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Information and Motivation Predict HIV–Serostatus Among a Population of High–Risk Men and Transgender Women Who Have Sex with Men

Alan Z. Sheinfil[1], **Rebecca Giguere**[2], **Curtis Dolezal**[2], **Javier Lopez–Rios**[2,3], **Sarah Iribarren**[4], **William Brown III**[2,5,6,7], **Christine Rael**[2], **Cody Lentz**[2], **Ivan Balán**[2], **Timothy Frasca**[2], **Catherine Cruz Torres**[8], **Raynier Crespo**[8], **Irma Febo**[8], **Alex Carballo–Diéguez**[2]

[1]Department of Psychology, Syracuse University, Syracuse, NY, USA

[2]Division of Gender, Sexuality and Health, HIV Center for Clinical and Behavioral Studies, NY State Psychiatric Institute and Columbia University, New York, USA

[3]Department of Community Health and Social Sciences, CUNY Graduate School of Public Health and Health Policy, New York, USA

[4]Biobehavioral Nursing and Health Informatics, University of Washington, Seattle, USA

[5]Department of Medicine, Center for AIDS Prevention Studies, University of California San Francisco, San Francisco, CA, USA

[6]Division of General Internal Medicine, Department of Medicine, Center for Vulnerable Populations At Zuckerberg San Francisco General Hospital and Trauma Center, School of Medicine, University of California San Francisco, San Francisco, CA, USA

[7]Bakar Computational Health Science Institute, University of California San Francisco, San Francisco, CA, USA

[8]Department of Pediatrics, University of Puerto Rico Medical Sciences Campus, San Juan, USA

Abstract

Two constructs from the information-motivation-behavioral skills model were used to predict HIV-serostatus among a sample of men and transgender women who have sex with men. Hypotheses were that lower levels of HIV knowledge and lower levels of motivation to remain HIV-negative would be associated with an increased likelihood of receiving a positive HIV test result at a study eligibility-screening session. Results of a backwards stepwise logistic regression analysis demonstrated that lower levels of HIV knowledge, lower levels of motivation to remain HIV-negative, lower levels of education, and identifying as Hispanic/Latinx were associated with greater odds of receiving a positive HIV test result. These findings are consistent with the broader

✉Alan Z. Sheinfil, azsheinf@syr.edu.

Conflict of interest All authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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

HIV-prevention literature that demonstrates that information and motivation are fundamental determinants of HIV preventive behavior. This work has implications for informing the development and improvement of HIV-prevention interventions.

Keywords

HIV-serostatus; Men who have sex with men; Transgender women; IMB model; HIV self-test

Introduction

There are an estimated 1.1 million people in the United States (US) who are living with HIV, including approximately 162,500 people who are unaware of their HIV-positive serostatus [1]. Of the estimated 40,000 new infections that occur in the US annually, only approximately 37,000 are diagnosed, and estimates suggest that approximately 14% of all people living with HIV (PLWH) are unaware of their HIV-serostatus [2]. Awareness of one's HIV-serostatus is an essential component of the HIV-care continuum [3–5], allowing PLWH to become connected to care, access the medical assistance they need to remain healthy (i.e., reduce viral load, increase immune functionality), and ultimately reduce the likelihood of onward transmission [3, 5]. The Joint United Nations Programme on HIV/AIDS (UNAIDS) has proposed a "90–90–90" plan to end the HIV epidemic: diagnose 90% of all PLWH, provide treatment for 90% of those diagnosed, and achieve viral suppression for 90% of those prescribed treatment [6]. Regarding the first objective, it is estimated that 40% of new HIV infections are transmitted by individuals who are unaware they are HIV-positive [5, 7]. Therefore, it is critical to understand factors that can be targeted in interventions that increase PLWH's awareness of their status (e.g., HIV-testing), enabling quick link to care and ultimately reduce HIV incidence.

Men who have sex with men (MSM) and transgender women (TGW) are disproportionately affected by HIV—accounting for more than 66% of new HIV diagnoses in the US in 2017 [8]. Given their particularly high-risk for HIV, targeted efforts to increase the uptake of HIV-testing among these sub-populations is warranted. To address this disparity the Center for Disease Control (CDC) has identified increasing HIV-testing efforts as a funding priority and has awarded funding to community-based organizations specifically to provide HIV-testing to MSM [9]. It is recognized that efforts on multiple fronts are needed to achieve the goal of diagnosing 90% of all PLWH. Therefore, it is important to understand factors that are positively associated with awareness of one's HIV-serostatus in order to achieve "90–90–90" goals.

