

# UC Davis

## UC Davis Previously Published Works

### Title

Sexual Assault Injuries and Increased Risk of HIV Transmission

### Permalink

<https://escholarship.org/uc/item/07h832fv>

### Journal

Advanced Emergency Nursing Journal, 34(1)

### ISSN

1931-4485

### Author

Draughon, Jessica E

### Publication Date

2012

### DOI

10.1097/tme.0b013e3182439e1a

### Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed



Published in final edited form as:

*Adv Emerg Nurs J*. 2012 ; 34(1): 82–87. doi:10.1097/TME.0b013e3182439e1a.

## Sexual Assault Injuries and Increased Risk of HIV Transmission

Jessica E. Draughon, PhD(c), MSN, RN, FNE-A

Johns Hopkins University School of Nursing

Sexual assault was the sixth leading cause of non-fatal injury in the United States (US) in 2007 (Department Of Justice, 2008). There were approximately a quarter of a million sexual assault victims in 2007 (DOJ, 2008). This public health concern coexists and in fact may feed another epidemic: that of the Human Immunodeficiency Virus (HIV) and Autoimmune Deficiency Syndrome (AIDS). The same group of young men and women (age 18–25) most at risk for sexual assault are also the fastest growing groups contracting HIV (El-Bassel, Cadeira, Ruglass & Gilbert, 2009; Greenwood et al., 2002; Petroll, Hare & Pinkerton, 2008). Sexual contact remains a major contributor to the spread of HIV transmission.

Risk of transmission is a product of the risk that the source person is HIV positive and the risk associated with a particular exposure (Fisher et al., 2006). Sexual transmission per any consensual sexual contact has been estimated between 0.1% and 3%, with higher transmission corresponding to receptive anal intercourse (DeGruttola, Seage, Mayer & Horsburgh, 1989; Gray et al., 2001). This article will explore the unique ways in which sexual assault may increase the likelihood of HIV transmission.

### Description of the injury

A large portion of the sexual assault literature to date has focused on treatment of patients following sexual assault. The scope has been as narrow as injury to a specific part of genital tissue (Keller & Nelson, 2008) to the outcomes achieved by sexual assault nurse examiners (SANE) or forensic nurse examiners (FNE) in contrast to post-sexual assault care offered by physicians (Campbell et al., 2006). As the majority of reported assaults for which data exists were perpetrated by a male assailant upon a female victim, the mechanism of injury in sexual assault is most commonly blunt force trauma inflicted by a penis. Genital injuries typically range from point tenderness to lacerations requiring suture repair. HIV transmission is possible anytime there is a breach in the patency of skin i.e. exposed cell nuclei such as one might see with toluidine blue dye (Zink et al., 2010). It has been thought that sexual assault should be associated with higher risk of transmission as there is higher likelihood of broken skin with a violent assault than with consensual intercourse.

### Consensual versus Non-consensual

A recent study by Anderson, Parker and Bourguignon (2009) compared chart review data from non-consensual intercourse to prospectively collected data from consensual intercourse. Using hierarchical logistic regression comparing the number of sites with injury and/or ecchymosis, total surface area of the injuries, and the number of hours since intercourse the researchers were able to correctly differentiate injuries consistent with non-consensual intercourse from those consistent with consensual intercourse 85% of the time (Anderson et al., 2009). This is not a great enough degree of certainty to convict a perpetrator of a crime; however, this well-designed study contributes important evidence to the knowledge base.

Using similar methods, Anderson, Parker and Bourguignon (2008) also found that after consensual intercourse the evidence of injury decreases inversely with time. This is

consistent with pathophysiology of injury and the body's response and natural course of healing. It could be inferred that the same decrease in apparent evidence of injury would hold true for non-consensual intercourse the greater the length in time between the assault and examination.

