Socio-demographic risk factors for HIV infection in women living in Mangaung, Free State

[a] **Hattingh Z,** PhD Nutrition [b] **Walsh C,** PhD [c] **Joubert G,** BA, MSc
[a] School of Tourism, Hospitality and Sport, Faculty of Management Sciences, Central University of Technology, Free State, South Africa
[b] Department of Nutrition and Dietetics, University of the Free State, South Africa [c] Department of Biostatistics, University of the Free State, South Africa
Correspondence to: Dr Zorada Hattingh, e-mail: hattingz@cut.ac.za
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Abstract

Objective: To determine socio-demographic risk factors associated with HIV infection in women in Mangaung.

Design and setting: A cross-sectional study was conducted in Mangaung, Bloemfontein.

Subjects and methods: A representative group of 500 black women (25–44 years) was randomly selected to participate. Socio-demographic data were determined with a structured questionnaire and compared between HIV-infected and HIV-uninfected women.

Results: After screening for eligibility, 488 women qualified. Sixty-one per cent of the younger women (25–34 years) and 38% of the older women (35–44 years) were HIV infected. It is possible that healthy women would be more likely to be working and were not included. HIV-infected women had been living significantly longer in urban areas ($p = 0.0001$ for both age groups) than HIV-uninfected women. Significantly more HIV-infected younger women than their HIV-uninfected counterparts snuffed tobacco ($p = 0.002$). Significantly more HIV-uninfected older women than HIV-infected older women were married or traditionally married ($p = 0.010$). Significantly more HIV-uninfected ($p = 0.012$ for younger and $p = 0.002$ for older) women than HIV-infected women reported a husband-headed household. Significantly more of the HIV-uninfected older women ($p = 0.018$) than the HIV-infected older women had no formal schooling or only primary school education. Unemployment ranged between 64.7 and 78.3%. Median room density between HIV-infected and HIV-uninfected women did not differ significantly.

Conclusions: Unemployment and low levels of education were commonly reported. A self-headed household, urbanisation and being unmarried appeared to be possible risk factors for HIV infection.

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Introduction

Sub-Saharan Africa hosts the world's worst HIV and AIDS epidemic, where women represented 61% of adults living with HIV in 2007. Of the estimated 2.1 million deaths due to AIDS reported worldwide in the same year, 76% occurred in sub-Saharan Africa. In this region, South Africa has the largest number of HIV infections in the world.[1] Data on HIV-prevalence rates among South African women are mainly obtained from reproductive women who attend antenatal public health clinics. In 2006, the highest prevalence rate (in all nine provinces) among attendees of these clinics was reported for KwaZulu-Natal (39.1%), followed by Mpumalanga (32.1%), and the Free State province following suit with 31.1%.[2]

Although numerous factors support the spreading of the HIV epidemic, the complex relationship between factors such as high unemployment rates and poverty,[3,4] migration, poor education[3] and the low socio-economic status of black women in particular aggravate their chances of becoming infected with the virus.[3,5] HIV and AIDS have a devastating impact on the economic stability, food supplies, education and health care of poor countries6 such as South Africa. The economic status of South African women living in sub-standard conditions places them at greater risk of becoming infected with HIV.[7] Unemployment and poverty deprive many black women of vital commodities such as food and housing.[4] In order to overcome these barriers, young black women from rural areas frequently leave their home villages in quest of a better life in informal town and city settlements. Low literacy levels and limited industrial skills leave them with few job opportunities in their new environment.[8] In order to survive, many are forced into financial strategies such as transactional or paid sex[3,8] which increase their risk of becoming HIV infected. The interaction between urbanisation and HIV infection has been reinforced by a Zambian study, in which the rural HIV-prevalence rate was about half of that of the urban population.[9] Migrating men employed in the mining and other sectors in South Africa move between urban and rural areas in search of employment and may become engaged in sexual relationships in the working environment, which could contribute to the spread of HIV infection when they go home for vacations to their spouse or life partner.[3]

In this article, we provide information that may lead to a better understanding of socio-demographic risk factors that could increase the vulnerability of disadvantaged black women for HIV infection.

Methodology

For this cross-sectional study, a representative sample of 500 women living in two informal settlements (Joe Slovo and Namibia) and two formal settlements (Pahameng and Botchabela) from the 13 sites in Mangaung, the black residential township of Bloemfontein,

was randomly selected to participate, using township maps. The four settlements were considered to be representative of Mangaung. Namibia had 2 995 plots, Pahameng 1 711, Joe Slovo 1 359 and Botchabela had 2 308. Non-pregnant, pre-menopausal but post-pubertal women between the ages of 25 and 44 years were targeted for participation. A proportionate number of respondents (180 from Namibia, 100 from Pahameng, 80 from Joe Slovo and 140 from Botchabela) was randomly selected from these settlements. Twenty subjects were recruited per week over a 25-week period.

