



Aboriginal people with chronic HCV: The role of community health nurses for improving health-related quality of life

Amineh Rashidi^{a,*}, Peter Higgs^b, Susan Carruthers^c

^a School of Nursing and Midwifery, Edith Cowan University Joondalup Campus, 6207, Australia

^b School of Psychology & Public Health, Department of Public Health, La Trobe University, Bundoora, 3083, Australia

^c Curtin University National Drug Research Institute, Australia



ARTICLE INFO

Article history:

Received 16 December 2018

Received in revised form 1 August 2019

Accepted 17 August 2019

Keywords:

Aboriginal

Health related quality of life

Hepatitis C

Substance abuse

Nursing role

ABSTRACT

Introduction: There is a lack of knowledge about Health-Related Quality of Life (HRQL) of Aboriginal Australians with self-reported hepatitis C infection in Western Australia. This marginalised group of people is disproportionately affected by the hepatitis C virus (HCV) for which there is no preventative vaccine. This study provides data that help understand the long-term consequences of living with HCV infection within the Aboriginal community. It outlines opportunities for nursing interventions for hepatitis care that focus on supporting mental health and drug and alcohol issues within this population.

Methods: We surveyed 123 Aboriginal people living with HCV in a community setting. Survey data included demographics, drug use history, length of time since diagnosis, changes in lifestyle since diagnosis, fatigue, social support, alcohol consumption, and physical and mental health measures.

Results: Most participants reported amphetamine injecting frequently in the last six months and their duration of injecting drug ranged from 8 to more than 11 years. Additionally, half of the participants were classified as high-risk alcohol users. Overall 52% of participants were in poor physical and 60% of participants were in poor mental health.

Discussion: This survey of Aboriginal people with self-reported hepatitis C infection indicates substantial problems of mental and physical comorbidities among this population.

Conclusion: There is a need for the development of HCV community clinics in Aboriginal health care settings with trained Aboriginal community health nurses to reduce problematic alcohol consumption, assess liver health and subsequently provide HCV treatment in a culturally appropriate way.

© 2019 Australian College of Nursing Ltd. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Summary of Relevance

Problem or Issue

Evidence suggests Aboriginal Australians are disproportionately affected by hepatitis C and this has a negative impact on physical and mental quality of life. This study examined potential predictors of health-related quality of life (HRQL) in Aboriginal Australians with a history of injecting drug use and currently living with hepatitis C.

What is Already Known

In this study we found that high levels of alcohol use; being more recently diagnosed with hepatitis C (between 1–4 years), using methamphetamine and fatigue were the most common factors associated with poor mental and physical health among Aboriginal Australians.

What this Paper Adds

Our findings support the integration of nursing interventions that can monitor and track HRQL over time for Aboriginal Australians living with hepatitis C.

* Corresponding author.

E-mail addresses: a.rashidi@ecu.edu.au (A. Rashidi), P.Higgs@latrobe.edu.au (P. Higgs), S.Carruthers@curtin.edu.au (S. Carruthers).

1. Introduction

Hepatitis C virus infection (HCV) is a significant public health concern, affecting 170 million people worldwide (WHO, 2015). Given the recent advances in hepatitis C treatment mean the current number of people living with HCV has been reduced to approximately 201,416 people (The Kirby Institute, 2018). The Aboriginal Australian and Torres Strait Islander peoples (hereafter Aboriginal Australians) comprise 3% of Australia's population and are over-represented in the prevalence of HCV as well as the incidence of newly reported HCV cases (Graham, Harrod, Iversen, & Hocking, 2016). Approximately 16,000 Aboriginal Australians were infected with chronic HCV in 2008, representing 8.3% of the total population infected with HCV in Australia (McNally & Latham, 2009). More recent data also indicate that in 2015, HCV rates among Aboriginal Australians were four times higher than among non-Aboriginals (The Kirby Institute, 2016). This can be explained by the higher number of HCV case detections for Aboriginal Australians who inject drugs and those who are in custodial settings (Lafferty, Treloar, Chambers, Butler, & Guthrie, 2016). Recent research suggests that the rate of newly diagnosed HCV among Aboriginal Australians is 115 per 100,000 compared to the non-Aboriginal rate of 40 per 100,000 (The Kirby Institute, 2016). Aboriginal people experience disadvantage across a range of health and socio-economic outcomes (Mitrou et al., 2014), which may also mean unequal access to health facilities to help manage health problems associated with HCV.

It has been suggested that the impact of a HCV diagnosis alone causes a reduction in HRQL (Groessler et al., 2008). HCV infection may be associated with impairment in health-related quality of life (HRQL) (Strauss & Teixeira, 2006) even in the absence of liver disease the impact of HCV seems to be most significant in mental and physical functioning. For example, a considerable reduction in HRQL was found in HCV-positive blood donors who were unaware of their status (Strauss, Porto-Ferreira, Almeida-Neto, & Teixeira, 2014). More recently, a treatment study with people newly infected with HCV found significant associations between higher physical HRQL and employment and lower physical HRQL and symptomatic acute infection, while lower levels of mental HRQL were associated with a history of injecting drugs (Doyle et al., 2016).

