

Quarterly Research Digest on Voluntary Medical Male Circumcision for HIV Prevention

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Combination HIV prevention

1. Abdool Karim, S. S., et al. **Advancing HIV prevention using tenofovir-based pre-exposure prophylaxis.** *Antivir Ther.* 2022;27(2):13596535211067589.

Online at:

https://journals.sagepub.com/doi/10.1177/13596535211067589?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0pubmed&.

Tenofovir-based pre-exposure prophylaxis (PrEP) revolutionized the global HIV prevention landscape. Prior to the proof-of concept trial in 2010, which demonstrated that tenofovir (TFV) could prevent sexual transmission of HIV, prevention options were largely limited to behavior change, condoms, and circumcision. Several subsequent studies evaluating oral tenofovir disoproxil fumarate (TDF) or the TDF/emtricitabine (FTC) combination as PrEP for HIV prevention provided evidence for regulatory approval and inclusion in national and international guidelines. By 2021, 1.5 million people had initiated oral tenofovir-based PrEP, contributing to declines in HIV incidence in some regions. Here we reflect on how oral tenofovir-based PrEP became an important component of combination HIV prevention programs across the globe.

2. Ssemata, A.S., et al. **Assessing knowledge, acceptability and social implications of a peer-to-peer HIV self-testing kit distribution model among adolescents aged 15-24 in Zambia and Uganda-HISTAZU: a mixed-method study protocol.** *BMJ Open.* 2022;12(5):e059340.

Online at: <https://bmjopen.bmj.com/content/12/5/e059340.long>.

INTRODUCTION: HIV self-testing (HIVST) across sub-Saharan African countries may be acceptable as it overcomes significant barriers to clinic-based HIV testing services such

as privacy and confidentiality. There are a number of suggested HIVST distribution models. However, they may not be responsive to the testing service needs of adolescents and young people (AYP). We will investigate the knowledge, acceptability and social implications of a peer-to-peer distribution model of HIVST kits on uptake of HIV prevention including pre-exposure prophylaxis, condoms, and voluntary medical male circumcision and testing services and linkage to anti-retroviral therapy among AYP aged 15-24 in Zambia and Uganda.

METHODS AND ANALYSIS: We will conduct an exploratory mixed methods study among AYP aged 15-24 in Uganda and Zambia. Qualitative data will be collected using audio-recorded in-depth interviews (IDIs), focus group discussions (FGDs), and participant observations. All IDIs and FGDs will be transcribed verbatim, coded and analysed through a thematic-content analysis. The quantitative data will be collected through a structured survey questionnaire derived from the preliminary findings of the qualitative work and programme evaluation quantitative data collected on uptake of services from a Zambian trial. The quantitative phase will evaluate the number of AYP reached and interested in HIVST and the implication of this on household social relations and social harms. The quantitative data will be analysed through bivariate analyses. The study will explore any social-cultural and study design barriers or facilitators to uptake of HIVST.

ETHICS AND DISSEMINATION: This study is approved by the Uganda Virus Research Institute Research and Ethics committee, Uganda National Council for Science and Technology, University of Zambia Biomedical Ethics Committee, Zambia National Health Research Authority and the London School of Hygiene and Tropical Medicine. Dissemination activities will involve publications in peer-reviewed journals, presentations at conferences and stakeholder meetings in the communities.

3. Choi, Y., et al. **Uptake and correlates of cervical cancer screening among women attending a community-based multi-disease health campaign in Kenya.** *BMC Womens Health.* 2022;22(1):122.

Online at: <https://bmcwomenshealth.biomedcentral.com/articles/10.1186/s12905-022-01702-4>.

INTRODUCTION: Despite the increased risk of cervical cancer among HIV-positive women, many HIV-care programs do not offer integrated cervical cancer screening. Incorporating self-collected Human Papillomavirus (HPV) testing into HIV programs is a potential strategy to identify women at higher risk for cervical cancer while leveraging the staffing, infrastructure and referral systems for existing services. Community-based HIV and HPV testing has been effective and efficient when offered in single-disease settings.

METHODS: This cross-sectional study was conducted within a community outreach and multi-disease screening campaigns organized by the Family AIDS Care and Education

Services in Kisumu County, Kenya. In addition to HIV testing, the campaigns provided screening for TB, malaria, hypertension, diabetes, and referrals for voluntary medical male circumcision. After these services, women aged 25-65 were offered self-collected HPV testing. Rates and predictors of cervical cancer screening uptake and of HPV positivity were analyzed using tabular analysis and Fisher's Exact Test. Logistic regression was performed to explore multivariate associations with screening uptake.

