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Willingness to participate in HIV vaccine trials: The impact of trial attributes

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Abstract

Objectives—To assess willingness to participate (WTP) in hypothetical Phase III preventive HIV vaccine trials, and the impact of trial attributes on WTP, among low socioeconomic, ethnically diverse adults from communities at elevated risk for HIV infection.

Method—Participants ($n=123$; median age=38; 69% male; 37% Latino; 14% African-American) were recruited in Los Angeles in 2003 using multi-site, venue-based sampling. WTP was assessed for eight hypothetical HIV vaccine trials that varied across seven dichotomous attributes, using a 2⁷⁻⁴ fractional factorial experimental design. Individual-specific impact of vaccine trial attributes on WTP was estimated using within-individual ANOVA and then meta-analyzed across individuals.

Results—Mean WTP for eight hypothetical vaccine trials ranged from 1.74 to 3.81 (1=highly unlikely, 5=highly likely). Lower WTP was associated with vaccine-induced infection risk (impact=0.88, $p<0.0001$), false HIV-positives (0.53, $p<0.0001$), no provision of free HIV medications (0.52, $p<0.0001$), and longer trial duration (0.27; $p=0.0002$).

Conclusion—HIV vaccine trial attributes may strongly influence WTP. Although existing candidate vaccines cannot cause HIV infection, perceptions of risk may impede WTP. Eliciting trial preferences and concerns prior to trial implementation may enable accommodation of participant preferences and support tailored interventions to address concerns and misconceptions to facilitate enrollment in safe and ethical trials among vulnerable communities.

Keywords

Clinical trial; Conjoint analysis; Consumer preference; Impact score; Recruitment

Introduction

Over 30 preventive HIV vaccine trials are in progress (IAVI, 2005). Nevertheless, several HIV chemoprophylaxis trials were shut down recently due to community concerns. The development and evaluation of candidate vaccines raise formidable social and behavioral challenges, including the recruitment of thousands of vaccine trial participants.

HIV vaccine preparedness studies indicate that concerns about vaccine-induced infection, side effects, false HIV-positives, and trial-related discrimination are associated with lower WTP (Mills et al., 2004). Most studies used a compositional approach, administering a series of disparate questions to assess the impact of discrete trial attributes on WTP. This approach has limited ability to discern the relative impact of different attributes on WTP and may confound the impacts of related attributes. Partitioning hypothetical products into singular attributes also renders findings more remote from reality.

We overcome limitations of the compositional approach by using a decompositional approach based on conjoint analysis (CA; Hay, 2002). We used CA to examine WTP in hypothetical Phase III preventive HIV vaccine trials and to assess the relative impact of trial attributes on WTP, among ethnically diverse individuals from vulnerable communities underrepresented in HIV vaccine preparedness research.

Methods

Participants ($n=123$) were recruited using venue-based sampling (Frankel et al., 1999) from 9 sites serving vulnerable communities in Los Angeles. The total annual caseload ranged from 331 to 6962 across sites. Eligibility criteria included: ≥ 18 years of age, not employed by recruitment site, and ability to communicate in English. Participants were reimbursed \$20 for a one-time, 60-minute, computer-assisted personal interview. Participants were randomized with equal chance to the present WTP study or a study of HIV vaccine acceptability (Newman et al., 2006a). Due to concerns about respondent burden, we did not conduct both interviews with the same participant. The study protocol was approved by UCLA and University of Toronto's IRBs.

We used conjoint analysis (CA) to measure consumer preferences among different HIV vaccine trials and to determine the relative influence of trial attributes on WTP. Respondents rated their WTP for eight hypothetical trials that varied across seven dichotomous attributes, on a Likert scale (1=highly unlikely to 5=highly likely).

Trial attributes (shown in Table 2) are selected based on vaccine preparedness literature, including our own formative research (Newman et al., 2006b). Attribute values (e.g., minor side effects) were chosen based on trials already conducted (e.g., Vaxgen) and the need to present meaningful alternatives from a consumer perspective. Attribute profiles for the hypothetical vaccine trials were constructed using a 2^{7-4} fractional factorial experimental design (Wu and Hamada, 2000).

For each participant, an analysis of variance (ANOVA) model was used to estimate the impact of each trial attribute on WTP. For each trial attribute, individual-specific impact scores were then summarized across participants as the attribute's mean impact on WTP; the statistical significance of the mean impact for the attribute was tested using a two-sided one-sample t test.

Results

For the overall study, 747 individuals were approached; 462 agreed to be screened (62%). Among individuals screened, 281 (61%) were eligible and 181 ineligible: 156 lacked English proficiency, 15 were under age 18, and 10 were agency staff. Among 281 eligible individuals, 266 (95%) participated in the overall study, with 123 (46%) randomized to the present WTP study. Since all non-responses occurred prior to randomization, the response rate for the WTP study is identical to that for the overall study, 59% (62% \times 95%). Participants' sociodemographic characteristics are reported in Table 1.

Table 2 shows the attribute profile and mean WTP for each hypothetical vaccine trial, and the impact of each trial attribute on WTP. Across eight HIV vaccine trials, mean WTP ranged from 1.74 to 3.81. Among seven trial attributes examined, risk of vaccine-induced infection had the largest impact on WTP: mean impact=0.88; 95% confidence interval (CI)=0.65–1.12; $p<0.0001$. False HIV-positives had the second largest impact: mean impact=0.53; 95% CI=0.35–0.72; $p<0.0001$; followed closely by provision of free HIV medications: mean impact=0.52; 95% CI=0.34–0.70; $p<0.0001$; and trial duration: mean impact=0.27; 95% CI=0.13–0.41; $p=0.0002$. Monetary reimbursement, number of doses, and minor side effects did not impact significantly on WTP.

