

Examining differences in syndemic factors by gender and sexual orientation among women, straight men, and gay, bisexual, and other men who have sex with men living with HIV in British Columbia, Canada

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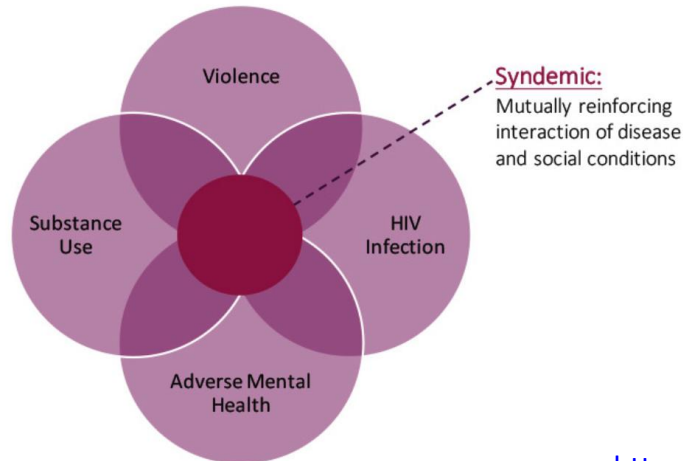
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Land Acknowledgement

I would like to acknowledge that we are meeting today on the original homelands of the Mashpee Wampanoag, Aquinnah Wampanoag, Nipmuc, and Massachusetts tribal nations.

Syndemics

- “The co-occurrence of mutually influencing and overlapping epidemics and endemics” (Halkitis, 2013)



Objectives

Among three groups of people living with HIV (PLHIV) in British Columbia (women, heterosexual men and gay, bisexual and other men who have sex with men [gbMSM]), where ART is available at no cost, we sought to:

1. Examine descriptive differences in syndemic factors (mental health, substance use and experiences of violence) by gender and sexual orientation
&
2. Assess associations between syndemic factors and HIV outcomes (treatment adherence and viral rebound)

Methods- Sampling

- Enrolment for the **Longitudinal Investigations into Supportive and Ancillary health services (LISA)** study occurred between July 2007 and July 2010
- Convenience sampling from AIDS service organizations (ASOs) throughout British Columbia until a sample size of 1,000 was achieved
- Eligibility included: living with HIV, ≥ 19 years of age at time of interview, resident of BC, able to provide informed consent
- Participants followed from interview until December 31st, 2018, most recent contact with the drug treatment program (provincial ART distributor), or death

Measures

- **Main Exposure**
 - Syndemic Index: **violence** (never, ever, in the last 6 months [recent]), **depressive symptoms** in the past week (10-item Centre for Epidemiological Studies Depression scale [≥ 10 indicating probable depression]), and **current street drug use** (current heroin, crack, crystal meth or speedball use)
- **Main Outcomes (from LISA interview until last-contact)**
 - **Ever viral rebound:** Two consecutive VL results ≥ 200 ≥ 30 days apart after the interview date
 - **Average annual ART adherence $\geq 95\%$ (optimal adherence):** # days active on ART in period/# days in period*100

Statistical Analyses

- Descriptive statistics (women vs. heterosexual men vs. gbMSM) using chi-square and Fisher's Exact for categorical and Kruskal-Wallis for continuous variables
- Crude and adjusted logistic regression:
 - Syndemic count → viral rebound and $\geq 95\%$ ART adherence
 - Adjusted for age, education, employment, ethnicity and stable housing
 - For women:
 - Individual syndemic factors → viral rebound and $\geq 95\%$ ART adherence
 - Dummy variables for syndemic factors → viral rebound and $\geq 95\%$ ART adherence

Baseline characteristics and differences by gender and sexual orientation (n=999)

Variable	Overall (999) n(%)	Women (264) n(%)	Heterosexual men (382) n(%)	gbMSM (353) n(%)	P-value
Indigenous	295 (29.5)	124 (47.0)	108 (28.3)	63 (17.8)	<0.001
Highschool or greater education	604 (60.5)	124 (47.0)	181 (48.0)	299 (84.7)	<0.001
Employed at time of interview	239 (23.9)	40 (15.2)	51 (13.4)	148 (41.9)	<0.001
Recent Violence	146 (14.8)	44 (17.2)	67 (17.7)	35 (10.0)	<0.001
Current Street Drug use	408 (41.0)	129 (49.4)	209 (54.9)	70 (19.9)	<0.001
Depressive symptoms (CES-D \geq 10)	565 (56.8)	178 (67.4)	215 (56.6)	172 (49.1)	<0.001
\geq 95% average annual adherence	507 (52.1)	91 (35.0)	168 (45.5)	248 (72.1)	<0.001
Any viral rebound	296 (30.4)	96 (37.9)	141 (37.9)	59 (16.9)	<0.001