Health-behavior theory can serve as a guide to understanding factors that are associated with HIV-serostatus awareness to inform the development and improvement of targeted prevention interventions. Research has demonstrated improved effectiveness of HIV-prevention interventions using health-behavior theory-based interventions [10, 11]. For example, the information-motivation-behavioral skills (IMB) model [12, 13] has been used in the development of various HIV-prevention interventions (for reviews see [13, 14]), including the use of HIV-self tests (HIVSTs) [15]. When applied to HIV-prevention, the

IMB model asserts that *information* about HIV, *motivation* to remain HIV-negative, and the *behavioral-skills* to successfully implement HIV-prevention strategies are fundamental determinants of engaging in preventive behaviors that ensure the maintenance of one's HIV-negative serostatus. An extensive evidence-base supporting the IMB model has been generated, including demonstrations of direct associations between HIV information and HIV preventative behaviors, and HIV-prevention motivation and HIV-preventative behaviors [16]. The model has also received empirical support when applied to samples of MSM [17–19]. Although other research has examined factors associated with HIV-serostatus awareness [20], to our knowledge, there have been no empirical studies testing the applicability of the IMB model to HIV-serostatus *awareness*.

The primary aim of this manuscript is to examine whether HIV information and motivation to remain HIV-negative significantly predict accurate awareness of HIV-serostatus among a high-risk population of MSM and TGW. It was hypothesized that participants who displayed *greater* (A) HIV knowledge, and (B) motivation to remain HIV-negative during a study eligibility-screening session, would be *less* likely to receive an HIV-positive test result. These findings have the potential to inform future efforts to increase the percentage of PLWH who are aware of their HIV-positive serostatus.

Methods

Overview

The study's field name was iSUM ("I'll show you mine"), a pun on the idea of potential sexual partners showing each other their HIVST results. iSUM was a 5-year randomized controlled trial exploring the effectiveness of HIVST as a risk reduction tool for high-risk populations [21]. The study was conducted in New York City (NYC) and Puerto Rico (PR). All procedures were approved by the Institutional Review Boards at the New York State Psychiatric Institute and the University of Puerto Rico Medical Sciences Campus.

Participants

Recruitment began in March 2014 and participant follow-up was completed in December 2018. Participants were recruited through mixed-methods using social media-based tools and traditional outreach strategies to recruit high-risk and hard-to-reach populations. See [22] for a detailed description of the study recruitment approach. Briefly, participants were recruited in-person at LGBT non-profit organizations, clubs, bars, or LGBT marches; online via social media and dating sites/apps; by email or phone using prior study participant registries; and via "snowball" sampling methods (i.e., $30 incentive for referring friends who enrolled in the study).

The eligibility criteria were as follows: HIV-negative; 18 years of age or older; identifying as a man or TGW who has sex with men; reporting three or more occasions of condomless anal sex (CAS) with serodiscordant or unknown status partners in the prior 3-months; two or more sexual partners in the previous 3 months; and currently not taking oral Pre-Exposure Prophylaxis (PrEP).

Procedures

Participants responded to a brief pre-screening survey by phone or in-person. Those who qualified were invited to an in-person screening visit (Visit 1) during which they completed a computer-assisted self-interview (CASI) that collected information regarding their sexual behavior history, HIV knowledge, motivation to remain HIV-negative, and other variables. In addition, participants received HIV testing to confirm their HIV-negative serostatus. The data reported in this manuscript were all collected at this Visit 1 assessment.

In terms of HIV-testing, at Visit 1 participants self-administered an oral HIV antibody test (i.e., the OraQuick® At-Home HIV test) while monitored by research staff. Results of this HIVST were corroborated by a fingerstick blood sample-based confirmatory test (i.e., Alere Determine™ HIV-1/2 Ag/Ab Combo Test) administered by research staff. Those who fulfilled the eligibility criteria, including having a negative result on both HIV tests, were invited to enroll in the trial and return for a subsequent enrollment visit (Visit 2).

