Efficacy of VMMC in Preventing Incident HIV Infection in MSM: A Randomized Controlled Trial

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June 17, 2024

HPTN Annual Meeting

Presentation Highlights

1. Does VMMC block HIV acquisition among MSM?
2. RCT in China found that VMMC does prevent transmission.
3. VMMC can be offered to MSM to reduce HIV risk.

3 RCTs in Africa, 60% Efficacy in Heterosexual Men in Africa

World Health Organization

Joint United Nations Programme on HIV/AIDS
UNAIDS
UNICEF • UNDP • UNFPA • UNDCP
UNESCO • WHO • WORLD BANK

The World Health Organization and the Joint United Nations Programme on HIV/AIDS (UNAIDS) recommend voluntary male medical circumcision as an important strategy for HIV prevention for heterosexual men.

Research Question

Can VMMC prevent incident HIV infection among MSM? (HPTN 079 → CoM)

Research Question

Circumcision to prevent HIV and other sexually transmitted infections in men who have sex with men: a systematic review and meta-analysis of global data

Tanwei Yuan, Thomas Fitzpatrick*, Nai-Ying Ko*, Yong Cai, Yingqing Chen, Jin Zhao, Linghua Li, Junjie Xu, Jing Gu, Jinghua Li, Chun Hao, Zhengrong Yang, Weiping Cai, Chien-Yu Cheng, Zhenzhou Luo, Kechun Zhang, Guohui Wu, Xiaojun Meng, Andrew E Grulich, Yuantao Hao†, Huachun Zou†*

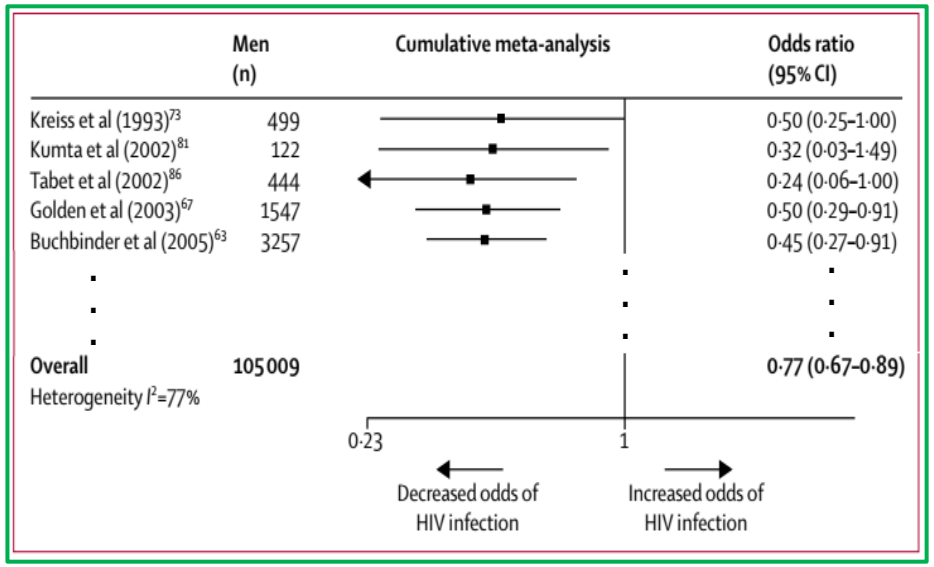
Lancet Glob Health. 2019;7(4):e436-e447.

