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Local Knowledge and Experiences of Vaccination: Implications for HIV-Preventive Vaccine Trials in South Africa

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This study forms part of the preparation of communities for HIV-preventive vaccine trials in South Africa. On the basis of the assumption that attitudes to any HIV vaccine or vaccine trials will partly be influenced by experiences of vaccination in general, this study aimed to investigate knowledge of, attitudes to, and experiences of vaccination in a small semirural community in KwaZulu-Natal, South Africa. The study also sought to investigate the effect of traditional, cultural, and religious beliefs on attitudes to vaccination, as well as to get some indication of willingness to participate in potential HIV vaccine trials. Overall, the findings reveal a good knowledge of, and positive attitudes to, vaccination, with little negative effect of traditional, cultural, and religious beliefs. The findings also reveal a generally positive attitude to HIV vaccines and vaccine trials. Barriers identified, such as anxiety about safety, were not surprising.

Keywords: *HIV/AIDS; vaccination; clinical trials; knowledge*

HIV is now recognized as the primary cause of death in South Africa (Dorrington, Bourne, Bradshaw, Laubscher, & Timaeus, 2001) and the fourth major cause of death in the world. In the face of the extent of the HIV pandemic, its devastating effects on populations, and the limited positive effects of other interventions (Harrison & Myer, 2000), the development of a preventive HIV vaccine represents the best hope of slowing the HIV pandemic. The past 10 years have seen the emergence of numerous vaccine concepts and the beginning of preventive HIV vaccine trials in different parts of the world, for example, Thailand, Uganda, and the United States, with trials being initiated in other countries. The South African AIDS Vaccine Initiative (SAAVI) was established by the South African government in 1999 and is charged with the development of an effective, affordable, and appropriate HIV vaccine for the South African population as soon as possible. The first Phase 1 trial of an HIV vaccine commenced in South Africa in 2003.

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Before HIV-preventive vaccine trials can commence, extensive preparation must take place. This involves educational initiatives at international, national, and local levels, and especially with populations and communities likely to be more directly involved in HIV vaccine trials. Although this is certainly necessary for Phase 1 vaccine trials, it is especially important for large-scale, community-based, Phase 3 vaccine trials, where large numbers of people will participate in the trials.

Educational initiatives within communities aim to inform community members about HIV vaccine development activities, and build capacity in the scientific, ethical, and human rights implications of trials to prepare communities to engage meaningfully in HIV vaccine development activities (Joint United Nations Programme on HIV/AIDS, 2000). Such initiatives may also aim to prepare community members for direct participation in HIV vaccine trials. Extensive educational programs in preparation for trials have been under way in South Africa for some time (Galloway & Frohlich, 2000).

RATIONALE FOR CURRENT STUDY

Much of the information about HIV vaccine development, including concepts and approaches, is complex and may be difficult to convey in community-based educational campaigns, especially in communities with limited education. However, immunization is a part of the social history of most countries, and the notion and experience of vaccination is probably a familiar one in most parts of the world, including in South Africa. Therefore, it is likely that perceptions and attitudes toward HIV vaccine trials will, at least partly, be influenced by the existing knowledge of, and attitudes toward, immunization in general.

An assessment of local knowledge and popular perceptions and beliefs about various aspects of vaccination in general, as well as identification of commonplace understandings, metaphors, and misconceptions of vaccination, will provide a useful base for planning and implementing HIV vaccine trial preparation. Furthermore, such an assessment may identify perceptions of vaccination that are likely to influence public acceptance of any successfully developed HIV vaccines in South Africa and elsewhere.

This investigation was a small scale study that aimed to explore attitudes to, and beliefs about, vaccination in general and to participation in HIV vaccine trials in particular, in one community in South Africa, as part of preparation for HIV vaccine trials.

KNOWLEDGE, PERCEPTIONS, ATTITUDES, AND EXPERIENCES OF VACCINATION

A number of studies have been carried out in local communities in different parts of the world exploring beliefs about, perceptions of, and attitudes to vaccines and vaccination, as well as experiences and use of vaccination programs. Some of these have produced evidence of generally good knowledge and positive attitudes to vaccination (McGrath et al., 2001; Pruitt & Kline, 1995). However, others reveal little understanding of the purpose of vaccination (Tarrant & Gregory, 2001) or the specific diseases for which it may be used (McCormick, Bartholomew, Lewis, Brown, & Hanson, 1997; Nichter, 1995; Streatfield & Singarimum, 1988; Tarrant & Gregory, 2001). Research has also revealed misperceptions about vaccination, including beliefs that any vaccine contributes to the general immunity of people rather than protecting against specific diseases or that

sick people cannot be immunized (Nichter, 1995), as well as some confusion of preventive and therapeutic vaccines (McGrath et al., 2001). Specific beliefs and attitudes toward vaccination have also been identified, for example, that if medicine can cure disease, there is no need for vaccination (Pruitt & Kline, 1995) or that vaccination of sick people is a sign of disrespect (Nichter, 1995).