The burden of HCV can be exacerbated by the impact it has on HRQL. HRQL is a multidimensional concept and refers to a patient's subjective assessment or perception of the impact of illness and/or its treatment on physical, mental, and social well-being (Zautra & Goodhart, 1979). Assessing HRQL and the associated factors are important for identifying ways to improve individual health for those living with HCV (Mahmoud, Shafik, & Attya, 2013), especially in populations who have poor health outcomes, such as Aboriginal people (Graham et al., 2016). Improving HRQL for individuals living with chronic HCV can bring nurses to the front line in providing HCV care, treatment, and support services (Lloyd et al., 2013). The evidence suggests that nurses can provide guidance and indeed lead to the management of HCV care and treatment (Ahern, Imperial, & Lam, 2004).

Educating individuals with HCV infection has been shown to improve HRQL through lifestyle changes initiated through behavioural modification (Mahmoud et al., 2013). For example, education on the monitoring of symptoms such as fatigue, body pain, depression, and lack of ability to function effectively (Mahmoud et al., 2013). Previous research has shown that individuals chronically infected with HCV respond to interventions focused on increasing knowledge and this, in turn, improves functional status and HRQL of individuals with chronic HCV (Sharif, Mohebbi, Tabatabaee, Saberi-Firoozi, & Gholamzadeh, 2005).

While little attention has been given to the delivery of effective HCV care in a culturally sensitive manner for Australian Aboriginal

people, it is well understood that the absence of appropriate cultural respect can be a barrier to providing appropriate care (North Coast Area Health Service, 2009). Cultural respect involves: "being aware that Aboriginal culture differs from non-Aboriginal culture, and that this culture may impact on the way that health and illness are perceived, how Aboriginal people communicate, and which services they are willing to access" (North Coast Area Health Service, 2009, 31). Community health nurses are well placed to play a key role in the provision of culturally sensitive HCV care. Despite previous research examining HRQL in people living with HCV, there are no published studies specifically examining the impact of HCV on HRQL among Aboriginal Australians. To date, considerations of HRQL have not been a focus in the development of HCV intervention strategies for Aboriginal Australians with chronic HCV.

1.1. Aim

This study aimed to examine what factors predict HRQL among Aboriginal people with a history of injecting drugs and who are living with chronic HCV. Knowing this will inform strategies for monitoring the physical and mental health of Aboriginal drug injectors over time.

2. Methods

2.1. Setting

Participants were recruited through multiple sites across the Perth metropolitan area. These sites include the peer-based Western Australian Substance Users Association (WASUA) in Perth and Bunbury; Hepatitis WA; WA AIDS Council (WAAC) Needle Syringe Exchange Program (NSEP) fixed site; and WAAC NSEP mobile van services, operating in eight locations in the metropolitan area (Rockingham, Mirrabooka, Joondalup, Midland, Forrestfield, Armadale, Fremantle and Gosnells).

2.2. Sampling

The level of HRQL was used to determine the sample size; this study used the higher proportion of 50%, that is, it was assumed that 50% of the sample would have poor HRQL and 50% would not have poor HRQL. By an acceptable sampling error of 9% at a 95% level of confidence (de Vaus, 1991) and employing the following formula (Kirkwood, 2000), the overall sample is:

$$\frac{n(1-n)}{e^2} = \frac{50(100-50)}{4.5^2} = 123$$

where n is the proportion and e the required size of standard error. Sampling error is two standard errors.

2.3. Participants

Current drug injectors who self-identified as Aboriginal and/or Torres Strait Islander and living with HCV were invited to participate in a cross-sectional survey. The eligibility criteria for study participants included: being 18 or more years of age; current injecting drug use; self-reported as having received an HCV diagnosis by a health care professional more than six months prior to interview; no previous experience of HCV treatment; and currently living in Western Australia. The main reason for choosing those with no experience of HCV treatment was to better understand how currently living with HCV can impact on both mental and physical HRQL.

2.4. Data collection

The survey was used to collect information from the 123 participants. Recruitment was undertaken through the distribution of study posters and information sheets at the venues previously described, and potential participants contacted the researcher directly by phone where eligibility was determined and a mutually agreeable time was arranged to complete the questionnaire. Consent was obtained, and the questionnaires were completed in a private room at the recruitment site inside or in the WAAC mobile van, or next to the mobile van wherever they felt comfortable and safe reading and responding to the questions. Participants were recompensed for their time and expertise with a supermarket voucher valued at AU \$20 on completion of the questionnaire.

2.5. Measures

2.5.1. Independent variables

The survey was adapted from validated survey instruments and included: socio-demographic and drug-history (Loxley, Carruthers, & Bevan, 1995), changes in lifestyle since HCV diagnosis (Horwitz, Brener, & Treloar, 2012), length of time since diagnosis (McNally, Sievert, & Pitts, 2006), fatigue (Fábregasa et al., 2013) and social support (Zimet, Dahlem, Zimet, & Farley, 1988). Alcohol consumption was measured using the AUDIT-C scale (Bush, Kivlahan, McDonnell, Fihn, & Bradley, 1998).

The first section (socio-demographic and drug history) contained questions about age, gender, accommodation, level of education, marital status, history of incarceration, residency status, drug use duration, frequency of injection and drug preference. Age in years was converted into a binary variable using the median score as the cut off (Tolmie, Muijs, & McAteer, 2011), <38 years old and ≥ 38 . All participants selected heroin or amphetamine as their preferred drug and the drug that they had injected recently, also they reported injecting drugs for “8–10” years or “more than 11 years” and reported injecting drugs either “once a day” or “more than once a day”, therefore the duration of injecting and frequency of injection was re-categorised accordingly. Alcohol consumption was assessed with 3 items (the first three questions of the full AUDIT). Alcohol consumption scores greater than 3, and 4 indicate high-risk consumption among women and men, respectively (Bush et al., 1998). These variables are considered as covariates.

