Mental health among people with HIV: insights from the ASTRA study

Fiona Lampe
Research Department of Infection and Population Health,
University College London
Outline

Among people living with HIV in the UK:

1. To what extent does living with HIV impact on mental health in the current era of successful treatment?
2. Does the prevalence of psychological symptoms vary according to socio-demographic factors?
3. Do psychological symptoms influence outcomes of HIV treatment?
4. Are those with evidence of depression receiving treatment?
5. Does depression impact on sexual behaviour and STI/HIV transmission risk?
# ASTRA and AURAH studies

<table>
<thead>
<tr>
<th></th>
<th><strong>ASTRA</strong></th>
<th><strong>AURAH</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Antiretrovirals, Sexual Transmission Risk and Attitudes</td>
<td>Attitudes to, and Understanding of, Risk of Acquisition of HIV</td>
</tr>
<tr>
<td>N</td>
<td>3258</td>
<td>2630</td>
</tr>
<tr>
<td>Study population</td>
<td>Adults with diagnosed HIV</td>
<td>Adults without diagnosed HIV (believed HIV-ve at recruitment)</td>
</tr>
<tr>
<td>Setting</td>
<td>8 HIV outpatient clinics, UK</td>
<td>20 GUM clinics, UK</td>
</tr>
<tr>
<td>Date</td>
<td>2011-12</td>
<td>2013-14</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Self-completed, confidential questionnaire: demographic, socio-economic, lifestyle, health, HIV and ART-related factors</td>
<td></td>
</tr>
<tr>
<td>Additional data</td>
<td>Clinic VL and CD4 at time of study. 92% gave additional consent for linkage with routine clinic data</td>
<td></td>
</tr>
<tr>
<td>Response rate</td>
<td>64%</td>
<td>60%</td>
</tr>
<tr>
<td><strong>MSM</strong></td>
<td>2248</td>
<td>1484</td>
</tr>
<tr>
<td>Heterosexual men</td>
<td>373</td>
<td>470</td>
</tr>
<tr>
<td>Women</td>
<td>637</td>
<td>676</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>45 (SD: 10) [range 18-88]</td>
<td>32 (SD: 10) [range 18-80]</td>
</tr>
<tr>
<td>On ART %</td>
<td>87%</td>
<td></td>
</tr>
</tbody>
</table>
## Measures of depression

<table>
<thead>
<tr>
<th>PHQ-9</th>
<th>Over the last 2 weeks, how often have you been bothered by any of the following problems?</th>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Little interest or pleasure in doing things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2)</td>
<td>Feeling down, depressed or hopeless</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>Trouble falling or staying asleep, or sleeping too much</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Feeling tired or having little energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5)</td>
<td>Poor appetite or overeating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6)</td>
<td>Feeling bad about yourself – or that you are a failure or have let yourself or your family down</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7)</td>
<td>Trouble concentrating on things, such as reading the newspaper or watching television</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8)</td>
<td>Moving or speaking so slowly that other people could have noticed. Or the opposite - being so fidgety or restless that it is hard to sit still</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9)</td>
<td>Thoughts that you would be better off dead, or of hurting yourself in some way</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PHQ-9 Depressive Symptoms:
- **Depressive Disorder [PHQ-9 DD]**
  (includes ‘major’ and ‘other’ DD)
- **Major Depressive Disorder [PHQ-9 MDD]**
- **Depression Severity Score [DSS]**
  (range 0-27, ≥10 indicates major depression)
- **Suicidal thoughts**
  (Q9: any occurrence)

• **Treatment for depression:** “Are you currently receiving treatment (medicine or other therapy) for depression?”
# Measure of anxiety

<table>
<thead>
<tr>
<th>GAD-7</th>
<th>Over the last 2 weeks, how often have you been bothered by any of the following problems?</th>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Feeling nervous, anxious or on edge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Not being able to stop or control worrying</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Worrying too much about different things</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Becoming easily annoyed or irritable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Trouble relaxing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Being so restless that it is hard to sit still</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Feeling afraid as if something awful might happen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GAD-7 anxiety symptoms:**

