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ORIGINAL ARTICLE

Health Beliefs and Intention to Get Immunized for HIV

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Purpose: **The purpose of this study was to evaluate the relationship of health beliefs to intention to accept human immunodeficiency virus (HIV) vaccination.**

Methods: **Respondents were 81 female and 44 male college students who completed self-administered questionnaires. Questionnaires included items assessing intention to get vaccinated for HIV and the following health beliefs: perceived susceptibility to HIV infection, severity of AIDS, benefits of HIV immunization, pragmatic obstacles to vaccination, conditional nonmembership in a risk group, fear of the vaccine, and fear of needles.**

Results: **Nearly 30% of the subjects were uncertain about or opposed to getting immunized for HIV. Susceptibility, severity, pragmatic obstacles, conditional nonmembership in a risk group, and fear of the vaccine were significantly correlated with intent to get vaccinated. Fear of needles, gender, and race were not associated with intent to get an HIV vaccine. Multiple regression analysis identified susceptibility, benefits, pragmatic obstacles, nonmembership in a risk group, and fear of the vaccine as significant independent predictors of intent to vaccinate.**

Conclusions: **These preliminary survey findings demonstrate that intention to accept HIV immunization is not universal and that health beliefs may influence HIV vaccine acceptance. They suggest that it may be important to consider the effects of psychological factors in future research on HIV vaccine acceptance and in the ultimate implementation of HIV immunization programs.** © *Society for Adolescent Medicine, 1997*

KEY WORDS:
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The development of a human immunodeficiency virus (HIV) vaccine will not ensure its widespread public acceptance by persons at risk for HIV infection. Experience with existing vaccines clearly demonstrates inadequate acceptance of immunization, even among specially targeted groups (1–3). Failure to obtain recommended routine immunizations is well documented among children (1) and among elderly persons for influenza immunization (2). Even among high-risk professional groups, acceptance of a recommended immunization (i.e., hepatitis B for surgeons) is only about 70% (3).

Although a safe and effective HIV vaccine will not be available in the immediate future, the likelihood of its eventual development suggests a unique opportunity to build an understanding of vaccine acceptance in parallel with vaccine development. By studying hypothetical vaccine acceptance now, it may be possible to ensure that HIV immunization programs are designed to meet the psychological needs and address the fears of the populations at risk.

Some issues pertinent to HIV vaccine acceptance can be derived from recent papers addressing HIV vaccine clinical trials (4–8). These include the recognition of concerns regarding the unknown benefits and risks of candidate vaccines, that people are worried about the potential stigma associated with HIV immunization, and that limited vaccine efficacy may provide false reassurance of protection.

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Such problems have potential relevance to acceptance of future HIV immunization. However, implementation of a large-scale HIV immunization program will likely raise several new issues. For instance, to demonstrate vaccine efficacy, HIV vaccine clinical trials must target populations with a high incidence of HIV infection. The literature on psychosocial issues associated with HIV vaccine trials therefore has focused on factors relevant to groups with high rates of HIV infection. However, HIV immunization programs are also likely to target groups with relatively low HIV incidence but high rates of HIV risk behaviors (e.g., adolescents and college students). It will be important to evaluate issues that may be specific to these subject groups. In addition, other issues, such as perceived low susceptibility to HIV infection and perceived or real difficulties accessing health care, may interfere with acceptance of HIV immunization. We have little understanding about these distinct psychosocial issues that may be faced after clinical trials, when HIV immunization programs must be implemented (9,10). These include: (a) health beliefs, such as doubts about vaccine efficacy, concerns about safety, and perceived lack of susceptibility to HIV infection; (b) characteristics of the immunization process, such as vaccine cost and inconvenient vaccination schedules (e.g., the need for multiple injections over time or booster shots); and (c) issues specific to a vaccine designed to prevent a sexually transmitted infection (STI), such as parental reluctance to have their children or adolescents immunized against an STI (9,10).

