**ROŚ, Bartosz, SIEKANIEC, Katarzyna, DOJS, Adriana, MIERZWIŃSKA-MUCHA, Julia, JAKUBOWICZ, Magdalena, KUCHENBEKER, Natalia and KOWALEWSKI, Wojciech. Male Circumcision and Its Long-Term Impact on Infections and Sexual Health: A Literature Review. Journal of Education, Health and Sport. 2025;82:60483. eISSN 2391-8306.**
**https://doi.org/10.12775/JEHS.2025.82.60483**
**https://apcz.umk.pl/JEHS/article/view/60483**

The journal has had 40 points in Minister of Science and Higher Education of Poland parametric evaluation. Annex to the announcement of the Minister of Education and Science of 05.01.2024 No. 32318. Has a Journal's Unique Identifier: 201159. Scientific disciplines assigned: Physical culture sciences (Field of medical and health sciences); Health Sciences (Field of medical and health sciences).
Punkty Ministerialne 40 punktów. Załącznik do komunikatu Ministra Nauki i Szkolnictwa Wyższego z dnia 05.01.2024 Lp. 32318. Posiada Unikatowy Identyfikator Czasopisma: 201159. Przypisane dyscypliny naukowe: Nauki o kulturze fizycznej (Dziedzina nauk medycznych i nauk o zdrowiu); Nauki o zdrowiu (Dziedzina nauk medycznych i nauk o zdrowiu). 
The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 23.04.2025. Revised: 25.04.2025. Accepted: 18.06.2025. Published: 25.06.2025.

# Male Circumcision and Its Long-Term Impact on Infections and Sexual Health: A Literature Review

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**Abstract:**

**Introduction and Purpose:**

Male circumcision is a surgical procedure that has been performed for thousands of years. In addition to traditional religious or cultural indications, there are also medical reasons for undertaking this intervention. Recently, there has been growing interest in the long-term effects of circumcision, particularly its association with sexually transmitted infections (STIs) and sexual satisfaction. The aim of this article is to provide a comprehensive overview of the current state of research on these issues.

**Current State of Knowledge:**

Our analysis of observational studies, systematic reviews, and meta-analyses indicates that male circumcision significantly reduces the risk of HIV and HPV infections, and lowers the likelihood of transmission to sexual partners. This also translates into reduced risk of cervical cancer in female partners of circumcised men. However, data concerning other STIs, such as Chlamydia trachomatis and Treponema pallidum, remain inconclusive and require further investigation. Male circumcision is also a well-established factor in reducing the incidence of urinary tract infections (UTIs). Findings related to sexual satisfaction post-circumcision are conflicting, with some studies reporting increased satisfaction, while others indicate a decline.

**Summary:**

Male circumcision appears to offer long-term protective benefits against HIV, HPV, and UTIs. However, due to inconsistent findings on other STIs and sexual satisfaction outcomes, further high-quality research is necessary to draw more definitive conclusions**.**

**Key words:** Male circumcision, foreskin removal, STI, HIV

**Introduction and purpose:**

Circumcision is a procedure in which the foreskin of the penile glans is partially or completely removed, resulting in the continuous exposure of the glans. It is a surgical practice that has been performed for thousands of years in various parts of the world. Despite its long

history, it has not lost its popularity and remains one of the most commonly performed surgical procedures worldwide [1].

Over the years, the course of the procedure, the technique used to perform it, as well as peri- and postoperative care, have evolved — particularly due to advances in aseptic techniques and modern medicine. Today, the health implications of circumcision are the subject of ongoing scientific debate and research, drawing interest from around the world. Researchers compare different techniques and postoperative protocols, report long-term observations related to complications, and seek to establish a link between this procedure and infections with the most common sexually transmitted viruses: human papillomavirus (HPV) and human immunodeficiency virus (HIV). The complications and long-term effects of the procedure remain a matter of debate and are often a source of controversy.

