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Title: Advertising for Demand Creation for Voluntary Medical Male Circumcision

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Conflicts of interest and sources of funding: No conflicts of interest were reported by any author. The International Initiative for Impact Evaluation (3ie) provided financial support for this project.

ABSTRACT/KEY WORD PAGE

Objective: To measure the effects of information, framing, and conditional cash transfers on take-up of voluntary medical male circumcision (VMMC).

Design: A randomized, controlled experiment with 6,000 recipients in Soweto (Johannesburg), South Africa.

Methods: We examined differences in take-up of several steps in the VMMC cascade between the control arm and each of several treatment arms using logistic regression.

Results: Logistic regression analysis indicated that the US$10 group and the "Are you tough enough?" group had significantly higher take-up of the VMMC procedure than did the control group (odds ratios, respectively 5.30 (CI: 2.20-12.76) and 2.70 (CI: 1.05-6.91. Similarly, the US$10 group had significantly higher take-up of the VMMC counseling session than did the control group (odds ratio 3.76 (CI: 1.79-7.89)). The analysis did not reveal significantly different take-up of either the VMMC counseling session or the procedure in the information group compared to the control group (odds ratios, respectively, 1.23 (CI: 0.51-2.97) and 1.67 (CI: 0.61-4.62)). The analysis did not reveal significantly higher take-up of the VMMC nurse hotline in any treatment group compared to the control group (odds ratios for US$10, information, and framing, respectively, 1.17 (CI: 0.67-2.07), 0.69 (CI: 0.36-1.32), and 0.60 (0.31-1.18)).

Conclusions: Among adult males in Soweto, South Africa, compensation of US$10 provided conditional on completing the VMMC counseling session or a postcard framing the VMMC decision with the statement "Are you tough enough?", compared with no compensation or framing, resulted in a moderate increase in take-up of circumcision.

Key words: advertising, conditional cash transfer, epidemiology, HIV, South Africa

INTRODUCTION

Evidence from randomized controlled trials conducted in Kenya,[1] Uganda,[2] and South Africa[3] indicates that voluntary medical male circumcision (VMMC) reduces HIV transmission by 51 to 76 percent. Based on these findings, the World Health Organization is aiding scale-up of mass VMMC campaigns in 14 high HIV prevalence, low male circumcision prevalence priority countries in Sub-Saharan Africa.[4] However, take-up of this fully subsidized health service remains low in much of the region of the world most heavily afflicted by the HIV/AIDS pandemic. Through the end of 2013, these countries had performed fewer than 6 million circumcisions out of the target number of nearly 21 million circumcisions (WHO 2014).

Existing literature on demand for VMMC highlights several factors that may be inhibiting VMMC take-up. First, opportunity costs of foregone wages during the recovery period[5,6,7,8,] and transportation costs associated with the counseling session/procedure[9] appear to be large impediments to receiving VMMC. Second, individuals are concerned about the pain associated with the procedure and the recovery period.[5,10,11,12,14] Third, men are concerned that VMMC will reduce sexual performance and pleasure.[5,10,11,12,14] Fourth, the fact that explaining to individuals that VMMC reduces the transmission of HIV and other STIs appears to increase the acceptability of VMMC[5,11,14] suggests that individuals may be uninformed about possible benefits of VMMC.

To assess the magnitudes and relative importance of these barriers, we conducted a randomized clinical trial in Soweto (Johannesburg), South Africa. In this study, we randomly assigned postcards offering a conditional cash transfer for completing the VMMC counseling session, a framing message, information on possibly previously unknown benefit of VMMC, or some combination thereof, to 6,000 households in Soweto township.

METHODS

Study setting, design, and participants

Soweto, our study setting, is a relatively poor township in Johannesburg, South Africa. Gauteng Province, where Soweto is located, has the lowest prevalence of male circumcision, 25.2 percent[10] and the second highest number of people living with HIV,[11] of any province in South Africa. We conducted our study in collaboration with the Centre for HIV and AIDS Prevention (CHAPS), which currently operates 23 VMMC sites in Gauteng. The Human Subjects Research Committee (Medical) at the University of Witwatersrand, Johannesburg and the Institutional Review Board at Reed College provided human subjects research ethical approval for our study.

Outreach workers distributed postcards - each sealed in an envelope - in a blind, pre-specified randomized order to households, following a random walk method. In this random walk, outreach workers began distribution at pre-specified locations, leaving the next postcard at every fifth house with an adult present, using coin-flips to determine the path at each intersection. The pre-specified order randomized each postcard type and stratified on timing and location of distribution. Among respondents who subsequently presented a postcard at a participating CHAPS clinic, 91 percent said they had gotten it directly from the distributor and 9 percent said they had gotten it from a friend or family member. Importantly, our statistical analysis compares VMMC take-up across groups of postcard recipients rather than with non-recipients, which reduces many spillover concerns that complicate other studies. If recipients shared their postcards with those who had not gotten any postcard, and this person visited a clinic, this does not compromise the design because the second person was not in another experimental group.

