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The nature and frequency of genital injuries sustained by female rape victims in Johannesburg

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The nature and frequency of genital injuries sustained by female rape victims in Johannesburg

Graham Ian Hutton

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Science in Emergency Medicine.

MScMed (Emergency Medicine)

Johannesburg, November 2013

DECLARATION

I, Graham Ian Hutton, declare that this research report is my own work. It is being submitted for the degree of Master of Science in Medicine (Emergency Medicine) in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signed: _____

Date: 25 November 2013

DEDICATION

This research is dedicated to all medical professionals involved in the care of sexual assault victims.

I hope that my experience will assist them in their gathering of knowledge and improving the quality of forensic evidence collection.

I hope that in future, medical professionals can testify in a rape trial without fear of defence attorneys questioning our reputations because we believed that one or other rape myths were scientific fact.

ABSTRACT

Background: Little research has addressed the types and meaning of genital injury in South African rape victims. In South Africa, rape victims in private practice are examined using gross visualisation and a light source only. Research has shown that the use of toluidine blue and/ or a colposcope increases the number of injuries seen.

Objective: To determine rape victim demographics and describe the genital injuries and other associated injuries reported during medico-legal examination of female rape victims older than 15 in four private Johannesburg hospitals between 1 January 2008 and 31 December 2009, as well as to determine any associations between these variables and the race or age of the victim.

Method: A retrospective chart review of 310 sexual assault victims seen at these hospitals.

Results: Black victims made up 62% of the study. One genital injury was recorded for 27% of the victims, while 21% had between 2 and 8 of a possible 11 injuries. The most commonly injured sites were the posterior fourchette, the hymen and the fossa navicularis. Bruising was the most common associated injury. Alcohol was reported in just fewer than 10% of cases.

Conclusion: The incidence of positive genital injury documented is comparable to other research. Genital injuries are not inevitable consequences of sexual assault.

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- Professor Efraim Kramer for his persistence.
- Editor: Lee-Anne Holmes.

Thank you to Chris Piccolo for sitting across the table from me as I typed out chapter after chapter of work.

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NOMENCLATURE

Abbreviations

AIDS: Acquired immune deficiency syndrome

ED: Emergency department

HIV: Human Immunodeficiency Virus

IQR: Interquartile range

SD: Standard Deviation

TEARS: Tears, Ecchymosis, Abrasions, Redness, Swelling.

Victim: The woman or girl who has been raped. (Interchangeable in this research with patient and survivor.)

Definitions

Abrasion: Skin excoriations caused by the removal of the epidermal layer and with a defined edge.[1]

Asian: Victims of Indian descent.

Bruise (contusion): bleeding underneath the tissue due to blunt force; discoloration due to haemorrhage into tissue from ruptured blood vessels from beneath the skin surface without the skin itself being broken; colour is red-blue-purple-yellow-green. As blood is absorbed, the skin discoloration changes from red/blue to yellow and green.[1]

Coloured: A South African ethnic group of people of mixed race, possessing ancestry from Europe, Indonesia. Malaysia, as well as various Khoisan and Bantu tribes.[2]

Colposcopy: a medical diagnostic procedure to examine an illuminated, magnified view of the cervix and the tissues of the vagina and vulva.[3]

Cramer's V: Cramer's V is a way of calculating correlation in tables which have more than 2x2 rows and columns. It is used as post-test to determine strengths of association after x^2 has determined significance. V is calculated by first calculating χ^2, then using the following calculation:

$$V = \sqrt{\frac{\chi^2}{N(k-1)}}$$

k is the number of rows or columns in the table.[4]

N is the grand total of observations.[4]

x^2 is derived from Pearson's Chi-squared test

Ecchymosis: Skin or mucous membrane discolorations, known as “bruising” or “black and blue” areas; due to the damage of small blood vessels beneath the skin or mucous membrane surface.[1] Usually bigger than 1cm in diameter.

Erythema: redness of the skin due to capillary congestion from irritation, injury, infection, allergy, or radiation.[1]

Fisher’s exact test: Fisher's exact test is a statistical test used to determine if there are non-random associations between two categorical variables.[5]

Fossa Navicularis: a depression between the posterior margin of the vaginal opening and the fourchette.[6]

Frenulum of clitoris: a fold formed by union of the labia minora on the under surface of the clitoris.[7]

Hymen: a membrane that surrounds or partially covers the external vaginal opening.[8]

Interquartile range: the distance between the 75th percentile and the 25th percentile of the data. Essentially the range of the middle 50% of the data.

J88: this is the medico legal report proforma used by the police as a doctor’s statement of clinical findings.

Labia majora: two folds of skin that extend downward and backward. They unite below and behind to form the posterior commissure and in front to form the anterior commissure. They form the lateral boundaries of the vulva. A Bartholin gland is situated in each of the labium majus.[7]

Labia minora: the two delicate folds of skin that lie within the labia majors. Anteriorly each labium minus splits into lateral and medial parts.[7]

Netcare: The largest private hospital group in South Africa.

Parous: having given birth to one or more viable children.[9]

Pearson's χ^2 *test*: the best-known of several Chi-squared tests – statistical procedures whose results are evaluated by reference to the chi-squared distribution. It tests a null hypothesis stating that the frequency distribution of certain events observed in a sample is consistent with a particular theoretical distribution.[10]

Petechiae: a small red or purple pot on the body caused by a minor haemorrhage.

Posterior fourchette: a tense band of mucous membranes at the posterior angle of the vagina that connects the posterior ends of the labia minora.[11]

Purpura: purple patches that are greater than 3 mm in size and that occur in the skin, organs, and mucous membranes (including the lining of the mouth). Caused by bleeding in the skin layers due to injury or illness.[1]

Rape: Forced sexual intercourse including both psychological coercion as well as physical force. Forced sexual intercourse means vaginal, anal or oral penetration by the offender(s). Rape also includes incidents where the penetration is from a foreign object such as a bottle.[12]

Rape myth: Rape myths are a specific set of attitudes and beliefs that may contribute to on-going sexual violence by shifting blame for sexual violence from perpetrators to victims.[13]

Sexual assault: A wide range of victimizations, separate from rape or attempted rape. These crimes include attacks or attempted attacks generally involving unwanted sexual contact between victim and offender. Sexual assaults may or may not involve force and include such things as grabbing or fondling. Sexual assault also includes verbal threats.[12]

Standard deviation: In statistics and probability theory, standard deviation (represented by the symbol σ) shows how much variation or "dispersion" exists

from the average (mean, or expected value). A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data points are spread out over a large range of values.[14]

Tear : Laceration- Any breaks in tissue integrity including fissures, cracks, lacerations, cuts, gashes or rips.

Toluidine Blue: is a blue cationic (basic) dye used in histology.[15]

Wits: The University of the Witwatersrand.

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PREFACE

The concept of sexual gratification through sexual assault is not new. Shakespeare and Yeats amongst others said that rape and politics are inseparable. In many parts of the world today, this is still true.

A sudden blow: the great wings beating still
Above the staggering girl, her thighs caressed
By the dark webs, her nape caught in his bill,
He holds her helpless breast upon his breast.

How can those terrified vague fingers push
The feathered glory from her loosening thighs?
And how can body, laid in that white rush,
But feel the strange heart beating where it lies?

A shudder in the loins engenders there
The broken wall, the burning roof and tower
And Agamemnon dead.

Being so caught up,
So mastered by the brute blood of the air,
Did she put on his knowledge with his power
Before the indifferent beak could let her drop?

WB Yeats 'Leda and the Swan'[16]

In Shakespeare's Henry V Act 3 Scene 3, Henry threatens to rape the women of the town of Harfleur saying "what difference will it make to him if the innocent maidens are raped as the men have asked for it."

If I begin the batt'ry once again
I will not leave the half-achieved Harfleur
Till in her ashes she lies buried.
The gates of mercy shall be all shut up,
And the fleshed soldier, rough and hard of heart,
In liberty of bloody hand shall range
With conscience wide as hell, mowing like grass
You fresh fair virgins and your flow'ring infants ...
What is't to me, when you yourselves are cause,
If your pure maidens fall into the hand
Of hot and forcing violation?
What rein can hold licentious wickedness
When down the hill he holds his fierce career'?
Why in a moment look to see
The blind and bloody soldier with foul hand
Defile the locks of your shrill-shrieking daughters.

Shakespeare 'Henry V' [17]

Clinicians struggle to answer the question, “are the genital injuries consistent with the patient’s history?” and “are the genital injuries consistent with sexual assault?” Clinicians examining rape victims need to understand the physiology as well as the anatomy of the female genitalia in order to attempt to come to evidence based scientific conclusions when documenting their opinions. Negative findings do not mean that the victim could not have been raped, and by the same token positive findings could have been caused by having consensual intercourse.

When testifying in a rape trial, the doctor is guaranteed to be asked by the defence attorney, “could this injury have been caused by this woman having rough sex?” Doctors typically answer in one of three ways: i) they vociferously state that it is impossible for a woman to sustain genital injuries while having tender sex with her lover. ii) Neutral testimony. iii) They attempt to explain typical injuries sustained during consensual versus non-consensual intercourse. Doctors describe aspects such as the female sexual physiology, injuries that adolescents may acquire that adults do not, the benefit of using adjuncts in the examination such as toluidine blue and some common rape myths.

The third answer originates from the doctor who is well informed and is basing their carefully worded answer on evidence which is published and scientifically accepted. Having testified in many rape trials, I can say without any hesitation that I am guilty of giving very neutral answers to these types of questions. I believed that the more generic my testimony, the less likely it would be that my reputation was placed under any strain by a clever defence attorney. I have, over time through my own experience, and after reading most of the published literature

about rape, decided that it is paramount that the doctor give scientific testimony. The doctor's testimony can assist the court to make an informed decision about a rapist's guilt, voracity of a victim's testimony and can likewise help a person wrongly accused.

Up until 1998 in South Africa, victims of rape were examined by district surgeons and doctors in public hospitals. Doctors in private practice were not really expected to examine rape cases and collect forensic evidence. During 1998, a well-known personality in Johannesburg was raped and attended one of the private emergency departments for help. She was refused attention based on the assumption that all rape cases should be seen by a district surgeon. The rape victim took umbrage with the lack of available and easily accessible services for rape victims and created a very public embarrassment for the institution and medical staff involved. What followed was a decision by my practice to never refuse care to a rape victim in our ED's. It was also decided that all rape cases would be seen free of charge in these privately run emergency departments.

INTRODUCTION

1.1 Statement of the problem

Forensic investigators remain unsure exactly why some sexual assault victims display acute injury while others do not. It is obvious from previous research that it would be very irresponsible for medical, police and legal personnel to make a decision on the validity of a rape victims claim based purely on the presence or absence of an acute genital injury. The treatment of rape survivors by the health care and criminal justice system has been found wanting in many respects.

No previous research covering the injuries documented on rape victims seen in private practice in South Africa exists. The examination of these victims is done by medical doctors with various levels of qualification, and while this research is done on existing documentation, it is hoped that gaps discovered in that documentation may be closed for any research done in the future.

The issue of genital injuries sustained due to rape has received an increasing amount of attention, with studies reporting a wide range of findings. Many of the existing studies were done in centres where the use of colposcopy and nuclear staining is standard. While the search for proof of injury should not cause an examiner to over interpret findings, it is widely accepted that more injuries are identified when these adjuncts are used.

The manner, in which doctors remain neutral, decreases the chances of having their credibility deconstructed while giving evidence in court. Unfortunately, the neutral report does limit the impact that a doctor's testimony might have in court.[18]

The examining doctors concluding statements on the J88 are particularly relevant

to progression of a case through the courts. The doctor is expected to come to two conclusions and document these: one based on the gynaecological examination and the other based on the physical examination.[19]

In this research the term “alleged rape” or “injuries are consistent with the patient’s history” appear to be the commonest conclusions that the examining doctors draw. As stated, it is hoped that this research might address this neutrality that doctors display in their documentation.

There has been no work on findings by rape examiners in private practice in South Africa, but there is reason to believe that they might be documenting fewer injuries than in forensics units in some other parts of the world. Victims are examined with the naked eye and a wall mounted light source. At the moment, adjuncts such as toluidine blue and colposcopy which have been proven to improve the chance of positively identifying an acute genital injury following an allegation of rape, are not used in the study centres.

Doctors in South Africa receive little or no training in the forensic examination of rape victims. This may result in doctors, who while doing their very best; lack some of the important knowledge available to help them make more informed decisions on the validity of an allegation of rape. Injuries to the genitalia occur during consensual and non-consensual sexual intercourse. Very little is understood about the patterns of injury that exist in each case, and more research certainly needs to be done to close this knowledge gap.

Unfortunately, the justice services in South Africa do rely on positive findings of injury when cases are in court. It is important that medical examiners understand these issues and make the effort to convey negative findings as completely acceptable and certainly not evidence of “nothing untoward having happened.”

1.2 Motivation and rationale for this research

Victims of sexual assault are often examined by doctors or nurses in Emergency Departments rather than by expertly trained sexual assault examiners. Some of these examiners may only see one or two sexual assault cases in their careers, while some of the examiners have examined several hundred cases. Most of the published research has been done in units where specially trained sexual assault nurse examiners examine the victims, and the South African studies are done in the public sector and in rural settings.

The contribution of the private healthcare sector in South Africa cannot be under-estimated. Since 1999, the hospitals involved in this study have been managing sexual assault victims at no charge to the patient. The researcher believes that this study is long overdue, if only to draw attention to some common misconceptions that doctors have about “normal rape findings” and the poor quality of many of these examiners records. This research concentrates on the findings of 311 female sexual assault victims seen in 4 private hospital emergency departments in Johannesburg, examined with direct visualisation only.

A common theme throughout the research paper is the concept of referral bias. The researcher feels that this bias may affect the results.

Referral bias exists because of the urban setting of these hospitals, as well as the fact that they are all private clinics. The sexual assault centres involved in this research do see rape victims from across the socio-economic spectrum as all cases are seen on a Pro Deo basis, but women from rural and poor areas may not be aware of this. Because of the easy accessibility of these units to the Johannesburg population, the time to examination may be lower than that of rural centres where the locality of the clinic may influence whether a victim is examined soon after the assault or not.

"Sexual assault is a worldwide problem representing an ever-present threat to society's men, women and children."[20] "Sexual assault is a unique type of interpersonal violence."[21] South Africa has one of the highest rates of rape reported to the police in a world where sexual violence takes a variety of forms, ranging from unwanted touching, to rape and at its most extreme, rape homicide.[22] The Criminal Law (Sexual Offences and Related Matters) Amendment Act of 2007 (The Act) has direct relevance for doctors who examine rape victims. The Act changes the legal definition of rape and sexual assault; sets down what services should be available for survivors of sexual assault; deals extensively with the sexual exploitation of children and deals with the compulsory HIV testing of the alleged perpetrators of rape.[23]

The incidence/ prevalence of rape in South Africa:

Police statistics since 1994 have consistently shown an upward trend in the number of victims reporting rape. By 2005 and 2006, 54 926 cases were reported to police. Of this total, 42.7% of rapes were reported by children. These statistics

only reflect the number of cases reported to the police, so the true extent of the problem in South Africa is unknown.[22] In 2009, 68 332 cases of rape were reported to the South African Police Services.[24] Two population-based studies from South Africa have found that 28% and 37% of men, respectively, have perpetrated rape.[25, 26] South African studies estimate prevalence rates for sexual violence across all categories, ranging from between 12 and 28% of women ever reporting rape.[27] Statistics South Africa found that one in two victims reported the rape to the police,[28] while the Medical Research Council found that only one in nine women reported rape.[29] Although the findings in these studies differ so greatly, they both illustrate that rape is clearly under-reported.[22]

Quantitative research findings on rape in South Africa, published by statssa in 1998 are summarised in the following table:[28]

Table 0-1: Incidence and prevalence of rape in South Africa

Study	Results
***The Victims of Crime Survey* of 1998 conducted by Statistics South Africa**	2.1% of women aged 16 years or more across population groups (N=337 000) reported that they had been sexually abused at least once between the beginning of 1993 and March 1998. More than half, i.e. 56.2% of this number had reported this incident to the police. This figure translates to 68 per 100000 of the population (excluding children under the age of 16years).
***Violence against women in three South African provinces*, by the Medical Research Council in 1998**	Approximately 1% of the women who were interviewed (n=1300) stated that they had been raped in 1997. This proportion is higher than that found countrywide in the *Victims of Crime Survey* (0.4%).
***The South African demographic and health survey of 1998*, by the Medical Research Council and the Department of Health**	Nationally 4.0% of women aged 15 to 49 years reported having been raped at some stage during their life. (n=11735)

It is worth noting that sexual assault was considered a penetration injury at this time, and it is recommended that statssa repeat this research now as the definition of a sexual offence in South Africa is much broader since the institution of the Sexual Offences amendment act 32 of 2007. The researcher feels that the rape statistics will be higher in 2012.

The impact of sexual assault on health in South Africa:

In a study, carried out in Johannesburg, Cape Town and Durban during 2002, 111 women were interviewed about the consequences of sexual violence. Fifteen per cent of these women said they had contracted a sexually transmitted infection, six per cent said they had acquired HIV, 14% reported becoming pregnant; and 4% of the group became infertile as a result of the abuse.[30] Analysis of 432 cases of rape reported in Johannesburg found 38% of this group had genital injuries and 37% to have sustained non-genital injuries.[31]

HIV/AIDS is devastating South Africa, with an estimated 1,600 new HIV infections and 600 people dying of an AIDS-related illness each day.[32] In a study done in Cape Town by Kalichman[32] in 2005, over 40% of women and 16% of men had been sexually assaulted, and more than one in five men openly admitted to having perpetrated sexual assault.

Another South African study from 2008, consisting of interviews with 1395 women, found child sexual assault or forced first intercourse to be associated with an increased risk of being subjected to physical and/ or sexual violence at the hands of an intimate partner.[27]

Research has identified a number of risk factors for rape perpetration. Men who rape show a greater acceptance of interpersonal violence and adversarial sexual beliefs. They accept rape myth and sex-role stereotyping. Sexually violent men have been shown to be more likely to be hostile towards women and perceive women as hostile to them. These men are more likely to have had delinquent childhood, often having witnessed violence. They lack empathy and remorse and often blame the woman for the rape.[33] It has been suggested that men who develop a relatively high emphasis on sexuality, particularly with sexual conquest, as a source of peer status and self-esteem, may use various means, including coercion to induce girls into sexual acts.[34] Experience of trauma in childhood reduces the ability of men to form loving and nurturing attachments, and thus results in an orientation to impersonal sexual relationships and short term sex seeking strategies rather than sex in the context of emotional bonding.[35] Alcohol plays a role[33] and peer pressure to have sex may encourage some men to force someone to have sex.[36]

Rape Myths

The cynical among us look at many rape cases that we see through suspicious eyes. Rape myths are a specific set of attitudes and beliefs that may contribute to on-going sexual violence by shifting blame for sexual violence from perpetrators to victims. Some studies have illustrated that many people, both men and women from various backgrounds ascribe to rape myths. These studies have demonstrated that high levels of rape myth acceptance are associated with perpetration of sexual assaults.[13] Both perpetrators of sexual assault and people in

the general population report beliefs that tolerate and even support sexual violence. Other forms of intolerance in society (e.g. sexism, classism, racism, religious intolerance, and homophobia) seem to perpetuate the acceptance of the rape myth, and therefore the levels of sexual violence.[37]

Traditional attitudes toward women's social and gender roles, as well as rape myths, were endorsed by a significant majority of both men and women in Kalichman's study.[32] Both men and women endorsed gender attitudes that represent traditional, submissive, and passive roles of women, with nearly all men and women stating that women should obey their husbands. Two out of three men and women agreed that there are many jobs that men can do much better than women, and one in three participants stated that women should not talk to men about sex. Although there were select gender differences on gender attitude items, there was a general pattern of response rates for men and women being more alike than different.[32]

As many as one in five participants across genders agreed that rape usually results from things that a woman says or does (27% across genders), that some cases of rape involve a woman who wants to have sex (18% across genders), and that rape is often a woman's fault (29% across genders). There were, again, few differences between men and women in terms of acceptance of rape myths.[32]

Narrowing the Justice Gap and the examination of the rape victim

The justice gap is the difference between the number of crimes which are recorded and the number which result in their perpetrator being brought to justice. Doctors examining sexual assault victims contribute directly to the justice gap. The criminal justice significance of injury is unclear. Both researchers and clinicians agree that a significant number of women who are raped are not injured. Methods for defining and categorising injuries remain unclear, but findings from research reports collectively show that the presence of injury influences decision making throughout the justice process, from victim reporting to police investigation to decisions whether or not to prosecute. Vetten et al[19], found that injuries in adults had no influence over arrests. They found that finding injuries was not significant in case progression to trial, however, having genital or non-genital injuries or both, was strongly associated with conviction.

A physical examination together with forensic evidence collection is a key component in the quest for justice. The doctor's opinion is expected to be independent and scientific and, therefore, may corroborate the crime.[38] In addition the doctor's findings may also help an innocent person wrongly implicated.

The rape victim possesses a scarce resource: information about the crime.[38] Proving a case of rape in a court of law is a challenge and independent corroboration may be necessary before finding the suspect guilty. This is where the doctor's role is important, as the doctor acts as an independent witness. There are still many misconceptions about the likelihood of sustaining injuries after a rape or sexual assault that, which can potentially have a negative impact on the

justice process.[39] For example, the case of a complainant whose examination findings do not match the perceived “norm” for such an assault might not be investigated as thoroughly. Likewise, the prosecutors may be less inclined to proceed with a case where the doctor describes “neutral” findings, not appreciating that this is a common finding.[39]

Sexual Assault has traditionally been portrayed as an impulsive act committed by an unknown assailant. Research however reveals that a large proportion of sexual assaults are committed by people known to the victims.[40, 41] Victims are however more likely to report the crime when the perpetrator is a stranger.[42]

Some factors that could be regarded as denying victims access to healthcare and justice include:

- Lengthy waits for medico-legal examinations[43]
- Delays in the provision of medical treatment[43, 44]
- Lack of privacy and confidentiality during examination and reporting processes[43, 45]
- Inadequate training and prejudicial attitudes towards rape victims[43]
- The absence of referral and counselling systems[43]
- Inadequate documentation and record keeping[19]

Justification for the research and The Gap that this research addresses

This research will add to the existing knowledge base.

There is a knowledge gap among sexual assault examiners in private practice in South Africa. This gap may even involve colleagues in the public sector. Previous South African studies have been done on women already in the legal system. This study was done on women who in many instances had not yet reported the crime to police services. This study may even include a more diverse range of women in terms of class and race than previous studies. There is still much emphasis placed on the need to find a positive genital injury to prove that a rape has occurred. This research addresses that. Many of the overseas studies are similar to this, but using adjuncts for the examination. This study addresses the fact that examinations are done using direct visualisation only, and is South African.

This research paper may hopefully address a propensity for some doctors to inadequately describe and document injuries seen, as well as the tendency of refraining from drawing acceptable conclusions to these findings. The researcher believes that doctors formulate neutral opinions about their findings too commonly.