- Anxiety Score
  - (range 0-21, ≥10 indicates anxiety)
**Measure of health-related quality of life (QoL)**

<table>
<thead>
<tr>
<th>EQ-5D-3L</th>
<th>Please indicate which statements best describe your own state of health TODAY</th>
</tr>
</thead>
</table>
| a) Mobility | I have no problems in walking about  
I have some problems in walking about  
I am confined to bed |
| b) Self-care | I have no problems with self-care  
I have some problems washing or dressing myself  
I am unable to wash or dress myself |
| c) Usual activities (e.g. work, study, housework, family or leisure activities) | I have no problems with performing my usual activities  
I have some problems with performing my usual activities  
I am unable to perform my usual activities |
| d) Pain / discomfort | I have no pain or discomfort  
I have some pain or discomfort  
I have extreme pain or discomfort |
| e) Anxiety / depression | I am not anxious or depressed  
I am moderately anxious or depressed  
I am extremely anxious or depressed |

**Quality of life score:**

Range 0-1.
(value 1 - perfect health; value 0 – death)
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5. Does depression impact on sexual behaviour and STI/HIV transmission risk?
# Mental health among people with HIV

**N=3258 people with diagnosed HIV (ASTRA)**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Prevalence (95% CI)</th>
<th>Comparison (Gen Pop)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHQ-9 DD (%)</strong> (Depressive disorder)</td>
<td>871</td>
<td>26.7 % (25.2, 28.3)</td>
<td>¹Germany: 9.2% N=2060</td>
</tr>
<tr>
<td><strong>PHQ-9 MDD (%)</strong> (Major depressive disorder)</td>
<td>600</td>
<td>18.4 % (17.1, 19.8)</td>
<td>¹Germany: 3.8% N=2060</td>
</tr>
<tr>
<td><strong>PHQ-9 score:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-4</td>
<td>1716</td>
<td>52.7 %</td>
<td></td>
</tr>
<tr>
<td>5-9</td>
<td>658</td>
<td>20.2 %</td>
<td></td>
</tr>
<tr>
<td>10-15</td>
<td>426</td>
<td>13.1 %</td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td>250</td>
<td>7.7 %</td>
<td></td>
</tr>
<tr>
<td>20-27</td>
<td>208</td>
<td>6.4 %</td>
<td></td>
</tr>
<tr>
<td>≥10</td>
<td>884</td>
<td>27.1 %</td>
<td></td>
</tr>
<tr>
<td><strong>Any depression</strong> (treatment* or PHQ-9 DD)</td>
<td>1148</td>
<td>35.2 % (33.6, 36.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Suicidal thoughts</strong></td>
<td>743</td>
<td>22.8 % (21.4, 24.3)</td>
<td></td>
</tr>
<tr>
<td><strong>GAD-7 anxiety</strong></td>
<td>715</td>
<td>21.9 % (20.6, 23.4)</td>
<td>²England: 5% N=2265</td>
</tr>
<tr>
<td><strong>PHQ-2~ DD score ≥3</strong></td>
<td>813</td>
<td>25.0 % (23.5, 26.5)</td>
<td>⁵UK (NATSAL): 9.4%, N=13507</td>
</tr>
</tbody>
</table>

*Medical or other. ~Uses first 2 PHQ-9 questions only.

Quality of life: people with HIV vs general population

N=3151 people with diagnosed HIV (ASTRA)
N=7424 from Health Survey for England (HSE), 2011

Difference in EQ-5D-3L QoL score ASTRA vs HSE: -0.11 (95% CI: -0.13, -0.10), p<0.001
Adjusted* for gender/sexual orientation, age, ethnicity, education, children, smoking

*Using two-part regression model

Adapted from Alec Miners et al. Lancet HIV 2014
Mental health: people with HIV vs ‘at risk’ group

N=2699 people with diagnosed HIV (ASTRA)  
N=2699 without diagnosed HIV (AURAH), matched datasets*

*AUcRAH data matched to ASTRA data (with replacement) for: gender/sexual orientation; age; ethnicity; education level; children. Ages 30-70 years included

Prevalence (%)  

P<0.001 for all factors  
ASTRA vs AURAH, Poisson regression with robust SEs

Acknowledgments: Alec Miners
Depression: time with diagnosed HIV vs ‘at risk’ group

N = 2699 people with diagnosed HIV (ASTRA)
N = 2699 without diagnosed HIV (AURAH), matched datasets*

* AURAH data matched to ASTRA data (with replacement) for: gender/sexual orientation, ethnicity, education, using Poisson regression with robust SEs.