The second section on changes in lifestyle since HCV diagnosis asked participants whether changes in their lifestyle had occurred since HCV diagnosis. This section contained 5 items; changes in diet, reduced or removal of alcohol, increased physical exercise, HCV monitoring, and any use of complementary medicines. Lifestyle changes scores were coded as a dichotomous no or yes. The items were summed together to form lifestyle changes scales; a higher score indicated greater behavioural changes. This section also asked the participants the length of time since their HCV diagnosis. The third section, on family/friend support, asked whether participants had support if they chose to undergo HCV treatment, which was measured by 8 items. For analysing social support, scores were grouped as “disagree” (grouping together the first three responses) and “agree” (the last two answers); the response “neutral” was included in the first group as it indicated that the subject did not necessarily agree (Alavi et al., 2015). Disagree and agree were re-categorised into “No” and “Yes”. Fatigue was measured through the Brief Fatigue Inventory (BFI) consisting of 10 items. Fatigues were categorised in mild (0–3 points), moderate (4–6 points), or severe fatigue (7–10 points) (Fábregasa et al., 2013).

2.5.2. Dependent variables

Mental and physical HRQL were measured using a 36-Item Short Form Health Survey (SF-36), the most common generic instru-

ment for measuring HRQL and one used in previous HCV research (Ferreiraa, Almeida-Netoa, Teixeiraab, & Strauss, 2015). This instrument is based on items related to physical and mental health status and can be applied to any disease and even to healthy subjects across eight domains (Ferreiraa et al., 2015). The SF36 is a validated measurement (Ferreiraa et al., 2015), which created a physical component summary (PCS) and a mental component summary (MCS). The PCS was used to assess physical health status, consisting of four domains; physical functioning, physical role, bodily pain, and general health perception. MCS consisted of vitality, social functioning, emotional role, and mental health scales. PCS and MCS score ranged from 0 (zero), corresponding to the worst health condition possible, to 100 (one hundred), corresponding to the best possible HRQL. PCS and MCS were categorised by the sample's median, poor PCS and MCS were defined as having a score lower than median value, this scoring system was adopted from the previous study (Marcuello et al., 2012).

2.6. Data analysis

Data from the questionnaires were coded and entered into SPSS (version 22; IBM, Chicago, USA) and cleaned prior to data analysis. Descriptive analysis was conducted to describe the background characteristics on all variables (predictors and outcomes) in the study, and percentage distributions for all variables were calculated to describe the full sample of participants. Bivariate analyses were conducted on all variables. Multivariate analyses (logistic regression) were conducted when there was more than one variable associated with the dependent variable $p < 0.10$ in bivariate analyses. All covariates were entered into the models. The variables with $p < 0.10$ in bivariate analyses were included as candidate measures in the multivariate model. In the multivariate analysis, $p < 0.05$ was considered for the retention of variables. The probability level of 95% was applied in all statistical tests.

2.7. Ethical considerations

Ethical approval for the study was granted by the Curtin University and Fremantle Hospital Human Research Ethics Committee (Reference Number: 12/198 and HR 77/2012). To ensure that participants were able to provide informed consent, the objectives, procedures, and implications of the study were explained clearly to interested potential participants. An information sheet and consent form were offered, and participants were informed that they were free to withdraw at any time. The primary researcher (AR) offered a follow-up interview, as support to participants who emotionally affected by speaking about their experience. Referral made to Hepatitis WA, where provides a support service for people with hepatitis C. However, none of the participants expressed their interest in the follow-up interview.

3. Results

3.1. General characteristics of the study sample

Of the 123 participants who completed the survey, over three-quarters were male (77.2%) and the median age of participants was 38 years. Most participants had a stable home and lived alone. The majority (83.7%) of participants had left school at or prior to completing Year 11. Just over half of all participants (55.3%) lived in a metropolitan area. Most participants (81.3%) described themselves as unemployed and derived their main source of income from government benefits. Heroin or methamphetamine was the only commonly injected drugs reported by participants in the six months prior to the interview. Almost 59% of participants had

Table 1
Socio-demographic data of survey participants.

Characteristics	n	%
Gender		
Male	95	77.2
Female	28	22.8
Median age (range)	38(24–60)	
Accommodation		
Non-homeless	86	69.9
homeless	37	30.1
Education		
<year 11	103	83.7
≥year 11	20	16.3
Employment		
Full or part time	23	18.7
Government benefits	100	81.3
Residency status		
Metropolitan	68	55.3
Non-metropolitan	55	44.7
Imprisonment		
Yes, not in the last 6 months	79	64.2
Yes, in the last 6 months	44	35.8
Recent injecting drug use		
Heroin	72	58.5
Methamphetamine	51	41.5
Drug duration		
8–10 years	51	41.5
More than 11 years	72	58.5
Frequency of injection		
Once a day	40	32.5
More than once a day	83	67.5
Alcohol consumption		
Low risk	49	39.8
High risk	74	60.2
Time since diagnosed		
5–10	48	39
1–4	75	61
Social support		
Yes	65	52.8
No	58	47.2
Positive Lifestyle change		
Yes	68	55.3
No	55	44.7
Fatigue		
Moderate	63	51.2
Severe	60	48.7
SF 36 domains		
Mental component score, median (range)	52(52.5–40)	
Not poor physical health	56	45.5
Poor physical health	67	54.5
SF 36 domains		
Physical component score, median (range)	51 (52.5–40)	
Not poor physical health	59	48
Poor physical health	64	52

injected amphetamine, most in the last six months. More than two-thirds of participants (67.5%) reported injecting more than once a day. The duration of injecting drug use for the participants ranged from 8 to more than 11 years. No participants reported injecting for less than 8 years. One-third of the participants reported injecting for 8–10 years. Nearly half of the participants were classified as high-risk alcohol users using AUDIT-C ranking, and 61% of participants had been diagnosed with HCV between 1–4 years previously. Almost 53% of the participants reported a supportive network of either family or friends. Less than half of participants reported no positive lifestyle changes since diagnosis with HCV. Further characteristics of the sample are presented in [Table 1](#).

