**Supplemental table 1.** Characteristics of AGYW who participated in HIV bio-behavioral survey—Siaya County HDSS, 2018 (N=3828)

|  |  |  |  |
| --- | --- | --- | --- |
| **Characteristics** | **N** | **weighted %** | **95% CI** |
| **Socio demographic characteristics** |  |  |  |
| Age category (years) |  |  |  |
| 15-19 | 2395 | 63.0 | 61.2-64.9 |
| 20-24 | 1433 | 37.0 | 35.1-38.8 |
| Highest education level attained |  |  |  |
| Primary and below | 1742 | 45.6 | 43.6-47.5 |
| Secondary ongoing/incomplete | 1546 | 41.2 | 39.3-43.1 |
| Secondary complete/any tertiary | 493 | 13.2 | 12.0-14.6 |
| Marital status |  |  |  |
| Never married | 2785 | 73.5 | 71.7-75.1 |
| Ever married | 1008 | 26.5 | 24.9-28.3 |
| Household socioeconomic status\* |  |  |  |
| Low | 433 | 27.4 | 24.8-30.3 |
| Middle | 543 | 32.9 | 30.1-35.9 |
| High | 676 | 39.6 | 36.7-42.6 |
| Migration status† |  |  |  |
| New in-migrants | 105 | 2.9 | 2.3-3.7 |
| Return in-migrants | 414 | 11.4 | 10.2-12.6 |
| Non-migrants | 3309 | 85.7 | 84.3-87.0 |
| Orphanhood status |  |  |  |
| No | 1958 | 76.3 | 74.1-78.4 |
| Paternal or maternal | 412 | 18.6 | 16.7-20.7 |
| Paternal and maternal | 128 | 5.1 | 4.1-6.2 |
| **Access to HIV prevention services** |  |  |  |
| Ever had HIV test |  |  |  |
| Yes | 3670 | 95.9 | 95.0-96.6 |
| No | 158 | 4.1 | 3.4-5.0 |
| Previous HIV test result |  |  |  |
| Positive | 153 | 4.0 | 3.3-4.9 |
| Negative | 3491 | 95.1 | 94.1-95.9 |
| Don't know/didn't receive results | 26 | 0.9 | 0.6-1.4 |
| Time since last HIV negative test |  |  |  |
| less than 3 months ago | 1292 | 36.0 | 34.2-38.0 |
| in the past 3 to 12 months | 1301 | 35.9 | 34.1-37.9 |
| more than 12 months ago | 374 | 13.5 | 12.2-14.9 |
| Don't know/can't remember | 524 | 14.6 | 13.2-16.0 |
| Participated in DREAMS program in past 12 months |  |  |  |
| No | 1473 | 47.7 | 45.5-49.8 |
| Yes | 1610 | 52.3 | 50.2-54.5 |
| **Sexual and behavioural risks** |  |  |  |
| Risk perception for HIV infection |  |  |  |
| High/moderate | 244 | 12.7 | 11.0-14.6 |
| Small/no risk | 1423 | 67.1 | 64.5-69.6 |
| I already have HIV | 118 | 5.8 | 4.6-7.2 |
| Don't know | 270 | 14.4 | 12.6-16.5 |
| Ever had sex |  |  |  |
| No | 1771 | 47.0 | 45.1-49.0 |
| Yes | 2056 | 53.0 | 51.0-54.9 |
| Age of sexual debut |  |  |  |
| <15 years | 311 | 15.0 | 13.2-17.0 |
| >=15 years | 1669 | 85.0 | 83.0-86.8 |
| Condom use at first sex |  |  |  |
| No | 876 | 44.5 | 41.9-47.2 |
| Yes | 1170 | 55.5 | 52.8-58.1 |
| Ever been forced to have sex |  |  |  |
| No | 1894 | 91.5 | 89.8-92.9 |
| Yes | 161 | 8.5 | 7.1-10.2 |
| Experienced partner violence |  |  |  |
| No | 1743 | 86.6 | 84.7-88.3 |
| Yes | 261 | 13.4 | 11.7-15.3 |
| Diagnosed with STI in past year |  |  |  |
| No | 2018 | 98.1 | 97.2-98.8 |
| Yes | 34 | 1.9 | 1.2-2.8 |
| Ever had anal sex |  |  |  |
| No | 2020 | .0 | 97.0-98.6 |
