



---

## Poverty-Related Stressors and HIV/AIDS Transmission Risks in Two South African Communities

Seth C. Kalichman, Leickness C. Simbayi, Sean Jooste, Chauncey Cherry, and Demetria Cain

---

**ABSTRACT** *Community stress associated with poverty is related to health risks and poor health outcomes. Perceived community stress is specifically related to HIV transmission risk behaviors in the United States, but research has not examined these relationships in southern Africa, the region of the world with the highest rates of HIV infection and among the greatest poverty. Men (N = 464) and women (N = 531) living in impoverished adjacent communities distinguished by race (e.g., indigenous African and Coloured) completed anonymous surveys of perceptions of 10 poverty-related community stressors and measures of HIV risk-related behaviors. Indigenous African and Coloured communities differed in their perceptions of stressors, with Africans consistently viewing the 10 community stressors as more serious problems. In addition, perceived seriousness of lacking basic living resources was related to higher risk for HIV among Africans. Perceived community stress was also related to alcohol and drug use, but substance use did not mediate the association between perceived community stress and HIV risks. In the Coloured community, perceived community stressors were related to drug use, but perceived community stressors were not associated with HIV risks. These findings extend the findings of previous research to show that poverty-related stressors are associated with HIV transmission risks in some poverty-stricken communities and that these associations are not mediated by substance use.*

**KEYWORDS** *HIV/AIDS prevention, Southern Africa, Poverty, Health Behavior*

---

### INTRODUCTION

The connection between lower socioeconomic status and poor health is well established.<sup>1-4</sup> Several factors related to low income and poverty likely contribute to health disparities including poor nutrition, lack of access to health care, poor sanitation, limited resources for meeting basic needs, and heightened conflict and violence. For infectious diseases such as HIV infection, the association between poverty and disease is further complicated by social density, closed sexual networks, alcohol and drug abuse, and trading sex to meet survival needs. Although speculation that poverty itself directly contributes to immune suppression and thus causes AIDS is unfounded,<sup>5</sup> the indirect association between poverty and HIV infection is indisputable.

---

Dr. Kalichman, Mr. Cherry, and Ms. Cain are with the University of Connecticut, Storrs, Connecticut; and Mrs. Simbayi and Jooste are with the Human Sciences Research Council, Cape Town, South Africa.

Correspondence: Seth C. Kalichman, Department of Psychology, 406 Babbidge Road, University of Connecticut, Storrs, CT 06269, USA (E-mail: seth.k@uconn.edu), or Leickness C. Simbayi, Social Aspects of HIV/AIDS and Health, Human Sciences Research Council, P. Bag X9182, Cape Town, 8000, South Africa. (E-mail: lsimbayi@hsrc.ac.za)

Research has shown that psychological factors can play important roles in linking poverty and health risks. For example, Ewart and Suchday<sup>6</sup> found that neighborhood stress in urban areas results from factors such as crime, gang violence, noise, number of neighbors with food stamps, and vacant buildings. These and other neighborhood stressors are believed to have direct effects on health hazards and adverse health outcomes.<sup>7</sup> Previous research has shown that indicators of poverty and community stress are perceived as more severe among people at greater risk of HIV infection in US inner cities.<sup>8,9</sup> In a study of HIV transmission risks that stem from injection drug practices, Latkin et al.<sup>10</sup> showed that indicators of community stress such as exposure to violence, crime, loitering, litter, vacant buildings, and vandalism were associated with emotional distress, which in turn was associated with frequency of injecting drugs and needle-sharing practices. The results of Latkin et al.<sup>10</sup> were the first to show direct connections among perceptions of community stressors, emotional distress, and behavioral risks for HIV transmission.

In previous research in South Africa, we have reported that perceptions of community stressors related to poverty, including crime, violence, unemployment, poor education, lack of sanitation, and poor nutrition, are related to perceptions of AIDS itself as a community stressor.<sup>11</sup> We found that people living in a community where as many as one in five residents may be HIV infected<sup>12</sup> viewed AIDS as a less serious problem than crime, violence, and unemployment. Although perceptions of AIDS as a relative community stressor may have implications for HIV prevention,<sup>10</sup> we are not aware of research that has examined perceptions of poverty stressors in relation to HIV transmission risks in southern Africa.