3.2. Factors associated with mental health status

Unadjusted analyses of factors associated with poor mental health are shown in [Table 2](#). In adjusted analysis, unemployment (AOR: 4.49, 95% CI: 1.39, 14.48), high risk alcohol use (AOR: 8.01, 95% CI: 2.37, 27), being diagnosed with HCV infection between 1–4 years

(AOR: 4.2, 95% CI: 1.3, 14.14), methamphetamine use (AOR: 4.3, 95% CI: 1.3, 14.07) and fatigue (AOR: 8.35, 95% CI: 2.47, 28.22) were associated with poor mental health status.

3.3. Factors associated with physical health status

Unadjusted analyses of factors associated with the poor physical role are shown in [Table 3](#). In adjusted analysis older age (AOR: 3.81, 95% CI: 1.22, 11.94), high risk alcohol use (AOR: 8.55, 95% CI: 2.49, 29.35), being diagnosed with HCV infection between 1–4 years (AOR: 4.5, 95% CI: 1.39, 14.59) methamphetamine use (AOR: 3.52, 95% CI: 1.1, 11.18) and fatigue (AOR: 8.13, 95% CI: 2.54, 26.03) were associated with poor physical status.

4. Discussion

This cross-sectional study was conducted to determine the measures required to improve HRQL of Aboriginal Australians with a history of injecting drugs and with chronic HCV. This study describes the demographic, physical, and mental health characteristics of Western Australian Aboriginal individuals who were HCV treatment naïve. To our knowledge, very few Australian studies have assessed both the mental and physical health status of this population within a community setting. This is the first study to assess HRQL in Aboriginal people who inject drugs who report being diagnosed with HCV using the SF36 and fatigue instruments. The data shows HRQL impairments for participants, especially in the physical and mental components of the instruments. The impact of an HCV diagnosis coupled with patterns of injecting drug use and other chronic conditions may aggravate the quality of life among HCV treatment naïve patients.

In this study, over half of the participants were classified as having poor physical (52%) and mental health (60%) status using the SF-36 scale. We found that HRQL scores were significantly lower than previously recorded in recently treated chronic HCV patients ([Younossi et al., 2017](#)). This finding indicates that Aboriginal people who inject drugs have a reduced quality of life in physical, mental and, general health domains. This supports the development of nurse-led interventions which target improving HRQL by focusing on physical HCV symptoms and addressing psychological needs in a culturally client centred sensitive manner.

The multivariate analysis showed an independent association between poor physical and mental HRQL and high-risk alcohol use, unemployment, older age, being diagnosed with HCV infection between 1–4 years previously, methamphetamine use and fatigue. It has been well established that HCV infection impacts on disease progression and other health outcomes and negatively affects physical functioning and mental health of individuals with chronic HCV ([Gao, Gao, Li, Shang, & Yu, 2013](#)). Additionally, in this study, alcohol consumption did not change significantly after HCV diagnosis and may indicate participants in this study were unaware of the impact of alcohol consumption on their health. Given its relative affordability as well as greater social acceptability, alcohol use was common. High levels of alcohol consumption among participants in this study was not surprising and highlights the negative impact of alcohol use on HRQL among people living with HCV ([Costenbader, Zule, & Coomes, 2007](#)).

More than one-third of participants in our study showed severe fatigue according to BFI, similar to fatigue rates reported among HCV patients in another study ([Basseri et al., 2010](#)). An earlier study among people with HCV-HIV co-infection identified fatigue was associated with impairment in physical and mental HRQL domains, and was a strong predictor of reducing HRQL ([Fábregasa et al., 2013](#)). Fatigue among participants in our study could be associated with depression, alcohol consumption, and other drug use. An

Table 2
Unadjusted and adjusted analyses of factors associated with mental health status.