The literature on the determinants of acceptance of hepatitis B immunization gives some further indication of the health beliefs that may be pertinent to an examination of HIV vaccine acceptance. Factors related to nonimmunization for hepatitis B that have been reported across multiple studies include perceiving oneself to be at low risk for infection (3,11–16), doubts about vaccine efficacy (11,13,17), concerns about vaccine safety (11–14,17,18), general inertia (i.e., "haven't gotten around to it") (3,14,15), and fears about getting injections (13,17). These health beliefs are consistent with aspects of the health belief model (HBM), which focuses on perceptions of illness and health behavior and is a widely used explanatory model of discrete health behaviors (19,20). The HBM proposes that an individual's decision to undertake a disease-related health behavior is a function of perceptions of susceptibility to the disease, disease severity, benefits of the preventive health behavior, and barriers to performance of the health behavior. The constructs associated with the HBM have been used effectively in explanatory models to understand acceptance and nonacceptance of a number of vaccines, including influenza (21,22), poliomyelitis (23), and hepatitis B (11).

The purpose of this study was to test the relationship of health beliefs to intention to get immunized for HIV among university undergraduates, a sample of convenience, but also one with high rates of HIV risk behaviors (24). Our hypotheses, which were derived from prior vaccine research and research with the HBM, were that higher levels of susceptibility, severity, and benefits, and lower levels of barriers (such as fear of the vaccine and fear of needles) would relate to greater willingness to get an HIV vaccine. This research represents a critical initial step in the exploration of HIV vaccine acceptance, since no previous investigations have addressed this topic.

Methods

Subjects and Setting

Subjects were 127 undergraduate students attending an urban Midwestern university. Voluntary participation in research studies is one means of fulfilling requirements of introductory psychology courses. Self-administered questionnaires required <20 min of class time. Ninety-eight percent (n = 125) returned questionnaires with all items answered. The study was approved by the university's institutional review board, which waived the requirement for written, informed consent.

Measures

The questionnaire elicited sociodemographic information, intention to get vaccinated for HIV, and health beliefs related to HIV disease and immunization. Each item was assessed using a seven-point scale (1 = "strongly disagree," 7 = "strongly agree"). (Items available from authors.)

Outcome measure: Intention to get vaccinated. One item evaluated each subject's intention to get immunized once an HIV vaccine becomes available.

Perceived susceptibility. Two items measured perceived susceptibility to HIV infection. The items were designed to assess feelings of vulnerability to infection, rather than a cognitive appraisal of probability of infection. The Susceptibility subscale demonstrated adequate internal reliability (α = .85).

Perceived severity. Three items measured perceived severity of AIDS. The Severity subscale had adequate internal reliability (α = .81).

Perceived benefits. Five items addressed the perceived benefits associated with receiving a hypothetical HIV vaccination. Items focused on the vaccine as a health maintenance measure, an AIDS prevention measure, and a way to increase sexual enjoyment (by decreasing worry). The Benefits subscale demonstrated adequate reliability (α = .70).

Perceived barriers. The domain of perceived barriers consisted of four distinct subscales. The first subscale, Pragmatic Obstacles to getting vaccinated (e.g., difficulty getting to a medical clinic) was assessed by three items (α = .74). The second barrier, conditional Nonmembership in a Risk Group, was measured with five items (α = .83). This scale was developed to tap individuals' sense of their participation in risk behaviors and/or identification with a risk group. The items in this subscale were distinguished from Susceptibility items in that they addressed beliefs that it would be unnecessary to receive HIV immunization as long as one did not participate in risk behaviors or belong to a group traditionally identified as high risk. Nonrisk group and susceptibility scores were only moderately correlated ($r = -.44$), indicating that they measured related but independent constructs. The third subscale, Fear of the Vaccine, was assessed with two items (α = .54), as was the fourth subscale, Fear of Needles not being clean (α = .73).