This study was conducted to replicate and extend previous research on perceived community stressors in relation to perceptions of AIDS in South Africa. Extending our previous research that was conducted in an indigenous African township,<sup>11</sup> we assessed perceptions of poverty-related community stressors in two communities: a township consisting mostly of Coloured people and an adjacent indigenous African community mostly living in settlements surrounding the township. Historically, Coloured people in the Western Cape have enjoyed a higher standard of living compared with their indigenous African counterparts as a legacy of the now-demised apartheid policy. During apartheid, the Western Cape was referred to as a “Coloured preference area,” which meant that, after Whites, preference was given to Coloured people for resources, jobs, land, and so forth. This policy meant better services such as education, health, social welfare, transport, water, and sanitation for Coloured people than for indigenous Africans. Although access to services has become more equitable for all racial groups since 1994, some of the inequalities still persist. This study focused on examining the structure of perceived community stressors and testing the association between community stress perceptions and HIV transmission risk behavior. On the basis of previous research in the United States,<sup>9,10</sup> we hypothesized that perceptions of poverty-related community stressors would be associated with HIV transmission risks. We also hypothesized that perceptions of community stressors would be related to alcohol- and drug-use history and that substance-use history would mediate the association between perceived community stressors and HIV transmission risks.

## **METHODS**

### **Participants**

Participants were 464 men and 531 women residing in a township and its surrounding informal settlements in Cape Town, South Africa. All men and women age 18

and older who were present in targeted community venues at the time of the survey were eligible for the study.

### **Research Setting and Procedures**

The township and informal settlements that participated in this study are located within 20 km of Cape Town's central business district. It is a relatively new township, established in 1990, and is among the first townships to begin racial integration in Cape Town with many indigenous Africans moving in and around the township. The overwhelming majority (77%) of the entire South African population is indigenous in origin and classified as African. A significant racial minority group (9% population) is known as Coloureds, is mainly made up of people who are of mixed race or Aboriginal in origin, and is mostly concentrated in the Western Cape province. The rest of the population, descended from Europe and the Indian subcontinent, is classified as Whites (12%) and Indians (2%), respectively. Such classification continues in South Africa because of the existence of many disparities in all spheres of life, including health status and access to health services.

Participants were approached while attending one of 25 venues within the township and its surrounding settlements. Surveys were collected in the commercial center of the township as well as along main thoroughfares running through the township and adjacent informal settlements. Venues included a day hospital (7% of surveys), seven shopping areas (27%), the community center that includes six social service facilities (25%), taxi waiting areas (17%), and nine street junctions that included bus stops, waiting areas, and street vendors (24%). These venues were purposely selected because they represent public access areas throughout the township and its surrounding areas.

Surveys were administered by a team of five indigenous African and four Coloured field workers recruited from the township and informal settlements who were then trained in survey collection procedures, the study protocol, and research ethics particularly focusing on confidentiality. Sampling occurred randomly throughout hours of the day and days of the week. Participants from each racial group were approached by a field worker from the same race and asked whether they would take a short time to answer an anonymous questionnaire. A total of 1,059 people were approached to participate in the survey, 64 refused (45 men and 19 women), representing a 94% response rate. Eight-five percent of participants read and responded to the survey on their own, and 15% (N=151) required assistance from a field worker to read the survey to them while participants recorded their own responses. Respondents were told that the results of the research would possibly assist local nongovernmental organizations as well as the Cape Town metropolitan health and social work departments in developing effective HIV prevention in their community and that the researchers were providing some financial contribution to the community resource center and library in appreciation for the community's participation.

### **Measures**

Measures were administered in English, Xhosa (an indigenous African language), and Afrikaans (the former South African national language rooted in Dutch). Surveys in Xhosa and Afrikaans were translated from English and then back translated to assure parallel forms. The survey included demographic characteristics, perceptions of poverty-related community stressors, HIV risk behaviors, and history of substance use.

*Demographic Characteristics* Participants reported their age, race, years of formal education, whether they were employed, and their marital status.

*Perceived Community Stressors* Participants rated their perceptions of 10 community stressors: housing, transportation, sanitation, insufficient food, HIV/AIDS, unemployment, discrimination, poor education, violence, and crime. The community stressor ratings were adapted for use in South Africa from measures used in previous research<sup>8,9,11</sup>; the specific community stressors were derived from descriptions of poverty in townships in South Africa's Western Cape.<sup>13</sup> The 10 community stressors were randomly ordered, resulting in the sequence described above. The instructions for this instrument were "People in your community may face many challenges in their lives. Please circle how much of a problem each of the following is for you in your life." Responses were made on a three-point scale, with 1, "Not a problem"; 2, "Somewhat of a problem"; and 3, "Serious problem."

*HIV Risk History* Several indicators of HIV risk history were included in the survey. Participants reported their number of male and female sex partners and frequency of sexual events, including vaginal and anal intercourse in the previous 3 months. Participants were instructed to think back over the past 90 days (3 months) and estimate the number of male and female sex partners they had and the number of occasions in which they practiced vaginal and anal sexual behaviors with and without condoms. Participants were also asked whether they had sexual intercourse in the past 3 months that involved bleeding from their own or their partner's genitals and whether they had ever exchanged sex for money, a place to stay, or material goods.