1.3 Aim and objectives

1.3.1 Study aim:

To describe the genital injuries and other associated injuries reported during medico-legal examination of adult female rape victims in four Johannesburg hospitals between 1 January 2008 and 31 December 2009, as well as to determine any associations between these variables and the race or age of the victim.

1.3.2 Study objectives:

- To describe rape victim demographics at four hospitals in Johannesburg.
- To determine the frequency, location and pattern of the genital and non-genital injuries sustained by female rape victims of 15 years of age and older.
- To examine any demographic or other factors associated with these injuries

Chapter 2 LITERATURE REVIEW

Introduction

The presence or absence of injury after a sexual assault is related to the event itself and factors such as age of the victim, time to presentation, use of foreign objects, virginal status among other individual factors.[1] It has been suggested that the positive documentation of an injury has been over emphasised. Research shows that many victims do not show signs of an injury following sexual assault. Forensic investigators remain unsure exactly why some sexual assault victims display an acute genital injury while others do not.

The literature review covers what has been researched about the subject, providing some insight into genital injuries and their association with victim demographic (especially age), and the method of examination and its association with injury visualisation. Most of the existing published research has been read and incorporated at some level into this paper. Almost all of the research reviewed is retrospective in nature and gleaned from medical records. It seems that most sexual assault researchers feel that there is a strong need for prospective research into injury patterns and demographic contributors to those patterns.

Most of the published research has been done by sexual assault nurse examiners in the USA. The standard of examination in the centres involved appears to be very high. Forensic evidence has become crucial in many instances in order to address the justice gap. A problem exists in that reported genital injury rates in the literature range very widely from 9% to 87%.[46-48] The researcher believes that the fact that these studies are 15 to 25 years old may explain this discrepancy. There

appears to have been a tendency to over-interpret positive findings on colposcopic examination, when it is now understood that something as simple as the insertion of a speculum can damage the vaginal mucosa.[49] The research done within the last eight years shows a narrowing of this gap to between 32% and 75%.[21, 50-53]
As researchers and examiners develop a better understanding of injury patterns and the limitations of the examination adjuncts, the researcher hopes that sexual assault examiners in South Africa will contribute more positively to the justice process.

Some of the really interesting research looks at genital injuries sustained during consensual intercourse which provides comparison to injuries sustained during sexual assault.[51, 53, 54] Until sexual assault examiners have a thorough understanding of the injury patterns sustained during consensual intercourse, it will remain difficult to determine injury patterns sustained during sexual assault. Most researchers agree that more research into consensual intercourse injury patterns is mandatory.

The literature review has been structured in a way that the researcher believes takes the reader on a bit of a journey through what goes through the medical examiners mind as he or she approaches the examination of a rape survivor. The journey starts with some knowledge of the forensics process and the examiners contribution to the process as well as some knowledge of human sexual physiology as physiology does explain in part, the injury patterns found. Genital injury is discussed and divided into injury sustained during consensual and non-consensual intercourse. Factors contributing to injury documentation such as age

and time to examination are discussed in separate chapters before the "normal" examination findings are covered. Finally, adjuncts like Toluidine Blue and colposcopy which are not used in the centres used for this research are discussed and debated.

A summary of similar previous research

The table is adapted from Sommers et al.[1] The table is in alphabetical order for ease of reference when reading the rest of the paper.

Table 2-1: Summary of previous research into sexual assault

Authors	Country	Sample	Findings
Adams et al.[55] 2001	USA	n=214 sexually assaulted females. 55% white, 9% black, 8% Mexican	36% had no injury; 25% injured at 1 site; 21% injured at 2 sites; 11% at 3; 5% at 4 or 5. Examined with Toluidine Blue and colposcope
Ahnaimugan and Asuen.[56] 1980	Nigeria	n=15 females 15-51 years of age, following consensual sexual intercourse.	10 females had single genital injury, 5 had multiple.
Alempijevic et al.[57] 2007	Serbia	n=113 retrospective review of sexual assault victims. Looking at associated non-genital injuries.	64% had 1 or more non-genital injury, 36% had none. Bruising described most often, less common abrasion or contusion. 2 lacerations. 1 severely injured victim. Direct visualisation.
Anderson et al.[58] 2006	USA	n=46 females following consensual intercourse (21-45 years); and n=56 females after sexual assault (16-54 years)	30% of consensual and 32% of sexual assaults had genital injury present. Examined with colposcope.
Baker et al.[59] 2010	USA	n=234 sexually assaulted females. Black 50%, White 49%.	Overall injury prevalence was 62.8%. Race was significantly associated with frequency of injuries in several anatomical

			locations, with White victims having a higher frequency than Black.
Beh.[60] 1998	China	N=350 sexually assaulted females (2-66 years of age), 169 were sexually active.	Bleeding genital injury 12%, Vulval injury 8%, recent hymen injury 10%, Bodily injury 35% (this is likely defined as genital injury). Direct visualisation.
Biggs et al.[61] 1998	Canada	Females 15-64 years of age; no race identified.	Overall genital injury 45%. 65% in those with no previous intercourse and 26% in non-virgin group. Direct visualisation, no colposcopy.
Bowyer and Dalton.[47] 1997	UK	Females 16-48 years of age who were sexually assaulted (n=83). No race identified.	26.5% had genital injuries. 82% had some form of physical injury, but most were minor. Gross visualisation.
Drocton et al.[62] 2008	USA	Females older than 12 who were sexually assaulted. (n=3356) 39.6% White; 37.7% Hispanic; 16.6% Black; 8% Asian.	49% sustained ano-genital injury; increased risk of injury when penetration or attempted penetration with penis, finger or object occurred. Toluidine blue and colposcopy used.
Fraser et al.[63] 1999	Australia, Dominican Republic, Finland, USA.	Post-coital examination of healthy females 18-35 years of age. (n=107)	56 superficial genital injuries found in 314 inspections of 107 females. Examined with colposcope.
Goodyear-Smith.[64] 1998	New Zealand	(n=190) Victims 2-83 years of age. 91% female following sexual assault. 765 European; 8% Maori; 11% Pacific Islander; 4% other	40.5% of adults sustained genital injury. 64% of adults sustained non-genital injury.
Grossin et al.[65] 2003	France	Victims 1.5-79 years old. (n=418) following sexual assault. 86% of victims female. No race identified.	Non-genital trauma found in 39% examined within 72 hours and 6.3% examined after 72 hours. Genital trauma found in 35.7% examined within 72 hours and 19.5%

			examined after 72 hours. Colposcopy by forensic physicians.
Hilden et al.[50] 2005	Denmark	Females 12-50 years old following sexual assault. (n=249). No race identified.	32% sustained genital injury. No association found between genital and non-genital injury. Gross visualisation only.
Jones et al.[66] 2009	USA	n=1917 sexual assault victims; 84% 18-49 years, 4% 50 years or older.	Post-menopausal victims had a greater mean number of non-genital (2.3 v 1.2) and genital injuries (2.5 v 1.8). Colposcopy.
Lenahan et al.[67] 1998	USA	n=17 female victims of sexual assault. (15 and older.)	53% had genital trauma. 76% had non-genital trauma. Colposcopy.
Maguire et al.[68] 2009	Ireland	(n=174) sexual assault victims aged 13-74. No race identified.	61% had non-genital trauma, 37% had genital trauma. Colposcopy.
McCauley et al.[69] 1987	USA	Genital lacerations visualised with and without Toluidine Blue. (n=24) female sexual assault victims of 19 years of age and older.	Detection of injury increased from 1 in 24 to 14 in 24 with Toluidine Blue application.
Ramin et al.[70] 1992	USA	129 females >50 and 129 aged 14-49 were compared. Older group was 32% Black, 64% White, 4% other; youger group was 53% Black, 38% White and 9% other.	Genital trauma was more common in the postmenopausal group (43 versus 18%; P < .001). Nearly one in three postmenopausal women had genital abrasions or oedema. Almost one in five older women had genital lacerations. In contrast, the frequency of extra-genital trauma was more common in younger victims (66 versus 49%; P < .01).
Rogers et al.[71] 2008	USA	(n=445) females 13-74years of age.	Compared colposcopy, Toluidine Blue and direct visualisation when examining rape victims. Colposcopy useful to photo-document subtle injuries. However, when compared to nuclear staining plus direct visualisation, it offered no benefit

			to the skilled examiner.
Slaughter et al.[48] 1992	USA	(n=131) sexual assaults 13-85 years of age. 113 White, 5 Black, 11 Hispanic, 2 Asian.	87% had genital injury when examined with colposcope.
Slaughter et al.[54] 1997	USA	(n=311)Females 11-85 following sexual assault and (n=75) women following consensual intercourse. 189 White, 6 Black, 17 Hispanic, 1 Asian.	After sexual assault, 213 had genital trauma; 162 had 3.1 mean sites of injury. After consensual intercourse, 11% had injury all occurring at a single site. Colposcope used.
Sommers et al.[51] 2008	USA	Females after consensual intercourse 21-68 years of age (n=120). 50% Black, 50% White/ other.	55% had at least one ano-genital injury. Black and White participants had significantly different genital injury prevalence (43% and 68% respectively), dark skin colour rather than race was a strong predictor for decreased injury prevalence. Colposcope used.
Sommers et al.[72] 2006	USA	Females after sexual assault 14-76 years of age (n=120). 50% Black, 50% White/ other.	Significant association between race/ ethnicity and genital injury. Whites more than four times as likely to sustain genital injury as Blacks. Colposcope used.
Sturgiss et al.[52] 2010	Australia	n=826 cases of sexual assault. 20 (19 females and 1 male) penetrated with foreign body.	75% of victims had genital injury, 91% had non-genital injury. Toluidine Blue and colposcope used.
Sugar et al.[21] 2004	USA	Female sexual assault victims (n=819) 15-87 years of age.63.4% White, 20.5% Black, 4.9% Hispanic, 8.2% other.	General body injury occurred in 52%; anal or genital injury occurred in 20%. Females 15-19 years of age had more than twice the genital injuries of women 20-49; females over 49 had more than three times the number of injuries as women 20-49. Colposcope used.

Teixeira.[73] 1981	Brazil	Female sexual assault victims 4-51 years of age (n=500).; 78.2% White; 14.6% Tawny; 5.4% Black; 0.8% Yellow; 1% other.	11.8% of cases showed additional trauma when examined with a colposcope compared to gross visualisation.
Zink et al.[53] 2010	USA	Females following consensual intercourse 21-68 years of age (n=120; 50% White/ other, 50% Black.	55% had at least one genital injury; direct visualisation and colposcopy yielded similar genital injury findings; more tears were identified using Toluidine Blue than with direct visualisation or colposcopy.

What is obvious from glancing at this summary of previous research is that between 20 and 80% of rape victims may show no sign of genital injury. There are several papers, which like this one have not used colposcopy or toluidine blue during the examination of rape victims.

2.1 The Medical/ Forensic Examination

The examination of victims of sexual offences represents an important activity in emergency medicine as it is estimated that 20% of adult women, 15% of university-aged women and 12% of adolescent girls have experienced some form of sexual assault or sexual abuse.[74] "The "traditional" approach to the rape victim examination within the emergency room setting has been a cursory medical interview, general physical exam, and a pelvic exam, utilizing gross visual inspection for both non-genital and genital trauma.[75]

The doctors and nurses performing these examinations have both therapeutic and forensic obligations to the patient. They have to provide medical care and look for evidence that may be used in any subsequent prosecution.[74] Care should be

guided by the individual's wishes and needs and provided sensitively in a coordinated and timely fashion to avoid the need for attendance at multiple services. Considerations after recent sexual assault include treatment of injuries, collection of evidence, pregnancy prevention, prevention of sexually transmitted infections, and psychosocial support. The forensic obligation may be neglected in emergency departments because of a lack of time and or experience of the attending clinician. In this research, many of the examinations of the sexual assault victim were done by inexperienced examiners, which the researcher believes may lead to under diagnosis of genital injury or alternatively over emphasis of subjective injury like tenderness. Many examiners do include subjective feelings of pain in their injury documentation, whereas the centres included in this research advocate the use of more objective evidence of injury documentation, including tears, ecchymosis, abrasions, redness and swelling (TEARS).

Although the traditional model of sexual assault examination does give victims access to pregnancy and sexually transmitted infection testing and prophylaxis, it usually means that the victim has to wait until life-threatening emergencies are handled, possibly causing biological evidence to degrade in the interim. Another problem with examining sexual assault victims in the emergency department is that even when the emergency department staff wants to help rape victims, services can be inconsistent and problematic. Some departments may not see enough victims to allow all staff the opportunity to become skilled examiners. This results in “victims in crisis being cared for by staff in crisis.”[75]

On completion of the sexual assault examination, the sealed kit is taken by the police and delivered to the forensics laboratory for further investigation. Unfortunately, this procedure does have some shortcomings, making it less effective than intended. The protocol is not comprehensive enough and does not provide enough help to the inexperienced examiner due to its inflexibility. The main limitation however, is that there is no procedure to safeguard and preserve the samples once the box is sealed and taken by the police. It is not unknown for the police to keep the evidence kit in their car for several days.[76] In South Africa, a pro forma (J88) is supplied with the evidence kit, which allows and encourages the taking of a detailed account of the patient's medical history as well as detail of the examination findings. The J88 form provides body charts for recording injuries as well. An additional pro forma supplied in the kit includes a list to indicate which forensic samples have been taken. This J88, is the document used to collect the data used in this research. The quality of documentation on this form differs from doctor to doctor, which does provide one of the limitations of this research as the quality of the documentation dictates the quality of the data.

2.2 Sexual Physiology and the examination of sexual assault victims

Masters and Johnson's theory[77] of human sexuality has been used by practitioners evaluating sexual assault since the 1970s.[78] Their theory proposes that a woman's physiological sexual responses protect her from sustaining injury during sexual intercourse.[77] The physiological changes associated with the human sexual response (e.g. lubrication, increased muscle tension and vaginal outlet lengthening), as well as the cooperation of both sexual partners, was hypothesized

to protect women from injury. As part of the sexual arousal or excitement phase, the inner two thirds of the vagina (where lacerations are more likely to occur) lengthens and distends. The internal diameter doubles or triples and lengthens by 10-20%. As the vagina becomes lubricated with transudate, the uterus and cervix elevate within the pelvis. Conversely, during a sexual assault, the lack of these responses would contribute to a woman sustaining injuries from the assault.[79] Predisposing factors causing injury during consensual coitus include: first coitus, intoxication, variant coital positions, anatomical disproportion, fear of discovery, postmenopausal state, as well as clumsiness.[77, 80, 81]

Based on Masters and Johnsons 50 year old theory, any genital injury detectable by gross visualisation was considered evidence of sexual assault.[82] Recently, the scientific merit of genital injury research has come under scrutiny and expert witness testimony questioned.[78] The doctor's opinion when giving evidence needs to be scientific current; therefore the doctor's understanding of how a woman may receive injuries to her genitalia is paramount.

Genital injuries sustained during sexual intercourse are most often superficial tears, bruises or abrasions that require no medical intervention.[78] Although some studies have focused on tears of the hymen when looking for genital trauma in adolescent rape victims[54], the hymen is not the most common site of injury in adolescents reporting sexual assault.[83] The fossa navicularis, labia minora and posterior fourchette are equally vulnerable to injury.[54, 55] In this research, the fossa navicularis and posterior fourchette are the area's most commonly injured.

As stated in the introduction, the attrition rate in rape cases is a problem in the criminal justice system. The rate at which cases drop out of the legal system and justice process is disproportionately high when compared to other serious offences.[84] This has led some researchers[85, 86] to postulate a "justice gap" between the number of cases reported and the number of convictions. At the heart of this "justice gap" lies the popular attitudes and the beliefs of prosecutors about what constitutes a 'real rape'.[85] "Real rape" typically involves a women being raped outdoors at night, by a stranger who would normally use a weapon to employ force, with the victim fighting for her life. The victim would then immediately go to the police and get the forensic examination done as soon as possible.[18] Attrition rate studies have found that attacks similar to that described in the above rape myth are actually quite rare.[84] The assumption on the part of the prosecutors and the public in general that the 'real rape' stereotype constitutes the rule rather than the exception undermines the victims chances of a successful prosecution.[84]

Due to these popular preconceptions about the number and severity of injuries with which the 'real rape' victim will present, and the use of these injuries by prosecutors to gauge the truthfulness of the victims statement,[85] it has become commonplace for the doctors and nurses examining rape cases to write neutral reports. A neutral report is a report that neither confirms nor denies the complainants allegation of rape. While clinicians will record the injuries which are obvious, provide explanations for the injuries and compare them to the history given by the patient, very few clinicians will draw conclusion as to whether the injuries are due to non-consensual intercourse.[84] The neutral report limits the significance which the doctor can present when giving evidence. The production of

a neutral report has become a way by which clinicians can limit deconstruction of their credibility when giving evidence in court.[18]

The rape examiner must have an understanding of both the biomechanical forces that cause injuries as well as the physiological changes of tissue repair in order to accurately comment on any findings.[85] The 'real rape' stereotype is a hindrance to the significance of the input that the clinician may have in a trial when giving evidence. Clinicians and prosecutors need to understand that a normal examination does not mean that no rape occurred.

2.3 Genital Injury: overview

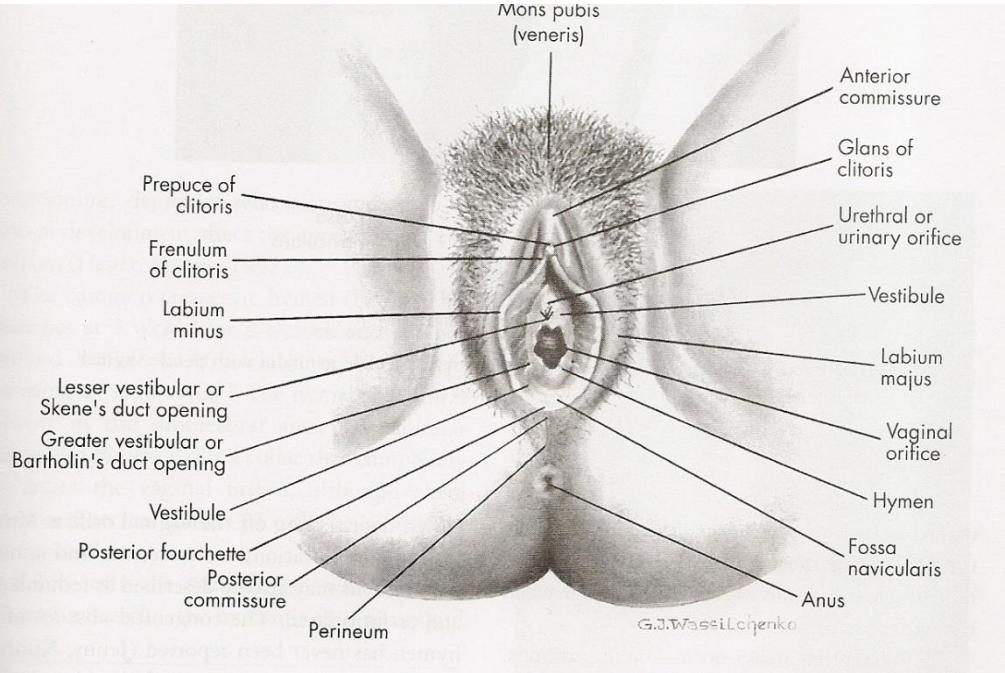

Figure 2-1: Diagram showing the female external genitalia anatomy[82]

The majority of research reports lack detail about the specific type of penetration causing injury.[78] Likewise, no consistent method of documenting injuries was used between studies. The mnemonic *TEARS* (*T*ears, *E*cchymoses, *A*brasions, *R*edness, *and Swelling*) is a commonly used system.[85, 87] As stated in the introduction, this is the method advocated at the study centres in this research, but some examiners do place emphasis on subjective injury findings. Some reports classify injuries by their type and location,[21, 68, 88] whereas others only note whether an injury is present or absent.[89] Victims with no prior sexual experience demonstrated a higher frequency of injuries.[21] Victims who presented for examination following sexual assault within 24 hours also had a higher percentage of documented injuries, while there were fewer identified injuries in victims who presented more than 48 hours later.[62] One study found that adolescents were more likely to sustain multiple injuries, [12] while in two other studies a history of multiple pregnancies and acquaintance with the assailant correlated with fewer documented injuries.[62, 88]

Injury may be sustained by a victim or an offender and can be the result of intentional or accidental actions on the part of either. Wounds vary in severity, extent, and appearance relative to the amount of force delivered, the time over which the force is delivered, the area of the body receiving the force, and the characteristics of the weapon delivering the force. Some injuries are intended to merely cause harm, while others are intended to kill. Injuries are a physical manifestation of action and motive and therefore a useful form of behavioural evidence.[90] The researcher has made mention of stab wounds as an associated injury in the discussion due to the intent that a stab wound signifies.

