# The effect of COVID-19 restrictions on daily sexual behaviour and pre-exposure prophylaxis use among men who have sex with men

Authors

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# SUPPLEMENTARY MATERIALS

### Supplementary Table 1. Socio-demographic characteristics and sexual behavior of AMPrEP participants in active follow-up by 1 December 2019 who were included and excluded from the analysis, at enrolment into the study (2015-2016), Amsterdam, the Netherlands, 2015-2020.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Included in the analysis** | | **Excluded from the analysis** | |  |
|  | (n=136) | | (n=166) | | *p-value1* |
| *Socio-demographic characteristics* | *n2* | *%2* | *n2* | *%2* |  |
| **Age at baseline (years)** |  |  |  |  |  |
| Median (IQR) | 43 | [36-51] | 39 | [33-48] | 0.0129 |
| < 35 year | 31 | 23% | 54 | 33% | 0.082 |
| 35 - 44 year | 42 | 31% | 54 | 32% |  |
| ≥ 45 year | 63 | 46% | 58 | 35% |  |
| **Gender identity** |  |  |  |  |  |
| Male | 136 | 100% | 165 | 99% | 0.550 |
| Transgender woman | 0 | 0% | 1 | 1% |  |
| **Self-declared ethnicity** |  |  |  |  |  |
| White | 125 | 92% | 133 | 80% | 0.0039 |
| Non-white | 11 | 8% | 33 | 20% |  |
| **Residence** |  |  |  |  |  |
| Amsterdam | 82 | 60% | 106 | 64% | 0.525 |
| Other | 54 | 40% | 60 | 36% |  |
| **Highest education level** |  |  |  |  |  |
| No college/university | 29 | 21% | 37 | 25% | 0.840 |
| College/university | 107 | 79% | 129 | 75% |  |
| **Employment** |  |  |  |  |  |
| Employed | 113 | 84% | 122 | 74% | 0.104 |
| Unemployed | 4 | 3% | 10 | 6% |  |
| Other | 17 | 13% | 32 | 20% |  |
| **Income** |  |  |  |  |  |
| Low (≤€1700) | 26 | 20% | 49 | 31% | 0.084 |
| Middle (€1701 to €2950) | 60 | 45% | 61 | 39% |  |
| High (>€2950) | 46 | 35% | 47 | 30% |  |
| **Steady relationship** |  |  |  |  |  |
| No | 67 | 50% | 94 | 58% | 0.166 |
| Yes | 68 | 50% | 69 | 42% |  |
| **Living situation** |  |  |  |  |  |
| Alone | 65 | 48% | 95 | 57% | 0.0454 |
| With partner | 56 | 41% | 46 | 28% |  |
| With others | 15 | 11% | 25 | 15% |  |
| **Sexual preference** |  |  |  |  |  |
| Exclusively homosexual | 109 | 80% | 128 | 78% | 0.587 |
| Not exclusively homosexual | 27 | 20% | 37 | 22% |  |
| **Number of anal sex partners (3M)3** |  |  |  |  |  |
| Median (IQR) | 12 | [6-22] | 12.5 | [6-25] | 0.525 |
| **CAS with casual partner (6M)4** |  |  |  |  |  |
| No | 6 | 4% | 8 | 5% | 0.867 |
| Yes | 130 | 96% | 158 | 95% |  |
| **Post-exposure prophylaxis used (6M)4** |  |  |  |  |  |
| No | 126 | 93% | 154 | 93% | 0.967 |
| Yes | 10 | 7% | 12 | 7% |  |
| **HIV-positive partner with an detectable viral load (6M)** |  |  |  |  |  |
| No | 132 | 97% | 163 | 98% | 0.515 |
| Yes | 4 | 3% | 3 | 2% |  |
| **Sexually transmitted infection (6M)4,5** |  |  |  |  |  |
| No | 88 | 65% | 102 | 61% | 0.560 |
| Yes | 48 | 35% | 64 | 39% |  |