In the event a participant received a positive HIV-test result, study staff informed the participant that the results indicated a high likelihood of HIV infection and that confirmatory testing was needed. In addition, study staff made referrals and facilitated linkage to care, either offering to escort participants to the offices of HIV-care providers on the medical campus or providing assistance to identify HIV-care providers located in areas convenient to participants. Subsequently, individuals were informed that they were no longer eligible to participate in the study and were compensated for their time. Study staff attempted to maintain open contact with these individuals and offered additional assistance as needed.

Measures

Pre–screening Survey

A 17-item survey, used to determine whether, overall, the participant met eligibility criteria, included the question, “Have you ever tested HIV positive?” A negative answer was required to qualify for the study.

Demographics

A demographics questionnaire was administered to gather information used to characterize the sample. Questions related to participants’ age, gender identity, sexual orientation, income, education, race/ethnicity, and employment status were included.

Sexual Behavior History

Participants reported on their sexual behavior over the previous 3-months. Information collected as part of this questionnaire included number of sex partners, gender identity of sex partners, sexual partner type (e.g., committed relationship, one-night-stand, other), knowledge of sex partners’ HIV-serostatus, number of insertive/receptive vaginal sex occasions, number of insertive/receptive anal sex occasions, and whether a condom was used during each occasion.

HIV Information

To index the "Information" construct of the IMB model, an adapted version of the Brief HIV Knowledge Questionnaire [23] was administered. This scale contained 23 "True or False" statements that assessed knowledge of HIV-prevention. The original 18-item scale demonstrated good internal consistency in previous studies (α = 0.75–0.89; [23]). However, because the original scale contains items that are not wholly relevant for MSM and TGW, the study team modified the wording of items and included additional ones pertinent for this population. For example, the item "Pulling out the penis before a man climaxes or cums keeps *the woman* from getting HIV during sex", was revised to read: "Pulling out the penis before a man climaxes or cums keeps *his partner* from getting HIV during sex." Items that assess participants' knowledge of contemporary HIV-prevention interventions (e.g., Post-Exposure Prophylaxis [PEP], circumcision, serosorting) were added to the original scale.

Motivation to Remain HIV–Negative

A single-item measure was administered to index the "Motivation" construct of the IMB model: "How motivated are you to remain HIV-negative?" Responses were provided using a 10-point Likert-type scale (1 = Not at all motivated, 10 = Extremely motivated).

Plans to Avoid Contracting HIV

A single-item was used to assess plans to remain HIV-negative: "When you consider everything that matters to you about your sex life, how much do you plan to do to avoid getting HIV?" Responses were given on a 10-point Likert-type scale (1 = I'll do nothing to avoid getting HIV, 10 = I'll do everything to avoid getting HIV, even not having sex).

Perceptions of HIV Risk

Participants' perceptions of their risk for contracting HIV were assessed with a single-item "Considering your usual sexual behavior, how likely is it that you will get HIV in your lifetime?" Ratings were made on a 10-point Likert-type scale (1 = extremely unlikely, 10 = extremely likely).

HIV Serostatus Awareness

To index HIV-serostatus awareness, participants' HIV-serostatus was used as the primary outcome variable (HIV-negative coded as 0, HIV-positive coded as 1). Although participants were not explicitly asked about their awareness of their HIV-serostatus, this construct was operationalized as receiving an HIV-positive test result on either HIV test that was administered as part of the study screening procedure. This operational definition was used for the following reasons: (1) in the pre-screening questionnaire, participants were asked whether they had ever tested HIV-positive (individuals were deemed ineligible for Visit 1 if answered "yes"), (2) potential participants agreed to participate in an HIV-prevention trial which provided rapid HIV home test kits as a sexual risk-reduction strategy, and (3) participants were informed that they would undergo HIV testing at our research office to confirm their HIV-negative serostatus before enrolling in the trial. Therefore, based on these factors, we considered all participants to be under the assumption that they were HIV-negative at Visit 1.

Data Analysis

Preliminary Analysis

All statistical analyses were conducted using IBM SPSS version 25. Means, standard deviations, and bivariate correlations between select study variables were calculated. Chi-square tests (categorical variables) and *t*-tests (continuous variables) were used to compare those who tested HIV-positive at Visit 1 to those who did not. Sexual behavior variables (i.e., number of sex partners, condomless receptive/insertive anal sex acts) and annual income had skewed distributions, and thus a $\log_{10}$ transformation was performed prior to statistical analyses.