Characteristics	Not poor Mental HRQL	Poor Mental HRQL	OR (95%CI)	p-value	AOR (95%CI)	p-value
Gender						
Male	37(38.9)	58(61.1)				
Female	19(67.9)	9(32.1)	0.3(0.12,0.73)	p < 0.001		
Age						
<38 years	39 (72.2)	15 (27.8)				
≥38 years	17 (24.6)	52(75.4)	7.95 (3.54,17.85)	p < 0.001		
Accommodation						
Non-homeless	44(51.2)	42(48.8)				
homeless	12 (32.4)	25(67.6)	2.18 (0.97,4.89)	p = 0.05		
Education						
<year 11	42(40.8)	61(59.2)				
≥year 11	16 (80)	6(30)	0.29 (0.1,0.83)	p = 0.01		
Employment						
Full or part time	51(51)	49(49)				
Government benefits	5(21.7)	18 (78.3)	3.74(1.29,10.87)	p = 0.01	4.49(1.39,14.48)	p < 0.01
Residency status						
Metropolitan	43(63.2)	25(36.8)				
Non-metropolitan	13(23.6)	42(76.4)	5.55(2.51,12.89)	p < 0.001		
Imprisonment						
Not within the last 6 months	46 (58.2)	33(41.8)				
In the last 6 months	10(22.7)	34(77.3)	4.73 (2.05,10.92)	p < 0.001		
Recent injecting drug use						
Heroin	43 (59.7)	29(40.3)				
Methamphetamine	13 (25.5)	38(74.5)	4.33 (1.97,9.51)	p < 0.001	4.3(1.3,14.07)	p < 0.01
Drug duration						
8–10 years	18(35.3)	33(64.7)				
More than 11 years	38(52.8)	34(47.2)	0.48 (0.23,1.02)	p = 0.05		
Frequency of injection						
Once a day	13 (32.5)	27(67.5)				
More than once a day	43 (51.8)	40(48.2)	0.44(0.2,0.98)	p = 0.04		
Alcohol consumption						
Low risk	41 (83.7)	8 (16.3)				
High risk	15 (20.3)	59 (79.7)	20.15(7.82,51.92)	p < 0.001	8.01(2.37,27)	p < 0.001
Year since diagnosed						
5–10	37(58.7)	26(41.3)				
1–4	19(31.7)	41(68.3)	3.07(1.46,6.43)	p < 0.001	4.2(1.3,14.14)	p = 0.01
Social support						
Yes	36(55.4)	29(44.6)				
No	20 (34.5)	38(65.5)	2.35 (1.13,4.89)	p = 0.02		
Fatigue						
Moderate	37 (58.7)	26(41.3)				
Severe	19(31.7)	41 (68.3)	3.071(1.46,6.43)	p < 0.001	8.35(2.47,28.22)	p < 0.001
Positive Lifestyle change						
Yes	44(64.7)	24(35.3)				
No	12(21.8)	43 (78.2)	6.56 (2.92,14.77)	p < 0.001		

effective nursing intervention to reduce the burden of fatigue is required. However, this cross-sectional study did not allow us to identify the causality between these factors and depression, hence further a prospective cohort study with a large, nationally representative sample is required to verify and enrich the results of the present study.

Being infected with HCV was associated with lower scores in physical and mental HRQL domains, which was expected and similar to a previous study (Younossi et al., 2015). Age also significantly influenced the HRQL physical domain. Older age was independently associated with diminishing effects upon quality of life (McDonald et al., 2013). Using methamphetamine had significant associations with poor physical and mental HRQL (Gonzales et al., 2009). This suggests that certain illicit drugs use may have a greater impact on HRQL and may play a more central role in decreasing HRQL physically and mentally. The presence of illicit drug use could be associated with changes in mental and physical functions of individuals. This is consistent with previous research showing methamphetamine was associated with poorer mental and physical quality of life (Gonzales et al., 2009). Apart from medical treatment, nurses working within Aboriginal cultural contexts

can provide supportive links to drug and alcohol counsellors and other services to meet an individual's needs.

Limited understanding of HCV symptoms, including lack of symptoms, may deter Aboriginal Australians from engaging in HCV treatment (Brener et al., 2016). Experiences of stigma and discrimination related to HCV, injecting drug use, and particularly Aboriginality can all be intensified for Aboriginal Australians (Brener et al., 2016) when compared to others living with HCV. Effective HCV pre and post-test discussions, including HCV diagnosis by nurses who can provide the necessary information about managing HCV (including referral for treatment) could help reduce these barriers to HCV care. As many Aboriginal Australians report more pressing health and social priorities (McNally & Latham, 2009), community nurses may be well placed to manage health problems associated with HCV. This includes education on the asymptomatic nature of HCV and the importance of lifestyle modifications including reducing alcohol use, maintaining a healthy weight and ongoing medical visits to prevent or delay liver damage (Ingrid Hickman et al., 2002). Such information and education particularly when they are provided by Aboriginal health workers can ensure culturally appropriate HCV care. Analysis of intervention studies should be undertaken to create HRQL

Table 3
Unadjusted and adjusted analyses of factors associated with physical health status.

Characteristics	Not poor Physical HRQL	Poor Physical HRQL	OR (95%CI)	p-value	AOR (95%CI)	p-value
Gender						
Male	40(42.1)	55(57.9)				
Female	19(67.9)	9(32.1)	0.34 (0.14,0.84)	p = 0.01		
Age						
<38 years	40 (74.1)	14 (25.9)				
≥38 years	19 (27.5)	50(72.5)	7.51 (3.35,16.83)	p < 0.001	3.81(1.22,11.94)	p = 0.02
Accommodation						
Non-homeless	46(53.5)	40(46.5)				
homeless	13 (35.1)	24(64.9)	2.12 (0.95,4.71)	p = 0.06		
Education						
<year 11	45(43.7)	58(56.3)				
≥year 11	14 (70)	6(30)	0.33 (0.11,0.93)	p = 0.03		
Employment						
Full or part time	53(53)	47(47)				
Government benefits	6(26.1)	17 (73.9)	3.19 (1.16,8.77)	p = 0.02		
Residency status						
Metropolitan	42(61.8)	26(38.2)				
Non-metropolitan	17(30.9)	38(69.1)	3.61(1.7,7.66)			
Imprisonment						
Yes, not in the last 6 months	47 (59.5)	32(40.5)				
Yes, in the last 6 months	12(27.3)	32(72.7)	3.91 (1.75,8.72)	p < 0.001		
Recent injecting drug use						
Heroin	44 (61.1)	28(38.9)				
Methamphetamine	15 (29.4)	36(70.6)	3.77 (1.75,8.11)	p < 0.001	3.52(1.1,11.18)	p = 0.03
Drug duration						
8–10 years	19(37.3)	32(62.7)				
More than 11 years	40(55.6)	32(44.4)	0.47 (0.22,0.98)	p = 0.04		
Frequency of injection						
Once a day	14 (35)	26(65)				
More than once a day	45(54.2)	38(45.8)	0.45(0.2,0.99)	p = 0.04		
Alcohol consumption						
Low risk	42 (85.7)	7 (14.3)				
High risk	17 (23)	57 (77)	20.11(7.65,52.87)	p < 0.001	8.55(2.49,29.35)	p < 0.001
Year since diagnosed						
5–10	39(61.9)	24(38.1)				
1–4	20(33.3)	40(66.7)	3.2 (1.55,6.8)	p < 0.001	4.5(1.39,14.59)	p = 0.01
Social support						
Yes	36(55.4)	29(44.6)				
No	23(39.7)	35(60.3)	1.88 (0.92,3.87)	p = 0.08		
Positive Lifestyle change						
Yes	43(63.2)	25(36.8)				
No	16(29.1)	39 (70.9)	4.19 (1.95,8.98)	p < 0.001		
Fatigue						
Moderate	52(34.1)	19(26.8)				
Severe	7(13.5)	45(86.5)	17.59(6.77,45.67)	p < 0.001	8.13(2.54,26.03)	p < 0.001

