HIV PREVALENCE AND RISK FACTORS IN WOMEN OF ACCRA, GHANA: RESULTS FROM THE WOMEN’S HEALTH STUDY OF ACCRA

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Abstract. The Women’s Health Study of Accra is a cross-sectional study designed to measure the burden of communicable and noncommunicable diseases in adult women residing in Accra, Ghana. This study assessed the prevalence rate of HIV and risk factors associated with HIV infection in 1,328 women age 18 years and older. The weighted overall HIV prevalence rate for women residing in Accra is 3.1%. The highest prevalence rate of HIV infections was identified in women age 25 to 29 years at 8.3%, OR (95% CI) 3.8 (1.68–8.33), \( P = 0.01 \). In addition to young age, other significant risk factors included sexually transmitted infection (STI) symptoms (OR 1.81 [1.14–2.87], \( P = 0.012 \)) and mean number of lifetime sexual partners (\( P < 0.001 \)). All HIV-positive women were sexually active. Other findings significantly associated with HIV-positive status included chills, oral lesions, tuberculosis, bloody sputum production, and intestinal parasite infections. There was a significant association with HIV-positive status and locality of residence in the city. There was no association with reported use of condoms, blood transfusions, surgery, reproductive health history including pregnancy or number of sexual partners, symptoms suggestive of AIDS, or self-perception of health. There was also no association with education level, religion, ethnicity, marital status, or socioeconomic level. This community-based study confirms the need to target young, sexually active women for HIV educational and preventive initiatives. A strong Ghanaian public health initiative to increase awareness of the risks of HIV and the link to STIs is critical at this time to prevent the further increase in HIV prevalence and the resultant HIV-associated illnesses.

HIV prevalence data are frequently reported from subpopulation testing in blood donor or antenatal clinics. However, this method of surveillance does not capture the rate of the population that does not use these services. The Women’s Health Study of Accra (WHSA), conducted in 2003, is a population-based cross-sectional survey assessing the burden of illness in adult women residing in an urban environment. (Hill AG and others, unpublished data) Ghanaian women, age 18 years and older, were selected by a two-stage cluster probability sample stratified by socioeconomic status based on the 2000 Ghanaian census data and included all ethnicities and religions. This first component of the study included a household health survey (HHS) for self-reported illnesses, reproductive history, health practices, Short Form 36 to measure self-reported health status, risks for illnesses and social history that was conducted in the privacy of individuals’ own homes. The WHSA also included a comprehensive medical and laboratory evaluation (CMLE) performed at Korle Bu Teaching Hospital, Accra, Ghana. Study participants met individually with a trained HIV counselor, and informed consent was obtained prior to HIV testing. This study was approved by the Human Subjects Committee at Harvard School of Public Health and Noguchi Memorial Institute for Medical Research, University of Ghana.

HIV testing was performed using the immunochromatographic qualitative rapid test Determine HIV 1/2 Test [3,4] (Abbott Laboratories, Abbott Park, IL). Positive and indeterminate tests were repeated using the qualitative rapid InstantScreen Rapid HIV 1/2 Assay [5] (Morwell Diagnostics GmbH, Zurich, Switzerland). All indeterminate tests (\( N = 7 \)) by Determine were negative by InstantScreen testing and are included in the analysis as negative. All HIV-positive women were contacted and received the test results. They were referred to the Fever Clinic at KBTH for medical care and social services.

Data was entered into SPSS version 13 database and SAS version 8 for Windows. Statistical analysis was performed using descriptive frequencies, logistics, Student’s t test, and non-parametric analyses including Wilcoxon rank sum test, Fisher’s exact test, and \( \chi^2 \) analysis, when appropriate. The odds ratio (OR) with a 95% confidence interval (CI) was used to describe the strength of the association.

A total of 3,175 women completed the HHS, and 1,328 completed the CMLE. The ages of the women ranged from 18 to 100 years. Twelve hundred ninety-six (97.6%) women examined at the clinic consented to HIV testing. Thirty-six of 1,296 (2.8%) women in this study were confirmed to be HIV-positive. Sampling fractions for the overall study design were used in a weighted analysis to produce representative results for all women residing in Accra. Using the weighted analysis, the HIV-positive rate for adult women in this urban population is 3.1%.

There was a significant association with HIV-positive status and age \( \leq 29 \) years (\( P < 0.01 \)). The prevalence of HIV was greatest in women age 25 to 29 years (8.3%, OR 3.8 [1.68–8.59], \( P = 0.003 \)) followed by women age 18 to 24 years (4.2%). The age range of the HIV-positive women was 19 to 63 years. (Table 1). All HIV-positive women were sexually active. Another risk factor for positive HIV status was the number of sexual partners reported, \( P < 0.001 \). Thirty-one HIV-positive women and 1,174 HIV-negative women reported their lifetime number of sexual partners. The mean number for HIV-positive women was 2.71 ± 1.6 (range 1 to 8) compared with 2.38 ± 1.5 (range 0 to 15) for HIV-negative women. For the women ages 25 to 29, the age group with the...
highest HIV prevalence, 56 (58.9%) reported 1 to 2 partners, 50 (51.1%) reported 3 to 5 partners, and 1 (1.1%) reported more than 5 partners. Older women did not report more partners than the younger women. Seventy percent of women ages 18 to 24 and 70 years and greater reported only 1 to 2 partners. Ninety-three women refused to report the number of lifetime partners. Of those 93 women, 90 consented to HIV testing, 85 were HIV-negative, and 5 were HIV-positive.