The lifetime history of sexually transmitted infection (STI) diagnoses and symptoms was also assessed, by participants reporting whether they had ever been diagnosed with an STI and whether they had ever experienced an open sore on their genitals (genital ulcers). Participants reported whether they had ever been tested for HIV, and if they had been tested, they were asked their most recent HIV test result.

A composite of six risk factors was therefore constructed to serve as an index of HIV transmission risks. The index consisted of three behavioral risk factors associated with recent increased risks of sexually contracting or transmitting HIV (a–c) and three lifetime HIV-transmission-facilitating factors (d–f): a, having two or more sex partners in the past 3 months; b, reporting no use of condoms outside marital relationships in the past 3 months; c, engaging in sexual intercourse involving genital bleeding; d, exchanging sex for money, drugs, or a place to stay; e, having been diagnosed with an STI; and f, having had a genital ulcer. It should be noted that STI history and genital ulcers may be redundant risk factors, as may be number of partners and exchanging sex. However, each risk factor can occur independently, and there is a greater risk of HIV transmission with aggregated risk factors. In addition, sexual practices that transmit HIV were represented as recent risk (e.g., multiple sex partners), whereas factors that create a context for HIV transmission were asked for lifetime occurrence (e.g., engaging in sex trade).

*Substance Use* To assess lifetime history of substance use, we required participants to indicate whether they had ever used alcohol, dagga (marijuana), Mandrax (methaqualone, a powerful sedative), cocaine, or other drugs. Because most of the drug use reported by participants was dagga use, we summed across drugs other than alcohol to form a composite drug-use measure.

### Data Analyses

Data analyses were conducted to (a) describe the perceptions of 10 poverty-related community stressors as rated by indigenous African and Coloured communities, (b) investigate the structure of perceived community stressors in two communities, and (c) test the associations among community stressors and HIV transmission risks.

For descriptive analyses, we evaluated differences between the relative ratings of the 10 community stressors for the two communities by using discriminant analysis. The 10 stressors were entered as dependent variables, and community was included as a between-subjects factor. This analysis produced a discriminant function with each social problem weighted for its contribution in discriminating between communities.

In the next step, principle components factor analyses were conducted on the relative ratings of the 10 community stressors to determine their structure of perceived seriousness and, for data reduction purposes, separately for Africans and Coloureds. Factor analysis identifies relatively independent subsets of variables based on correlations among the total set.<sup>14</sup> Variables that are highly correlated within a subset and relatively uncorrelated with other variables are clustered into factors.<sup>15</sup> In this study, we used factor analysis to summarize the interrelationships among community stressors for Africans and Coloureds. Factors were extracted with eigenvalues greater than 1 and were orthogonally rotated using a varimax procedure. Indicators obtaining rotated factor loadings of .30 or greater on an orthogonally rotated factor were used to define the factors.<sup>16</sup> Indicators that obtained factor loadings greater than .30 on two or more factors were interpreted as contributing secondarily to multiple factors. We subsequently labeled the resulting factors based on the interpretation of the item clusters. Factor scores, which represent linear composites of weighted items, were calculated for African and Coloured participants from the resulting factor solutions.

Lastly, we conducted path analyses to test the associations of perceived community stressors and HIV risk. In this model, the resulting community stressor factor scores were entered as predictor variables of HIV risk index scores. Because HIV risk index scores were slightly skewed (skew=1.3, SE=0.8), we transformed these scores using the formula  $\log_{10}(x+1)$ , reducing the skew (skew=0.52, SE=0.11). Analyses were repeated by using transformed risk index scores,<sup>17,18</sup> with no differences in findings from the nontransformed risk index. Results are therefore presented by using the nontransformed scores.

Alcohol and other drug use were also entered as predictors of HIV risk index scores in separate models. Participant gender and age were included in all of these analyses as control variables. We report standardized regression coefficients and their associated significance levels for each analysis. In addition, we examined whether alcohol- and drug-use history mediated the association between perceived community stressors and HIV risks. For these analyses, we followed guidelines offered by Baron and Kenny.<sup>19</sup> As a condition for proceeding with the mediation analysis, a community stressor factor had to be associated with the risk index as well as either alcohol or drug use, or both. As a second condition, the substance-use variable had to be associated with HIV risks. In that case, we repeated the hierarchical regression analysis, entering the substance-use variable in the block preceding the community stressor factor scores predicting HIV risk. Changes in standardized regression weights were inspected as an indicator of mediation.