database in order to develop HCV management program and to measure ongoing Aboriginal HRQL in the near future. Also, promoting community-based self-management and care programs for HCV may support and develop better physical and mental health.

5. Limitations

There are limitations to this study, which must be noted. Firstly, there was no serological testing to confirm self-reported HCV status as participants were primarily recruited from non-clinical settings. However, previous studies, particularly Australian studies, indicate good levels of validity and reliability for self-reported HCV data (O'Keefe, Aitken, Higgs, & Dietze, 2013). To minimise this bias, we specified receiving an HCV diagnosis by a health care professional as an inclusion criterion for this study and this likely improved the self-reporting accuracy. Self-reporting is also susceptible to social desirability bias. However, SF-36 is a validated and reliable instrument which involves a mixture of both positively and negatively worded helping to minimise this bias (Doyle et al., 2016). Also, the survey was administered when the participant had no experience

of HCV treatment meaning their experience living with HCV was still memorable. Thirdly, selection bias may have occurred in the study sample, as the sample was based on convenience, not a random sample. Recruiting primarily from community-based needle syringe programs may have led to a potential bias towards participants who had better access to health care services. To minimise this and to increase the geographical diversity in the sample, data was collected at three different NSP sites including Bunbury and a mobile service visiting eight suburbs, where almost half the participants identified themselves as a non-metropolitan resident at the time of being interviewed. The study sample was not diverse in terms of age and duration of injection, for example, a small minority of study participants (17%) were aged below 30 years, and all study participants had injected for more than eight years, which is not representative of the entire population of HCV-infected Aboriginal people who inject drugs in Perth. Therefore, the findings of this study are not generalisable to other Aboriginal people in Australia. Another limitation was the cross-sectional study design, which it is not possible to make any causal inference about the relationship between the predictors and HRQL.

6. Conclusion

In conclusion, these findings provide new insights into the quality of life of Aboriginal Australians living with chronic HCV. It shows the impact of HCV on mental and physical health status in Aboriginal people who inject drugs with chronic HCV. This study confirms a need for nursing interventions which monitor and track HRQL over time among Aboriginal people who inject drugs with chronic HCV. Even with the advent of interferon-free all-oral HCV treatments, psychosocial and socioeconomic factors will likely continue to be a significant barrier to treatment uptake for people who inject drugs (Higgs, Wright, & Hellard, 2016). We argue that there is a need for nursing led and focused HCV interventions which could improve the physical and mental HRQL for Aboriginal Australians. Engagement in HCV diagnosis, treatment, and care may also result in better self-management and care of the long-term consequences of HCV infection within the Aboriginal community. Data from our study suggest attention to preventative care and strategies to reduce excessive alcohol consumption are also required. Ultimately this could result in the establishment of HCV community clinics in Aboriginal health care settings with trained Aboriginal community health nurses who can provide support, encourage drug users to assess their liver health and subsequently undertake HCV treatment in a culturally appropriate way.

Ethical statement

Ethical approval for the study was granted by the Curtin University and Fremantle Hospital Human Research Ethics Committee (Reference Number: 12/198 and HR 77/2012). To ensure that participants were able to provide informed consent, the objectives, procedures and implications of the study were explained clearly to interested potential participants. An information sheet and consent form were offered, and participants were informed that they were free to withdraw at any time. A follow-up interview, as support, was offered to participants who emotionally affected by speaking about their experience.

Conflict of interest

None.

CRedit authorship contribution statement

The paper properly credits the meaningful contributions of co-authors and co-researchers.

