



Association between HIV/AIDS Knowledge and Attitudes among African American Undergraduate Students in Jackson, Mississippi

Prince Onyekachi Andrew^{1*}, Azad R. Bhuiyan², Jung Hye Sung³,
Anthony Mawson⁴ and Mohammad Shahbazi⁵

¹Lewisville Medical Pharmacy, 560 W Main St, Lewisville, TX 75057, USA.

²Department of Epidemiology and Biostatistics, School of Public Health, Jackson State University, USA.

³Biostatistics Concentration, School of Public Health, Jackson State University, USA.

⁴Department of Epidemiology and Biostatistics, Jackson State University, USA.

⁵Department of Behavioral Health Promotion and Education, Jackson State University, USA.

Authors' contributions

This work was carried out in collaboration with all authors. Author POA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors POA, ARB, JHS, AM and MS managed the analyses of the study. Author POA managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJRID/2020/v3i230124

Editor(s):

(1) Dr. Win Myint Oo, Associate Professor, Department of Physical Medicine and Rehabilitation, Sibu Clinical Campus, SEGi University, Malaysia.

Reviewers:

(1) Ekaete Francis Asuquo, University of Calabar, Nigeria.

(2) Muhammad Fawad Rasool, Bahauddin Zakariya University, Pakistan.

(3) Theresa Azonima Irinyenikan, University of Medical Sciences, Nigeria.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/54631>

Original Research Article

Received 09 December 2019

Accepted 13 February 2020

Published 20 February 2020

ABSTRACT

Objective: This study aimed to determine HIV/AIDS knowledge level, attitudes toward individuals living with HIV/AIDS and to explore the relationship between HIV/AIDS knowledge and attitudes among African American undergraduates in Jackson, Mississippi.

Methods: A cross-sectional method was used in this study. A total of 400 students were randomly selected from Jackson State University undergraduate students. Data were collected by using a

*Corresponding author: E-mail: princeandrew55@gmail.com;

self-administered questionnaire on HIV/AIDS knowledge and their attitudes toward individuals living with HIV and AIDS.

Results: Most of the students (96.5%) had good knowledge about HIV/AIDS, while some students had some misconceptions about HIV infection transmission. There was no significant difference between male and female students on HIV/AIDS knowledge in this study ($\chi^2 = 3.05$; $P = 0.08$). Most of the study participants (87.8%) showed positive attitudes toward individuals living with HIV/AIDS. However, there were some negative attitudes toward individuals living with HIV/AIDS among participants of this study. Male participants expressed more negative attitudes compared to female participants (19.1% vs. 8.5%, $\chi^2 = 9.6$; $P < 0.002$). HIV/AIDS knowledge was significantly associated with positive attitudes toward people living with the disease ($p = 0.019$, Pearson's $\chi^2 = 7.431$).

Conclusions: In general, we concluded that most students (96.5%) in this study demonstrated high levels of HIV/AIDS knowledge and positive attitudes (87.8%). There was an association between knowledge of the disease and positive attitudes toward HIV/AIDS patients. However, there were HIV/AIDS knowledge gaps, misconceptions, and intolerant attitudes toward HIV positive patients also identified in this study. Hence, this study calls for more robust and age-appropriate HIV/AIDS awareness education programs geared towards reducing the impacts of negative attitudes toward individuals living with the disease, eliminating the gaps in HIV/AIDS knowledge and misconceptions identified in this study.

Keywords: Knowledge; attitudes; undergraduate students; HIV/AIDS; sexually transmitted diseases.

1. INTRODUCTION

Human immunodeficiency virus (HIV) remains a major public health threat that has claimed over 34 million lives globally [1,2]. United Nations Program on HIV/AIDS (UNAIDS) estimated that 37.9 million individuals were living with HIV globally, with 1.7 million new HIV infections and 770, 000 thousand AIDS-related deaths in 2018 [1,2]. The Centers for Disease Control and Prevention (CDC) estimates that about 1.2 million individuals are currently living with HIV in the United States (U.S.) [3,4]. African Americans are disproportionately affected by HIV/AIDS burden in the U.S. Despite representing about 13% of the U.S. population, African Americans had the highest rate of HIV diagnoses and accounted for 43% of HIV diagnosed in 2017 [3,5]. CDC estimates that among African American men, most new HIV diagnoses occur among gay and bisexual men in the U.S. CDC estimates that approximately one in twenty African American men, and one in two African American gay and bisexual men in the U.S. will receive a diagnosis of HIV during their lifetimes [3,5]. In 2017, African American women accounted for 59% of new HIV diagnoses among women, and the rate of new HIV diagnoses is 15 times higher than the rate among Caucasian women and five times higher than the rate among Latino women [3,6]. HIV infection rate is more pronounced among African American men than women. CDC estimates that about 73% of African Americans who received HIV diagnosis were men and 26% were women in 2017 [7].

This high rate of HIV infection among African American men is being driven mainly by gay and bisexual men. It is estimated that 60% of African Americans who received HIV diagnosis in 2017, were gay or bisexual men [7]. It is disturbing that some African American men who have sex with men (MSM) believed there is a cure for HIV infection that will soon be made available to the general public [3,7,8]. Such misinformation and misconception among African American MSM could undermine and mitigate HIV/AIDS awareness and prevention campaigns among such vulnerable groups of African Americans [3]. This disproportionate HIV infection burden among African Americans underscores the need to curtail and eliminate this disease and various negative attitudes associated with it.