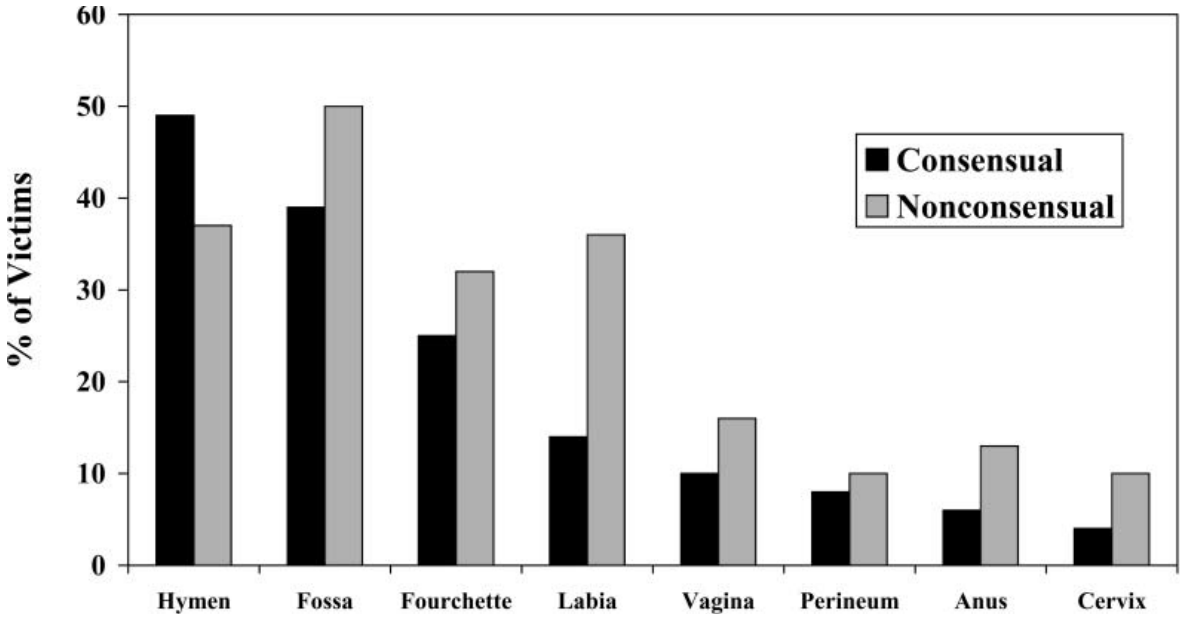

Figure 2-2:Frequency and location of injuries in 210 adolescents with anogenital findings.[83]

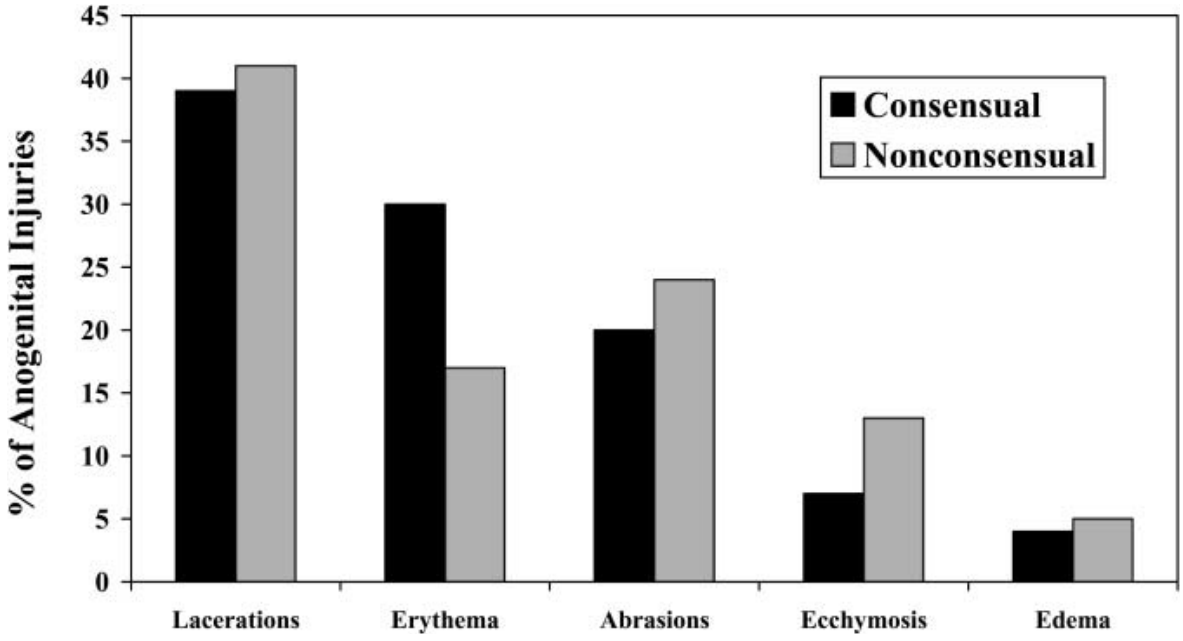

Figure 2-3: Types of genital trauma documented after consensual and non-consensual intercourse.[83]

Studies have shown that the prevalence of anogenital injury in adult women after rape is greater than that seen in adult women following consensual intercourse.[69] In the Jones et al[83] study shown above, anogenital injuries were documented in

73% of girls after consensual intercourse versus 85% of girls who were sexually assaulted. Although these prevalence data were not statistically different, the localised pattern, severity, and extent of injuries in rape victims appear to differ from changes after consensual intercourse. This is demonstrated in figure2.2 which shows a higher incidence of hymenal injuries in the consensual group. The severity of injury is not shown in this figure and most of the injuries were described as increased vascularity in the consensual group. Clearly, the presence of anogenital trauma suggests that penetration has occurred but implies nothing about consent. In addition, anogenital injury is not an inevitable consequence of rape and the lack of genital injury does not imply consent by the victim or lack of penetration by the assailant.[83]

2.4 Genital injury

In three studies examining injuries sustained during consensual sex, two reported overall genital injury rates of 55%.[53, 72] The third paper examined injuries over time and documented that injury surface area decreased significantly between the time of the first presentation and a follow-up examination 24 hours later.[90]

In 1997, Slaughter *et al*[54] published one of the first reports to compare genital findings in sexual assault victims with those of women who had consensual intercourse. Using magnification, she found that injuries were present in both sexual assault survivors and the control subjects, but that rates were higher in the sexual assault group. As well as using colposcopy, this study also included subjective injuries such as swelling and redness, rather than restricting the findings to objective injuries like laceration and bruising.

Subsequent to this research, during a rape trial in Virginia (USA) in 2000, the court weighed the data from the Slaughter study and others and ruled that scientific evidence did not support a difference in genital injury patterns between women involved in consensual versus non-consensual intercourse.[78] The court further ruled that Masters and Johnson's theory of human sexual response was not consistent with current research and could not be used by clinicians during testimony.[78] This decision has prompted further research into the patterns of injury resulting from both sexual assault and consensual intercourse. Doctors and nurses involved in the care of sexual assault victims need to have up-to-date knowledge of the evidence regarding genital injury patterns to deliver efficient and appropriate medical care as well as provide accurate documentation and informed legal opinion.

There is some slight disagreement between studies of consensual versus non-consensual genital injury rates in the literature. Feldhaus *et al* stated in their 2000 paper that while the prevalence of genital injury is higher after rape, consensual intercourse may result in injury but is uncommon.[91]

The patterns of injury sustained during consensual versus non-consensual intercourse have yet to be definitively differentiated.[78] In 1988, Geist[81] proposed that vaginal lacerations sustained during intercourse are more common in post-menopausal women, women who have delivered children vaginally, had surgery or radiation therapy because the tissue weakening that such events cause. Geist also notes that severe injuries are more likely to be found higher in the vagina and less severe injuries in the area of the posterior fourchette.[81]

In a 1982 study using Toluidine Blue, Lauber and Souma[92] reported a significant difference in the injuries sustained during consensual and non-consensual intercourse. They compared 22 recently sexually assaulted women with 22 women who had recently had consensual sex. Nine of the assaulted women had injuries, whereas only one in the other group had an injury. In 2003, Jones *et al*[83] had a look at colposcopy photographs taken of adolescents after sex. They found a statistically non-significant higher rate of anogenital injury in adolescents following non-consensual sex than in those following consensual intercourse (85% *vs.* 73%).[91] Although their data did not show much statistical difference, the localised pattern, severity, and extent of injuries in rape victims differs from changes after consensual intercourse.

A prospective study was conducted in 1984 by Norvell *et al*, on 18 volunteers, each of whom was examined after 72 hours of sexual abstinence and again within 6 hours of sexual intercourse.[93] Using magnification and nuclear staining, anogenital injuries were found in 61% of these women after consensual vaginal intercourse. What is important to note is that this data included only adult subjects.[83] The incidence of perineal lacerations in adolescents having voluntary intercourse was similar to the incidence in adolescent rape victims.[94]

2.5 Genital Injury following non-consensual intercourse

In 1997 Slaughter *et al*[54] found that genital injury occurred significantly more frequently as a result of non-consensual intercourse. It was noted that the hymen

is not the most common site of injury in adolescents reporting non-consensual intercourse with penile penetration by Jones *et al*[83] in 2004. They confirm the equal vulnerability of the fossa navicularis, the posterior fourchette and the labia minora. Lacerations appear most often on the posterior fourchette and the fossa navicularis, abrasions on the labia minora, and ecchymosis on the hymen and cervix. This pattern provides evidence that the major cause of genital trauma seen in rape victims occurs as an entry injury with insertion or attempted insertion of the penis or foreign body into the vagina.[54] The relative fixation of the posterior introitus to the perineal body may account for the concentration of injuries in this area.[81]

Lower vaginal injuries are more common in virgins evaluated after consensual or non-consensual intercourse.[83] Hymen trauma is common after a woman's first intercourse, and includes tears, abrasions, ecchymosis, oedema and erythema. These injuries are usually posterior and cause minor bleeding and pain. More violent coitus such as that seen during rape may cause hymen lacerations that extend into the vaginal wall, rectum or perineal body. These lacerations can cause severe bleeding and require urgent medical attention.[81]

Although obstetrically related trauma remains the most common cause of vaginal injury, trauma of non-obstetric origin is not uncommon. Severe vaginal lacerations may result in exsanguinating haemorrhage and death.[95] Non-obstetric lacerations of the vagina differ from lacerations sustained during childbirth and can generally be classified into two types based on severity. The first type is minor and often associated with a first experience of intercourse, while the second is more severe,

characterised by deeper laceration and copious bleeding. Geist[81] in 1988, reported that up to 75% of women presenting to the emergency department with vaginal laceration require surgery. These patients usually have severe vaginal bleeding (80%) as well as lower abdominal or perineal pain (10-20%). Haemorrhagic shock may be present in up to 15% of these patients. The lacerations tend to be located in the posterior distal vagina.[81]

The most common cause of non-obstetric injury to the vagina is coitus. Predisposing factors that may lead to these injuries include virginity, disproportion of male and female genitalia, and atrophic vagina in post-menopausal women, previous surgery and radiation therapy with scarring. Other important factors include rough intercourse, insertion of foreign bodies and sexual assault.[81]

Jeng *et al*[96] in their 2007 study, found that all vaginal lacerations sustained during consensual intercourse were to the right posterior fornix. They postulated that this vulnerable site of vaginal laceration may be due to the dextro-rotation characteristics of the uterus and the dispensability of the vagina in this area. The vaginal fornix can be extremely distended during sexual intercourse, making it vulnerable to laceration. Lacerations of the upper vagina are not frequently reported in forced vaginal intercourse, but are occasionally reported as injuries sustained during consensual coitus. In adolescents, the absence of reported sexual assault, a severe vaginal fornix laceration can be consistent with the diagnosis of coital injury from consensual intercourse.[97]

In 2010, Sturgiss *et al*[52] reported that positive genital findings were more likely when penetration of the vagina had occurred with a foreign object. The genital findings included lacerations and abrasions, as well as the subjective complaints of tenderness and redness. A positive non-genital finding occurred in 91.7% of alleged sexual assaults involving penetration with a foreign object compared to 53.1% among those reporting sexual assault without the use of a foreign object.[52] Penetration by a foreign object was more common when more than one assailant was involved.[52]

The cervix can be injured during intercourse. During the medico-legal examination of a rape victim, the cervix must be visualised. The cervix lies in the upper vagina, and is the base of the uterus. The cervix is lined with squamous epithelium around the border and columnar epithelium in the centre. The normal cervix has a variable appearance which may be influenced by parity, menstruation, physiological changes, and position of the uterus, infection, surgery and tumours.[98] Understanding the normal variations in the appearance of the cervix and its anomalies is important when deciding what conditions are caused by trauma.[98] Injuries to the cervix appear to be quite rare.[98]

Slaughter and Brown initiated research of the cervix in sexual assault patients in 1991,[48] utilising a colposcope. A colposcope is a magnifying instrument used to view and photograph genital injuries. Trauma may be seen involving the cervix in consensual as well as non-consensual intercourse.[98] In addition, injuries to the cervix following sexual assault, are seen more frequently when directly visualised rather than when examined by review of photographs.[55] In Keller and Lechners[98]

2009 retrospective review of 114 charts, 12.3% of sexual assault victims had a documented injury to the cervix. Tears (0.9%), ecchymosis (4.4%), abrasions (0.9%), petechiae (6.1%), and blood blisters (0.9%) were found. Petechiae were noted to be a more frequent occurrence in sexual assault victims than in a consensual intercourse study.[63] Petechiae are described as red pinpoint spots and differ from ecchymosis only in size (ecchymosis being a bruise with a diameter greater than 0.5cm).[99]

2.6 The young victim

Distinguishing accidental from non-accidental injuries in young girls is one of the pitfalls faced by forensic clinicians. Most accidental injuries in girls are relatively easy to distinguish from those caused by sexual assault.[100] Most accidental injuries are straddle type injuries causing injury to the labia. This is because the labia cover the opening to the vagina and the surrounding tissues and are invariably injured despite what other tissue damage may occur. The question of sexual assault arises when the hymen or vestibule tissues are injured without any damage to the labia, particularly in a young child who may be unable to speak[87].

Some conditions mimic signs of sexual abuse, including congenital anomalies, dermatology conditions and urogenital abnormalities.[100] Periurethral bands, mounds on the edge of the hymen, diastasis ani, anterior midline perianal skin tags, intermittent anal dilatation and intravaginal longitudinal ridges, that were once considered to be evidence of prior trauma, are now recognised as normal.[101] Erythema secondary to poor hygiene, bladder infections and soap may be a cause for concern when discovered in a young infant.[87]

2.7 The elderly victim

A high incidence (52%) of genital trauma in elderly sexual assault victims has been reported.[102] In a 1992 study by Ramin and colleagues[70] found that significantly more of the postmenopausal group than the younger group (43% *vs.* 18%) sustained genital trauma. In addition, genital trauma was more severe in the postmenopausal group. This is attributed to physical changes of genital tissue increasing their susceptibility to injury. Prolonged oestrogen deprivation in postmenopausal women causes thinning and atrophy of the vulval and vaginal epithelium, as well as reduced vaginal lubrication. The skin loses its subcutaneous fat and elasticity which results in skin that is easy to injure and slow to heal. With oestrogen loss, the vagina becomes pale and its epithelium thins, resulting in diminished distensibility and reduced secretion. This means that the post-menopausal vagina is easily traumatised.[103]

In Eckert and Sugar's 2008 study[104], they commented that the vast majority of rape victims are young. They conclude that women over 40 differ in vulnerabilities, circumstances of assault and in physical outcomes than do younger victims. Older women were more frequently hit, choked or threatened with physical force. Women over 55 were more likely to be assaulted in their own home or in a care facility. The assailant was more likely to be a service provider or stranger than in the younger groups of women. These findings are consistent with the social situation of older women, who tend to live alone or in care facilities.[104]

2.8 Time to examination

A factor associated with fewer identified genital injuries is a delay between the assault and examination. The longer the delay, the fewer injuries were documented.[105] It has been documented that microscopic injuries to the genitalia tend to heal within 72 hours.[78] In 2001, Adams *et al*[55] however found that the degree of localized erythema following sexual assault was the same in patients examined 24 hours after the assault as in the patients examined 48 to 72 hours after the assault. They concluded that hypervascularity in young adults might result from intercourse, but might be a normal variant in others.

In 1997, Bowyer and Dalton[47] claim that the lack of research informing medical evidence on rape may exacerbate the underreporting of rape. The variety of examination/ visualisation techniques as well as participant inclusion/ exclusion criteria used in different studies makes it difficult to compare findings between these studies.[91]

2.9 When the examination is "Normal"

Adams *et al*[55] coined the phrase "its normal to be normal" in conclusion to their 2001 retrospective study of patient files and colposcopic photographs of 236 children with perpetrator conviction for sexual abuse. "Normal does not mean nothing happened" is the conclusion to Goodyear-Smith and Laidlaw's[64] 1998 review of the literature. They established that it is often impossible to decide whether a hymen is "intact" with regard to previous sexual intercourse.

A minority of women reporting sexual assault have an injury to support the "real rape" stereotype.[46, 106-108] Less than one third of the women in Palmer *et al*[88] study in Newcastle in 2004 displayed a genital injury, and most of those injuries were minor. The likelihood of genital injuries following vaginal penetration is dependent on a number of factors: the integrity, lubrication and state of the tissues, the size of the penetrating object and the degree of force involved.[88]

2.10 Colposcopy and nuclear stains in the forensic examination of rape

It was once written, "in our society….to be real, a thing must be visible."[109] The observation and documentation of visual evidence which may involve optical tools is central to the process of the medical forensic examination.[110] Because witnesses to sexual violence are frequently not present,[111] it has come to be accepted that bodily evidence skilfully collected and testified to by experts can be vital within criminal justice systems as a means of increasing the number of assailants convicted.[112] For some medical examiners it is standard practice to photograph each injury in order to document it. Examiners may also choose to use a staining agent such as toluidine blue, gentian violet, fluorescein or Lugol's solution to enhance visualisation of genital trauma. When applied, these stains adhere to and illuminate damaged tissue.

Toluidine blue is an important tool which helps to detect genital injuries after sexual assault. It is a nuclear stain commonly used by gynaecologists to detect vulvar cancer.[49] Normal vulvar skin contains no nuclei and will not bind the dye. In 1982, Lauber and Souma[92] found that it could be used to detect lacerations in rape victims. When lacerations occur, the deeper dermis which contains nuclei is

exposed. In their study, 70% of nulliparous patients and 40% of the total number of patients examined within 48 hours of an alleged sexual assault demonstrated a toluidine blue positive laceration. In other studies, application of toluidine blue stain and its subsequent removal with a destaining reagent has been shown to increase the detection rate of posterior fourchette lacerations from 16% to 40% in adult rape victims.[49, 53, 69, 92]

In McCauley's prospective case-control study of 1986 found that Toluidine blue increased the detection of lacerations to the posterior fourchette from 4% to 28% in adolescent victims.[94] The presence of lacerations to the posterior fourchette does not necessarily implicate the penis as the cause of the injury. Fingers and even the insertion of a speculum can cause lacerations of the posterior fourchette.[49] It is recommended that the toluidine blue test should be performed before any digital or speculum examination is performed.[69, 92]

Colposcopy improves the detection of genital trauma in sexual assault victims significantly.[67] It also provides a means of photo documentation of any injury. Colposcopes provide magnification of up to 30 times. The use of colposcopy during the examination of sexual assault cases is becoming more widespread. Colposcopic photographs can be used in court as evidence. Drawbacks to the use of a colposcope include the access to and maintenance of the equipment, training in its use and the potential of increased psychological trauma to the patient of having a photographed genital examination.[71] As described by Patel *et al* in 1993[113], the procedure is a potential stressful invasion of a woman already vulnerable and at risk of developing Rape Trauma Syndrome.

In Lenahan Ernst and Johnsons[67] study in 1998, genital trauma was documented in 9 of 17 patients using the colposcope, while gross visualisation alone found genital trauma in one patient. Slaughter and Browns 1992[48] study, also showed that the use of the colposcope improved detection of genital trauma when compared with detection by gross visualisation alone.

Rogers and McIntyre[71] examined 445 consecutive sexual assault cases in 2008 where anogenital trauma was detected in 68% of patients. A total of 837 ano-genital injuries were documented. Direct visualisation alone demonstrated 531 injuries. Nuclear staining with toluidine blue identified an additional 285 lacerations or abrasions. Colposcopy identified 21 injuries not seen using direct visualisation or nuclear staining. Overall, three women had subtle genital injuries detected only by colposcopy. They feel that colposcopy offers little advantage to the skilled medical examiner when compared to direct visualisation and nuclear staining.

Conclusion

The literature reviews on studies of rape victims relate to incidence and prevalence of injuries as well as injury patterns and the use of examination adjuncts. Most studies are done on female victims but have been done in other countries. South African studies focus on women already in the justice system and focus on how their injuries impact the attrition through the justice system. This may increase or even decrease the incidence and prevalence of injury.

Sugar et al[21], for example, only found visible genital injury in 20% of victims but they excluded all subjective findings like redness, tenderness or pain from their statistics. The TEARS system used in this research as well as in Sommers[72, 114], Slaughter[54], Zink[53], Anderson[115, 116] and Jones[66], does include redness as a positive genital injury. Redness is a common finding and contributes to higher injury rates in these studies.

It is accepted that colposcopy should increase the number of genital injuries identified, although over-reliance on positive findings to prove a case of rape needs to be de-emphasised. Teixeira[73] found that 11% of cases showed additional hymen injury when examined with a colposcope. However Zink[53] found that direct visualisation and colposcopy yielded similar genital findings, but that the use of toluidine blue allowed more injuries to be identified than either of the other methods. This research was done on victims using direct visualisation only and yielded positive genital injury findings of nearly 50%. The researcher believes that colposcopy provides a photographic record of injuries that may prove beneficial in the South African setting where positive injury findings do impact whether perpetrators are convicted or not.

Sommers et al[51, 72] found a significant association between ethnicity (Black and White) and genital injury following sexual assault with Whites more than four times more likely to have a genital injury than Blacks. They found that following consensual intercourse, while Black and White participants had significantly different genital injury prevalence (43% and 68% respectively), dark skin colour rather than race was a strong predictor for decreased injury prevalence.

Chapter 3 MATERIALS AND METHODS

The dependent variable in this study was the outcome of whether there was an acute genital injury or no injury, defined as the presence or absence of recorded abrasions, tears, redness, bruises or swelling. Examinations used a light source and gross visualisation only. No victims were examined using toluidine blue or colposcopy. Data include only the presence or absence of injury findings, and lack specific descriptors about injury size and severity.

The data provided variables on patient demographics including victim age; race; parity and use of contraception. Variables such as education level; marital status and virgin status were not recorded. Associated injuries included abrasions, bruises, stab wounds and lacerations to the victim at a site not including the genitalia.

Data on characteristics related to the assault (associated factors) included anal penetration, use of a foreign body to rape the victim; and the use of alcohol by the victim.

Time between assault and examination was included as a variable, as well as the presence or absence of the J88.

It was obvious during data collection that important variables like definite reported vaginal penetration or attempted penetration with penis, with finger, or with objects; lubrication used; and weapon involvement do not get documented well enough by the medical examiners.

Research into sexual assault injuries goes back to the 1960's. Lack of consistency in the classification systems used to describe genital and non-genital injury complicates the significance of injury. The centres involved in this particular

research generally document injuries according to a system developed by Slaughter et al, based on injury type (tears, ecchymosis, abrasions, redness and swelling.)[54] This system does rely on the physician being willing to use the terms tears and lacerations, as well as bruises and ecchymosis interchangeably.

The 11 genital areas examined in this research were chosen as they are mentioned individually on the medical-legal form that gets completed for the police (J88). These areas include the clitoris, frenulum of clitoris, urethral orifice, para-urethral folds, labia majora, labia minora, posterior fourchette, fossa navicularis, hymen, vagina and the cervix. The perineum was not included in the areas looked at, and the researcher decided to include any anal penetration as an associated injury group instead of describing the injury in detail.

This research looked at female sexual assault victims over the age of 15 only. Male victims as well as females under the age of 15 were excluded from the study.

Demographic variables included age and ethnicity. The victims were grouped into the following age categories:'15-16', '17-29', '30-49', '50-70' and '70+'. There is no scientific reason for choosing these particular ages to group together, but some of the existing research does follow similar patterns and the researcher is of the opinion that owing to the changing physiological nature of a woman's genitalia as she ages, these age groups may give some insight into injury patterns.

Race was grouped according to a traditional South African definition of Black, White, Coloured and Indian/ Asian. The researcher felt that there may be similarities between Coloured and Indian victims (purely due to his opinion of their historical socio-economic conditions), so it was decided to combine these two groups for all stratified analyses because there were very few respondents.

“Why separate women according to their ethnicity?” In South Africa, much of the social and economic inequality exists along ethnic lines, and it is well documented in previous research that women in poorer areas typically are exposed to higher rates of crime, including sexual assault.

Is there any difference in injury pattern according to skin colour? Sommers et al found that White victims were more than four times as likely to have a genital injury as Black victims.[72] The researcher felt it may be worth looking at this.