RESULTS: Among the 2016 women of screening age who attended the outreach campaigns, 749 women (35.6%) were screened, and 134 women (18.7%) were HPV-positive. In bivariate analysis, women who had no children ($p < 0.01$), who were not pregnant ($p < 0.01$), who were using contraceptives ($p < 0.01$), who had sex without using condoms ($p < 0.05$), and who were encouraged by a family member other than their spouse ($p < 0.01$), were more likely to undergo screening. On multivariable analysis, characteristics associated with higher screening uptake included: women aged 45-54 (OR 1.62, 95% CI 1.05-2.52) compared to women aged 25-34; no children (OR 1.65, 95% CI 1.06-2.56); and family support other than their spouse (OR 1.53, 95% CI 1.09-2.16). Women who were pregnant were 0.44 times (95% CI 0.25-0.76) less likely to get screened. Bivariate analyses with participant characteristics and HPV positivity found that women who screened HPV-positive were more likely to be HIV-positive ($p < 0.001$) and single ($p < 0.001$).

CONCLUSIONS: The low screening uptake may be attributed to implementation challenges including long waiting times for service at the campaign and delays in procuring HPV test kits. However, given the potential benefits of integrating HPV testing into HIV outreach campaigns, these challenges should be examined to develop more effective multi-disease outreach interventions.

Enhancing uptake of VMMC

1. Friedman, W., et al. **Can nudging overcome procrastinating on preventive health investments? (abstract).** *Econ Hum Biol.* 2022;45:101040.

Online at:

<https://www.sciencedirect.com/science/article/abs/pii/S1570677X21000642?via%3Dihub>.

A fundamental puzzle about human behavior is low investment in preventive health inputs. Present-biased preferences have frequently been put forth as a theoretical explanation for this, but with limited empirical evidence supporting it, especially in developing countries. We extend our previous analysis of a field experiment testing advertising strategies to increase demand for a potentially life-saving preventive health technology, voluntary medical male circumcision. Offering compensation of US\$10 conditional on a complement to the procedure, a short counseling session at a providing clinic, tripled uptake of the procedure. This is consistent with the idea that subsidizing a

complement encouraged procrastinating men with latent demand to invest in preventive health. In addition, framing the basic advertisement using the statement "Are you tough enough?" doubled uptake.

2. Marukutira, T., et al. **Male circumcision uptake during the Botswana Combination Prevention Project.** *PLoS One.* 2022;17(6):e0269178.

Online at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269178>.

INTRODUCTION: Voluntary medical male circumcision (VMMC) uptake has been slow in some countries, including Botswana. To inform demand creation efforts, we examined sociodemographic characteristics and referral procedures associated with VMMC uptake in the Botswana Combination Prevention Project (BCPP) and examined the effectiveness of referral of men to MC services from HIV testing venues.

DESIGN: BCPP was a community-randomized trial evaluating the impact of a combination HIV prevention package which included VMMC on community HIV incidence. We conducted a sub-analysis of VMMC uptake in intervention communities.

METHODS: During the initial VMMC campaign in 15 intervention communities, baseline male circumcision (MC) status was assessed among men eligible for HIV testing. Uncircumcised male community residents aged 16-49 years with negative/unknown HIV status were mobilized and linked to study VMMC services. Outcomes included MC baseline status and uptake through study services. Univariate and multivariate logistic regressions were performed to identify factors associated with MC uptake.

RESULTS: Of 12,864 men eligible for testing, 50% (n = 6,448) were already circumcised. Among the uncircumcised men (n = 6,416), 10% (n = 635) underwent MC. Of the 5,071 men identified as eligible for MC through HIV testing services, 78% declined referral and less than 1% of those were circumcised. Of those accepting referral (n = 1,107), 16% were circumcised. Younger (16-24 years) (aOR: 1.51; 95%CI:1.22,1.85), unemployed men (aOR:1.34; 95%CI: 1.06,1.69), and those undergoing HIV testing at mobile venues (aOR: 1.88; 95%CI: 1.53,2.31) were more likely to get circumcised. Fear of pain was the most prevalent (27%) reason given for not being circumcised.

CONCLUSION: Younger, unemployed men seeking HIV testing at mobile sites in Botswana were more likely to get VMMC. Addressing unique barriers for employed and older men may be necessary. Given the simplicity of VMMC as an intervention, the HIV testing programs offer a platform for identifying uncircumcised men and offering information and encouragement to access services.

