

Special Edition  
"HIV-related Stigma across  
the Lifespan"

## Research

### \*Corresponding author

**Pamela Payne Foster, MD, MPH**  
Associate Professor  
Institute for Rural Health Research  
College of Community Health Sciences  
The University of Alabama  
Tuscaloosa, AL 35487, USA  
Tel. (205)-348-5148  
E-mail: [pfoster@ua.edu](mailto:pfoster@ua.edu)

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# HIV Knowledge, Perceived Risk and Gender as Modulators of Salivary HIV Rapid Testing in African Americans

**Pamela Payne Foster, MD, MPH<sup>1\*</sup>; Safiya George Dalmida, PhD<sup>2</sup>; Graham J. McDougall Jr., PhD, RN, FAAN, FGSA<sup>2</sup>; Joe Burrage, PhD, RN, FAAN<sup>†3</sup>**

<sup>†</sup>Deceased

<sup>1</sup>Institute for Rural Health Research, College of Community Health Sciences, The University of Alabama, Tuscaloosa, AL 35487, USA

<sup>2</sup>Capstone College of Nursing, University of Alabama Capstone College of Nursing, Tuscaloosa, AL 35487, USA

<sup>3</sup>Graduate Programs and Associate Professor at The University of Alabama Capstone College of Nursing, Tuscaloosa, AL, USA

### ABSTRACT

**Background:** Of more than 1.2 million people in the United States (US) living with HIV infection, almost 1 in 8 (12.8%) are unaware of their infection. The introduction of a rapid HIV test using a saliva sample in 2004 made immediate results possible in community-based settings. Despite use of salivary rapid testing (SRT) over the last ten years, not enough is known about barriers to and acceptability of SRT among African Americans (AAs).

**Purpose:** The purpose of this study was to identify factors associated with SRT for HIV among AAs.

**Methods:** A cross-sectional study was conducted with 329 AA men and women recruited from a sexually transmitted infection (STI) clinic.

**Results:** Results of study showed that participants with higher AIDS knowledge ( $p < 0.001$ ) and problem-focused coping ( $p < 0.003$ ) tended to have higher likelihood for participation in testing. Nearly two-thirds (65.3%) were males. In terms of seeking medical help, participants with lower emotional-focused coping, lower risky behavior and higher AIDS knowledge tended to be more likely to seek medical help ( $p = 0.015$ ,  $p < 0.001$ ,  $p < 0.04$ , respectively). Female participants with higher values of risky behavior tended to be more likely to participate in testing ( $p = 0.001$ ).

**Conclusions:** The findings support the need to assess barriers and facilitators to testing decisions in order to increase testing rates. In particular, AIDS knowledge and either problem or emotional-focused coping and risky behaviors, based on gender may be important in making testing and care entry decisions.

**KEY WORDS:** Salivary rapid testing (SRT); African Americans; HIV/AIDS.

**ABBREVIATIONS:** SRT: Salivary Rapid Testing; STI: Sexually Transmitted Infection; PLWHA: Persons Living With HIV/AIDS; QoL: Quality of Life; CLIA: Clinical Laboratory Improvement Amendments; CHSCP: Comprehensive Health Seeking and Coping Paradigm; PI: Principal Investigator; AAs: African Americans.

### INTRODUCTION

Of more than 1.2 million people in the United States living with HIV infection, almost 1 in 8 (12.8%) are unaware of their infection. Early testing remains one of the most effective prevention strategies. For years, researchers have known that knowledge of HIV status and quality of life (QoL) are related. In a large study of 2,864 HIV-infected adults, were evaluated for eight health domains with the medical outcomes study SF-36.<sup>1</sup> Physical functioning was about the same as normal for adults with asymptomatic HIV disease and was worse for those with symptomatic HIV disease.<sup>1</sup> Emotional well-being was significantly worse for patients with other

chronic diseases except depression.<sup>1</sup> In a study by Dalmaida et al<sup>2</sup>, a sample of 292 persons living with HIV (PLWHA) reported that additional factors such as religion, mental health, medication adherence and social support are important in the health related QoL of PLWH.

