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Harry A. Persaud
DePaul University, hpersaud@mail.depaul.edu

Douglas Bruce
DePaul University, dbruce1@depaul.edu

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Acknowledgements

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Knowledge of Clinical Measures and Healthcare Adherence in Young Gay and Bisexual Men Living with HIV/AIDS

Harry A. Persaud & Douglas Bruce*

Department of Health Sciences

ABSTRACT Knowledge of HIV/AIDS test results and adherence to healthcare interventions are two important outcomes that reflect proper HIV/AIDS management. This study aimed to determine which demographic and HIV acceptance measures were significantly associated with health literacy and adherence indicators in young MSM. 200 HIV/AIDS positive young MSM completed computer based surveys regarding demographics, HIV/AIDS health literacy indicators, and HIV/AIDS acceptance measures. It was found that young African American MSM, in comparison to young white MSM, had lower odds of knowing both viral load and CD4 measures. Further, participants who had a high school diploma were found to have increased odds of knowing both their CD4 and viral load measures in comparison to those young MSM participants who had not obtained a high school diploma. Further research should examine the factors associated with the lack of health literacy reported by young African American MSM.

INTRODUCTION

Young gay and bisexual African Americans are the subpopulation of men who have sex with men (MSM) that have the highest incidence of HIV infection [1]. In 2010, men who have sex with men contracted 63% of all new HIV cases, while young black MSM bore 55% of the incidence of HIV in all young MSM [2]. Identifying populations in which the HIV burden is disproportionally high is crucial in containing and reducing the spread of HIV/AIDS.

Knowing and understanding HIV test results, such as CD4 counts and viral load (VL) measures, is an important indicator of patient participation in HIV management. Individuals who know CD4 and VL measures have a greater understanding of their disease progression compared to those who do not know these health indicators. Health literacy, a measure of how much an individual understands health information, is an important variable in assessing knowledge of HIV clinical test results. Those with lower health literacy have been consistently less likely to know CD4 and VL measures [3, 4]. Further, education attainment has been associated with understanding HIV test results and general health literacy [4, 5].

Adhering to healthcare appointments and HIV medication regimens are additional indicators that measure patient involvement in HIV control. Research has suggested that the number of missed healthcare appointments is associated with increased disease progression as indicated by lower CD4 counts and higher VLs [6]. Medication adherence, especially to antiretroviral therapy (ART), is extremely important in HIV/AIDS management, with current recommendations stating individuals must maintain at least 95% adherence [7]. Multiple studies have reported lower levels of ART adherence among African American MSM [8, 9, 10, 11]. Additionally, it has been reported that African American MSM are significantly less likely to be on ART in comparison to white MSM [12]. In addition, persons with education attainment lower than a high school diploma are significantly less likely to be offered ART [13].

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*Faculty Advisor: Dr. Douglas Bruce
Department of Health Sciences
Research Completed in Winter 2014
Author Contact: hpersaud@mail.depaul.edu

An individual's degree of health literacy may also be affected by HIV acceptance measures. The degree to which a person living with a chronic disease accepts and/or perceives benefits of the disease has been shown to be associated with improved physical and psychological health outcomes [14]. How much an individual has come to terms with and accepted one's HIV diagnosis may affect one's ability to not only adhere to sometimes complex treatment regimens, but also to understand the treatment's role in HIV disease management. This study aimed to determine which demographic and HIV acceptance measures were associated with healthcare adherence and knowledge of HIV clinical measures in young MSM.

METHODS

STUDY PROCEDURES

Data for the study was obtained at 14 different Adolescent Trials Network for HIV/AIDS Interventions (ATN) locations. In order to participate in the study, participants had to be diagnosed with HIV, be born biologically male as well as identify as male during study participation, be between 16 and 24 years old, have had either oral or anal sex with another male, including either anal or oral penetration within the past year, and have had contracted HIV through sexual behaviors or substance use. Study coordinators at each site screened potential participants. Informed consent was obtained for those participants who qualified for the study and agreed to participate. A total of 200 participants were included in the study. Participants completed an audio computer-assisted self-interview (ACASI). The institutional review boards at DePaul University and all study sites approved the study protocol [15].

MEASURES

Three different types of data were collected for the study. Demographic data included age, race/ethnicity, and educational background. White ethnicity was modeled as the reference category for ethnicity while obtaining a high school diploma was modeled as the reference category for educational background. Self-reported knowledge of CD4 counts and viral loads served as health literacy indicators. Knowledge of both CD4 counts and viral loads were self-reported with participants selecting either "knows" or "don't know." Missed healthcare appointments in the past three months was self-reported and dichotomized to missing any appointments or missing no appointments. Missed medication doses in the past week was self-reported and dichotomized to either not missing any HIV medication doses or missing one or more doses.

