

https://dspace.org/

An audit of injuries resulting from interpersonal violence at the Leratong Provincial Hospital, in 2009

Saimen, Amashnee

2012-01-17
http://hdl.handle.net/10539/11053

Downloaded from a DSpace repository. https://dspace.org/

AN AUDIT OF INJURIES RESULTING FROM INTERPERSONAL VIOLENCE AT THE LERATONG PROVINCIAL HOSPITAL, IN 2009

Amashnee Saimen

9402887T

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 in Science in Medicine (Emergency Medicine)

Johannesburg

DECLARATION

I, **Amashnee Saimen**, declare that this research report is my own work.
It is being submitted for the degree of Master of Science in Medicine (Emergency Medicine) at 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:

DEDICATION

This work is dedicated to my husband, Rob, for all his love and support during my studies.

ABSTRACT

Interpersonal violence is a global health issue, the impact of which filters through every facet of society. Studies have shown that more than 1.6 million people die annually across the world as a result of violence; injured survivors may suffer from a range of physical, sexual, reproductive and mental health problems.[3] The aim of this study is to describe the trends and profile of violence-related injuries originating in a South African community, with regard to the hospital records of an urban emergency department and crisis centre.

Materials and Methods: A retrospective, descriptive study was conducted by reviewing patient files at Leratong Provincial Hospital. Relevant clinical information such as victim's age and gender; time, date and day of hospital attendance; nature of injury; presence/absence of alcohol; and nature of weapon (if any) was extracted. Each patient record was given a unique study number and patient confidentiality was maintained at all times. The extracted information was recorded on a data sheet and analysed statistically.

Results: Leratong Hospital sees a large number of patients with injuries due to interpersonal violence throughout the year, with an increase in May, November and December. Higher numbers of patients present in the last week of the month, and as found in other studies Saturday and Sundays experience the most hospital attendances due to interpersonal violence. Victims were predominantly male (64%), except in the case of sexual assault where the victims were all (100%) female; females also suffered more blunt injuries than penetrating injuries. Blunt injuries were the most frequent type of injury in the overall sample, although over the weekend males sustained more penetrating injuries than blunt injuries. Young males were noted to be the main victims of interpersonal violence, and possibly also the main perpetrators.

Conclusion: This study highlights the trends in interpersonal violence injuries seen at Leratong Provincial Hospital. Young adults, especially males, are noted to be significantly affected by interpersonal violence.

ACKNOWLEGEMENTS

I would like to thank my supervisor, Guin Gordon for her all her guidance and patience during the whole research process, your positive words were greatly appreciated.

I would also like to thank, Professor Efraim Kramer, Head of Division-Emergency Medicine, for being so generous with his time and for all the motivation he has provided.

I would also like to acknowledge the assistance I received from two statisticians, Dr S Manda and Mr L Kondlo (who stepped in when Dr Manda was away).

I would like to thank Dr Elabor for his words of wisdom in the initial phase of this research report.

I would like to acknowledge the assistance of Sue Randall for the proof reading of my research report.