| Yes | 36 | 2.0 | 1.4-3.0 |
| Ever had oral sex |  |  |  |
| No | 1942 | 94.3 | 92.9-95.4 |
| Yes | 114 | 5.7 | 4.6-7.1 |
| Used mind altering substances in the past 12 months |  |  |  |
| No | 3819 | 99.9 | 99.7-99.9 |
| Yes | 6 | 0.1 | 0.1-0.3 |
| Had multiple sexual partners in the past 12 months |  |  |  |
| No | 1776 | 91.7 | 90.1-93.1 |
| Yes | 156 | 8.3 | 6.9-9.9 |
| Had a casual partner in the past 12 months |  |  |  |
| No | 1597 | 89.8 | 88.0-91.3 |
| Yes | 201 | 10.2 | 8.7-12.0 |
| Had older (by > 10 years) partner in the past 12 months |  | |  |
| No | 1550 | 86.8 | 84.7-88.6 |
| Yes | 221 | 13.2 | 11.4-15.3 |
| Had HIV-positive partner in the past 12 months |  |  |  |
| No | 1298 | 71.5 | 68.9-74.0 |
| Yes | 80 | 5.1 | 3.9-6.6 |
| Unknown | 419 | 23.3 | 21.0-25.8 |
| Main partner circumcised |  |  |  |
| No | 485 | 29.3 | 26.7-32.0 |
| Yes | 1241 | 70.7 | 68.0-73.3 |
| Given money/gifts/favors for sex in the past 12 months |  |  |  |
| No | 1101 | 60.4 | 57.6-63.2 |
| Yes | 697 | 39.6 | 36.8-42.4 |
| **Reproductive Health History** |  |  |  |
| Ever been pregnant |  |  |  |
| Yes | 1465 | 72.8 | 70.5-75.0 |
| No | 587 | 27.2 | 25.0-29.5 |
| Use of contraception in the past 12 months |  |  |  |
| No | 677 | 38.7 | 36.1-41.4 |
| Yes | 1121 | 61.3 | 58.6-63.9 |
| **HIV infection** | 174 | 4.5 | 3.7-5.3 |

\*Socioeconomic status was generated using the principal component analysis statistical technique, where household assets are used to categorize socioeconomic status into low, middle or high.

†Migrant status defined as follows: *New in-migrants* were individuals who had never resided in the HDSS area, and moved to reside in the HDSS; *return in-migrants* were HDSS residents who had migrated from the area for at least 1 month and then returned; *non-migrants* were individuals who have not migrated out of the HDSS area for more than 1 month.

**Supplemental table 2.** Factors associated with HIV infection among sexually active AGYW 15-24 years (n=2056) in the Siaya County HDSS, 2018

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable/Factor** | **Weighted HIV prevalence (95%CI)** | **unadjusted PR  (95% CI)** | **p value** | **adjusted PR (95% CI)** | **p value** |
| **Socio demographic characteristics** |  |  |  |  |  |
| Age group (years) |  |  |  |  |  |
| 15-19 | 3.8 (2.4 - 5.8) | 1 |  | 1 |  |
| 20-24 | 9.5 (7.7 - 11.7) | 2.50(1.67 - 3.73) | <0.001 | 2.04(1.33 - 3.12) | 0.001 |
| Highest education level attained |  |  |  |  |  |
| None/Primary and below | 11.0 (8.8 - 13.6) | 1 |  | 1 |  |
| Secondary ongoing/incomplete | 4.1 (2.7 - 6.2) | 0.43(0.29 - 0.63) | <0.001 | 0.57(0.37 - 0.86) | 0.008 |
| Secondary complete/any tertiary | 4.5 (2.5 - 7.8) | 0.34(0.20 - 0.57) | <0.001 | 0.39(0.22 - 0.67) | 0.001 |
| Marital status |  |  |  |  |  |
| Never married | 4.3 (3.0 - 6.1) | 1 |  |  |  |
