

The effects of psychological inoculation on cognitive barriers against condom use in women with HIV: A controlled pilot study

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Abstract

Past studies have shown that in attempts to prevent HIV, health education yields little change in condom use. The reason may be that education fails to target barriers for changing behaviour. The present controlled pilot study tested whether psychological inoculation (PI) reduces such barriers for using male condoms. Twenty-two Nigerian women with HIV were randomly assigned to receive PI or health education (control). In the PI condition, women learned to refute sentences reflecting barriers against condom use, while controls learned how to use condoms and the consequences of their non-use. Barriers for condom use, self-efficacy to negotiate condom use with partners and actual condom use were self-reported before and one week after interventions. Results revealed that only in the PI group were there statistically significant increases in condom use negotiating self-efficacy and reductions in barriers concerning motivation, sexual satisfaction and partners. Controls reported no statistically significant changes. However, actual reported condom use was unchanged in both groups. Thus, it is feasible to conduct PI interventions in an African sample of HIV patients. Furthermore, PI can reduce cognitive barriers for condom use, while health education yields little changes in such outcomes over time. If replicated in larger samples with longer follow-ups, these findings could eventually have implications for HIV prevention in several world regions.

Keywords: Psychological inoculation, condom use, HIV prevention, barriers, Africa.

Résumé

Des études antérieures ont montré que dans les tentatives pour prévenir le VIH, les efforts d'éducation sanitaire modifiaient peu la fréquence d'utilisation d'un préservatif. C'est peut-être parce que l'éducation ne parvient pas à cibler les obstacles liés au changement de comportement. La présente étude pilote contrôlée a tenté de savoir si l'inoculation psychologique (IP) réduit ou non ces obstacles dans l'utilisation de préservatifs masculins. Vingt-deux femmes nigérianes contaminées par le VIH ont été désignées pour recevoir au hasard un PI ou une éducation sanitaire (témoin). Dans le cas du PI, les femmes ont appris à réfuter des phrases reflétant des barrières contre l'utilisation du préservatif, alors que les témoins ont appris à utiliser des préservatifs et les conséquences de leur non-utilisation. Les obstacles pour l'utilisation du préservatif, le sentiment d'efficacité personnelle à négocier l'utilisation du préservatif avec des partenaires et le réel taux d'utilisation du préservatif ont été auto-déclarés avant et une semaine après les interventions. Les résultats ont révélé que c'est seulement dans le groupe d'IP qu'il y avait eu des augmentations statistiquement significatives dans le sentiment d'efficacité personnelle à négocier l'utilisation du préservatif, et dans la réductions des obstacles concernant la motivation, la satisfaction sexuelle et les partenaires. Les témoins n'ont signalé aucun changement statistiquement significatif. Toutefois, le taux réel d'utilisation du préservatif est resté inchangé dans les deux groupes. Ainsi, il est possible de mener des interventions d'IP dans un échantillon de patients atteints du VIH et originaires d'Afrique. En outre, l'IP peut réduire les obstacles cognitifs pour l'utilisation du préservatif, alors que les efforts de politique sanitaire n'apportent guère de changement au cours du temps dans les résultats. Si les conclusions de cette étude pilote sont les mêmes avec de plus grands échantillons avec davantage de suivis, elles pourraient éventuellement avoir des implications pour la prévention du VIH dans plusieurs régions du monde.

Mots clés: Inoculation psychologique, utilisation du préservatif, VIH, obstacles, Afrique.

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Introduction

Human immunodeficiency virus (HIV) and its clinical manifestation of acquired immune deficiency syndrome (AIDS) is a major cause of death worldwide. Currently, 33 million people are living with HIV/AIDS globally, of whom 67% live in Africa alone (UNAIDS, 2008a). While there have been tremendous advances in the understanding of the biology and treatment of HIV/AIDS, the main cause of its spread in developing countries is unsafe sexual behaviour (Beorma, Gregson, Nyamukapa & Urassa, 2003). The latter includes multiple factors such as early debut of sexual relations, multiple partners and premarital sex. However, a leading underlying cause is non-use of condoms (Schmid et al., 2004). Furthermore, condoms, when used consistently, were found to reduce the incidence of HIV by 80% (Weller & Davis, 2001), a testimony of the importance of condoms for global public health. Current estimates suggest that more women than men are now infected by HIV in sub-Saharan Africa (Halliman, 2004; UNAIDS, 2008b). However, given that in many African societies women's social status is lower than men's (Obbe, 1980), there is urgency to develop ways to increase women's self-efficacy to practise safe sex, especially among sexually active African women.