Figure	LIST OF FIGURES	Page
Figure 1:	Demographics of patients presenting with interpersonal violence-related injuries; Leratong Provincial Hospital, 2009	20
Figure 2:	Age of patients attending hospital due to interpersonal violence; Leratong Provincial Hospital, 2009	21
Figure 3:	Trend in hospital attendance among female victims of interpersonal violence, according to age groups; Leratong Provincial Hospital, 2009	21
Figure 4:	Trend in hospital attendance among male victims of interpersonal violence, according to age groups; Leratong Provincial Hospital,	22
Figure 5:	Distribution of interpersonal violence injuries by day of injury; Leratong Provincial Hospital, 2009	23
Figure 6:	Trend in interpersonal violence by gender and day of the week; Leratong Provincial Hospital, 2009	24
Figure 7:	Trend in interpersonal violence by week of the month; Leratong Provincial Hospital, 2009	25
Figure8:	Trend in interpersonal violence by month; Leratong Provincial Hospital, 2009	26
Figure 9:	Proportion of male and female victims of interpersonal violence by month; Leratong Provincial Hospital, 2009	26
Figure 10:	Trend in hospital attendance due to interpersonal violence, by month, in the male study population; Leratong Provincial Hospital, 2009	27
Figure 11:	Trend in hospital attendance due to interpersonal violence, by month, in the female study population; Leratong Provincial Hospital, 2009	27
Figure 12:	Trend in hospital attendance due to interpersonal violence over 24 hours; Leratong Provincial Hospital, 2009	28
Figure 13:	Trend in hospital attendance due to interpersonal violence by time interval; Leratong Provincial Hospital, 2009	29
Figure 14:	Trend in hospital attendance due to interpersonal violence over 24 hour period in relation to gender of victim; Leratong Provincial Hospital, 2009	29

Figure 15	Distribution of age groups in relation to time; Leratong Provincial Hospital, 2009	30
Figure 16:	Distribution of injuries due to interpersonal violence by day of the week; Leratong Provincial Hospital, 2009	33
Figure 17:	Distribution of the different types of injuries in relation to the weeks in a month; Leratong Provincial Hospital, 2009	34
Figure 18:	Prevalence of injuries in relation to the weeks in a month; Leratong Provincial Hospital, 2009	35
Figure 19:	Proportion of injuries by month due to interpersonal violence; Leratong Provincial Hospital, 2009	36
Figure 20:	Trend in injuries due to interpersonal violence over 24 hours; Leratong Provincial Hospital, 2009	37
Figure 21:	Proportion of injuries due to interpersonal violence in relation to time of day; Leratong Provincial Hospital, 2009	38
Figure 22:	Proportion of injuries in relation to age groups; Leratong Provincial Hospital, 2009	39
Figure 23:	Distribution of injuries in relation to weapon; Leratong Provincial Hospital, 2009	40
Figure 24:	Distribution of injuries due to various weapons in relation to time of presentation; Leratong Provincial Hospital, 2009	41
Figure 25:	Distribution of injuries due to firearms, bottles/glass and knives in relation to time; Leratong Provincial Hospital, 2009	42
Figure 26:	Distribution of injuries due to blunt objects and body parts in relation to time at Leratong Provincial Hospital, 2009	42
Figure 27:	Prevalence of alcohol use in relation to time of attendance at Leratong Provincial Hospital, 2009	43

Table	LIST OF TABLES	Page
Table 1:	Data codes assigned to hospital records	15
Table 2:	Classification of injuries	16
Table 3:	Distribution of injuries sustained in relation to time; Leratong Provincial Hospital,2009	29
Table 4:	Prevalence of injuries due to interpersonal violence at Leratong Hospital, 2009	31
Table 5:	Nature of injuries due to interpersonal violence in relation to patient gender; Leratong Provincial Hospital, 2009	32
Table 6:	Frequency of injuries occurring by month due to interpersonal violence; Leratong Provincial Hospital, 2009	36

ABBREVIATIONS

WHO – World Health Organization

MRC – Medical Research Council

NIMSS – National Injury Mortality Surveillance System

SD – Standard Deviation

GLOSSARY

Level I hospital:	a district hospital
Level II hospital:	a regional hospital
Level III hospital:	a tertiary hospital
Priority 1 patient:	Patient in need of emergency specialist medical care, life threatening within 2 hours
Gender:	in this study gender is categorised into male and female

***

Note: In the Results chapter, the totals may exceed 100% due to rounding off.