### **Assault-related Injury and Associated Risk**

Injuries which increase risk of transmission include abrasions and lacerations (broken skin). These injuries are most often to the posterior fourchette and the fossa navicularis. These injuries are found in 22% to 90% of patients reporting sexual assault (Anderson, McLain & Rivellio, 2006; Palmer, McNulty, D'este & Donovan, 2004; Sommers, 2007; Stears, Rossman, Wynn & Jones, 2008). As stated in the introduction, the risk of transmission varies by the type of exposure. Between 15% and 30% of patients do not know what area was exposed during their assault (Drocton, Sachs, Chu & Wheeler, 2008; Du Mont et al., 2008). There are many reasons for not being able to recall what happened, ranging from drug facilitated sexual assault (date-rape drugs) to unintentional memory blocking as a protective mechanism.

**Anal and/or rectal injury**—Of those who can recall what happened during their assault, 10% to 15% of reported sexual assaults including unprotected receptive anal intercourse which has the highest recorded rate of HIV transmission (Drocton et al., 2008; Girardet, Lemme, Biason, Bolton & Lahoti, 2009; Hilden, Shei & Sidenius, 2005; Kerr, et al., 2003). The reason for higher risk of transmission is because the rectal tissue is more friable, non-lubricating and more prone to tearing.

**Oral injury**—Oral penetration is on the opposite end of the HIV transmission risk spectrum. About 25% of sexual assaults involved oral penetration (Riggs, Houry, Long, Markovchick & Feldhaus, 2000). Transmission after ingesting infected fluids can be increased by abrasions and other open sores (either present or induced during assault) (Mbopi-Keou, Belec, Teo, Scully & Porter, 2002). It is possible to have frenulum tears inflicted during both consensual and nonconsensual oral acts. Furthermore, if the patient was beaten around the face prior to oral penetration it is likely that more broken skin and mucous membranes would be vulnerable to HIV transmission via ejaculate.

**Vaginal injury**—The vast majority of assaults 55% to 80% include vaginal penetration (Kerr, Cottee, Chowdhury, Jawad & Welch, 2003). There are many factors which may affect risk of HIV transmission for example the age of the patient and attendant postmenopausal changes in vaginal lubrication (Poulos & Sheridan, 2008). A recent review examined the evidence available specific to cervical injury and found most commonly that there was erythema only to the cervix following sexual assault (Keller & Nelson, 2008). Unfortunately, the literature available is dated and suffers from lack of consistency in documentation and examination of injuries as well as what caused the specific injuries. Erythema does not indicate that the skin was broken.

**Object penetration associated injuries**—In Sturgiss and colleagues' (2010) ground breaking study of object penetration during sexual assault, they found that when an object was utilized for penetration there was a greater likelihood of both genital and extra-genital injuries. The authors performed a retrospective chart review comparing sexually assaulted patients who reported object penetration to sexually assaulted patients who did not report object penetration. Sturgiss and colleagues (2010) also found that a significant portion of their study sample experienced other types of penetration in addition to object penetration, including penile penetration. If a patient had injuries inflicted by the object (often a glass bottle or even a piece of glass) there is much greater likelihood of associated trauma. If this

is then followed by penile insertion (with or without ejaculation) the likelihood of HIV transmission would be greatly increased. Similarly, with sexual assault there are often extra-genital injuries, that is, injuries to other parts of the body.

**Other assault-related injuries**—Sexual assaults are often associated with injury to areas of the body in addition to genital injury. Over 60% of patients in Belgrade over a five year period sustained extra-genital injuries, the majority of which were contusions which would not increase likelihood of HIV transmission (Alempijevic, Savic, Pavlekic & Jecmenica, 2007). In a study of police reported sexual assault in Baltimore MD (Read, Kufera, Jackson & Dischinger, 2005) the authors found that 45% of patients had some type of non-genital injury. Maguire, Goodall and Moore (2009) found non-genital injuries in 60% of patients, 40% abrasion, 4% lacerations and 1% included burns and bites. Consistent with Anderson and colleagues' findings (2008) patients examined within 72 hours of the assault had greater frequency of bodily injury than those presenting after 72 hours. This may be due to natural healing, or that patients who present within 72 hours have more severe bodily injuries.

These extra-genital injuries may pose an increase in transmission risk depending on severity, location, and mechanism of injury. For example, an assailant punches his victim in the mouth and gets a "fight bite" (the victim's tooth or teeth penetrate the knuckle). His blood is now exposed. It is highly likely that while being punched in the face, the victim's skin is broken. Now there are open wounds on both the perpetrator and the victim: risk of transmission is increased. Similarly, HIV transmission through bloody bite marks (Campo, et al., 2006) or other open wounds has been documented.