Backwards Stepwise Logistic Regression

To test our a priori hypothesis, which predicted that HIV information (i.e., HIV Knowledge Questionnaire) and motivation to remain HIV-negative would significantly predict accurate awareness of HIV-serostatus (i.e., HIV-test result), we conducted a backwards stepwise logistic regression analysis. Specifically, we predicted that *higher* scores on the HIV Knowledge Questionnaire and *higher* motivation to remain HIV-negative would be associated with decreased likelihood of receiving an HIV-positive test result at Visit 1. Because the parent study was designed to test the efficacy of HIVST as a primary HIV-prevention intervention, the instruments used to measure behavioral-skills were specific to using an HIVST, interpreting the results of the HIVST, and navigating receiving a positive HIVST result. Therefore, the behavioral-skills component of the IMB model was excluded from the present analyses, as these behavioral-skills are not directly relevant to *general* awareness of one's HIV-serostatus. Thus, the analyses presented in this article are restricted to utilizing the information and motivation constructs of the IMB model.

In an effort to account for other constructs that are likely associated with HIV-serostatus awareness, while addressing concerns related to potential multicollinearity between the primary predictor variables (i.e., HIV knowledge, motivation to remain HIV-negative) and other covariates (e.g., perceptions of HIV risk), we elected to use a backwards stepwise regression approach. This approach begins with specifying a model that includes all predictors and iteratively removes each variable that demonstrates the weakest association with the outcome until only variables that have a significant ($p < 0.05$) relationship with the outcome remain. The HIV Knowledge Questionnaire and motivation to remain HIV-negative item were entered into the model as primary predictors. The decision to enter additional variables into the initial multivariate model as covariates was based on meeting one of two criteria—either representing a theoretically well-established determinant of HIV-risk (e.g., receptive-CAS), and/or having demonstrated a significant difference between the two groups based on bivariate comparisons (e.g., ethnicity). Based on this approach, number of previous 3-month receptive-CAS occasions, number of previous 3-month insertive-CAS occasions, number of previous 3-month sex partners, plans to avoid contracting HIV, HIV risk perceptions, age, education, income, race, ethnicity, and gender were entered into the model as covariates. Logistic regression was selected as an appropriate statistical approach to test our hypotheses due to the dichotomous nature of the primary outcome variable (i.e., HIV-

positive serostatus based on HIV-test results). Adjusted-odds ratios (aORs), 95% confidence intervals, and *p*-values are reported.

Results

Sample Description

A total of $N = 368$ participants completed a Visit 1 assessment. Of these participants, $n = 28$ ($n = 25$ MSM, $n = 3$ TGW) received an HIV-positive test result on either or both HIV tests administered at Visit 1. The average age of the sample was 33.34-years-old ($SD = 10.55$); the majority of participants were Hispanic/Latinx (54%) and employed (64%) with an average annual salary of $21,209 ($SD = $23,116). Seventy-seven percent of participants identified as gay/homosexual, and TGW comprised 10% of the overall sample ($n = 37$). In addition, participants reported a median of 10 sex partners during the previous 3 months ($M = 18.92$, $SD = 53.18$), a median of 4 insertive-CAS occasions in the previous month ($M = 9.6$, $SD = 33.41$), and a median of 5 receptive-CAS occasions in the previous month ($M = 8.7$, $SD = 17.69$). Table 1 displays the sample demographic information.

Bivariate Associations

Results of chi-square and *t*-test comparisons demonstrated that there were no significant differences between the two groups in terms of study site, gender identity, HIV-information, perceived HIV-risk, occasions of receptive/insertive-CAS, age, sexual orientation, and income. Individuals who received HIV-positive test results endorsed significantly lower levels of plans to avoid contracting HIV ($t = 2.71$ (362), $p = 0.007$), less motivation to remain HIV-negative ($t = 4.13$ (363), $p < 0.001$), and had fewer years of education ($t = 2.67$ (366), $p = 0.008$). In addition, participants who received a positive HIV test result were more likely to identify as Hispanic/Latinx ($\chi^2 = 8.22$ (1), $p = 0.004$) and non-White ($\chi^2 = 11.04$ (1), $p = 0.001$). Overall, the average number of correct items on the HIV-Knowledge Questionnaire was 14.57 ($SD = 3.80$), and this variable demonstrated weak correlations with income ($r = 0.17$) and education ($r = 0.15$). On average, participants reported that they were motivated to remain HIV-negative ($M = 8.38$, $SD = 2.26$), and motivation to remain HIV-negative was negatively associated with perceived HIV-risk ($r = -0.18$). Additional information is displayed in Table 2.

