

Differences in HCV prevalence, treatment uptake, and liver related events in urban vs. rural HIV/HCV co-infected residents of British Columbia

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Background

- Direct acting antivirals (DAA) are simple, safe, and effective treatments for hepatitis C virus (HCV)
- Individuals in rural and remote areas may have limited accessibility to treatments
- These factors should be considered in the provincial scale up of DAA treatment throughout British Columbia
- We compared the prevalence of HCV, pre-DAA treatment uptake, and outcomes of patients with HIV/HCV in rural vs. urban areas

Methods

- Retrospective study using population based data from the British Columbia Comparative Outcomes and Service Utilization Trends (COAST)
- All individuals with HCV from 1996 - 2013 were included
- HCV status was determined by serology in HIV/HCV infected individuals, and by serology, ICD-9/10 codes, and physician report for HCV mono-infected individuals
- Rurality (vs. urban or suburban dwelling) was determined by postal code of residence or CMA code
- Prescriptions for interferon and ribavirin were identified from Provincial PharmaNet
- Liver related events were defined using ICD-9/10 diagnostic codes from Medical Service billing and hospitalization records
- Medians and Q1-Q3 were calculated for explanatory variables, while univariable and multivariable logistic regression were used to fit the models

Table 1

Characteristics of study participants

Outcome	Total cohort (n=17,596)	HCV mono-infection (n=13,313)	HIV/HCV co-infection (n=4,283)
Demographics			
Age at baseline (median, Q1-Q3)	48.5 (39.8 – 55.7)	50.9 (43.4 – 57.3)	40.1 (33.3 – 46.6)
Sex (%)			
Male	65.5	63.0	73.1
Female	34.5	37.0	26.9
PWID (%)	49.4	38.5	83.1
History of mood disorder (%)	63.0	63.1	63.0
Place of residence (%)			
Urban	62.1	54.2	86.4
Sub-urban	24.1	29.4	7.8
Rural	13.8	16.4	5.8
HCV treatment			
HCV treatment uptake ever (%)	21.5	25.2	9.9
HCV treatment completion (%)			
24 weeks	41.1	41.0	42.2
48 weeks	4.2	4.3	3.3
Liver-related outcomes			
End stage liver disease (%)	15.4	17.6	8.6
Liver related mortality (%)	7.1	8.8	1.9
HIV related factors			
Adherence to ART >95% (%)	-	-	35.4
Viral load (%)			
< 40 copies/mL	-	-	61.3
≥ 40 copies/mL	-	-	20.8
Unknown	-	-	18.0
History of ADI (%)	-	-	23.4
CD4 nadir (cells/mm ³) (median, Q1-Q3)	-	-	110 (30 – 200)

Results

- Characteristics from 17,596 identified individuals with HCV are summarized in Table 1
- Individuals with HIV/HCV co-infection (24.3%) were more likely to live in urban centers than those with HCV alone (Table 1)
- HCV treatment uptake was higher in mono-infected vs. co-infected individuals in both urban (25.9 vs. 10.3%, p< 0.0001) and rural (25.1 vs. 9.7%, p<0.001) settings
- Treatment uptake was low among HIV/HCV individuals in both urban and rural settings, and no geographic differences were observed in liver related outcomes (Table 2)
- Rurality, female sex, and PWID were factors associated with less treatment uptake, while history of mood disorder and HCV mono-infection were associated with higher treatment uptake (Table 3)
- In HIV/HCV co-infected individuals, female sex, AIDS defining illness (ADI), and viral load (VL) ≥ 40 copies/mL were associated with less treatment uptake. No differences were observed with urban vs. rural dwelling, HIV treatment adherence, or PWID (data not shown)

Table 2

Pre-DAA treatment uptake and outcomes in HIV/HCV co-infected individuals by rural vs. urban setting

Variable	Urban (n=3,700)	Rural (n=248)	p-value
Treatment uptake (%)	10.3	9.7	0.7655
End stage liver disease (%)	8.9	8.9	0.9911
Liver related mortality (%)	1.8	2.8	0.2715

Table 3

Multivariable logistic regression examining factors associated with pre-DAA treatment uptake in HCV mono-infected, and HIV/HCV co-infected individuals

Variable	Adjusted odds ratio	95% Confidence interval
HCV mono-infection vs. HIV/HCV co-infection	2.53	2.24 - 2.85
Sub-urban vs. urban	0.88	0.80 - 0.96
Rural vs. urban	0.89	0.80 - 0.99
PWID ever vs. never	0.44	0.40 - 0.48
Mood disorder ever vs. never	1.46	1.34 - 1.58
Female vs. male	0.17	0.11 - 0.26

Conclusions

- Approximately 1/10 individuals with HIV/HCV were treated for HCV (pre-DAA) in this population based cohort
- Treatment uptake in rural settings is almost 3x higher in HCV mono-infection than HIV/HCV co-infection
- Barriers to treatment uptake including rurality, female sex, PWID, and others should be considered in HCV treatment scale up with DAAs



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