A randomly selected residential plot was approached by a community health care worker who received prior training in obtaining informed consent and explaining the purpose and procedures of the study to possible participants. One woman per selected residential plot was screened for eligibility (not pregnant and within the age group). In households with more than one woman, the household decided which woman would volunteer to participate. Only women who were at home at the time of the study were selected. If no one was at home, the residential plot to the right was targeted, and if still unsuccessful the residential plot to the left of the original address was approached. If these attempts failed, another residential plot was randomly selected. Both employed and unemployed women were recruited for the study. Employed respondents were issued with a letter explaining the extent and purpose of the study to employers. Women who were unemployed and at home at the time of the study were probably more likely to be included in the study. A certain degree of bias therefore cannot be excluded in this regard. The subjects participated voluntarily, after giving written informed consent. The study was approved by the Ethics Committee of the Faculty of Health Sciences, University of the Free State (ETOVS no. 02/00).

Prior to the study, a letter explaining the purpose of the study was handed to the community leaders of the four selected areas and approval of the research project was obtained. A talk by the project leader on a local black radio station informed the community of Mangaung about the study. In addition, the two community health workers who assisted the researchers addressed community meetings in each of the four selected areas to explain the purpose and procedures of the study.

Before commencing with the main study in March 2000, a pilot study was conducted in which 10 black women in the age group 25 to 44 years participated. The questionnaires forming part of the larger study were administered to ascertain that terminology was clearly understood and to indicate the number of subjects that could be handled with ease during one data-collection session. The subjects were instructed to gather at a central point for collection at 08:00 on the day of data collection, after which they were transported to the research centre. The community health workers were remunerated for their contribution.

On arrival at the research centre, respondents were issued with a nametag with their respondent number and a list of all the data-collection stations that they had to visit as part of the larger study. A structured questionnaire was used to collect socio-demographic information during a face-to-face interview with each subject. Sotho and Xhosa interpreters assisted the researchers. Questions included the number of years residing in an urban area, language, smoking habits, household composition, marital status, level of education, employment status of respondent and husband/partner, head of the household, type and size of dwelling and available facilities, income (number of people contributing, average household income per month) and the amount of money spent on food per week. Respondents each received R40 to cover their transport cost back home. Reliability was determined by repeating a random sample of 10% of the questionnaires within one to three weeks of the initial survey. Where more than 10% of the answers to a question differed between the first and second survey, the question was considered unreliable.

Fasting blood samples were collected from participants as part of the larger study to compile a comprehensive biochemical profile of each participant. This study was conducted before the South African government initiated its "Operational Plan for Comprehensive HIV and AIDS Care, Management and Treatment for South Africa" and none of the participants were therefore receiving any antiretroviral therapy for HIV at the time of the study. Very few subjects indicated that they were originally aware of their HIV status and were given the option of receiving the results. Those who were HIV infected who chose to receive their results (< 30%) were confidentially seen by a medical practitioner, who referred them for counselling and follow-up. The research team was kept blinded to the outcome of the individual HIV tests that were performed on an Abbott AxSYM® System, using the Human Immunodeficiency Viruses (HIV-1/HIV-2): (Recombinant Antigens and Synthetic Peptides) reagent pack (Abbott, Germany, catalogue no 3D41-20). The HIV 1/2 gO reagent pack was used for the in vitro qualitative detection of antibodies to human immunodeficiency virus type 1 and/or type 2 in human serum or plasma, by using Microparticle Enzyme Immunoassay.

Statistical analysis

Data were processed using the SAS Statistics software program.[10] Frequencies and percentages were used to summarise categorical variables and Chi-squared tests were used to compare sub-groups. Mann-Whitney tests were used to compare the numerical variables of sub-groups. P values ≤ 0.05 were considered statistically significant.

Results

A total of 500 women were recruited for the study, of which 488 met the inclusion criteria. Of these subjects, 273 were 25 to 34 years old and 215 were 35 to 44 years old. In those respondents that were 25 to 34 years old, 167 of the 273 (61%), and in the age group 35 to 44 years, 82 of the 215 (38%) were HIV infected. Twelve respondents were excluded from the study. Four were found to be pregnant when examined by a medical practitioner and eight did not meet the age requirement.