All of the regression analyses that included the social problems factors were repeated with perceptions of HIV/AIDS removed from the social problem factors,

to avoid potential redundancy in the analysis. However, none of the results changed, and we report the results for the full array of perceived social problems.

## RESULTS

Nearly half of the sample identified themselves as African (N=482, 48%), and nearly half identified as Coloured (N=442, 45%), with the remaining 7% (N=71) identifying as White or Indian. Participants represented a range of ages, with 21% (N=181) under age 20, 53% (N=469) between 21 and 35 years old, and 26% (N=225) age 36 and older. In addition, 37% (N=335) of participants were married, 36% (N=326) completed at least 12 years of education, and 41% (N=369) were employed. One in five participants (N=187) indicated knowing at least one person living with HIV/AIDS. Table 1 summarizes the sample demographic characteristics for African and Coloured participants. Comparisons between races indicated that African participants were significantly younger, less likely to be married, less likely to have 11 years or more of education, and more likely to have tested HIV positive.

The most frequently reported risk factor for HIV transmission was having two or more sex partners in the previous 3 months (N=293, 29%), followed by having engaged in intercourse involving genital bleeding in the past 3 months (N=179, 18%), and having been diagnosed with an STI (N=147, 15%). Comparisons showed that Africans were significantly more likely to report HIV risk factors than Coloureds ( $\chi^2_5=70.2, P<.01$ ) (Table 2). The association between race and HIV risk factors remained significant after controlling for participant gender, age, education, marital status, and survey venue [adjusted odds ratio (OR)=1.50, 95% CI=1.3–1.70].

### Community Differences in Perceived Stressors

African and Coloured persons perceived all 10 stressors as relatively serious in their communities, with all mean ratings above the scale's midpoint. The discriminant

**TABLE 1. Demographic characteristics among African and Coloured participants**

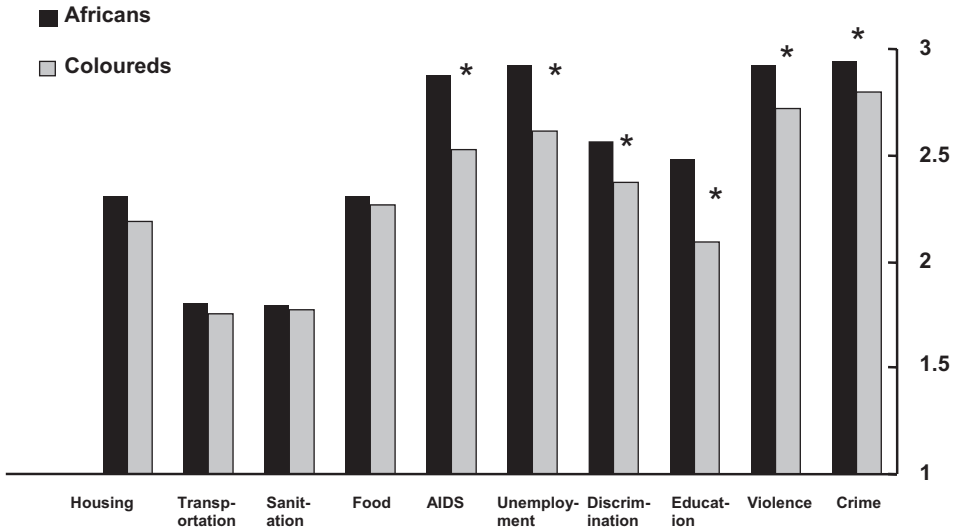
| Characteristic               | Africans [N (%)] | Coloureds [N (%)] | $\chi^2$ |
|------------------------------|------------------|-------------------|----------|
| Age                          |                  |                   |          |
| 18–20                        | 169 (34)         | 103 (24)          |          |
| 21–35                        | 271 (54)         | 213 (48)          | 14.7†    |
| 36 and older                 | 104 (22)         | 122 (28)          |          |
| Male                         | 223 (46)         | 198 (45)          | 0.17     |
| Female                       | 258 (54)         | 242 (55)          |          |
| Employed                     | 191 (40)         | 175 (40)          | 0.01     |
| Married                      | 157 (33)         | 180 (41)          | 6.6*     |
| Education less than 11 years | 256 (53)         | 264 (60)          | 46.2†    |
| Tested for HIV               | 213 (46)         | 168 (40)          | 3.7      |
| Tested HIV positive          | 16 (4)           | 5 (2)             | 20.8†    |
| Lifetime substance use       |                  |                   |          |
| Alcohol                      | 186 (39)         | 285 (67)          | 68.1†    |
| Dagga                        | 31 (7)           | 84 (20)           | 35.8†    |
| Mandrax                      | 10 (3)           | 1 (0)             | 0.8      |
| Cocaine                      | 7 (2)            | 16 (4)            | 4.8*     |
| Other drugs                  | 7 (2)            | 19 (5)            | 7.2†     |

\* $P < .05$ .