In another study of 226 HIV-infected males in the southern US, the authors found that coping and social support were related to some aspects of health, but that depressive symptoms were related to all aspects of health related QoL.<sup>3</sup> In a sample of 121 HIV-infected gay and bisexual men (64 African American, 57 White), the African American males reported higher use of multiple coping strategies.<sup>4</sup> In a study of 141 HIV-infected women of color, the authors identified depression, illness severity, and psychological abuse with a greater risk of having 5 or more barriers to care.<sup>5</sup>

Research addressing testing strategies that make HIV testing easily accessible and accepted with populations who are heavily burdened by the epidemic, such as African Americans (AAs) is crucial. The introduction of a rapid HIV test using a saliva sample in 2004 made immediate results possible in community-based settings, thereby eliminating the use of invasive techniques using oral methods rather than blood draws, lengthy delays for test results, reducing stigma, lack of privacy, and the need to return to the agency for getting the test results.<sup>6</sup>

The HIV salivary rapid test (SRT) is food and drug administration (FDA) approved and clinical laboratory improvement amendments (CLIA) waived screening test for HIV antibodies. The manufacturer reported a 99.3% accuracy rate when the test was initially approved about ten years ago for use in community settings. Since that time, the literature reports varying sensitivity of the SRT and in some circumstances suggests combining the test with 4<sup>th</sup> generation tests such as the enzyme immunoassays and the nucleic acid amplification tests in more clinical settings.<sup>7</sup> However, because the SRT is still relatively new, there is little data describing factors impacting HIV test seeking or subsequent entry into care. Similarly, few if any cultural or population-based instruments are available to measure those factors in the context of this relatively new non-invasive rapid testing modality. There is also a need to identify information addressing factors affecting the likelihood of HIV testing and subsequent entry into the health care system, if appropriate.

AAs are disproportionately infected with HIV; they seem a likely population to develop culturally appropriate interventions. From a systematic literature review, the findings demonstrated that HIV self-testing was a highly acceptable method for minorities.<sup>7</sup> Also, to decrease disparities in care, research must be conducted that uses adapted or developed instruments appropriate and sensitive to appropriate study minority populations. Therefore, there is a crucial need to develop and test instruments to further examine African American's HIV test seeking behaviors. Identifying the factors that influence the likelihood of an individual to seek HIV testing will provide information on

which to base development of interventions to facilitate testing.

Nyamathi developed the Comprehensive Health Seeking and Coping Paradigm (CHSCP) model to determine whether thoughts and actions individuals' use to overcome threats to health and deal with life crises encountered.<sup>8</sup> Nyamathi and colleagues<sup>9</sup> tested and refined the CHSCP in studies that examined HIV testing in the context of health seeking and coping for HIV drug-abusing, homeless, and impoverished men and women at risk for HIV. In a high risk population of African American, White, and Hispanic men and women, Nyamathi and colleagues<sup>9</sup> found that predictors of HIV testing included injection drug use, greater social support, more AIDS knowledge, a higher perceived risk for AIDS and a positive coping style. Predictors of HIV testing and return for men were injection drug use, greater AIDS knowledge, a higher perceived risk for AIDS, and a positive coping style.

In a study of homeless African American, White/non-Hispanic and Hispanic women, the findings revealed that HIV testing and return were predicted by more social support, greater AIDS knowledge, greater perceived risk for AIDS, and more problem-focused coping strategies.<sup>10</sup> The same research team found that the impact of peer, nurse case-managed, and standard HIV risk reduction programs predicted behavioral outcomes among homeless African American, Hispanic, and Anglo women.<sup>11</sup> All participants were offered HIV testing prior to the intervention.