Ages 30-70 years included

Adjusted for age, gender/sexual orientation, ethnicity, education, using Poisson regression with robust SEs.

Acknowledgments: Alec Miners

Depression: time with diagnosed HIV vs ‘at risk’ group

N=2699 people with diagnosed HIV (ASTRA)
N=2699 without diagnosed HIV (AURAH), matched datasets*

*AURAH data matched to ASTRA data (with replacement) for: gender/sexual orientation; age; ethnicity; education level; children.

Ages 30-70 years included

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Acknowledgments: Alec Miners

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**Gender/ethnicity, depression and anxiety symptoms**

*N=3258 people with diagnosed HIV (ASTRA)*


**PHQ-9 DD**

**GAD-7 anxiety**

Adjusted PR (95% CI), from modified Poisson regression model including gender/sexual orientation/ethnicity; age group; years with diagnosed HIV
Age, time since HIV diagnosis and depressive symptoms

N=3258 people with diagnosed HIV (ASTRA)

Adjusted prevalence ratios (PR) of PHQ-9 DD, from modified Poisson regression model including age group; years with diagnosed HIV; gender/sexual orientation; ethnicity

Adapted from Jennifer McGowan et al. HIV Medicine, 2017
Socio-economic factors and depressive symptoms

N=3258 people with diagnosed HIV (ASTRA)

Qualifications: University degree (1317)
'A' / 'O' levels or equivalent (1348)
Other/missing (222)
None (371)

Housing: Homeowner (1083)
Renting, private (786)
Renting, council / housing assoc (971)
Temporary / homeless (94)
Other/missing (324)

Money for basic needs: Yes (1392)
Mostly (836)
Sometimes (565)
No (400)

Supportive network*: High 1 (1042)
2 (1001)
3 (533)
4 (368)
Low 5 (252)

*p <0.001 for all, Chi-squared tests. Associations similar after adjustment for demographic/HIV-related factors

*Modified Duke UNC Functional Social Support Questionnaire.
Outline

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Mental health and ART non-adherence

*N=2771 people on ART (ASTRA)*

Overall (n=319; 11.6%)

- PHQ-9 DD: No
  - PHQ-9 MDD: No
    - PHQ-9 score: 0-4
      - PHQ-9 score: 5-9
        - PHQ-9 score: 10-14
          - PHQ-9 score: 15-19
            - PHQ-9 score: 20-27

- PHQ-9 DD: Yes
  - PHQ-9 MDD: Yes
    - PHQ-9 score: 0-4
      - PHQ-9 score: 5-9
        - PHQ-9 score: 10-14
          - PHQ-9 score: 15-19
            - PHQ-9 score: 20-27

Any depression (treatment or PHQ-9 DD): No

- Suicidal thoughts: No
  - GAD-7 Anxiety: No

- Suicidal thoughts: Yes
  - GAD-7 Anxiety: Yes

Any depression (treatment or PHQ-9 DD): Yes

- Suicidal thoughts: No
  - GAD-7 Anxiety: No

- Suicidal thoughts: Yes
  - GAD-7 Anxiety: Yes

*Non-adherence= Missed 2 or more consecutive days of ART on 2 or more occasions in the past 3 months

See: Gonzalez et al. JAIDS 2011; Langebeek et al. BMC Medicine 2014

Acknowledgments: Alice Goodman

Prevalence (%) significant ART non-adherence*

\[ p <0.001 \text{ for all, unadjusted and adjusted for demographic factors and time on ART.} \]
Mental health and VL non-suppression on ART

*N=2481 people on ART, started ≥6 months prior to VL measure (ASTRA)*

Overall (n=212; 8.5%)