Although HIV and other sexually transmitted diseases (STDs) affect individuals of all ages, HIV and other STDs have taken a heavy toll on young people in the U.S. Impact of HIV/AIDS among African Americans is more pronounced when examining its presence among younger African Americans under the age of 25 years. Youth aged 13 to 24 accounted for 21% of new HIV diagnoses in the United States in 2017 [9]. CDC estimates that 51% of young people aged 13-24 who were living with HIV, do not know their HIV status. Young people aged 13-24 also represents the highest rate of undiagnosed HIV in any other age group in the U.S. [3,10]. African American young adults, ages 13-24, represented 52% of new HIV diagnoses in that age group in 2017 [6]. Most African American undergraduate

students fall within the age range of people most affected by HIV infection in the U.S. Any educational training is given to this age group, without protecting them from HIV infection may be a wasted effort [3,11]. Young undergraduate students are constantly exposed to various forms of sexual risk behaviors. These exposures usually occur during the transition period from high school to university as freshmen or as returning students in various universities across the U.S. [2,12]. These constant exposures to sexual risk behaviors also make undergraduate students more vulnerable to HIV infections. Despite this high rate of HIV infection among youth aged 13 to 24, it is estimated that young people were the least likely to be aware of their infection status compared to any other age group [7]. CDC estimates that youth ages 15-24 make up just over one-quarter of the sexually active population, but this age group accounted for half of the 20 million new STDs that occur each year in the U.S. [2,13]. HIV infection rates among this age group would continue to rise unabated if no effective and youth-friendly interventions were implemented [13]. More young males than young females were infected with HIV in 2017. CDC estimated that 87% of youth who received HIV diagnosis in 2017 were young men and 13% were young women [9].

Studies have shown that increased HIV knowledge may be an initial step towards sexual risk behavior change among young people [2, 11,14,15]. In preparing our young people for adult life ahead of them, education remains an excellent tool for transmitting HIV/AIDS knowledge that will prevent HIV infection among this vulnerable age group. A well-planned education about HIV and sexuality increases knowledge, better skills, and a rise in positive attitudes that can reduce risk behaviors among young people [2,16]. HIV/AIDS knowledge can serve as a useful tool and guide on policy formulation and intervention in a fight to reduce the prevalence of HIV and other STDs in universities [2,11]. Young people are valuable resources for any society; thus, they should be armed with adequate HIV/AIDS preventive information to save this vulnerable group from falling prey to this vicious infectious disease. Considering the fact there is still no cure for this disease, assessing these undergraduate students' HIV/AIDS knowledge will provide vital information on the students' knowledge and possible misconceptions of this disease. A similar study conducted by Premadasa and colleagues found that 75% of their study

participants had low knowledge about HIV/AIDS, some misconceptions about modes of HIV infection transmission and negative attitudes toward people living with the disease [15]. Effective youth-friendly HIV/AIDS awareness programs can prevent HIV/AIDS knowledge gaps and intolerant attitudes toward individuals living with this disease.

Since the inception of the HIV epidemic, stigma and discrimination have associated with the disease [3]. Stigma and discrimination associated with HIV infection have not only compromised the fight against the disease but have also compounded the effects of the epidemic and prevented access to quality healthcare services over the years [3,17]. Stigma is any harmful societal phenomenon that begins when a specific trait or group is labeled and linked to negative stereotypes, leading to status loss and discrimination [3,18]. Some of the HIV-related stigmas are negative feelings, beliefs, and attitudes towards people living with the disease [3,12]. Discrimination can be described as an act or behavior that has the intention or effect of impairing the fundamental human rights and limits access to health care and services [3,19]. HIV-related stigma and discrimination are associated with several negative consequences such as societal rejection, depression, low self-esteem, and thoughts or acts of suicide [3,20]. HIV-infected individuals are considered as social outcasts in some societies [3,21-23]. HIV/AIDS-related stigma and discrimination are worsened by negative attitudes and the belief that people with HIV/AIDS are justifiably punished for their bad lifestyles [3,24]. Individuals living with HIV/AIDS are under constant fear of stigma, threats and rejection from society, friends, and family members. Studies have shown that people living with HIV/AIDS stand to lose their social place of belonging, lose their shelter, and job security [3,20,25]. Poor knowledge of the disease, HIV/AIDS misconceptions and intolerant attitudes relating to HIV/AIDS can affect the ability of friends, family members and health caregivers in providing quality care for HIV positive patients [3,25]. Stigma and discrimination toward HIV positive students have been found to increase their chance of experiencing violence such as physical assault, bullying, teasing, and harassment when compared with other students in their schools [3,26]. HIV positive African Americans may denial and hide their status due to fear of stigma and discrimination. Some HIV positive African Americans think

disclosing their HIV status may create stressful situations and shame that may cause them to lose their family support and health care provision [3,21,23]. Individuals living with HIV/AIDS have the right to non-discrimination and should be treated with respect and dignity [3,19].