In another study using the CHSCP model<sup>9</sup> examined personal cognitive behavioral and demographic predictors of HIV testing and STIs in a sample of 621 multiracial homeless women. Data were collected using accepted or previously tested self-report questionnaires. The findings revealed that higher social support, AIDS knowledge, and perceived risk for AIDS scores were predictive of HIV testing and return for results. Also, problem-focused coping strategies mediated relationships among higher self-esteem, social support, AIDS knowledge, less risky sexual behavior, and HIV testing and return for test results. Emotion-focused coping moderated non-Hispanic ethnicity, more drug use, perceived risk for AIDS, less self-esteem, and less social support. AAs used more emotion-focused coping than Hispanics.

Nyamathi's modified Comprehensive Health Seeking and Coping Paradigm (CHSCP) is composed of six factors: personal (self-esteem); coping resources, socio-demographic (age, education, marital status, employment status, and socioeconomic status); cognitive appraisal (perceived stigma, perceived risk for AIDS and AIDS knowledge); health seeking and coping behaviors (problem-focused and emotion-focused coping strategies and risky drug and sexual behavior) and health outcomes (likelihood of participating in SRT and entry into care). This model guided this study and provide the specificity necessary to examine factors that may impact the likelihood of participating in SRT and adopting appropriate protective health behaviors

such as obtaining health care if HIV positive.

This study had three aims. Aim 1) to describe relationships between selected personal factors (self-esteem), social resources (social support), and cognitive appraisal components (perceived stigma, perceived risk for AIDS, AIDS knowledge, and reasons for rapid testing) and the likelihood of an individual's participation in SRT and subsequent entry into care if HIV infected; Aim 2) Next, to determine if relationships existed between the health seeking and coping components (problem focused coping, emotion focused coping and risky drug and sexual behavior) and the likelihood of participating in SRT and entry into care if HIV infected. Aim 3) to explore the relationships between selected socio-demographic factors and the likelihood of an individual's participation in SRT and entry into care if HIV infected.

## METHODOLOGY

This cross-sectional study was conducted in a county sexually transmitted infection Clinic located in a large Mid-Western city. Selection criteria included: African American, 18 years and older, ability to read and write at the 8<sup>th</sup> grade level, last tested for HIV either less than a year or more than a year and were not involved in any other aspect of the study. African American was defined as adults who designate their racial background as Black, Negro, or African American. A screening survey was used to determine these criteria.

After obtaining Institutional Review Board approval, participants were recruited through advertisements from flyers and posters in the STI Clinic, and clinic staff informed eligible patients of the study. A \$50 cash incentive was offered to support recruitment of participants. Interested participants contacted the researcher. Immediately after their clinic appointment, each participant filled out self-administered questionnaire in a private room on-site at the STI Clinic. Measurement of variables *via* pencil and paper questionnaires (cognitive, psychosocial and behavioral factors) was accomplished using a face-to-face approach by the researcher. Total subject involvement required approximately 60 minutes.

## Measures

All questionnaires had known psychometric reliability and validity and were used in previous studies that included African American adults who were infected with HIV. A description of each instrument and associated psychometric data follows. The instruments were organized according to CHSCP Model Components.

### Socio-demographic Factors

**Patient demographic data questionnaire:** This questionnaire assessed African American ancestry, age, race, gender, education, sexual orientation, partner status, employment status, income, and insurance coverage.

### Personal Factors

**Coopersmith self-esteem inventory:** Self-Esteem was measured with the revised 23-item Self-Esteem Inventory (SEI), which uses yes or no responses.<sup>12</sup> The internal consistency with homeless females and males was 0.79 and 0.83, respectively.<sup>12-14</sup>

### Social Resources

**Social support:** It was measured using the Interpersonal Support Evaluation List - General Population (ISEL), which is a 12-item true or false scale that measures perceived availability of social resources, rated on a 4-point Likert scale from 1 (definitely false) to 4 (definitely true). Higher scores indicated higher levels of social support. The three subscales (appraisal, tangible, and belonging) each contain 4 items. Cronbach's alpha was reported as 0.78 in a study of the effectiveness of social support interventions for people with HIV.<sup>15</sup>

**Attitudes toward people with HIV:** This 15-item questionnaire assessed opinions about people who are infected with HIV and addressed the measurement of perceived stigma in terms of the anticipated consequences or outcomes of HIV testing. A five-point scale ranging from one (strongly disagree) to five (strongly agree) was used to determine opinions others have of those with HIV.<sup>16</sup> Cronbach's alpha ranges from 0.82-0.91.