Some research has provided evidence of significant beliefs opposing vaccination, including conspiracy suspicions of hidden political agendas (e.g., subtle contraception), attempts by Western biomedical scientists to undermine traditional values, or motives of "civilizing the other" through the imposition of Western science (Nichter, 1995). In this context, vaccines were perceived as vehicles of ideology and not to be trusted. Opposition to vaccine campaigns was also based on perceptions that these were diverting attention from poverty relief, delivery of basic services, and other fundamental health needs of the population.

Attitudes to vaccination might be affected by a range of personal factors. These may include fear about safety and side effects (McGrath et al., 2001) or fear of needles (Pruitt & Kline, 1995) and the influence of significant others (Tarrant & Gregory, 2001). Traditional cultural and religious practices may also contribute to misconceptions; unrealistic expectations; or distrust of, or opposition to, vaccination (Nichter, 1995; Odebiyi & Ekong, 1982). However, traditional knowledge systems may also have terms, concepts, or metaphors for diseases or health promotion practices through which acceptance of vaccination may be fostered. Use of such traditional knowledge may create a better acceptance of vaccination than changing people's understanding of etiology of disease to a scientific biomedical understanding (Nichter, 1995), and vaccination may be accepted in addition to, rather than instead of, traditional practices (Eng, Naimoli, Naimoli, Parker, & Lowenthal, 1991). Systemic barriers to vaccination may include clinic distance and difficulty traveling (Gedlu & Tesemma, 1997; Pruitt & Kline, 1995), waiting time (Pruitt & Kline, 1995), lack of well-child clinics (McCormick et al., 1997), cost (Pruitt & Kline, 1995), negative attitudes of health care workers (Pruitt & Kline, 1995), and poor tracking systems (McCormick et al., 1997). Demographic factors have also been associated with low levels of vaccination use, for example, low levels of education (Edpuganti, 2000; Orenstein, Atkinson, Mason, & Bernier, 1990), low socioeconomic status (Odebiyi & Ekong, 1982; Orenstein et al., 1990; Rahman, Islam, & Mahalanabis, 1995; Streatfield & Singarimum, 1988), young parental age (Orenstein et al., 1990), and urban versus rural dwelling (Edpuganti, 2000). Birth order and gender have also been shown to affect the uptake of vaccination (Nichter, 1995).

PARTICIPATION IN HIV VACCINE TRIALS

Potential barriers to participation in HIV vaccine trials include the following: concerns about vaccine safety and side effects, concerns about the social consequences of vaccine-induced seropositivity and trial participation, seeing oneself as not being vulnerable to HIV, the potential for vaccine-induced HIV infection, accelerated progression to AIDS, duration of the trial, and distrust of researcher and government (MacQueen, 1998; McGrath et al., 2001). On the other hand, willingness to participate in HIV vaccine trials has been found to be associated with the desire for personal protection against HIV infection, the desire to help fight HIV/AIDS, and the desire for free medical advice (McGrath et al., 2001). The experiences of the first Phase 1 HIV vaccine trial in Africa indicated a

number of perceived barriers to participation and misconceptions about trial participation, including fears of deliberate infection with HIV (Mugerwa et al., 2002).

A number of empirical studies on willingness to participate in these trials in Northern America and Thailand have been conducted on female commercial sex workers, injecting drug users, and gay and bisexual men and women at risk for HIV (MacQueen, 1998). Results of these studies indicated that 20% to 50% of people surveyed expressed willingness to participate in trials, whereas those not at all willing to participate ranged from 3% to 9% of people surveyed. In South Africa, a study conducted in rural KwaZulu-Natal explored the issue of community preparedness to participate in HIV prevention research, finding that 49.4% of women and 42% of men would be willing to participate in HIV vaccine research (Frohlich, Abdool Karim, Gouws, & Abdool Karim, 2003). The decision to participate in a preventive HIV vaccine trial may be related to perceived personal risk of HIV infection, perceived risks of participating in the trial, perceived benefits of participating, comprehension of how the trial works, trust in those implementing and supporting the trial, altruistic motivations, and peer influence (MacQueen, 1998).

AIMS AND METHOD

As part of the national preparation for HIV vaccine trials in South Africa, this study set out to investigate attitudes to vaccination in general, and to possible participation in HIV vaccine trials specifically, in one local South African community.

The key objectives of the current study were to assess (a) local or popular understandings of, and barriers to, vaccination; (b) culturally and traditionally based beliefs about, and metaphors for, vaccination, and their impact on vaccination practices; and (c) knowledge of potential HIV vaccines and participants' willingness to participate in HIV vaccine trials.

Procedure

A community-based organization in the area was approached to assist with entry into a semirural community situated in the province of Kwazulu-Natal. Field-workers from this organization assisted in arranging meetings with elected community representatives, where the research was described and permission was obtained to invite individual members of the community to participate in the research. A field-worker discussed the aims and requirements of the research with each potential volunteer for the study, including the wish to tape-record the interview. Written consent to participate was obtained from each participant on a form in isi-Zulu, the local language of the community, which was read out and explained where necessary. A field-worker then interviewed the participant using a semistructured interview schedule.¹ Interviews were later translated and transcribed into English in one step. Following completion of the study, feedback was provided to the community, and parcels of foodstuffs were donated to the community as an expression of gratitude for their participation.