Adult males (i.e., age 18 or above) who presented a study postcard at a participating CHAPS clinic were asked to provide written informed consent.

Interventions

All randomly assigned postcards offered basic information about the HIV risk-reduction benefits of circumcision, clinic hours, and an offer of refreshments for respondents who came for a VMMC consultation. Subsets of these also offered a conditional cash transfer, information on a possibly previously unknown benefit of VMMC, a framing message, or some combination thereof. Our cross-cutting randomization produced six study arms of equal size (i.e. 1,000 households each). First, control postcards included basic information that VMMC reduces HIV transmission by 51 to 76 percent and the names and workdays of participating clinics. They further indicated that a male age 18 or older could return the postcard to a clinic and receive light refreshments while participating in a VMMC counseling session. All treatment postcards contained this information and the conditional offer of light refreshments as well. The offer of light refreshments served as an incentive for the recipient (or another adult male) to bring the postcard with him if he chose to come to a clinic. This self-tracking mechanism allowed us to measure take-up of multiple steps in the VMMC cascade and observe how this varied across study arms.

Second, "money" postcards offered R100 (i.e. approximately US$10) as compensation for attending a VMMC counseling session at a participating clinic in addition to the statements included in the control postcard. Third, "information" postcards stated that a recent survey indicated that among partners of uncircumcised men, 2 out of 3 would prefer that their partner be circumcised in addition to the statements in the control postcard. Fourth, "money+information" postcards combined the offers and information on the "money" postcards and the "information" postcards. Fifth, "challenge" postcards added the statement, "Are you tough enough?", to the control postcards to frame the statement about the 51 to 76 percent reduction in HIV transmission. Sixth, "money+challenge" postcards combined the offers and the framing in the "money" postcards and the "challenge" postcards.

All transfers were disbursed conditional on attending a VMMC counseling session at a participating clinic. For example, we provided the R100 (US$10) cash transfer to men with cash transfer postcards only after they attended a participating clinic and completed the VMMC counseling session. Similarly, the light refreshments provided via all of the study arms were disbursed after the VMMC counseling session. Distribution of postcards began on June 30, 2015 and was completed by August 6, 2015. All postcards stated an offer expiration date of August 29, 2015, meaning each postcard had a redemption period of approximately 1-2 months .

Data collection and statistical analyses

We collected data on three steps in or related to the VMMC cascade (i.e., the series of steps required to complete VMMC). These three steps were: (1) calling or texting the VMMC hotline, (2) completing the VMMC counseling session, and (3) completing the VMMC procedure. We also collected survey data on the characteristics of individuals completing any of these steps in the VMMC cascade. These characteristics include basic demographic information (e.g. age) and past risky sexual behavior (e.g. condom use).

In our statistical analysis, the primary outcomes of interest were uptake of the VMMC counseling session and of the VMMC procedure, as well as the initial possible step of calling the VMMC hotline. For each of these three outcomes, the outcome is a binary variable equal to one if the participant completed the step at a participating CHAPS clinic and equal to zero if otherwise. Our primary analysis uses logistic regression to compare uptake at each of these steps in each of the intervention groups to uptake in the control group. We used Stata Version 13.1 (StataCorp) to conduct our statistical analyses and all statistical tests were two-sided with a p-value of less than 0.05.

The trial specified a sample size of 6,000 households, divided into six study arms of equal size. In our power calculations, we analyzed the sample size required to test whether a single treatment generated a statistically larger take-up. We assumed a two-sided test with an alpha of 0.05 and a goal of 90 percent power. In addition, we assumed that 5 percent of control postcard recipients would obtain VMMC and that a treatment postcard (i.e. financial compensation, information, framing, or a combination thereof) would increase this number by 5 percentage points. The required sample size in each group was 621, or 3,726 summed across the six different study arms. We chose a sample size of 6,000 to ensure that we were able to identify an even smaller treatment effect than 5 percentage points.

We complemented our quantitative experimental analysis with focus group discussions (FGDs) among study participants. In these groups, participants discussed their perspectives on the different postcards and what brought the participants to the clinics for consultation or would bring others to get circumcised.

RESULTS

Characteristics of respondents

Table 1 displays basic demographic and socioeconomic characteristics of respondents who presented study postcards at participating CHAPS clinics. Because our study did not include a traditional baseline survey, the descriptive statistics in Table 1 provide the best available information about postcard recipients. As we noted in the Methods section, 9 percent of individuals who returned a postcard to a clinic reported that they received it from a friend or family member and 91 percent reported that they received it from a distributor.