### Perpetrator Characteristics

There are many factors related specifically to the perpetrator that may or may not play a part in the practitioner's HIV exposure risk assessment as it will usually depend on the quality of the patient's recall at time of exam. Specifics such as multiple assailants and acts performed may be much easier to recall than whether or not a condom was used, whether the perpetrator had another sexually transmitted infection (STI) or was circumcised.

**Multiple assailants**—In a retrospective analysis of over 1000 cases of sexual assault Riggs and colleagues (2000) found that 20% of their sample experienced an assault involving multiple assailants. In the study of object penetration, they found that assaults involving multiple assailants were also more likely to involve penetration with an object with injuries of greater extent (Sturgiss et al., 2010).

**Erectile dysfunction**—In a related study, Jones, Rossman, Wynn and Ostovar (2009) found that there was a greater incidence of extra-genital injuries (72% versus 46%) when a patient's assailant was unable to maintain an erection sufficient for penetration. In their sample 8% of assailants experienced erectile impotence (Jones et al., 2009). The authors did not find any difference in type of non-genital trauma between the women whose assailant experienced erectile impotence and those who did not.

**Condom use**—Condom use has been shown to decrease HIV transmission by 80% (Weller, & Davis-Beaty, 2002). However, in a study of incarcerated sexual offenders, 42.1% of rapists never used a condom (Davis, Shraufnagel, George, & Norris, 2008). If a condom was not used during an assault, the presence of concurrent STI in the perpetrator (and the patient) may present another venue for infection. Open sores on the penis would increase likelihood of HIV transmission (Galvin & Cohen, 2004; Fleming & Wasserheit, 1999). In Campbell and colleagues' (2008) review of literature regarding intimate partner violence (IPV) and HIV risk they found that abusive partners were more likely to commit non IPV

sexual assault and have multiple other sexual contacts, increasing their likelihood for STIs and HIV transmission (Campbell, et al., 2008).

**Circumcision**—There has been much discussion as to whether circumcision is protective against HIV infection. Researchers found that circumcision is more protective against HIV for the insertive person (De Vincenzi, & Mertens, 1994). The foreskin increases risk of HIV infection due to the high density of HIV target cells (Bailey, Plummer, & Moses, 2001; Weiss, 2007). Circumcision may decrease HIV transmission by up to 60% and reduce risk for other STIs (Bailey, Plummer & Moses, 2001; Weiss, 2007). This effect may be more pronounced in resource-poor areas where HAART is less available (Millett, Flores, Marks, Reed & Herbst, 2008). This may be more important in cases of male patients with incidence of forced penetration of their assailant, no matter the sex of the perpetrator.

## Treatment Implications

As can be seen in the research previously discussed, accurate assessment and documentation of injuries sustained during a sexual assault is especially important in the context of HIV risk assessment. This assessment and documentation of injuries as well as the patient's report of what occurred during the assault will have an effect on whether or not the patient is offered HIV post-exposure prophylaxis (PEP).

In 2005 the CDC updated its non-occupational PEP (nPEP) guidelines such that nPEP is offered routinely, only to those who are at 'high risk'. A high risk exposure is: exposure of the vagina, rectum, eye, mouth, or other mucous membrane with blood, semen, vaginal secretions, and rectal secretions, only when the source is known to be HIV infected (CDC, 2005). When the source has unknown serostatus the health care provider, must make an assessment and nPEP is then offered on a case by case basis. Many sexual assault centers have developed site specific algorithms for offering nPEP in order to decrease the gray area (e.g. Wieczorek, 2010).

The consequences of not providing nPEP to an appropriate patient are life-altering and expensive. The estimated cost of treating one case of AIDS is \$223,000 versus the \$600-\$1200 for 4 weeks of nPEP; or approximately \$65–128 for a 3 day starter pack (CDC, 2005; Pinkerton et al., 2004). These costs are based on the CDC preferred medication regimens (CDC, 2005). Most states have mechanisms for reimbursing victimized patients for related expenses, including medical costs.