≥95% average annual adherence by gender and sexual orientation

	Women			Heterosexual men			GbMSM		
	Yes (n=91)	No (n=169)	P-value	Yes (n=168)	No (n=201)	P-value	Yes (n=248)	No (n=96)	P-value
Age	44 (39-50)	40 (33-45)	<0.001	47 (42-55)	46 (41-51)	0.062	47 (42-55)	44 (39-49)	<0.001
Ethnicity			0.036			0.029			<0.001
Indigenous	34 (37.4)	89 (52.7)		37 (22.0)	69 (34.3)		30 (12.1)	31 (32.3)	
White	48 (52.7)	72 (42.6)		113 (67.3)	117 (58.2)		195 (78.6)	61 (63.5)	
Other	9 (9.9)	8 (4.7)		18 (10.7)	15 (7.5)		23 (9.3)	<5	
Education			0.003			0.397			0.004
Highschool or more (vs. less than high school)	54 (59.3)	68 (40.2)		83 (49.7)	91 (45.3)		219 (88.3)	73 (76.0)	
Stable housing	62 (68.1)	102 (60.4)	0.215	87 (52.1)	114 (56.7)	0.375	230 (92.7)	75 (78.1)	<0.001
Employed at interview (ref no)	16 (17.6)	22 (13.0)	0.320	22 (13.1)	29 (14.4)	0.712	125 (50.4)	20 (20.8)	<0.001

Viral rebound from interview to end of follow-up by gender and sexual orientation

	Women			Heterosexual men			GbMSM		
	Yes (n=96)	No (n=157)	pvalue	Yes (n=141)	No (n=231)	pvalue	Yes (n=59)	No (n=291)	pvalue
Age	39 (34-45)	42 (35-48)	0.03	46 (41-51)	48 (43-53)	0.012	42 (38-50)	46 (42-53)	0.001
Ethnicity			0.182			0.019			0.702
Indigenous	51 (53.1)	67 (42.7)		51 (36.2)	54 (23.4)		13 (22.0)	48 (16.5)	
White	41 (42.7)	77 (49.0)		80 (56.7)	154 (66.7)		42 (71.2)	220 (75.6)	
Other	<5	13 (8.3)		10 (7.1)	23 (10.0)		<5	23 (7.9)	
Education						0.153			0.280
Highschool or more (vs. less than high school)	44 (45.8)	76 (48.4)	0.691	61 (43.3)	116 (50.4)		53 (89.8)	244 (83.8)	
Stable housing	59 (61.5)	101 (64.3)	0.646	67 (47.5)	134 (58.3)	0.052	50 (84.7)	257 (88.3)	0.618
Employed at interview (ref no)	11 (11.5)	28 (17.8)	0.173	15 (10.6)	36 (15.6)	0.204	16 (27.1)	131 (45.0)	0.009

Syndemic count and HIV outcomes overall and by gender and sexual orientation

Outcome	Ever viral Rebound		Average ART adherence $\geq 95\%$	
	Unadjusted Odds Ratio (uOR) (95%CI)	Adjusted Odds Ratio[aOR] (95%CI)	uOR (95%CI)	aOR (95%CI)
Overall	1.42(1.22-1.65)	1.16(0.98-1.38)	0.63(0.55-0.73)	<u>0.79(0.67-0.94)</u>
Women (syndemic count)	1.09(0.83-1.44)	1.01(0.72-1.41)	0.82 (0.62-1.09)	0.93(0.66-1.31)
Heterosexual men (syndemic count)	1.12(0.89-1.40)	0.98(0.77-1.26)	0.96(0.77-1.20)	0.98(0.77-1.25)
gbMSM (syndemic count)	2.07(1.47-2.92)	<u>1.98(1.33-2.95)</u>	0.39(0.28-0.53)	<u>0.51(0.35-0.72)</u>

*All models adjusted for age, education, employment, ethnicity and stable housing

Syndemic factors and $\geq 95\%$ average annual adherence among women (n=260)