**Abbreviations:** AMPrEP, Amsterdam PrEP demonstration project; CAS, condomless anal sex;HIV, human immunodeficiency virus; IQR, interquartile range; M, months. Data were missing for employment (n=4), income (n=7), steady relationship (n=4), and sexual preference (n=1)

1. Continuous variables were compared using a Wilcoxon rank-sum test. Categorical variables were compared using a Pearson’s chi-squared test or Fisher’s exact test.
2. Unless otherwise stated
3. In the 3 months before enrolment
4. In the 6 months before enrolment
5. At least one bacterial sexually transmitted infection (i.e. syphilis, or urethral or rectal chlamydia or gonorrhoea)

### Supplementary Table 2. Socio-demographic characteristics and sexual behavior of participants who recorded app data before and after COVID-19 restrictions versus participants who reported data before or after restrictions, at enrolment into the study (2015-2016), Amsterdam, the Netherlands, 2015-2020.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Before and after**  **15 March** | | **Before or after1**  **15 March** | |  |
|  | (n=103) | | (n=33) | | *p-value2* |
| *Socio-demographic characteristics* | *n3* | *%3* | *n3* | *%3* |  |
| **Age at baseline (years)** |  |  |  |  |  |
| Median (IQR) | 44 | [36-51] | 41 | [33-52] | 0.482 |
| < 35 year | 20 | 19% | 11 | 33% | 0.216 |
| 35 - 44 year | 32 | 31% | 10 | 30% |  |
| ≥ 45 year | 51 | 50% | 12 | 36% |  |
| **Gender identity** |  |  |  |  |  |
| Male | 103 | 100% | 33 | 100% | NA |
| Transgender woman | 0 | 0% | 0 | 0% |  |
| **Self-declared ethnicity** |  |  |  |  |  |
| White | 97 | 94% | 28 | 85% | 0.087 |
| Non-white | 6 | 6% | 5 | 15% |  |
| **Residence** |  |  |  |  |  |
| Amsterdam | 64 | 62% | 18 | 55% | 0.438 |
| Other | 39 | 38% | 15 | 45% |  |
| **Highest education level** |  |  |  |  |  |
| No college/university | 24 | 23% | 5 | 23% | 0.320 |
| College/university | 79 | 77% | 79 | 77% |  |
| **Employment** |  |  |  |  |  |
| Employed | 88 | 87% | 25 | 76% | 0.0496 |
| Unemployed | 1 | 1% | 3 | 9% |  |
| Other | 12 | 12% | 5 | 15% |  |
| **Income** |  |  |  |  |  |
| Low (≤€1700) | 20 | 20% | 6 | 18% | 0.568 |
| Middle (€1701 to €2950) | 47 | 47% | 13 | 39% |  |
| High (>€2950) | 32 | 32% | 14 | 42% |  |
| **Steady relationship** |  |  |  |  |  |
| No | 54 | 49% | 13 | 41% | 0.243 |
| Yes | 49 | 51% | 19 | 59% |  |
| **Living situation** |  |  |  |  |  |
| Alone | 51 | 50% | 14 | 42% | 0.614 |
| With partner | 40 | 39% | 16 | 48% |  |
| With others | 12 | 12% | 3 | 9% |  |
| **Sexual preference** |  |  |  |  |  |
| Exclusively homosexual | 81 | 79% | 28 | 85% | 0.437 |
| Not exclusively homosexual | 22 | 21% | 5 | 15% |  |
| **Number of anal sex partners (3M)4** |  |  |  |  |  |
| Median (IQR) | 12 | [5-23] | 7 | [5-26] | 0.551 |
| **CAS with casual partner (6M)5** |  |  |  |  |  |
| No | 5 | 5% | 1 | 3% | 0.657 |
| Yes | 98 | 95% | 32 | 97% |  |
| **Post-exposure prophylaxis used (6M)5** |  |  |  |  |  |
| No | 96 | 93% | 30 | 91% | 0.660 |
| Yes | 7 | 7% | 3 | 9% |  |
| **HIV-positive partner with an detectable viral load (6M)** |  |  |  |  |  |
| No | 100 | 97% | 32 | 97% | 1.000 |
| Yes | 3 | 3% | 1 | 3% |  |
| **Sexually transmitted infection (6M)5,6** |  |  |  |  |  |
| No | 65 | 63% | 23 | 70% | 0.491 |
| Yes | 38 | 37% | 10 | 30% |  |