3.1 Ethics

This research was approved by the Human Research Ethics Committee of the Faculty of Health Sciences of the University of the Witwatersrand (protocol approval number M10450 - Appendix 1).

Netcare ethics: Ethics clearance was obtained from the Netcare Research division. (Appendix 2)

Any expenses incurred were borne by the researcher.

3.2 Study Design

This is a retrospective cross sectional study. The study was done on 310 sexual assault victims seen at Sunninghill, Milpark, Garden City and Union Hospitals emergency departments during the period January 2008 to December 2009.

3.3 Study Setting and Population

The study population consisted of female patients older than 15 years of age who agreed to a forensic examination between January 2008 and December 2009.

The four emergency departments included in the study provided services to sexual assault victims seven days a week, 24 hours-a-day. Guided by sexual assault evidence kits, these examinations, which involved detailing and documenting genital and other associated extra-genital injuries and collecting biological samples generally took between one and two hours.

The emergency departments were located in middle to upper class areas and saw between 1600 and 2900 patients per month each. All of the units had full time casualty doctor and specialist cover. These emergency departments all have well established sexual assault treatment protocols. All rape victims were seen free of charge. The doctor's findings from the genital and general examination are documented on the J88, and any physical evidence such as semen and foreign material is collected and sealed in the Sexual Assault Evidence Collection Kit. These kits are uniquely barcoded for security of the evidence trail, and eventually get taken by the investigating police officer and sent to the police forensics laboratory for analysis. The doctor's findings documented on the J88 and the findings of the forensics laboratory play a central role in prosecutor's decisions about how to proceed with a complaint.[36]

This research was done using the medical-legal findings on examination, by a variety of doctors in the emergency department, as documented on the J88 form. The experience of these doctors ranges from examiners who may have only done one or two rape examinations in their careers, to some of the most experienced

examiners in the country. The quality of the documentation also mirrors the experience that these doctors have.

Inclusion criteria

- Female sexual assault victims of 15 years of age and older
- Consent to forensic examination must have been given
- The medical legal form where the doctor's record their findings (J88) must be available and complete or medical notes should have been written which documented the information as required by the J88.

Exclusion criteria

- Girls under the age of 15 years
- Male victims
- Patients who were unsure whether an assault occurred
- Victims who refused consent for a forensic examination were excluded

The exclusion of male victims from this research was a conscious decision by the researcher. Occasionally, female patients present to the emergency department saying that they suspect that they may have been raped but that they had no recollection, and that the only reason that they were concerned was because of the amnesia. Owing to the influence that the media have on our lives and the stories that people are exposed to daily, there are anxious patients who attend the emergency departments to "rule out rape." If it was stated on the J88 that this was the case, these women were excluded. This was also a conscious decision by the researcher as he is of the opinion that the

likelihood of an injury would be really low, which was confirmed when browsing through the notes of these patients.

3.4 Study Protocol

3.4.1. Data collection

In the emergency departments included in this research, all sexual assault victims have a specially designed “pro-forma” file used for documentation. These files are kept separate from the files belonging to all the other patients attending the ED. A J88 is completed for each victim which is copied, and this copy is attached to this file. The original J88 is handed to the police, together with the crime kit. The doctors are advised to write notes in the sexual assault file, as well as keep a record of these notes with the J88 attached in the practice archives together with all other patient’s notes. The researcher found that it was far easier to trace records in the Emergency Department Practice archives, than from the hospital group’s sexual assault file archives. The hospital group warehouses all sexual assault documentation in boxes. Finding these files and going through the documentation was tedious work, and identified a weakness in the medical practices current system of keeping records of sexual assaults. Unfortunately, most of the records were in boxes and not in the medical practices archives. All data collection was done by the researcher himself.

Data was extracted from the victim’s medical notes and J88 (Appendix 3) made by the treating doctor. The notes may include circumstantial information relating to the assault, such as relationship to the assailant and demographic details of the assailant; nature and location of genital injuries; and which police station the victim

reported the crime to. A gynaecology and obstetrics history forms part of the notes and included age at menarche, menopausal state, parity, time of last consensual intercourse, and number of recent sexual partners. Demographic information such as age and race was documented. All completed J88 were utilised, regardless of the quality of the doctors documented findings on the J88.

Multiple injuries at one genital site or bilateral injury at a certain anatomic location were categorized as single-site trauma. The researcher realises that this may cause some concern when interpreting the data, but the quality of the existing medical documentation usually wasn't good enough to clearly decide when there was or wasn't more than a single injury per site. The categories of injuries were bruises, abrasions, redness, swelling and lacerations.

The perineum was excluded from the sites of genital trauma based on the researcher's opinion that the examiners aren't examining this area adequately. There was no perineal injury documented in any of the victims included in this research. This research concentrated on genital injury only, so anal trauma was excluded. Hence the term ano-genital trauma isn't used.

All victims were examined by a doctor. During the two years used for this research, 26 doctors examined sexual assault cases included in this study. The experience of the doctors differs from full-time emergency doctors who are among the most experienced sexual assault examiners in the country, to doctors who have never examined a sexual assault victim before. This difference in doctor's experience does impact the quality of the examination as well as the documentation in the researcher's opinion, but further discussion of this was

advised against by the research committee due to some ethical concerns regarding the doctors permission.

Neither colposcopy nor nuclear staining was used on any of the patients. The researcher discusses this at length in this paper, as it is accepted that examination with the help of nuclear staining and colposcopy does increase the possibility of seeing subtle injuries.

Some patient files did not have the J88; however, they contained adequate medical notes which could be utilised. The J88 documents all of the genital anatomic sites of interest to the rape examiner. The information from the J88 was entered onto a Microsoft Excel spread sheet.

All data collection was done by the researcher only. The data was captured as single entry into the spread-sheet, but no mistakes were expected. The data capturing took three days, and all J88's and medical records have been kept in storage.

3.4.2. Data Management

The ages of the women in the study were categorised into five groups. The groups are 15 and 16, 17-29, 30-49, 50-70 years and older than 70. The researcher decided to include the ages of 15 and 16 into their own group because many of these were adolescent girls who were sexually active. They were at an age where menses may not have stabilised yet, and were less likely to have a partner than the slightly older girls. This is the researcher's opinion.

The researcher decided that the 17-29 year old category would likely depict women in their younger years, possibly unmarried, often with only one child, and according to literature are the age group at highest risk of being raped.

The category 30-49 year old category was recognised as a group of women who would most likely be married, have stable relationships and usually pre-menopause.

The above 50 year old group were characterised to depict the menopausal group. The older group was considered to be a group of women at higher risk of associated non-genital injury due to their age and social circumstances. These two categories were combined because the number of women in the older group was too low to be used in isolation. There were too few women over the age of 70 years, and therefore were included into one group of over 50 years. Studies have shown that older group of women at higher risk of associated non genital injury due to their age and social circumstances.

The race demographic broadly classified the women into one of South Africa's four main race groups, Black, White, Coloured or Asian/Indian. The Ethnicity categories 'Coloured' and 'Asian' were combined as these comprised very few respondents.

The genital injuries were documented according to what the J88 listed. The 11 anatomical sites were identified on the J88. The associated injuries included bruises, abrasions, stab wounds and lacerations. For the purpose of this study, the

terms “bruise” and “ecchymosis”, and “tears” and “lacerations” mean the same thing. These were physical injuries that the victim sustained when raped.

When deciding on how to define a late presentation for examination, the researcher decided on using the 72 hours parameter. It is the researcher’s opinion that some subtle injuries may have healed in 72 hours.

3.4.3. Sample Size

This was a convenience sample. Data was collected from 310 victims of rape who were seen in 2008 and 2009. These 310 victims had completed J88's or alternatively, they had good medical notes. Several of the victims seen during 2008 and 2009 could not be included in the study because the J88 was not present, or the notes were too scanty to collect any data from.

Statistical considerations: Although this is a convenience sample, the sample size required to detect an assumed prevalence of anogenital injury for this population has been calculated. Sixteen previous studies ranging in size were used for this calculation. The smallest study had 117 subjects while the largest had 1076.

Sample size calculations for the estimation of the prevalence with 5% precision, based on the 95% confidence interval, an infinite population and different literature estimates of prevalence were performed. The results showed:

Table 3-1: Sample size and estimation of prevalence

Prevalence	Sample size
15	196
30	323
40	369
50	385
60	369
70	323
85	196

The worst case sample size estimate is 385 at 50% prevalence, somewhat higher than the sample size of 310 used in this study. Relaxation of the precision criterion from 5% to just 6%, however, reduces the sample size estimate at 50% prevalence to 267. Thus the sample size of 310 used in this study is adequate.

3.4.4. Data Analysis

Microsoft Excel was used for data entry and management.

Microsoft Corp., Redmond, WA

The data was tabulated and analysed with SAS software.

SAS Institute Inc., SAS Software, version 9.1.3 for Windows, Cary, NC, USA: SAS Institute Inc. (2002-2003).

All categorical variables were described using frequencies and percentages, and continuous variables with means and medians. Tests for significant relationships were carried out using Pearson's χ^2 test at the 95% confidence level.

Fisher's exact test was used in the case of 2x2 tables, or where the requirements for Pearson's χ^2 test could not be met.

The strength of the associations was determined by Cramer's V (the Phi coefficient was used in the case of Fisher's exact test). The absolute values of these coefficients were interpreted as follows:

Table 3-2: Interpretation of coefficient values

0.50 and above	high/strong association
0.30 to 0.49	moderate association
0.10 to 0.29	weak association
below 0.10	little if any association

Chapter 4 RESULTS

Introduction

The layout of this chapter takes the reader through the thought processes of the researcher. The first section in the chapter covers the presence or absence of the J88. The J88 did not really form part of the objectives of this research, but the presence of this document was compulsory for the research to be done. The demographic profile of the research population is then added. A table summarising the demographic such as age, race, parity, contraceptive use and alcohol use is included. The researcher was interested to know whether parity, contraceptive use and alcohol use contributed to injury at all. The injuries sustained; whether they were genital or non-genital/ associated injuries, are then discussed. Tables summarising all injuries are included. Associated factors; which include anal penetration, foreign body use and alcohol use are presented in the following section; and the chapter concluded with the results of whether a delayed examination impacted the findings.

When reading and interpreting the results:

- Genital injuries mean an injury to one of 11 genital anatomical sites. Perineum and anus excluded.
- Associated injury means a physical injury to the patient's body. This may be bruising, abrasions, stab wounds or lacerations.
- Associated factors mean the presence or absence of alcohol, reported anal penetration or the use of a foreign body to rape the patient.

4.1 Presence of the J88

Table 4-1: Table showing the presence or absence of J88.

J88	%
No	4.8 (n=15)
Yes	95.2 (n=295)

The number of cases with no J88 form (n=15) is too low to allow for analysis by age or race. The lack of a J88 should not be over analysed, as the reason is purely administrative. These 15 victims without a J88 were included in the research because of the good quality medical notes.

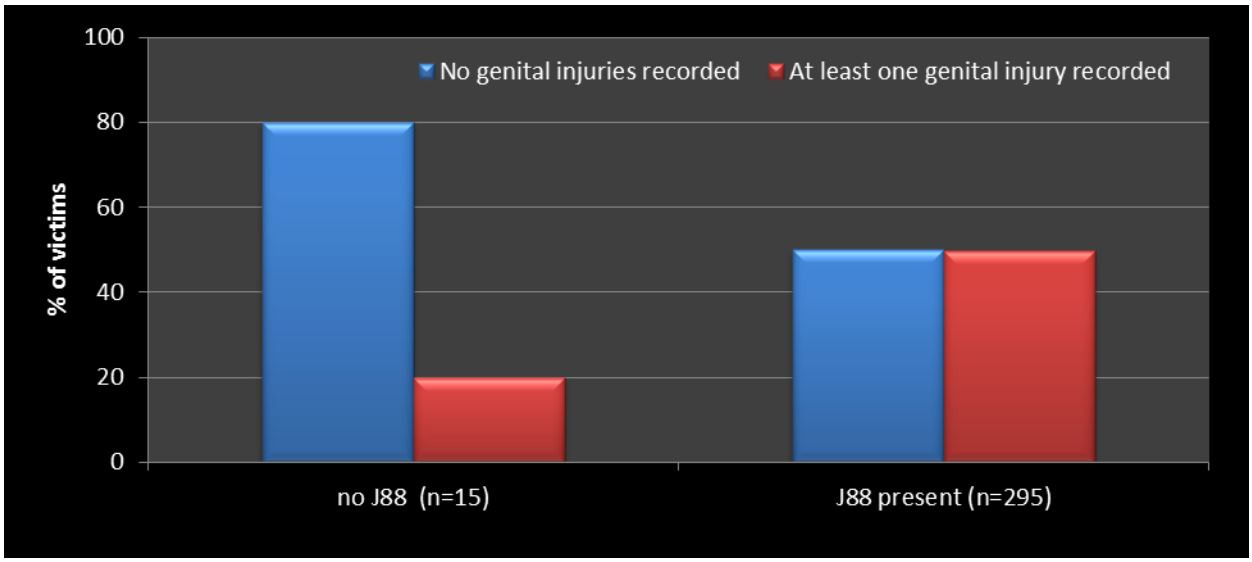

Figure 4-1: The association between the presence of the J88 and the presence of genital injuries.

There was a significant association between the number of genital injuries (none *vs.* at least one) and the presence of the J88 (p=0.032): the group without a J88 contained fewer cases with at least one genital injury. The association was weak (phi = 0.13). There was no significant association between the numbers of associated injuries (none *vs.* at least one) and the presence or absence of the J88

(p=0.35). There was no significant association between any of the associated factors and the presence or absence of the J88 (anal penetration: p=0.51; foreign body: p=1.00; alcohol: p=0.17).

There was no significant association between delayed examinations and the presence or absence of the J88 (p=1.00) although it should be noted that all cases of delayed examination (n=17) had a J88.

The researcher feels that the presence of an injury may prompt the examiners to pay more attention to the quality of their record keeping. This may contribute to so few victims with a positive genital injury in this study group having no J88 attached to their records.

4.2 Demographic profile of the rape victims

Table 4-2: Summary of population description

		n	%
Age in years : mean (sd) median (interquartile range)		26.1 (11.8) 23 (18-29.5)	
Age category	15-16	50	16.1
	17-29	181	58.4
	30-49	62	20.0
	50-70	8	2.6
	>70	5	1.6
	Unknown	4	1.3
Race	Black	191	61.6
	White	75	24.2
	Coloured	34	11.0
	Asian	8	2.6
	Unknown	2	0.7
Contraceptive use	Yes	63	21.0
	No	215	66.1
	Not recorded	40	12.9
Parity	0	164	52.9
	1	45	14.5
	2	33	10.7
	3	16	5.2
	4	8	2.6
	More than 4	3	1.0
	Not recorded	41	13.2
Alcohol use reported with assault		30	9.7

The ages of the victims ranged from 15 - 89 years, with the mean age of the victims at 26.1 years (SD=11.8 years) and the median age was 23 years (IQR 18-29.5 years).

The figure below shows the frequency distribution of women, it is noticeable that there was a large group of victims aged younger than 17 years (16%). The majority of the victims (58%) were aged 17-29 years, followed by those in the 30-49 year age group (20%). There were a high number of 15 and 16 year old victims (n=50).

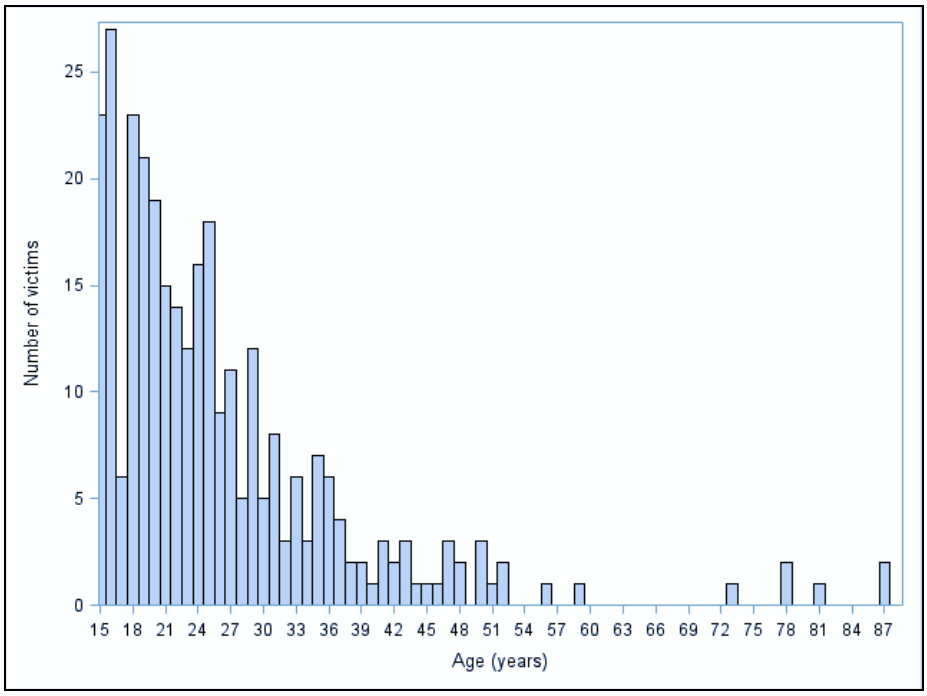

Figure 4-2: The frequency distribution of the victim's ages.

For further quantitative analysis, due to their low frequencies, the race groups Coloured and Asian were combined and the age groups ’50-70’ and ‘>70’ were combined (group named ‘>50’).

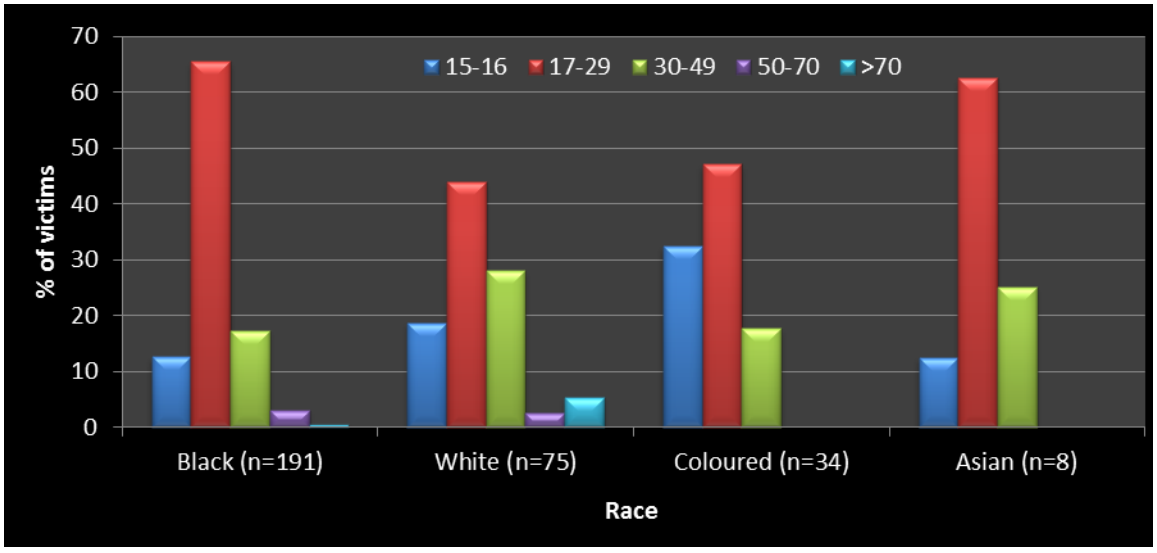

Figure 4-3: Age profile of victims by race.

As illustrated in Figure 4.3, the most important difference was that within the Black group there was a higher proportion of 17-29 year old victims (n=125: 65.4%) compared to the White group (n=33: 44%). However, there was a significant but weak association between the race and age categories (Cramer's V = 0.17).

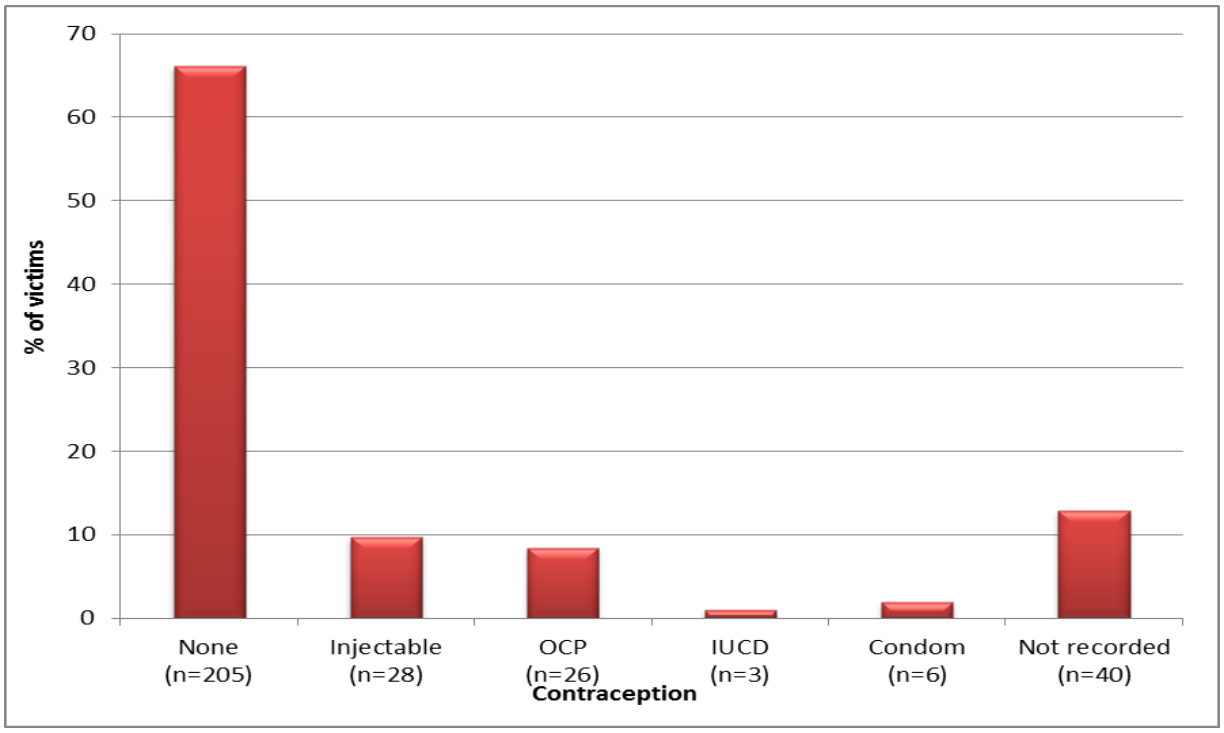

Figure 4-4: Contraceptive use by rape victims

As shown in Figure 4.4, 66% of victims (n=205) were documented in the J88 as not being on any form of contraception.