The aim of our study was to conduct a literature review that compiles the most recent knowledge on the circumcision procedure, with a focus on its long-term health implications.

We conducted a literature review using PubMed, Google Scholar, and Elsevier. A team consisting of two independent authors (B.R. and K.S.) carried out the research using search terms “male circumcision” and “foreskin removal”. Additional references were obtained from the bibliographies of previously selected articles.

**Describtion of state of knowledge:**

History, indications and methods

The earliest historical evidence of male circumcision dates back more than 6,000 years, as shown by ancient drawings and Egyptian mummies from that era [2]. Over the years, the procedure has not lost its popularity, as indicated by estimates suggesting that, depending on the source, approximately 12.5% to 39.0% of men worldwide have undergone circumcision [1, 3, 4].

Circumcision is mandatory in some cultures and religions, such as Judaism, among the majority of Muslim scholars, and in certain traditional African communities — where it is often performed within the first days of a newborn’s life [2, 3]. Circumcision is less common in European countries, but in some parts of the world, such as Canada, Africa, and the USA, most newborns undergo the procedure [3].

In addition to being performed for cultural or religious reasons, circumcision may also be indicated for medical purposes. The most frequently cited indications include phimosis, paraphimosis, balanitis and/or balanoposthitis, as well as recurrent urinary tract infections (UTIs) [3, 5].

Many surgical techniques and methods have been developed over the years. Some involve traditional surgical removal of the foreskin, such as the dorsal slit or sleeve technique [6]. Circumcision staple devices are growing in popularity, as they can simultaneously cut and suture the foreskin, allowing the procedure to be performed more quickly and with less pain. Laser-assisted circumcision methods have also been described [3, 7]. The most commonly used methods among newborns include the Mogen clamp, the Gomco clamp, and the Plastibell device [4, 5]. Sinkey et al. suggested that the Mogen clamp causes less pain than the Gomco clamp [8].

Regardless of the method used, all patients should be provided with adequate anesthesia. Pain relief can be achieved using various methods, the most common being a dorsal penile nerve block, penile ring block, or the application of lidocaine/prilocaine cream to the foreskin [9, 10]. However, in some cases of cultural or religious circumcision, anesthesia is not used [4].

Potential complications

The typical complications of circumcision are similar to those associated with other surgical procedures. The overall complication rate is estimated at 3.8% of all procedures [6]. The most common complications include hemorrhage (incidence: 0.32%, making it the most frequent), pain, swelling, and wound infection. In cases of poor surgical technique, mechanical injury to the penile glans may also occur [5]. Serious adverse effects are rare and are usually associated with additional risk factors and improper surgical technique [1].

Long-term complications that may also occur include persistent pain, mucosal or skin adhesions, fistulas, decreased penile sensitivity, post-inflammatory hyperpigmentation, necrotizing fasciitis, and changes in sexual function [3, 6, 11]. Despite emerging theories about the potential psychological adverse effects (in cognitive abilities, body image disorders, etc.) caused by neonatal circumcision, high-quality evidence shows that this procedure does not predisposes to such disorders [12].

Risk of urinary tract infections (UTIs) after circumcision

Dubrovsky et al. observed a higher risk of UTIs in uncircumcised boys compared to circumcised ones — a finding supported by a large systematic review including 402,908 patients, which estimated an 87% risk reduction associated with circumcision [2, 13]. This relationship is particularly important in boys with antenatal hydronephrosis (AHN), where UTIs are a significant risk factor for renal damage. A protective effect of circumcision has been demonstrated across all subgroups of AHN patients, regardless of etiology, including

those with vesicoureteral reflux, obstructive hydronephrosis, and posterior urethral valves. Therefore, circumcision should be considered in boys with AHN, with individual assessment of the benefit-risk ratio given the potential complications of the procedure [4, 14, 15].