† $P < .01$ .

**TABLE 2. HIV transmission risk indicators and risk index scores among African and Coloured participants**

| Risk factor                                 | Africans [N (%)] | Coloureds [N (%)] | Total     |
|---|------------------|-------------------|-----------|
| <b>Lifetime history</b>                     |                  |                   |           |
| Exchanging sex                              | 22 (5)           | 24 (6)            | 46 (5)    |
| STI history                                 | 102 (22)         | 40 (10)           | 142 (15)  |
| Genital ulcers                              | 41 (9)           | 37 (9)            | 78 (8)    |
| In the past 3 months more than two partners | 197 (42)         | 85 (21)           | 282 (31)  |
| Blood during sex                            | 131 (29)         | 43 (11)           | 174 (19)  |
| Never used condoms                          | 43 (9)           | 39 (10)           | 82 (9)    |
| <b>Total score</b>                          |                  |                   |           |
| 0   | 170 (36)         | 272 (63)          | 442 (49)  |
| 1   | 163 (34)         | 99 (23)           | 262 (29)  |
| 2   | 82 (17)          | 37 (9)            | 119 (13)  |
| 3   | 38 (8)           | 12 (3)            | 50 (6)    |
| 4   | 15 (3)           | 11 (3)            | 26 (3)    |
| 5   | 7 (2)            | 3 (1)             | 10 (1)    |
| Mean (SD)                                   | 1.1 (1.1)        | 0.6 (1.0)         | 0.9 (1.0) |



**FIGURE.** Mean ratings of 10 community stressors for Africans and Coloureds living in adjacent communities. \*, significant differences in mean ratings,  $P < .05$ .

analysis found significant differences between Africans and Coloureds in the perceived seriousness of community stressors, indicating a single significant discriminant function, Wilks  $\lambda=0.86$ ,  $P < .001$ . Results showed that races significantly differed in their perceptions of seriousness for HIV/AIDS, unemployment, discrimination, education, violence, and crime (all  $P$ s  $< .001$ ), with Africans perceiving each as a more serious problem than Coloureds (Figure).

### Structure of Perceived Community Stressors

Correlations among the 10 community stressors rated for perceived seriousness are summarized in Table 3. Most of the assessed community stressors were positively associated, with a range of correlations between .01 and .73. For Africans, AIDS was significantly correlated with all of the other community stressors except transportation, and AIDS was correlated with all other nine community stressors among Coloureds.

To examine the structure of the perceived community stressors, we conducted principle components factor analyses on the 10 social problem ratings separately for Africans and Coloureds. For Africans, the factor analysis suggested a three-factor solution. The first factor consisted primarily of housing (factor loading .80), sanitation (.74), transportation (.69), and insufficient food (.50), accounting for 28% of the variance in the factor solution. This factor was labeled *lack of basics*. The second factor for Africans consisted of crime (.80), violence (.80), and HIV/AIDS (.53), accounting for 16% of the variance and labeled *threats to life*. Lastly, the third factor consisted of education (.75), discrimination (.71), and unemployment (.67), accounting for 10% of the explained variance and was labeled *lack of opportunity*.

The principle components analysis for the ratings of perceived community stressors among Coloureds also indicated a three-factor solution. The first factor was composed of violence (.86), crime (.79), discrimination (.70), unemployment (.62), poor education (.53), and AIDS (.57) and accounted for 38% of the variance. The first factor for the Coloured community was labeled *threats to life and lack of opportunity*. The second factor consisted of lack of housing (.82) and insufficient food (.78), accounting for 18% of the explained variance and labeled *lack of basics*. Lastly, the third factor consisted of transportation (.81) and sanitation (.77), accounting for 11% of the variance and labeled *poor infrastructure*.

### Perceived Community Stressors, HIV Risk Factors, and Substance Use Among Africans

Results of a multiple regression analysis conducted for African participants, entering age and gender as control variables and then entering the three perceived community stressor composites as predictors of the HIV risk, indicated that the equation was statistically significant ( $F_{5,476} = 5.06, P < .001, R^2 = 0.04$ ). Table 4 summarizes the standardized regression coefficients for the model for African participants, indicating that perceptions of lack of basics as a community stressor were associated with greater risks for HIV infection.