To confirm the subscale structure, principal components factor analysis was performed (25). Seven factors were extracted which coincided with the seven subscales described above, supporting the hypothesized dimensional structure. The varimax rotated factor matrix indicated that all items loaded most highly (.50 or better) on their respective subscales with an overall mean loading of .76. Ninety-eight percent of the cross loadings were <.3 and only one cross loading exceeded .5. The seven factors combined to explain 69.0% of the total variance.

Correlations among the health belief variables ranged from $r = .01$, $p = .94$ (for conditional nonmembership in a risk group, with fear of the vaccine) to $r = -.44$, $p < .001$ (for conditional nonmembership in a risk group, with susceptibility). Several variables were significantly correlated, including susceptibility, with severity ($r = .34$, $p < .001$) and pragmatic obstacles, with Fear of the Vaccine ($r = .20$, $p < .05$).

Statistical Methods

Bivariate relationships of continuous variables (e.g., health belief measures and age) with intention to get immunized for HIV were assessed with Spearman rank correlation coefficients. The associations of categorical variables (i.e., gender and race) with the outcome measure were evaluated with analysis of variance. Given the significant intercorrelations among some of the health belief measures, a regression analysis was used to control for shared variance in the prediction of the outcome variable. Those predictors with bivariate associations of $p = .10$ or better with intention to vaccinate were entered into a simultaneous entry multiple regression equation (26) to predict intention. This level of significance was chosen rather than a more conservative criterion (e.g., $p < .05$) because in a multiple regression equation, the control for covariance can result in increased predictive power for certain variables owing to suppression of irrelevant variance (26,27). In a preliminary study such as this, it is particularly important to not exclude potentially meaningful variables by setting too strict a criterion for variable entry.

Results

Sample Description

The 125 subjects ranged in age from 18 to 29 years (mean = 21.5; standard deviation = 3.1; median = 20) and 65% (n = 81) were female. Seventy-five percent described themselves as non-Hispanic white and 7% as African-American, and 18% reported other racial/ethnic backgrounds. No data on socioeconomic status, sexual activity, STI history, or immunization history were obtained.

Prediction of Intention to Vaccinate

The distribution of scores on the outcome measure (mean = 5.5; standard deviation = 1.4) indicates that 30% strongly agreed that they would get vaccinated for HIV once the vaccine became available. An additional 40% either agreed or slightly agreed that they would get immunized, whereas 22% were not sure and 7% disagreed.

Intention to get vaccinated was marginally associated with age ($r_s = -.15$; $p = .10$) and not significantly related to gender ($F = 1.2$; $p = .27$) or race ($F = 0.8$; $p = .38$). Intention to get vaccinated for HIV was

Table 1. Multiple regression summary statistics for prediction of intention to get vaccinated for HIV

Variable	Bivariate Spearman Correlation	Standardized β	Partial Correlations
Age	−.15*	−.10	−.10
Susceptibility	.40****	.19**	.16
Severity	.26***	.08	.09
Benefits	.15*	.21***	.24
Pragmatic obstacles	−.37****	−.16**	−.18
Nonmembership in risk group	−.45****	−.30****	−.31
Fear of vaccine	−.26***	−.20***	−.24

Note. Overall R^2 for model including only significant predictors = .37; $F(5, 119) = 13.8$; $p < .0001$.
* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

significantly correlated with susceptibility ($r_s = .40$; $p < .001$), severity ($r_s = .26$; $p < .01$), pragmatic obstacles ($r_s = -.37$; $p < .001$), conditional nonmembership in a risk group ($r_s = -.45$; $p < .001$), and fear of the vaccine ($r_s = -.26$; $p < .01$). Intention to vaccinate was marginally associated with benefits ($r_s = .15$; $p = .10$). These correlations indicate that increased intention to get HIV immunization was associated with higher levels of susceptibility, severity, and benefits, and lower levels of pragmatic obstacles, nonmembership in a risk group, and fear of the vaccine. Fear of needles was not associated with intention to get vaccinated for HIV ($r_s = -.13$; $p = .14$).