- PHQ-9 DD: No
- PHQ-9 MDD: No
- PHQ-9 score: 0-4
- 5-9
- 10-14
- 15-19
- 20-27

Any depression (treatment or PHQ-9 DD): No

- Yes

Suicidal thoughts: No

- Yes

GAD-7 Anxiety: No

- Yes

Prevalence (%) VL > 50 copies/mL*

*p <0.001 for all, unadjusted and adjusted for demographic factors and time on ART.*

*Using clinic-recorded VL at the time of the questionnaire.
# Mental health and risk of virological rebound

**N=1773 people on ART with VL<=50, started ART ≥6 months prior to baseline VL (ASTRA)**

<table>
<thead>
<tr>
<th>N=145 rebounds (first VL&gt;200c/mL)</th>
<th>Mean [range] 2.3 [0.01, 3.3] years follow-up</th>
<th>p-y</th>
<th>VL rebound rate /100 p-y (events)</th>
<th>Adjusted HR* (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHQ-9 DD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2996</td>
<td>2.7</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>891</td>
<td>7.3</td>
<td>65</td>
<td>2.8 (2.0, 3.8)</td>
</tr>
<tr>
<td><strong>PHQ-9 MDD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3263</td>
<td>2.8</td>
<td>93</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>624</td>
<td>8.3</td>
<td>52</td>
<td>3.0 (2.1, 4.3)</td>
</tr>
<tr>
<td><strong>PHQ-9 score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-4</td>
<td>2129</td>
<td>2.3</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>5-9</td>
<td>802</td>
<td>3.2</td>
<td>26</td>
<td>1.5 (0.9, 2.4)</td>
</tr>
<tr>
<td>10-15</td>
<td>475</td>
<td>6.1</td>
<td>29</td>
<td>2.7 (1.7, 4.2)</td>
</tr>
<tr>
<td>15-19</td>
<td>269</td>
<td>5.6</td>
<td>15</td>
<td>2.4 (1.4, 4.3)</td>
</tr>
<tr>
<td>20-27</td>
<td>213</td>
<td>11.7</td>
<td>25</td>
<td>4.6 (2.8, 7.5)</td>
</tr>
<tr>
<td><strong>Any depression (treatment or PHQ-9 DD)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2612</td>
<td>2.5</td>
<td>66</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>1275</td>
<td>6.2</td>
<td>79</td>
<td>2.4 (1.7, 3.3)</td>
</tr>
<tr>
<td><strong>Suicidal thoughts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3089</td>
<td>2.9</td>
<td>91</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>798</td>
<td>6.8</td>
<td>54</td>
<td>2.3 (1.6, 3.3)</td>
</tr>
<tr>
<td><strong>GAD-7 anxiety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3118</td>
<td>2.9</td>
<td>91</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>769</td>
<td>7.0</td>
<td>54</td>
<td>2.5 (1.8, 3.5)</td>
</tr>
</tbody>
</table>

*Adjusted for gender/sexual orientation, ethnicity, age, time with VL suppression, using Cox proportional hazards regression. p-y=person years at risk*
Mental health and knowledge of personal VL level

N=2771 people on ART (ASTRA)

Self-reported VL level:
- ≤50c/mL / ‘undetectable’
- >50c/mL / ‘detectable’
- Don’t know

Inaccurate self-report of VL = self-reported VL category does not agree with clinic-recorded VL* or participants respond ‘don’t know’

*Latest VL available to participant at time of questionnaire

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>n</th>
<th>% with inaccurate self-report of VL</th>
<th>Adjusted PR$ (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>2678</td>
<td>434</td>
<td>16.2</td>
<td></td>
</tr>
<tr>
<td>PHQ-9 score ≥ 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1955</td>
<td>265</td>
<td>13.6</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>723</td>
<td>169</td>
<td>23.4</td>
<td>1.9 (1.6, 2.2)</td>
</tr>
<tr>
<td>GAD-7 score ≥ 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2082</td>
<td>301</td>
<td>14.5</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>596</td>
<td>133</td>
<td>22.3</td>
<td>1.6 (1.3, 1.9)</td>
</tr>
</tbody>
</table>