Epidemiological studies

1. Kreniske, P., et al. **Brief report: mobile phones, sexual behaviors, and HIV incidence in Rakai, Uganda, from 2010 to 2018 (abstract).** *J Acquir Immune Defic Syndr.* 2022;89(4):361–65.

Online at:

https://journals.lww.com/jaids/Abstract/2022/04010/Brief_Report_Mobile_Phones,_Sexual_Behaviors,_and.1.aspx.

BACKGROUND: Sub-Saharan Africa has the highest HIV incidence and prevalence in the world. In the past decade, mobile phone ownership has doubled, affecting social and sexual practices. Using longitudinal follow-up data, this study examined whether mobile phone ownership was associated with sexual behaviors and HIV incidence for youth and adults.

METHODS: The Rakai Community Cohort Study gathers demographic and sexual health information and conducts HIV testing among an open cohort in southcentral Uganda every 12-18 months.

RESULTS: Of the 10,618 participants, 58% owned a mobile phone, 69% lived in rural locations, and 77% were sexually active. Analyses were adjusted for time, location, religion, and socioeconomic status. Phone ownership was associated with increased odds of ever having had sex act for 15- to 19-year-olds [men adjusted odds ratio (AOR): 2.12, 95% confidence interval (CI): 1.78 to 2.52; women AOR: 3.20, 95% CI: 2.45 to 4.17]. Among sexually active participants, owning a phone was associated with increased odds of having 2 or more concurrent sex partners (15- to 24-year-old men AOR: 1.76, 95% CI: 1.34 to 2.32; 25 to 49-year-old men: AOR 1.81, 95% CI: 1.54 to 2.13; 25- to 49-year-old women AOR: 1.81, 95% CI: 1.32 to 2.49). For men, phone ownership was associated with increased odds of circumcision (15- to 24-year-old men AOR: 1.24, 95% CI: 1.08 to 1.41; 25- to 49-year-old men AOR: 1.12, 95% CI: 1.01 to 1.24). Phone ownership was not associated with HIV incidence.

CONCLUSION: Although mobile phone ownership was associated with sexual risk behaviors, it was not associated with increased risk of HIV acquisition. Research should continue exploring how phones can be used for reducing sexual health risk.

Impact and coverage

1. Johnson, L. F., et al. **The effect of HIV programmes in South Africa on national HIV incidence trends, 2000-2019.** *J Acquir Immune Defic Syndr.* 2022;90(2):115–23.

Online at: <https://www.ncbi.nlm.nih.gov/pubmed/35125471>.

BACKGROUND: Recent studies have shown HIV incidence declines at a population level in several African countries. However, these studies have not directly quantified the extent to which incidence declines are attributable to different HIV programs.

METHODS: We calibrated a mathematical model of the South African HIV epidemic to age- and sex-specific data from antenatal surveys, household surveys, and death registration, using a Bayesian approach. The model was also parameterized using data on self-reported condom use, voluntary medical male circumcision (VMMC), HIV testing, and antiretroviral treatment (ART). Model estimates of HIV incidence were compared against the incidence rates that would have been expected had each program not been implemented.

RESULTS: The model estimated incidence in 15-49 year olds of 0.84% (95% CI: 0.75% to 0.96%) at the start of 2019. This represents a 62% reduction (95% CI: 55% to 66%) relative to 2000, a 47% reduction (95% CI: 42% to 51%) relative to 2010, and a 73% reduction (95% CI: 68% to 77%) relative to the incidence that would have been expected in 2019 in the absence of any interventions. The reduction in incidence in 2019 because of interventions was greatest for ART and condom promotion, with VMMC and behavior change after HIV testing having relatively modest impacts. HIV program impacts differed significantly by age and sex, with condoms and VMMC having greatest impact in youth, and overall incidence reductions being greater in men than in women.

CONCLUSIONS: HIV incidence in South Africa has declined substantially since 2000, with ART and condom promotion contributing most significantly to this decline.

2. Punjani, N., et al. **Genitourinary infections related to circumcision and the potential impact on male infertility.** *World J Mens Health.* 2022;40(2):179–90.

Online at: <https://wjmh.org/DOIx.php?id=10.5534/wjmh.210043>.

Male circumcision (MC) is one of the oldest surgical procedures still completed today. Medical indications for MC include phimosis, recurrent balanitis, cosmesis, and infection prevention. In this review, we mainly focus on the role of MC in the prevention of human immunodeficiency virus, human papillomavirus, herpes simplex virus, gonorrhea, chlamydia, chancroid, and syphilis, and the subsequent impact of these genitourinary infections on male fertility. Overall, many compelling data support that MC may play an essential role in both genitourinary infection prevention and male fertility.