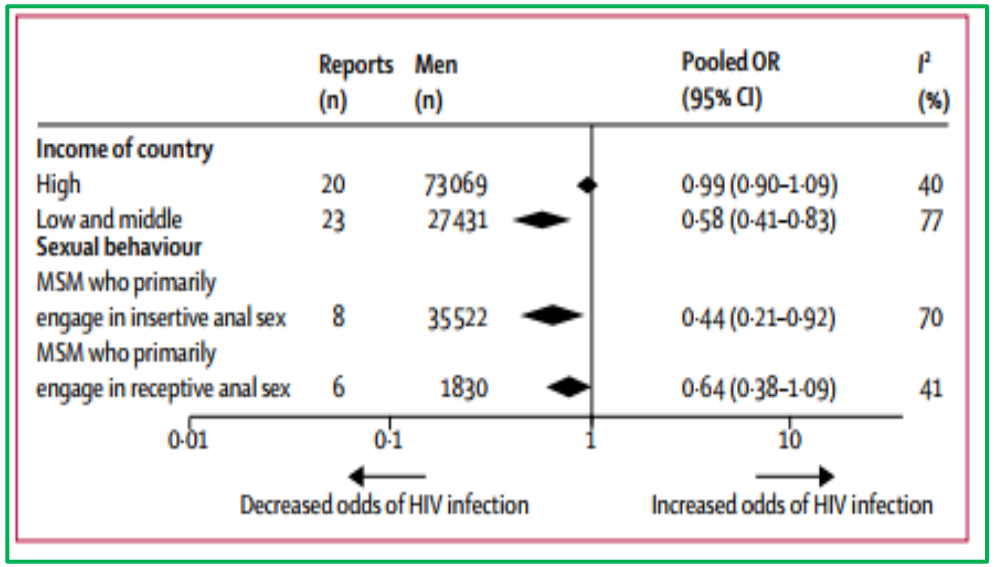
And a second systematic review!

Zhang C, Qian HZ, Liu Y, Vermund SH. **Voluntary medical male circumcision and HIV infection among men who have sex with men: Implications from a systematic review.** *SAGE Open Med*. 2019;7:2050312119869110.

Research Question

- Overall: 23% HIV
  1) Insertive partner: 56%
  2) Developing countries: 42%
- HPV: 29% HSV-2: 16%





Yuan…Zou, *Lancet Glob Health* 2019

Preliminary finding: cross-sectional--correlation

RCT is needed to answer cause-effect

Methods

- Primary objective: To evaluate the efficacy of VMMC in preventing incident HIV infection among MSM
- Secondary objectives：
  1）Change in sexual behaviors
  2）Safety
  3）Satisfaction

- Study Design: Multi-center RCT comparing immediate vs. deferred (12 mo.) circumcision

Methods

- Timeline： Recruitment 20 months; Follow-up 12 months
- Sites： Beijing, Tianjin, Qingdao, Chongqing, Luzhou, Guangzhou, Shenzhen, Foshan, Jiangmen

