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Latent Profiles of Social Media Users, STI Knowledge, and Condom Use among African American Young Adults

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Abstract

The abundance of social networking platforms has increased the frequency and the availability for which individuals communicate with one another. The feasibility and accessibility to go online to find sexual partners pose opportunity for contracting sexually transmitted infections (STI) in the absence of safe sexual practices. Low condom use has been reported among young adults who seek sexual partners online. African American young adults have some of the highest rates of infection for certain STIs. In order to mitigate the incidence and prevalence of STIs in at-risk populations, sexually active young adults must use condoms consistently and correctly during sexual activities. The present study sought to uncover the heterogeneity within African American young adults regarding their online networking utilization, STI knowledge, and sexual risk behavior. African American young adults (N = 236), ages 18 - 23, completed private online survey administration. Using latent class analysis, three classes were identified: Social Network Communicators (43%; N = 101), Social Networking Daters (36%; N = 83), and Media Sharers (21%; N = 52). Social Networking Daters exhibited the highest probability of using online dating sites daily, low STI knowledge, and a zero probability of consistent condom use. All three groups exhibited relatively low STI knowledge. Furthermore, having a history of STI increased the likelihood of being classified into the Social Networking Daters class relative to the other classes. Findings highlight the need to capitalize upon online platforms for African American young adults who utilize online dating sites and other online environments.

Keywords

Social Networking, Condom Use, Online Dating, Sexual Behavior, Latent Class Analysis

1. Introduction

Young people ages 15 - 24 account for half of all newly diagnosed sexually transmitted infections (STIs) [1]. African Americans between the ages of 15 - 24 have the highest rate of chlamydia and gonorrhea among all racial groups. The rate of chlamydia among African American adolescents and young adults was found to be 3.6 to 8.9 times the rate of their Caucasian counterparts [1]. Disparities in rates of gonorrhea are similar, with gonorrhea rates among African American adolescents and young adults reported to be 7.4 to 9.3 times the rate of their counterparts [1]. Furthermore, African American men, ages 20 - 24, reported the highest rates of syphilis among all racial/ethnic groups in 2017 [1]. Among individuals who are sexually active, proper and consistent condom use remains one of the most efficacious ways to prevent the spread of STIs. Young adults are at a developmental time when dating, courtship, and arrangements for "hooking up" may be commonplace. This lends itself to opportunities for sexual encounters and probabilities associated with STI risk behavior.

The abundance of online networking platforms has increased the frequency and the mediums in which individuals communicate with one another. With an increase in online networking applications like Facebook, Instagram, and Snapchat, young adults have a way of socializing with others both inside and outside of their social circle with great frequency. Given the accessibility and the online connection to endless people within their peer groups, searching for sexual partners is one of the many reasons individuals use online networking sites catered to dating activities [2]. The ease of going online to find a sexual partner poses health risks such as opportunity for contracting STIs, especially in the absence of safer-sex practices such as consistent condom use. Low condom use has been reported among adults and young adults who seek sexual partners online [2] [3]. This is cause for alarm because STI or HIV status may not be disclosed during online partner seeking.

Young adults are of particular interest as they are spending more time on social media and engaging in riskier behaviors while using social media [4]. Gebremeskel and colleagues [5] found positive correlates between time spent on social media and number of sexual partners, onset age of sexual relationships, and frequency of engaging in risky sexual behaviors among older adolescents. Meanwhile, perceived norms, descriptive norms, and attitudes regarding sexual behaviors online increase an individual's willingness to engage in risky behaviors online, such as communicating sexually with a stranger [6]. Self-presentation behaviors online such as "sexy" poses and semi-clothed profile pictures may misguide individuals on the behaviors of their peers, influencing them to engage in riskier behaviors than they would engage in otherwise [7]. Much of this research, however, has utilized adolescent samples, non-African American samples, men who have sex with men (MSM), other sexual minorities, or included substance use behaviors as a primary focus. Although adolescence is a crucial time of psychosocial development regarding sexuality, it does not discount that young

adulthood involves continued identity development and an exploration of oneself, including one's sexuality. Nonetheless, the accessibility to people along with regular usage of online networking sites provides ample opportunity for those seeking sexual partners.