Description of injuries sustained by the victims

Any injury = genital injury and/or associated injury and/or anal penetration and/or foreign body.

In the table below: Y= Yes and N= No.

"Any injury" = Y if patient had one or more of the following: one or more genital injuries, bruise, abrasion, laceration, stab, anal penetration or foreign body. = N if none of these injuries were present.

“Any injury count” = number of injuries based on “Any injury” definition.

“Genital injury” = Y if patient had one or more genital injuries

= N if patient had no genital injuries

“Genital injury count” = number of genital injuries

“Non-genital injury” = Y if patient had one or more non-genital injuries (bruise, abrasion, laceration, stab, anal penetration or foreign body)

= N if patient had no non-genital injuries

“Non-genital injury count” = number of non-genital injuries

66.8% of the victims had one or more injuries according to the “Any injury” definition. There were 103 women with no injury at all, as the table below shows.

Table 4-3: Summary of Any Injury v Genital injury v Non-genital injury

ANYINJ	Frequency	Percent
N	103	33.2
Y	207	66.8

Table of GI by NGI				
	GI	NGI		
		N (n=187)	Y (n=123)	Total (n=310)
Frequency	N (n=160)	103	57	160
Row percent		64.4	35.6	
	Y (n=150)	84	66	150
		56.0	44.0	
	Total (n=310)	187	123	310
		60.3	39.7	100.0

ANYINJCOUNT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	89	43.0	89	43.0
2	63	30.4	152	73.4
3	27	13.0	179	86.5
4	18	8.7	197	95.2
5	3	1.5	200	96.6
6	3	1.5	203	98.1
7	2	1.0	205	99.0
8	1	0.5	206	99.5
9	1	0.5	207	100.0

48.4% of the victims had one or more genital injuries and 39.7% of the victims had one or more non-genital injuries. 21.3% of the victims had both genital and non-genital injuries. The total injury count (of any type) = 432.

4.3 Genital injuries sustained by the rape victims

No genital injuries were recorded for 52% of the victims included in the study. The median number of genital injuries was 0 (IQR 0-1 injury). The mean number of genital injuries was 0.88 (sd=1.26). One genital injury was recorded for 27% of the victims, while 21% of the victims had between 2 and 8 (of a possible 11) genital injuries.

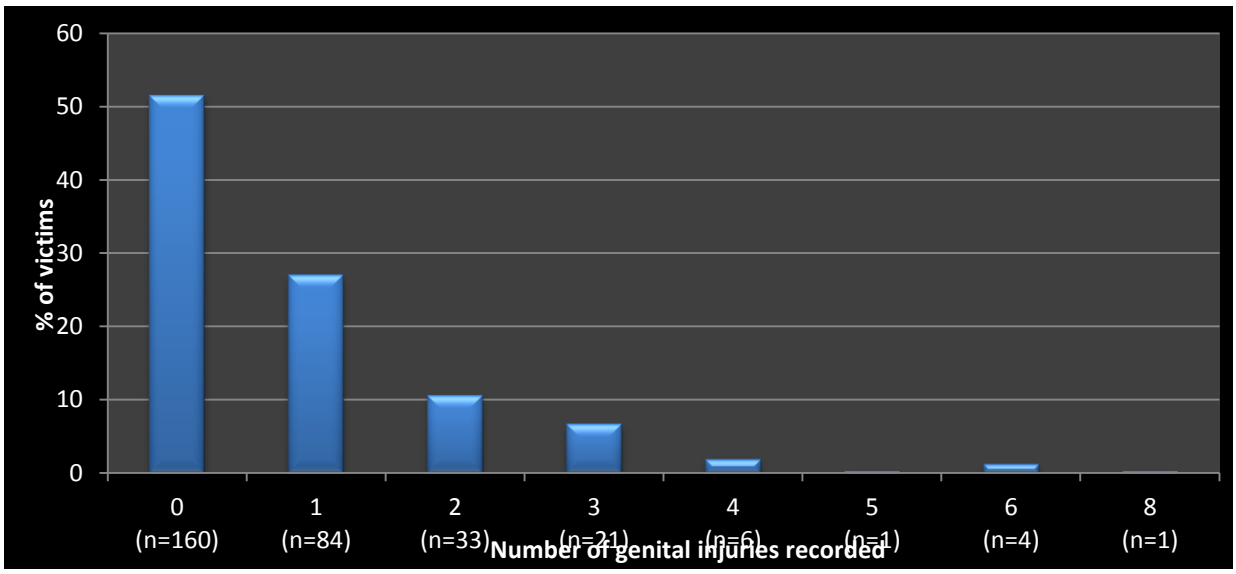

Figure 4-5: The number of genital injuries by victim.

Figure 4.5 demonstrates the number of genital injuries recorded. 160 victims had no genital injuries, 84 victims had at least 1 injury, 66 had more than 1 injury and 1 victim had 8 of a possible 11 injuries.

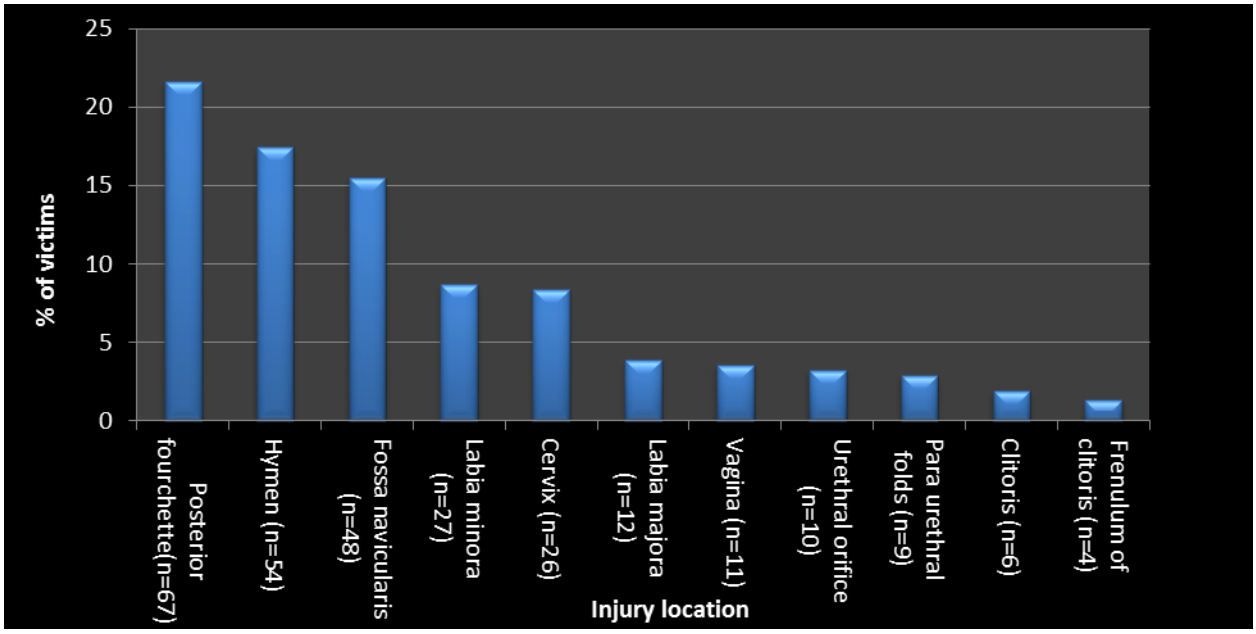

Figure 4-6: The percentages of victims for whom a particular genital injury was recorded (the percentages do not amount to 100% since some of the victims have multiple injuries).

Figure 4.6 shows the injury sustained for each anatomical site, the injury to posterior fourchette, fossa navicularis, labia minora and hymen featured most often as one of multiple injuries. The cervix was usually an isolated injury and therefore the trend is reversed when compared to the other injury sites.

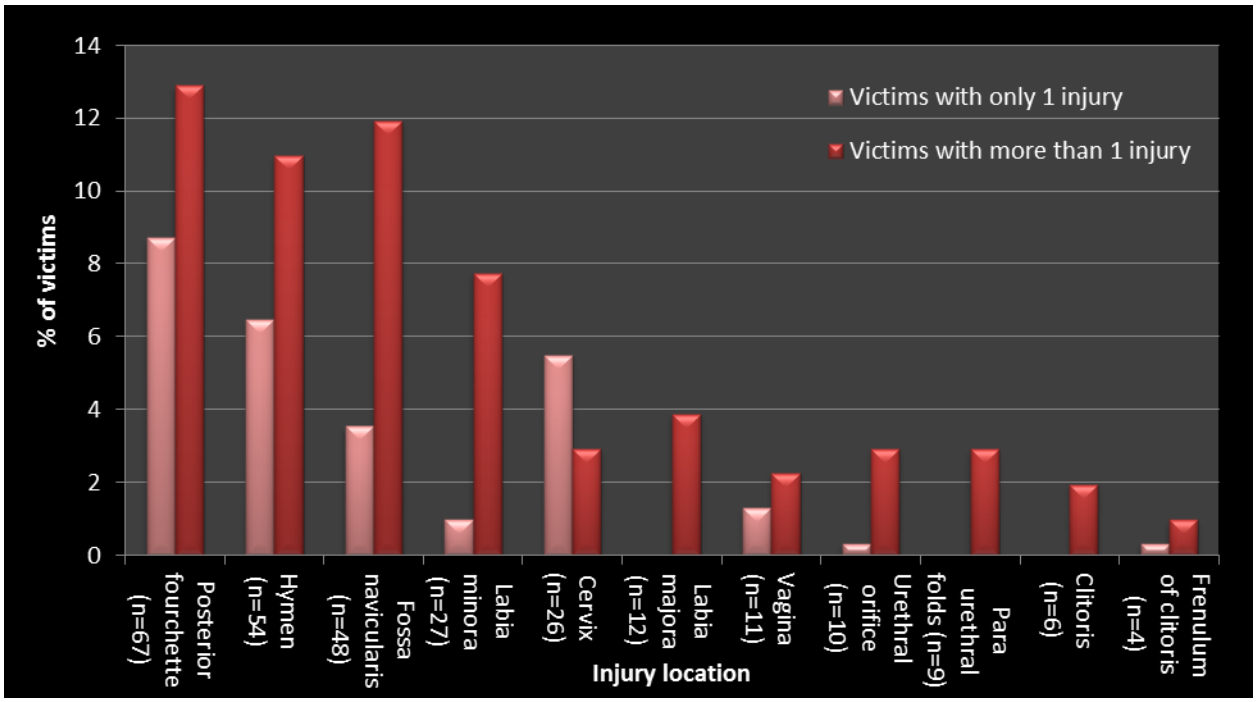

Figure 4-7: The association between victims with a single and victims with multiple genital injuries.

Table 4-4: Entry v Internal genital injury

Frequency	Table of ENTRY by INTERNAL Genital Injury			
%	ENTRY	INTERNAL		
Row %		N (n=275)	Y (n=35)	Total
Column %	N (n=183)	160	23	183
		51.6	7.4	59.0
		87.4	12.6	
		58.2	65.7	
	Y (n=127)	115	12	127
		37.1	3.9	41.0
		90.6	9.5	
		41.8	34.3	
	Total	275	35	310
		88.7	11.3	100.0

Internal injuries were defined as injuries to the cervix and vagina. Entry injuries were defined as injury to the other genital anatomical sites. There was no significant association between Entry and Internal injury. (p=0.47)

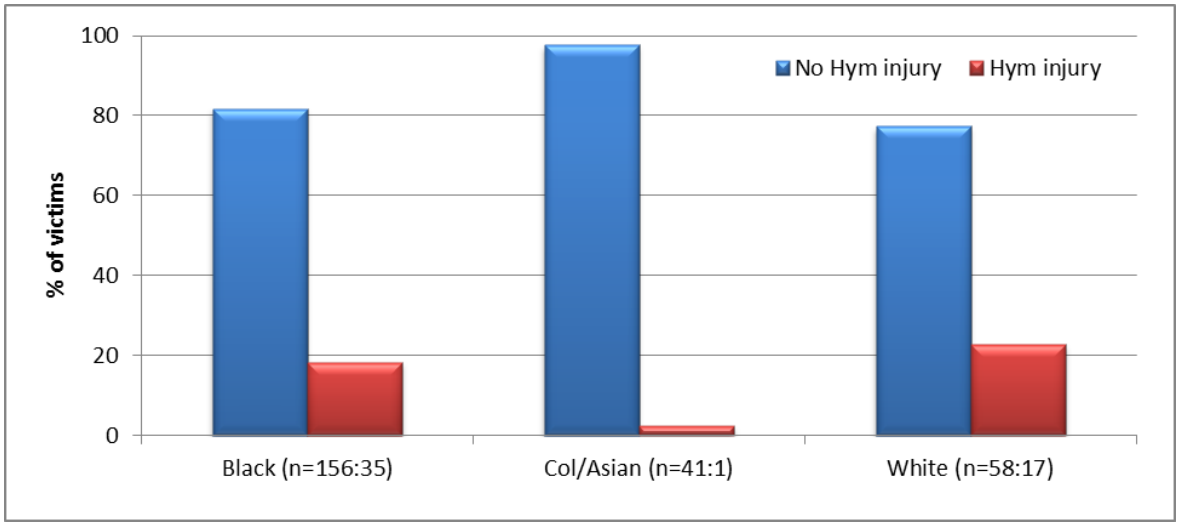

Figure 4-8: Association between injury to the hymen and the race of the victim.

Looking specifically at young women (aged under 21 years) *vs.* older women (aged 21 years and older), there was no significant association between these age categories and injuries to the hymen (p=0.27). There was, however, a significant association between an injury to the hymen and the race of the victims (p=0.016): fewer hymen injuries occurred in the Coloured/Asian group compared to the White group. The association was weak (Cramer's V = 0.16).

A logistic regression of the occurrence of hymen injuries vs. age, race and deliveries (nulliparous / primiparous/ multiparous) showed that women from the Coloured/Asian race group were far less likely to have sustained hymen injuries than Black victims (OR 0.12; CI 0.02-0.90), while the difference for White vs. Black victims was not significant (OR 1.19; CI 0.59-2.40). Primiparous and multiparous women were less likely to have sustained hymen injuries compared to nulliparous women (OR 0.29; CI 0.10-0.85 and OR 0.23; CI 0.07-0.75 respectively). There

was no significant effect of age on the incidence of hymen injuries (OR 1.03; CI 0.99-1.08). *OR=odds ratio; CI=95% confidence interval for odds ratio.*

The figure below demonstrates the parity of the women and girls. The median number of deliveries was 0 (IQR 0-1). The mean number of previous deliveries per victim was 0.80 (SD= 1.32). The information regarding parity was missing for 13% of the victims.

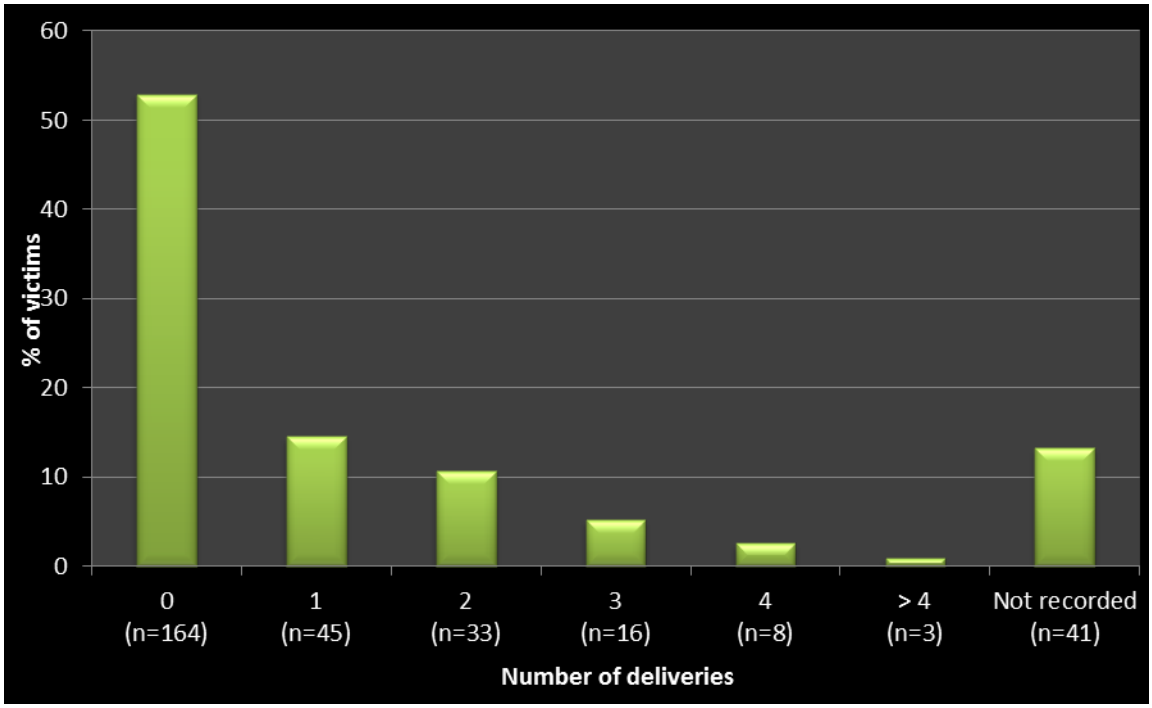

Figure 4-9 Victim parity

It was impossible to tell whether these were vaginal or caesarean deliveries when collecting the data. The impact of multiple vaginal deliveries on genital injury pattern during sexual assault is thus uncertain. For the analysis of the frequency of genital injuries *vs.* the number of deliveries, the number of deliveries was grouped as 0, 1 and more than 1.

There was no significant association between the number of deliveries and injuries to the clitoris (n=6, p=0.73), frenulum of the clitoris (n=4, p=0.34), urethral orifice (n=10, p=1.00), para-urethral folds (n=9, p=0.55), labia majora (n=11, p=0.46), the vagina (n=9, p=0.1.00), the posterior fourchette (n=65, p=0.51), fossa navicularis (n=46, p=0.49), labia minora (n=25, p=0.40) and cervix (n=23, p=0.86).
(The values of n are lower in some cases since some cases were disregarded due to missing data for the number of deliveries).

There was a significant, but weak, association between an injury to the hymen and the number of deliveries (0, 1 or more than 1) of the victims (Fisher's exact test: p=0.026; Phi coefficient=0.17): a higher proportion of hymen injuries occurred in the nulliparous group compared to the other two groups.

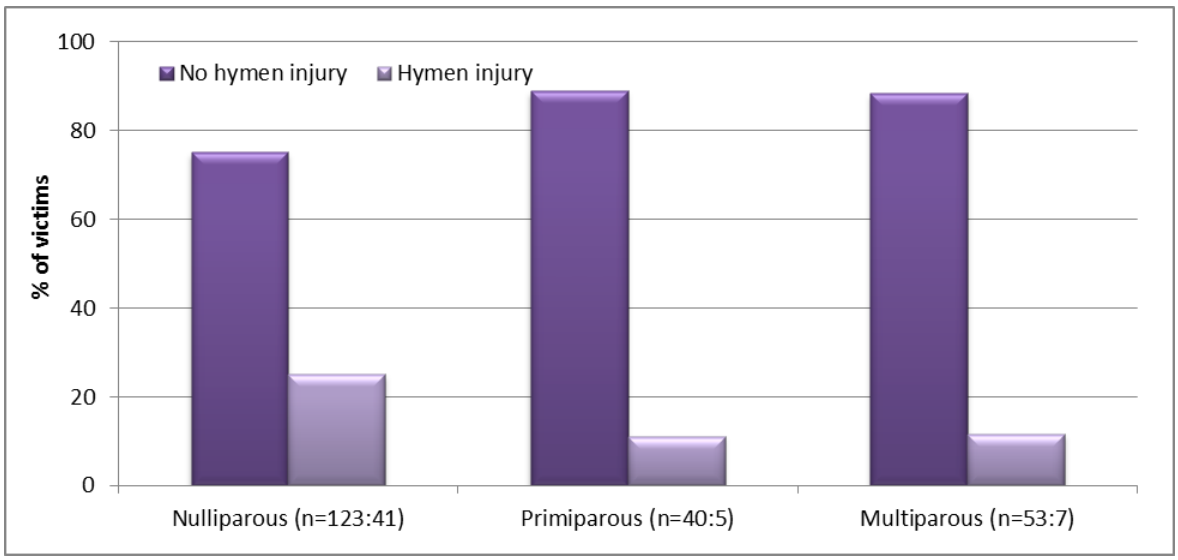

Figure 4-10: Hymen injuries per parous group. (No parity data available on 41 women)

4.4 Associated injuries sustained by the rape victims

Associated non-genital injuries sustained by the women in the study include bruising, abrasions, lacerations and stab wounds. Bruising was the most common associated injury type, recorded in 25% of victims (70 % of those who had an associated injury).

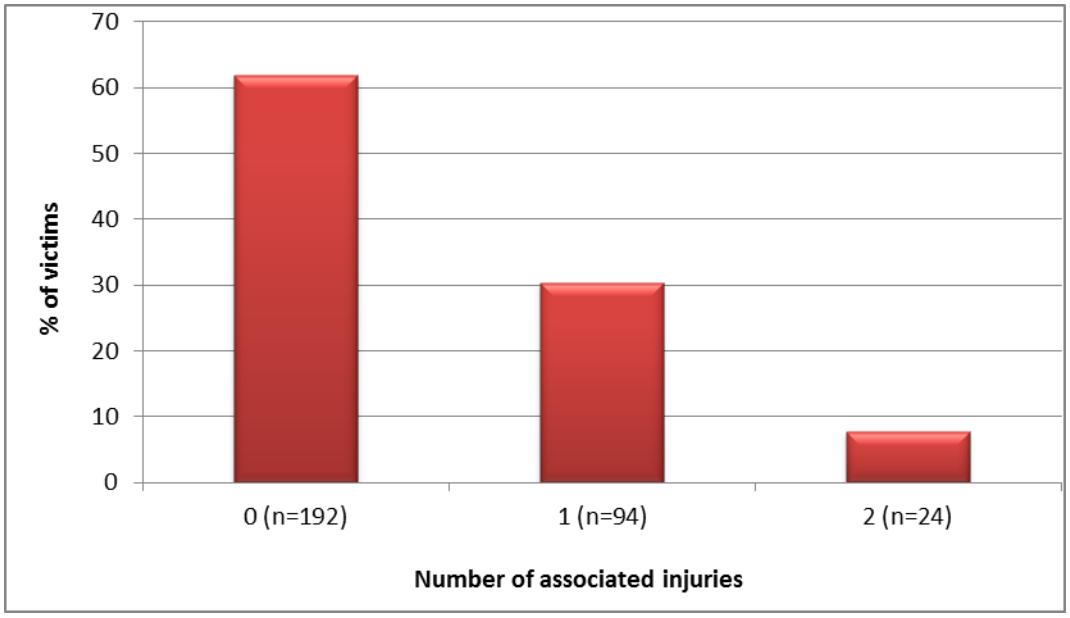

Figure 4-11: Number of associated injuries per victim.