There was no association with a history of sexually transmitted infections (STIs). However, there was a significant association of risk for HIV-positive status and gynecologic symptoms of foul smelling vaginal discharge with or without pelvic pain consistent with a diagnosis of STIs, OR 1.81 (1.14–2.87), \( P = 0.012 \).

There was no association with other risk factors related to HIV-positive status including history of blood transfusions or situations where the women may have received a blood transfusion such as malaria, surgical procedures, hospitalizations, or delivery.

Several medical conditions were associated with HIV-positive status. HIV was associated with a prior diagnosis of tuberculosis (OR 36.97 [2.27–603.5], \( P < 0.05 \)) and a positive trend was identified for symptoms suggestive of tuberculosis (bloody sputum production, OR 12.30 [1.25–121.3], \( P < 0.10 \)). Only 4 women in the entire cohort reported bloody sputum production and 1 (2.9%) was HIV-positive compared with 3 (0.2%) of HIV-negative women. There was a significant association with mouth ulcers (OR 5.27 [1.5–18.5], \( P = 0.03 \)), and a significant trend was identified with oral thrush (OR 12.29 [1.25–121.2], \( P = 0.10 \)) in HIV-positive women.

Constitutional symptoms were queried and 31.4% of HIV-positive women reported chills compared with 17.5% of HIV negative (\( P = 0.04 \)). There was no significant association with fatigue, weight loss, anorexia, fever, depression, suicidal thoughts, sadness, or loneliness.

There was no association with use of any reported birth control methods, age at first delivery, age at last delivery, currently pregnant, number of pregnancies, induced abortions, stillbirths, or miscarriages.

There was also no association of symptoms suggestive of AIDS such as wasting, diarrhea, or skin lesions with a positive HIV status. Only 5 women reported intestinal parasites, 2 of whom were HIV-positive for a prevalence rate of 5.7% for HIV-positive women compared with 0.2% for HIV negative women (OR 25.31 [4.09–156.6], \( P < 0.001 \)).

There was no association with any finding on the clinical examination, such as body mass index, generalized wasting or cachexia, enlarged lymph nodes, skin lesions, or suspicious findings for cervical cancer on the internal pelvic examination. HIV-positive status did not correlate with any laboratory testing for the white blood count, differential, hemoglobin <10 g/dL, platelet count, or Papanicolaou (Pap) smear results.

The women who were HIV-positive were just as likely to report good to excellent health as those who were HIV negative (\( P = NS \) (SF-36; Table 2). HIV-positive women also perceived their health to be just as good as those who were HIV negative (SF-36; Table 3). No HIV-positive women expected her health to worsen. There was no association with education, socioeconomic status, religion, ethnicity, education, marital status, or co-wives. No woman in this study who relocated to Accra within the year was HIV-positive (\( P < 0.01 \)). There was a significant regional distribution within the city with the Labadi/Teshi district having the highest prevalence rate of 5.2% (\( P = 0.01 \)).

The HIV/AIDS pandemic is one of the most important and urgent public health crises and challenges today. It is estimated that 40 million people worldwide are living with HIV/AIDS and approximately two thirds of those live in sub-Saharan Africa (SSA), for an adult prevalence rate of 7.5% to 8.5%. In Accra, the prevalence rate increased from 0.7% in 1992 to 3.1% in 2000. Although this prevalence rate is relatively low in comparison to many other countries in SSA, the rates are steadily increasing with regional epidemics dependent on biological factors and social circumstances.

The WHSA supports the earlier reports that young women are at particular risk of HIV infection. It is estimated worldwide that 50% of all new HIV infections are among young people and that 30% of those living with HIV/AIDS are 15–24 years old. The vast majority of HIV-infected younger people do not know that they are infected, and few who are engaging in sex know the HIV status of their partners. The primary transmission of HIV in SSA is through heterosexual intercourse. Education and prevention measures for the younger generation may have the most impact in reducing transmission and changing attitudes and behaviors. Sexual behavior can be modified in adolescence and

