

Age group differences in HIV outcomes, substance use and patient-reported health concerns among people with HIV enrolled in a primary-care based alcohol treatment study

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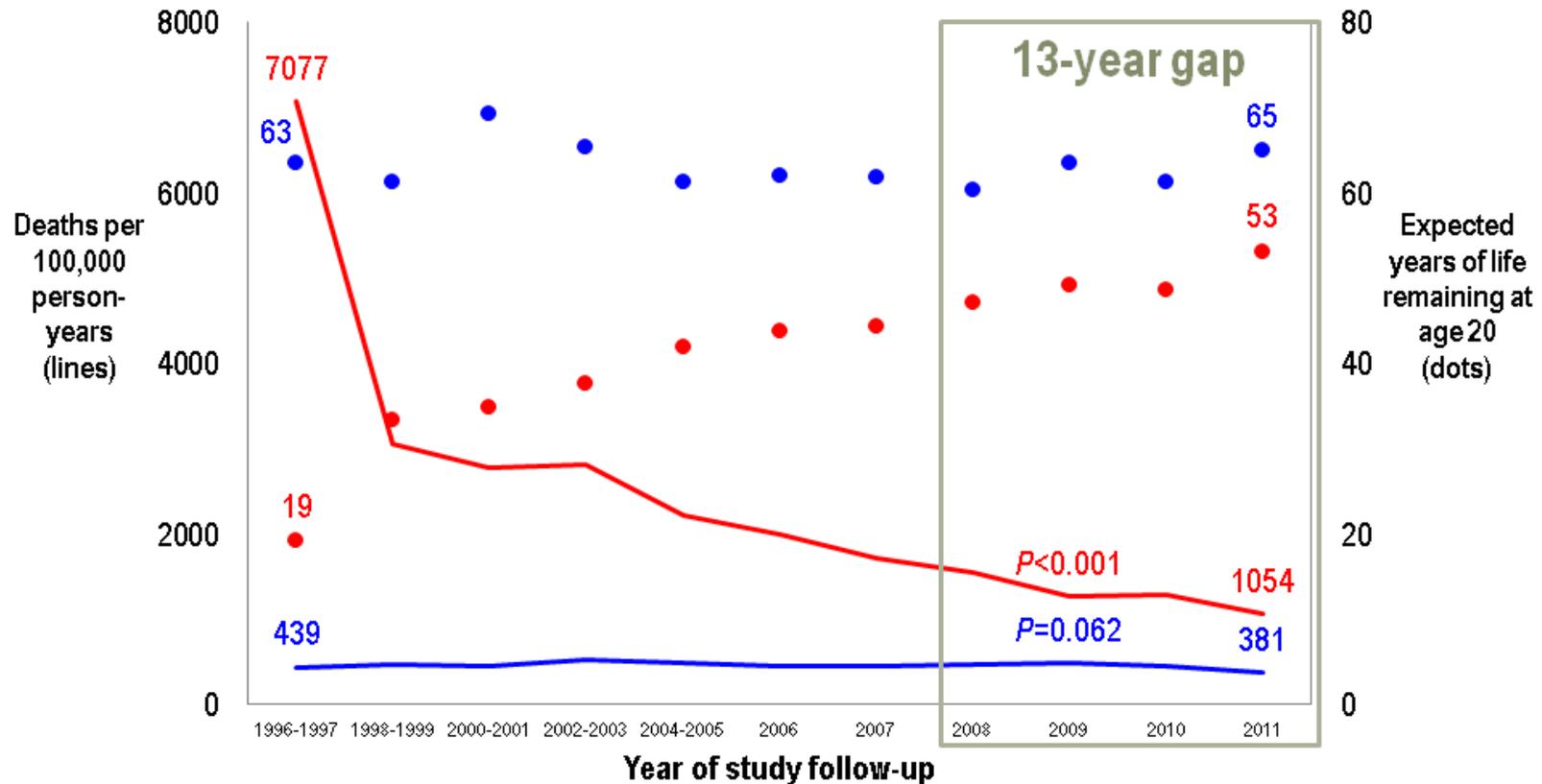
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Aging-Related Challenges in HIV Care

- In spite of effective antiretroviral therapy (ART), concerns include:
 - Increasing physical and mental health comorbidity
 - Cognitive changes with age
 - Frailty
 - Polypharmacy
 - Effects of alcohol and other drug use

HIV and Life Expectancy at Age 20



Decreasing mortality rates (lines) and increasing life expectancy (dots) for **HIV+**, while stable for **HIV-**. However, a gap in life expectancy remains (13 years overall, or 8 years in well-treated HIV).

