermined by social and structural barriers to equitable HCV care and outcomes, including with regard to re-infection prevention, specifically, and health and wellbeing, more generally. To more fulsomely realize the potential promise granted by DAAs and to comprehensively support PWID throughout HCV treatment, equity-oriented policies and programming adaptations are urgently needed. Specifically, our findings underscore the need for decentralized and responsive HCV care, along with broader structural interventions, including anti-stigma and -violence efforts, improvements to the social welfare system (e.g., enhances access to adequate housing and income), and bettered working conditions and supports for PWID engaged in sex work and peer outreach.

Authors' contributions

TG led the analysis of data and conceptualized, wrote, and revised the manuscript. RK conceptualized the study, obtained study funding, contributed to data collection and analysis, and provided mentorship in writing this manuscript. HB and AJB contributed to data analysis and provided mentorship in conceptualizing, writing, and revising the manuscript. PH led data collection and contributed to data analysis and manuscript revision. LT contributed to data analysis and offered critical revisions to the manuscript. All authors read and approved the final manuscript.

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Declaration of interest

Declarations of interest: none.

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