The negative stereotypes and discriminations toward HIV positive young African Americans remain public health challenges facing HIV prevention within marginalized and stigmatized African American communities [3,26]. Studies have shown that misconceptions relating to HIV/AIDS among young people can mitigate the fight against this disease. Some of these misconceptions include that HIV infection can be transmitted through insect bites, sharing of clothes and a public toilet with HIV positive individuals [2,3,27–30]. These important HIV misconceptions, HIV knowledge gaps and intolerant attitudes among young people underscore the need for HIV prevention education programs that will keep young adults well informed about the disease. Despite these various misconceptions of HIV infection, poor HIV knowledge, and negative attitudes, only few epidemiological studies have examined knowledge and attitudes toward HIV/AIDS among African American undergraduate students. Thus, we assessed knowledge and attitudes toward HIV and AIDS among undergraduate students at a historically black university will provide strong empirical evidence among this age group of African American undergraduate students.

2. MATERIALS AND METHODS

2.1 Study Area and Design

This was a cross-sectional study conducted from January 10, 2016 to September 30, 2016. The study participants were randomly selected among undergraduate students of Jackson State University (JSU). The inclusion criteria for the study participants were as follows: (1) must be freshman, sophomore, junior or senior undergraduate students of JSU; (2) being at least 18 years of age; (3) giving consent to participate in the research; and (4) must be an African American undergraduate student at JSU. JSU is located at City of Jackson. At the time of this study, JSU had about 9,000 undergraduate students, fourth largest institution of higher learning in Mississippi State and fourth largest Historically Black Colleges and Universities

(HBCUs) in the U.S. [3,31]. Jackson is the capital of Mississippi.

By using the formulas of Michel and Talbot, a minimum sample size of 369 was calculated [3,32,33]. The sample size of this study was increased to 400 students to allow for non-response. After obtaining permission and approval of the students' lecturers, the students were informed and encouraged to participate in the study. Those undergraduate students who agreed to participate in the study were given informed consent letters to sign before participating in the study. The study questionnaires were only given to those students who have signed the informed consent letters at the end of their scheduled class session. Completed questionnaires were retrieved from the students after the session.

2.2 Data Collection

The study instrument was a self-administered questionnaire composed of three parts. 1) Composed of student's demographic background, 2) on HIV/AIDS knowledge, and 3) on attitudes toward individuals living with HIV/AIDS. This study questionnaire item was adopted and modified for this study from the World Health Organization [33] and included additional items that were identified from a literature review. The study questionnaire was validated after a draft was given to a group of JSU undergraduates for feedback. Those students were not included in these final study participants. The validation test showed that Cronbach's alpha was 0.78 for HIV/AIDS knowledge and 0.72 for attitudes toward individuals living with HIV/AIDS. Cronbach's alpha coefficient values range from 0-1, with coefficient values closer to 1.0 indicating higher internal consistency [3,34]. HIV/AIDS Knowledge was assessed using items in the questionnaire that included HIV infection transmission, predisposing sexual risk behaviors and practices, symptoms of HIV and AIDS, and methods for preventing HIV infection. Attitudes toward individuals living with HIV/AIDS were assessed using items in the questionnaire which included isolation of people living with the disease, HIV patients as paying the price of their immoral lifestyles and whether students with HIV/AIDS should attend regular schools.

2.3 Scoring

Each correct response from participants was given a score of 1, and a wrong or unsure

response from participants was scored 0. The total HIV/AIDS knowledge scores ranged between 0-21. HIV/AIDS knowledge scores from 0 to 10 were considered poor knowledge regarding HIV/AIDS, while a total score more than ten were considered as having good knowledge regarding HIV/AIDS. Attitudes toward people living with the disease were assessed using a 10-item questionnaire, where attitude scores between 0 to 5 were considered as a negative attitude toward people living with HIV/AIDS, and scores 6 to 10 were considered as a positive attitude toward people living with HIV/AIDS.

2.4 Data Analysis

Data were analyzed with SAS® 9.3 statistical software (SAS Institute Inc., Cary, NC, 2012). Descriptive statistics were used for background variables like age, sex, and other variables in the questionnaire. Associations between variables were measured and tested using chi-square. Pearson’s Chi-square was done to establish an association between knowledge and attitudes. A significance level of $\alpha=0.05$ was taken for analysis in this study.

3. RESULTS

3.1 Students’ Profile

A total of four hundred JSU undergraduate students participated and completed the questionnaire. The mean age of the 400 study participants was 21.9 years, standard deviation \pm 5.7 years and age ranged from 18 to 57 years (Table 1). A total of 141 (35.2%) were male undergraduates, and a total of 259 (64.8%) were female undergraduates. The participants of this study were all African American undergraduate students at JSU. Regarding religious demography of the participants of the study, 88.3% were identified as Christians, and 11.7% were identified as Non-Christians (Table 1).