Sample

The sampling procedure attempted to obtain a demographic profile comparable to samples likely to be recruited for HIV vaccine trials in similar communities. Participants were recruited using snowball sampling with the assistance of community committee

representatives. The final sample consisted of 41 people roughly stratified by age and gender, although male persons were underrepresented (34%) compared with female persons (66%). The community was visited on weekends as well as during the week to ensure that people in regular employment (especially men) were able to participate, but field-workers still had great difficulty increasing the number of older male participants. The majority of participants (80%) had completed at least part of a secondary (year 8-12) education, but 81% of the participants were unemployed. Eighty percent of the participants belonged to 1 of 17 religious groups in the area, whereas 20% of the sample claimed to have no religious affiliation.

Measures

Face-to-face interviews were conducted in isi-Zulu, the dominant indigenous language of the area, by a first-language isi-Zulu speaker. The interview schedule consisted of open-ended questions that probed participants' knowledge and personal experiences of vaccination; perceived barriers to, and concerns about, vaccination; perceived alternatives to vaccination; and their knowledge of, and attitudes to, HIV vaccines and vaccine trials. Where it was suspected that social-desirability pressures might come into play, participants were asked both about their own perceptions and what they thought *other* community members might say about the same topic.

Data Analysis

After initial translation and transcription, transcripts were checked and verified by an independent isi-Zulu-speaking researcher. At the start of the analysis, a full schedule of codes was developed through a careful reading of all transcripts, attempting to allow these codes to emerge as they occurred in the data corpus rather than imposing a framework on the participants' responses (Weber, 1985). The large number of emerging codes and themes were refined and reorganized to form a hierarchical coding schedule of 184 codes and subcodes.

A sample of interviews was independently coded by two raters using the coding schedule to check accuracy and consistency of coding. Discrepancies provided the opportunity for detailed discussion between coders to improve the reliability of coding. The remainder of the transcripts were then coded. All coding was carried out using QSR Software's Nudist NVIVO®.

Following this, a frequency count of codes was generated and cross-tabulated with age and gender. In cases where the same code appeared more than once in an individual participant's interview, it was recorded only once, as the study was primarily interested in how many of the interviews reflected a theme, rather than how often it occurred for each participant. Codes that were expected to systematically differ along demographic lines were selected for chi-square analysis (using the SPSS 11.0® statistical package). The use (and utility) of these chi-square tests in this study requires some explanation. Given the small sample size ($N = 41$) and the use of categories with up to five divisions (such as participants' age-group), the expected counts for many cells was low with a consequent loss of power and accuracy. Moreover, chi-square tests were run on 60 of the 184 codes, and the chance of having found a spurious chi-square association should be considered reasonably high. (Alpha was set at .05 and, all other things being equal, we should expect three significant results by chance alone.) It would therefore be unwise to extrapolate these results to other samples or populations. Given the small, nonrandom sample, statis-

tical generalization is not possible in any case and is not the intention of the study. Instead, the chi-square tests were performed to flag greater-than-expected partiality of demographic groupings of participants for certain responses. It must also be remembered that these caveats result in decreased power, and there is a chance that this study has failed to identify some weaker associations between demographic groupings and responses that may exist in the community. Some results have therefore been reported as “approaching significance” to alert future researchers to these potentially important associations.

RESULTS

Local or Popular Understandings, Perceptions, and Barriers to Vaccination

Perceptions of the Purpose and Mechanisms of Vaccination. Almost all participants (95%) stated that the purpose of vaccination was to promote health or prevent illness. The most common response (37%) was that vaccines make one’s body or immune system “strong” and able to fight diseases. Unusual responses included, “Vaccination cleans the blood” and “[a vaccine] goes through the bones, destroying viruses, but I can’t say exactly how.” No participants spelled out the exclusive relationship of specific vaccines to specific diseases, although the fact that many were able to name specific vaccine-preventable diseases in response to more specific questions suggests some implicit knowledge of the specific nature of vaccines.

With reference to information provided by health care workers (HCWs) to participants about vaccination, 69% of those who ventured an opinion expressed trust in the HCWs and the information they had provided. Although 31% of these participants did not explicitly say that they believed the information, none expressed open distrust. Male respondents were significantly more likely to be ignorant of information provided by HCWs about vaccination ($\chi^2 = 5.218$, $df = 1$, $p = .035$, $n = 41$), but those men who had heard of HCWs’ information were no less likely to believe it. Twelve percent of respondents added that personal experience of vaccination confirms medical advice.