A focus on women in Nigeria is particularly important given their increasing infection rates, and since they particularly may be negatively affected by the stigma and discriminated against due to being HIV positive. Furthermore, Nigerian women with HIV deserve special attention since they are likely to die prematurely of AIDS, and since they carry a major part of the burden of caregiving for other members of the family who may also have been infected with the disease (Olley, Ephraim-Oluwanuga, Lasebikan & Gureje, 2006).

Most current intervention approaches for increasing safe sexual behaviour for HIV prevention include education and increasing awareness for the consequences of unsafe sex. However, awareness alone often does not change routine behaviours (Gidron & Hochberg, 2005). Furthermore, the effectiveness of such educational interventions in altering people's actual condom use has been very limited (Van Rossen & Meekers, 2007). A meta-analysis of 11 studies on educational interventions in schools, in which only three included condom use as an outcome, concluded that no educational intervention increased condom use (Gallant & Matika-Tyndale, 2004). Additionally, the cultural attitudes to condom use and to women, the economic constraints and political complexities call for an 'African brand' of HIV prevention, which takes into account such complexities (Govender, 2005; Nyamwaya, 2003), to effectively empower African women.

Studies in other health domains such as diabetes have shown that interventions based on psychological models of health behaviour are more effective than non-theoretically based interventions (Hampson *et al.*, 2000). Of greater importance, most educational interventions in health domains in general and in HIV prevention specifically fail to address and change people's *cognitive barriers* for behaviour change. In studies adopting the Health Belief Model, the most important predictor of condom use was perceived barriers for change (Volk & Koopman, 2001; Winfield & Whaley,

2002), pointing at the potential importance of addressing barriers for increasing condom use. Multiple cognitive and social barriers for condom use have been identified including reduced sexual pleasure, trust in (or from) one's partner and fear of male partner's refusal (Bedimo, Bennet, Kissinger, & Clark, 1998; Nuwaha, Faxelid & Höjer, 1999). However, the existing literature cannot really fully separate the effects of psychosocial interventions versus health education as the former usually include some forms of health education as well. Nevertheless, adding psychological aspects (e.g. teaching to alter barriers) to health education interventions may possibly enhance their effects.

One type of cognitive intervention that specifically aims to challenge and alter people's cognitive and social barriers for adopting healthy behaviours is psychological inoculation (PI). PI was first introduced by McGuire (1961), who claimed that people who lack the capacity to refute social challenges will succumb to social messages encouraging them to adopt non-adaptive behaviours. In the PI intervention, people are exposed to challenging sentences which reflect reasons or barriers for not adopting a healthy behaviour (the 'vaccine'). These barriers can stem from social or internal sources. They are then expected to systematically refute the sentences (reflecting an 'antibody' response), while receiving feedback on their performance. PI may be mapped on the 'social norms' and 'self-efficacy' components of cognitive models such as the Theory of Planned Behaviour. Furthermore, PI is very similar to elements from cognitive therapy or rationale emotive behaviour therapy (Sacks, 2004), including the 'devil advocate' technique and cognitive restructuring. Similar to those therapies, PI assumes that cognitions play a key role in human behaviour. However, PI emphasises that social pressures are the main source of such cognitions, and that people succumb to them since they do not have the ability ('antibodies') to refute such pressures. Finally, unlike typical cognitive therapies, PI specifically focuses on beliefs which underlie daily behaviours (e.g. smoking, physical activity), as is applied mainly to mentally 'normal' individuals, not to psychopathology.

To date, most studies testing the effects of PI involved adolescents. In a review of studies, PI was found in most studies to be better than health education (used as a control group) in preventing smoking, joining a drunk driver and other adverse outcomes (Duryea, Ransom & English, 1990). While health education can be conceptualised as a partial 'inoculation' as well because it exposes people to knowledge and skills related to healthy behaviour, it usually does not train people to systematically reject or refute challenges against adopting healthier behaviours. PI precisely does that. However, to the best of our knowledge, the effects of PI were never systematically tested in the context of HIV and condom use. Furthermore, barriers to condom use are often cultural (Sunmola, 2001), hence they require a specific study in each culture, e.g. in the Nigerian context. The purpose of this preliminary study was therefore to test the effects of PI versus health education (control) on cognitive barriers and self-efficacy to negotiate about condoms and on self-reported condom use. We hypothesised that PI will have stronger effects in altering these three outcomes than health education.