Human Papilloma Virus (HPV) infection and transmission

HPV is the most common sexually transmitted infection (STI) worldwide. More than 40 subtypes of this virus are known to infect mucosal surfaces of the body and are categorized into low-risk and high-risk oncogenic types. Infection with low-risk types (such as HPV 6 or HPV 11) can lead to genital warts (benign lesions of the anogenital region) and low-grade squamous intraepithelial lesions of the cervix [16]. High-risk types (such as HPV 16 and HPV 18) are strongly associated with the development of cervical, vulvar, anal, penile, and oropharyngeal cancers [17].

Male circumcision has been shown to reduce the prevalence of genital HPV infection by 32–43% in men who undergo the procedure, as confirmed by meta-analyses and systematic reviews conducted across various populations globally [2, 18, 19, 20, 21].

There is also a significant protective effect for female partners of circumcised men, who demonstrate a lower risk of infection with both oncogenic and non-oncogenic HPV types. This manifests as a reduced incidence of secondary HPV-related cancers, including cervical cancer — with one study reporting a 58% reduction in risk among female partners of circumcised men compared to those with uncircumcised partners [21, 22].

Semen HPV infection has also recently been associated with asthenozoospermia, the presence of anti-sperm antibodies, reduced semen volume and sperm count, as well as an increased sperm DNA fragmentation index. These factors may contribute to difficulties in achieving pregnancy, although further research in this area is needed. [23, 24].

Penile carcinoma

The most common single agent that promotes genetic mutations and induces the neoplastic process leading to penile carcinoma is HPV. Approximately 40% of penile cancers are classified as HPV-associated (mostly HPV-16). In the remaining cases, these cancers are not related to infection with this virus (HPV-independent) and result from processes induced by other risk factors, such as phimosis, smoking, poor hygiene, or low socioeconomic status [22, 25].

It should be emphasized that HPV-associated subtypes are considered high-risk due to their greater potential to invade lymph nodes and form distant metastases. A strong correlation has

been demonstrated between paediatric circumcision and lower rates of invasive penile cancer. However, there is a lack of high-quality evidence supporting an association between paediatric circumcision and in situ penile cancer or intraepithelial neoplasia [26].

Circumcision thus appears to be a procedure that reduces the risk of both HPV-associated (by decreasing the likelihood of infection with the virus) and HPV-independent penile cancer (as removal of the foreskin prevents the development of phimosis and facilitates proper hygiene) [25, 27].

Human Immunodeficiency Virus (HIV) infection

HIV infections have been described by the World Health Organization (WHO) as an epidemic. In 2021, an estimated 38.4 million people worldwide were living with HIV, including 1.5 million new infections. While it is difficult to determine the exact number of cases, it is believed that this number has continued to grow. There are two serotypes of the virus – HIV-1 and HIV-2 – with HIV-1 accounting for approximately 95% of infections [28]. Although the development and wider availability of pre-exposure prophylaxis (PrEP), along with the implementation of community education programs, have contributed to a decline in transmission rates, the virus still causes significant morbidity and mortality [29].

It has been suggested that circumcision may help reduce the risk of HIV acquisition by lowering the chance of female-to-male HIV transmission [29]. We identified numerous studies confirming that circumcision significantly reduces the odds of HIV infection—by up to 70% — among both men who have sex with women (MSW) and men who have sex with men (MSM) [4, 30, 31, 32, 33].

However, it is worth noting that some authors argue circumcision offers little protection for women against transmission from HIV-positive male partners [31, 34].

Given that MSM are disproportionately affected by HIV worldwide, some researchers recommend including this group in circumcision promotion campaigns in low- and middle-income countries [29]. Nevertheless, it is advised that the procedure be performed only in adulthood, when individuals are able to provide informed consent [4].