Perceptions of Diseases That Are Vaccine Preventable. The most prominent diseases correctly identified as vaccine-preventable were influenza, measles, and polio, with no significant differentiation between male and female participants in responses ($\chi^2 = 1.111$, $df = 1$, $p = .292$, $n = 41$). Every participant correctly mentioned at least one common vaccine-preventable disease. The main diseases *incorrectly* identified as vaccine-preventable were malaria and those coded under the category “other” (including cancer, arthritis, and bilharzia). Regarding the incorrect reporting of vaccine-preventable diseases, there was a significant association by sex ($\chi^2 = 3.873$, $df = 1$, $p = .049$, $n = 41$), with 57% of male participants compared with 26% of female participants incorrectly naming diseases that are vaccine-preventable.

Whereas 5% of participants believed that HIV is currently vaccine-preventable, 68% of participants explicitly reported that there is no vaccine to prevent HIV. A significantly greater proportion of these participants ($\chi^2 = 4.557$, $df = 1$, $p = .033$, $n = 41$) were men (86%) than women (52%).

Perceptions of Vaccine Target Populations. The majority of participants (76%) reported that vaccination is indicated for people of all ages, although 34% said that it is

mainly for children. Most participants reported that vaccination is mainly for healthy people (46%), with almost as many reporting that it is useful for both the healthy and the sick (37%). A small group stated that vaccination is only for the sick (7%). It is worth noting that participants did not oppose receiving vaccination for themselves or for their children. In other words, no participants specifically said they avoided vaccination for any reasons, such as pain, inconvenience, or incompatibility with traditional practices or beliefs.

Actual and Preferred Sources of Information Regarding Vaccination. The most commonly reported sources of information about vaccination were clinics, hospitals, and schools, with 68% of participants mentioning one or more of these as their primary information sources. Only 20% of participants identified the media as a source of information on vaccines, and 10% identified other sources such as neighbors or community members. When participants were asked if there was anything they would like to know about vaccination, responses included queries about how vaccination works (25%), what vaccines are available (8%), and requests for information about HIV vaccines (18%). When asked how they would like to receive such information, many participants (34%) were not as concerned with the source of information as the credibility and knowledge of the information giver, saying that they would like to receive information from "anyone who is well-informed." A total of 27% of respondents suggested that medical personnel such as doctors, nurses, or clinics were preferred sources of information on vaccines and vaccination. Only 3 participants mentioned any form of mass media (in this case, radio) as an attractive source of information. The majority of respondents (68%) preferred face-to-face and personal information sources.

Safety, Side Effects, and Barriers to Vaccination. One of the aims of this study was to explore perceived safety, side effects, and barriers to vaccination, as part of identifying possible negative factors perceived to be associated with vaccination. As there is a considerable degree of overlap between these three aspects, the findings are shown in Figure 1.

The most common concern about vaccination identified by participants was lack of information about vaccines (27%). Most of the participants who identified a lack of information as a barrier to vaccination belonged to the 41-50 age-group, and this association approached significance ($\chi^2 = 7.606$, $df = 3$, $p = .055$, $n = 41$). Cultural and religious issues (22%) were also identified as potential barriers. However, participants did not go into any detail about incompatibilities between Western medicine and traditional practices. Instead, they spoke of such potential barriers as problems that other people may have, rather than expressing them as personal dilemmas. A prototypical example of how participants referred to cultural alternatives to vaccination is seen in the statement of one participant, "If a person believes in traditional medicines (*amakhambi esintu*), she is less likely to go for vaccination (*umgomo*) or have her children vaccinated (*ukugonywa*), because she believes that traditional medicines (*amakhambi esintu*) are better than Westernized medicines (*amakhambi asentshonalanga*)." Participants tended to speak of religious barriers as if they were more exclusive. For example, one participant said, "Some people do not believe in vaccination (*umgomo*); they believe in the use of 'holy water' (*isiwasho*) to protect them against diseases (*izifo*), and this can stop them from getting vaccinated (*ukugonywa*) or having their children vaccinated (*ukugonywa*)." Another participant reported that "they say they do not use medicine (*umuthi*) as they believe in Jesus."