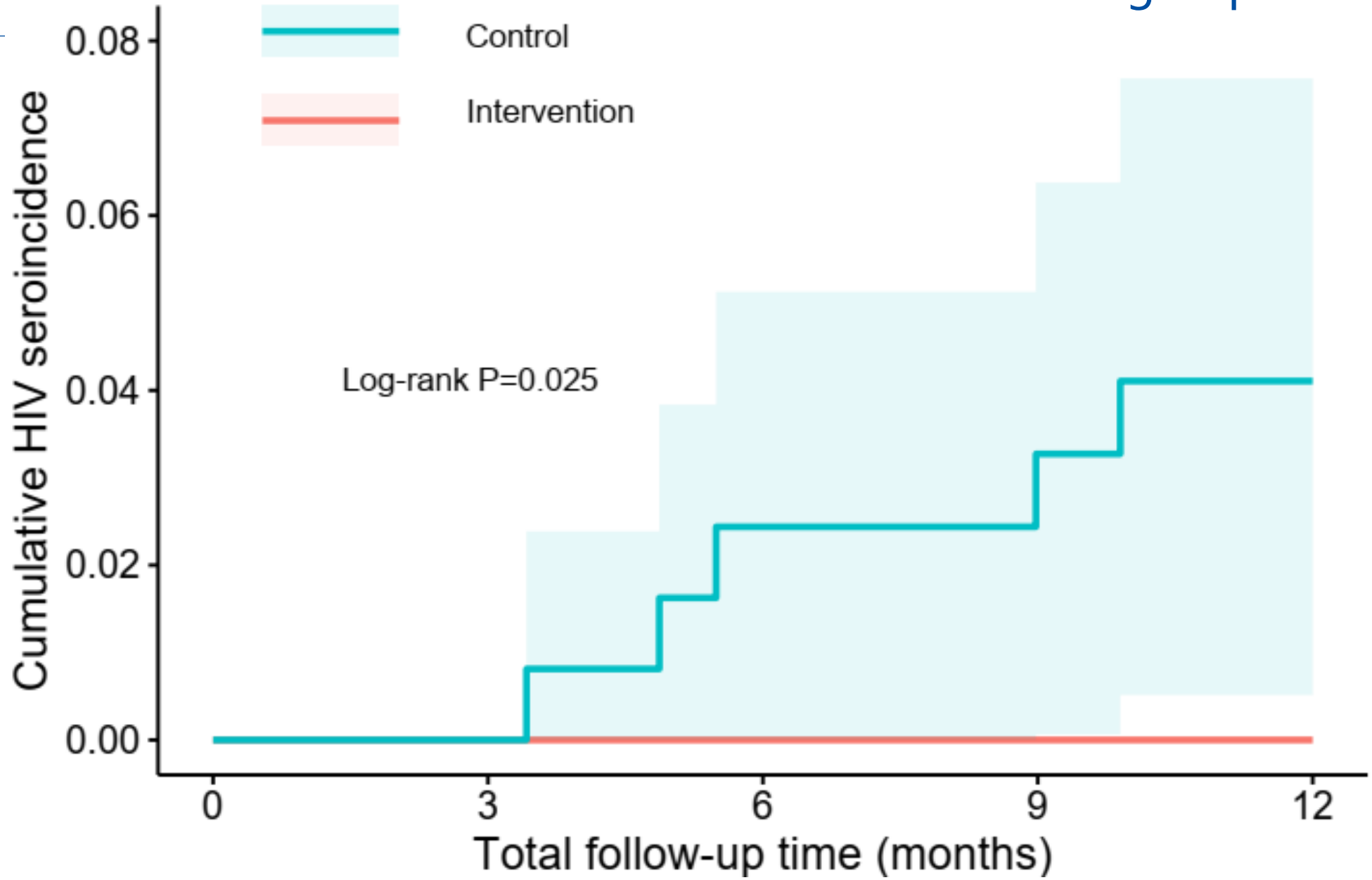
Chu ZX, et al. China. Sci Rep 2018; 8(1): 24.
Zhang J, et al. AIDS Behav 2018; 22(3): 711-21.
Huang W, et al. Open Forum Infect Dis 2020; 7(5):ofaa147.