**Perceived risk for AIDS:** Five risk perception items from the Capsa Health Protection Questionnaire evaluated the perceived risk for AIDS. The items were assessed on a five-point scale ranging from one (strongly disagree) to five (strongly agree) The standardized alpha for the entire scale was 0.91.<sup>17</sup>

**AIDS Knowledge:** AIDS Knowledge and attitudes toward HIV/AIDS was measured by a modified 21-item CDC knowledge and attitudes questionnaire for HIV/AIDS.<sup>18</sup> Internal consistency reliability for the overall HIV knowledge and attitude scale was 0.88 with homeless men and 0.90 for homeless women in a previous study.<sup>19</sup>

### Health Seeking and Coping Behaviors

**Risky drug and sexual behavior:** This construct was measured by (a) the number of sexual partners in the past six months (log transformed to avoid extreme skewness); (b) the frequency of vaginal sex; (c) the frequency of oral sexual behavior; (d) the frequency of anal sex; (e) the frequency of use of mind/mood altering drug use, ranging from 0=never to 7=everyday; and (f) whether the respondent had sex without a condom in the last 6 months.<sup>10</sup>

**Emotion-focused and problem-focused coping strategies:** A 17-item version of the Medical Outcomes study, Modes of Coping Battery assessed coping used in response to physical health problems, emotional problems, and other problems faced in the past six months. The items were rated on a five-point Likert scale from one (never) to five (very often). Internal consistency

cies for these scales have been over 0.85 for minority adults.<sup>20</sup>

**HIV testing/entry into care likelihood:** This researcher<sup>15</sup> developed-measure consisted of two questions.<sup>1</sup> If you were offered an HIV test tomorrow that only required a sample of saliva and would be given the results within 30 minutes, how likely would it be that you would you take it?<sup>2</sup> If you took the test, and the results showed that you were infected with HIV (the virus that cause AIDS), how likely would it be that you would go to the doctor to be seen on a regular basis even if you did not feel or look sick? These items were rated on a five-point Likert scale from one (not at all) to five (very).

### Power Analyses and Estimated Sample Size

As no similar studies were identified in the literature, information was not available from which to estimate expected effect sizes for the study aims. As an alternative, the number of participants that could reasonably be recruited within time and funding limits was estimated and entered into power calculations. Given the anticipated 300 participants (expected recruitment of 25 per week for 12 weeks) the effect size (ES) required to provide a power of at least 0.80 at a 0.025 Type 1 error rate was calculated and evaluated as to its practicality.

The multiple regression model proposed for addressing Aim 3 contained the largest number of estimated parameters (12, given a first-order model consisting of all seven proposed socio-demographic factor variables) and, consequently, largest sample for a given effect size. Effect sizes (ES) providing a minimum 0.80 power were estimated for (1) test of the overall model containing seven predictors and (2) test for one predictor after controlling for the other six predictors in the model, with a between-predictor  $R^2$  of 0.25. Estimates were calculated using PASS 2008.<sup>22</sup> Other assumptions used for the estimates included (1) sample size of 250, (2) a two-tailed test, and (3) a Type I error rate of 0.025. Ideally, a Bonferroni adjustment for multiple testing would be applied to maintain a study-wise 0.05 Type I error rate. However, the 12 models tested (6 hypotheses\*2 dependent variables), required an adjusted alpha of 0.004, which is impractical given the exploratory nature of this study and feasible sample available. ES of 0.08 (multiple  $R^2$  for the full model), and .03 (partial  $R^2$  for individual predictors) were estimated to provide the minimum 0.80 power. Those ES were not unreasonable for an exploratory study, and indicated that 250 participants would provide adequate power to the study's aims.