Backwards Stepwise Logistic Regression

Results of the logistic regression analysis are presented in Table 3. The model converged after 10 iterations of selectively excluding non-significant predictors ($p > 0.05$). The final iteration of the model demonstrated that each unit increase in HIV knowledge was associated with a 13% decrease in the odds of receiving a positive HIV test result ($b = -0.15$, *S.E.* = 0.06, aOR = 0.87, 95% CI [0.77, 0.98], $p = 0.02$). In addition, each unit increase in motivation to remain HIV negative was associated with a 25% decrease in the odds of receiving a positive HIV test result (b = − 0.30, S.E. = 0.10, aOR = 0.75, 95% CI [0.62, 0.90], p = 0.003). Participants were 69% less likely to receive a positive HIV test result if they did not identify as Hispanic/Latinx ($b = -1.18$, *S.E.* = 0.54, aOR = 0.31, 95% CI [0.11, 0.90], $p = 0.03$). Further, each unit increase in level of education was associated with a 38% decrease in the odds of receiving a positive HIV test result (b = − 0.47, S.E. = 0.22, aOR =

0.62, 95% CI [0.40, 0.96], p = 0.03). No other variables were retained as significant predictors of HIV-serostatus awareness in the final regression model.

Discussion

The IMB model was used as a theoretical framework for predicting HIV-serostatus awareness among a high-risk population of MSM and TGW. Findings from this study provided support for the predictive utility of the information and motivation constructs of the model. Namely, lower levels of HIV knowledge and lower motivation to remain HIV-negative significantly predicted receiving a positive HIV test result. These results supported our a priori hypotheses. Notably, in our sample ethnicity was the strongest predictor of receiving a positive HIV test result. This finding is consistent with public health data that demonstrates Hispanic/Latinx MSM are disproportionately affected by HIV, and on average, HIV-infected Latinx individuals are more likely to be unaware of their HIV-positive serostatus [24]. Moreover, no participants who identified as White received a positive HIV test result in our study.

The findings from this study are in line with the broader literature that has examined the IMB model in the context of HIV-preventive behaviors and lend further support to the notion that the motivation component of the model has stronger predictive value than the information component [25]. Furthermore, although other research has demonstrated that HIV information is not a reliable determinant of HIV preventive behavior among various sub-populations [18, 26–29], our results showed that information did indeed predict HIV-serostatus awareness. In terms of other factors that are associated with accurate HIV-serostatus awareness, Maman et al. [20] similarly found higher levels of education to be associated with greater likelihood of HIV-serostatus awareness at the bivariate level; however, unlike our findings, their results did not hold in multivariate analyses.

Our results differ from findings of other research that have observed strong associations between sexual risk-behavior and HIV-serostatus. Most notably, neither the number of insertive- nor receptive-CAS occasions over the previous 3-months were significantly associated with HIV-positive serostatus. This is at odds with research that consistently demonstrates male-to-male sexual contact as the primary mode of HIV-transmission in the US [30], with receptive-CAS being the sexual behavior associated with the highest-risk of transmission [24]. One potential explanation for this discrepant finding may be related to the study's eligibility criteria. Eligibility criteria were specifically established to ensure that individuals at high risk for HIV were sampled. Therefore, one criterion required participants to have engaged in three or more occasions of CAS with serodiscordant or unknown status partners in the 3-months prior to screening. As a result, there may not have been enough variability in sexual risk behavior to detect a statistically significant relationship with HIV-positive serostatus due to the high-rates of CAS across the entire sample. Alternatively, due to a variety of factors (e.g., seasonal patterns), sexual behavior over the previous 3-months may not be wholly representative of an individual's behavior over a longer timeframe, and thus 3 months of sexual behavior may not be sufficient for predicting HIV-serostatus. Additionally, research has demonstrated that individual-level risk factors, such as sexual risk behavior, do not solely account for racial disparities in HIV prevalence. Rather,

psychosocial, structural, and social network factors, among others (e.g., education, race/ethnicity), affect disproportionate rates of HIV [31–33]. Therefore, it is also possible that these factors were associated with differences in HIV-serostatus awareness, as opposed to individual-level sexual risk behavior. Nonetheless, this somewhat surprising finding highlights that other psychosocial factors aside from transmission-risk behavior, such as HIV information and motivation to remain HIV-negative, can act as important predictive factors of HIV-serostatus.