Results

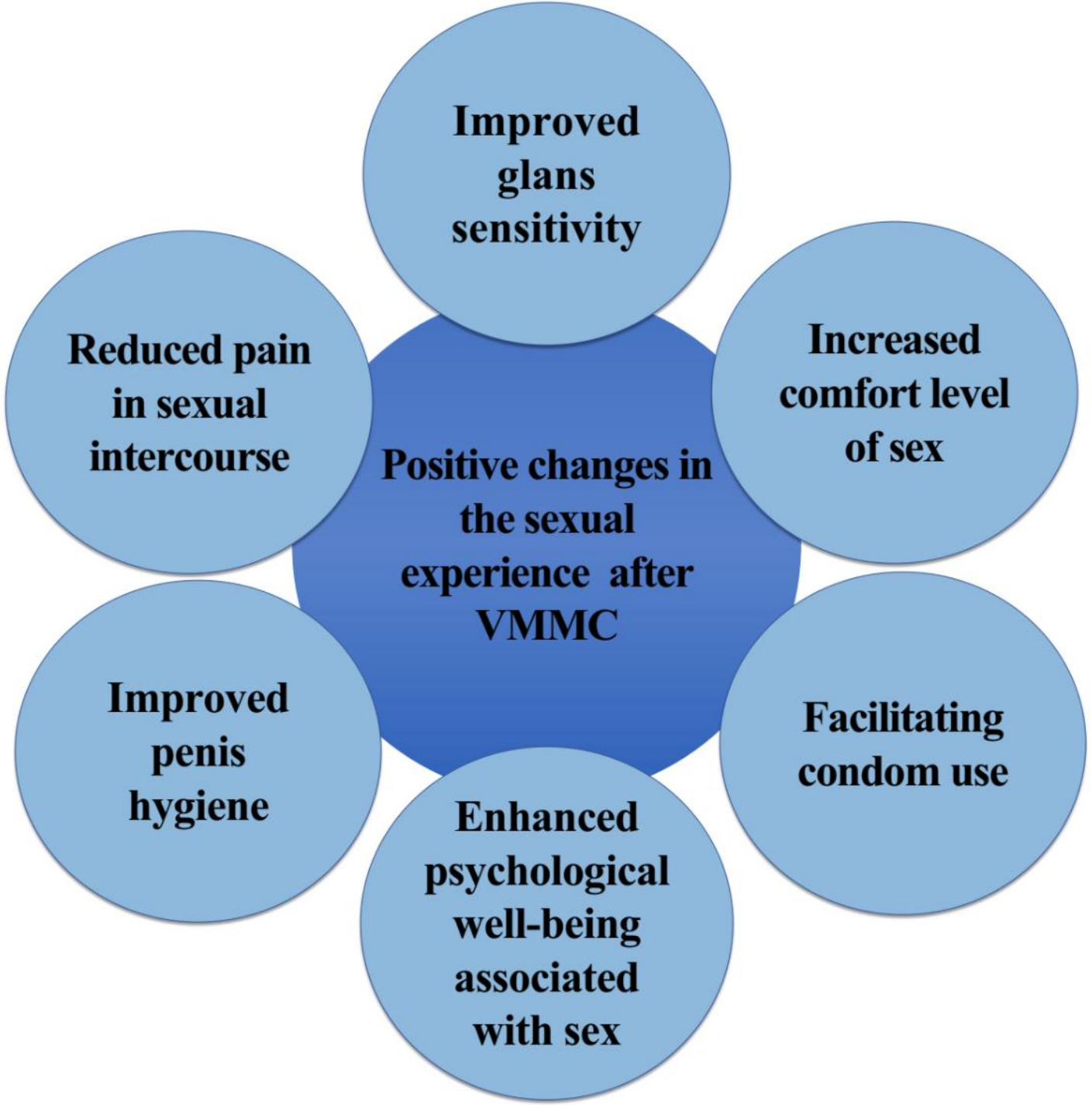
- Intervention: 124 men, 121 py, 0 seroconversion, HIV incidence rate: 0.0/100 py, 95%CI: 0.0-3.1/100 py
- Control: 123 men, 123 py, 5 seroconversions, HIV incidence rate: 4.2/100 py, 95% CI: 1.3-9.5/100 py
- HR: 0.09, 95% CI: 0.00 to 0.81, *P*=0.029 - penalization method
- No differences in syphilis, HSV-2, penile HPV given this sample size and length of F/U