No associated injuries were recorded for 62% of the victims (n=192). 30% of the victims had one associated injury type (n=94), while 8% had two types of associated injury (n=24).

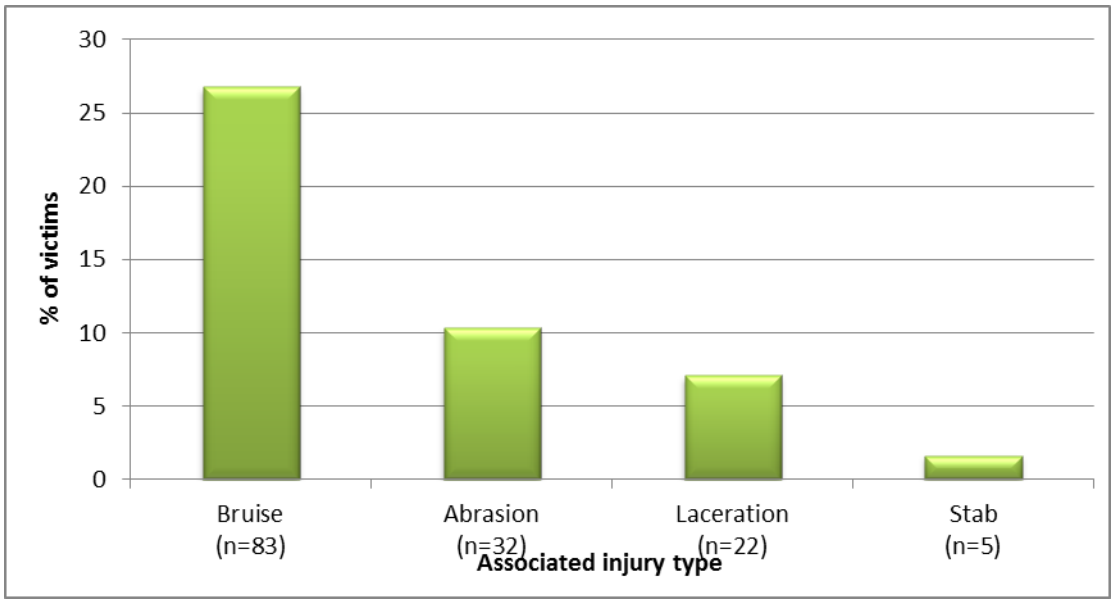

Figure 4-12: Associated injury type.

The researcher was interested to know if there was an association between multiple (two or more) associated injuries (NGI_MULT) and Internal genital injury. The possibility exists that an internal genital injury and/or multiple associated injuries signifies greater force being used. This is an opinion of the researcher as injury documentation generally didn't indicate how significant that injury was.

Table 4-5: Multiple non-genital by Internal genital injury

Table of Multiple Non genital injury by Internal Genital Injury				
	Multiple Associated Injury	Internal Injury		
		N (n=275)	Y (n=35)	Total
Frequency	0 (n=187)	167	20	187
%		53.9	6.5	60.3
Row %		89.3	10.7	
Column %		60.7	57.1	
	1 (n=91)	81	10	91
		26.1	3.2	29.4
		89.0	11.0	
		29.5	28.6	
	2 (n=32)	27	5	32
		8.7	1.6	10.3
		84.4	15.6	
		9.8	14.3	
	Total	275	35	310
		88.7	11.3	100.0

There is no significant association between multiple associated injuries and internal injury. (p=0.71)

There was also no significant association between any associated injury (one or more) and any genital injury. (p=0.079)

Table 4-6 Association between non-genital injuries. (The values in the table are injury counts)

	Abrasion	Bruise	Laceration	Stab
Abrasion	32			
Bruise	14 *	83		
Laceration	2	5	22	
Stab	0	2	1	5
** significant association at the 99% confidence level				
* significant association at the 95% confidence level				

The association between each pair of associated injuries is summarised in the table. There was a significant association between the number of associated injuries (none vs. at least one) and the age of the victims (p=0.010) shown in the figure below. The 15-16 age group had fewer associated injuries, while the 50+ age group had more associated injuries. The association was weak (Cramer's V = 0.19).

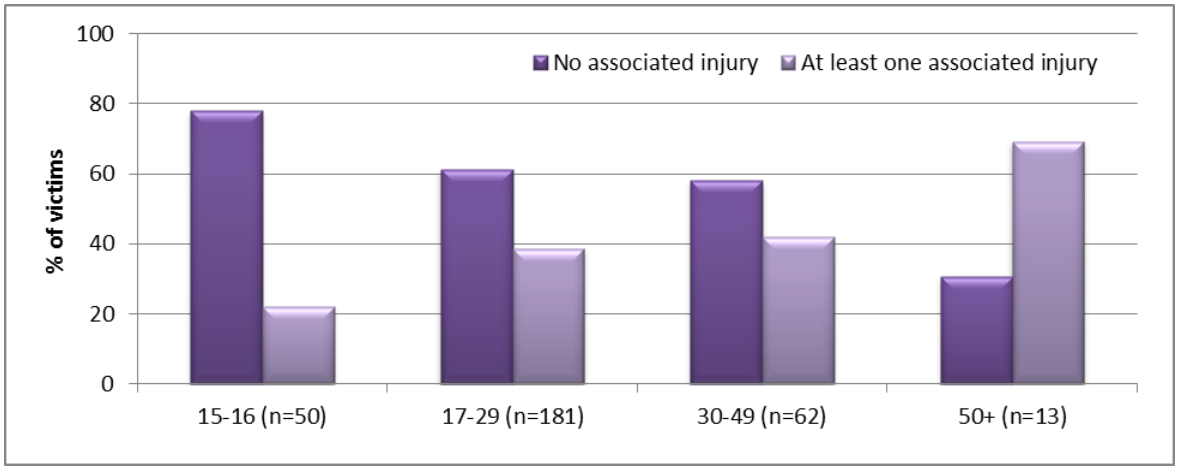

Figure 4-13: Association between associated injuries and victims age (p=0.010).

The occurrence of lacerations (n=22) and stab injuries (n=5) were too low to allow for analysis by age. There was no significant association between the presence of abrasions (p=0.19), bruises (p=0.29), lacerations (p=0.17) or stab injuries (p=0.17) and the age of the victims. There was no significant association between the number of recorded genital injuries (none / one / more than one) and the number of associated injuries (none / at least one) (p=0.09).

The occurrence of stab injuries (n=5) was too low to allow for analysis by race. There was no significant association between the presence of abrasions (p=0.55), and lacerations (p=0.22) and the race of the victims. There was, however, a significant association between the presence of bruises and the race of the victims (p=0.020): fewer bruising injuries per victim occurred in the Black group. The association is weak (Cramer's V = 0.16).

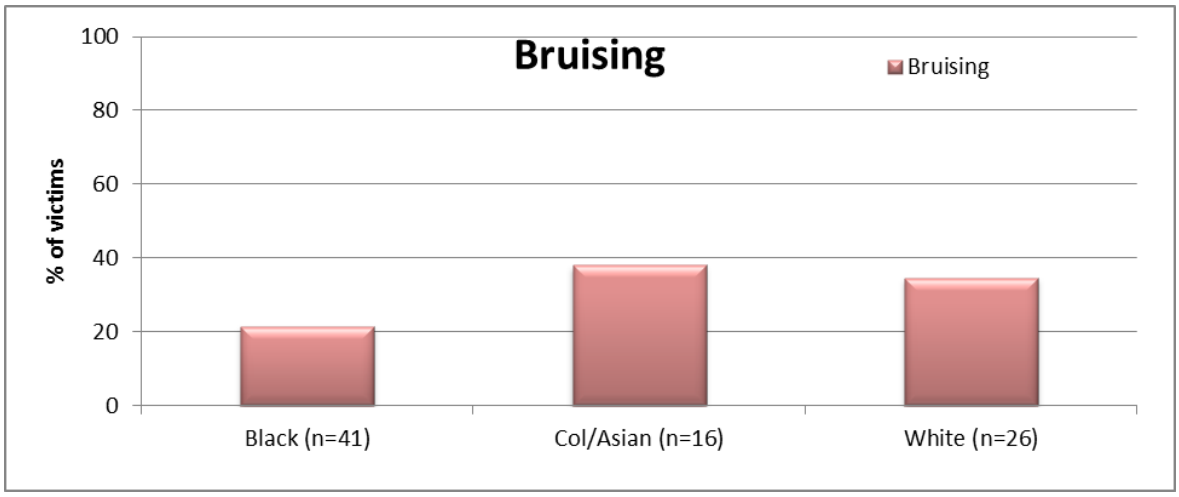

Figure 4-14: Association between bruising and the race of the victim.

Table 4-7: Table of associations between genital and other injuries.

	Clitoris	Frenulum of clitoris	Urethral orifice	Para-urethral folds	Labia Majora	Labia Minora	Posterior Fourchette	Fossa Navicularis	Hymen	Vagina	Cervix
n (genital injury)	6	4	10	9	12	27	67	48	54	11	26
Abrasions (n=32)	0	0	2	1	1	2	8	5	5	1	3
Bruising (n=83)	2	3	1	2	6	11	21	18	18	6	9
Laceration (n=22)	0	0	0	0	1	4	4	3	5	1	0
Stab (n=5)	0	0	0	0	0	0	1	0	0	0	0

There were no significant associations between any combinations of genital injuries or associated injuries.

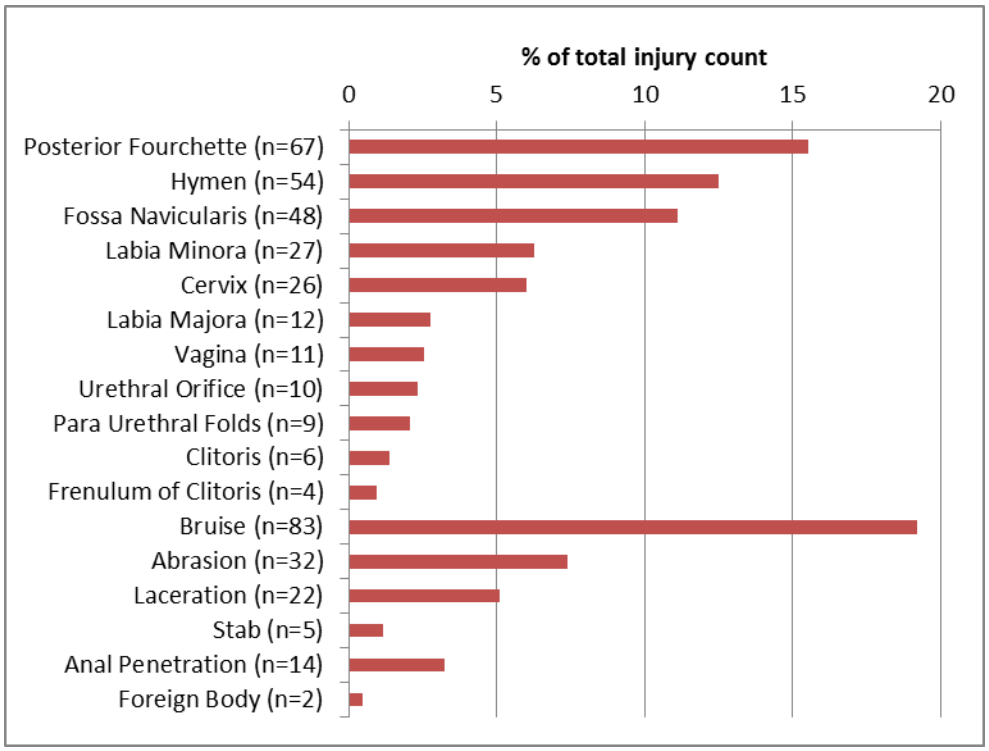

Figure 4-15: Percentage of total injury count (n=432)

When looking at factors which may help explain the patterns of all injuries, genital or non-genital injury: contraceptive type was defined as none/ own/ condom and number of deliveries was defined as 0/1/ more than 1.

There was no significant association between “Any Injury” and age (p=0.078), race (p=0.34), number of deliveries (p=0.76) or contraceptive type (p=0.49).

There was a significant, weak, association between “Any Injury” and whether or not the examination was delayed (p=0.0077; phi coefficient =0.16). The prevalence of delayed examination was lower in cases where there was at least one injury.

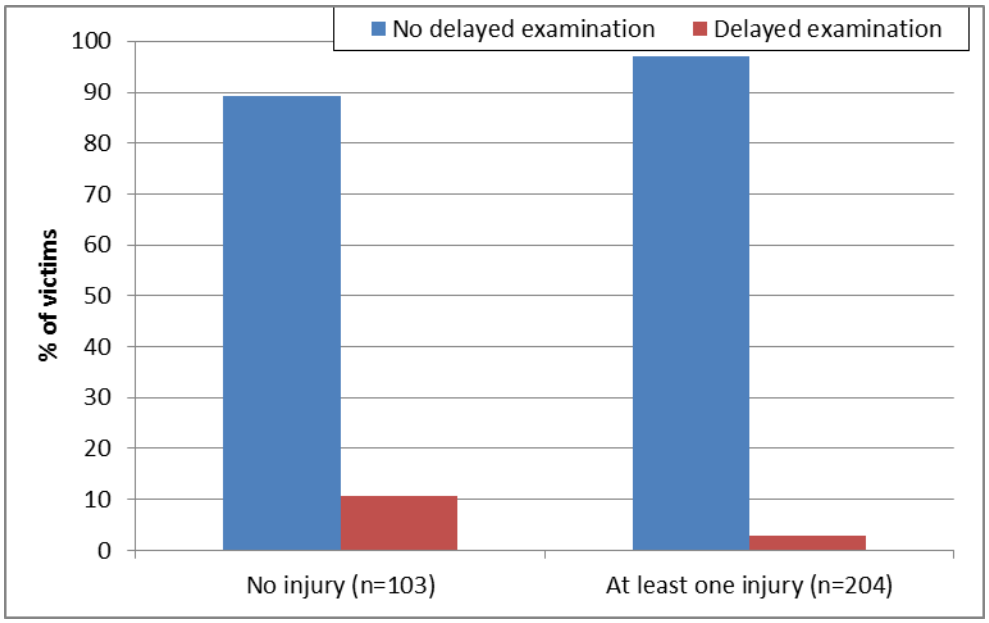

Figure 4-16: Association between time to examination and "Any injury" (frequency missing =3)

Genital injury: There was no significant association between genital injury (GI) and age (p=0.31), race (p=0.36), number of deliveries (p=0.24) or contraceptive type (p=0.14).

There was a significant, weak, association between genital injury (GI) and whether or not examination was delayed (p=0.045; phi coefficient =0.12).

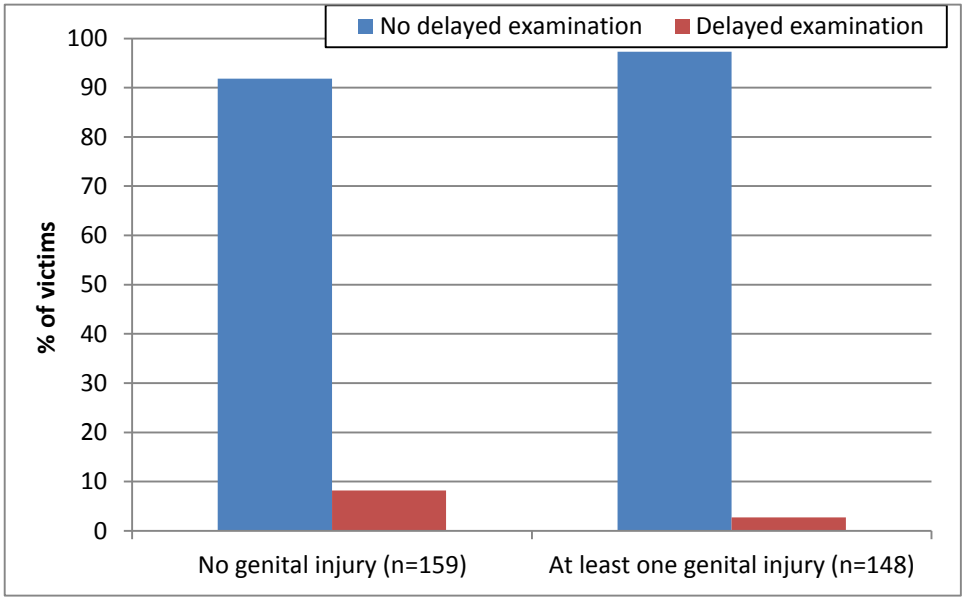

Figure 4-17: Association between genital injury and time to examination (frequency missing =3)

Non-genital injury: (including associated injury, anal penetration and foreign body)

There was no significant association between "non-genital injury" and race (p=0.079), number of deliveries (p=0.13), contraceptive type (p=0.64) or time to examination (p=0.21).

There was a significant, weak, association between "genital injury" and age (p=0.0089; phi coefficient =0.19). The prevalence of non-genital injuries increased with age.

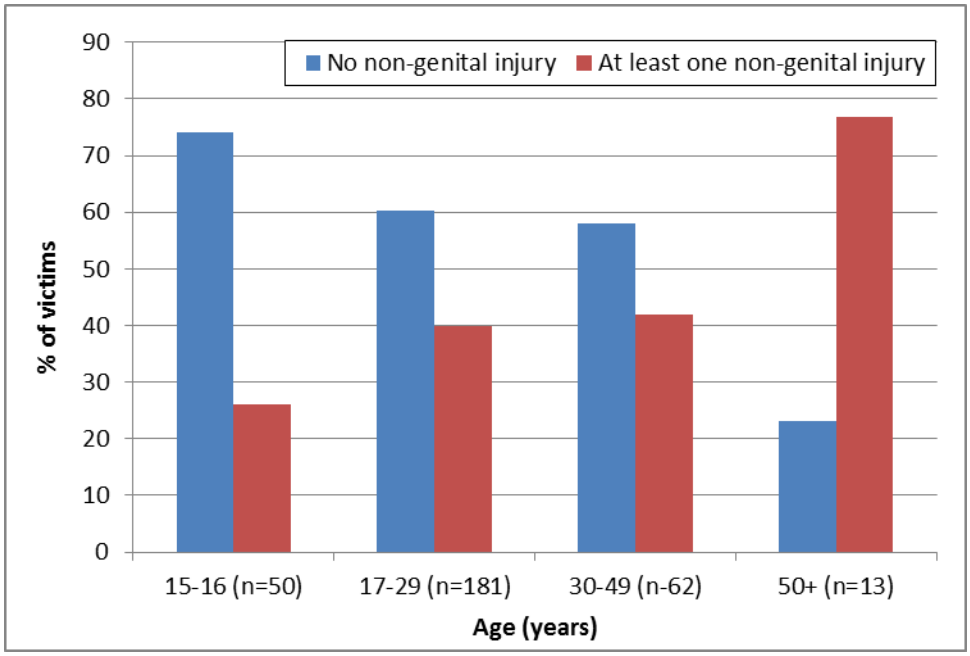

Figure 4-18: Association between genital injury and age (frequency missing =4)

When dividing the population sample into two age categories of younger and older than 50, the following information becomes apparent. Note that the 50+ year group is very small (n=14) compared to the <50 year group (n=294).

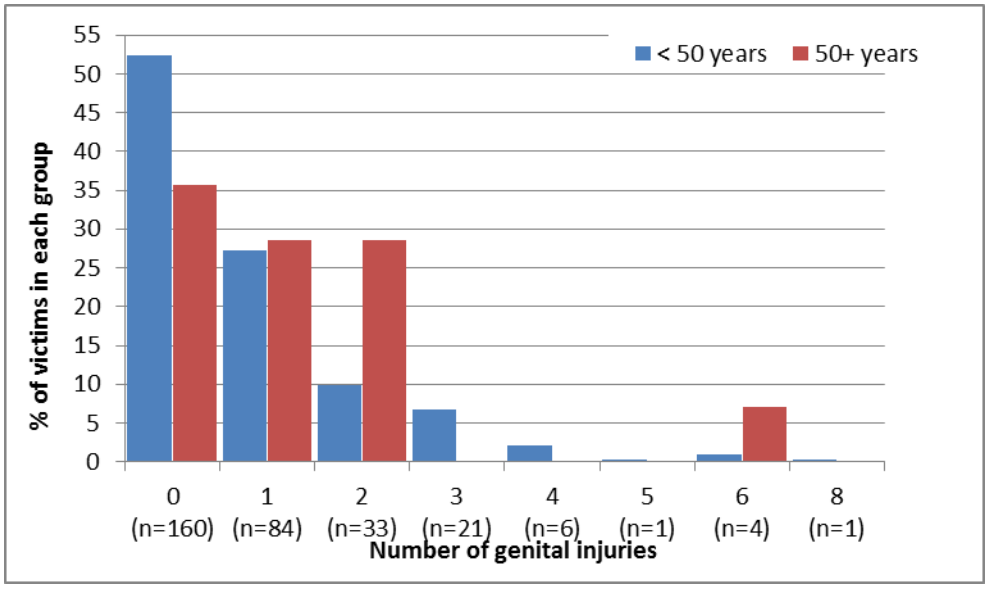

Figure 4-19:Frequency distribution of the number of genital injuries in two age groups

The mean number of genital injuries for the younger group was 0.9 (sd=1.2), while that for the older group was 1.3 (sd=1.6). Given the skewness of the data, the medians were considered: 0 for the younger group (IQR 0-1), compared to 1 for the older group (IQR 0-2). There was no significant difference between the median number of genital injuries for the two groups (Wilcoxon rank sum test p=0.19).

When looking at only the women with at least one genital injury, the 50+ year group (n=9) compared to the <50 year group (n=140): The mean number of genital injuries for the younger group was 1.8 (sd=1.2), while that for the older group was 2.0 (sd=1.6). The medians were 1 for the younger group (IQR 1-2), compared to 2 for the older group (IQR 1-2). There was no significant difference between the median number of genital injuries for the two groups (Wilcoxon rank sum test p=0.69).

4.5 Associated factors

The presence of the various associated factors is shown in Figure 4-20.

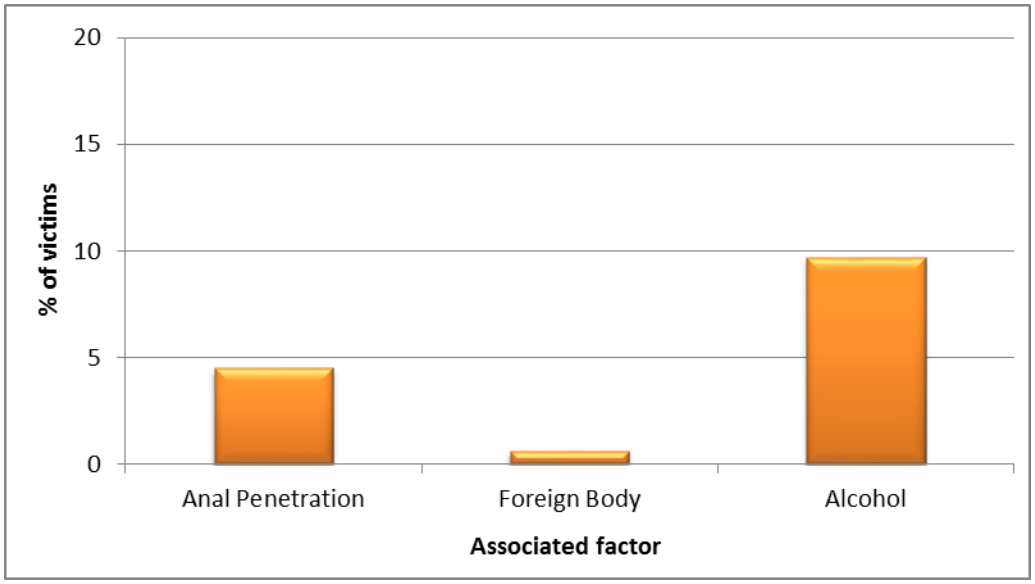

Figure 4-20: Percentage of victims with an associated factor.