In a subsequent regression analysis to examine the association of perceived community stressors and substance use, we found that age, gender, and the three community stress factors were significantly associated with history of alcohol use ( $F_{5,476} = 15.61, P < .001, R^2 = 0.13$ ); perceived seriousness of lacking basics was significantly related to history of alcohol use ( $\beta = .08, t = 1.98, P < .05$ ). For the model predicting drug use, the equation was again significant ( $F_{5,476} = 2.27, P < .05, R^2 = 0.01$ ). In this case, perceived lack of opportunity was associated with drug use ( $\beta = .13, t = 2.79, P < .01$ ).

Because lack of basics was associated with both HIV risks and alcohol use, we examined whether alcohol use was related to HIV risks. Results showed that history of alcohol use was associated with HIV risk index scores ( $\beta = .13, t = 2.81, P < .01$ ). Thus, we conducted analyses to determine whether alcohol use mediated the association between perceptions of stress of lacking basics and HIV risks. Results showed



**TABLE 3. Correlations among ratings of seriousness of 10 community stressors by African (upper panel) and Coloured (lower panel) participants**

|                | Housing | Transportation | Sanitation | Food | HIV/AIDS | Employment | Discrimination | Education | Violence | Crime |
|----------------|---------|----------------|------------|------|----------|------------|----------------|-----------|----------|-------|
| Housing        | —       | .43†           | .41†       | .37† | .16*     | .28†       | .17†           | .13*      | .12†     | .01   |
| Transportation | .33†    | —              | .39†       | .14† | .04      | .18†       | .20†           | .17†      | .03      | .02   |
| Sanitation     | .49†    | .57†           | —          | .26† | .09*     | .15*       | .13*           | .19†      | .13†     | .01   |
| Food           | .61†    | .23†           | .38†       | —    | .21†     | .29†       | .26†           | .12*      | .12*     | .14†  |
| HIV/AIDS       | .43†    | .19†           | .23†       | .34† | —        | .15†       | .16†           | .18†      | .27†     | .20†  |
| Employment     | .37†    | .15†           | .14†       | .43† | .48†     | —          | .30†           | .30†      | .15†     | .04   |
| Discrimination | .22†    | .16†           | .13†       | .34† | .43†     | .52†       | —              | .36†      | .23†     | .19†  |
| Education      | .05     | .28†           | .28†       | .07  | .16†     | .27†       | .37†           | —         | .22†     | .16†  |
| Violence       | .20†    | .06            | .02        | .24† | .45†     | .48†       | .48†           | .36†      | —        | .45†  |
| Crime          | .18†    | .05            | .04        | .24† | .46†     | .35†       | .38†           | .27†      | .73†     | —     |

\* $P < .05$ .

† $P < .01$ .

**TABLE 4. Standardized regression weights for perceived community stressors as predictors of HIV risk separately for African and Coloured communities**

| Variables  | $\beta$ | $t$  |
|--|---------|------|
| Africans   |         |      |
| Age  | -.07    | 1.5  |
| Gender   | -.19    | 4.1† |
| Lack of basics (housing, transportation, sanitation, and food)   | .09     | 2.1* |
| Threats to life (crime, violence, and HIV/AIDS)  | .03     | 0.6  |
| Lack of opportunity (education, discrimination, and unemployment)  | .06     | 1.3  |
| Coloureds  |         |      |
| Age  | .14     | 2.8† |
| Gender   | -.11    | 2.2* |
| Threats to life and lack of opportunity (crime, violence, discrimination, education, unemployment, and HIV/AIDS) | .01     | 0.9  |
| Lack of basics (housing and food)  | .02     | 0.4  |
| Poor infrastructure (transportation and sanitation)  | .02     | 0.4  |

\* $P < .05$ .† $P < .01$ .

that the model with age, gender, perceptions of lacking basics, and alcohol-use history was significant ( $F_{4,477} = 8.15$ ,  $P < .001$ ,  $R^2 = 0.12$ ). The examination of the standardized regression weights showed that perceived severity of lacking basics was still significantly related to HIV risks after accounting for alcohol-use history ( $\beta = .10$ ,  $t = 2.32$ ,  $P < .05$ ), failing to support the hypothesis that alcohol use mediated the association between perceived seriousness of lacking basics and HIV risks.