As efforts to achieve the UNAIDS "90–90–90" goals continue to progress, the results of this study support the recommendation for researchers to continue to apply theories of health-behavior, such as the IMB model, to guide the design, development, and implementation of HIV-prevention interventions. For example, as part of formative work for the present study, Brown et al. [15] used the IMB model as a framework for understanding MSM's perceptions of using an HIVST to screen potential sexual partners as an HIV-risk reduction strategy. Their findings showed that participants demonstrated limited information regarding the HIVST, endorsed motivation to use the HIVST as a convenient prevention technique, and expressed concerns about possessing the skills to navigate a partner receiving a positive HIV test result. Findings from this work were used to inform the development of a biomedical primary HIV-prevention intervention, grounded in IMB-theory, in which participants were granted free and easy access to HIVSTs to use to test potential sexual partners—the study from which these analyses were conducted. While the IMB model is one example of a theory that can inform the development of HIV-prevention interventions, there are a multitude of other health-behavior theories (for a review see [34]) that can provide behavioral scientists a range of theoretical frameworks suited for use within their unique research areas.

Limitations and Future Directions

The current findings should be interpreted in consideration of study limitations that provide directions for future research. Most notably, because HIVST use was focus of the intervention, the full IMB model was not tested, only the information and motivation constructs. This limits the scope of the assertions that can be made about the performance of the IMB model in predicting HIV-serostatus awareness as a whole. Future research could consider testing the IMB model in its entirety as it applies to HIV-serostatus awareness. Second, we operationalized accurate HIV-serostatus awareness as receiving an HIV-negative test result at a study screening visit. These two constructs do not necessarily entirely overlap, as it is possible that an individual may have been aware that they were likely HIV-positive without ever receiving a positive HIV test result (an eligibility criterion assessed in the pre-screening questionnaire). Similarly, individuals may have attended Visit 1 for the purposes of undergoing free HIV-screening based on suspicions about potential HIV-infection. Therefore, our inference of HIV-serostatus awareness on the basis of HIV test results could be improved through the use of participant self-reported HIV-serostatus awareness corroborated by biomarkers of HIV-infection (e.g., rapid HIV-antibody tests).

Additionally, conclusions were drawn from a combined sample of MSM and TGW. Researchers often combine these heterogenous groups into a single sample, despite their

unique HIV-risk profiles [35, 36] and potentially discrepant HIV-serostatus awareness rates [35, 37]. Therefore, future studies should be designed to ensure that an adequate number of TGW participate as a way to maximize the statistical power necessary to test the IMB model within this sub-group, independent of other high-risk groups. Lastly, the HIV tests that were used to confirm HIV-serostatus at the research offices were antibody tests. These tests had an approximate 28-day window-period from the time of seroconversion until the possible detection of a positive test result. Consequently, it is possible for participants who were recently HIV-infected to be inaccurately categorized as HIV-negative—potentially underestimating the prevalence of HIV-positive participants in our sample. Future studies should consider using rapid HIV tests that have shorter window periods for more robust HIV prevalence estimates.

Clinical Implications

Findings from this study can inform clinical practice and public health interventions that target increasing accurate HIV diagnosis. For example, public health campaigns and sex education curriculum should be bolstered and aim to target sub-population groups that are at disproportionately high-risk for HIV, such as Hispanic/Latinx MSM and TGW. In addition, based on the results of this study and others, simply teaching fundamental information about HIV is insufficient in terms of influencing HIV preventive behavior [26]. Further, messaging surrounding HIV-prevention should be consistent with broader health messaging theory [38] as a way to increase motivation to remain HIV-negative. This can lead to individuals being more likely to engage in HIV-preventative behavior and increase the uptake and prevalence of HIV-testing.