***

Definitions:

Sex: refers to the biological and physiological characteristics that define men and women.[1]

Gender: refers to the socially constructed roles, behaviour, activities, and attributes that a given society considers appropriate for men and women.[1]

TABLE OF CONTENTS

Declaration……..... i
Dedication……..... ii
Abstract……..... iv
Acknowledgements……..... v
List of figures……..... vi
List of tables……..... viii
Abbreviations……..... ix
Glossary……..... x

CHAPTER ONE: Introduction

1.1 Introduction……..... 2
1.2 Problem statement……..... 2
1.3 Literature review……..... 2
1.3.1 Categories of violence……..... 2
1.3.2 Global picture of interpersonal violence……..... 3
1.3.2.1 Interpersonal violence and its relation to gender……..... 3
1.3.2.2 Trends in interpersonal violence..……..... 4
1.3.2.3 Weapons and injuries……..... 5
1.3.2.4 Alcohol and interpersonal violence……..... 6
1.3.3 African picture of interpersonal violence……..... 7
1.3.3.1 General trends in interpersonal violence……..... 7
1.3.3.2 Interpersonal violence and its relation to gender..... 8
1.3.3.3 Mechanism and types of injuries due to interpersonal violence.... 10
1.3.3.4 Alcohol and interpersonal violence……... 11

CHAPTER TWO: Research methodology

2.1 Hypothesis for the current study……..... 13

2.2 Study aims and objectives…….. 13
2.2.1 Main purpose of the study…….. 13
2.2.2 Objectives……... 13
2.3 Materials and methods…….. 14
2.3.1 Study design…….. 14
2.3.2 Study site……... 14
2.3.3 Study population……... 15
2.3.4 Sampling……..... 15
2.3.5 Data coding……..... 15
2.3.6 Data collection……..... 17
2..3.7 Data analysis……... 17
2.4 Ethical considerations……..... 18

CHAPTER THREE: Results

3.1 Introduction……..... 19
3.2 Demographics……..... 19
3.2.1 Age and gender distribution……..... 19
3.2.2 Trend in interpersonal violence by age group…….. 20
3.2.3 Summary……... 22
3.3 Time-related trends in interpersonal violence…….. 22
3.3.1 Trend in interpersonal violence by day of the week……... 22
3.3.2 Trend in interpersonal violence by week of the month……. 24
3.3.3 Trend in interpersonal violence by month……. 25
3.3.4 Trend in interpersonal violence according to time of day……. 28
3.3.5 Summary……. 31
3.4 Trend in injuries…….. 31
3.4.1 Type of injury…….. 31
3.4.2 Injury trend in relation to day of the week……. 33
3.4.3 Injury trend in relation to weeks of the month……. 34
3.4.4 Injury trend in relation to month……. 35
3.4.5 Injury trend in relation to time of day……... 36
3.4.6 Injuries and age groups……... 38
3.4.7 Summary……. 39

3.5 Contributory factors……... 40
3.5.1 Weapons……..... 40
3.5.2 Alcohol……... 43
3.5.3 Summary……..... 44

CHAPTER FOUR: Discussion

4.1 Introduction……... 45
4.2 Time-related trends……..... 45
4.2.1 Months of the year……..... 45
4.2.2 Days of the week……..... 47
4.3 General trends in injuries.....……..... 48
4.3.1 Type of injury and weapon.....……..... 48
4.3.2 Gender of victims……... 49
4.4 Interpersonal violence and relation to gender…….. 51
4.5 Contributory factors……..... 53
4.5.1 Alcohol……... 53
4.5.2 Weapons…….. 54
4.6 Limitations of the study……..... 54
4.7 Conclusion and recommendations……..... 56

Appendices……..... 59
References……..... 65

CHAPTER ONE

Introduction

1.1 INTRODUCTION

Interpersonal violence is a global health issue, the impact of which filters through every facet of society. Interpersonal violence is defined by the World Health Organisation (WHO) as "the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in, or has a likelihood of resulting in injury, death, psychological harm, mal-development or deprivation".[2] From this definition it can be seen that the effects of interpersonal violence are far reaching. Studies have shown that in excess of 1.6 million people die each year as a result of violence, and those that are injured suffer from a range of physical, sexual, reproductive and mental health problems.[3]