3.2 Knowledge about HIV/AIDS

The results of data analysis showed that more than 97% of the respondents knew that HIV could be transmitted via unprotected sexual intercourse, through infected semen, sharing unsterilized needles and sharps. More than 90% of the study participants knew that HIV could be transmitted through vertical transmission from infected mother to child and by receiving infected

blood. About 71% of students thought that consistent use of a condom during sexual intercourse could prevent HIV infection transmission. Whether HIV infection affects the immune system of infected patients, about 93% gave an appropriate response to the question; and about 88% indicated that HIV is already a pandemic disease. The question whether HIV and AIDS have the same clinical manifestations in patients, about 35%, gave an appropriate response. About 75% of the respondents knew that untreated sexually transmitted diseases increase the risk of HIV infection, about 95% indicated that having multiple sex partners can increase the risk of acquiring HIV infection, and about 48% indicated that avoiding alcohol and other drug abuse can reduce the risk of HIV infection. About 87% of the students indicated that HIV infection could be prevented through sexual abstinence, and about 15% of participants did not know that HIV is a type of virus.

Table 1. Characteristics of 400 JSU undergraduate students that participated in the study

Characteristics	n (%) or Mean \pm S.D.
Age	21.9 \pm 5.7
Gender	
Male	141 (35.2)
Female	259 (64.8)
Religion	
Christian	353 (88.25)
Non-Christians	47 (11.75)

n = Number of students in each group; S.D =Standard Deviation; % = Percentage (3)

This study revealed some misconceptions relating to HIV and AIDS, with about 55% of students indicated that HIV could spread through insects or mosquito bites, and about 6% believed that HIV-positive people could be recognized through their facial appearance. Four percent of the students indicated that HIV does not affect young people, and about 19% of participants indicated that there was a cure for AIDS. Twenty percent of students indicated that HIV could spread from sharing bathrooms and clothes, and about 22% of the respondents indicated that HIV could spread by sharing public toilets with infected individuals.

The overall mean HIV/AIDS knowledge score for the 400 students in this study was 16.7 ± 2.8 . When the sample was stratified into poor knowledge (scores of 0–10) and good knowledge (scores of 11–21), about 94% of male

respondents and about 98% of the female respondents had good knowledge about HIV and AIDS in this study (Table 3). The result also revealed that there was no significant difference between the HIV/AIDS knowledge of the male and female undergraduates in this study ($\chi^2 = 3.05$; $P = 0.08$).

3.3 Attitudes towards HIV/AIDS

Data analysis of attitudes toward individuals living with HIV/AIDS results revealed that most students had a positive attitude (87.8%). However, about 12.2% of the students of the survey had some form of negative attitudes toward individuals living with HIV/AIDS. The result further showed that about 29.5% of the respondents believed that AIDS diagnosed patients are paying the price of their past immoral lifestyles, and about 23% of the students indicated that HIV/AIDS patients should be isolated from everyone. Over 7% of the respondents indicated that HIV infection only affects individuals with immoral lifestyles. On the willingness to buy stationeries from HIV infected person, about 33% disagreed; and about 29% of

students favored that HIV/AIDS patients should not eat with same plates with HIV negative individuals. It is encouraging that 96.5% of the students were willing to share reading materials or be in an academic discussion group with an HIV infected student. On the question whether HIV/AIDS patients should attend the same school with others not infected with the disease, about 6.2% recommended that HIV/AIDS patients should not be allowed to attend same school with students not infected, and about 23.7% of students were willing to share the same public toilet with an people living with HIV/AIDS. About 96% of the study participants agreed that HIV positive tested individuals should seek further medical care, and about 97.5% agreed that people should be encouraged to undergo voluntary counseling and testing (VCT).

The total mean score for attitudes of the students in this study was 7.7 ± 1.9 . When the sample was stratified into a negative attitudes group (scores of 0-5) and positive attitudes group (scores of 6-10), a total of 87.8% of the students of this study had positive attitudes toward individuals living with HIV/AIDS (Table 5).

Table 2. HIV/AIDS knowledge among 400 undergraduate students in the study

Variables	Appropriate responses	n (%)
HIV is a type of virus	True	339 (84.8)
HIV/AIDS affects the immune system	True	373 (93.3)
HIV and AIDS have the same clinical manifestations	False	141(35.3)
Opportunistic infections are common	True	158 (39.5)
HIV is already pandemic disease	True	350 (87.5)
People can get HIV from:		
Sexual intercourse without a condom	True	389 (97.3)
Infected mother-to-child transmission	True	377 (94.3)
Receiving infected blood	True	369 (92.3)
Sharing infected needles and sharps	True	389 (97.3)
Through infected semen	True	389 (97.2)
HIV infection can be prevented through:		
Consistent use of condoms can prevent HIV Infection	True	285 (71.3)
Sexual abstinence		349 (87.3)
HIV Misconceptions:		
HIV is transmitted through insect bites	False	182 (45.5)
HIV is transmitted through sharing clothes	False	320 (80)
HIV is transmitted through using public toilet	False	313(78.3)
Diagnose HIV by looking at facial expression	False	377(94.3)
HIV does not affect young	False	383(95.8)
AIDS is a curable disease	False	324 (81)
HIV infection risk:		
Multiple sex partners increase HIV infection risk	True	380 (95)
Untreated STD increases HIV infection risk	True	299 (74.8)
Avoiding alcohol and drug abuse reduce HIV risk	True	193(48.3)

STD= Sexual transmitted disease; HIV= Human immunodeficiency virus; AIDS=acquired immune deficiency syndrome; n = Number of students; %=Percentage