Conclusion

This work aimed to apply the IMB model as a theoretical framework for predicting accurate HIV-serostatus awareness. HIV information, and motivation to remain HIV-negative, represented the information and motivation constructs of the IMB model, respectively. Both HIV information and motivation to remain HIV-negative were significantly associated with accurate awareness of one’s HIV-serostatus. As efforts to end the epidemic continue, theories of health behavior, such as the IMB model, can be valuable tools for efforts to reduce HIV incidence. Future research can further elucidate the ways in which information, motivation, and behavioral-skills are interrelated and work together to explain HIV-serostatus awareness, with the ultimate goal of informing the development and implementation of HIV-prevention interventions.

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Table 1

Sample demographics by HIV-serostatus

Demographics	**HIV-negative (*n* = 340)** **N (%)**	**HIV-positive (*n* = 28)** **N (%)**	**χ^2 (df)**	**Significance**
Study site			2.75 (1)	.097
New York City	214 (62.9)	22 (78.6)		
Puerto Rico	126 (37.1)	6 (21.4)		
Ethnicity			8.22 (1)	.004
Hispanic/Latinx	192 (56.5)	8 (28.6)		
Non-Hispanic/Latinx	147 (43.5)	20 (71.4)		
Race			11.04 (1)	.001
White	98 (28.8)	0 (0)		
Black/African-American	133 (39.1)	18 (64.3)		
Asian	8 (2.4)	0 (0)		
Native American	5 (1.5)	1 (3.6)		
Other/more than one	95 (28.0)	9 (32.1)		
Gender identity			0.02 (1)	.904
Man	306 (90.0)	25 (89.3)		
Woman/transgender	34 (10.0)	3 (10.7)		
Sexual orientation			0.66 (1)	.415
Gay/homosexual	264 (77.6)	20 (71.4)		
Bisexual	51 (15.0)	6 (21.4)		
Straight/heterosexual	10 (2.9)	1 (3.6)		
Other	13 (3.8)	11 (3.9)		
Employment status			4.37 (1)	.037
Employed	115 (33.9)	15 (53.6)		
Unemployed	224 (66.1)	13 (46.4)		

Table 2

Group comparisons of continuous variables

Variable	HIV-negative (*n* = 340) Mean *(SD)*	HIV-positive (*n* = 28) Mean *(SD)*	*t* (df)	Significance
Age	34.07 (11.22)	33.14 (8.24)	0.43 (365)	.668
Education level	4.41 (1.27)	3.75 (1.18)	2.67 (366)	.008
Annual income[a]	3.72 (1.34)	3.16 (1.57)	1.903 (323)	.058
HIV Knowledge	15.22 (3.82)	13.93 (3.79)	1.72 (366)	.086
Plan to Avoid HIV	7.71 (2.07)	6.57 (2.94)	2.71 (362)	.007
HIV-negative motivation	9.11 (1.70)	7.64 (2.82)	4.13 (363)	< .001
Perceived HIV Risk	5.25 (2.43)	5.70 (2.69)	− 0.93 (357)	.356
3-month sex-partners[a]	1.06 (0.36)	1.04 (0.45)	0.247 (366)	.805
Insertive-CAS[a]	0.69 (0.47)	0.80 (0.63)	− 1.22 (363)	.222
Receptive-CAS[a]	0.72 (0.46)	0.85 (0.45)	− 1.52 (366)	.128

N = 325–368 due to missing data. 3-month Sex-Partners = number of self-reported sex partners over previous 3-months, Insertive-CAS = number of insertive condomless sex acts in previous 3-months, Receptive-CAS = number of receptive condomless sex acts in previous 3-months

[a]Indicates variable underwent a $\log_{10}$-transformation

Table 3

Adjusted backwards stepwise logistic regression predicting HIV-positive serostatus

Predictor	Beta	Standard Error	Wald χ^2	Significance	Odds Ratio	95% CI
HIV Knowledge	− 0.15	0.06	5.57	.018	0.87	0.77–0.98
HIV-Negative Motivation	− 0.30	0.10	9.12	.003	0.75	0.62–0.90
Education	− 0.47	0.22	4.63	.032	0.62	0.40–0.96
non-Hispanic/Latinx	− 1.18	0.54	4.68	.031	0.31	0.11–0.90

N = 317 due to missing data, *95% CI* = 95% confidence intervals