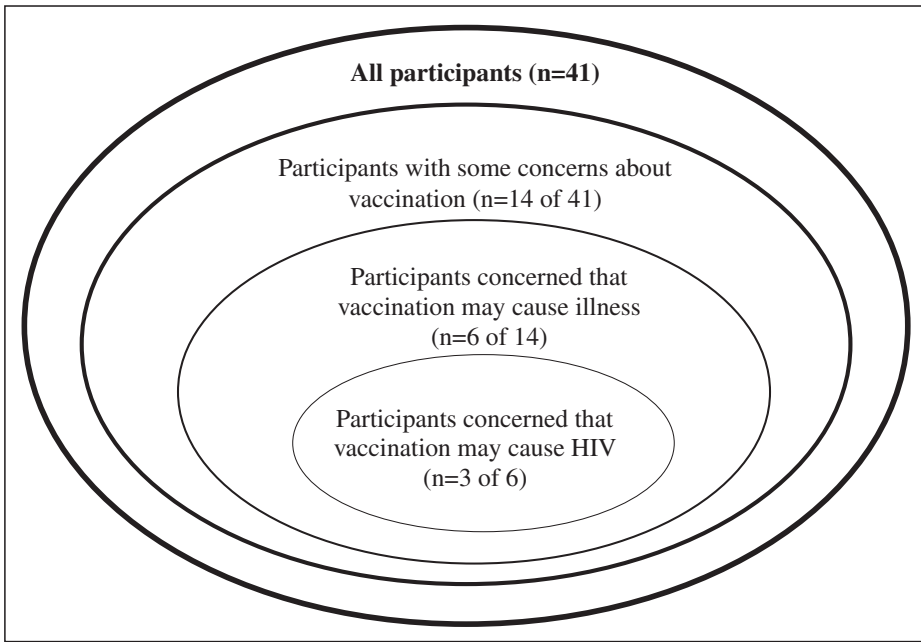


Figure 1. Venn diagram representing participants' concerns about vaccination.

The medical safety of vaccination was also identified and included the concern that HCWs may reuse needles (5%), the concern about the role of hospitals and clinics in disease transmission (5%), and the fear of pain involved in vaccination (5%). Other common barriers included personal factors such as laziness (15%); logistical factors (15%); and social concerns (5%), such as the fear of having private illnesses exposed. Far more women than men cited personal barriers to vaccination such as laziness, and this association approached significance ($\chi^2 = 3.644$, $df = 1$, $p = .056$, $n = 41$).

When asked whether they had heard of negative effects of vaccination, 34% of participants replied in the negative. Although 15% admitted to hearing of such negative effects, 12% of respondents said they did not believe them. A total of 37% reported that vaccines may have side effects of some kind, and many mentioned symptoms such as loss of appetite, nausea, temporary sickness, raised temperature, fatigue, pain, and swelling. When probed, none of these participants suggested that side effects signal problems with vaccines. On the contrary, 25% of these participants (i.e., 3 of 15) argued that side effects prove that the vaccines are having the desired effect. However, given that side effects (albeit very minor) are possible sequelae to vaccination, it is noteworthy that 63% of the participants were either unaware of vaccination side effects or did not mention them when questioned.

Alternatives to Vaccination. The dominant response (66%) from participants was that there is no traditional or cultural alternative to vaccination. The remaining 34% of respondents suggested diet and sanitation (15%), traditional alternatives such as "steaming" (the inhalation of herbal infusions) or "spuit" (a self-administered enema, 12%), and religious alternatives such as prayer (7%). Only 5% of the sample expressed the belief that these al-

ternatives are better than vaccination for disease prevention, whereas 17% argued that these alternatives are usually complementary to vaccination.

Knowledge and Perceptions of HIV Vaccines and Vaccine Trials, Perceived Willingness to Participate, and Barriers to Participation

Knowledge and Expectations of Potential HIV Vaccines. Although a total of 59% of participants had never heard of the possibility of an HIV vaccine, 34% said they were familiar with the concept. Once participants were informed of the efforts currently under way to develop such a vaccine, they were asked whether a potential vaccine would be aimed at prevention or treatment and whether it would be mainly aimed at HIV-positive or HIV-negative people. The participants' responses are recorded in Table 1. It is important to note that there was some degree of confusion between potential HIV vaccines and currently available antiretroviral therapies such as Nevirapine.

Stated Willingness to Participate in Potential HIV Vaccine Trials. When asked whether they would participate in HIV vaccine trials at all, 24% stated that they definitely would not participate, 40% said they would definitely be willing to participate, and 37% said they were unsure or that they would participate if certain conditions were met. These conditions included requests for more information (43% of the unsure or conditional responses), a guarantee that involvement would incur no significant risks (43% of the unsure or conditional responses), and a request that participants' dependents be cared for if the trial went awry (7% of the unsure or conditional responses). Two participants were simply unsure (14% of the unsure or conditional responses) and did not offer any suggestions as to what would sway them in either direction.

Although there were no significant associations of response by sex, there were significant associations by age. In particular, younger participants (belonging to the 14-20 and 21-30 age-groups) were more likely to be unsure about participation in HIV vaccine trials than older participants ($\chi^2 = 11.064$, $df = 3$, $p = .011$, $n = 38$). Although there were no significant associations between age and refusal to participate, the association between age and willingness to participate approached significance. More older participants were willing to participate without reservation compared with only one of the participants aged between 21 and 30 ($\chi^2 = 6.523$, $df = 3$, $p = .089$, $n = 38$).

When asked about motivations for participating in HIV vaccine trials and whether they would expect incentives for such participation, a substantial proportion of participants (44%) expressed an altruistic desire to reduce the impact of HIV/AIDS and to help communities and individuals who are suffering as a result of the pandemic. These participants expressed the notion that an altruistic sense of helping the community would be sufficient reward. Although 17% of participants suggested material incentives (especially jobs and housing) as an incentive to participate, none insisted that these would be a firm prerequisite for participation. There were no significant associations between incentives or motivation for HIV vaccine trial participation and age or gender.