If the advanced practice emergency nurse feels or suspects that she or he is treating a patient who has experienced sexual assault, it is vital that the patient is provided appropriate forensically-based post-sexual assault care. This care is ideally coordinated through a forensic nursing or Sexual Assault Nurse Examiner (SANE) program where available. For further information regarding post-sexual assault care and follow-up, Linden (2011) reviews the care which should be provided to adult patients following sexual assault.

## Conclusions

As can be seen from the discussion in preceding sections the factors associated with increased risk of HIV transmission following sexual assault are multivariate and complex. Appropriate assessment and documentation are vital during risk assessment for HIV transmission. The literature regarding injury in sexual assault is still sparse. In particular, associations between specific injuries and unambiguous mechanism of injury still need greater depth and breadth of inquiry. Furthermore, there are many difficulties inherent in linking HIV transmission and sexual assault therefore further research into nPEP after

sexual assault is needed. It may be further be appropriate to consider undertaking the creation of a measure relating to severity of injuries sustained both genital and extra genital to assist in HIV risk assessment.

## References

- Alempijevic D, Savic S, Pavlekic S, Jecmenica D. Severity of injuries among sexual assault victims. *Journal of Forensic and Legal Medicine*. 2007; 14(5):266–269.10.1016/j.cfm.2006.08.008 [PubMed: 17112761]
- Anderson S, McClain N, Riviello RJ. Genital findings of women after consensual and nonconsensual intercourse. *Journal of Forensic Nursing*. 2006; 2(2):59–65. [PubMed: 17073065]
- Anderson SL, Parker BJ, Bourguignon CM. Predictors of genital injury after nonconsensual intercourse. *Advanced Emergency Nursing Journal*. 2009; 31(3):236–247. [PubMed: 20118876]
- Anderson SL, Parker BJ, Bourguignon CM. Changes in genital injury patterns over time in women after consensual intercourse. *Journal of Forensic and Legal Medicine*. 2008; 15(5):306–311.10.1016/j.jflm.2007.12.007 [PubMed: 18511005]
- Bailey RC, Plummer FA, Moses S. Male circumcision and HIV prevention: Current knowledge and future research directions. *The Lancet Infectious Diseases*. 2001; 1:223–231. [PubMed: 11871509]
- Campbell R, Townsend SM, Long SM, Kinnison KE, Pulley EM, Adames SB, Wasco SM. Responding to sexual assault victims' medical and emotional needs: A national study of services provided by SANE programs. *Research in Nursing & Health*. 2006; 29(5):384–398. [PubMed: 16977639]
- Campbell JC, Baty ML, Ghandour RM, Stockman JK, Francisco L, Wagman J. The intersection of intimate partner violence against women and HIV/AIDS: A review. *International Journal of Injury Control and Safety Promotion*. 2008; 15(4):221–231. [PubMed: 19051085]
- Campo J, Perea MA, del Romero J, Cano J, Hernando V, Bascones A. Oral transmission of HIV, reality or fiction? *Oral Diseases*. 2006; 12:219–228. [PubMed: 16700731]
- Centers for Disease Control and Prevention. Antiretroviral postexposure prophylaxis after sexual, injection-drug use, or other nonoccupational exposure to HIV in the United States: Recommendations from the U.S. Department of Health and Human Services. *Morbidity and Mortality Weekly Report*. 2005; 54(RR-2):1–20. [PubMed: 15647722]
- Davis KC, Schraufnagel TJ, George WH, Norris J. The use of alcohol and condoms during sexual assault. *American Journal of Men's Health*. 2008; 2(3):281–290. [PubMed: 19477791]
- DeGruttola V, Seage GR, Mayer KH, Horburgh CRJ. Infectiousness of HIV between male homosexual partners. *Journal of Clinical Epidemiology*. 1989; 42:849–856. [PubMed: 2789269]
- De Vincenzi I, Mertens T. Male circumcision: A role in HIV prevention? *AIDS*. 1994; 8(2):153–160. [PubMed: 8043224]
- Drocton P, Sachs C, Chu L, Wheeler M. Validation set correlates of anogenital injury after sexual assault. *Archives of Emergency Medicine*. 2008; 15(3):231–238.
- Du Mont J, Myhr TL, Husson H, Macdonald S, Rachlis A, Loutfy MR. HIV postexposure prophylaxis use among Ontario female adolescent sexual assault victims: A prospective analysis. *Sexually Transmitted Diseases*. 2008; 35(12):973–978. [PubMed: 18836390]
- El-Bassel N, Caldeira NA, Ruglass LM, Gilbert L. Addressing the unique needs of African American Women in HIV prevention. *American Journal of Public Health*. 2009; 99(6):1–6.
- Fisher M, Benn P, Evans B, Pozniak A, Jones M, Maclean S, et al. UK Guideline for the use of post-exposure prophylaxis for HIV following sexual exposure. *International Journal of STDs and AIDS*. 2006; 17:81–92.
- Fleming DT, Wasserheit JH. From epidemiological synergy to public health policy and practice: The contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sexually Transmitted Diseases*. 1999; 75:3–17.
- Galvin SR, Cohen MS. The role of sexually transmitted disease in HIV transmission. *Nature Reviews, Microbiology*. 2004; 2(1):33–42.