The average age of men in this study was 29 years. Just under one-half of respondents worked for pay in the last week, and just over one-half did so in the last year. The average years of schooling among the respondents was roughly 11. Approximately one-half of men had at least one child and 64% were neither married nor living with their partner. Twenty-nine percent of respondents reported that an immediate family member was HIV positive. More than three-quarters of respondents had ever been tested for HIV. Ten percent had ever been treated for any STI, and 7% currently had symptoms. Nearly all respondents reported ever having had sex (93%), with the average age of debut at 16 years. The average number of partners in the last year was nearly two and more than one-half of respondents reported using a condom the last time they had sex.

Effects on VMMC hotline

Table 2 presents the effects of the treatment postcards on take-up of several steps in or associated with the VMMC cascade. Column (1) in Table 2 shows the effects of each of the three main interventions we examined in our cross-cutting randomized design on whether a recipient called or sent a text message to the hotline. For none of the three interventions (i.e., compensation, information, or challenge) did we observe a statistically significant effect on the likelihood the study participant called or sent a text message to the VMMC hotline (for compensation, challenge, and information, respectively: OR 1.18, 95% C.I. 0.67-2.07; OR 0.60, 95% C.I. 0.31-1.18; OR 0.69, 95% C.I. 0.36-1.32).

Effects on VMMC counseling session

Column (2) in Table 2 shows the effects of each of the three main interventions on take-up of the VMMC counseling session. Uptake of the VMMC counseling session was significantly higher in the US$10 group than in the control group (OR 3.76, 95% C.I. 1.79-7.89). Uptake in neither the "Are you tough enough?" group nor the "2 out of 3 prefer a circumcised partner" group was

significantly different than in the control group (odds ratios, respectively, 2.02 and 1.23; 95% confidence intervals, respectively, 0.90-4.51 and 0.51-2.97).

Effects on VMMC procedure

Column (3) in Table 2 presents the effects of the treatment postcards on take-up of the VMMC procedure. Take-up of the VMMC procedure was significantly higher in the US$10 group and in the "Are you tough enough?" group than in the control group (odds ratios, respectively, 5.30 and 2.69; 95% confidence intervals, respectively, 2.20-12.76 and 1.05-6.91). Take-up of the VMMC procedure was not significantly different in the "2 out of 3 prefer a circumcised partner" group than in the control group (OR 1.67, 95% confidence interval 0.61-4.62).

Cost-effectiveness

This intervention is extremely low-cost. Combined with noticeable impacts on uptake, this implies that the cost-effectiveness is relatively high. Printing and distribution of each postcard cost approximately US$2, and the cash-transfer cost US$10 per consultation. Refreshments for each consultation cost approximately US$1. The high conversion rate - whereby nearly all men who came for a consultation stayed for the procedure - and only needing to pay the latter two costs for those who chose to use the voucher kept costs low. The expected effect on take-up from the addition of the transport reimbursement voucher postcard relative to the basic postcard was 2.5 percentage points. This gives a cost per additional circumcision of $91. The fact that Soweto is a high HIV prevalence area implies that one VMMC generates approximately 1/15 to 1/5 of an HIV infection averted.[12] Thus, we estimate that this intervention costs between US$450 and US$1350 per HIV infection averted, excluding clinical costs.

DISCUSSION

The results of our randomized clinical trial indicate that offering economic compensation for the VMMC counseling session was effective at increasing take-up of the VMMC procedure. Similarly, framing the VMMC decision with the statement, "Are you tough enough?", was also effective at increasing take-up the VMMC procedure. In contrast, providing the information that, among partners of uncircumcised men, 2 out of 3 would prefer that their partner be circumcised was not effective at increasing take-up of the VMMC procedure.

Our results contribute to a growing body of evidence on factors affecting demand for VMMC. At least two other studies have conducted randomized clinical trials testing the effect of economic compensation on take-up of the VMMC procedure. The magnitude of the main effect reported in the first study (i.e. in Kenya an offer of US$8.50 in food vouchers disbursed conditional on completing the VMMC procedure increased VMMC uptake relative to the control arm more than fourfold)[13] is very similar to the effect of economic compensation that we report in the current analysis (i.e. an offer of US$10 disbursed conditional on completing the VMMC counseling session increased VMMC uptake relative to the control arm more than fivefold). The second study also finds large impacts on take-up of circumcision from conditional compensation of approximately US$11 in Kenya.[14]

The finding that posing the challenge, "Are you tough enough?", was effective at increasing VMMC take-up provides scarce experimental evidence for the largely non-experimental literature citing (concern about) pain[5,10,12,14] and (expected) diminished sexual performance as major factors limiting demand for VMMC.[5,10,11,12,14] Although many largely non-experimental studies propose that explaining to individuals that VMMC reduces the transmission of HIV and other STIs increases the acceptability of VMMC,[5,11,14] our results indicate that the responsiveness of VMMC take-up to further information campaigns, or at least information campaigns citing partner preference for circumcised men, may be limited.