## RESULTS

### Sample

A total of 329 adults participated in the survey. There were 286 (87%) people that completed data for Aim 1, 299 (91%) for Aim 2, and 173 (53%) for Aim 3. All but 3 participants were AAs, and these 3 cases were dropped in subsequent analyses. Sample demographics are presented in Table 1. The mean age was 30.02 years ( $SD=9.87$ ). More than half were under 30 years

of age (57.8%). Nearly two-thirds (65.3%) were males. The overwhelming majority were heterosexual (91.3%) and lived in urban areas (97.3%). Almost 7 in 10 (69.9%) were single. Only one third worked full-time (30.7%) while nearly two-thirds made less than \$10,000 in annual income (58.1%). Roughly three-fifths lived within 10 miles of the site location (60.5%) and traveled there in their own private vehicle (62.3%).

**Aims 1 and 2:** Spearman correlation coefficients for the selected personal and coping factors with likelihood of testing and seeking help are presented in Table 2. For participation in testing, participants with higher AIDS Knowledge ( $p<.001$ ) and higher problem-focused coping tended to have higher likelihood for participation in testing. In terms of seeking medical help, participants with lower emotional-focused coping, lower risky behavior, and higher AIDS knowledge tended to be more likely to seek medical help ( $p=.015$ ,  $p<0.001$ ,  $p<0.04$ ).

**Aim 3:** No statistically significant relationship was found between the set of personal characteristics and seeking help or getting tested. Relationships were also tested for each of those personal characteristics separately. None of those models met the 0.025 adjusted level for significance. There were no statistically significant relationship between the set of personal characteristics and seeking help or getting tested.

## DISCUSSION

The aims of this study were to identify barriers and facilitators of salivary rapid HIV testing (SRT) decisions among AAs. The principal investigator (PI) was able to recruit a large sample of AAs. The identification of facilitators and barriers for AAs in SRT of HIV were not known when this study was implemented. Even so, this study adds new knowledge in a variety of ways. First, AIDS knowledge and perceived risk such as emotion-focused coping were important in many aspects of testing and care entry decisions. Second, gender moderation of risky behaviors was associated with participation in testing. Female participants with higher values of risky behavior tended to be more likely to participate in testing. Finally, there were no significant associations between personal characteristics of study participants and seeking help and being tested.

The main findings of this study emphasized four major themes: 1) testing and AIDS knowledge, 2) testing and coping strategies, 3) testing and risky behaviors, and 4) testing and gender. Those individuals with higher AIDS knowledge and problem-focused coping had a greater likelihood to participate in testing, ( $p<0.001$ ,  $p<0.003$ , respectively). These findings were supported in earlier studies.<sup>1,4,6</sup> Participants with higher problem-focused coping were more likely to seek medical help.

The knowledge factor was relevant in both styles of coping, both problem solving and emotional regulation. Our sample was 65% male and men scored higher in problem solving coping. For the third of the sample that were female, they experienced different issues related to coping and seeking medi-

**Table 1:** Demographic Characteristics of Participants.

	<b>Demographic Variable</b>	<b>N</b>	<b>%</b>
Age	18-29	188	57.8
	30 and over	141	42.2
Race	African American	326	99.1
	Non-African American	3	0.9
Gender	Male	215	65.3
	Female	114	34.7
Sexual orientation*	Straight	302	91.8
	Gay	3	0.9
	Bisexual	16	4.9
Marital status*	Single	230	69.9
	Partnered	81	24.6
	Married	15	4.6
Highest educational level*	Grade school	10	3.0
	High school	226	68.7
	College and above	88	26.7
Residence*	Urban	320	97.3
	Rural	7	2.1
Distance to site location	1-5 miles	88	26.7
	6-10 miles	111	33.7
	11-15 miles	71	21.6
	16-20 miles	42	12.8
	More than 20 miles	17	5.2
Time to travel to site*	Less than 1 hour	306	93.0
	More than 1 hour	21	6.4
Type of transportation used*	Private vehicle	205	62.3
	Assistance from friend	78	23.7
	Bus/Taxi/Walked	45	13.6
Child care*	Someone looked after kids	89	27.1
	No one looked after kids	222	67.5
Difficulty of getting child care*	Yes	52	15.8
	No	253	76.9
Employment*	Full-time	101	30.7
	Part-time	55	16.7
	Not employed	170	51.7
Annual income	\$1,000 and less	193	58.7
	\$1,001-\$10,000	38	12.1
	\$10,001 and more	96	29.2
Health insurance**	Has medicare	12	3.6
	Has medicaid	37	11.2
	Has private insurance	27	8.2
	Has other forms of insurance	45	13.7
	No insurance	190	58.7
Time since last HIV Test*	12 months and less	147	44.7
	13 months and more	165	40.1
Times tested for HIV*	Never	79	24.0
	One time	99	30.1
	Two times	76	23.1
	Three times	39	11.9
	More than three times	32	9.7