Other sexually transmitted infections (STIs)

In addition to HIV and HPV, other STIs, which also pose a significant epidemiological concern, are being investigated in ongoing studies. Unfortunately, for many STIs, the findings remain inconclusive and often vary depending on the geographic origin of the study population. A literature review by Morris B. et al. indicated that some studies report lower

rates of Chlamydia trachomatis infection among circumcised men and their partners compared to uncircumcised men and their partners. However, other studies contradict this association [21]. When comparing similar study groups, no significant difference was observed in the incidence of Neisseria gonorrhoeae infection. Regarding Trichomonas vaginalis, the risk of infection and transmission may be reduced, but further research is necessary [35].

The evidence on Treponema pallidum (syphilis) is also mixed—some studies suggest a reduced risk of infection following circumcision, while others do not support this finding [36]. Interestingly, female partners of circumcised men were found to be 40% less likely to develop bacterial vaginosis [37].

Sexual function and satisfaction

The relationship between circumcision and sexual function has been the subject of many scientific studies, with conflicting findings. Unfortunately, there is no consensus regarding the impact of circumcision on sexual function, and the conclusions of the authors vary depending on the study. Some claim that circumcised men experience reduced penile sensitivity, which may lead to difficulties in achieving orgasm, and that their female partners are more likely to report dissatisfaction with sexual fulfillment [38, 39]. Other authors suggest that circumcision increases penile sensitivity, which is expected to positively affect overall sexual satisfaction [40, 41]. Additionally, some emerging studies indicate no significant change in sexual satisfaction following circumcision [42]. Undoubtedly, this remains an area that requires further research. The methodology for studying this issue is challenging due to the complexity of factors affecting sexual satisfaction, as well as the difficulty in measuring and comparing it.

**Conclusions:**

The reviewed literature indicates that male circumcision is an effective procedure for reducing the risk of urinary tract infections (UTIs), which is particularly important in patients at risk of secondary kidney damage. Moreover, the protective effect of circumcision in reducing both the acquisition and transmission of human papillomavirus (HPV) and human immunodeficiency virus (HIV) has been consistently demonstrated in the literature, reinforcing its potential value as a preventive public health intervention against these infections. Male circumcision may also offer indirect health benefits for women, as reduced male-to-female HPV transmission lowers the risk of cervical cancer.

In contrast, findings regarding the impact of circumcision on the risk of other sexually transmitted infections (STIs) and on sexual satisfaction remain inconclusive, with results

varying depending on study design, population size, and demographic background.
This area warrants further investigation and would benefit from greater standardization in research methodology.

**Disclosure:**

**Authors' contribution**

Conceptualization: BR and KS;
Methodology: BR and JMM;
Software: WK and NK;
Check: AD, WK and JMM;
Formal analysis: NK;
Investigation: BR and KS;
Resources: MJ and KS;
Data curation: MJ;
Writing - rough preparation: BR and KS;
Writing - review and editing: MJ, NK and JMM;
Visualization: MJ and WK;
Supervision: KS;
Project administration: BR;
Receiving funding: not applicable;
All authors have read and agreed with the published version of the manuscript.

**Funding Statement:** The study did not receive special funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflicts of interest.

**Acknowledgements:** Not applicable.

**Declaration of the use of generative AI and AI-assisted technologies in the writing process:** In preparing this work, the authors used ChatGPT for the purpose of improving readability and text formatting. After using this tool, the authors have reviewed and edited the content as needed and accepted full responsibility for the substantive content of the publication.

**List of references:**


1. Ventura F, Caputo F, Licata M, Bonsignore A, Ciliberti R. Male circumcision: ritual, Science and Responsibility. *Ann Ist Super Sanità*. 2020;56(3):351-358. doi:https://doi.org/10.4415/ANN_20_03_13

2. Alkhenizan A, Elabd K. Non-therapeutic infant male circumcision. Evidence, ethics, and international law perspectives. *Saudi Medical Journal*. 2016;37(9):941-947. doi:https://doi.org/10.15537/smj.2016.9.14519

3. Rosato E, Miano R, Germani S, Asimakopoulos AD. Phimosis in Adults: Narrative Review of the New Available Devices and the Standard Treatments. *Clinics and Practice*. 2024;14(1):361-376. doi:https://doi.org/10.3390/clinpract14010028