### Table 1

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>% Positive</th>
<th>Total tested</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–24</td>
<td>4.2</td>
<td>193</td>
<td>1.66 (0.75–3.70)</td>
</tr>
<tr>
<td>25–29</td>
<td>8.3</td>
<td>96</td>
<td>3.80 (1.69–8.33)</td>
</tr>
<tr>
<td>30–39</td>
<td>2.4</td>
<td>169</td>
<td>1.21 (0.42–3.45)</td>
</tr>
<tr>
<td>40–49</td>
<td>2.0</td>
<td>249</td>
<td>1.49 (0.57–3.87)</td>
</tr>
<tr>
<td>50–59</td>
<td>3.0</td>
<td>231</td>
<td>0.90 (0.39–2.07)</td>
</tr>
<tr>
<td>60 and greater**</td>
<td>1.1</td>
<td>358</td>
<td>3.13 (1.10–8.90)</td>
</tr>
</tbody>
</table>

\* \( P = 0.001 \); ** \( P = 0.033 \).

### Table 2

Comparison of HIV status and self-perception of excellent health status

<table>
<thead>
<tr>
<th>HIV status</th>
<th>Definitely true (%)</th>
<th>Mostly true (%)</th>
<th>Don’t know (%)</th>
<th>Mostly false (%)</th>
<th>Definitely false (%)</th>
<th>Total (N = 1,265)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>27.8</td>
<td>50.0</td>
<td>2.8</td>
<td>16.7</td>
<td>2.8</td>
<td>36/100.0%</td>
</tr>
<tr>
<td>Negative</td>
<td>20.0</td>
<td>42.4</td>
<td>7.2</td>
<td>23.8</td>
<td>6.6</td>
<td>1,229/100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>20.2</td>
<td>42.6</td>
<td>7.1</td>
<td>23.6</td>
<td>6.5</td>
<td>1,265/100.0%</td>
</tr>
</tbody>
</table>

Question: How true or false is the following statement for you: Is your health excellent!
young adults to reduce their risk of becoming HIV-positive, particularly if these interventional strategies are peer-led.20–22

In contrast, this study identified 11 women age 50 and older who are HIV-positive (30.5%, P = NS). Given the relatively short life expectancy of most HIV-infected individuals with no access to antiretroviral therapy, these figures suggest that recent infections may be associated with a slower progression of immunosuppression.23 The lack of many symptoms or abnormal findings on the clinical examination suggests that most of the infections may have been relatively recent. This finding does emphasize the need for education of both men and women on the consequences of sexual mobility among older women as well.

It was expected that there would have been a statistically positive association with HIV-positive status and a history of a recent STIs24 and the number of lifetime partners. Most women that were clinically symptomatic for STIs appeared to be unaware of such a diagnosis.25 Underreporting and/or refusal to report an STI or number of sexual partners may occur if the woman feels that she may be judged negatively. This may have been a contributing factor for the lack of statistical significance for those associations in this study.

It was also expected that this study would have identified a significant association between HIV-positive status and cervical neoplasia. In a report from Zimbabwe, HIV-1-positive women had twice the risk of having abnormal cervical cells than HIV-negative women (relative risk 2.47, OR 10.14, P < 0.001).26 However, in the WHSA, only 8 of 832 (0.96%) Pap smears identified a neoplasia (Duda RB, unpublished data, manuscript in preparation), a much lower finding than expected.

In the WHSA, no woman reported an occupation as a commercial sex worker (CSW) and there was no documentation sought to suggest otherwise. In a recent study designed to identify the causes of HIV positivity in men residing in Accra, 84% of the men were affected from commercial sex workers.27 The HIV prevalence rate ranged from 4.9% among clients of mobile CSW to 32.1% among boyfriends of the CSW. In return, infected husbands infected unsuspecting wives and girlfriends. Because of the geographic clustering of HIV-positive cases in the WHSA, the suggestion is that sexual networks are concentrated in these areas.

Self-perception of health status by HIV-positive women, as measured by the SF-36, revealed that they perceived themselves to be in as good health as their peers and not ill with a deadly disease. There are significant implications for health care delivery based on self-perception. A subject’s perception of poor health has been reported to be independently associated with acceptance of HAART (highly active antiretroviral therapy).28 The conclusion is that the personal decision to accept therapy is related to a belief that one’s health is deteriorating. The concern for our women who tested HIV-positive is that they have a higher than appropriate perception of their own health. In particular for young women, this erroneous perception may adversely affect their acceptance of therapy should it ever become available to them.

A strong public health initiative to prevent HIV infection and STIs is critical at this time to prevent the prevalence rate of HIV from increasing in the young women in particular and in the Ghanaian population in general. Included in this initiative should be educational information concerning STIs and an inclusion of the significance of STIs as a facilitator of HIV infection.

Table 3

Comparison of HIV status and anticipation of health changes

<table>
<thead>
<tr>
<th>Question: How true or false is the following statement for you: I expect my health to get worse, . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV status</td>
</tr>
<tr>
<td>Positive</td>
</tr>
<tr>
<td>Negative</td>
</tr>
<tr>
<td>Total responses</td>
</tr>
</tbody>
</table>

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