Impact of Unhealthy Alcohol Use among People with HIV (PWH)

- Cardiovascular disease
- Cognitive dysfunction
- Liver disease
- Cancer
- Infections
- Depression and anxiety
- Poor ART adherence
- Accelerated HIV disease progression

Williams et al., *ACER*, 2016 Oct; 40(10): 2056–2072; Azar et al., *Drug Alcohol Depend.* 2010;112(3):178-193; Samet et al., *J Acquir Immune Defic Syndr.* 2007;46(2):194-199.

Health & Motivation Intervention Study

- PWH in KP San Francisco primary care reporting ≥ 1 unhealthy drinking days in prior year
- 614 recruited by phone and randomized to three behavioral intervention conditions:
 - Motivational interviewing, emailed feedback, or usual care alone (SBIRT)
- Telephone follow up interviews at 6, 12 and 24 months
- All three groups improved by 12 months, no overall differences (MI was better for those with low motivation or drug use)
- 90% follow up rate at 24 months (N=553)

Current Analysis: 24-month Outcomes by Age

- Compared three age groups:
 - 18-44, 45-54, 55+
- 30-day unhealthy drinking (4+/5+in a day for women/men),
- Other substance use
- Depression (PHQ-9) and anxiety (GAD-7)
- Quality of life (SF-12), pain, and clinical symptoms (checklist)
- Self-reported ART adherence
- EHR data:
 - HIV RNA and CD4 levels
 - Service utilization

Baseline Characteristics by Age Group

| Characteristics | Total N = 553 | Age (years) | | | P-value |
|--|------------------|------------------|-----------------|----------------|---------|
| | | 18-44 N = 169 | 45-54 N =211 | ≥55 N = 173 | |
| | N (%) | % | % | % | |
| Male | 537 (97.1) | 95.9 | 96.7 | 98.8 | 0.23 |
| Race/ethnicity | | | | | <.01 |
| Black | 52 (9.4) | 7.7 | 12.3 | 7.5 | |
| Hispanic | 76 (13.7) | 21.3 | 13.3 | 6.9 | |
| Other/Unknown | 72 (13.0) | 21.3 | 12.8 | 5.2 | |
| White | 353 (63.8) | 49.7 | 61.6 | 80.4 | |
| Income | | | | | 0.09 |
| ≥\$50K | 336 (60.8) | 53.8 | 67.3 | 59.5 | |
| <\$50K | 199 (36.0) | 43.2 | 29.9 | 36.4 | |
| Unknown | 18 (3.3) | 3.0 | 2.8 | 4.1 | |
| ≥1 unhealthy drinking days in prior 30 days | 269 (48.6) | 109 (64.5) | 105 (49.8) | 55 (31.8) | <.01 |

24-Month Substance Use, Health and HIV Outcomes

| Characteristics | Total N = 553 | Age (years) | | | P-value |
|---------------------------------------|---------------------------|------------------|------------------|----------------|---------|
| | | 18-44 N = 169 | 45-54 N = 211 | ≥55 N = 173 | |
| | N (%) | % | % | % | |
| 30-day Substance Use | | | | | |
| Tobacco use | 106 (19.2) | 31.4 | 14.7 | 12.7 | <.01 |
| Marijuana use | 261 (47.2) | 47.9 | 43.1 | 51.5 | 0.26 |
| Other substance use | 112 (20.3) | 29.0 | 17.1 | 15.6 | <.01 |
| Alcohol use | 482 (87.2) | 87.6 | 85.8 | 88.4 | 0.73 |
| ≥1 days of unhealthy drinking | 133 (24.1) | 37.9 | 23.7 | 11.0 | <.01 |
| Mental health / QOL | | | | | |
| Moderate/severe anxiety | 66 (11.9) | 14.2 | 12.3 | 9.3 | 0.13 |
| Moderate/severe depression | 66 (11.9) | 11.8 | 12.3 | 11.6 | 0.97 |
| Mental quality of life ⁺ | Mean (SD) = 48.9 (9.9) | 47.5 (10.9) | 48.3 (11.0) | 49.3 (10.7) | 0.33 |
| Physical quality of life ⁺ | Mean (SD) = 48.4 (10.9) | 52.2 (7.3) | 48.9 (10.1) | 46.1 (10.7) | <.01 |
| HIV Outcomes | | | | | |
| ART adherence ≥ 95% ⁺⁺ | 427 (82.3) | 79.4 | 83.0 | 84.2 | 0.50 |
| HIV RNA < 75 copies/mL | 517 (93.5) | 90.5 | 94.8 | 94.8 | 0.17 |
| CD4 T-cells/μl | Mean (SD) = 703.5 (287.4) | 724.2 (281.3) | 731.9 (279.5) | 648.8 (296.6) | <.01 |