4. Prabhakaran S, Ljuhar D, Coleman R, Nataraja RM. Circumcision in the paediatric patient: A review of indications, technique and complications. *Journal of Paediatrics and Child Health*. 2018;54(12):1299-1307. doi:https://doi.org/10.1111/jpc.14206

5. Sinan Kılıç. Comparative analysis of two methods in circumcision: a new disposable device versus classic sleeve technique. *BMC Urology*. 2024;24(1). doi:https://doi.org/10.1186/s12894-024-01513-9

6. Shabanzadeh DM, Clausen S, Maigaard K, Fode M. Male Circumcision Complications - A systematic review, meta-analysis and meta-regression. *Urology*. 2021;153(1). doi:https://doi.org/10.1016/j.urology.2021.01.041

7. Ameer Steven-Jorg Hohlfeld, Ebrahim S, Muhammed Zaki Shaik, Kredo T. Circumcision devices versus standard surgical techniques in adolescent and adult male circumcisions: a Cochrane review. *BJU International*. 2021;130(1):26-34. doi:https://doi.org/10.1111/bju.15604

8. Sinkey RG, Eschenbacher MA, Walsh PM, et al. The GoMo study: a randomized clinical trial assessing neonatal pain with Gomco vs Mogen clamp circumcision. *American Journal of Obstetrics and Gynecology*. 2015;212(5):664.e1-664.e8. doi:https://doi.org/10.1016/j.ajog.2015.03.029

9. Omole F, Smith W, Carter-Wicker K. Newborn Circumcision Techniques. *American Family Physician*. 2020;101(11):680-685. https://pubmed.ncbi.nlm.nih.gov/32463643/

10. Labban M, Menhem Z, Bandali T, Hneiny L, Zaghal A. Pain control in neonatal male circumcision: A best evidence review. *Journal of Pediatric Urology*. 2020;17(1). doi:https://doi.org/10.1016/j.jpurol.2020.09.017

11. Tirana R, Othman D, Gad D, Elsadek M, Fahmy MAB. Pigmentary complications after non-medical male circumcision. *BMC Urology*. 2022;22(1). doi:https://doi.org/10.1186/s12894-022-00999-5

12. Morris BJ, Moreton S, Bailis SA, Cox G, Krieger JN. Critical evaluation of contrasting evidence on whether male circumcision has adverse psychological effects: A systematic review. *Journal of Evidence-Based Medicine*. 2022;15(2):123-135. doi:https://doi.org/10.1111/jebm.12482

13. Dubrovsky AS, Foster BJ, Jednak R, Mok E, McGillivray D. Visibility of the urethral meatus and risk of urinary tract infections in uncircumcised boys. *CMAJ*. 2012;184(15):E796-E803. doi:https://doi.org/10.1503/cmaj.111372

14. Irfan Wahyudi, Putu Angga Risky Raharja, Gerhard Reinaldi Situmorang, Arry Rodjani. Circumcision reduces urinary tract infection in children with antenatal hydronephrosis: Systematic review and meta-analysis. *Journal of Pediatric Urology*. 2023;19(1):66-74. doi:https://doi.org/10.1016/j.jpurol.2022.10.029

15. Chan J, Adree Khondker, Min Joon Lee, et al. The role of circumcision in preventing urinary tract infections in children with antenatal hydronephrosis: Systematic review and meta-analysis. *Journal of Pediatric Urology*. 2023;19(6). doi:https://doi.org/10.1016/j.jpurol.2023.07.017

16. Trottier H, Franco EL. The epidemiology of genital human papillomavirus infection. *Vaccine*. 2006;24(1):S4-S15. doi:https://doi.org/10.1016/j.vaccine.2005.09.054