References

- Ahern, M., Imperial, J., & Lam, S. (2004). Impact of a designated hepatology nurse on the clinical course and quality of life of patients treated with rebetron therapy for chronic hepatitis C. *Gastroenterology Nursing*, 27(4), 149–155.
- Alavi, M., Krahe, M., Fortier, E., Dunlop, A. J., Balcomb, A. C., Day, C. A., ... & Grebely, J. (2015). Effect of treatment willingness on specialist assessment and treatment uptake for hepatitis C virus infection among people who use drugs: The ETHOS study. *Journal of Viral Hepatitis*, 22(11), 914–925. <http://dx.doi.org/10.1111/jvh.12415>
- Basseri, B., Yamini, D., Chee, G., Enayati, P., Tran, T., & Poordad, F. (2010). Comorbidities associated with the increasing burden of hepatitis C infection. *Liver International*, 30(7), 1012–1018. <http://dx.doi.org/10.1111/j.1478-3231.2010.02235.x>
- Brener, L., Wilson, H., Jackson, L. C., Johnson, P., Saunders, V., & Treloar, C. (2016). Experiences of diagnosis, care and treatment among Aboriginal people living with hepatitis C. *Australian and New Zealand Journal of Public Health*, 40(Suppl. 1), S59–S64. <http://dx.doi.org/10.1111/1753-6405.12402>
- Bush, K. R., Kivlahan, D., McDonnell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT alcohol consumption questions (AUDIT-C): An effective brief screening test for problem drinking. *Archives of Internal Medicine*, 158(16), 1789–1795.
- Costenbader, E. C., Zule, W. A., & Coomes, C. M. (2007). The impact of illicit drug use and harmful drinking on quality of life among injection drug users at high risk for hepatitis C infection. *Drug and Alcohol Dependence*, 89(2–3), 251–258.
- de Vaus, D. (1991). *Surveys in social research* (3rd ed.). Sydney: Allen and Unwin.
- Doyle, J. S., Grebely, J., Spelman, T., Alavi, M., Matthews, G. V., Thompson, A. J., ... & Hellard, M. E. (2016). Quality of life and social functioning during treatment of recent hepatitis C infection: A multi-centre prospective cohort. *PLoS One*, 11(6). <http://dx.doi.org/10.1371/journal.pone.0150655>
- Fábregasa, B. C., Ávilac, R. E. d., Fariaa, M. N., Mourac, A. S., Carmoc, R. A., & Teixeira, A. L. (2013). Health related quality of life among patients with chronic hepatitis C: A cross-sectional study of sociodemographic, psychopathological and psychiatric determinants. *The Brazilian Journal of Infectious Diseases*, 17(6), 633–639. <http://dx.doi.org/10.1016/j.bjid.2013.03.008>
- Ferreira, F. A. P., Almeida-Neto, C., Teixeira, M. C. D., & Strauss, E. (2015). Health-related quality of life among blood donors with hepatitis B and hepatitis C: Longitudinal study before and after diagnosis. *Brazilian Journal of Hematology and Hemotherapy*, 37(6), 381–387. <http://dx.doi.org/10.1016/j.bjhh.2015.08.004>
- Gao, F., Gao, R., Li, G., Shang, Z. M., & Yu, J. (2013). Health-related quality of life and survival in Chinese patients with chronic liver disease. *Health and Quality of Life Outcomes*, 11(131), 1–8. <http://dx.doi.org/10.1186/1477-7525-11-131>
- Gonzales, R., Ang, A., Marinelli-Casey, P., Glik, D. C., Iguchi, M. Y., & Rawson, R. A. (2009). Health-related quality of life trajectories of methamphetamine-dependent individuals as a function of treatment completion and continued care over a 1-year period. *Journal of Substance Abuse Treatment*, 37(4), 353–361. <http://dx.doi.org/10.1016/j.jsat.2009.04.001>
- Graham, S., Harrod, M.-E., Iversen, J., & Hocking, J. S. (2016). Prevalence of hepatitis C among Australian aboriginal and Torres Strait islander people: A systematic review and meta-analysis. *Hepatitis Monthly*, 16(7).
- Grossi, E., Weingart, K., Kaplan, R., Clark, J., Gifford, A., & Ho, S. (2008). Living with hepatitis C: Qualitative interviews with hepatitis C-infected veterans. *Journal of General Internal Medicine*, 23(12), 1959–1965. <http://dx.doi.org/10.1007/s11606-008-0790-y>
- Hickman, I., Clouston, A., Macdonald, G. A., Purdie, D. M., Prins, J., Ash, S., ... & Powell, E. E. (2002). Effect of weight reduction on liver histology and biochemistry in patients with chronic hepatitis C. *Gut*, 51(1), 89–94. <http://dx.doi.org/10.1136/gut.51.1.89>
- Higgs, P., Wright, C., & Hellard, M. (2016). Letter: New treatments for hepatitis C have implications for quality of life in people who inject drugs. *Alimentary Pharmacology & Therapeutics*, 43(7), 840–841. <http://dx.doi.org/10.1111/apt.13538>
- Horwitz, R., Brener, L., & Treloar, C. (2012). Evaluation of an integrated care service facility for people living with hepatitis C in New Zealand. *International Journal of Integrated Care*, 12(11), 1–9.
- Kirkwood, B. (2000). *Essentials of medical statistics*. UK: Blackwell Science.
- Lafferty, L., Treloar, C., Chambers, G. M., Butler, T., & Guthrie, J. (2016). Contextualising the social capital of Australian Aboriginal and non-Aboriginal men in prison. *Social Science & Medicine*, 167, 29–36. <http://dx.doi.org/10.1016/j.socscimed.2016.08.040>
- Lloyd, A. R., Clegg, J., Lange, J., Stevenson, A., Post, J. J., Lloyd, D., ... & Monkley, D. (2013). Safety and effectiveness of a nurse-led outreach program for assessment and treatment of chronic hepatitis C in the custodial setting. *Clinical Infectious Diseases*, 56(8), 1078–1084. <http://dx.doi.org/10.1093/cid/cis1202>
- Loxley, W., Carruthers, S., & Bevan, J. (1995). *In the same vein: First report of the Australian study of HIV and injecting drug use*. Perth, Australia: National Centre for Research into the Prevention of Drug Abuse, Curtin University of Technology.
- Mahmoud, B. H., Shafiq, N., & Attya, S. (2013). Impact of a designed supportive nursing program for hepatitis C patients on their functional health status during interferon therapy in the national hepatology medicine institute. *Nature and Science*, 11(6), 80–90. <http://dx.doi.org/10.7537/j.issn.1545-0740>
- Marcuello, C., Calle-Pascual, A. L., Fuentes, M., Vega, I. r. d. l., Soriguer, F., Goday, A., ... & Vendrell, J. J. (2012). Evaluation of health-related quality of life according to carbohydrate metabolism status: A Spanish population-based study. *International Journal of Endocrinology*, 2012, 1–6. <http://dx.doi.org/10.1155/2012/872305>
- McDonald, S. A., Hutchinson, S. J., Palmateer, N. E., Allen, E., Cameron, S. O., Goldberg, D. J., ... & Taylor, A. (2013). Decrease in health-related quality of life associated with awareness of hepatitis C virus infection among people who inject drugs in Scotland. *Journal of Hepatology*, 58(3), 460–466. <http://dx.doi.org/10.1016/j.jhep.2012.11.004>
- McNally, S., & Latham, R. (2009). *Recognising and responding to hepatitis C in indigenous communities in Victoria*. Melbourne: Australian Research Centre in Sex, Health and Society, La Trobe University.
- McNally, S., Sievert, W., & Pitts, M. K. (2006). Now, later or never? Challenges associated with hepatitis C treatment. *Australian and New Zealand Journal of Public Health*, 30(5), 422–427. <http://dx.doi.org/10.1111/j.1467-842X.2006.tb00457.x>
- Mitrov, F., Cooke, M., Lawrence, D., Povah, D., Mobilia, E., Guimond, E., ... & Zubrick, S. R. (2014). Gaps in indigenous disadvantage not closing: A census cohort study of social determinants of health in Australia, Canada, and New Zealand from 1981–2006. *BMC Public Health*, 14(1), 201. <http://dx.doi.org/10.1186/1471-2458-14-201>
- North Coast Area Health Service. (2009). *Cultural respect and communication guide*. Lismore (AUST): The Health Service.
- O'Keefe, D., Aitken, C., Higgs, P., & Dietze, P. (2013). Concordance between self-reported and actual hepatitis C virus infection status in a cohort of people