#### **Perceived Community Stressors, HIV Risk Factors, and Substance Use Among Coloureds**

The model with age, gender, and perceived community stressors was significant in predicting risks for HIV in the Coloured community ( $F_{5,436} = 2.66$ ,  $P < .05$ ,  $R^2 = 0.02$ ). However, the examination of the standardized regression weights showed that both age and gender were related to risks, whereas none of the perceived community stressors were associated with the risk index (Table 4). In addition, perceived community stressors were not related to alcohol use ( $F_{5,436} = 0.79$ ,  $P > .1$ ). However, perceived community stressors were associated with history of drug use in the Coloured community ( $F_{5,436} = 4.79$ ,  $P < .001$ ,  $R^2 = 0.04$ ); perceived severity of poor infrastructure was related to drug-use history ( $\beta = .11$ ,  $t = 2.40$ ,  $P < .05$ ).

In the model testing alcohol- and drug-use history in relation to HIV risks, the equation was significant ( $F_{7,434} = 5.61$ ,  $P < .001$ ,  $R^2 = 0.07$ ); drug-use history was associated with HIV risk index scores ( $\beta = .22$ ,  $t = 4.53$ ,  $P < .001$ ). Alcohol-use history was not significantly associated with HIV risks in the Coloured community. No mediation tests were performed because perceived community stressors were not related to HIV risks.

#### **DISCUSSION**

Perceptions of poverty-related community stressors observed in this study were similar to those reported in past research.<sup>11</sup> In both African and Coloured communities,

HIV/AIDS was perceived as more serious than lacking basic resources and opportunities for social advancement. AIDS was also viewed as serious as unemployment, violence, and crime. Africans consistently rated the poverty-related stressors as more serious problems than Coloured participants did. Although the two communities appeared similar in socioeconomic characteristics, their living conditions were different; Coloureds lived in a formal township with small fixed structure housing, whereas Africans were living in adjacent informal settlements consisting mostly of temporary structures or shacks. Differences in poverty between the two communities were apparent in ratings of community stressors. It should be noted, however, that the structures of perceived community stressors as delineated by factor analysis were similar for the two communities. These findings once again show that HIV/AIDS is not viewed as an isolated issue by South Africans and that multiple indicators of poverty, including HIV/AIDS, are interrelated.<sup>19</sup>

This study found that perceptions of poverty-related stressors were associated with HIV risks in the African community. In particular, the greater the degree to which African participants viewed lacking resources to meet basic needs as serious, the higher their risks for HIV transmission. Perceived seriousness of lacking basic resources was also associated with history of alcohol use, and perceived seriousness of lacking social opportunities was related to history of drug use.<sup>20</sup> Although alcohol-use history was also related to HIV risks, there was no evidence that alcohol use mediated the association between community stressors and HIV risks. This pattern of results suggests that perceived severity of poverty-related stressors has direct effects on HIV transmission risks and substance use among some indigenous Africans, but the association between poverty-related stressors and HIV risks is not accounted for by lifetime history of substance use.

In the Coloured community, there were no associations between perceptions of community stressors and HIV transmission risks. Perceptions of the seriousness of poor neighborhood infrastructure were, however, related to drug-use history. In addition, drug-use history was related to HIV risk factors. These findings therefore illustrate that the association between community-related stressors and HIV transmission risks is not universal among economically impoverished South Africans. The observed differences between indigenous Africans and Coloureds on perceived community stressors and their relationships to HIV risks may be explained by the difference in socioeconomic conditions in an established township versus living conditions in informal settlements.

Alcohol- and drug-use history were also associated with HIV risks among Africans, and drug-use history was related to HIV risks among Coloureds. Although substance-use history was related to perceived community stressors, there was no evidence that history of alcohol or drug use accounts for the link between perceptions of poverty and HIV/AIDS. Substance use, particularly alcohol use in the indigenous African community, is an important consideration in planning HIV risk reduction interventions in South Africa. Alcohol abuse is increasing in South Africa, and there is evidence that alcohol use is related to greater HIV transmission risks.<sup>21-23</sup> Our findings are tempered by using a lifetime measure of history of substance use that may have overestimated current or recent use. Future research should focus on describing and explaining the role of alcohol and other drugs in HIV risks in South Africa.

This study replicates and extends past research and uses previously developed and tested methods and measures. The findings from this study should, however, be interpreted in light of its methodological limitations. This study used a street venue

sampling method for survey collection. Although we believe that we obtained a relevant sample, our participants cannot be considered representative of the Western Cape province of South Africa. Participants responded to surveys in public places and were afforded as much privacy as possible. Nevertheless, the highly sensitive and personal nature of the survey increases the likelihood that respondents underreported substance use and HIV risk factors. The rates of behaviors reported in this research must therefore be considered conservative and potential underestimates of HIV transmission risks. In addition, the risk history composite consisted of recent behaviors that can expose one to HIV along with lifetime history of experiences that promote HIV transmission. Using multiple time frames for different types of risk factors reduces the interpretability of the risk index score. Our substance-use measure also used a lifetime framework that cannot be taken as an indicator of current or recent use. Nevertheless, we believe that our study findings have important implications despite these limitations. The link between poverty and AIDS is complicated by multiple social and contextual factors including the perceived threat and stress people experience in daily living. Further research is needed to examine these factors on individual as well as societal levels.