- Girardet RG, Lemme S, Biason TA, Bolton K, Lahoti S. HIV post-exposure prophylaxis in children and adolescents presenting for reported sexual assault. *Child Abuse & Neglect*. 2009; 33(3):173–178. [PubMed: 19324415]
- Gray RH, Wawer MJ, Brookmeyer R, Sewankambo NK, Serwadda D, Wabwire-Mangen F, the Rakai Project Team. Probability of HIV-1 transmission per coital act in monogamous, heterosexual, HIV-1 discordant couples in Rakai, Uganda. *Lancet*. 2001; 357(9263):1149–1153. [PubMed: 11323041]
- Greenwood G, Relf MV, Huang B, Pollack LM, Canchola JA, Catania JA. Battering victimization among a probability-based sample of men who have sex with men. *American Journal of Public Health*. 2002; 92:1964–1969. [PubMed: 12453817]
- Hilden M, Schei B, Sidenius K. Genitoanal injury in adult female victims of sexual assault. *Forensic Science International*. 2005; 153(2-3):200–205. [PubMed: 16182966]
- Jones, JS.; Rossman, L.; Wynn, BN.; Ostovar, H. Assaultants' sexual dysfunction during rape: Prevalence and relationship to genital trauma in female victims. *The Journal of Emergency Medicine*. 2009. in press Retrieved from [http://www.sciencedirect.com/science?\\_ob=MImg&\\_imagekey=B6T8B-4VNCC1N-9-3&\\_cdi=5082&\\_user=75682&\\_pii=S073646790800930X&\\_orig=search&\\_coverDate=02%2F20%2F2009&\\_sk=999999999&view=c&wchp=dGLbVtb-zSkWA&md5=c70b56929989e5d33c06f8b1397dc817&ie=/sdarticle.pdf](http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6T8B-4VNCC1N-9-3&_cdi=5082&_user=75682&_pii=S073646790800930X&_orig=search&_coverDate=02%2F20%2F2009&_sk=999999999&view=c&wchp=dGLbVtb-zSkWA&md5=c70b56929989e5d33c06f8b1397dc817&ie=/sdarticle.pdf)
- Keller P, Nelson JP. Injuries to the cervix in sexual trauma. *Journal of Forensic Nursing*. 2008; 4(3): 130–137. 10.1111/j.1939-3938.2008.00021.x [PubMed: 18798879]
- Kerr E, Cottee C, Chowdhury R, Jawad R, Welch J. The Haven: A pilot referral centre in London for cases of serious sexual assault. *British Journal of Obstetrics & Gynecology: An International Journal of Obstetrics and Gynecology*. 2003; 110(3):267–271.
- Linden JA. Care of the adult patient after sexual assault. *New England Journal of Medicine*. 2011; 365(9):834–41. [PubMed: 21879901]
- Maguire W, Goodall E, Moore T. Injury in adult female sexual assault complainants and related factors. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2009; 142(2): 149–153. 10.1016/j.ejogrb.2008.10.005 [PubMed: 19054602]
- Mbopi-Keou F, Belec L, Teo CG, Scully C, Porter SR. Synergism between HIV and other viruses in the mouth. *The Lancet Infectious Disease*. 2002; 2:416–424.
- Millett GA, Flores SA, Marks G, Reed JB, Herbst JH. Circumcision status and risk of HIV and sexually transmitted infections among men who have sex with men: A meta-analysis. *Journal of the American Medical Association*. 2008; 300(14):1674–1684. [PubMed: 18840841]
- Palmer CM, McNulty AM, D'Este C, Donovan B. Genital injuries in women reporting sexual assault. *Sexual Health*. 2004; 1:55–59. [PubMed: 16335297]
- Petroll AE, Hare CB, Pinkerton SD. The essentials of HIV: A review for nurses. *Journal of Infusion Nursing*. 2008; 31(4):228–235. [PubMed: 18641486]
- Pinkerton SD, Martin JN, Roland ME, Katz MH, Coates TJ, Kahn JO. Cost-effectiveness of postexposure prophylaxis after sexual or injection-drug exposure to human immunodeficiency virus. *Archives of Internal Medicine*. 2004; 164:46–54. [PubMed: 14718321]
- Poulos CA, Sheridan DJ. Genital injuries in postmenopausal women after sexual assault. *Journal of Elder Abuse & Neglect*. 2008; 20(4):323–335. [PubMed: 19042660]
- Read KM, Kufera JA, Jackson CM, Dischinger PC. Population-based study of police-reported sexual assault in Baltimore, Maryland. *American Journal of Emergency Medicine*. 2005; 23(3):273–278. 10.1016/j.ajem.2005.01.002 [PubMed: 15915397]
- Riggs N, Houry D, Long G, Markovchick V, Feldhaus KM. Analysis of 1,076 cases of sexual assault. *Annals of Emergency Medicine*. 2000; 35(4):358–362. [PubMed: 10736122]
- Sommers MS. Defining patterns of genital injury from sexual assault: A review. *Trauma, Violence, and Abuse*. 2007; 8(3):270–280.
- Stears S, Rossman L, Wynn B, Jones JS. Anogenital Injury in Adolescent Sexual Assault: Analysis of 1,024 Cases Using Colposcopy and Nuclear Staining. *Annals of Emergency Medicine*. 2008; 52(4):S64.