| Ever married | 10.8 (8.6 - 13.4) | 2.89(2.03 - 4.12) | <0.001 |  |  |
| Household socioeconomic status |  |  |  |  |  |
| Low | 7.9 (4.2 - 14.3) | 1 |  |  |  |
| Middle | 7.7 (4.6 - 12.5) | 1.39(0.70 - 2.79) | 0.35 |  |  |
| High | 4.5 (2.4 - 8.1) | 0.78(0.36 - 1.69) | 0.534 |  |  |
| Migration status |  |  |  |  |  |
| Non-migrant | 7.3 (5.8 - 9.0) | 1 |  |  |  |
| New in-migrant | 11.5 (5.7 - 22.0) | 1.63(0.89 - 2.99) | 0.117 |  |  |
| Return in-migrant | 7.1 (4.4 - 11.4) | 1.05(0.67 - 1.62) | 0.842 |  |  |
| Orphanhood status |  |  |  |  |  |
| No | 5.3 (3.6 - 7.9) | 1 |  |  |  |
| Paternal or maternal | 4.8 (2.8 - 8.3) | 1.74(0.95 - 3.20) | 0.075 |  |  |
| Paternal and maternal | 6.8 (3.0 - 14.7) | 2.27(1.04 - 4.97) | 0.04 |  |  |
| **Access to HIV prevention services** |  |  |  |  |  |
| Participated in DREAMS program in past 12 months |  |  |  |  |  |
| No | 6.1 (4.3 - 8.4) | 1 |  |  |  |
| Yes | 5.8 (4.1 - 8.2) | 0.97(0.65 - 1.45) | 0.888 |  |  |
| **Sexual and behavioral risks** |  |  |  |  |  |
| Risk perception for HIV infection |  |  |  |  |  |
| Small/no risk | 1.3 (0.7 - 2.2) | 1 |  |  |  |
| High/moderate | 3.4 (1.5 - 7.7) | 2.27(0.96 - 5.37) | 0.063 |  |  |
| Age of sexual debut |  |  |  |  |  |
| <15 years | 9.1 (6.1 - 13.5) | 1 |  |  |  |
| >=15 years | 7.2 (5.8 - 8.9) | 0.73(0.50 - 1.08) | 0.117 |  |  |
| Condom use at first sex |  |  |  |  |  |
| Yes | 4.8 (3.5 - 6.4) | 1 |  |  |  |
| No | 10.8 (8.4 - 13.7) | 2.28(1.66 - 3.15) | <0.001 |  |  |
| Ever been forced to have sex |  |  |  |  |  |
| No | 7.1 (5.8 - 8.6) | 1 |  |  |  |
| Yes | 11.6 (6.8 - 19.0) | 1.50(0.93 - 2.43) | 0.095 |  |  |
| Partner violence |  |  |  |  |  |
| No | 6.3 (5.1 - 7.8) | 1 |  |  |  |
| Yes | 14.6 (10.1 - 20.5) | 2.19(1.54 - 3.11) | <0.001 |  |  |
| Diagnosed with STI in past year |  |  |  |  |  |
| No | 7.0 (5.7 - 8.5) | 1 |  | 1 | . |
| Yes | 34.1 (17.1 - 56.6) | 4.70(2.82 - 7.84) | <0.001 | 3.01(1.74 - 5.19) | <0.0001 |
| Ever had anal sex |  |  |  |  |  |
| No | 7.1 (5.9 - 8.6) | 1 |  |  |  |
| Yes | 23.7 (10.1 - 46.2) | 2.34(1.11 - 4.94) | 0.026 |  |  |
| Ever had oral sex |  |  |  |  |  |
| No | 7.6 (6.2 - 9.1) | 1 |  |  |  |
| Yes | 5.8 (2.2 - 14.5) | 0.59(0.25 - 1.40) | 0.231 |  |  |
| Had multiple sexual partners in the  Past 12 months |  |  |  |  |  |
| No | 7.0 (5.7 - 8.6) | 1 |  |  |  |
| Yes | 12.0 (6.8 - 20.3) | 1.39(0.83 - 2.31) | 0.208 |  |  |
| Had a casual partner in the past 12 months |  |  |  |  |  |
| No | 8.1 (6.6 - 10.0) | 1 |  |  |  |
| Yes | 2.5 (0.9 - 6.5) | 0.32(0.13 - 0.78) | 0.012 |  |  |
| Had older (by > 10 years) partner  in the past 12 months |  |  |  |  |  |
| No | 6.1 (4.7 - 7.9) | 1 |  | 1 | . |
| Yes | 17.0 (12.0 - 23.3) | 3.08(2.18 - 4.36) | <0.001 | 1.45(1.02 - 2.08) | 0.04 |
| Had HIV positive partner in the  past 12 months |  |  |  |  |  |
| No | 4.0 (2.9 - 5.4) | 1 |  | 1 | . |