Table 3. Differences in distribution of HIV/AIDS knowledge for all respondents by Sex

Sex	Knowledge		χ^2	P
	Good knowledge n (%)	Poor knowledge n (%)		
Male	133 (94.3)	8 (5.7)	3.05	0.08
Female	253 (97.7)	6 (2.3)		

P: p-value; p < 0.05 is considered significant; n = Number of students in each group; χ^2 = Chi-square; % = Percentage

Table 4. Attitudes of 400 undergraduate students that participated in the Study towards HIV/AIDS patients

Variables	Appropriate responses	n (%)
HIV only affects people who lived an immoral life	Disagree	369 (92.3)
AIDS patients are paying the price of their immoral lifestyles	Disagree	282 (70.5)
People with HIV/AIDS should be isolated	Disagree	308 (77)
Willingness to share the same toilet with HIV and AIDS person	Agree	95 (23.7)
Youth with HIV/AIDS should not attend regular schools	Disagree	335 (83.8)
HIV Positive tested individuals should seek further medical care	Agree	386 (96.5)
People should be encouraged for VCT	Agree	390 (97.5)
Willingness to buy stationeries from an AIDS infected seller	Agree	268 (67)
Willingness to share reading materials or be in a discussion group with an HIV infected student	Agree	386 (96.5)
HIV/AIDS patients should not eat with the same plates with others	Disagree	284 (71)

HIV= human immunodeficiency virus; AIDS = acquired immune deficiency syndrome; VCT = voluntary counseling and testing; n = Number of students; % = Percentage

There was a significant difference between the attitudes of male and female participants in this study ($\chi^2 = 9.6$; $P = 0.002$). More female than male respondents reported having positive attitudes toward people living with HIV/AIDS, and more male than female respondents reported having negative attitudes toward people living with HIV/AIDS as shown in Table 6.

Table 5. Characteristics of Attitudes towards HIV/AIDS of the 400 Undergraduate Students that participated in the Study

Attitudes	n	Percentage
Negative	49	12.2
Positive	351	87.8

n = Number of students

3.4 Association between Knowledge and Attitudes

Data analysis showed that level of knowledge significantly contributed to level of positive attitudes as shown in Table 7. The result showed significant association between good knowledge of HIV/AIDS and positive attitudes of

undergraduate students ($p = 0.019$, Pearson's $\chi^2 = 7.431$) in this study.

4. DISCUSSION

This study has succeeded in providing more empirical pieces of evidence about HIV/AIDS knowledge and attitudes of undergraduate students toward people living with the disease. This study results showed that most students had a high HIV/AIDS knowledge. The HIV/AIDS knowledge result of this study is much higher than a similar study result conducted among students in Xinjiang, China. Their study also found that most of their respondents had a high HIV/AIDS knowledge [27]. However, comparisons of both studies should be treated with caution, as different assessment questionnaires and population samples were used. This study observed a relatively small gap of knowledge and some misconceptions regarding modes of transmission of HIV infection and precautions among study participants. The higher HIV/AIDS knowledge scores observed in this study participants may be attributed to better

Table 6. Differences in the distribution of attitude towards HIV/AIDS patients for 400 students by Sex

Sex	Negative attitudes n (%)	Positive attitudes n (%)	Chi-Square test	p-value
Male	27 (19.1)	114 (80.9)	9.6	0.002
Female	22 (8.5)	237 (91.5)		

n = Number of students; % = Percentage

Table 7. Association between knowledge and attitudes among respondents

Knowledge	Attitude		p-value of pearson Chi-Square
	Negative n (%)	Positive n (%)	
Poor	5 (35.7)	9 (64.3)	0.019
Good	44 (11.4)	342 (88.6)	

n = Number of students; % = Percentage

education, suggesting the potential positive impact of health education programs. There was an association between good knowledge of the disease and positive attitudes toward HIV/AIDS patients in this study. A longitudinal survey in Greece where 15 years of continuous health education campaign significantly increased HIV/AIDS knowledge and positive attitudes toward people living with the disease among participants of their study [35]. In contrast, poor HIV/AIDS knowledge may lead to an increase in stigmatization, intolerant and unnecessary concerns regarding interaction with individuals living with the disease [36].

Some students in this study lacked basic HIV/AIDS knowledge in certain vital areas. This was demonstrated by some students not recognizing sexual abstinence as a means of preventing HIV infection, and some considered AIDS as a curable disease. It is equally disturbing that some respondents in this study still believed that HIV does not affect young people, and some indicated that they could identify HIV infected individuals by looking at the person's facial appearance. A similar study found that many youths tend not to perceive themselves to be at risk for HIV infection or other sexual transmitted disease [2,12]. They also found that some of the study participants with good knowledge of HIV/AIDS risk do not see the need to practice safe sex, and often downplay the possible risk of HIV infection [2,12]. Some of the HIV infection misconceptions observed in this study include the erroneous belief that HIV infection can be transmitted through sharing of clothes with HIV positive individuals, sharing the same toilet with people living with HIV/AIDS and that the disease can be transmitted through insect bites. Previous studies reported similar HIV/AIDS knowledge gaps and the disease

misconceptions [2,27–30]. While it is encouraging to note that most students in this study showed high levels of HIV/AIDS knowledge. However, it is disturbing that some students were not aware that other sexual transmitted diseases will increase the risk of acquiring HIV infection. This finding is consistent with similar previous studies [2,27–30]. There was no significant difference in HIV/AIDS knowledge between male and female participants of this study. It is possible that less-educated youths may even have greater HIV/AIDS knowledge gaps and more misconceptions about the disease. It is imperative that HIV prevention programs should be targeted toward all young adults, including less educated ones. As such comprehensive HIV preventive approach will eliminate HIV knowledge gaps and correct some of the misconceptions of this disease among these vulnerable youths.