- Sturgiss EA, Tyson A, Parekh V. Characteristics of sexual assault in which adult victims report penetration by a foreign object. *Journal of Forensic and Legal Medicine*. 2010; 17(3):140–142.10.1016/j.jflm.2009.11.001 [PubMed: 20211454]
- U.S. Department of Justice. Department of Justice Publication No. NCJ 224390. 2008. *Criminal Victimization 2007*.
- Weiss HA. Male circumcision as a preventive measure against HIV and other sexually transmitted diseases. *Current Opinion in Infectious Diseases*. 2007; 20:66–72. [PubMed: 17197884]
- Weller SC, Davis-Beatty K. Condom effectiveness in reducing heterosexual HIV transmission. *Cochrane Database of Systematic Reviews*. 2002; 1:Art. No.: CD003255.10.1002/14651858.CD003255
- Wieczorek K. A forensic nursing protocol for initiating human immunodeficiency virus post-exposure prophylaxis following sexual assault. *Journal of Forensic Nursing*. 2010; 6(1):29–39. [PubMed: 20201913]
- Zink T, Fargo JD, Baker RB, Buschur C, Fisher BS, Sommers MS. Comparison of methods for identifying ano-genital injury after consensual intercourse. *Journal of Emergency Medicine*. 2010; 39(1):113–118. [PubMed: 19217245]

## Biography

Jessica Draughon is a Doctoral Candidate at the Johns Hopkins University School of Nursing. She is prepared at the Masters level as a Clinical Nurse Specialist with a focus in Forensic Nursing. She is a licensed Forensic Nurse Examiner and has three years experience as an Emergency Department RN, including working in a Level 1 Trauma center.