#### ACKNOWLEDGEMENT

National Institute of Alcohol Abuse and Alcoholism (R21-AA014820) and National Institute of Mental Health (R01-MH071160) supported this research. The authors thank MaAfrika Tikkun of Cape Town for assisting with this study.

#### REFERENCES

1. Adler N, Ostrove J. Socioeconomic status and health: what we know and what we don't. In: Adler NE, Marmot MG, McEwen BS, Stewart J, eds. *Socioeconomic Status and Health in Industrial Nations: Social, Psychological, and Biological Pathways*. New York, NY: New York Academy of Sciences; 1999:3–15.
2. Lantz FM, House JS, Lepkowski JM, Williams DR, Mero RP, Chen J. Socioeconomic factors, health behaviors, and mortality: results from a nationally representative prospective study of US adults. *JAMA*. 1998;279:1703–1708.
3. Syme S, Berkman L. Social class, susceptibility and sickness. *Am J Epidemiol*. 1976;104:1–8.
4. Williams D. Socioeconomic differentials in health: a review and redirection. *Soc Psychol Q*. 1990;53:81–99.
5. Phatlane SN. Poverty and HIV/AIDS in Apartheid South Africa. *Soc Identities: J Study Race, Nation Cult*. 2003;9:73–91.
6. Ewart C, Suchday S. Discovering how urban poverty and violence affect health: development and validation of a neighborhood stress index. *Health Psychol*. 2002; 21:254–262.
7. Baum A, Singer J, Baum CS. Stress and the environment. *J Soc Issues*. 1981;37:4–35.
8. Kalichman SC, Adair V, Somlai A, Weir S. The perceived social context of AIDS: study of inner-city sexually transmitted disease clinic patients. *AIDS Educ Prev*. 1995;7:298–307.
9. Kalichman SC, Hunter TL, Kelly JA. Perceptions of AIDS susceptibility among minority and nonminority women at risk for HIV infection. *J Consult Clin Psychol*. 1992;60: 725–732.
10. Latkin C, Williams C, Wang J, Curry A. Neighborhood social disorder as a determinant of drug injection behaviors: a structural equation modeling approach. *Health Psychol*. 2005;24:96–100.

11. Kalichman SC, Simbayi L. The perceived social context of AIDS in South Africa. *Afr J AIDS Res.* 2003;2:33–38.
12. Shisana O, Simbayi L. *Nelson Mandela/HSRC Study of HIV/AIDS: South African National HIV Prevalence, Behavioral Risks and Mass Media, Household Survey 2002.* Cape Town, South Africa: Human Sciences Research Council; 2002.
13. Ramphele M. *Steering by the Stars: Being Young in South Africa.* Cape Town, South Africa: Tafelberg Books; 2002.
14. Cattell RB. *Handbook of Multivariate Experimental Psychology.* Chicago, IL: Rand McNally; 1966.
15. Rummell RJ. *Applied Factor Analysis.* Evanston, IL: Northwestern University Press; 1970.
16. Kim J, Mueller CW. *Factor Analysis: Statistical Methods and Practical Issues.* Newbury Park, CA: Sage; 1978.
17. Tabachnick BG, Fidell LS. *Using Multivariate Statistics.* New York, NY: Harper & Row; 1989.
18. Winer BJ. *Statistical Principles in Experimental Design.* New York, NY: McGraw-Hill; 1971.
19. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol.* 1986;51:1173–1182.
20. van der Vliet V. Apartheid and the politics of AIDS. In: Feldman DA, ed. *Global AIDS Policy.* Westport, CT: Bergin & Garvey; 1994.
21. Parry C, Bhana A, Myers B, et al. Alcohol use in South Africa: findings from the South African Community Epidemiology Network on Drug Use (SACENDU) Project. *J Stud Alcohol.* 2002;63:430–435.
22. Simbayi LC, Kalichman SC, Jooste S, Mathiti V, Cain D, Cherry C. Alcohol use and sexual risks for HIV infection among men and women receiving sexually transmitted infection clinic services in Cape Town, South Africa. *J Stud Alcohol.* 2004;65:434–442.
23. Weir SS, Pailman C, Mahlalela X, Coetzee N, Meidany F, Boerma JT. From people to places: focusing AIDS prevention efforts where it matters most. *AIDS.* 2003;17:895–903.