Another important finding of this research study is some of the negative attitudes toward individuals living with the disease. Although most participants of this study had a positive attitude toward those living with the disease, indeed, it is disturbing that some of the students still intolerant towards people living with HIV/AIDS. Some of the respondents indicated that AIDS patients are paying the price for their previous immoral lifestyles, while some students believed that HIV/AIDS patients should be isolated totally from the rest of society. Some participants of this study strongly believed that HIV could only infect individuals who had lived immoral lifestyles and some recommended that HIV/AIDS patients should be prevented from attending the same school with others not infected by the disease. It is equally disturbing that the majority of the students were not willing to share the toilet with

those living with the disease. Similar negative attitudes have been reported in several other studies around the globe [3,30,37,38]. HIV-related stigmatization has been shown to be a huge barrier preventing patients from seeking treatment and impediment to the fight against this disease [3,39]. However, it noteworthy that most students were willing to share reading materials or be in the same academic discussion group with other HIV positive students. It is encouraging that most students disagreed that people living HIV/AIDS shouldn't eat with the same plates with individuals not infected with the disease. It is arguable that some of the positive attitude behaviors exhibited by students in this study may be attributed to good knowledge of HIV/AIDS. However, similar study has shown that adequate HIV/AIDS knowledge may not eliminate totally some of the negative attitudes and misconceptions associated with this disease [2,3].

This study showed a significant difference between the attitudes of male and female students. More male than female respondents reported having negative attitudes toward people with the disease. This finding is consistent with a similar study among undergraduate students at a Historical Black University [3]. This study findings simply underscore the need for youth-specific HIV awareness programs that encourage positive attitudes toward HIV positive individuals. A community-based HIV awareness and education campaign program in South Africa has set an interesting example in implementing HIV/AIDS prevention program success. This comprehensive HIV preventive program has led to an increase in the disease knowledge and reduced social stigma within the communities where this program has been implemented in South Africa [39]. To win the fight on HIV infection, it is uttermost important to decrease social stigma, provide social protection and improve the knowledge and attitudes of the public toward individuals living with the disease [3,36,40]. Therefore, this study suggests for a comprehensive approach in eliminating negative attitudes toward HIV/AIDS patients. The use of social media messages to reach targeted young audiences on HIV-related discrimination and stigmatization prevention should be implemented at various institutes of higher learning. This study findings have also provided vital information and guidance in creating youth-specific friendly messages and educational materials. The findings clearly demonstrated that the universities should provide health education

programs on HIV/AIDS to increase the students' knowledge and positive attitudes towards HIV and AIDS patients. These knowledge gaps, misconceptions and intolerants toward HIV positive patients identified in this study should be addressed immediately in order to win this global fight on HIV/AIDS. Furthermore, this study suggests that undergraduate students cannot be considered as homogenous population for which one type of intervention will be effective. Interventional programs for HIV prevention should be prepared in a manner of addressing different issues identified in this study [41,42].

5. STRENGTH AND LIMITATIONS OF THE STUDY

This study was only conducted among African American undergraduate students of a Historical Black University. It would have been better if students from more than one Historical Black Universities were evaluated. Because the study targeted only undergraduate students, the study findings, therefore, should not be generalized to all students in Historical Black Universities. This study was a cross-sectional study based on retrospective memory data collection, the possibility of memory recall bias or selective memory recall may have occurred. Another limitation of this study was the use of the cross-sectional design that makes it difficult in differentiating cause and effect from the simple association. Finally, an assessment tool for this study was a self-administered questionnaire, which gives room for social desirability bias, considering the sensitive nature of this disease as young people may be reluctant to provide more sincere information about their sexual risk behaviors. These could have negatively impacted this study findings. However, the anonymity of assessment tools hopefully encouraged students to be unbiased in their responses. Strength of This study strength was a good response rate of 100% from students during this study survey. Despite some of these limitations, this research study has provided empirical data on HIV/AIDS knowledge and attitudes toward individuals living with the disease among these JSU undergraduate students.

6. CONCLUSIONS

This study revealed that misconceptions about the mode of HIV infection transmissions, HIV/AIDS knowledge gaps, and stigmatizing attitude towards HIV/AIDS patients continue to

exist among undergraduate students at a Historical Black University. Although most students in this study demonstrated high levels of HIV/AIDS knowledge, however, some study participants lacked basic HIV/AIDS knowledge in certain vital areas. There were no gender differences for HIV/AIDS knowledge among the participants. Although the overall negative attitude score was low, it is disturbing to note that some of stigmatizing attitudes of respondents, especially the male students, as male students had more negative attitudes compared to female students. There was an association between good knowledge of the disease and positive attitudes toward HIV/AIDS patients. Anti-stigma communication strategies should be directed to reduce intolerant attitude towards people living with HIV/ in this study, eliminate HIV/AIDS knowledge gaps and various misconceptions about the disease. The use of drama and other forms of social media messaging platforms that are more appealing to young adults should be considered in this global fight against HIV and AIDS.