| Yes | 55.5 (41.2 - 69.0) | 13.68(9.87 - 18.95) | <0.001 | 9.09(6.18 - 13.37) | <0.0001 |
| Unknown | 8.4 (5.7 - 12.3) | 1.95(1.29 - 2.96) | 0.002 | 1.70(1.11 - 2.61) | 0.014 |
| Main partner circumcised |  |  |  |  |  |
| Yes | 5.5 (4.1 - 7.2) | 1 |  |  |  |
| No | 13.8 (10.2 - 18.3) | 2.47(1.78 - 3.43) | <0.001 |  |  |
| Given money/gifts/favors for sex  In the past 12 months |  |  |  |  |  |
| No | 9.0 (7.0 - 11.4) | 1 |  |  |  |
| Yes | 5.4 (3.7 - 7.8) | 0.66(0.46 - 0.95) | 0.025 |  |  |
| **Reproductive Health History** |  |  |  |  |  |
| Ever been pregnant |  |  |  |  |  |
| No | 3.3 (1.9 - 5.8) | 1 |  |  |  |
| Yes | 9.0 (7.4 - 11.0) | 3.13(1.91 - 5.15) | <0.001 |  |  |
| Use of contraception in the past 12 months |  |  |  |  |  |
| No | 7.0 (4.9 - 9.8) | 1 |  |  |  |
| Yes | 7.9 (6.2 - 10.0) | 1.20(0.84 - 1.71) | 0.311 |  |  |

**Supplemental table 3.** Factors associated with high HIV risk perception among sexually active AGYW 15-24 years (n=1,658) in the Siaya County HDSS, 2018

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable/Factor | **Weighted prevalence  high HIV risk perception  (95%CI)** | **unadjusted PR  (95% CI)** | **p value** | **adjusted PR  (95% CI)** | **p value** |
| **Socio demographic characteristics** |  |  |  |  |  |
| Age group (years) |  |  |  |  |  |
| 15-19 | 14.1 (11.1 - 17.9) | 1 |  |  |  |
| 20-24 | 16.6 (14.0 - 19.6) | 1.31(1.02 - 1.69) | 0.035 |  |  |
| Highest education level attained |  |  |  |  |  |
| Primary and below | 18.2 (14.9 - 22.1) | 1 |  |  |  |
| Secondary ongoing/secondary   incomplete | 14.1 (10.8 - 18.2) | 0.79(0.60 - 1.04) | 0.089 |  |  |
| Secondary complete/any tertiary | 12.8 (9.3 - 17.3) | 0.87(0.64 - 1.18) | 0.369 |  |  |
| Marital status |  |  |  |  |  |
| Never married | 12.8 (10.3 - 15.7) | 1 |  |  |  |
| Ever married | 18.7 (15.4 - 22.5) | 1.30(1.02 - 1.64) | 0.032 |  |  |
| Household socioeconomic status |  |  |  |  |  |
| Low | 15.0 (9.7 - 22.5) | 1 |  |  |  |
| Middle | 15.3 (10.4 - 21.9) | 0.96(0.60 - 1.54) | 0.858 |  |  |
| High | 13.9 (9.3 - 20.3) | 0.74(0.46 - 1.20) | 0.227 |  |  |
| Migration status |  |  |  |  |  |
| Non-migrant | 15.5 (13.3 - 18.1) | 1 |  |  |  |
| New in-migrant | 17.0 (7.6 - 33.6) | 0.72(0.36 - 1.48) | 0.375 |  |  |
| Return in-migrant | 16.2 (11.2 - 22.8) | 1.03(0.74 - 1.43) | 0.88 |  |  |
| Orphanhood status |  |  |  |  |  |
| No | 13.1 (10.2 - 16.6) | 1 |  |  |  |
| Paternal or maternal | 14.4 (9.0 - 22.3) | 1.18(0.76 - 1.83) | 0.457 |  |  |
| Paternal and maternal | 11.9 (4.5 - 28.2) | 0.76(0.32 - 1.79) | 0.527 |  |  |
| **Access to HIV prevention services** |  |  |  |  |  |
| Ever had HIV test |  |  |  |  |  |
| Yes | 15.4 (13.4 - 17.7) | 1 |  |  |  |
| No | 50.7 (20.7 - 80.2) | 2.49(1.22 - 5.07) | 0.012 |  |  |
| Participated in DREAMS program in past 12 months |  |  |  |  |  |
| No | 14.4 (11.3 - 18.1) | 1 |  |  |  |