Methods

Participants

Twenty-two women diagnosed and treated for HIV at the Ogbera Oloba/Gbaremu Ona-Ara local government primary health care clinic in Ibadan, South West Nigeria, voluntarily took part in this study. To participate in the study women had to be 18 years or older, to be HIV positive, to understand English or Yoruba and to be capable of completing the questionnaires and consent forms alone. Those judged by the primary care team (local health care professionals and counsellors) as mentally stable and cognitively capable of participating in the study, took part. This sample size met our pre-study sample size calculations, where we anticipated an increase of 15 - 20% on the condom negotiation self-efficacy scale (see below) in the PI group, a statistical power of 0.80 and a statistical significance of $p < 0.05$.

Participants taking part in regular group meetings were approached and were provided information sheets and consent forms. Explanations were provided both in English and in Yoruba. All women provided informed consent and the study was approved by the ethics committee of the School of Health Sciences and Social Care at Brunel University, UK, and by the Local Action Committee for AIDS in Ona-Ara local government, Nigeria.

Measures

Background information was obtained from women, and included their age, marital status, attained education level and religion. The outcome measures included two valid questionnaires and one simple direct question. The first measure was the condom negotiation self-efficacy (CNSE) (Crosby *et al.*, 2003) scale. This scale includes four items (e.g. Do you feel confident in your ability to persuade partners to use condoms?), each rated on a 5-point scale (0=strongly disagree, 4=strongly agree). In the present study, the internal reliability of the CNSE scale was adequate (Cronbach's $\alpha = 0.81$).

The second measure was the condom barriers scale (CBS) (St. Lawrence, Chapdeleine, Devieux & Bannon, 1999). The CBS includes 28 items, each rated on a five-point scale (0=strongly disagree, 4=strongly agree). It includes four subscales: Access-related barriers (e.g. 'Condoms cost too much'), motivational barriers (e.g. 'When I use a condom, I feel less worried'; reverse coded), partner barriers (e.g. 'If I suggested my partner use a condom, he will think I am accusing him of cheating') and sexual satisfaction barriers (e.g. 'Condoms change the climax or orgasm'). In the present study the internal reliability of the entire scale was high (Cronbach's $\alpha = 0.94$). These two scales were not previously validated in African samples but were tested in black American women. Finally, we directly asked women how often they used a condom during the past week (0=rarely/never; 1=sometimes; 2=always).

Interventions

PI was provided individually and followed similar protocols as described by Duryea *et al.* (1990), with slight modifications. First, we developed challenging sentences for the first session, based on empirically-derived barriers and predictors of condom non-use from the scientific literature (e.g. 'You can never get to climax with condoms'; 'He is always angry with you every time you ask him to

use a condom'; Mufune, 2005; Plummer *et al.*, 2006). Women were provided each sentence, and asked to refute it. If they could not refute it, the sentence was slightly exaggerated, to be more absurd, to make it easier to refute. Women received feedback on their refutations from the researcher. At the end of the first session women were asked to provide their own barriers for condom use. The second and last session then included challenging sentences based on individually tailored barriers. In the first session, women received 12 standardised challenging sentences, and in the second session, women received between five and eight challenging sentences, depending on their individual number of identified barriers.

Controls were provided safe sex health education in a group format during two meetings. These included discussing the risks of unprotected sex, the benefits of using condoms, and how to use condoms. In previous studies testing the PI method, health education was also used as a comparison group or control group (Duryea *et al.*, 1990), controlling for attention, expecting benefit and number of meetings. Each PI and control session lasted approximately 20 minutes.

Design

This study used a quasi-experimental randomised controlled design, where women were randomly assigned to the PI or health education control group, using random numbers. The independent variables were group (PI, control; a between-subjects variable) and time (pre-, post-treatment measures; a within-subjects variable), while the dependent variables (outcomes) included condom use barriers, ability to negotiate with one's partner about condom use, and the direct question concerning frequency of using condoms. However, by mistake, two of the participants were not randomly allocated to each group (hence the term quasi-experimental randomised controlled trial), yet the pattern of results remained similar with or without their inclusion. Since this was a preliminary trial, and in order to increase our statistical power, we report here the results *with* the data of those two participants.

Procedure

As mentioned above, women thought to be cognitively suitable for the present study were recruited from the local government primary health care clinic in Ibadan. After receiving an explanation, women first provided their written informed consent. They then completed the assessments for background data and for baseline measures (condom use, barriers). These measures were administered to the sample one week following the second intervention session, to test for changes over time due to exposure to the PI or health education control group. The same researcher administered the questionnaires and interventions to women. Some women had to have the questionnaires read to them, due to literacy problems.