3. Resch, S. C., et al. **Health impact and cost-effectiveness of HIV testing, linkage, and early antiretroviral treatment in the Botswana Combination Prevention Project.** *J Acquir Immune Defic Syndr.* 2022;90(4):399–407.

Online at:

https://journals.lww.com/jaids/Fulltext/2022/08010/Health_Impact_and_Cost_Effectiveness_of_HIV.5.aspx.

BACKGROUND: The Botswana Combination Prevention Project tested the impact of combination prevention (CP) on HIV incidence in a community-randomized trial. Each trial arm had approximately 55,000 people, 26% HIV prevalence, and 72% baseline ART coverage. Results showed intensive testing and linkage campaigns, expanded antiretroviral treatment (ART), and voluntary male medical circumcision referrals increased coverage and decreased incidence over approximately 29 months of follow-up. We projected lifetime clinical impact and cost-effectiveness of CP in this population.

SETTING: Rural and periurban communities in Botswana.

METHODS: We used the Cost-Effectiveness of Preventing AIDS Complications model to estimate lifetime health impact and cost of (1) earlier ART initiation and (2) averting an HIV infection, which we applied to incremental ART initiations and averted infections calculated from trial data. We determined the incremental cost-effectiveness ratio [US\$/quality-adjusted life-years (QALY)] for CP vs. standard of care.

RESULTS: In CP, 1418 additional people with HIV initiated ART and an additional 304 infections were averted. For each additional person started on ART, life expectancy increased 0.90 QALYs and care costs increased by \$869. For each infection averted, life expectancy increased 2.43 QALYs with \$9200 in care costs saved. With CP, an additional \$1.7 million were spent on prevention and \$1.2 million on earlier treatment. These costs were mostly offset by decreased care costs from averted infections, resulting in an incremental cost-effectiveness ratio of \$79 per QALY.

CONCLUSIONS: Enhanced HIV testing, linkage, and early ART initiation improve life expectancy, reduce transmission, and can be cost-effective or cost-saving in settings like Botswana.

4. Saul, J., et al. N., et al. **Modeling DREAMS impact: trends in new HIV diagnoses among women attending antenatal care clinics in DREAMS countries.** *AIDS.* 2022;36(Suppl 1):S51–S59.

Online at:

https://journals.lww.com/aidsonline/Fulltext/2022/06151/Modeling_DREAMS_impact_trends_in_new_HIV.6.aspx.

OBJECTIVES: To understand the impact of United States President's Emergency Plan for AIDS Relief (PEPFAR's) DREAMS (Determined, Resilient, Empowered, AIDS-Free, Mentored, and Safe) Partnership on new HIV diagnoses among women in antenatal care (ANC) settings in 10 African countries from 2015 to 2020.

DESIGN: We modeled spatiotemporal changes in new HIV diagnoses among women in ANC settings using PEPFAR data. Statistical tests were performed in R to compare differences in new diagnoses rates between DREAMS and non-DREAMS subnational units (SNUs) and to explore predictors of new diagnoses declines within DREAMS SNUs.

METHODS: We used a predictive geospatial model to forecast the rate of new diagnoses for each time period in a 5 km grid cell (n = 861 SNUs). Linear model analyses were conducted using predictor variables: urbanicity, DREAMS geographic footprint, 'layering' proxy, and community-level male viral load suppression.

RESULTS: New HIV diagnoses in ANC from 2015 to 2020 declined in nearly all SNUs. 'Always' DREAMS SNUs reported declines of 45% while 'Never' DREAMS SNUs reported a decline of only 37% (F = 8.1, 1 and 829 DF, P < 0.01). Within Always DREAMS SNUs, greater declines were seen in areas with a higher number of minimum services in their DREAMS primary package (t = 2.77, P < 0.01).

CONCLUSION: New HIV diagnoses among women are declining in both DREAMS and non-DREAMS SNUs; mirroring HIV incidence decreases and reflecting increasing community viral load suppression and voluntary male medical circumcision rates. DREAMS programming may have contributed to accelerated declines of new HIV diagnoses in DREAMS SNUs compared with non-DREAMS SNUs. Increased progress is needed to further reduce the disparities between adolescent girls and young women (AGYW) and young men to achieve epidemic control.