| Yes | 16.4 (13.1 - 20.3) | 1.20(0.92 - 1.58) | 0.185 |  |  |
| **Sexual and behavioral risks** |  |  |  |  |  |
| Age of sexual debut |  |  |  |  |  |
| <15 years | 22.9 (16.7 - 30.5) | 1 |  |  |  |
| >=15 years | 14.9 (12.7 - 17.3) | 0.72(0.54 - 0.96) | 0.027 |  |  |
| Condom use at first sex |  |  |  |  |  |
| Yes | 11.5 (9.3 - 14.2) | 1 |  | 1 |  |
| No | 21.3 (17.7 - 25.5) | 1.72(1.36 - 2.17) | <0.001 | 1.61 (1.26 - 2.05) | <0.001 |
| Ever been forced to have sex |  |  |  |  |  |
| No | 15.7 (13.6 - 18.1) | 1 |  |  |  |
| Yes | 15.0 (8.7 - 24.8) | 0.96(0.61 - 1.49) | 0.843 |  |  |
| Partner violence |  |  |  |  |  |
| No | 14.0 (11.9 - 16.3) | 1 |  |  |  |
| Yes | 28.8 (21.1 - 37.9) | 1.70(1.27 - 2.28) | <0.001 |  |  |
| Diagnosed with STI in past year |  |  |  |  |  |
| No | 15.4 (13.4 - 17.8) | 1 |  | 1 |  |
| Yes | 28.4 (11.8 - 54.0) | 2.89(1.73 - 4.85) | <0.001 | 2.44 (1.30 - 4.58) | 0.006 |
| Ever had anal sex |  |  |  |  |  |
| No | 15.2 (13.2 - 17.5) | 1 |  | 1 |  |
| Yes | 52.4 (25.6 - 77.9) | 2.81(1.62 - 4.87) | <0.001 | 2.35 (1.33 - 4.14) | 0.003 |
| Ever had oral sex |  |  |  |  |  |
| No | 15.4 (13.3 - 17.8) | 1 |  |  |  |
| Yes | 20.0 (12.0 - 31.4) | 1.61(1.08 - 2.39) | 0.019 |  |  |
| Used mind-altering substances in the past 12 months |  |  |  |  |  |
| No | 15.7 (13.6 - 18.0) | 1 |  |  |  |
| Yes | . | 0.00(0.00 - 0.00) | <0.001 |  |  |
| Had multiple sexual partners in the past 12 months |  |  |  |  |  |
| No | 14.9 (12.8 - 17.4) | 1 |  | 1 |  |
| Yes | 28.7 (19.5 - 40.1) | 2.12(1.54 - 2.91) | <0.001 | 1.79 (1.31 - 2.47) | <0.001 |
| Had a casual partner in the past 12 months |  |  |  |  |  |
| No | 16.6 (14.2 - 19.4) | 1 |  |  |  |
| Yes | 18.6 (12.8 - 26.4) | 1.49(1.08 - 2.07) | 0.015 |  |  |
| Had older (by > 10 years) partner in the past 12 months |  |  |  |  |  |
| No | 16.0 (13.6 - 18.7) | 1 |  |  |  |
| Yes | 23.6 (16.5 - 32.6) | 1.60(1.17 - 2.19) | 0.003 |  |  |
| Had HIV-positive partner in the past 12 months |  |  |  |  |  |
| No | 13.4 (11.1 - 16.2) | 1 |  | 1 |  |
| Yes | 53.9 (31.0 - 75.3) | 4.34(2.94 - 6.42) | <0.001 | 4.38 (2.96 - 6.47) | <0.001 |
| Unknown | 25.2 (19.5 - 31.8) | 1.95(1.51 - 2.52) | <0.001 | 1.73 (1.33 - 2.25) | <0.001 |
| Main partner circumcised |  |  |  |  |  |
| Yes | 14.4 (11.9 - 17.3) | 1 |  |  |  |
| No | 20.3 (15.7 - 25.9) | 1.52(1.17 - 1.97) | 0.002 |  |  |
| Given money/gifts/favors for sex in the past 12 months |  |  |  |  |  |
| No | 16.3 (13.4 - 19.8) | 1 |  |  |  |
| Yes | 17.6 (14.0 - 21.8) | 1.15(0.90 - 1.46) | 0.278 |  |  |
| **Reproductive health history** |  |  |  |  |  |
| Ever been pregnant |  |  |  |  |  |
| No | 9.3 (6.7 - 12.7) | 1 |  |  |  |
| Yes | 18.4 (15.7 - 21.4) | 1.85(1.37 - 2.50) | <0.001 |  |  |
| Use of contraception in the past 12 months |  |  |  |  |  |
| No | 19.5 (15.5 - 24.3) | 1 |  |  |  |
| Yes | 15.3 (12.6 - 18.4) | 0.82(0.64 - 1.05) | 0.125 |  |  |