Table 4-8: Frequency of associated factors.

Associated factor	Frequency	%
Anal penetration	14	4.5
Foreign Body	2	0.6
Alcohol	30	9.7

Alcohol was reported in just fewer than 10% of cases. Anal penetration had occurred in 4.5% of cases, while the presence of a foreign body had been recorded in 0.6% of cases. There was no significant association between the presence of foreign bodies (p=0.65) or alcohol (p=0.24) and the age of the victims.

There is a significant association between the occurrence of anal penetration and the age of the victims (p=0.020). There were a higher proportion of victims where anal penetration occurred in the 15-16 years and 50+ years age groups than in the 17-29 years and 30-49 year age groups. The association is weak (Phi coefficient=0.18). There was no significant association between the presence of foreign bodies (p=1.00) and the race of the victims. There is a significant association between the occurrence of anal penetration and the race of the victims (p=0.012). There were a higher proportion of victims where anal penetration occurred in the Coloured/Asian group than in the Black group. The association is weak (Phi coefficient=0.17).

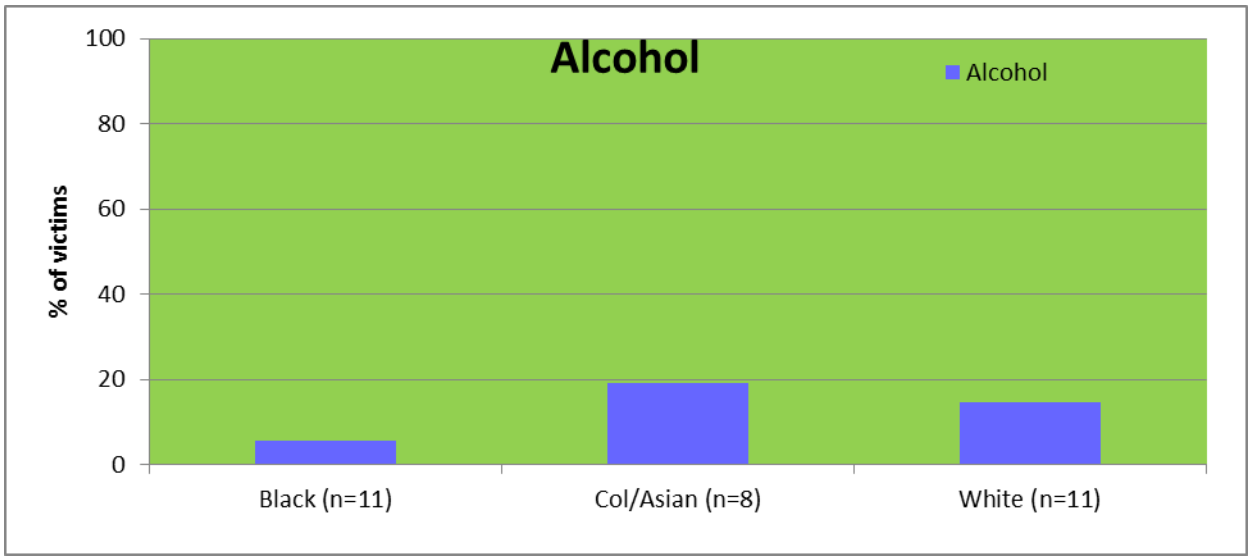

Figure 4-21: Association between alcohol and the race of the victim.

There was a significant association between the presence of alcohol and the race of the victims (p=0.008. The association was weak (Cramer's V = 0.18).

Table 4-9: Association between associated factors and genital injuries (the numbers= injury counts).

	Clitoris	Frenulum of clitoris	Urethral orifice	Para-urethral folds	Labia majora	Labia minora	Posterior fourchette	Fossa navicularis	Hymen	Vagina
n (genital injury)	6	4	10	9	12	27	67	48	54	11
Anal penetration (n=14)	0	0	1	0	1	1	3	4	1	1
Foreign Body (n=2)	0	0	0	0	0	1	2 *	2 *	0	2 **
Alcohol (n=30)	0	0	1	1	0	2	6	4	3	0

There were no strong associations, with the exception that both of the cases involving foreign bodies also had injuries to the posterior fourchette, the fossa navicularis and the vagina.

Table 4-10: Association between associated factors and associated injuries (the numbers= injury counts).

	Abrasion	Bruising	Laceration	Stab
n (genital injury)	32	83	22	5
Anal penetrat (n=14)	3	7	0	1
Foreign Body (n=2)	0	2	1	0
Alcohol (n=30)	4	11	1	0

As shown in Table 4-10, 50% of the cases involving anal penetration also included bruising. Both of the cases involving foreign bodies involved bruising. There were no significant associations between any combinations of associated factors and associated injuries.

4.6 Delayed examination

Table 4-11: Percentage of victims presenting earlier and later than 72 hours.

Delayed examination	%
No	94.5
Yes	5.5

Table 4-11 demonstrates that 5.5% of the victims presented for examination more than 72 hours after the rape had taken place. The occurrence of delayed examination (n=17) is too low to allow for analysis by age or race. There was a significant association between the occurrence of delayed examination and the age of the victims (p=0.013). There were a higher proportion of victims in the 15-16 year age group who delayed examination compared to the other age groups. The strength of the association is weak (Phi coefficient=0.21).

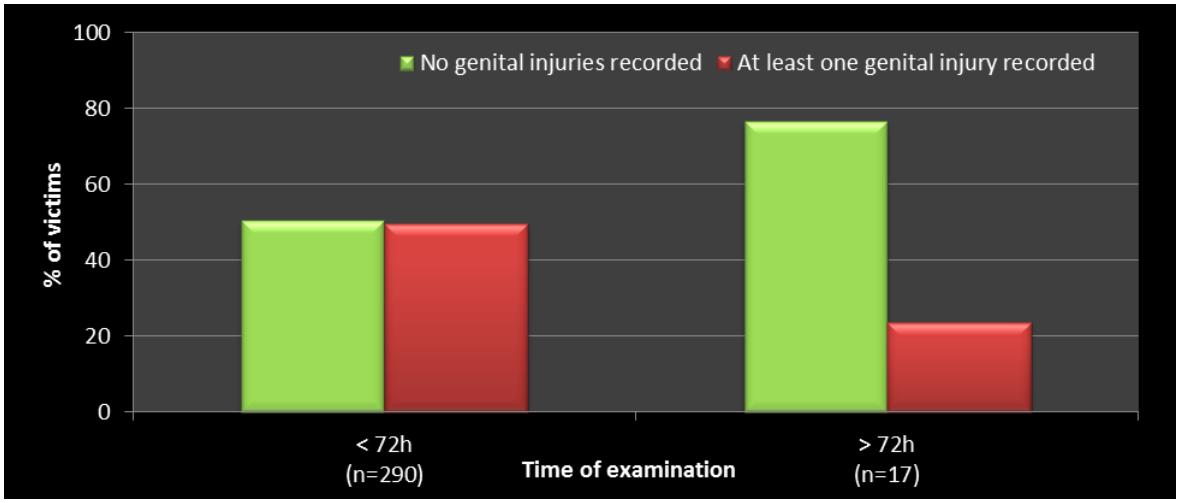

Figure 4-22: Association between number of genital injuries and time to examination (p=0.045).

As seen in the above figure, there was a significant association (Fisher's Exact test) between the number of genital injuries (none vs. at least one) and the occurrence of delayed examination (p=0.045): the group who presented for examination more than 72 hours after the rape had taken place contained fewer cases with at least one genital injury. The association is weak (phi = -0.12). There was no significant association between the occurrence of delayed examination and the race of the victims (p=0.39). There was no significant association between the number of associated injuries (none *vs.* at least one) and the occurrence of delayed examination (p=0.12). The time to examination of 3 victims was not recorded.

There was no significant association between the presence of associated factors and the occurrence of delayed examination (anal penetration: p=0.55; foreign body: p=1.00; alcohol: p=0.39). All cases involving foreign bodies or alcohol, and all but one of the anal penetration cases presented for examination within 72hours.

Chapter 5 DISCUSSION

Introduction

The discussion is divided into seven sections. The results are compared with what is known. Following this research we now have information on a small but significantly population of urban women seen at four private hospitals in Johannesburg, thus adding to the existing knowledge base.

To establish a more reliable basis for forensic analysis we need to be able to grade genital trauma based on degree and type of injury.

Additionally, some factors related to physical findings in the victims were assessed. These factors include time to examination, parity, age of the victim and presence of non-genital trauma. Race was briefly considered as a potential factor when considering injury patterns.

5.1. Presence of the J88

The J88 was not present in 4.8% of cases. The lack of a J88 did not mean that it was not done, but instead was a weakness in administration. Usually a copy of the J88 is kept with the doctors records and the original is put into the sexual assault evidence collection kit for the police. There is a significant association between the number of genital injuries and the presence of the J88. There were very few cases in which there was no J88 and in these the doctor's notes were substantial so it is unlikely that there is any clinical significance.

The only significance regarding J88 documentation is that the doctors, who complete and maintain good medical records, potentially complete a more thorough examination of the rape victims.

Whilst the assessment of completeness of doctors records did not form part of this study, it is obvious that the quality of some examiners notes is poor.

5.2 Demographic profile of the rape victims

5.2.1 Race profile

In this study, 62% of the victims were Black, 24% White, 11% were Coloured and 3% were Indian.

Presently the official population race demographic shows the following:

Table 5-1: Midyear population estimates by population group 2010.[117]

(adapted from statssa 2010 population census)

Population Group	Female	
	Number	Percentage of total population
African	20 368100	79.4
Coloured	2 299200	9.0
Indian/Asian	653300	2.5
White	2 341700	9.1
Total	25 662300	100.0

From the table above, it is obvious that the rape victim race profile in this study does not match the general race profile of South Africa. This may because this study was done in private hospitals in an urban setting. This is important to understand when interpreting what the researcher means by “referral bias”. Private

hospitals in South Africa are visited by patients with medical insurance, or who can afford to pay for the care which they receive. The emergency departments included in this study do see victims of sexual assault for free, but the issue of transportation to and from these departments exists. Patients from rural areas do not travel to these departments due to the distances involved. Victims from some of the traditionally black townships which are in some instances quite close to these hospitals may find it easier to attend the public hospitals in their areas. Most of the indigent sexual assault victims seen at these departments are brought by the police.

In this research study, which encompassed cases reported in urban private practice; it would appear that the chance of being raped is higher in the White and Coloured population and lower in the African population. In the Vetten and Jewkes *et a*l[19] study done on female rape victims in Gauteng, it was found that African women have a higher risk of being raped. In their study, African women made up 88.2% of the victims but only 73% of the population (2001 census), while white women made up 4.5% of the victims and 21% of the female population in Gauteng.

Table 5-2: Comparison of the findings in the Vetten study versus this study compared to the 2001 population census in Gauteng[19]

Race	Total % of rape victims in 2008 Vetten *et al* study	Total % of rape victims in private practice this study 2008 / 2009	2001 Census
African	88.2%	61.6%	73%
Coloured	4.7%	11%	4%
White	4.5%	24.2%	21%
Indian	0.8%	2.6%	2%
Unknown	1.8%		

In this study there were more White women and Coloured women who presented with a history of rape. The differences in the studies could be explained by several factors including the referral bias that exists. Some women present to the emergency departments seeking medical attention only and never open police cases. The Vetten study was done on case reports from the police services, whereas this research was done using medical records.

5.2.2 Age profile

Age is no boundary to the perpetrators of sexual assault. Power and violence are described as being the two most common motivating factors in sexual crimes.[103]

The majority of the victims (58%) were aged between 17 and 29 years, followed by those in the 30-49 year age group (20%). In all race groups, the largest age category was formed by women between the ages of 17 and 29.

This mirrors almost all studies done previously. The risk of being raped would appear to be highest in women in their 20's.

Regarding the effect of age on the risk of sustaining genital injury during a sexual assault, there was no significant association between the number of genital injuries and the age of the victims (p=0.64). There was no significant association between the age categories of the victims and injuries to any of the recorded areas. This contrasts Ramin and colleagues[70] who state that significantly more post-menopausal women in their study sustained genital trauma than in the younger group (43% vs 18%). In this study, menopausal status was not assessed; however there were only 14 women older than 50 years of age. Post=menopausal women account for a small number of presentations to sexual assault services; between 2% and 7% in published studies.[70, 102, 103]

When dividing the population sample into two age categories of younger and older than 50, the following information becomes apparent. The mean number of genital injuries for the younger group was 0.9, while that for the older group was 1.3. Although there were more injuries in the older group there was no significant difference between the median number of genital injuries for the two groups (Wilcoxon rank sum test p=0.19). There was also no statistical difference between the numbers of genital injuries between the two groups.

Looking specifically at younger women (aged under 21) vs. older women (aged 21 and over), there was no significant association between these age categories and injury to the hymen (p=0.27). Logistical regression of the occurrence of hymen injuries vs. age once again showed no significant effect of age on the incidence of

hymen injuries (odds ratio 1.02; confidence interval 0.99-1.08), controlling for race and number of deliveries.

The researcher looked at hymen injuries out of interest because in his experience, there seems to be an over emphasis on hymen injuries when testifying in court. The data is useful to quote when testifying, but the issue that the researcher has with hymen injuries, is that they are really difficult to comment on as there is very often no hymen present and these victims are tagged as “no hymen injury present” because of the way that the J88 is laid out, leaving no scope for reasonable interpretation. This may skew the data and its relevance.

This study showed that 38% of presenting victims had an associated physical injury. The risk of having an associated injury was highest in the over 50 group with more than 60% of these women having an associated injury and lowest in the 15-16 group with around 20% having an associated injury. In contrast, Sugar *et al*[21] state that associated physical injuries occurred in 52% and anal or genital injuries in 20% in their study of 819 women. Victims in the 15-19 year age group had more than twice the number of genital injuries of the victims in the 20-49 year age group. Women older than 49 years sustained genital-anal trauma more than three times as often as those between 20 and 49 years of age.

It may be that several of the older women presented as a result of their injuries and not as a direct result of the sexual assault. This occurs because of the fact that some older women are institutionalised and are thus often unable to tell anyone of the assault due to several factors ranging from aphasia from strokes to

dementia to shame. Some of the women seen personally by the researcher only attended the emergency departments when the family members visited and became aware that the victim had been assaulted.

5.3 Genital injuries sustained by the rape victims

Rape victims experience the evidence collection process as invasive and traumatic in nature. They also expect that the examination will prove that the rape did take place.[118]

In this study 48% of the women had a documented genital injury. This confirms previous research suggesting that observed genital injuries are absent in more than 50% of cases of sexual assault, even among victims presenting to a hospital based service.[119]

Other studies using only gross visualization found injuries in between 26.5%[47] and 45%[61] of victims and studies using toluidine blue and/ or colposcopy found a range of 32%[58] to 87%.[48] Whilst it is difficult to compare this study to the others as the populations may be different, there is an overlap in the frequency of injuries seen; even without the adjuncts used in some studies. It may be true that doctors' document injuries more carefully when a woman complains of having been raped.

It is perfectly acceptable to do a sexual assault examination with the use of light and the naked eye only. Injuries are seen using this manner of examination, but the use of Toluidine Blue and colposcopy may assist in injury detection.

Some understanding of genital injury findings among practitioners at the four emergency departments used in this study may have contributed to a high incidence of positive genital injury findings considering the method of examination. Toluidine blue and colposcopy were not used in this study and their use would probably increase the rate of positive findings. Zink *et al*[53] note in their 2010 study that direct visualisation and colposcopy yielded similar genital injury findings but that more lacerations were identified using toluidine blue than with direct visualisation or colposcopy.

The history of the assault is as important as the examination. White and Dumont[110] suggested in their 2009 study that not enough emphasis is placed on the rape victim's history, and that the demand for visual proof of injury to the genitalia decontextualizes the rape victim's physical examination and history. They have called attention to the use of colposcopy as a standard tool in the examination of the rape victim as it may perpetuate the myth that these women must have an injury due to its ability to detect microscopic injury. They observed that when rape examiners place too much emphasis on precise measurements and empirical facts the victims experience becomes diminished. As mentioned before, genital injuries may be sustained during consensual intercourse as well, so the over reliance on micro-visual findings needs to be tempered. The fallibility of research into the use of colposcopy to distinguish between consensual rough intercourse and rape, may call into question at this time, the validity of using expert testimony to prove non-consensual sex.[110]

In previous research, non-consensual genital injury, rates range between 20-81%.[21, 48, 53, 68, 78, 88, 92, 105] Most of these studies utilised either/ or both of toluidine blue and colposcopy when examining the victims. In this retrospective cross sectional study, all of the victims were examined in emergency departments using a wall mounted or portable light source and gross visualisation only. It has been stated categorically in the literature that the application of toluidine blue and subsequent removal with a destaining reagent improves the chances of seeing genital injuries when compared with gross visualisation only.[49, 53, 69, 92, 94]

It is however also possible that the dye is overly sensitive, making normal genital inflammation appear to be an injury.[120] A study that separately investigates reliability and validity before and after dye application might elucidate this influence. The researcher believes that the use of Toluidine Blue would aid in the detection of injury, and should be used, but needs to be interpreted together with the information described above.

It is possible to discredit all evidence collected without the use of colposcopy.[121] However, studies that have evaluated the use of medico-legal evidence in rape cases have found that genital injuries alone, viewed with the naked eye, are not related to positive justice outcomes.[122] This questions the increased reliance on colposcopy in the medico-legal examination of rape victims. Efforts to focus on visualizing micro-trauma of the genital region in sexual assault forensic examination might be misguided.[118] The use of static two-dimensional images may limit the ability of experts to make a determination of injury that could easily be made during the patient exam. The use of video documentation might lead to

improved ability to make a determination of injury. It may be worth researching this in the future.

One of the benefits offered by the colposcope is the buffer that it provides in the examination of the rape victim. Medical examiners are very mindful of the discomfort caused by a vaginal examination following a sexual assault. They themselves often hurry the examination in order to ease the victim's discomfort, possibly missing injuries while doing so. A colposcope is used from a distance, decreasing the examiners discomfort and need to hurry, while providing the opportunity to re-examine captured pictures at a later stage.

The lack of consistency in the classification systems used to describe genital and associated non-genital injury complicates the documented injury significance.[1] Widespread acceptance of the TEARS system which has been used in this study has not occurred. The main reason for reluctance in accepting this system is the difficulty discriminating between several subjective components of the TEARS system, particularly swelling and redness.

The most common sites of injury were the posterior fourchette, the hymen, the fossa navicularis and the labia minora. Reasons postulated for the high incidence of injury at the posterior fourchette include lack of pelvic tilt, vaginal lubrication and relaxation in the victim, force used by the perpetrator and lack of partner assistance with insertion.[82] The location of the most common injuries when the perpetrator is lying on top of the victim, is typically at the posterior fourchette at the 5 or 7 o'clock position. For each anatomical area, a large proportion of victims had an injury to another area of the genitalia as well.

Injury to the posterior fourchette and fossa navicularis was almost always described as bruising or superficial laceration. Injury to the hymen usually gets described according to a clock; for example, examiners describe an injury as “bruising at 3 o clock on the hymen. Clitoral injuries were always superficial abrasions or lacerations. Urethral orifice injuries were usually described as redness. Injury to the cervix was often described as “hyperaemia” of the cervix. A positive cervical injury was hardly ever associated with another injury, which is a reversal of the trend followed by other genital injuries. This was a finding that some examiners appeared to be familiar with, and may have been over-interpreting.

Having a posterior fourchette, hymen or a labia minora injury is not strongly associated with any other genital injury type, but having a fossa navicularis injury is associated with a posterior fourchette injury in 58% of cases. This is of unclear significance, and the severity of the injuries was not documented. Having a labia majora injury was associated with a labia minora injury in 75% (9 of 12) of cases, but in the victims with a labia minora injury, an associated labia majora injury was seen in only 33% (9 of 27) cases. The significance of this is difficult to discuss with any certainty due to low numbers.

Parity was looked at a possible influence on genital injury. There was no significant association between injuries to any of the genital areas (except for the hymen), and the number of deliveries (0, 1, or more than 1) of the victim. There was a significant, but weak association between an injury to the hymen and the number of deliveries. A higher proportion of hymen injuries occurred in the

nulliparous group compared to the other two groups. The data does get skewed by the fact that in the victims who had no hymen visible, instead of having a “not applicable” group, may have been captured as “no injury”.

Use of different types of contraception does not appear to have an effect on injury occurrence.

5.4 Associated injuries sustained by the rape victims

No associated injuries were recorded for 62% of the victims. 30% of the victims had one associated injury type, while 8% had two types of associated injury. Bruising was the most common associated injury type, recorded in 25% of victims (70% of those who had any associated injury).

The associated non-genital injuries looked at included abrasions, bruising, lacerations and stab wounds. Stab wounds and lacerations are both open wounds caused by trauma, but it was decided to categorise them separately due to the intent that a stab wound indicates. A stab wound is often an attempt at murder.

A laceration is defined as tearing or splitting of the full thickness of the skin caused by blunt force.[103] They are differentiated from incised wounds in that the loss of continuity of the tissues is caused by tearing or splitting rather than slicing. In addition, lacerations may have abraded or bruised margins and fibrous strands across the wound.

There were22 women with an associated injury that could have been either a cut or a laceration. For the purpose of this research project, open wounds that may have been caused by a cut have been called lacerations, as well as open wounds caused by blunt injury. The quality of the doctor's documentation made it impossible to distinguish between typical cuts and lacerations, because doctors often incorrectly group all open wounds as lacerations. Several of the open wounds/ lacerations were caused by the perpetrator cutting the victim with a knife or glass. Superficial lacerations to the anterior neck are common when the perpetrator holds a knife to a woman's neck when raping her. Lacerations to the scalp are caused by victims being assaulted with a brick or rock in some cases.

Stab wounds can be to any part of the body. One of the victims in this study was examined in the intensive care unit where she was being treated for a stab wound to the abdomen.

Older women were more frequently hit, choked or threatened with physical force. These findings were consistent with the social situation of older women, who tend to live alone or in care facilities.[104] There was a significant association between the presence of bruises and the race of the victims. Fewer bruising injuries occurred in the Black group. There is some discussion in literature about whether darker skin has better elastic properties and is therefore more difficult to injure. The researcher feels that the lower rate of injury is purely due to the fact that it is more difficult to see bruising on darker skin.