$Adjusted prevalence ratios (PR) of inaccurate self-report of VL, from modified Poisson regression model adjusted for: gender/sexual orientation; age group; ethnicity; time since started ART

Janey Sewell et al. HIV Medicine, 2017
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Among people living with HIV in the UK:

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Depression: symptoms and treatment

N=3258 people with diagnosed HIV (ASTRA)

TOTAL with evidence of depression: 35.2% (N=1148) of whom 516 (45.0%) were not receiving treatment

Treatment=medicine or other therapy for depression

Gender/ethnicity and treatment for depression

*N=1148 people with diagnosed HIV and evidence of depression* (ASTRA)

% receiving treatment for depression (medicine or other therapy) of all those with evidence of depression (*treatment or PHQ-9 DD)

- MSM [N=784]
- BA HM: Black African heterosexual men [N=64]
- OE HM: Other ethnicity heterosexual men [N=59]
- BA W: Black African women [N=153]
- OE W: Other ethnicity women [N=88]

Adjusted prevalence ratios (PR), from modified Poisson regression model including gender/sexual orientation/ethnicity; age group; ART status

$p<0.0001$
Depression: symptoms, treatment and VL outcome

1. N=2481 people on ART, started ≥6 months prior to VL measure
2. N=1773 people on ART with VL<=50, started ART ≥6 months prior to baseline VL (ASTRA)

<table>
<thead>
<tr>
<th>Measure of depression</th>
<th>(1) VL non-suppression: &gt;50c/mL at questionnaire</th>
<th>(2) VL rebound: time to VL &gt;200 c/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Adjusted PR* (95% CI)</td>
</tr>
<tr>
<td>Symptoms (PHQ-9 DD)</td>
<td>Treatment (medicine/other)</td>
<td>N</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>2110</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>277</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>516</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>355</td>
</tr>
</tbody>
</table>

N given for non-suppression analysis

*Prevalence ratio, adjusted for gender/sexual orientation, ethnicity, age, time on ART, using modified Poisson regression.

#Hazard ratio, adjusted for gender/sexual orientation, ethnicity, age, time with VL suppression, using Cox proportional hazards regression.
Among people living with HIV in the UK:

1. To what extent does living with HIV impact on mental health in the current era of successful treatment?

2. Does the prevalence of psychological symptoms vary according to socio-demographic factors?

3. Do psychological symptoms influence outcomes of HIV treatment?

4. Are those with evidence of depression receiving treatment?

5. Does depression impact on sexual behaviour and STI/HIV transmission risk?
Depression and condomless sex among MSM

N=2189 MSM with diagnosed HIV (ASTRA); N=1484 MSM without diagnosed HIV (AURAH)

See Ada Miltz et al, Br J Psych Open 2017

Sexual behaviour (anal/vaginal sex) in the past 3 months

<table>
<thead>
<tr>
<th></th>
<th>No sex</th>
<th>Condom-protected sex</th>
<th>1 CLS partner</th>
<th>&gt;=2 CLS partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: AURAH</td>
<td>144</td>
<td>487</td>
<td>423</td>
<td>430</td>
</tr>
<tr>
<td>N: ASTRA</td>
<td>797</td>
<td>556</td>
<td>442</td>
<td>394</td>
</tr>
</tbody>
</table>

P<0.001 across categories for AURAH and ASTRA, unadjusted and adjusted for demographic factors

CLS=condomless sex

Summary

• People living with HIV have substantially higher prevalence of mental health problems compared to HIV-negative people - the difference is greatest for those diagnosed with HIV for longest

• Socioeconomic disadvantage is a key factor closely linked to mental health problems

• Psychological symptoms are associated with ART non-adherence, VL non-suppression, VL rebound, lower knowledge of personal VL level, and are linked to condomless sex

• Depression may be under-recognised or under-treated, particularly among Black African men and women
Implications

- Results emphasise importance of screening, identification and management of depression among people living with HIV, with links to appropriate support services.

- Highlights need for collection of patient-reported data on psychological symptoms as well as socio-economic factors, for research studies and clinical care.
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