Statistical analysis

We first established group equivalence at baseline, by comparing groups on baseline variables using *t*-tests for continuous variables and chi-square tests for categorical variables. We then used paired *t*-tests to examine change over time in each group separately on all three outcomes. This was repeated with non-parametric tests for dependent samples (in each group separately), to verify the robustness of our findings.

Results

Equality of groups at baseline

Table 1 depicts the background variables of participants in each group separately. No statistically significant differences were found between groups on age, education, religion or marital status (all p s > 0.05). Table 2 depicts the means (SD) of women in each group in relation to the three outcome variables, at baseline and post intervention. At baseline, there were no significant differences between groups on condom negotiation self-efficacy scores, total condom barriers scores or on actual reported use of condoms (all p s > 0.05).

Effects of group on condom use negotiating self-efficacy

Among controls, total self-efficacy for negotiating condom use tended to significantly increase with time from pre to post treatment ($t(19)=2.01, p=0.075$). In contrast, in the PI group there were statistically significant increases in reported self-efficacy for negotiating condom use ($t(10)=2.47, p=0.033$).

Effects of group on condom use barriers

Among controls, scores on satisfaction barriers tended to significantly decrease from pre to post intervention ($t(9)=2.23$,

Table 1. Baseline characteristics of health education (control) and psychological inoculation (experimental) groups of Nigerian women with HIV

Variable	Health education		PI	
	Mean	SD	Mean	SD
Age	29.1	3.9	27.0	4.7
Education (%)				
No formal	20.0%		9.1%	
Primary	40.0%		54.5%	
Secondary	30.0%		36.4%	
Tertiary	10.0%		0.0%	
Religion (%)				
Christian	20.0%		18.2%	
Muslim	80.0%		81.8%	
Marital status (%)				
Married	20.0%		18.2%	
Single	80%		81.8%	

PI = psychological inoculation.

Table 2. Baseline and post-intervention scores of health education (control) and psychological inoculation (experimental) groups of Nigerian women with HIV on outcome variables

Variable	Health education		PI	
	Mean	SD	Mean	SD
Pre-self-efficacy	7.1	4.5	7.4	4.5
Post-self-efficacy	8.2 [!]	4.9	9.9 [*]	3.4
Pre-barriers - motivation	10.6	6.6	8.4	3.7
Post-barriers - motivation	10.2	6.6	6.6 [*]	3.2
Pre-barriers - partner	23.6	11.7	21.9	11.8
Post-barriers - partner	17.8	11.9	13.7 ^{**}	8.3
Pre-barriers - satisfaction	9.1	6.5	11.7	4.9
Post-barriers - satisfaction	8.3 [!]	6.8	7.1 ^{**}	4.5
Pre-barriers - access	8.5	5.3	7.2	3.5
Post-barriers - access	7.8	5.4	5.7 [!]	2.8
Pre-condom use (%)				
Rarely	20.0		9.1	
Sometimes	70.0		72.7	
Always	10.0		18.2	
Post-condom use (%)				
Rarely	10.0		0.0	
Sometimes	90.0		72.8	
Always	0.0		27.2	

PI = psychological inoculation; [!] = $p < 0.10$ from pre to post intervention; ^{*} < 0.05 from pre- to post-intervention; ^{**} $p < 0.01$ from pre- to post-intervention.

$p=0.053$). No other trends or significant changes were found in controls. In contrast, there were statistically significant reductions in the PI group in barriers for motivation ($t(10)=2.25, p=0.048$), in barriers for negotiating with partners ($t(10)=3.26, p=0.009$), in satisfaction barriers ($t(10)=3.54, p=0.005$) and a tendency for reduced barriers concerning access ($t(10)=1.93, p=0.083$). These results were corroborated with very similar results using paired non-parametric statistics (Wilcoxon signed ranks test; data not shown). Fig. 1 depicts the changes in the perceived barriers concerning sexual satisfaction and partners for each group.

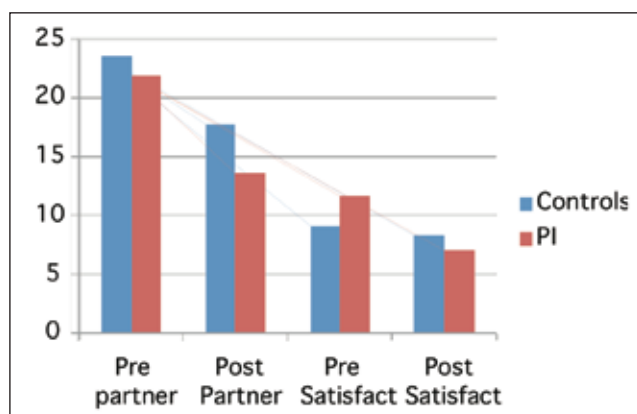


Fig. 1. Changes in psychological inoculation (PI) versus health education (controls) on scores of condom use barriers concerning partner and sexual satisfaction.