17. Wolf J, Kist LF, Pereira SB, et al. Human papillomavirus infection: Epidemiology, biology, host interactions, cancer development, prevention, and therapeutics. *Reviews in Medical Virology*. 2024;34(3):e2537. doi:https://doi.org/10.1002/rmv.2537

18. Shapiro SB, Laurie C, El-Zein M, Franco EL. Association between male circumcision and human papillomavirus infection in males and females: a systematic review, meta-analysis, and meta-regression. *Clinical Microbiology and Infection*. 2023;29(8):968-978. doi:https://doi.org/10.1016/j.cmi.2023.03.028

19. Shapiro SB, Wissing MD, Khosrow-Khavar F, et al. Male Circumcision and Genital Human Papillomavirus (HPV) Infection in Males and Their Female Sexual Partners: Findings

From the HPV Infection and Transmission Among Couples Through Heterosexual Activity (HITCH) Cohort Study. *The Journal of Infectious Diseases*. 2022;226(7). doi:https://doi.org/10.1093/infdis/jiac147

20. Zhu YP, Jia ZW, Dai B, et al. Relationship between circumcision and human papillomavirus infection: a systematic review and meta-analysis. *Asian Journal of Andrology*. 2017;19(1):125-131. doi:https://doi.org/10.4103/1008-682X.175092

21. Morris BJ, Hankins CA, Banerjee J, et al. Does Male Circumcision Reduce Women's Risk of Sexually Transmitted Infections, Cervical Cancer, and Associated Conditions? *Frontiers in Public Health*. 2019;7(8). doi:https://doi.org/10.3389/fpubh.2019.00004

22. Castellsagué X, Bosch FX, Muñoz N, et al. Male Circumcision, Penile Human Papillomavirus Infection, and Cervical Cancer in Female Partners. *New England Journal of Medicine*. 2002;346(15):1105-1112. doi:https://doi.org/10.1056/nejmoa011688

23. Ferlin A, Foresta C. Infertility: Practical Clinical Issues for Routine Investigation of the Male Partner. *Journal of Clinical Medicine*. 2020;9(6):1644. doi:https://doi.org/10.3390/jcm9061644

24. Garolla A, Pizzol D, Bertoldo A, De Toni L, Barzon L, Foresta C. Association, prevalence, and clearance of human papillomavirus and antisperm antibodies in infected semen samples from infertile patients. *Fertility and Sterility*. 2013;99(1):125-131.e2. doi:https://doi.org/10.1016/j.fertnstert.2012.09.006

25. Mannam G, Miller JW, Johnson JS, et al. HPV and Penile Cancer: Epidemiology, Risk Factors, and Clinical Insights. *Pathogens (Basel, Switzerland)*. 2024;13(9):809. doi:https://doi.org/10.3390/pathogens13090809

26. Larke NL, Thomas SL, dos Santos Silva I, Weiss HA. Male circumcision and penile cancer: a systematic review and meta-analysis. *Cancer Causes & Control*. 2011;22(8):1097-1110. doi:https://doi.org/10.1007/s10552-011-9785-9

27. Smith JS, Backes DM, Hudgens MG, et al. Male Circumcision Reduces Penile HPV Incidence and Persistence: A Randomized Controlled Trial in Kenya. *Cancer Epidemiology, Biomarkers & Prevention*. 2021;30(6):1139-1148. doi:https://doi.org/10.1158/1055-9965.epi-20-1272

28. Williams A, Menon S, Crowe M, et al. Geographic and population distributions of HIV-1 and HIV-2 circulating subtypes: a systematic literature review and meta-analysis (2010-2021). *The Journal of Infectious Diseases*. 2023;228(11). doi:https://doi.org/10.1093/infdis/jiad327

29. Yuan T, Fitzpatrick T, Ko NY, et al. 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. *The Lancet Global Health*. 2019;7(4):e436-e447. doi:https://doi.org/10.1016/S2214-109X(18)30567-9