HIV acceptance data, questions targeting the participant's beliefs surrounding how HIV/AIDS affected their lives, were collected using three sub-scales (Helplessness, α=.79; Acceptance, α=.87; and Perceived Benefits, α=.88). Each subscale consisted of six to eight questions and the participant's response to each question was rated using a four-point scale ("strongly agree," "agree," "disagree," "strongly disagree"). An example of an HIV Helplessness question administered to a participant was "My HIV frequently makes me feel helpless." A sample HIV Acceptance question was "I can handle problems related to my HIV." An example of an HIV Perceived Benefits question was "HIV has made my life more precious to me."

ANALYSIS

Bivariate analyses were run on HIV acceptance measures, health literacy indicators, adherence variables, and demographic data to determine significant correlations. Significant bivariate relationships were further analyzed using multivariate logistic regression models to determine which associations remained significant at the multivariate level. All data was analyzed using the statistical program SPSS.

RESULTS

Demographic information, frequencies of participant's knowledge of their viral load and CD4 counts, weekly adherence to HIV medications as well as missed healthcare appointments in the past three months are presented in Table 1. The majority of participants were African American (66%) and most participants had earned a high school

diploma (73.5%). The mean age of participants was 21.15 ± 1.911 years old. While most participants (60%) did not know their viral load, the majority of the participants knew their CD4 counts (59%).

Table 1: Participant Characteristics (n=200)

Variable	*M*	*SD*
Age	21.15	1.911
	n	%
Race/Ethnicity		
White	14	7.0
African American	132	66.0
Biracial/Other	14	7.0
Latino	37	18.5
Asian/Pacific Islander	1	0.5
Native American	2	1.0
Education Level		
Less than H.S. Diploma	53	26.5
H.S. Diploma or More	147	73.5
Knows His Viral Load		
Doesn't Know	120	6.0
Knows	78	39.0
Knows His Most Recent CD4		
Doesn't know CD4	82	41.0
Knows CD4	118	59.0
Missed Doctors Appts. in Past 3 Months		
No Missed Appts.	134	67.0
1 or More Appts.	66	33.0
Any Missed Medication Doses in Past 7 Days		
No Missed Doses	74	37.0
1 or More Doses Missed	20	10.0
Missing (Not on ART)	106	53.0

After bivariate analysis, being African American was found to be significantly, negatively, associated with knowledge of both CD4 counts (r=-0.17; P< 0.05) and viral loads (r=-0.19; P< 0.01). Having a high school diploma was significantly associated with knowing CD4 counts (r=0.14; P< 0.05) and not missing healthcare appointments in the past three months (r=-0.16; P< 0.05). The association between having a high school diploma and knowledge of viral loads was not significant (r=0.11 P=0.11). HIV acceptance was significantly associated with knowledge of viral loads (r=0.29 P<0.01) but not knowledge of CD4 counts (r=0.13 P=0.080). Similarly, HIV perceived benefits were significantly associated with knowledge of viral loads (r=0.25 P<0.01) but not significantly associated with knowledge of CD4 counts (r=0.11 P=0.11). HIV helplessness showed no significant associations in the bivariate analysis.

Table 2 depicts logistic regression results for knowledge of CD4 counts. Young African American MSM were 64% less likely than white participants to know their CD4 counts (OR=0.362; CI 0.186-0.704). Participants with a high school diploma were more than twice as likely to know their CD4 counts than those individuals who did not obtain a high school diploma (OR=2.149; CI 1.017-4.173). Participants who perceived greater levels of benefits from being diagnosed with HIV were 66% more likely to know their CD4 counts than those participants who did not believe having an HIV diagnosis benefited them much (OR=1.646; CI 1.105-2.607).

Logistic regression results for knowledge of viral loads are depicted in Table 3. African American participants were 60% less likely to know their viral loads than white participants (OR=0.397; CI 0.207-0.762). Although only marginally significant, those who had obtained a high school diploma were twice as likely to know their viral load than those individuals who did not graduate from high school (OR=2.007; CI .974-4.135). Participants who had come to accept their HIV diagnoses were nearly twice as likely to know their viral loads than those individuals who exhibited lower levels of HIV acceptance (OR=1.014; CI 1.721-4.418).

Table 4 displays logistic regression results for healthcare appointments missed in the past three months. Missing healthcare appointments in the past three months was significantly associated with having a high school diploma. Participants with a high school diploma were 52% less likely to miss healthcare appointments in the past 3 months compared to those who had not obtained a high school diploma (OR=0.482; CI 0.253-0.924). Missed medication doses were not

regressed as there were no significant correlates in the bivariate analysis.