Age and six of the health belief subscales met the regression equation entry criterion (i.e., Spearman rank order correlation significance at $p = .10$ or better). These variables were entered into a multiple regression equation to predict intention to get vaccinated. Susceptibility, benefits, pragmatic obstacles, nonmembership in a risk group, and fear of the vaccine were significant independent predictors of intention. The partial correlation coefficient and standardized beta weight for each predictor are presented in Table 1. These statistics provide estimates of each variable's predictive power after controlling for the shared contribution of all other variables. Age and severity did not contribute significantly to the predictive power of the model. The model (after removing nonsignificant variables) accounted for 37% of the variance in intention to get vaccinated for HIV ($F = 13.8$; $p < .0001$).

Discussion

These preliminary survey findings demonstrate that intention to accept an HIV vaccine is not universal. Nearly 30% of the subjects were uncertain or opposed to getting immunized for HIV. In other groups, this percentage might be higher. Studies have documented, for example, that African-Americans are particularly distrustful of science and public policy as they relate to acquired immunodeficiency syndrome (AIDS) (28,29). In addition, if an HIV vaccine has limited efficacy (perhaps no greater than 50%), as some have suggested (30), the rates of nonacceptance might increase dramatically.

The data also support our hypotheses that health beliefs may ultimately influence HIV vaccine acceptance. Bivariate analyses indicated that each of the four broad health belief domains was correlated significantly with intention to get vaccinated for HIV. Susceptibility, benefits, conditional nonmembership in a risk group, and fear of the vaccine demonstrated significant independent predictive power. The findings are consistent with reports from research on determinants of acceptance of hepatitis B vaccine (3,11–18) and influenza vaccine (21,22), which indicate that failure to get these vaccines was related to perceived low susceptibility, doubts about the benefits of the vaccine, and concerns about vaccine safety. As HIV vaccine development proceeds, it will be important to continue to study determinants of vaccine acceptance. Ultimately, a successful immunization program will depend both on the availability of an effective vaccine and on the acceptance of this vaccine by those individuals most at risk for HIV infection.

Factor analysis and analysis of internal consistency also indicated that the key health belief constructs, as measured by this questionnaire, constituted conceptually distinct dimensions for the respondents and provided a useful framework for studying health beliefs about HIV immunization.

There are several limitations that must be considered in interpreting the results. The nature of the topic (i.e., HIV immunization) required that subjects indicate intention to receive a hypothetical vaccine.

Although behavioral intention and the carrying out of health behaviors often are highly related (31), vaccination intent is likely to correlate imperfectly with actual vaccination behavior. In addition, the association of intent to behavior may vary across different subject groups (e.g., the association may be stronger among college students compared to urban high school students). This limitation, however, clearly cannot be overcome until a vaccine is developed and made available.

In addition, this study focused on university undergraduates. Although university undergraduates are not at the highest risk for HIV infection, they engage in a high frequency of HIV risk behaviors (e.g., multiple sexual partners and inconsistent condom use) (24). In the present project we were not able to collect data regarding sexual behavior and drug use, making it impossible to assess the specific behavioral risk of our sample. Also, it is not clear to what extent our results may generalize across different subject groups, including adolescents in general. It will be important to study determinants of HIV vaccine acceptance in other populations whose behaviors place them at even greater risk for HIV infection.

Finally, other issues will almost certainly play an important role in vaccine acceptance. Vaccine characteristics and health lifestyle (i.e., health-enhancing and health-compromising behavior patterns) may predict intention to get vaccinated for HIV (31). It also will be important in future research to explore the potential role of social influence on attitudes about HIV immunization.

Despite these limitations, the results of the present study represent the first empirical exploration of potential determinants of HIV immunization. The findings suggest that people may have reservations about accepting an HIV vaccine and that these reservations may be associated, in part, with health beliefs. Future public health programs designed to disseminate HIV vaccine may be more successful if there is an emphasis on individuals' susceptibility to HIV infection, the benefits of vaccination, and the safety of the vaccine. In addition, it may be important to continue to emphasize that it is behavior, not membership in a traditionally identified risk group, that leads to HIV infection.

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