Perceived Barriers to Trial Participation. In the current study, only 44% of participants offered any response to the question of possible barriers to participation in HIV vaccine trials. Specifically, of these, 61% ($n = 11$) mentioned fear of physical risk or illness, 39% ($n = 7$) identified the fear of discovering their own HIV status, 11% ($n = 2$) identified the fear of injections, and 6% ($n = 1$) mentioned potential social risks such as stigmatization.

Table 1. Perceived Purpose of Potential HIV Vaccine

Purpose of Potential HIV Vaccine	<i>N</i>	%
Never heard of HIV vaccine	20	48
Have heard of HIV vaccine	14	34
Possible confusion between potential HIV vaccines and antiretroviral therapies	9	22
HIV vaccine would be for prevention	19	46
HIV vaccine would be for treatment	17	41
HIV vaccine would be for both prevention and treatment	8	20
HIV vaccine would be mainly for people who are HIV-	14	34
Mainly for people who are HIV+	19	46
Both people who are HIV- and HIV+ (this includes people who responded to both of the above categories)	13	32

Suspicious of Conspiracy. Ten percent of participants ($n = 4$) noted at different points in their interviews that the prevalence of HIV/AIDS in South Africa is much higher among Blacks than among Whites. Two of these participants expressed doubt about vaccination, suggesting that vaccination procedures may infect Blacks with HIV/AIDS. Another participant expressed concern that HIV vaccine research may be an attempt to infect larger numbers of Blacks with HIV/AIDS (and thus eliminate them) in an attempt by Whites to gain a political majority.

DISCUSSION

This exploratory study set out to investigate knowledge, beliefs, attitudes, and experiences of vaccination, as part of the process of preparation for HIV vaccine trials in South Africa. The following discussion will address each of the key objectives of the study.

Local or Popular Understandings, Perceptions, and Barriers to Vaccination

Although the finding that participants generally have a good knowledge of, and positive attitudes to, vaccination confirms the findings of previous studies (McGrath et al., 2001; Pruitt & Kline, 1995), it is worth noting that few participants could identify many vaccine-preventable diseases. In addition, a significant proportion of male respondents incorrectly named particular diseases as vaccine-preventable for which there are at present no vaccines. The mention of malaria as a vaccine-preventable disease may be a function of public knowledge of malaria-vaccine trials in Africa but might also arise from a misunderstanding of malaria prophylaxis as a form of vaccination. The small portion of participants who reported that HIV/AIDS is a vaccine-preventable disease may either believe this to be the case or may have made this link as a result of the awareness that the field-worker was part of an HIV-vaccine research project, so activating social desirability processes.

However, the findings do suggest the possibility that participants are not necessarily aware of the disease-specific nature of vaccines, with a possible belief in the general immune-boosting properties of any vaccine apparently leading to increased protection against all diseases. If this is indeed a widespread belief, then it is likely to have two seri-

ous implications or risks. First, any vaccination would be expected to protect against any disease, so it might not be seen as necessary to have a full range of specific vaccinations, including HIV, if and when such becomes available. Second, the occurrence of any illness in people who have been vaccinated (for anything) might be seen as evidence of the inefficacy and pointlessness of any vaccination. Colloquial isi-Zulu has a less formal taxonomy of diseases than English speakers are used to, and a symptom of a disease is often used as a readily understandable disease name. For example, the isi-Zulu words *ukuqubuka* and *utwayi* can refer to a rash or to any disease that has symptoms of a rash, including measles, German measles, or smallpox. The apparent vagueness of participants' knowledge of the disease-specific nature of vaccines may be related to the nature of the medical terminology available in colloquial isi-Zulu.

There was also a small minority of participants who had the belief that vaccines are only intended for sick people. Although this would be consistent with the action of therapeutic vaccines, it is not likely that this belief reflects such sophisticated knowledge. Therefore, there was some evidence of confusion of the preventive versus therapeutic use of vaccines.

Most participants trusted the vaccine-related information provided by HCWs. Although male participants were significantly more likely to be ignorant of the details of information provided by HCWs, they were no less likely to believe them. This, taken alongside the finding that significantly more male participants incorrectly report nonimmunizable diseases as vaccine-preventable, suggests that men are less knowledgeable about vaccination than their female counterparts. Although the reason for these reported gender differences were not explored, they could well be due to the fact that women are more involved in, and carry more responsibility for, the vaccination of children and therefore have more access to reliable information about vaccination.

The findings of a generally positive and trusting attitude to vaccination and HCW information about vaccination are reassuring and seem to disconfirm Nichter's (1995) findings of deep suspicion and mistrust of vaccination in his Indian study. However, the findings do provide some grounds for concern. First, a portion of the sample did not specifically express trust or belief in vaccination and its efficacy. As the interviews used an open-ended format, participants were not specifically asked about the trustworthiness of vaccines and vaccine-related information; rather, there was a reliance on spontaneous report. Although this format had the advantage of accessing spontaneous views of participants, it does make it difficult to arrive at a precise interpretation of the findings. There is also the possibility that social desirability processes prevented participants from explicitly expressing other negative views, especially given their awareness that the interviewer was associated with an HIV vaccine trial program. Second, a couple of participants articulated decidedly suspicious views about vaccination and about HIV/AIDS vaccines in particular.