30. Vermund SH. Voluntary Medical Male Circumcision to Reduce HIV Acquisition and Transmission. *Current HIV/AIDS Reports*. 2022;19(6). doi:https://doi.org/10.1007/s11904-022-00631-z

31. LEI J hao, LIU L ren, WEI Q, et al. Circumcision Status and Risk of HIV Acquisition during Heterosexual Intercourse for Both Males and Females: A Meta-Analysis. Tang JW, ed. *PLOS ONE*. 2015;10(5):e0125436. doi:https://doi.org/10.1371/journal.pone.0125436

32. Gao Y, Zhan Y, Sun Y, et al. Efficacy of Voluntary Medical Male Circumcision to Prevent HIV Infection Among Men Who Have Sex With Men. *Annals of Internal Medicine*. 2024;177(6):719-728. doi:https://doi.org/10.7326/m23-3317

33. Weiss HA, Quigley MA, Hayes RJ. Male circumcision and risk of HIV infection in sub-Saharan Africa: a systematic review and meta-analysis. *AIDS*. 2000;14(15):2361-2370. doi:https://doi.org/10.1097/00002030-200010200-00018

34. Weiss HA, Hankins CA, Dickson K. Male circumcision and risk of HIV infection in women: a systematic review and meta-analysis. *The Lancet Infectious Diseases*. 2009;9(11):669-677. doi:https://doi.org/10.1016/s1473-3099(09)70235-x

35. Abigail Norris Turner, Morrison CS, Padian NS, et al. Male Circumcision and Women's Risk of Incident Chlamydial, Gonococcal, and Trichomonal Infections. *Sexually Transmitted Diseases*. 2008;35(7):689-695. doi:https://doi.org/10.1097/olq.0b013e31816b1fcc

36. Punjani N, Basourakos SP, Nang QG, et al. Genitourinary Infections Related to Circumcision and the Potential Impact on Male Infertility. *The World Journal of Men's Health*. 2021;40(2). doi:https://doi.org/10.5534/wjmh.210043

37. Cherpes TL, Hillier SL, Meyn LA, Busch JL, Krohn MA. A Delicate Balance: Risk Factors for Acquisition of Bacterial Vaginosis Include Sexual Activity, Absence of Hydrogen Peroxide-Producing Lactobacilli, Black Race, and Positive Herpes Simplex Virus Type 2 Serology. *Sexually Transmitted Diseases*. 2008;35(1):78-83. doi:https://doi.org/10.1097/olq.0b013e318156a5d0

38. Frisch M, Lindholm M, Grønbæk M. Male circumcision and sexual function in men and women: a survey-based, cross-sectional study in Denmark. *International Journal of Epidemiology*. 2011;40(5):1367-1381. doi:https://doi.org/10.1093/ije/dyr104

39. Bronselaer GA, Schober JM, Meyer-Bahlburg HFL, T'Sjoen G, Vlietinck R, Hoebeke PB. Male circumcision decreases penile sensitivity as measured in a large cohort. *BJU international*. 2013;111(5):820-827. doi:https://doi.org/10.1111/j.1464-410X.2012.11761.x

40. Gao J, Xu C, Zhang J, et al. Effects of Adult Male Circumcision on Premature Ejaculation: Results from a Prospective Study in China. *BioMed Research International*. 2015;2015:1-7. doi:https://doi.org/10.1155/2015/417846

41. Nordstrom MP, Westercamp N, Jaoko W, Okeyo T, Bailey RC. Medical Male Circumcision Is Associated With Improvements in Pain During Intercourse and Sexual Satisfaction in Kenya. *The Journal of Sexual Medicine*. 2017;14(4):601-612. doi:https://doi.org/10.1016/j.jsxm.2017.02.014

42. Kigozi G, Lukabwe I, Kagaayi J, et al. Sexual satisfaction of women partners of circumcised men in a randomized trial of male circumcision in Rakai, Uganda. *BJU International*. 2009;104(11):1698-1701. doi:https://doi.org/10.1111/j.1464-410x.2009.08683.x