Online social networking is an increasingly important staple for young adults to communicate and engage, making it a new avenue where researchers can implement STI interventions [3] [8] [9]. Dunaev and Stevens [10] point to the positive role of social media, finding that 50% of adolescents search for sexual reproductive health and HIV information through online outlets. However, it is unclear as to whether the information attained from such sources is accurate or that it increases STI knowledge. Using latent class analysis, our goal was to highlight the underlying profiles regarding STI knowledge, condom use, and social media usage; and identify whether STI history influences group profile membership. Highlighting the underlying profiles pertaining to STI knowledge and online media site will identify heterogeneity within a seemingly homogeneous sample of African American young adults regarding their online networking utilization, STI knowledge, and condom use behavior.

Understanding how online utilization confers with sexual health related variables to create profiles has the potential to benefit society by directing or re-directing public health resources (e.g. college-based STI intervention messages that incorporate online media profiling; online public service announcements; development of STI prevention messages dependent on social media platform and targeted profile) where they can be maximally reached by their intended audience, as well as garner further research inquiry. What follows are the details of the present study methodology, including our analytic approach and model selection for those who may not be familiar with latent class analysis, the reporting of model results, and a discussion of the findings with public health related implications and implications for future research.

2. Methods

2.1. Participants

Two-hundred and thirty-six sexually active young adults were recruited at a 4-year minority-serving college in the U.S. South. Forty-one percent (N = 97) were males and 59% (N = 139) were females. Participant ages ranged from 18 - 23 (M_{age} = 19, SD = 1.3). All participants reported being African American.

2.2. Measures

The survey instrument used for the present study consisted of 52 items that measured psychosocial constructs (attitudes, intentions, motivations, norms, and self-efficacy) related to sexual behavior and condom use, STI knowledge and self-reported STI history, social media usage, preferred online networking sites, and sexual behaviors.

For the present study, preferred online networking sites (4 items), STI know-

ledge (27 items), self-reported STI history (1 item), and condom use frequency (1 item) were used to examine profiles of online networking users. Regarding preferred online networking sites, participants were prompted to indicate (check off) the types of online networking they typically utilized (*i.e. Do you typically connect with people on a daily basis using the following kinds of online networking platforms*). Three types of online networking sites with application examples were listed: *general social networking sites* (*e.g. Facebook, Twitter, Instagram, Snap Chat*), *media sharing sites* (*e.g. YouTube, iFunny, Sound Cloud*), and *online dating sites* (*e.g. E-Harmony, Plenty of Fish, Tinder, Grinder*).

STI knowledge items were adopted from Jaworski and Carey's [11] STI Knowledge Scale and consists of 27 true/false statements about awareness of STI symptoms (*e.g. Soon after infection with HIV, a person develops open sores on his or her genitals* (*penis or vagina*)) and acquiring various STIs (*e.g. It is easier to get HIV if a person has another sexually transmitted infection*). Self-reported STI history was measured by asking participants, *Has a doctor, nurse, or other health worker ever told you that you have a sexually transmitted disease?*, to which participants answered yes, no, or don't know. The condom use item asked participants, *during the past 3 months, how often did you use a condom during sex?*, to which participants had the option to answer 1) not at all; 2) a few times; 3) often; 4) almost always; or 5) always.

2.3. Procedure

Upon obtaining IRB approval from the institution, participants were recruited through the university's online research participation platform to participate in the survey research. Potential participants were informed that their responses would remain anonymous and used as aggregate data only. Potential participants were also informed of the eligibility criteria: being officially enrolled as a university student and having been sexually active within the past 3 months. Those who wished to participate were screened for eligibility online by answering affirmatively to the above-mentioned eligibility criteria in order to continue. Participants were then consented via online consent form in which they were required to acknowledge that they have understood their voluntary participation in order to continue to the survey. Participants were administered a 52-item secure online survey. Participation (consenting and survey administration) took approximately 15 minutes.

2.4. Analytical Procedure

Latent class analysis (LCA) served as the analytic procedure for the current study. Analysis was conducted using Mplus Version 7.4. LCA was utilized to explore and identify participants' underlying online networking profiles and conditional probabilities of daily uses of general social networking sites, media sharing sites, online dating sites, and STI knowledge. For each participant, preferred online networking sites were categorized as Yes (1) and No (0) for each

type of site. A mean STI knowledge was calculated on each participant for entry into the latent class model. Condom use frequency was conceptualized using those that reported (5) *Always* as consistent condom users; and was categorized as Yes (1) and No (0). STI history, the covariate in the model, was categorized as Yes (1) and No (0).