	Yes (n=91)	No (n=169)	pvalue	Multivariable aOR (95%CI)
Depressive symptoms	66 (72.5)	109 (64.5)	0.188	1.93 (1.03-3.60)
Current street drug use	37 (41.1)	90 (53.9)	0.051	0.67 (0.36-1.25)
Recent violence			0.042	
Never	15 (17.0)	28 (17.1)		Ref
Ever	65 (73.9)	101 (61.6)		1.20 (0.56-2.53)
Recent	8 (9.1)	35 (21.3)		0.47 (0.17-1.36)
Syndemic factor depression and street drug use (ref none)			0.080	Ref
Depression, no street drugs	28 (31.1)	51 (30.5)		0.59 (0.27-1.27)
No depression, street drugs	16 (17.8)	45 (26.9)		0.49 (0.20-1.20)
Both	21 (23.3)	45 (26.9)		0.48 (0.20-1.14)
Syndemic factor drug use and recent violence (ref none)			0.043	Ref
Street drugs, no recent violence	32 (36.4)	62 (38.0)		0.76 (0.39-1.48)
No street drugs, recent violence	<5	8 (4.9)		0.52 (0.12-2.22)
Both	5 (5.7)	27 (16.6)		0.29 (0.10-0.90)
Syndemic factor depression and recent violence (ref none)			0.065	Ref
Depression, no recent violence	44 (50.0)	72 (43.9)		0.82 (0.45-1.51)
No depression, recent violence	5 (5.7)	13 (7.9)		0.62 (1.87-2.04)
Both	<5	22 (13.4)		0.23 (0.06-0.84)

*All models adjusted for age, education, employment, ethnicity and stable housing

Syndemic factors and ever viral rebound among women (n=253)

	Yes (n=96)	No (n=157)	pvalue	Multivariable aOR (95%CI)
Depressive symptoms	60 (62.5)	109 (69.4)	0.256	0.63 (0.35-1.13)
Current street drug use	53 (55.8)	70 (45.2)	0.103	1.55 (0.84-2.83)
Recent violence			0.763	
Never	15 (16.1)	28 (18.3)		Ref
Ever	61 (65.6)	102 (66.7)		1.12 (0.55-2.31)
Recent	17 (18.3)	23 (15.0)		1.30 (0.51-3.27)
Syndemic factor: depression and street drug use (ref none)			0.051	Ref
Depression, no street drugs	30 (31.6)	47 (30.3)		1.79 (0.79-4.06)
No depression, street drugs	29 (30.5)	29 (18.7)		2.76 (1.11-6.89)
Both	24 (25.3)	41 (26.5)		1.91 (0.77-4.70)
Syndemic factor: drug use and recent violence (ref none)			0.241	Ref
Street drugs, no recent violence	40 (43.5)	52 (34.0)		1.74 (0.90-3.38)
No street drugs, recent violence	5 (5.4)	5 (3.3)		2.45 (0.62-9.64)
Both	12 (13.0)	18 (11.8)		1.48 (0.58-3.82)
Syndemic factor depression and recent violence (ref none)			0.920	Ref
Depression, no recent violence	43 (46.2)	72 (47.1)		1.08 (0.59-1.95)
Depression ,recent violence	7 (7.5)	9 (5.9)		1.22 (0.40-3.72)
Both	10 (10.8)	14 (9.2)		1.24 (0.48-3.21)

*All models adjusted for age, education, employment, ethnicity and stable housing

Discussion

- Women living with HIV and Heterosexual men experienced significantly higher levels of syndemic factors (depressive symptoms, recent experiences of violence and substance use) compared to gbMSM
- Higher syndemic factors associated with HIV outcomes among gbMSM but not among women or heterosexual men
- Among Women:
 - Depressive symptoms were associated with increased odds of $\geq 95\%$ annual ART adherence
 - The combined experience of recent violence and depressive symptoms as well as recent violence and current substance use was associated with $< 95\%$ average annual adherence among women

Limitations

- Cross-sectional exposure data
 - Cannot assess change in exposure from interview to outcome
- Convenience sampling limits the ability for these findings to be generalizable to all women living with HIV in the province of British Columbia
- Adherence based on dispensing records

Conclusion

- Testing syndemic theory within samples overall may not capture the intersectional effects of syndemic factors on HIV outcomes for different populations of PLHIV
- Syndemic theory functions differently by gender and sexual orientation
- Syndemic impact of substance use, violence and depressive symptoms on HIV outcomes for women living with HIV requires further investigation

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I would like to honour the
256 participants (72 women)
from this study who have
gone on before us