Table 2: Logistic Regression of Knowledge of CD4

				95% C.I.	
	B	S.E.	O.R.	Lower	Upper
African American	-1.015	.339	.362**	.186	.704
Diploma	.765	.339	2.149*	1.107	4.173
HIV Benefits	.509	.209	1.664*	1.105	2.607

**p<.01
*p<.05

Table 3: Logistic Regression of Knowledge of Viral Load

				95% C.I.	
	B	S.E.	O.R.	Lower	Upper
African American	-.924	.332	.397**	.207	.762
Diploma	.697	.369	2.007¤	.974	4.135
HIV Acceptance	1.014	.241	2.757***	1.721	4.418

***p<.001
**p<.05
¤p=.059

Table 4: Logistic Regression of Missed Healthcare Appointments

				95% C.I.	
	B	S.E.	O.R.	Lower	Upper
Diploma	-.727	.331	.482*	.253	.924

*p<.05

DISCUSSION

HEALTH LITERACY

Young African American MSM were significantly less likely to know their viral loads compared to young white MSM participants. The specific link between young African American MSM and lack of viral load knowledge was difficult to specify. The association between African Americans and lower health literacy has been reported in tandem with higher levels of poverty, lower education attainment, and geographic location [16]. Attempts to disentangle the links between African American ethnicity and lower health literacy may be confounded by other socioeconomic factors that were not accounted for in this study. Future research among diverse groups of young MSM needs to take into account a broad range of socio-demographic variables that may help explain the association between African American ethnicity and lower health literacy. In regards to education, MSM participants who obtained a high school diploma were twice as likely to know their viral loads compared to young MSM participants who had not finished high school. Concepts such as CD4 counts and viral loads can be abstract and confusing due to their inverse relationship, and may be more difficult to fully comprehend the relationship between these indicators -- viral suppression and disease progression -- without a high school education.

HIV acceptance was the only HIV acceptance subscale significantly associated with knowledge of viral loads. Those who have accepted their HIV diagnoses were less likely to deny they have contracted HIV and therefore may be more proactive in terms of fighting the disease. While not significant, there was a relationship between perceiving benefits from having HIV and knowing viral loads.

Results for knowledge of CD4 counts were similar to those found for viral loads. Young African American MSM respondents were significantly less likely to know their current CD4 counts compared to young white MSM participants while MSM of any ethnicity with a high school diploma were twice as likely to know their CD4 counts. An association between education and CD4 counts was expected as CD4 counts were another health literacy measure, measures likely associated with general education. The only HIV acceptance subscale associated with CD4 counts was perceived benefits, with those seeing benefits in their HIV diagnosis being significantly more likely to

know their CD4 counts than participants who saw little benefit from an HIV diagnosis. Those who feel they have benefited to some degree from having an HIV diagnosis may feel as if their lives are more valuable, as seen in one of the HIV perceived benefits questions. By valuing life more, a participant may feel the need to better understand and control their HIV.

ADHERENCE

Having a high school diploma was the only variable significantly associated with missed healthcare appointments in the past three months. Those with a high school diploma were already known to have better odds of knowing both their CD4 counts and viral loads. Therefore, it was expected those with high school diplomas would be at attending scheduled healthcare visits, as the most likely location a participant would receive HIV test results would be with a healthcare professional. Additionally, it was expected that those who had obtained a high school diploma would be more likely to attend healthcare appointments in comparison to those who did not finish high school because high school graduates may better understand the significance of controlling chronic diseases such as HIV. Those without a high school education may not realize how serious an HIV diagnosis is and therefore elect to miss appointments with healthcare professionals. Further research should investigate the relationship between education, missing healthcare appointments, and knowledge of both CD4 counts and viral loads.

With a sample size of only 200 individuals, the power and generalizability of the study can reasonably be questioned. In future studies, recruiting more participants could provide clearer results and possibly identify variables that can relate any association between young African American MSM and lower odds of knowing health literacy indicators. Additionally, the results yielded in this study only apply to young MSM within the United States due to the limited scope of the sample. Further, expanding the study to include a Test of Functional Health Literacy in Adults (TOFHLA) may increase the chances of revealing previously unseen relationships and better gauge health literacy in participants [17]. In addition, the data used in this analysis was based off of self-reported behaviors, behavioral responses without any verification. Therefore, while it is unlikely participants were untruthful in their responses, the risk that some individuals were deceptive in their responses is possible. Finally, because this was a cross-sectional study, all results can only be described as relational, not causal.

Further research needs to investigate which factors are associated with young African American MSM and lower health literacy knowledge. Additionally, more research between varying levels of education and its association to health literacy could provide an estimation of what level of education is require to be considered “health literate.” Interventions that improve health literacy in young, African American, MSM living with HIV need to be created in order to improve their HIV management.

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