A series of LCA models specifying one to five latent classes was tested. Global maximum likelihood estimates were ran for each model. Indices used to determine the optimal LCA solution included the following: Akaike Information Criteria (AIC); the Bayesian Information Criteria (BIC); and the sample size-adjusted BIC (aBIC). For each model, the improvement in fit was compared with a model with one less class. The best-fitting model was identified by considering the lowest log likelihood, AIC, BIC, and aBIC values. The Lo-Mendell-Rubin/Likelihood Ratio Test (LMR/LRT) determined the improvement in fit with the inclusion of one additional class [12] [13]. Lastly, entropy and interpretability of the classes during model selection was considered for final model selection [13]. Table 1 shows the model selection analysis for the LCA.

After identifying the best-fitting latent class solution, STI history was used as a covariate in a multinomial regression model to identify whether it was a factor in predicting one class membership relative to another class. STI history was treated as an auxiliary variable using the R3STEP option, allowing the multinomial regression to control for uncertainty in class assignment while maintaining the class structure and initial meaning [14] [15]. Additionally this approach yielded adjusted odds ratios (AORs) and confidence intervals (CIs), illustrating associations between STI history and class membership.

3. Results

The present study reports conditional probabilistic classes of online networking users characterized by STI knowledge and self-reported condom use frequency. Three latent classes were identified: Social Network Communicators (43%; N =

Table 1. Tests of model fit.

	Log-likelihood	AIC[1]	BIC[2]	aBIC[3]	Entropy[4]	LMR/LRT[5] p-value
1 Class	−6987.8	13,467.13	13,561.26	13,544.25		
2 Class	−3574.9	6973.18	7012.33	7006.24	0.853	<0.001
3 Class	**−3478.4**	**6968.66**	**7011.90**	**6999.60**	**0.899**	**<0.01**
4 Class	−3211.5	6874.75	6923.95	6648.71	0.873	0.04
5 Class	−3187.9	6691.18	6890.12	6493.23	0.740	0.10

[1]AIC: estimates the relative information lost regarding the trade-off between the goodness of fit of the model and the simplicity of the model; lower values indicate a preferred model. [2]BIC: estimates the information lost regarding the trade-off between the goodness of fit of the model and the sample size of the model, but is more conservative than the AIC; lower values indicate a preferred model. [3]aBIC: similar to the BIC plus imposes a penalty for adding parameters based on sample size; less conservative than the BIC. [4]An entropy approaching 1 indicates a complete delineation of classes. [5]Estimates the significant or non-significant increase in model fit by adding k + 1 classes.

101), Social Networking Daters (36%; N = 83), and Media Sharers (21%; N = 52). Table 2 shows the probabilistic class profiles for each of the groups. Social Network Communicators were classified by having the highest probability of using general social networking sites daily (0.96) and second highest probability of daily media sharing (0.83); the lowest probability of using dating sites (0.17), lowest STI knowledge (M = 7.1), and a 48% chance of consistent condom use. Social Networking Daters were classified by having the highest probability of utilizing online dating sites (0.75) and the second highest probability of using social networking sites daily (0.88); low STI knowledge (8.4); and a zero probability of consistent condom use. Media Sharers were characterized by having the highest probability of utilizing media sharing sites daily (0.97) and average STI knowledge (11.7) which was highest among the three groups. Media Sharers were characterized with a 97% chance of consistent condom use.

Regression analysis showed that those having a previous STI history were 8.3 times more likely to be classified as Social Networking Daters than Media Sharers; and were 2.2 times more likely to be classified as Social Networking Daters than Social Network Communicators. Table 3 shows the results of the R3STEP regression model predicting Class 2: Social Networking Daters, compared to the other two classes.

4. Discussion

The present study explored the various uses of online networking for African American young adults attending a predominantly minority university. Differences

Table 2. Profiles of social networking users.

Indicators	Class 1: Social Networkers (N = 101)	Class 2: Social Networking Daters (N = 83)	Class 3: Media Sharers (N = 54)
Social Networking Sites (yes)	0.96[1]	0.88	0.83
Media-Sharing Sites (yes)	0.83	0.43	0.97
Online Dating Sites (yes)	0.17	0.75	0.26
STI Knowledge (mean score out of 27)	7.1	8.4	11.7
Consistent Condom Use (yes)	0.48	0.00	0.97

[1]All values represent the conditional probability of the indicators, except for STI Knowledge which reflects the mean knowledge score.

Table 3. STI history as a predictor of class membership.