- who inject drugs. *Drug and Alcohol Review*, 32(2), 208–210. <http://dx.doi.org/10.1111/j.1465-3362.2012.00502.x>
- Sharif, F., Mohebbi, S., Tabatabaee, H.-R., Saberi-Firoozi, M., & Gholamzadeh, S. (2005). Effects of psycho-educational intervention on health-related quality of life (QOL) of patients with chronic liver disease referring to Shiraz University of Medical Sciences. *Health and Quality of Life Outcomes*, 3(81), 1–6. <http://dx.doi.org/10.1186/1477-7525-3-81>
- Strauss, E., & Teixeira, M. C. D. (2006). Quality of life in hepatitis C. *Liver International*, 26(7), 755–765. <http://dx.doi.org/10.1111/j.1478-3231.2006.01331.x>
- Strauss, E., Porto-Ferreira, F. A., Almeida-Neto, C. d., & Teixeira, M. C. D. (2014). Altered quality of life in the early stages of chronic hepatitis C is due to the virus itself. *Clinics and Research in Hepatology and Gastroenterology*, 38(1), 40–45. <http://dx.doi.org/10.1016/j.bjhh.2015.08.004>
- The Kirby Institute. (2016). *Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander people: Surveillance and evaluation report*. Sydney: Kirby Institute.
- The Kirby Institute. (2018). *Monitoring hepatitis C treatment uptake in Australia (Issue 9)*. UNSW Sydney, Australia: The Kirby Institute.
- Tolmie, A., Muijs, D., & McAteer, E. (2011). *Quantitative methods in educational and social research using SPSS*. UK: McGraw-Hill Education.
- WHO. (2015). *World Health Organisation hepatitis C fact sheet*. (2015, July). Retrieved 25 December 2015 from <http://www.who.int/mediacentre/factsheets/fs164/en/>
- Younossi, Z., Stepanova, M., Afdhal, N., Kowdley, K. V., Zeuzem, S., Henry, L., . . . & Marcellin, P. (2015). Improvement of health-related quality of life and work productivity in chronic hepatitis C patients with early and advanced fibrosis treated with ledipasvir and sofosbuvir. *Journal of Hepatology*, 63(2), 337–345. <http://dx.doi.org/10.1016/j.jhep.2015.03.014>
- Younossi, Z., Stepanova, M., Omata, M., Mizokami, M., Walters, M., & Hunt, S. (2017). Health utilities using SF-6D scores in Japanese patients with chronic hepatitis C treated with sofosbuvir-based regimens in clinical trials. *Health and Quality of Life Outcomes*, 15(25), 1–5. <http://dx.doi.org/10.1186/s12955-017-0598-8>
- Zautra, A., & Goodhart, D. (1979). Quality of life indicators: A review of the literature. *Community Mental Health Review*, 4(1), 1–14. http://dx.doi.org/10.1300/J257v04n01_01
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1), 30–41. http://dx.doi.org/10.1207/s15327752jpa5201_2