Discussion

This study quantifies the relative impact of a broad array of HIV vaccine trial attributes on willingness to participate in HIV vaccine trials. Low socioeconomic, largely ethnic minority adults from communities vulnerable to HIV infection—among the most important candidates for future HIV vaccine trials—reported a wide range of WTP across vaccine trials with different attribute profiles. Importantly, this suggests the impact of specific vaccine trial attributes on trial enrollment and the possibility of enhancing enrollment both through changes in trial design and implementation of empirically based, targeted interventions to address barriers to WTP.

Risk of vaccine-induced HIV infection had the largest impact on WTP. Although current trials are conducted on synthetic/recombinant candidate vaccines that pose no risk of HIV infection, a recent study suggests a majority of U.S. adults believe that HIV vaccines may cause HIV infection (Allen et al., 2005). Perception of risk—even absent actual risk—may strongly influence WTP. The delivery of unambiguous messages, tailored for local communities, that one cannot be infected by a candidate vaccine may be a vital component of HIV vaccine trial recruitment.

The large impact of false HIV-positives may reflect concerns about AIDS stigma and trial-related discrimination, as well as mistrust or confusion about the difference between false positives and actual HIV infection (Newman et al., 2006b). Concerns about false positives have been associated with lower WTP (Mills et al., 2004); yet this is a likely consequence of HIV vaccine trial participation. Trial participation might be facilitated by: provision of Polymerase Chain Reaction testing; identification cards indicating participation in a trial (e.g., HVTN 042; HVTN, 2004); testing algorithms that distinguish false positives from actual infection; and engagement of local communities in trial planning and implementation (Newman et al., 2006b).

Provision of unlimited HIV-related medical care in the event of breakthrough infections, also associated with greater WTP, may be challenging for trial investigators; nevertheless, securing trial sponsor agreements to cover participants' HIV treatment costs and availability of referrals for locally administered HIV treatment are important benchmarks for state-of-the-art HIV vaccine trials (Bass, 2004).

Our participants preferred trials of shorter duration. Given the potential for augmented trials with alternative endpoints, it may be prudent to offer alternatives to volunteers; an option for shorter time commitment may engage more potential participants.

Limitations

Study limitations include the small sample size, use of venue-based sampling, and restriction to English speakers. We did not screen for individual risk behaviors, but relied on venue-based sampling to target communities at elevated HIV risk. Nevertheless, venue-based targeting mimics likely approaches to future HIV vaccine dissemination. Additionally, self-reported WTP may not guarantee actual trial enrollment, although Buchbinder et al. (2004) identified WTP as the best predictor of actual enrollment.

Conclusions

This study of low socioeconomic, largely ethnic minority adults at risk for HIV infection found a wide range of WTP across hypothetical HIV vaccine trials with different attribute profiles. Specific trial attributes may strongly influence WTP. Such consumer research can be a cost-effective way to improve trial recruitment and retention. Eliciting community preferences and concerns before the design and implementation of HIV vaccine trials (Newman et al., 2004), and openness to negotiating changes that are scientifically and economically feasible, may enhance community engagement, support empirically based interventions to facilitate enrollment and strengthen the sustained and ethical implementation of HIV vaccine trials among vulnerable communities.

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Table 1Sociodemographic characteristics of participants ($n=123$) in Los Angeles, 2003

Characteristics	Percent (%)
Age in years (mean=38.4; median=38.0)	
18 to 34	41
35 to 49	39
50+	20
Race/Ethnicity	
Hispanic/Latino	37
White	34
Black/African American	14
API, Native American and others	15
Born in the U.S.	79
Gender	
Male	69
Female	31
Sexual orientation	
Heterosexual	48
Gay	28
Lesbian	9
Bisexual	15
Ever injected drugs	50
Education	
No high school degree	19
High school graduate or GED	27
Some college, AA degree, trade school	37
Bachelor's degree or more	17
Annual income (\$)	
0 to 5000	22
5001 to 10,000	22
10,001 to 25,000	31
25,000+	25
Health insurance	
Employer or other private	30
Medi-Cal, Medi-Care, VA	29
None	42

Table 2
Willingness to participate (WTP) in hypothetical HIV vaccine trials and impact of trial attributes on WTP ($n=123$)

HIV vaccine trial number ^a	Willingness to Participate (mean) ^b	Vaccine trial attributes						Side effects
		Vaccine-induced HIV infection	False HIV-positive	Free HIV medications	Duration of trial	Reimbursement per visit	Number of injections	
1	3.81	No risk	No	Yes	3 years	\$25	5	None
2	2.96	No risk	No	No	5 years	\$75	5	Minor
3	2.764	No risk	HIV+	Yes	5 years	\$25	2	Minor
4	2.756	Small risk	No	Yes	3 years	\$75	2	Minor
5	2.72	No risk	HIV+	No	3 years	\$75	2	None
6	2.20	Small risk	HIV+	Yes	5 years	\$75	5	None
7	2.02	Small risk	No	No	5 years	\$25	2	None
8	1.74	Small risk	HIV+	No	3 years	\$25	5	Minor
Impact score (mean) ^c	0.88*		0.53*	0.52*	0.27*	0.07	-0.11	-0.13

^a HIV vaccine trial numbers assigned in order of decreasing mean willingness to participate (WTP), not in order of presentation to participants. During face-to-face interviews, eight hand cards, each describing a hypothetical vaccine trial, were presented concurrently to each participant.

^b WTP mean is based on a 5-point Likert scale, ranging from 1=highly unlikely to 5=highly likely.

^c Impact score is the mean impact of each vaccine trial attribute on WTP, on a 5-point Likert scale.

* $p<0.001$ for two-sided one-sample t test.