Results of the socio-demographic data and the significance of differences in the socio-demographic status between HIV-uninfected and HIV-infected women are indicated in Table I. In both age groups, the HIV-infected group had been living in an urban area significantly longer than the HIV-uninfected group. The majority of women spoke Sotho and Tswana. Among young women, the use of nasal snuff was more popular than cigarette smoking. A fairly large percentage of all the older women snuffed or smoked. Significantly more of the HIV-infected young women than the HIV-uninfected young women snuffed ($p = 0.002$).

Many of the women were living with a partner. Significantly more ($p = 0.010$) of the HIV-uninfected older women than the HIV-infected older women were either married or traditionally married.

Young women were better educated than older women, with 54.7% HIV-uninfected younger women and 43.7% HIV-infected younger women indicating that they had Standard 9 to 10 (Grade 11 to 12) education. A large percentage of all the older women had no education, or primary school education only, or Standard 6 to 8

Table I: Socio-demographic profile of HIV-uninfected and HIV-infected women (25–34 years and 35–44 years)

Parameter	Age group 25–34 years old					Age group 35–44 years old				
	HIV UNINFECTED		HIV INFECTED			HIV UNINFECTED		HIV INFECTED		
	N	% of total group	N	% of total group	P value	N	% of total group	N	% of total group	P value
Language:	106		167			133		82		
• Sotho	49	46.2	93	55.7		73	54.9	38	46.3	
• Tswana	29	27.4	41	24.6		27	20.3	29	35.4	
• Afrikaans	5	4.7	1	0.6		4	3.0	2	2.4	
• Other	23	21.7	32	19.2		29	21.8	13	15.9	
Do you smoke at all?	106		167			133		82		
• Yes	4	3.8	15	9.0		44	33.1	20	24.4	
• No	83	78.3	100	59.9		51	38.4	40	48.8	
• Snuff	19	17.9	52	31.1	0.002*	38	28.6	22	26.8	0.133
Marital status of respondent	106		167			133		82		
• Unmarried	39	36.8	62	37.1		35	26.3	19	23.2	
• Married/ Traditionally married	26	24.5	26	15.6	0.066	38	28.6	11	13.4	0.010*
• Divorced	2	1.9	4	2.4		8	6.0	10	12.2	
• Separated	2	1.9	2	1.2		9	6.8	3	3.7	
• Widowed	0	0.0	3	1.8		6	4.5	8	9.8	
• Living together	37	34.9	70	41.9		37	27.8	29	35.4	
• Other	0	0.0	0	0.0		0	0.0	2	2.4	
What is your highest level of education?	106		167							
• None/primary school	14	13.2	24	14.4	0.787	64	48.1	26	31.7	0.018*
• Std 6–8 (Gr 8–10)	32	30.2	68	40.7		50	37.6	42	51.2	
• Std 9–10 (Gr 10–12)	58	54.7	73	43.7		18	13.5	14	17.1	
• Tertiary education	2	1.9	2	1.2		1	0.8	0	0.0	
Employment status of respondent	106		167			133		82		
• Housewife by choice	1	0.9	0	0.0		0	0.0	0	0.0	
• Unemployed/	83	78.3	120	71.9	0.235	86	64.7	59	72.0	0.268
• Self-employed	2	1.9	5	3.0		6	4.5	5	6.1	
• Full-time wage earner	2	1.9	2	1.2		4	3.0	3	3.7	
• Other, specify (part-time, piece job, etc.)	18	17.0	40	24.0		37	27.8	15	18.3	
Husband/partner's employment status	65		99			80		49		
• Retired by choice	0	0.0	0	0.0		1	1.3	0	0.0	
• Unemployed	9	13.9	12	12.1		9	11.3	5	10.2	
• Self-employed	2	3.1	7	7.1		1	1.3	3	6.1	
• Full-time wage earner	31	47.7	65	65.7		44	55.0	24	49.0	
• Other, specify (part-time, piece job, etc.)	23	35.3	15	15.2		25	31.3	17	34.7	
Who is the head of this household?	106		167			133		82		
• Self	16	15.1	25	15.0		52	39.1	31	37.8	
• Husband	39	36.8	38	22.8	0.012*	57	42.9	18	22.0	0.002*
• Child/Children	0	0.0	0	0.0		0	0.0	0	0.0	
• Parent	40	37.7	65	38.9		17	12.8	20	24.4	
• Grandparent	3	2.8	9	5.4		0	0.0	0	0.0	
• Friend	1	0.94	0	0.0		0	0.0	13	15.9	
• Other, specify	7	6.60	30	17.96		7	5.26	0	0.0	
Type of dwelling	106		167			133		82		
• Brick, concrete	71	67.0	129	77.3	0.062	98	73.7	60	73.2	0.934
• Traditional mud	0	0.0	1	0.6		0	0.0	0	0.0	
• Tin	23	21.7	28	16.8		32	24.1	18	22.0	
• Plank wood	9	8.5	7	4.2		3	2.3	3	3.7	
• Other, specify	3	2.8	2	1.2		0	0.0	1	1.2	
Where do you get drinking water most of the time?	106		167			133		82		
• Own tap	100	94.3	153	91.6		126	94.7	77	94.0	0.381