⁺ 38 PWH with missing both physical and mental quality of life information. ⁺⁺ 34 PWH with missing ART adherence information .

Pain Level at 24 Months

| Pain measure | Total N = 553 | Age (years) | | | P-value |
|--|------------------|------------------|------------------|----------------|----------------|
| | | 18-44 N = 169 | 45-54 N = 211 | ≥55 N = 173 | |
| | N (%) | % | % | % | |
| Moderate / Severe bodily pain in the past 4 weeks¹ | | | | | <.01 |
| Yes | 153 (27.7) | 18.3 | 32.7 | 30.6 | |
| No | 400 (72.3) | 81.7 | 67.3 | 69.4 | |
| Pain interferes with normal work² | | | | | <.01 |
| Yes | 235 (42.5) | 32.5 | 43.1 | 51.5 | |
| No | 280 (50.6) | 53.9 | 50.7 | 47.4 | |
| Not applicable | 38 (6.9) | 13.6 | 6.2 | 1.2 | |

¹ Yes = Moderate + Severe + very severe; No = None + very mild + Mild. ² Yes = A little bit + Moderately + Quite a bit + Extremely; No = Not at all

Symptom Checklist by Age Group at 24 Months

| Characteristics | Total N = 553 | Age (years) | | | P-value |
|-----------------------|------------------|------------------|------------------|----------------|-------------|
| | | 18-44 N = 169 | 45-54 N = 211 | ≥55 N = 173 | |
| | N (%) | % | % | % | |
| Any symptoms | | | | | 0.02 |
| Yes | 76 (13.7) | 81.7 | 85.3 | 91.9 | |
| No | 477 (86.3) | 18.3 | 14.7 | 8.1 | |
| Total symptoms | | | | | 0.15 |
| 0 | 76 (13.7) | 18.3 | 14.7 | 8.1 | |
| 1 - 4 | 176 (31.8) | 32.0 | 31.3 | 32.4 | |
| 5 - 9 | 171 (30.9) | 29.6 | 31.8 | 31.2 | |
| 10 - 14 | 106 (19.2) | 17.2 | 16.6 | 24.3 | |
| 15 - 19 | 24 (4.3) | 3.0 | 5.7 | 4.1 | |

Summary of total symptoms: Minimum (Maximum) = 0 (19); Mean (SD) = 5.8 (4.6), Median = 5.0

Prior-Year Service Utilization by Age Group at 24 Months

| Characteristics | Total N = 553 | Age (years) | | | P-value |
|--------------------|------------------|------------------|-----------------|----------------|-------------------|
| | | 18-44 N = 169 | 45-54 N =211 | ≥55 N = 173 | |
| | N (%) | % | % | % | |
| Utilization | | | | | |
| Any utilization | 488 (88.3) | 79.9 | 90.1 | 94.2 | <.01 |
| Primary Care | 371 (67.1) | 53.3 | 72.0 | 74.6 | <.01 |
| Mental health | 56 (10.1) | 7.1 | 10.4 | 12.7 | 0.22 |
| Addiction Medicine | 24 (4.3) | 5.3 | 4.3 | 3.5 | 0.70 |
| Other Ambulatory | 235 (42.5) | 30.2 | 45.0 | 51.5 | <.01 |
| Emergency | 39 (7.1) | 4.7 | 7.1 | 9.3 | 0.26 |
| Inpatient | 8 (1.5) | 0.6 | 2.4 | 1.2 | 0.36 ⁺ |