Results

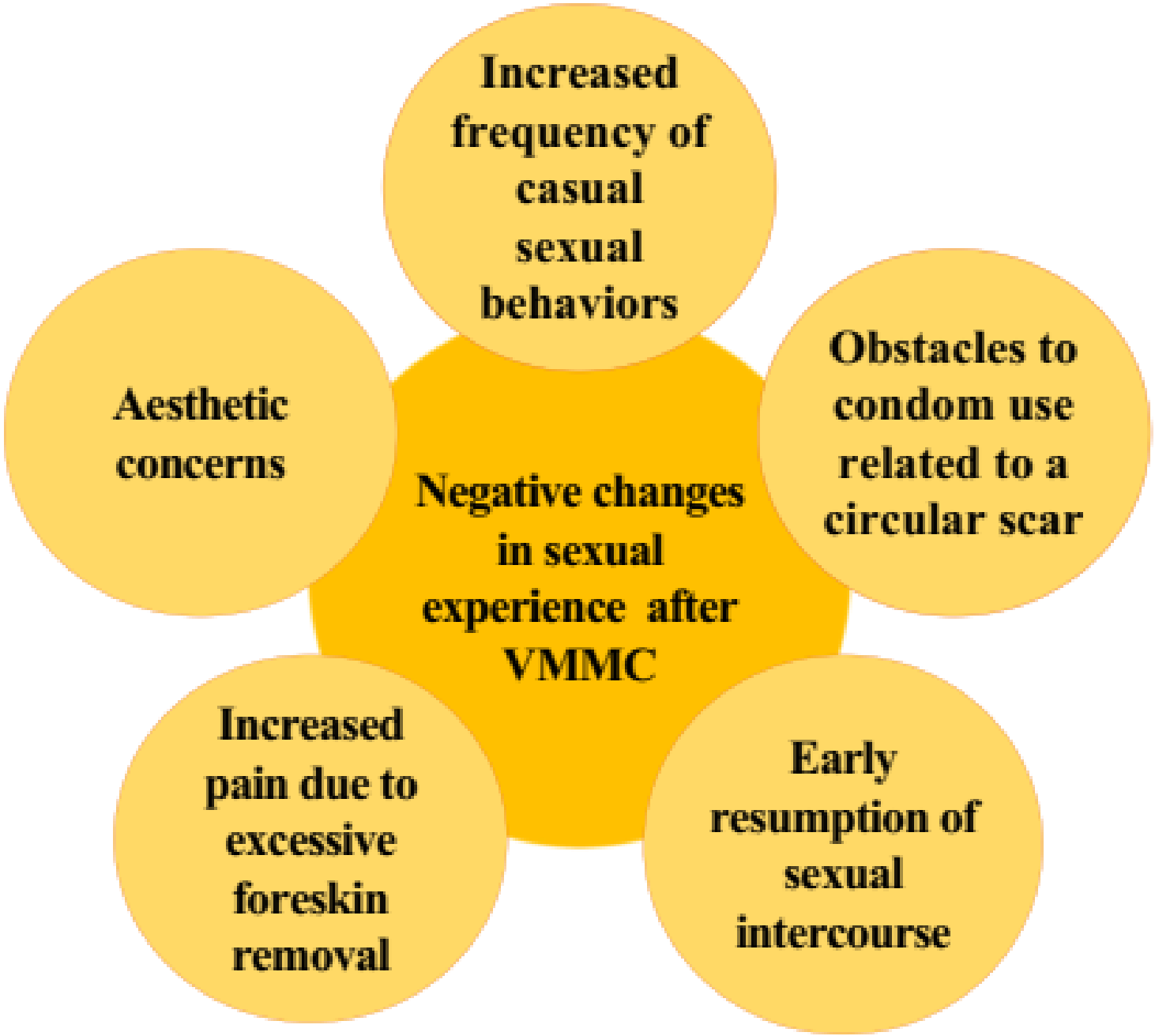
HIV seroincidence in the two groups



Results


Improved glans sensitivity
Reduced pain in sexual intercourse
Increased comfort level of sex
Positive changes in the sexual experience after VMMC
Improved penis hygiene
Facilitating condom use
Enhanced psychological well-being associated with sex

Results


Increased frequency of casual sexual behaviors
Aesthetic concerns
Negative changes in sexual experience after VMMC
Obstacles to condom use related to a circular scar
Increased pain due to excessive foreskin removal
Early resumption of sexual intercourse

Publications

Annals of Internal Medicine ORIGINAL RESEARCH

Efficacy of Voluntary Medical Male Circumcision to Prevent HIV Infection Among Men Who Have Sex With Men

A Randomized Controlled Trial

Yanxiao Gao, MD, PhD*; Yuewei Zhan, MPH*; Yinghui Sun, MD*; Weiran Zheng, MPH; Weijie Zhang, MD; Leiwen Fu, MD; Zhihui Guo, MD; Yi-Fan Lin, PhD; Yuwei Li, MS; Lingling Zheng, PhD; Yiqiang Zhan, PhD; Zhiqiang Zhu, MD; Junyi Duan, MS; Guanghui Zhang, MS; Tao Huang, MS; Bin Su, PhD; Maohe Yu, MD; Guohui Wu, MD; Lin Ouyang, MD; Jin Zhao, PhD; Guanghui Wang, MD; Yepeng Zhou, MD; Han-Zhu Qian, PhD; Thomas Fitzpatrick, MD; Sten H. Vermund, MD, PhD; and Huachun Zou, PhD