**Abbreviations:** CAS, condomless anal sex; HIV, human immunodeficiency virus;IQR, interquartile range

Data were missing for employment (n=2), income (n=4), and steady relationship (n=1)

1. 32 Participants only recorded data in the app before COVID-19 restrictions; one participants only recorded data during COVID-19 restrictions
2. Continuous variables were compared using a Wilcoxon rank-sum test. Categorical variables were compared using a Pearson’s chi-squared test or Fisher’s exact test.
3. Unless otherwise stated
4. In the 3 months before enrolment
5. In the 6 months before enrolment
6. At least one bacterial sexually transmitted infection (i.e. syphilis, or urethral or rectal chlamydia or gonorrhoea)

**Supplementary Table 3. Changes in the average proportion of days per week on which anal sex was reported per partner type in the 15 weeks before compared to after COVID-19 restrictions, per time period, among the 58 participants who filled in the app ≥90% of days during each month in the first time**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Steady partner(s)** | | | **Known casual partner(s)** | | | **Unknown casual partner(s)** | | |
|  | OR | 95%CI | p-value | OR | 95%CI | p-value | OR | 95%CI | p-value |
| **December 2019-June 2020** |  |  | **0.08941** |  |  | **0.00071** |  |  | **<0.00011** |
| Before 15 March | REF |  |  | REF |  |  | REF |  |  |
| After 15 March | 1.37 | 1.13-1.65 | 0.0012 | 0.69 | 0.59-0.80 | <0.0001 | 0.54 | 0.47-0.62 | <0.0001 |
| **December 2018-June 2019** |  |  |  |  |  |  |  |  |  |
| Before 15 March | REF |  |  | REF |  |  | REF |  |  |
| After 15 March | 1.09 | 0.91-1.31 | 0.366 | 0.97 | 0.85-1.11 | 0.657 | 0.92 | 0.80-1.06 | 0.258 |

**period, Amsterdam, the Netherlands.**

**Abbreviations**: CI, confidence interval; OR, odds ratio  
1. P-value value of the two-way interaction between time period and before/after restrictionsusing a multilevel logistic regression while adding a random-intercept to account for baseline variation between participants.

### Supplementary Figure 1. App use over time among 136 AMPrEP participants who used the app at least once between 1 December 2019 and 30 June 2020, Amsterdam, the Netherlands. Percentages indicate the percentage of participants who filled in the app out of the total number of participants who used the app at least once between 1 December 2019 and 30 June 2020.

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**Supplementary** **Figure 2. Daily PrEP use between 1 December 2019 and 30 June 2020 as recorded in the app per participant, Amsterdam, the Netherlands.**

Footnote 1: White squares represent days on which no data on PrEP use were provided.

Footnote 2: Data in the Figure are sorted based on patterns of app use and PrEP use. Participant number is a number created for ease of reference in this Figure and does not refer to the original participant’s study number used in the AMPrEP study.

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**Supplementary Figure 3. Proportion of days on which sex was reported per partner over time in the 15 weeks before and after COVID-19 restrictions, per time period, among the 58 participants who filled in the app ≥90% of days during each month in the first time period, Amsterdam, the Netherlands.**

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Supplementary **Figure 4. Prevention strategies (PrEP and condom use) per anal sex act per partner type over time in the 15 weeks before and after COVID-19 restrictions from 1 December 2019 to 30 June 2020, Amsterdam, the Netherlands.**

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