• Communal tap	6	5.7	14	8.4		7	5.3	4	4.9	
• Other	0	0.0	0	0.0		0	0.0	1	1.2	
What type of toilet does this household have?	106		167			133		82		
• Flush	98	92.5	154	92.2	0.943	127	95.5	79	96.3	1.00
• Bucket, pot	8	7.6	13	7.8		6	4.5	3	3.7	
Does the home have a working refrigerator and/or freezer?	106		167			133		82		
• Yes	61	57.6	86	51.5	0.328	67	50.4	40	48.8	0.82
• No	45	42.5	81	48.5		66	49.6	42	51.2	
Does the home have a working stove (gas, coal or electric) or hot plate?	106		167			133		82		
• Yes	81	76.4	117	70.1	0.252	90	67.7	50	61.0	0.317
• No	25	23.6	50	29.9		43	32.3	32	39.0	39.0
Does the home have a working primus or paraffin stove?	106		167			133		82		
• Yes	71	67.0	116	69.5	0.667	104	78.2	63	76.8	0.815
• No	35	33.0	51	30.5		29	21.8	19	23.2	
Does the home have a working microwave?	106		167			133		82		
• Yes	14	13.2	16	9.6	0.350	12	9.0	3	3.7	0.134
• No	92	86.8	151	90.4		121	91.0	79	96.3	
Does the home have a working radio and/or television?	106		167			133		82		
• Yes	95	89.6	142	85.0	0.274	103	77.4	66	80.5	0.597
• No	11	10.4	25	15.0		30	22.6	16	19.5	
Room density	106		167			133		82		
• Median	2.5		3.0		0.307	3.0		2.85		0.33
Number of years living in urban area	106		167			133		82		
• Median	8.5		14		0.0001*	10		12.5		0.0001*

* Statistically significant

(Grade 8 to 10). In the last-mentioned group, significantly more of the HIV-uninfected women ($p = 0.018$) had no formal or only primary school education. Less than 2% of all the women had some form of tertiary education.

Unemployment rates ranged from 71.9 to 78.3% for younger HIV-infected and -uninfected women, and 64.7 to 72.0% for older HIV-uninfected and -infected women respectively. More young HIV-infected women than HIV-uninfected women (24.0% versus 17.0%), but more of the older HIV-uninfected than HIV-infected women (27.8% versus 18.3%) were casual workers.

Table I shows that significantly more of the HIV-uninfected than the HIV-infected women reported a husband-headed household ($p = 0.012$ and $p = 0.002$ in the younger and older group respectively). Many older HIV-uninfected (39.1%) and HIV-infected women (37.8%) headed their own household.

Although more than two-thirds of all the subjects stayed in brick houses with their own tap for drinking water and a flush toilet, up to almost 25% stayed in tin shacks. Although most households had adequate cooking facilities, a fairly large percentage had no working stove (coal, gas, electric) or a working primus or paraffin stove. About half of all the households had a working refrigerator and/or freezer. More than 75% of all households had a radio and/or television. The median room density for young HIV-uninfected and HIV-infected women was 2.5 and 3.0 respectively. In the older group, median room density ranged between 3.0 and 2.85 for the HIV-uninfected and HIV-infected groups respectively.

Discussion

This cross-sectional study assessed the socio-demographic risk factors that could possibly be associated with HIV infection in women in Mangaung, the black residential township situated on the outskirts of Bloemfontein, the capital city of the Free State province. The original study was designed to investigate the prevalence of diseases of lifestyle in urban black women in this township. The high prevalence of HIV infection was unexpected, therefore stimulating us to further investigate the association between HIV status and socio-demographic parameters. HIV infection has apparently spread at an alarming rate in this township, with 61% of women in the age group 25 to 34 years, and 38% in the age group 35 to 44 years being HIV infected. The fact that young African women have been indicated to be particularly vulnerable to HIV infection[3] was confirmed in the present study. A similar pattern of HIV infection was found in a neighbouring South African country, where both rural and urban women in their reproductive years were more likely to be infected with HIV.[9]

The positive relationship between lower socio-economic status and HIV progression is well documented.[3–5] Unemployment rates were however high among all the participants in the present study and were not associated with HIV infection. In another Free State study, urban unemployment rates of 83 and 80% were reported respectively for HIV-affected and HIV-unaffected households.[11] Results from a study conducted in an informal settlement in the Vaal Triangle revealed that only 5.8% of the respondents and 19.9% of their partners were employed,[12] confirming that low levels of employment is a common trend among the socially disadvantaged. The majority of subjects who had a job in the present study were casual workers. Together

with the high unemployment rates, subjects were unable to report on their monthly or weekly income and results obtained in this regard were not reliable.