Baker *et al*[59] note in their 2010 study done on 234 rape victims that overall injury prevalence was 62.8% and that the White women had a higher frequency of associated injuries than Black women.

There was no significant association between the number of recorded genital injuries (none / one / more than one) and the number of associated injuries (none / at least one).

This study may under-estimate the number of women sustained severe injuries during sexual assault. The emergency departments used for this research examine rape victims for free, and historically the emergency medical services know to take severely injured victims to public trauma centres if they do not have health insurance. Therefore, the referral bias that private hospitals in cities

experience prevent this study from including more than a few severely injures victims.

5.5 Associated Factors

The associated factors included in this study were anal penetration, alcohol and the presence of a foreign body. A foreign body was only mentioned if the offending object was present in the victim's vagina or anus at the time of examination. One of the victims in the study presented with a 40cm piece of bamboo in her vagina. It was felt that the intent of the insertion of the bamboo was to murder the victim, so it was deemed important enough to list under a separate category of "associated factors". The bamboo had caused a laceration to the vagina in this case, which was treated conservatively without the need for operative repair.

There has been quite a lot of reporting in the media regarding the use of drugs during the commission of rape. It is however true that tests for the well-known date rape drugs such as benzodiazepines and ketamine are inevitably negative. Alcohol was the most likely cause of the amnesia that some victims experience following a sexual encounter. Alcohol was reported in just fewer than 10% of cases. Alcohol levels were not done in any of the rape centres used in this study. Alcohol use by the perpetrator was not documented. The presence of alcohol was documented on the J88 based on the clinical opinion of the attending doctor or the patient's admission that she had been drinking prior to the sexual assault.

The researcher is of the opinion that alcohol levels should be checked in more trauma cases, and that the police services need to start taking this aspect of

trauma cause more seriously and investigating assaults and accidents more aggressively.

Anal penetration had occurred in 4.5% of cases, while the presence of a foreign body had been recorded in 0.6% of cases. There was no significant association between the presence of foreign bodies (p=0.65) or alcohol (p=0.24) and the age of the victims.

There was a significant association between the occurrence of anal penetration and the age of the victims (p=0.020). There were a higher proportion of victims where anal penetration occurred in the 15-16y and 50y+ age groups than in the 17-29y and 30-49y age groups.

There was a significant association between the occurrence of anal penetration and the race of the victims (p=0.012). There were a higher proportion of victims where anal penetration occurred in the Coloured/Asian group than in the Black group. The association is weak (Phi coefficient=0.17).

A larger study including more victims of anal penetration would need to be done to analyse any race bias properly.

5.6 Delayed Examination

Seventeen of the victims presented for examination more than 72 hours after the rape had taken place. The time to examination was important when assessing for injuries because minor superficial type injuries may have healed before examination in some of these cases and superficial injuries may be less obvious 72 hours after the rape. Alternatively, as has been suggested in previous literature,

time may enhance the visibility of some lesions, or severity of injury may cause victims to delay reporting of the incident.[54] Prompt forensic assessment of all rape victims is important although delayed reporting does continue to occur. Time to examination should not be used to predict the validity of a complaint, but delayed reporting may carry quite substantial bias against the victim. In Slaughter and Brown's 1997 research, they found that all false reports were made within 24 hours.[54]

In this study, 72 hours was used as a defining time to delayed examination because this is presently the time after which post exposure prophylaxis against HIV and pregnancy is deemed ineffective. On the whole, when talking about the rape victims seen in one of the units in this study, the women who present too late for post-exposure prophylaxis are defined as being delayed presentations. I decided to stick to this time in the definition.

There was a significant association between the occurrence of delayed examination and the age of the victims (p=0.013). There were a higher proportion of victims in the 15-16y age group who delayed attending the clinic for examination compared to the other age groups. This may be because of the "fear of discovery" behaviour that many adolescents display when having consensual sexual intercourse. The units in this study have seen many adolescents who have been discovered having sexual relationships by their parents, and then brought for examination following a charge of statutory rape being laid by their parents. There was no significant association between the occurrence of delayed examination and the race of the victims (p=0.39).

The group who presented for examination more than 72 hours after the rape had taken place contained fewer cases with at least one genital injury. There was no significant association between the number of associated injuries (none vs. at least one) and the occurrence of delayed examination (p=0.12). There was no significant association between the presence of associated factors and the occurrence of delayed examination. All cases involving foreign bodies or alcohol – and all but one of the anal penetration cases - did present for examination within 72hours.

One of the problems with seeing most victims so soon after the assault is that doctors know that contusions can take 48 hours to become obvious. This means that many clinically significant injuries may be missed because the victims were examined “too soon” after the assault. Any tenderness found when examining the genitalia needs to be documented and contextualised.

5.7 Limitations and strengths of this study

Limitations:

There are limitations of this study that are common to all retrospective studies, such as:

- Possible poor record-keeping (and reliance on the record keeping of others), possible missing data and difficulty in establishing the accuracy of available data;
- The lack of availability of key statistics, many of which only become apparent *post hoc* during the analysis of the data;

- Retrospective studies are vulnerable to bias in the selection of the study cohort, especially selection bias and information bias; as happened with the referral bias in this study.

The specific limitations that were important in this study were as follows:

The results may only be generalizable to victims who present to this or similar hospitals for examination and not to any broader population of sexual assault victims. Referral bias (or selection-type bias) exists because of the nature and the situation of the study centres. The clinics in the study were all private clinics in urban areas, so the accessibility to victims who live in rural areas and even informal suburbs was limited.

As the victims younger than 15 were excluded from this study, we are unable to draw any conclusions about this group of victims.

The victims were examined by doctors with different levels of expertise. The standard of the examination may therefore have differed from patient to patient. There may have been under-recording with inexperienced doctors and over recording because of the fact that the presence of an injury would aid the legal process of getting justice.

The large proportion of victims who do not seek medical care may exhibit a different pattern of injury associations. The history of the assault was exclusively by patient report. The possibility exists that some of the women in the study were not raped.

There were too few women at the extremes of age to make any meaningful conclusions in these women.

Almost all of the women with genital injuries in this study had minor injuries. This study may have under-estimated the number and severity of associated injuries in the population. The reasons for this may be because the study sites are in privately owned hospitals, which see rape victims free of charge. These hospitals do not treat traumatic and surgical conditions *pro deo* unless the injuries are life threatening or the victim requires resuscitation prior to referral to a public hospital. Ambulance services understand this and therefore transport the severely injured victims to public hospitals because the treatment of any life threatening injury takes priority over the forensic collection of rape evidence. While some of the victims in this study were severely injured, they were limited to a small percentage of the population who can afford health insurance. This study suffers as a result of the low numbers of polytrauma rape victims included.

Victims who presented to the emergency departments requesting examination to exclude rape were excluded from this study if no examination was carried out. Many of these victims had used drugs and alcohol. The presence of alcohol was one of the factors looked at in the objectives and so the exclusion of this group of victims from this study may possible decrease the estimate of alcohol and its effect on injury patterns. The use of drugs and alcohol and their effect on the chance of being raped, their use during rape, and their effect on injuries sustained during rape would add substance to this study.

This study did not document the effect of menstruation on sexual assault injury. Previous studies have documented fewer injuries in menstruating victims. The same applies to tampon use. There is a possibility that the recent use of tampons may affect the injury pattern

The sample was too small to categorise women into smaller age categories. In some sub-group analyses with small numbers of victims the results may be different to the same group if it had a larger sample size.

Fifteen J88's were missing, but the notes were good enough to be included for analysis. If J88 were not completed for some victims who had no injury, then the denominator of the study becomes smaller, and includes more people with injury, thus underestimating the absence of injury.

There remains some confusion over whether skin colour or race affects injury patterns or injury prevalence. The results of this study may not be generalizable to the whole South African population.

Strengths:

1. The sample size is relatively large. The larger the sample, the more likely it is that associations become significant. This is the largest sample to be studied in South African private practice.

2. The majority of the data was collected from the J88. This form is unique to South Africa as it is the documented evidence that is used in court. The J88 makes reporting of injuries uniform and systematic; and makes it easy to quantify these injuries.

Chapter 6 CONCLUSIONS

The aim of this research was to describe the genital injuries and other associated injuries reported during medico-legal examination of adult female rape victims in four Johannesburg hospitals between 1 January 2008 and 31 December 2009, as well as to determine any associations between these variables and the race or age of the victim. These objectives were met and what was found compares to previous research done on the subject.

Close to half of the women in this study had a documented genital injury seen without the use of toluidine blue or colposcopy. The range of genital injuries associated with sexual assault varies between 26.5%[47] and 45%[61] using gross visualization. The studies using adjunctive methods like colposcopy also range from 32%[58] up to 87%[48].

Multiple studies using colposcopy had very similar findings to the current study.[51, 53, 62, 67] This does raise the question about whether colposcopy is necessary to identify acute genital injury or whether a simple gross visual examination is acceptable. The researcher believes that toluidine blue should be used as a simple adjunct to the sexual assault examination, but until the sexual assault examiners are trained and familiar with the use of a colposcope, its use is ill advised.

The lack of a documented genital injury should not be regarded as evidence of no sexual assault having occurred as it is unlikely that 52% of the women in this study were not raped. It is important for medical examiners and the legal profession to

understand this. However apart from the fact that the success of a prosecution often hinges on the documentation of injury it is also important for the woman who is reporting the rape to know that there may be no visible injury.

The injuries documented involved all of the genital anatomical areas studied, but entry type injuries to the posterior fourchette, labia minora and fossa navicularis were most common.

Sixty-two percent of the victims were Black, 24% of the victims were White, followed by Coloured (11%) and Asian (3%). The percentage of White women in this study is higher than the official census of White women in South Africa and much higher than the percentage of White women in the Vetten and Jewkes study[19]. At first glance, it appears that the risk of being raped in the areas around the study clinics is higher if you are White or Coloured. The researcher believes that the difference is better explained by the possibility that White and Coloured women are more likely to seek medical attention at one of the emergency departments in this study following a sexual assault. The victim's race appears to have no significant effect on genital injury. This is at odds with Sommers et al[51] who found that Black and White victims had significantly different genital injury prevalence, although they did conclude that it was the darker skin colour and not the victim's race that was the predictor for decreased injury prevalence.

There is a significant association between the race and age categories.

The 50+ age group had more associated injuries than the other age groups. There are however very few women in the over 50 sub-group, so these results would need to be confirmed on a larger group of victims.

Genital injury or associated non-genital injury is not an inevitable consequence of sexual assault. It is important that the doctors examining rape victims, as well as the police and legal services dealing with these women understand this fact.

Recommendations

The role of the forensic examiner is to provide a thorough examination as the basis for a report. Findings must be accurately, clearly and reliably documented.

Research recommendations

A prospective multisite study of women at different institutions, both public and private, across all ages and by an experienced group of examiners is necessary. This study would need to be larger and include more victims of anal penetration, drunken victims and victims of severe physical trauma to analyse any race or age bias properly.

Genital injuries are sustained by women following consensual as well as non-consensual intercourse. A South African study looking at the difference in injury patterns between these two groups would add to our knowledge base.

The use of colposcopy or toluidine blue should be studied prior to them being introduced as tools of examination in South African rape victims.

Clinical recommendations

The continued education and training of medical staff in the proper documentation of rape findings, and the subsequent expulsion of existing rape myths is a priority.

The use of specialist nurse sexual assault examiners is advocated. For the time being, in the units studied, doctors examine the victims of rape. The interests of justice and the interests of the patient are best served when they are examined by a person with knowledge and an interest in the subject of sexual assault.

If colposcopy is used in the examination of a sexual assault victim, training is required. The use of colposcopy can however not be recommended without further research.

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Appendix 1 Human Research Ethics Committee clearance

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Dr Graham I Hutton

CLEARANCE CERTIFICATE	**M10450**
PROJECT	The Emergency Departmentd of Netcare Sunninghill, Milpark, Union and Garden City Hospitals
INVESTIGATORS	Dr Graham I Hutton.
DEPARTMENT	Division of Emergency Medicine
DATE CONSIDERED	30/04/2010
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 03/05/2010 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Dr Y Adam

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

Appendix 2 Netcare ethics clearance

Netcare Management (Pty) Limited

Tel: + 27 (0)11 301 0000
Fax: Corporate +27 (0)11 301 0499
76 Maude Street, Corner West Street, Sandton, South Africa
Private Bag X34, Benmore, 2010, South Africa

20 August 2010

Dr Graham I Hutton
PO Box 623
BEDFORDVIEW
2008

E mail: hutton@casualty.co.za

Dear Dr Hutton

THE GENITAL INJURIES SUSTAINED BY FEMALE RAPE SURVIVORS

It is with pleasure that we inform you that your application to conduct research on; The genital injuries sustained by female rape survivors, at Netcare Sunninghill, Union & Milpark Hospitals, has been successful, subject to the following:

i) All information with regards to Netcare will be treated as confidential.

ii) Netcare's name will not be mentioned without written consent from the Academic Board of Netcare.

iii) Where Netcare's name is mentioned, the research will not be published without written consent from the Academic Board of Netcare.

iv) A copy of the research will be provided to Netcare once it is finally approved by the tertiary institution, or once complete.

v) All legal requirements with regards to patient rights and confidentiality will be complied with.

Directors: E J Brannigan, M S F da Costa, I M Davis, J du Plessis, V Firman, R H Friedland, V L J Litlhakanyane, M B Nkosi, C Pallman, P Warrener
Company Secretary: L Kok Reg. No. 1995/012717/07

Appendix 3 The J88

G.P.-S. 01/02 **J 88** (81/805259)

REPORT BY AUTHORISED MEDICAL PRACTITIONER ON THE COMPLETION OF A MEDICO-LEGAL EXAMINATION 1

To be completed in legible handwriting and signed on every page

A. DEMOGRAPHIC INFORMATION

1. Police station:	2. CAS No.:	3. Investigating officer: Name and number:	4. Time ☐☐:☐☐ Day ☐☐ Month ☐☐ Year ☐☐☐☐

5. Name of medical practitioner:
6. Registered qualifications:
7. Phone number:
8. Fax number:
9. Place of examination:

10. Physical practice address or stamp:

11. Full names of person examined: 12. Sex: M ☐ F ☐ 13. Date of birth/apparent age:

B. GENERAL HISTORY

1. Revelant medical history and medication:

C. GENERAL EXAMINATION

1. Condition of clothing:

2. Height (cm):	3. Mass:	4. General body build:

5. Clinical findings: In every case the nature, position and extent of the abrasion, wound or other injury must be described and noted together with its probable date and manner of causation. The position of all injuries and wounds must also be noted on the sketches.

6. Mental health and emotional status:

7. Clinical evidence of drugs or alcohol:

8. CONCLUSIONS

Signature of medical practitioner

D. HISTORY IN CASE OF ALLEGED SEXUAL OFFENCE

2

1. Age of menarche ☐☐ 2. Number of pregnancies ☐☐ 3. Number of deliveries ☐☐ 4. Duration of pregnancy (if applicable) ☐☐ weeks

5. Contraception (indicate with X): Yes ☐ No ☐ 7. First date of last menstruation:

6. Method and last date of application/ingestion: 8. Duration of period ☐☐ 9. Duration of cycle ☐☐

10. Date and time of last intercourse with consent:

11. Number of consensual sexual partners during last 7 days:

12. Condoms: Yes ☐ No ☐

13. Since the alleged offence took place, has the person (indicate with X): bathed ☐ washed ☐ douched ☐ showered ☐ urinated ☐ changed clothing ☐

E. GYNAECOLOGICAL EXAMINATION (State clinical findings)

1. Breast development: Tanner stage 1–5 ☐ 2. Pubic hair: Tanner stage 1–5 ☐ 3. Mons pubis:

4. Clitoris: 5. Frenulum of clitoris:

6. Urethral orifice: 7. Para-urethral folds:

8. Labia majora: 9. Labia minora:

10. Posterior fourchette: scarring: bleeding:
tears: increased friability:

11. Fossa navicularis:

12. Hymen: configuration: 13. Opening diameter (mm): Transverse ☐☐ Vertical ☐☐

14 Swelling: 15. Bumps: 16. Clefts:

17. Fresh tears (position): 18. Synechiae: 19. Bruising:

20. Vagina: Number of fingers admitted: bleeding: tears:
discharge:

21. Cervix: erosion: discharge:
bleeding: other:

22. Perineum:

F. SAMPLES TAKEN FOR INVESTIGATION

1. Forensic specimens taken: Urine sample for pregnancy test: Positive ☐ Negative ☐ Seal number of Evidence Collection Kit:

2. Specimens handed to: Name: Rank and Force number:

Signature:

3. CONCLUSIONS

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Signature of medical practitioner

G. ANAL EXAMINATION (State clinical findings) 3

SKIN SURROUNDING THE ORIFICE

1. Hygiene:
2. Pigmentation:
3. Fissures/cracks:
4. Abrasions:
5. Scars:
6. Swelling/thickening:
7. Redness/erythema:
8. Bruising/haematoma:
9. Tags:

ORIFICE

10. Tears/fissures:
11. Swelling/thickening of rim (tyre sign):
12. Funnelling:
13. Reflex dilatation:
14. Shortening/eversion of anal canal:
15. Cupping:
16. Twitchiness/winking:
17. Discharge:

DIGITAL EXAMINATION

18. Presence of hard faeces in rectum:
19. Laxity (pressure on anal orifice):
20. Thickening of anal verge:
21. Tone (sphincter grip):

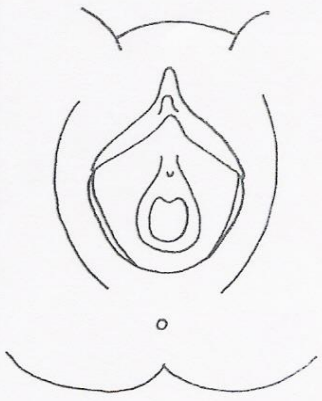
22. CONCLUSIONS

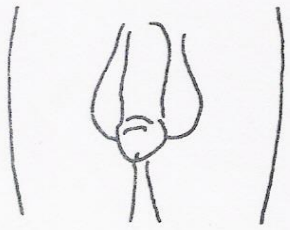
H. MALE GENITALIA

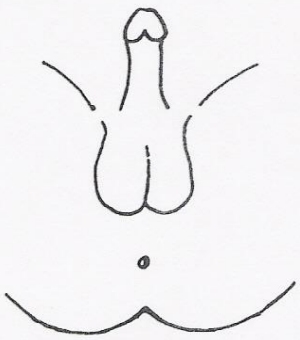
1. Genital development: Tanner stage 1–5 ☐
2. Glans:
3. Testes:
4. Ulceration:
5. Presence of faeces:
6. Pubic hair: Tanner stage 1–5: ☐
7. Shaft:
8. Epididymus:
9. Penile discharge:
10. Circumcision:
11. Prepuce and frenulum:
12. Scrotum:
13. Vas deferens:
14. Smegma:
15. Urethral orifice:

16. CONCLUSIONS

SCHEMATIC DRAWING OF FINDINGS







Signature of medical practitioner

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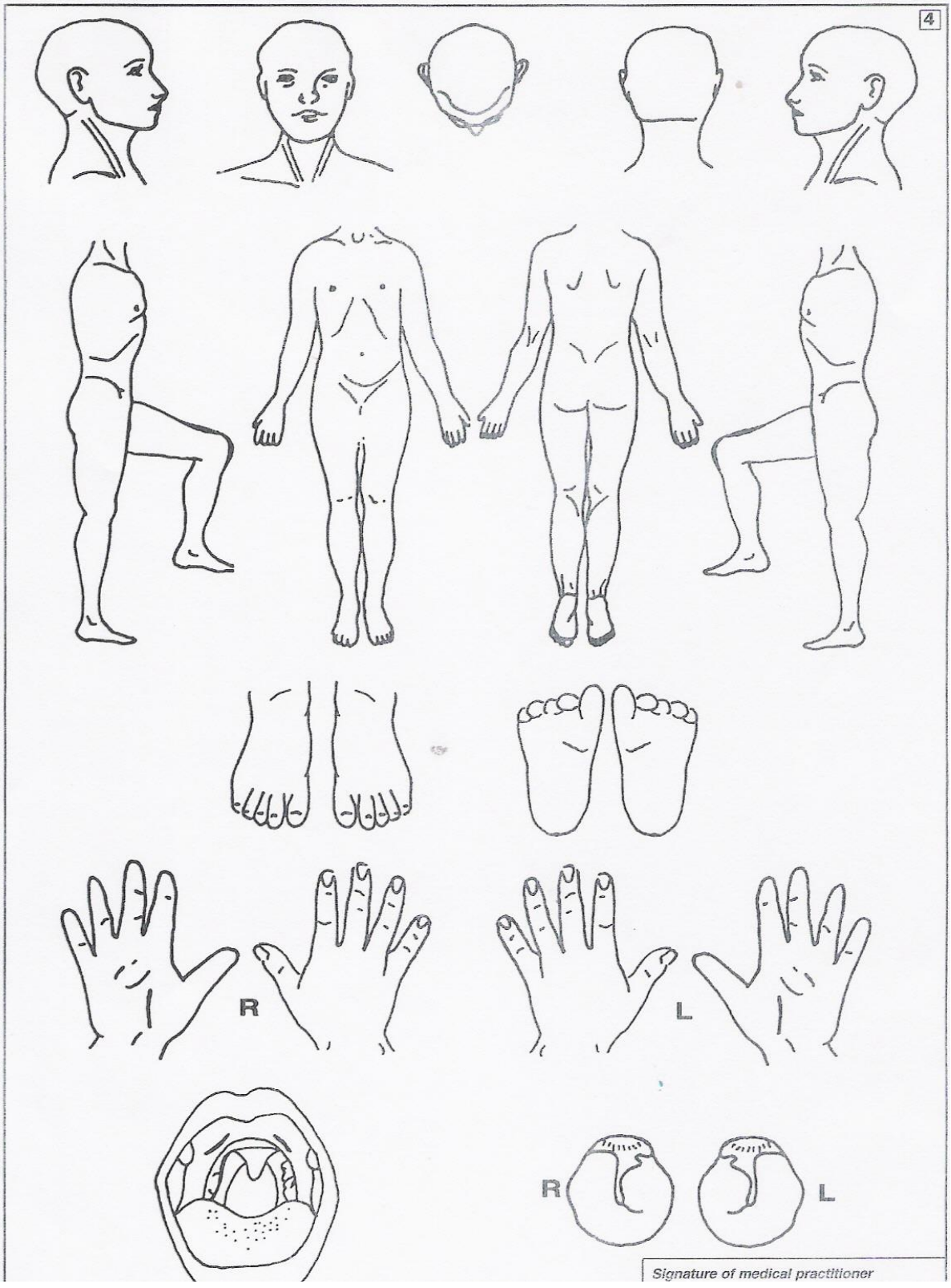

Signature of medical practitioner