7. RECOMMENDATIONS

The results of this study provided important information to inform and develop university policies to address students' educational needs. Policies and interventions can be tailored to HIV/AIDS knowledge gaps, misconceptions and intolerant attitudes toward HIV positive patients identified in this study. Primary goal of such intervention should increase the competency of young people to prevent new HIV infections. This study suggests for more HIV prevention awareness programs through drama and various forms of social media messaging platforms that are more appealing to our young adults. In addition, health education through entertainment programs on HIV/AIDS and other STDs as an integral part of the university's curriculum. Finally, more recreational centers are needed on campuses to allow students to channel their energies towards sports and other forms of entertainment.

CONSENT AND ETHICAL APPROVAL

Ethical clearance for this study was obtained from the Jackson State University Institutional Review Board. Before data collection, all study participants were given information on the study and assured that all data were confidential and will only be analyzed as aggregates. All students signed the informed consent form before participation in the study. The data obtained

during this study were kept private in accordance with U.S. federal law. Privacy of the participants was protected by withholding their identities and other personal information from all persons not directly connected to this study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. The Joint United Nations Program on HIV/AIDS. 2018 Global HIV statistics; 2019. Available:https://www.unaids.org/sites/default/files/media_asset/UNAIDS_FactSheet_en.pdf
2. Andrew PO, Bhuiyan AR, Mawson A, Buxbaum SG, Sung JH, Shahbazi M. HIV/AIDS knowledge of undergraduate students at a Historically Black College and University. *Diseases*. 2018;6(98):1-8.
3. Andrew PO, Bhuiyan AR, Mawson A, Shahbazi M. Assessment of attitudes toward HIV and AIDS among undergraduate students at a historically Black University. *Journal of AIDS and HIV Treatment*. 2019;1(2):25-32.
4. CDC. HIV in the United States: At a glance; 2018. Available:<https://www.cdc.gov/hiv/statistics/overview/atagance.html>
5. CDC. HIV and African Americans; 2019. Available:<https://www.cdc.gov/hiv/group/racialethnic/africanamericans/index.html>
6. CDC. Diagnoses of HIV infection in the United States and dependent areas. 2017; 2018. Available:<https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2017-vol-29.pdf>
7. Dillon PJ, Basu A. HIV/AIDS and minority men who have sex with men: A meta-ethnographic synthesis of qualitative research. *Health Communication*. 2014; 29:182–192.
8. Dodge B, Jeffries WLIV, Sandfort TGM. Beyond the down low: Sexual risk, protection, and disclosure among at-risk Black men who have sex with both men and women (MSMW). *Archives of Sexual Behavior*. 2008;37:683–696.
9. CDC. HIV and Youth; 2019. Available:<https://www.cdc.gov/hiv/group/age/youth/index.html>