A higher percentage of the older women smoked at the time of the study. In those individuals infected with HIV, several opportunistic infections are associated with cigarette smoking,[13] thereby emphasising the importance of good health practices for the person living with the disease. In the younger group, significantly more of the HIV-infected women than the HIV-uninfected women reported that they snuffed tobacco. The use of dry nasal snuff was also popular among the older women, with more than 25% reporting this habit. Although the use of dry snuff has a lower risk for cardiovascular disease than cigarette smoking, chronic abuse has been associated with morphological and functional changes in the nasal mucosa[14] and should as such be discouraged.

Almost 40% of all the older women headed their own households, possibly placing them at a greater risk for financial insecurity. The majority of all the women were either unmarried or had a life partner. The finding that more of the HIV-infected women than the HIV-uninfected women from both age groups were unmarried could possibly have played a role in their HIV status. The possibility of HIV-infected women having more than one sexual relationship therefore cannot be excluded.[15] Similar levels of HIV infection were found among young urban women in Zambia, where the odds ratio for unmarried and married women was 1 : 0.81.[9] Results from a study conducted in Khayelitsha, Cape Town, revealed that self-headed households increased from 11% in women who had been living in an urban area for less than five years to 35% in those who had been living in an urban area for more than 20 years. The authors ascribed this phenomenon to "an adaptive strategy adopted by women in the face of gender oppression in a harsh urban environment", and results were not related to divorce or death of spouses.[16] In the present study, significantly more younger and older HIV-infected women had been living in an urban area for more than 10 years. The interplay between these factors could possibly have contributed to the high rates of HIV infection in this study group.

Poor education has been indicated as a major determinant in HIV infection.[3] In this study significantly more of the older HIV-uninfected than the HIV-infected women had no education, or primary school education only. Since low educational levels were a common trend in all the women, no significant difference between HIV infection and schooling was identified. In the Women's Health Status Study performed in Khayelitsha, Cape Town, 7% of the respondents had no formal schooling, 16.5% had less than five years of formal education and 54.3% had some form of secondary education.[17] In this study, the younger women were more educated than the older women, possibly indicating that levels of education are improving among the younger black generation living in poor communities.

Poor housing conditions and overcrowding sketch a typical picture of disadvantaged South African communities and could increase the risk of HIV infection of those having to face these challenges. In the present study, more than two-thirds of all the women stayed in brick houses, while more of the HIV-uninfected than the HIV-infected women from both age groups stayed in tin shacks, possibly showing that living conditions of HIV-infected women were not necessarily worse than those of their HIV-uninfected counterparts. Considering urban HIV-affected and unaffected households in the Free State, means of 5.6 persons versus 4.6 persons were reported for these households respectively, indicating that HIV-affected households were larger than unaffected ones.[11] In the present study, median room density between households of younger and older HIV-uninfected and HIV-infected women did not differ significantly.

Safe drinking water, cold/frozen storage and adequate cooking facilities are indispensable in any household and even more so in those with HIV-infected individuals. The observation that the majority of households in this community had their own tap for drinking water and a flush toilet needs to be commended. However, the lack of essential equipment such as cooking facilities and a refrigerator and/or freezer in many households is worrisome. The risk of food and water-borne infections and the safe handling, cooking and storage of foods remain a challenge in all households, in particular those with HIV-infected individuals.[18]

A possible limitation of the study was that only women at home on the date that the community health workers visited households to obtain consent were eligible for selection.

Conclusion and recommendations

Unemployment and low levels of education were the general tendency, and not only relevant to HIV-infected women. Although the rate of HIV infection was high in the whole study population, younger women were more vulnerable than older women. The number of years living in an urban area, marital status and being the head of the household appeared to be contributing factors to the HIV status of women living in this township.

Concerted strategies to improve the socio-economic status of black South African women living in poor communities should be intensified. The supportive role of the South African government in this regard is imperative for improving the quality of life of those uninfected and infected with HIV.

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