\*numbers do not add up to 100% due to incomplete responses

\*\*numbers do not add up to 100% due to accumulation of responses

**Table 2:** Bivariate Associations with Participating in HIV Saliva Rapid Testing and with Seeking Medical Help if HIV Infected.

	HIV saliva rapid testing		Seek medical help	
	Correlation	<i>p</i> -level	Correlation	<i>p</i> -level
	Coefficients		Coefficients	
Self-esteem	0.03	0.643	0.04	0.45
Social support	0.04	0.458	0.08	0.18
Perceived Risk for AIDS	0.12	0.122	0.05	0.39
AIDS knowledge	0.21	0.001*	0.12	0.04*
Stigma	-0.08	0.15	-0.06	0.32
Problem-focused coping	0.16	0.003*	0.10	0.092
Emotion-focused coping	-0.08	0.155	-0.14	0.015*
Risky Behaviors	0.10	0.089	0.18	0.001*

cal help. Female participants with high risky behavior were more likely to receive HIV tests. Among those AAs with HIV, we found an association between emotion-focused coping and testing. However, our study demonstrated that lower emotion focused coping was associated with greater entry into care. The findings from this study suggested that interventions which address coping skills need to be considered to either facilitate testing or entry into the health care system.

Previous studies have identified factors which may influence HIV testing which support these four themes.<sup>19,21</sup> For example, the Messer study reported differences in attitudes about HIV testing between AAs and Whites. In the National Health Interview Study, when Blacks were compared to Whites, the AAs reported that they were twice as likely to have plans to be tested on a voluntary basis.<sup>19</sup> In another study of 30 AA women, gender specific facilitators for HIV testing included: support for testing and diagnosis by health care provider and family, being pregnant, or availability of testing.<sup>21</sup> Barriers for testing included: lack of privacy or discretion of testing facility, drug addiction, mental illness or side effects of HIV drugs.<sup>21</sup>

In the Nyamathi study, the women reported similar barriers for HIV testing that included drug use and abuse and facilitators such as HIV knowledge and social support.<sup>10</sup> Additional factors which supported this study's findings included predictors of HIV testing in homeless women such as increased problem-solving strategies, more AIDS knowledge and less risky sexual behavior.

The results from this study confirmed and strengthened previous theories and research which examined facilitators and barriers of HIV testing. For example, this study showed that higher HIV knowledge continues to be important in affecting a person's decision to get a HIV test.<sup>22-25</sup>

The relationships among social support, self-esteem, stigma and AIDS knowledge have all been associated independently with HIV testing and care entry as referenced in previous studies. However, this study did not show any associations in directly influencing the decision to test or enter care. This possibly suggests that there may have been too many components

in our theoretical model to effectively predict testing and care entry or it may suggest that this population has no relationship that predicted HIV testing or entry into care.

Interventions which educate at risk populations on the basics of HIV and prevention are needed to close the gap for the HIV continuum of care in this country. In the same way, gender differences and entry into the care system needs to be considered when considering HIV testing. Women with greater risky behaviors were more likely to get tested. Therefore, identifying those risk behaviors in women in order to differentiate gender differences would be important in tailoring HIV testing.

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#### CONFLICTS OF INTEREST

None of the authors have any conflicts of interest.

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