Infant male circumcision

1. Ezomike, U. O., et al. **Evaluation of maternal preferences for neonatal male circumcision in Enugu Nigeria.** *Afr J Paediatr Surg.* 2022;19(2):73–77.

Online at: <https://www.afripaed Surg.org/article.asp?issn=0189-6725;year=2022;volume=19;issue=2;spage=73;epage=77;aulast=Ezomike>.

BACKGROUND: Although circumcision in male neonates is one of the most common procedures performed in neonatal surgery, mothers' preferences concerning the aspects of circumcision are not well-known. Since mother is the likely parent to present child for circumcision, her preferences should be given adequate consideration.

OBJECTIVES: The objective of this study is to evaluate maternal preferences for neonatal male circumcision in Enugu.

METHODOLOGY: A cross-sectional study where questionnaire was distributed by the researchers to consenting pregnant women attending antenatal clinics in two teaching hospitals in Enugu. Data analysis was performed using the SPSS. The results presented as means, percentages and tables. Test for significance was done using the Chi-square test.

RESULTS: Four hundred and sixty-one pregnant women participated in the study. Ninety-five percent (438/461) wanted circumcision and 83.5% (385/461) wanted it on or before the 8(th) day of life. The reasons were cultural/religious in 69% (302/447). Fifty-four percent (250/461) had no preferences as to methods, but for those who had, Plastibell was most preferred method in 28% (129/461) while 76% (235/309) preferred circumcision to be done in hospital. In 49.2% (227/461) preferred personnel were nurses but 79.6% (367/461) wanted doctors to attend to post-circumcision complications. In 79.2% (365/461), mothers will not insist on the use of anaesthesia for circumcision. Mothers with circumcised husbands were significantly more willing to circumcise a male child ($P = 0.0018$). Higher educational status of mother was significantly related to willingness to insist on the use of anaesthesia ($P = 0.046$) and use of analgesics after circumcision ($P = 0.001$).

CONCLUSIONS: Most mothers prefer neonatal male circumcision by nurses, while preferring doctors for post-circumcision complications. These choices are not affected by parents' educational status. Mothers with circumcised husbands accepted circumcision more than those with uncircumcised husbands. Higher maternal education encourages anaesthesia during circumcision and post-circumcision analgesia.

Social and behavioural research

1. Byaruhanga, A., et al. **Women's support for voluntary medical male circumcision in fishing communities on the shores of Lake Victoria, Uganda.** *BMC Health Serv Res.* 2022;22(1):505.

Online at: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-022-07842-5>.

BACKGROUND: Women's support can improve uptake of voluntary medical male circumcision (VMMC). We assessed the level of women's support for VMMC and associated factors in fishing settlements on the shores of Lake Victoria in Uganda, to inform interventions aimed at increasing the uptake of safe male circumcision services in such high-risk populations.

METHODS: We conducted a cross-sectional study, employing mixed methods of data collection, at Kasenyi and Kigungu landing sites in April 2018. We included women aged 18-49 years, who had stayed at the landing sites for ≥ 3 months. We obtained qualitative data using focus group discussions (FGDs), and interviewer-administered

semi-structured questionnaires for quantitative data. The tool captured demographic characteristics, community factors including cultural norms and beliefs, women's experiences, and health facility-related factors. The dependent variable was derived from the response to the question: "Would you encourage your partner/husband to go for VMMC?", and used as a proxy for support of VMMC. We used modified Poisson regression to identify factors associated with women's support for VMMC. Qualitative data were analysed using thematic content analysis.

RESULTS: We enrolled 313 women with a mean age of 28 (SD+/-6.8) years. Of the 313 women, 230 (73.5%) supported VMMC. Belief that VMMC increases penile hygiene (Adjusted prevalence ratio [aPR]=1.9; CI: 1.8-3.2), performing VMMC for religious reasons (aPR=1.9; CI: 1.8-2.9), preference for a circumcised man (aPR=1.3; CI: 1.2-1.5), belief that vaginal fluids facilitate wound healing (aPR=1.9; CI: 1.3-2.7), and knowledge about when a man can resume sex (4 weeks) after circumcision (aPR=2.1; CI: 1.8-3.3) were associated with women's support for VMMC. FGDs revealed that women were not adequately involved in VMMC activities for decision making.

CONCLUSION: The support for VMMC was high among women in the fishing communities. However, women perceived they were not involved in decision-making for VMMC and had several misconceptions, including a belief that vaginal fluids facilitate wound healing. The Ministry of Health and VMMC implementing partners should devise strategies to increase sensitization and involvement of women in VMMC decision-making without slowing service uptake.