10. CDC. HIV in the United States and dependent areas; 2019. Available:<https://www.cdc.gov/hiv/statistics/overview/ataglance.html>
11. Bigala P, Adebawale SA, Oladipo SE. Influence of HIV testing on knowledge of HIV/AIDS prevention practices and transmission among undergraduate youths in North-West University, Mafikeng. *Gender & Behavior*. 2014;12(2):6286-6300.
12. Fennie T, Laas A. HIV/AIDS-related knowledge, attitudes and risky sexual behavior among a sample of South African university students. *Gender & Behaviour*. 2014;12(1):6035-6044.
13. CDC. Youth risk behavior survey: Data summary and trends report 2007–2017; 2018. Available:<https://www.cdc.gov/healthyyouth/data/yrbs/pdf/trendsreport.pdf>
14. Oladipo SE, Kalule-Sabiti I. Knowledge of HIV/AIDS and risky sexual behavior among Tertiary Institution Students in Nigeria; 2014.
15. Omoyeni ST, Akinyemi AI, Fatusi A. Adolescents and HIV-related behaviour in Nigeria: does knowledge of HIV/AIDS promote protective sexual behaviour among sexually active adolescents? *African Population Studies. Special issue on Nigeria*. 2014;27(2):331-342.
16. Chaves CB, Bentoa MT. et al. Knowledge about HIV/AIDS: The influence of lifestyles and self-regulation in adolescents. *The European Journal of Counseling Psychology*. 2013;2195-7614.
17. United States Agency for International Development. HIV/AIDS-related knowledge, Stigma, and Discrimination: Tanzania; 2007. Available:<https://www.usaidassist.org/sites/assist/files/tanzaniastigma.pdf>
18. UNAIDS. Agenda for Zero Discrimination in Health Care; 2016. Available:<http://www.unaids.org/en/resources/documents/2016/Agenda-zero-discrimination-healthcare>
19. UNAIDS. Eliminating Discrimination in Health Care; 2016. Available:<http://www.unaids.org/en/resources/documents/2016/eliminating-discrimination-in-health-care>
20. The Well Project. Stigma and discrimination against women living with HIV.; 2016. Available:<http://www.thewellproject.org/hiv-information/stigma-and-discrimination-against-women-living-hiv>
21. Stangl AL, Lloyd JK, Brady LM, Holland CE, Baral SA. Systematic review of interventions to reduce HIV-related stigma and discrimination from 2002 to 2013: How far have we come? *Journal of the International AIDS Society*. 2013;16(2):18734.
22. Health and Development Networks and Global Network of People Living with HIV/AIDS. Breaking the cycle: Can the Stigma of HIV/AIDS ever be Eradicated?; 2004. Available:http://www.hdnet.org/library/Kampala_no%20cover.pdf
23. Mandana Saki M, Mohammad S. et al. Perception of patients with HIV/AIDS from stigma and discrimination. *Iran Red Crescent Med J*. 2015;17(6).
24. Foreman M, Lyra P, Breinbauer C. Understanding and Responding to HIV/AIDS-related Stigma and Discrimination in the Health Care Sector; 2003. Available:http://www.paho.org/English/AD/FCH/AI/Stigma_report_english.pdf
25. International Council of Nurses. Reducing the impact of HIV/AIDS on nursing & midwifery personnel. International Council of Nurses (ICN), Geneva; 2006. Available:http://www.icn.ch/images/stories/documents/publications/guidelines/guideline_reducing_AIDS.pdf
26. CDC. Stigma and Discrimination; 2016. Available:<https://www.cdc.gov/msmhealth/stigma-and-discrimination.htm>
27. Maimaiti A, Shamsuddin K, Abdurahim A. et al. Knowledge, attitude and practice regarding HIV/AIDS among university students in Xinjiang. *Global Journal of Health Science*. 2010;2(2):51-60.
28. Al-Rabeei NA, Dallak AM, Al-Awadi FG. Knowledge, attitude and beliefs towards HIV/AIDS among students of health institutes in Sana'a city. *Eastern Mediterranean Health Journal*. 2012;18(3):221-226.
29. Shiferaw Y, Alemu A, Girma A, Getahun A. et al. Assessment of knowledge, attitude and risk behaviors towards HIV/AIDS and other sexual transmitted infection among preparatory students of Gondar town, North West Ethiopia. *BMC Research Notes*. 2011;4(505):1-8.

30. Tavoosi A, Zaferani A, Enzevaei A, Tajik P, Ahmadinezhad Z. Knowledge and attitude towards HIV/AIDS among Iranian students. *BMC Public Health*. 2004; 4(17):1-16.
31. Historically Black Colleges and Universities. Jackson State Becomes the 4th Largest HBCU by Enrollment; 2015. Available:<http://hbculifestyle.com/jackson-state-enrollment-rank/>
32. Mishel MH. Methodological studies: Instrument development. In *Advance Design in Nursing Research*; Sage Publications: Thousand Oaks, CA, USA. 1998;235–282.
33. Talbot LA. Principles and Practice of Nursing Research; Mosby Year Book: St. Louis, MO, USA; 1995.
34. Mishel MH. Methodological studies: Instrument development, 2nd Edn. In *Advance Design in Nursing Research*. Sage Publications, Thousand Oaks, CA. 1998;235-282.
35. Merakou K, Costopoulos C, Marcopoulou J, Kourea-Kremastinou J. Knowledge, attitudes and behaviour after 15 years of HIV/AIDS prevention in schools. *European J. Public Health*. 2002;12:90–3.
36. Mahajan AP, Sayles JN, Patel VA, et al. Stigma in the HIV/AIDS epidemic: A review of the literature and recommendations for the way forward. *AIDS*. 2008;22(2):67–79.
37. Savaser S. Knowledge and attitudes of high school students about AIDS: A Turkish perspective. *Public Health Nurse*. 2003;20:71–9.
38. Al-Mazrou YY, Abouzeid MS, Al-Jeffri MH. Knowledge and attitudes of paramedical students in Saudi Arabia toward HIV/AIDS. *Saudi Med J*. 2005;26(11):83–9.
39. Treves-Kagan S, Steward WT, Ntswane L, Haller R, Gilvydis JM, Gulati H, et al. Why increasing availability of ART is not enough: A rapid, community-based study on how HIV-related stigma impacts engagement to care in rural South Africa. *BMC Public Health*. 2016;16(16): 87.
40. Cluver LD, Orkin FM, Yakubovich AR, Sherr L. Combination social protection for reducing HIV-risk behavior among adolescents in South Africa. *Journal of Acquired Immunodeficiency Syndrome*. 2016;72:96-104.
41. Premadasa G, Sadek M, Ellepola A, Sreedharan J, Muttappallymalil J. Knowledge of and attitudes towards HIV/AIDS: A survey among dental students in Ajman, UAE. *J. Investig Clin Dent*. 2013; 6(2):147–155. DOI: 10.1111/jicd.12080
42. World Health Organization. Interview schedule on knowledge, attitude, beliefs and practices on AIDS/KABP survey. Geneva, World Health; 1988.

© 2020 Andrew et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/54631>