Ann Intern Med. [Epub 28 May 2024]. doi:10.7326/M23-3317

Conclusions

- RCT confirms VMMC efficacious in preventing incident HIV infection among MSM
- Risk Compensation was not observed
- High follow-up, high surgical completion, high surgical satisfaction
- AEs improved quickly
- Resumption of sexual activity within the abstinence period (6 weeks after surgery) was high, but most wounds were healed
- Settings such as MSM in China may be particularly suitable for VMMC for HIV prevention

Acknowledgments

Support for developmental work for HPTN 079 and overall support for the HPTN is provided by the NIAID, Office of the Director, NIH, NIDA, NIMH, and NICHD under Award Numbers UM1AI068619-17 (HPTN Leadership and Operations Center), UM1AI068617-17 (HPTN Statistical and Data Management Center), and UM1AI068613-17 (HPTN Laboratory Center). The content is solely the responsibility of the authors and does not represent the official views of the NIH.

Thank You !

Thanks to the CoM participants an many staff and facilitators, and to Professor Zou for persistence.

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For questions

Methods- Inclusion Criteria

1. Biological male
2. 18-49 years of age
3. ≥2 male sex partner, ≥10 anal sex encounters, in past 6 m
4. Insertive party in ≥70% of anal sex encounters
5. HIV uninfected
6. Willing to undergo VMMC
7. In non erectile, covers over half of glans penis
8. Willing to be randomized to early or later circumcision