The findings of this study demonstrate the strength of experimentation to provide information beyond what can be gleaned from direct questioning. In focus group discussions, most men reported that they believed others would be dissuaded from taking up the procedure by the "Are you tough enough?" postcard, and anticipated that the provision of information postcard would be more effective. However, the results of the randomized controlled trial demonstrated the opposite: the challenge postcard yielded more respondents than did the information postcard, although the difference is not statistically significant (OR: 1.610 (CI: 0.727-3.565)).

Focus group discussions also point to a possible explanation for the effectiveness of such a small financial compensation: many of the men reported that they were thinking of going for circumcision anyway. This suggests that these postcards may be increasing uptake by discouraging procrastination. The extremely high rate of conversion (i.e. take-up of the procedure conditional on coming for the counseling session) also fits with this explanation. If this explanation is true, then financial compensation may be viewed as a nudge that helps individuals to follow through on their own plans to protect their health before it is too late.

Interventions generated VMMC procedures that would not have occurred during redemption period in the absence of the interventions. The ratio of VMMC procedures conducted among men who would have not received the VMMC procedure in the absence of the US$10 offer to those would have done so anyway was approximately 5 to 1. For the "Are you tough enough?" intervention, this ratio was slightly less than 3 to 1. These facts suggest that this intervention can be a relatively inexpensive way to increase uptake of VMMC. One important reason that these costs are low is that the bulk of the costs (i.e. the procedure and the transport reimbursement) are only paid for those who choose to get circumcised.

This study has a few limitations. First, respondents were only given between one and two months to redeem their vouchers. A longer redemption period may have generated higher take-up. Second, because we chose not to conduct a baseline survey of postcard recipients – which could have biased the findings by increasing salience of issues around circumcision – we do not know background characteristics of recipients. Without a baseline survey, we cannot know what fraction of recipients were uncircumcised before the intervention, and we cannot compare the demographic characteristics of those who did and did not visit a clinic. While this lack of a baseline may limit the nuances we can uncover, the randomized design removes concerns about omitted variables, lending credibility to the findings presented.

ACKNOWLEDGEMENTS
This study would not have been possible without the thorough and competent work and advice provided by Genevieve Dean, Alexandra Spyrelis, Dirk Taljaard, and the rest of the staff at the Centre for HIV and AIDS Prevention Studies (CHAPS). We also thank Harsha Thirumurthy, Paul Wang, and participants at the Bill and Melinda Gates Foundation meeting on Demand Creation for Voluntary Medical Male Circumcision for many excellent comments. The International Initiative for Impact Evaluation (3ie) generously provided financial support for this project.

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Table 1: Descriptive statistics for all men completing VMMC counseling session

Variable	**Mean (SD)**
Age	29.03 (9.29)
Worked for pay in the last 7 days	0.46 (0.50)
Worked for pay in the last 12 months	0.53 (0.50)
Years of schooling	11.03 (1.88)
Single (not married or living with a partner)	0.64 (0.48)
Has one or more children	0.51 (0.51)
Has been tested for HIV	0.77 (0.42)
Immediate family member is HIV positive	0.29 (0.45)
Currently has STI symptoms	0.065 (0.25)
Has ever been treated for an STI	0.11 (0.31)
Has ever had sex	0.93 (0.26)
Age at first sex	16.45 (2.95)
Number of partners in the last year	1.95 (1.37)
Used a condom at last sex, if ever had sex	0.57 (0.50)

Note: Means and standard-deviations in parentheses reported for demographic characteristics of men who reported to a participating clinic with a postcard. This information was collected via a one-on-one survey with a clinical officer. The sample size ranges from 107-123. The lower sample-sizes are for questions conditional on a previous answer (e.g. conditional on having had sex).

Table 2: Effects of conditional cash transfer, information, and framing on various steps in VMMC cascade

	Outcome		
Treatment	*Call or Text*	*Consultation*	*Procedure*
Compensation	1.18 (0.67-2.07)	3.76 (1.79-7.89)	5.30 (2.20-12.76)
Information	0.69 (0.36-1.32)	1.23 (0.51-2.97)	1.67 (0.61-4.62)
Challenge	0.60 (0.31-1.18)	2.02 (0.90-4.51)	2.69 (1.05-6.91)

Odds-ratios presented, based on logistic regressions including treatment group specified and pure control. 95% confidence intervals in parentheses. The sample size used to estimate each specification is 2000.