Loneliness and ARV adherence: Results from a cohort study of people living with HIV in Ontario, Canada.

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- Loneliness is often defined as a subjective experience that causes distress over the absence of social contact, belonging or a sense of being alienated.
- Loneliness is independently associated with a diverse range of mental health concerns or issues, including depression, anxiety, self-harm, suicidality and service use.
- Our goal was to investigate the degree of loneliness experienced by people living with HIV (PLWH) and its impact on adherence to ARV medications using Ontario HIV Cohort Study (OCS).



- A community governed, longitudinal cohort study of people living with HIV
- >8000 participants since 1995
- 15 clinics across Ontario
- Collects clinical data and annual interviewer-administered questionnaires
- ~2000 questionnaires collected in 2020

Check out the OCS at: www.ohtncohortstudy.ca







In 2020, a 3-item short UCLA Loneliness Scale was added to the annual questionnaire:

- 1. How often do you feel that you lack companionship?
- 2. How often do you feel left out?
- 3. How often do you feel isolated from others?

Response options: Hardly ever, Some of the time, Often.

Combined loneliness score:

- Range: 3-9
- categorized into 3 categories: Low: 3-4, Medium: 5-6, High: 7-9



Are you currently taking antiretroviral medications?

When was the last time you missed taking any of your medications? Response options:

- Never skipped medications,
- Within the past week,
- 1-2 weeks ago,
- 1-3 months ago,
- More than 3 months ago.

Among those who are currently on ARV we dichotomized answers:

- Never skipped or skipped more than 3 months ago,
- Skipped recently less than 3 months ago



- Descriptive statistics, chi-square test
- Logistic regression
- Proportional odds model (POM)
 - is a class of generalized linear models used for modelling the dependence of an ordinal response on discrete or continuous covariates.
 - The key **assumption** in proportional odds model is that the effects of any explanatory variables are consistent or proportional across the different levels of the outcome.
 - In POM odds ratios can be interpreted as constant across the entire range of the outcome.
 - We used SAS proc logistic to fit POM to 3 ordered levels of the combined Loneliness score: Low, Medium, High.



- **1,870 participants** had completed Loneliness scale questions as of 10-JUNE-2021
- Mean age (STD): 52.2 (12.1)
- From May June 2021, participants identified as:

Gender Identity			80.0%		
Female	21.7% (n=403)				
Male	71.3% (n=1324)				
Non-Binary	7.0% (n=129)				
Sexual Orientation		21.7%			
Heterosexual	35.4% (n=658)				15.8%
LGBQ	64.6% (n=1198)			2.5%	
 36.6% had less than \$20,000 of Personal gross income/year 61.0% are single or widowed or divorced 37.4% were born outside Canada 11.8% use non-medicinal drugs 9.4% - harmful alcohol use (AUDIT scale) 75.4% lived with HIV more than 10 years 		year Black (N=397)	White (N=1099)	Indigenous (N=46)	Other (N=289

Results: Loneliness questions and combined Loneliness score





Combined Ioneliness score Median = 3, IQR = 4-6.











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¹ – Chi-square test p-value



Independent Predictors of Loneliness: Proportional Odds Model results¹

Independent predictors	Predictor Categories	Unadjusted OR(95%CI)	Adjusted OR(95%CI) ²
	<35	2.18 (1.89, 4.21)	2.84 (1.80, 4.48)
A	35-49	3.07 (2.24, 4.21)	3.18 (2.22, 4,56)
Age	50-64	2.18 (1.62, 2.93)	2.18 (1.57, 3.03)
	65+	1	1
Gross personal yearly	< \$20,000	1.93 (1.60, 2.31)	1.51 (1.23, 1.85)
income	\$20,000+	1	1
	Yes	1.67 (1.25, 2.23)	1.49 (1.08, 2.07)
Harmful Alconol use	No	1	1
	Single/Widowed/Divorced	4.12 (3.39, 5.03)	4.04 (3.26, 5.00)
Marital status	Married/Living with		
	partner	1	1
Non modicinal drug uso	Yes	2.09 (1.60, 2.73)	1.52 (1.13, 2.06)
Non-medicinal drug use	Νο	1	1
Say at hirth	Female	1.34 (1.09, 1.65)	1.38 (1.06, 1.79)
Sex at birth	Male	1	1
	Black	0.99 (0.80, 1.25)	0.67 (0.5, 0.89)
Page 1	Indigenous	1.88 (1.07, 3.29)	1.06 (0.56, 2.00)
Kale	Other	0.93 (0.73, 1.20)	0.78 (0.59, 1.03)
	White	1	1

¹ – Probabilities are modeled over lower ordered values of combined loneliness scores

 2 – Final model was chosen to satisfy the test for proportional odds assumption.





When was the last time you missed taking any of your medications?



Non-adherence to ARV¹ and Loneliness (p²<.0001)

We found **strong** association between ARV **non-adherence and higher loneliness** scores

- ¹ Among participants who are on antiretroviral medications
- ² Chi-square test p-value





Loneliness as predictor¹ for ARV non-adherence

Independent predictors of adherence to ARV medications ¹	Predictor Categories	Unadjusted OR(95%CI)	Adjusted OR(95%CI)
	Low (3-4)	1	1
Loneliness scale	Medium (5-6)	1.53 (1.23, 1.90)	1.45 (1.14, 1.84)
	High (7-9)	1.80 (1.41, 2.29)	1.41 (1.08, 1.85)
	<35	4.00 (2.61, 6.13)	3.59 (2.24, 5.74)
A cro	35-49	2.07 (1.51, 2.83)	1.85 (1.30, 2.63)
Age	50-64	1.80 (1.34, 2.41)	1.55 (1.13, 2.12)
	65+	1	1
Sax at hirth	Female	0.74 (0.59, 0.93)	0.88 (0.67, 1.16)
Sex at birth	Male	1	1
	Black	0.59 (0.47, 0.75)	0.62 (0.47, 0.84)
Deee	Indigenous	0.74 (0.39, 1.48)	0.74 (0.39, 1.48)
Race	Other	0.97 (0.74, 1.26)	0.92 (0.69, 1.48)
	White	1	1
	Yes	2.67 (1.91, 3.74)	2.00 (1.38, 2.91)
narmui Alconol use	No	1	1
Non modicinal drug uco	Yes	3.75 (2.69, 5.22)	2.55 (1.79, 3.64)
Non-medicinal drug use	No	1	1

¹ – in Logistic regression model, adjusted for age, sex, race alcohol and non-medicinal drug use.





- PLWH with **higher loneliness scores** are more **likely to skip or miss**their ARV medications.
- About 13% to 20% of OCS participants experienced at least one of the three aspects of loneliness, almost half have high scores on the combined loneliness scale.
- Younger age is associated with **both** higher loneliness scores and non-adherence to ARV medications.
- More research is needed to identify **relationship between loneliness and co-morbid conditions**, such as substance use.
- Intervention strategies are need in communities of PLWH to combat loneliness, especially during current COVID-19 pandemic.



- People living with HIV who organized to create the OCS, contribute to the data in the OCS, support the governance of data, and guide the research process.
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Thank you for your time!

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