	AOR (95% CI)	*p*
Class 1 = REF		
Class 2: Social Networking Daters		
STI History	8.3 (1.6, 16.8)	<0.01
Class 3 = REF		
Class 2: Social Networking Daters		
STI History	2.2 (1.9, 10.4)	<0.01

were observed between the type of online network used daily, STI knowledge, and condom use frequency. The different online network user groups were related with different levels of STI knowledge and self-reported consistent condom use. It is important to note that STI knowledge was relatively low among all groups as the highest group mean was 11.7 out of a total score of 27.

The present findings of low STI knowledge in this age group ranging from 18 - 23 may align with current data that shows half of newly diagnosed STIs occur in young people age 15 - 24 [16]. Possessing limited knowledge of how STIs are transmitted or prevented may be a social determinant of health that contributes to the disproportionate occurrence of STIs in young African American adults. The degree to which mandatory sex-education in public schools is taught, including information about STIs, varies between state and local governments and grade level [16]. Researchers planning to intervene may consider adding a basic STI-educational component for those who are unable to access formal education or accurate preventative knowledge about the transmission and behavioral prevention of STIs. It is important to note, however, knowledge about STIs alone does not translate into consistent condom use and other STI-prevention behaviors.

Out of the three groups, Social Network Communicators and Social Network Daters had the lowest average STI knowledge scores. This is cause for concern, particularly for social networking daters who may be presented with multiple opportunities for sexual encounters. Although social media networking has been criticized for influencing sexual self-objectification [17], particularly among adolescent and adult women, social media and networking sites can be an excellent medium for employing interventions for a variety of populations and concerns. Online sexual health interventions may seek to implement programs on common online dating websites in order to reach the intended or at-risk audiences. In order for sexual-health web-based interventions to produce significant results, culturally appropriate materials are needed that addresses risk-related behaviors within a community or social context. For example, web-based interventions such as *Safe Sistah* [18] has been shown to increase safe-sex behaviors among African American women by taking into consideration and addressing cultural norms surrounding sexual behavior.

History of an STI played an interesting role in this study. Specifically, an STI history was related to the increased odds of being in the Social Networking Daters class. Yet this class resulted in a 0% chance of consistent condom use. This infers that those who have had an STI and actively use online networks for dating are not likely to use condoms consistently, more so than any other class. Social media-based interventions have the potential to influence young adults with a medium to which they are comfortable and with which they frequently interact. Dissemination of STI knowledge on online dating sites will capture those most in need of understanding their susceptibility associated with condomless sex.

5. Limitations

Limitations of this study include the self-reporting of consistent condom use. We hoped to solicit a truer response by allowing a "sliding scale" of condom use frequency reporting. For example, those who may be inclined to report a socially-desirable response could report that they use condoms *almost always* to lessen the cognitive dissonance of untruthfulness; however, they were still categorized as non-consistent condom users on the consistent condom use variable. Nevertheless, social desirability poses a limitation for the current study. Relationship status (e.g. monogamous relationship, married, single, dating) was not measured or controlled for in the present study, which may have influenced consistent condom use behavior, as those who are married or in a monogamous relationship often report lower condom use relative to other relationship statuses. Lastly, LCA classes do not equate to definite class membership. Class membership is probabilistic. Cases are classified to their most probabilistic class specified for the k-class model based on the indicators' ability to form distinct classes.

6. Future Research and Conclusion

Future studies may want to identify the barriers associated with consistent condom use for those reporting an STI history in order to mitigate subsequent STI infection or the spread of infection to others. Qualitative research such as focus groups would be beneficial to understand how online networking facilitates sexual encounters. In addition, variables such as an individual's alcohol or drug use, psychological health (e.g. depression, impulsivity), and amount of non-virtual peer-support should be investigated as they relate to sexual risk-related behavior among online daters.

The present study utilized an all-African American sample. While African American young adults exhibit higher instances of certain STIs (*i.e.* chlamydia and gonorrhea), it is unknown as to whether the same grouping pattern would be found in other ethnicities. This warrants further investigation. Findings highlight the need to capitalize upon African American college students who utilize online dating sites and other online environments. Overall, increasing knowledge about STIs is needed in this population. Understanding how online networking usage facilitates sexual encounters may give professionals an avenue to increase consistent condom use, thereby decreasing STIs.

Compliance with Ethical Standards

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

Ethical Approval

All procedures in this study involving human participants were in accordance

with the ethical standards of the institutional and/or national research committee.

Informed Consent

Informed consent was obtained from all individual participants included in this study.

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