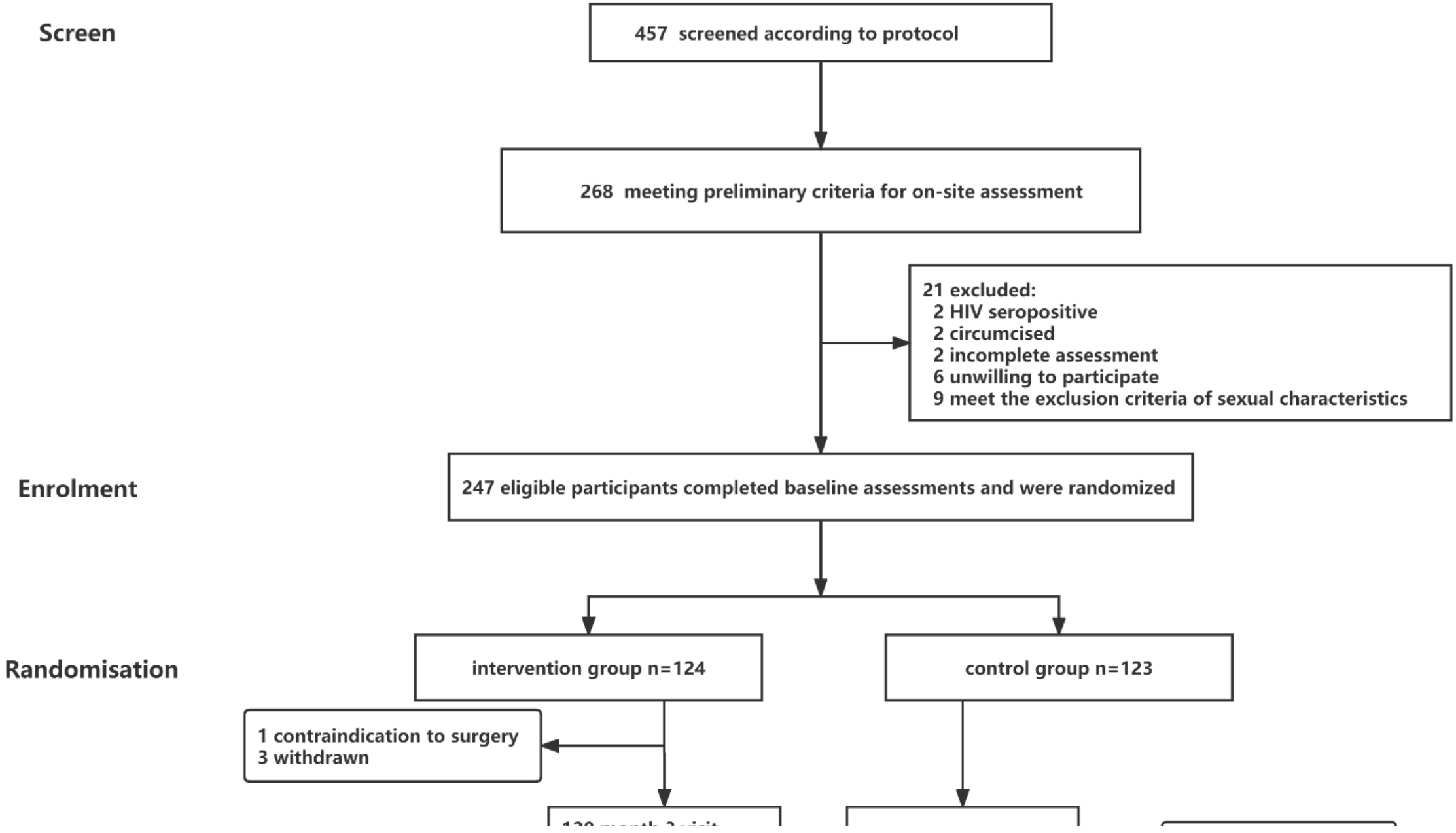
Methods - Exclusion Criteria

1. Already circumcised;
2. Participated in other HIV biomedical prevention projects
3. Hemophilia or other bleeding disorders
4. Other contraindications for circumcision