Effects of group on actual condom use

Finally, concerning actual condom use, there were no significant differences post intervention in percentages of participants using condoms between PI and control groups ($p>0.05$). When combining patients using condoms never and sometimes versus always, a nearly significantly higher percentage of PI patients (27.3%) reported using condoms always than controls (0%; $\chi^2(1)=3.18, p=0.074$). Thus, as shown in Table 2, though not statistically significantly different, the pattern is in line with a seemingly better performance for the PI group.

Discussion

This feasibility study aimed to preliminarily test the effects of PI versus health education in reducing barriers for condom use. To the best of our knowledge, this is the first systematic investigation of this issue in HIV+ patients, especially in an African sample. Though based on a small sample and on short-term outcomes, our results reveal that only in the PI group were there statistically significant increases in condom use negotiation self-efficacy and reductions in several cognitive/social barriers concerning condom use. Finally, a higher percentage of PI patients tended to report always using condoms, than controls, though this did not reach statistical significance. In contrast, controls who received health education did not report statistically significant changes, though they also tended to slightly improve. However, no changes were seen in actual reporting of condom use in either group. Our findings support those of previous reviews suggesting that health education alone yields minor changes in condom use (Gallant & Matika-Tyndale, 2004) and that it does not address barriers for condom use (Sunmola, 2001). In contrast, PI, an intervention that specifically targets barriers for behaviour

change, yielded important reductions in condom use barriers and tended to increase condom use.

The lack of changes in reported actual condom use in both groups could have been expected since the sample was small and the time from the intervention to reassessment was only one week though PI patients showed a trend in the positive direction. In addition, the sample included HIV women on treatment, who though were sexually active, may restrict sexual activities; thus, one would not expect to find such effects on this outcome in this short period of time. A longer follow-up may be required to enable PI participants to enact their altered cognitive barriers on this actual behaviour, namely condom use. Thus, future studies need to test the effects of PI on actual condom use in a larger sample with a longer follow-up.

The changes observed in the PI group in condom use negotiation self-efficacy are of potential importance since condom use self-efficacy was found to predict condom use and sexual behaviour (Sieving *et al.*, 1997). Furthermore, self-efficacy is often considered the most important predictor of behaviour change in social cognitive models (AbuSabha & Achterberg, 1997). The changes observed in the PI group in reducing barriers for sexual satisfaction and especially in reducing barriers for talking with one's partner are potentially of tremendous importance, particularly in African societies. The entire topic of communicating and asking one's partner to use a condom has been reported to elicit fears of anger and questions of trust on behalf of the partner in African samples (Bedimo *et al.*, 1998; Nuwaha *et al.*, 1999). Thus, to the extent that our findings are replicated in future, they may demonstrate a potential manner for inducing some changes in the complex interpersonal and social issues concerning condom use in certain parts of African culture. On the other hand, one must keep in mind the possibility that such a 'new role' on behalf of women (i.e. being more assertive concerning condom use) could elicit negative reactions (e.g. aggression) by some male partners in these societies. These issues require full attention in future studies.

This study included several limitations such as its small and selective sample and lack of follow-up. Furthermore, while the PI group received their intervention individually, controls received their sessions in a group format. Hence we cannot rule out the effects of extra individual attention provided to each PI participant, beyond the effects of PI alone, on the observed results. However, it may also be argued that controls may have received greater social support, having been treated in a group. Given the trends nevertheless observed in the control group, future studies need to test the effects of *combining* health education with PI on condom use. Finally, the same researcher administered the interventions and assessments, and was thus not blind to group status. Future studies must also test whether PI can increase actual condom use in larger and less selected samples of HIV patients and in people at risk for developing HIV, as a preventive measure. If successful, studies should also test the ultimate outcome, i.e. whether PI can possibly reduce the incidence of HIV better than health education alone. Clearly, PI is a real and simple form of empowering women, since it systematically trains them to find answers to and refute internal and external social pressures against condom use, demonstrated here by increasing negotiating self-efficacy and by reducing barriers

about condom use. Thus, these findings may have important future implications for HIV-prevention, if replicated and extended.

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