One of the interesting findings concerns the importance of personal contact as a source of credibility regarding vaccine-related information. This finding suggests that information delivery through clinics, hospitals, schools, or trained members of local committees is preferable to the logistically simpler dissemination of knowledge through public media campaigns.

A large portion of the sample reported having heard of possible barriers to, or side effects of, vaccination, but these were generally framed as "reported" rather than reflecting their personal attitudes or experiences. Again, this phenomenon may be a function of social desirability, with participants hesitant to acknowledge that these were their personal beliefs. The findings regarding concerns about safety, personal, and logistical fac-

tors are consistent with the findings of previous studies in other countries (MacQueen, 1998; McGrath et al., 2001). The fear of HCWs reusing needles during vaccination is an important finding, even though only mentioned by a small portion of participants. Although this may well be a reflection of common practices among traditional practitioners, it also fits the recent claims that repeated use of syringes and surgical instruments might be important vectors of HIV transmission in Africa (McMurray, 2003; Woodman, 2003). The fear that vaccines may cause illness may either be a reflection of the common misconception that vaccination may cause the very disease it is designed to prevent, or it may be an expression of the deep suspicion that vaccination (HIV in particular) is part of a campaign of conspiracy.

Culturally and Traditionally Based Attitudes, Metaphors, and Beliefs Surrounding Vaccination, and Impact on Attitudes to Vaccination

One of the aims of the study was to assess culturally based beliefs and attitudes to vaccines and vaccination, and to identify local metaphors of vaccination that might be useful in HIV vaccine preparation programs. The strongly positive findings regarding attitudes to, and experiences of, vaccines reported above, together with the finding that the majority of the sample reported that there were no real culturally based alternatives to vaccination, suggest that acceptance of vaccination is not severely undermined by traditional cultural beliefs. In addition, the point made by some participants that traditional alternatives are complementary to vaccination further strengthens this conclusion (cf. Eng et al., 1991).

The fact that none of the participants suggested that vaccines would directly interfere with traditional, spiritual, or religious beliefs and interventions or vice versa is an extremely positive finding in the light of previous research. A study conducted by Odebiyi and Ekong (1982) found that traditional or religious beliefs were a considerable source of tension with respect to vaccination uptake. The findings from the present study can be seen as extremely positive for people commencing HIV vaccine trial preparations in communities such as these, particularly given that there has been no vaccination trial preparation at all in the community from which this sample is drawn.

As positive as the findings were, they were disappointing in that all descriptions of vaccination were variations on the theme of vaccination as protection through enhancing immune functioning. The findings revealed no unique metaphors for the understanding of vaccines, which might have been useful in HIV vaccine trial preparation. However, even though these findings did not satisfy this particular goal of the study, they nevertheless raise the hope that similar South African communities may have fairly sound understandings of vaccination on which future education campaigns may build. On the other hand, the findings could be seen as further evidence for the argument reported by Nichter (1995) regarding the hegemony of Western biomedical science vis-à-vis traditional cultural views of health and illness, even in semirural communities.

Knowledge About Potential HIV Vaccines and Attitudes to Participation in HIV Vaccine Trials

The largest portion of the sample had never heard of an HIV vaccine or its development, although a small portion of participants claimed that there was already a preventive HIV vaccine available. The clearest finding in this regard was that a fairly large propor-

tion of the participants appeared to confuse antiretrovirals, such as Neviraprine, and potential HIV vaccines. Because the consequences of this confusion could complicate vaccine trials, there is a clear need for education campaigns to address this area.

As discussed previously, a small minority of participants reported that routine vaccination is therapeutic. However, when asked about HIV vaccines, slightly more participants thought that an HIV vaccine would be therapeutic in nature than those who thought it would be preventive, a finding parallel to that of McGrath et al. (2001). In line with this finding, the proportion of the sample who thought that HIV vaccines were mainly for HIV-infected people was considerably higher than those who thought that they were for HIV-uninfected people. This may be further evidence for the confusion of vaccines and antiretroviral therapies.

The findings provide evidence of decided suspicions about the origins and nature of HIV and the possible role of vaccination (especially HIV vaccination) in infecting Blacks with HIV for political reasons. Although this reflects only a small portion of the total sample, it is possible that other participants suppressed such views in the knowledge that the interviewer was associated with an HIV vaccine trial program. In a related vein, some participants mentioned the fear that vaccination procedures might inadvertently reveal personal illness. Given the extent of stigma surrounding HIV, this may represent a real barrier to HIV vaccine trial participation. Although the present study cannot estimate the prevalence of such beliefs, they should be given serious attention in HIV vaccine trial preparation and education.