+ P-value based on Fisher's exact test

Age Effects on 24-month Mental Health and Quality of Life Outcomes

| Outcomes | Age (years) | Unadjusted Model | | Adjusted Model | |
|----------------------------|-------------|-------------------|-----------|-------------------|-----------|
| | | OR (95% CI) | P-value | OR (95% CI) | P-value |
| Moderate/severe anxiety | 18-44 | 1.62 (0.83 ,3.19) | 0.1572 | 1.89 (0.90 ,3.95) | 0.09 |
| | 45-54 | 1.38 (0.71 ,2.66) | 0.3389 | 1.47 (0.74 ,2.94) | 0.27 |
| | ≥55 | Reference | Reference | Reference | Reference |
| Moderate/severe depression | 18-44 | 1.03 (0.53 ,1.99) | 0.9373 | 1.08 (0.52 ,2.25) | 0.83 |
| | 45-54 | 1.08 (0.58 ,2.00) | 0.8192 | 1.15 (0.6 ,2.22) | 0.67 |
| | ≥55 | Reference | Reference | Reference | Reference |
| | | | | | |
| | | β (SE) | P-value | β (SE) | P-value |
| Mental quality of life | 18-44 | -1.80 (1.22) | 0.1411 | -1.64 (1.29) | 0.20 |
| | 45-54 | -1.02 (1.13) | 0.3685 | -1.21 (1.14) | 0.29 |
| | ≥55 | Reference | Reference | Reference | Reference |
| Physical quality of life | 18-44 | 6.14 (1.08) | <.0001 | 6.12 (1.15) | <.01 |
| | 45-54 | 2.85 (1.00) | 0.0047 | 2.96 (1.02) | <.01 |
| | ≥55 | Reference | Reference | Reference | Reference |

Covariates: sex, Race/ethnicity, education, Married, social support, unhealthy alcohol drinking, tobacco smoking.

24-Month HIV Outcomes by Age Group

| Outcomes | Age (years) | Unadjusted Model | | Adjusted Model | |
|------------------------|-------------|-------------------|-----------|-------------------|-----------|
| | | OR (95% CI) | P-value | OR (95% CI) | P-value |
| ART adherence ≥ 95% | 18-44 | 0.72 (0.41 ,1.28) | 0.2685 | 1.03 (0.54 ,1.95) | 0.94 |
| | 45-54 | 0.92 (0.53 ,1.61) | 0.7694 | 1.03 (0.57 ,1.85) | 0.93 |
| | ≥55 | Reference | Reference | Reference | Reference |
| HIV RNA < 75 copies/mL | 18-44 | 0.53 (0.23 ,1.22) | 0.1351 | 0.51 (0.2 ,1.34) | 0.17 |
| | 45-54 | 1.00 (0.40 ,2.47) | 0.9962 | 1.04 (0.39 ,2.75) | 0.94 |
| | ≥55 | Reference | Reference | Reference | Reference |
| | | | | | |
| | | β (SE) | P-value | β (SE) | P-value |
| CD4 T-cells/μl | 18-44 | 75.41 (30.88) | 0.0149 | 64.47 (33.48) | 0.05 |
| | 45-54 | 83.17 (29.28) | 0.0047 | 83.53 (30.04) | <.01 |
| | ≥55 | Reference | Reference | Reference | Reference |

Covariates sex (male, female[reference]), age (18-44, 45-54, ≥55 [reference]), Race/ethnicity (Black, Hispanic, Other, White [reference]), education (graduate, some college/college, ≤ HS [reference]), Married (yes, no[reference]), social support, unhealthy alcohol drinking (yes, no[reference]), tobacco smoking (yes, no[reference]).

Limitations

- Participants were drawn from a single clinic in San Francisco
- Enrolled in an alcohol intervention study
- Privately insured
- Mostly MSM

Summary & Clinical Implications

- In a sample of PWH with good viral control and a history of unhealthy alcohol use:
 - Older adults report less unhealthy drinking than younger PWH
 - High levels of alcohol and cannabis use regardless of age
 - Lower CD4 count, indicating worse immune function
 - But trend for younger adults to have worse viral suppression
 - Pain and physical health problems are higher in older adults
 - Higher outpatient service utilization
- Understanding age-associated differences can assist in planning effective health services for PWH as this population ages
- Further analyses will examine the relationship of alcohol and cannabis use to pain, medical problems and quality of life

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