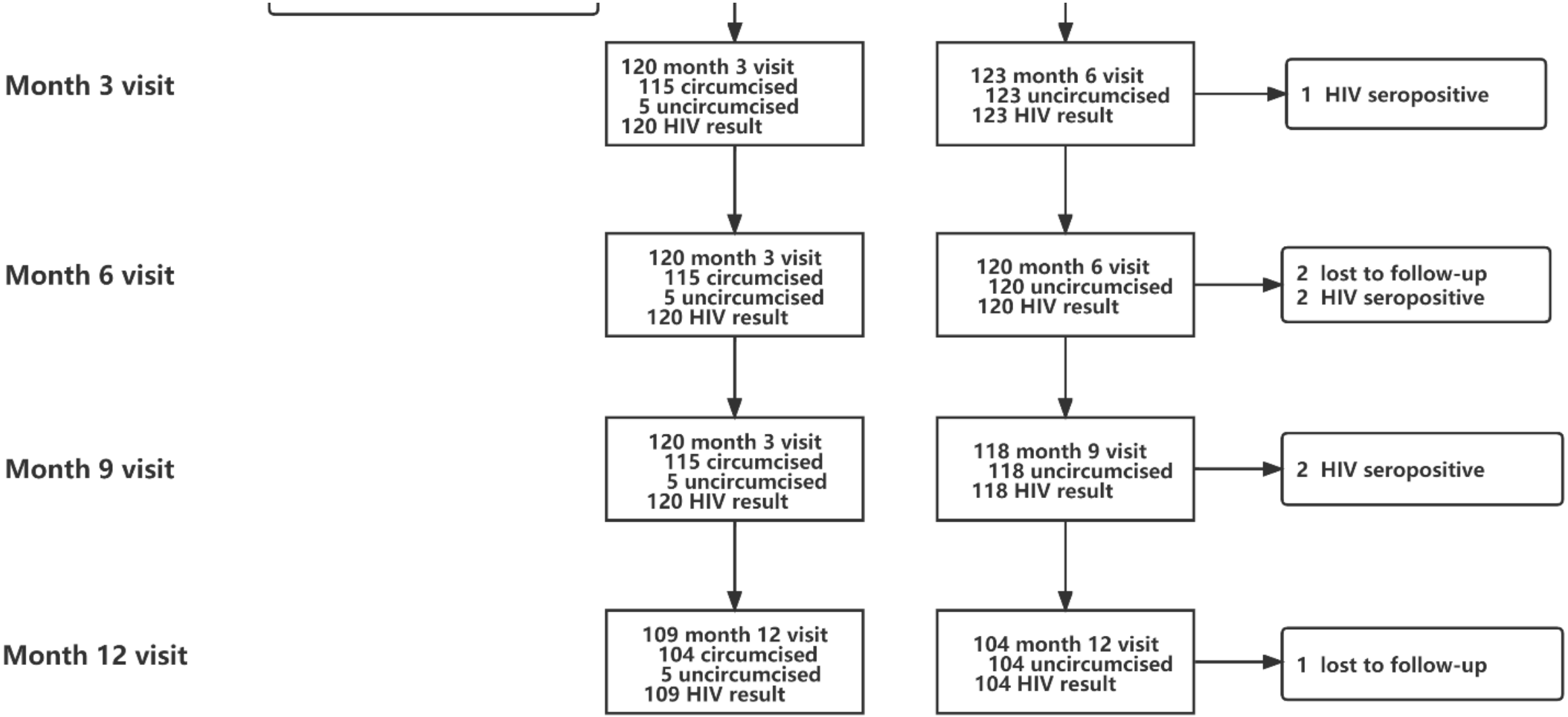
Methods

- HIV and other STIs (syphilis, HSV-2, and penile HPV) incidence estimated per 100 person-years by the Poisson regression models or exact method, as appropriate.
- Intention-to-treat approach.
- We summarized baseline characteristics of the entire sample as well as the intervention and control arms separately with descriptive statistics.
- The variables for each behavioral characteristic were analyzed separately using generalized linear model tailored for longitudinal data analysis.
- Penalization methods add a small constant to all cells of the contingency table (continuity correction) or a Bayesian approach with informative priors, for estimating hazard ratio (HR) and 95% Cis to handle scenarios with zero events.
- The log-rank test applied to discern differences in HIV seroconversion probabilities between the early vs. late circumcision arms.
- Two-sided *P* value of <0.05 as level of statistical significance.

Results


Screen
457 screened according to protocol
268 meeting preliminary criteria for on-site assessment
21 excluded:
2 HIV seropositive
2 circumcised
2 incomplete assessment
6 unwilling to participate
9 meet the exclusion criteria of sexual characteristics
Enrolment
247 eligible participants completed baseline assessments and were randomized
Randomisation
intervention group n=124
control group n=123
1 contraindication to surgery
3 withdrawn

Results


Month 3 visit
120 month 3 visit
115 circumcised
5 uncircumcised
120 HIV result
123 month 6 visit
123 uncircumcised
123 HIV result
1 HIV seropositive
Month 6 visit
120 month 3 visit
115 circumcised
5 uncircumcised
120 HIV result
120 month 6 visit
120 uncircumcised
120 HIV result
2 lost to follow-up
2 HIV seropositive
Month 9 visit
120 month 3 visit
115 circumcised
5 uncircumcised
120 HIV result
118 month 9 visit
118 uncircumcised
118 HIV result
2 HIV seropositive
Month 12 visit
109 month 12 visit
104 circumcised
5 uncircumcised
109 HIV result
104 month 12 visit
104 uncircumcised
104 HIV result
1 lost to follow-up

Results

Variable	All（n=247，%）	Intervention（n=124，%）	Control（n=123，%）
Age	28.0 [24.0, 34.0]	28.0 [24.0, 33.0]	28.0 [24.0, 36.0]
Ethnicity			
Han	233 (94.3)	118 (95.2)	115 (93.5)
Others	14 (5.7)	6 (4.8)	8 (6.5)
Education			
High school and below	79 (32.0)	36 (29.0)	43 (35.0)
College and above	168 (68.0)	88 (71.0)	80 (65.0)
Salary (CNY)			
<5000	127 (51.4)	65 (52.4)	62 (50.4)
>=5000	120 (48.6)	59 (47.6)	61 (49.6)
Students			
No	201 (81.4)	105 (84.7)	96 (78.0)
Full-time	41 (16.6)	18 (14.5)	23 (18.7)
Part-time	5 (2.0)	1 (0.8)	4 (3.3)
Marital status			
Single/divorced/widowed	176 (71.3)	84 (67.7)	92 (74.8)
Married/coinhabit	71 (28.7)	40 (32.3)	31 (25.2)
Sexual orientation			
Homosexual	210 (85.0)	104 (83.9)	106 (86.2)
Bisexual	37 (15.0)	20 (16.1)	17 (13.8)