Although participants did not have extensive knowledge about current efforts to develop an effective HIV vaccine, a smaller portion stated that they definitely would not participate in vaccine trials compared with those who stated that they would. The proportion willing to participate compares favorably with the findings of other South African studies reported above (Frohlich et al., 2003). It is a striking finding that older members of the sample expressed more willingness to participate in HIV vaccine trials and that younger participants (particularly in the 21-30 age-group) were more likely to be unsure, although the reasons for this are not apparent. The stated motivation of participants for possible involvement in such HIV vaccine trials is strikingly similar between U.S., Thai, and African settings. In each case, altruism and the opportunity for reducing one's personal risk for HIV infection have been reported as reasons for participation in vaccine trials (Odebiyi & Ekong, 1982). Results from the current study indicate a high altruism level, which is good news for the field of HIV vaccine research in South Africa, although, again, social desirability may have inflated the frequency of altruistic responses. The findings regarding requests for material incentives for trial participants in the form of housing or employment are also no surprise in a community with very limited material resources and are consistent with the findings of a parallel study by the authors that resource-poor communities are inclined to view clinical trial participation in terms of bartering for resources.

Limitations of the Study and Implications for Further Research and for HIV Vaccine Trials

The present study was conducted on a very limited nonrandom sample in a semirural community of KwaZulu-Natal in South Africa, which makes generalization of findings very difficult. Furthermore, the interviews aimed to explore diversity of opinion in an open-ended manner. This approach necessarily demands more flexibility in interviews, coding, and analysis than would be the case if forced-choice questions were used and, at

times, it complicated interpretation of the findings. For example, where participants did not spontaneously report something like the efficacy of vaccines, it was difficult to know whether this meant that they did not regard vaccines as effective or whether they simply forgot to mention this. In addition, there was the distinct possibility of social desirability influencing some of the findings, especially as participants were aware that researchers were part of an HIV vaccine project. As such, the findings of this study should be compared to similar studies currently being carried out in different South African communities to assess the generalizability of specific findings.

IMPLICATIONS FOR PRACTITIONERS

This study highlights the fact that medical taxonomies and terminology do not necessarily translate directly or exclusively between languages. Given the exclusive and specific relationship between diseases and their vaccines, researchers and educators would be well-advised to find ways of ensuring that the language and idioms used to describe these relationships are precise enough to avoid misunderstandings about the specific nature of vaccination. At times, this may mean developing new ways of describing diseases and vaccination procedures. In South Africa, with 11 official languages, this is a particularly challenging recommendation.

It was interesting to note that the participants of this study reported being comfortable with accessing Western biomedical treatments in parallel with religious and traditional alternatives. It is important to ensure that the language and idiom employed in vaccine education is compatible with this type of informal dualism, rather than creating unnecessary polarizations between Western medicine and religious and traditional belief systems.

The findings show some deficits in knowledge or confusions about vaccination that would be important for health educators to bear in mind, for example, ignorance that vaccines are disease-specific, with the implicit assumptions that all vaccines generally enhance immune functioning; the differences between antiretrovirals and potential HIV vaccines; and the differences between preventive and therapeutic vaccines. The findings also raise important questions about whether the most appropriate media for vaccine education is mass media or personal contact, especially as the present findings reveal the greater credibility of personal contact.

The present study reveals the potential impact of the social context and consequences of HIV infection on vaccination practices, including participation in HIV vaccine trials. The findings regarding anxiety about having private illness publicly exposed during vaccination procedures, together with potential suspicions of conspiracy about deliberate HIV infection through vaccination, suggest that these might be important barriers to participation in HIV vaccine trials. These findings are especially important for health educators or primary HCWs working in areas with high HIV rates.

CONCLUSIONS

This study was part of a broad national project in South Africa to prepare for the implementation of HIV-preventive vaccine trials. On the basis of the assumption that vaccines and vaccination are a routine part of the life experience of most people in South Africa, this study sought to explore attitudes to, and experiences of, vaccination, as well as the

impact of cultural and traditional beliefs on attitudes to, and use of, vaccination. This knowledge was seen as providing a potentially useful basis to undertake further community education for HIV-preventive vaccine trials. Although the nature of the sample prevents generalization to the population, the findings have provided useful information for vaccine education campaigns. Overall, the findings provide evidence for optimism in this endeavor. The findings relating to the influence of cultural and traditional understanding were disappointing as they yielded little specific information, but overall, they suggest that culture and tradition are not likely to complicate the introduction of HIV vaccine trials. The findings regarding HIV vaccine trials were largely positive, revealing a surprising level of willingness to participate in such trials. The findings provide important and useful, but not altogether surprising, clues to possible barriers to HIV vaccine trial participation. Finally, the findings from a small portion of the participants are also a sobering reminder of the extent to which the HIV pandemic, and the attempt to remedy it, has been influenced and complicated by historical and political processes.

Note

1. Available on request from the authors.

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