Interpersonal violence in South Africa has caused around 1.0 million (6.5% of all) disability life years.[4] In South Africa the age-standardized mortality due to interpersonal violence injuries is seven times the global rate.[4] The burden on the economy in terms of cost and lost productivity due to interpersonal violence has been substantial. According to the WHO report on economic costs of interpersonal violence, in England and Wales these costs were estimated at 63.8 billion US dollars; homicides in Australia cost an estimated 194 million US dollars per year; and in South Africa the estimated cost just in the Western Cape was 30 million US dollars per year.[5] Furthermore, studies indicate that the costs of health care for injuries due to interpersonal violence negatively affect the economic growth in middle to low income economies.[5] When attaching a price tag to the estimated costs of interpersonal violence injuries, and counting the needless loss of life, one can question whether the urgency of intervention needed has become apparent.

Hospital emergency departments and crisis centres worldwide have direct contact with victims of interpersonal violence, thus these organisations are in a position to offer vital information on the magnitude and trend of interpersonal violence-related injuries.

1.2 PROBLEM STATEMENT

It is widely noted that interpersonal violence is a major health issue, and that injuries due to violence are potentially avoidable via intervention and preventative strategies. In order to develop such strategies, statistical data on interpersonal violence injuries is needed.

In South Africa, the literature on the trend and profile of injuries due to non-fatal cases of interpersonal violence is limited. Much of the literature on interpersonal violence centres on injuries sustained during previous political violence. Few studies in South Africa have focused on trends of non-fatal injuries resulting from interpersonal violence. It is indeed difficult to monitor all non-fatal injuries due to the large numbers of cases; also, surveillance systems required for capturing data about non-fatal injuries are not as well developed as those recording mortality. Globally, the number of non-fatal injuries is estimated to be twenty times that of fatal injuries, according to a WHO report.[3]

Little is known about the trend of non-fatal injuries resulting from interpersonal violence in the population that Leratong Provincial Hospital services. This community is located in the West Rand of Gauteng, South Africa. The results of this study will provide information that will be relevant to all emergency departments. Knowledge of the types of injuries, patient demographics and the trends in violence-related injuries will assist in predicting the type and number of future injuries, which will in turn assist accident and emergency departments to prepare for the actual demand. This will also ensure improvement of staffing during periods showing an increase in violence-related injuries.

1.3 LITERATURE REVIEW

1.3.1 Categories of violence

The World Health Organisation's report on violence and health categorises violence into three spectrums according to who committed the violent act: self-directed violence, interpersonal violence, and collective violence.[3] The nature of the act is described as being physical, sexual or psychological. Interpersonal violence is described as violence inflicted by another person

or by a small group of people. It is further divided into intimate partner violence versus individual/community violence. Community or individual violence is described as violence between people who may or may not know each other and which often occurs in a public place.[6] Intimate partner violence can be defined as the range of sexually, psychologically and physically coercive acts used against adult and adolescent women by current or former male intimate partners.[3]

1.3.2 Global picture of interpersonal violence

1.3.2.1 Interpersonal violence and its relation to gender

Approximately 8.8 per 100 000 people are killed annually in acts of interpersonal violence worldwide. The factors of younger age and being male have been identified as risk factors for violence;[7] the principal victims of violence are male, with male homicide rates being about three times that of females.[3] The United States homicide rate for males is approximately 3.6 times that of females.[7] The highest rate of homicide, at 19.4 per 100 000, is found in males aged 15 to 29 years, but this rate declines with men's increasing age.[3] Homicides amongst women occur at a rate of about 4 per 100 000.[3] Homicide was the second leading cause of death in the United States in the age group 15 to 24 years.[7]

The highest rate of youth homicide is noted in Africa and Latin America, and the lowest rates in Western Europe and parts of Asia and the Pacific. According to some reports, for every young person killed by violence an estimated further 20% to 40% of victims sustain injuries that require treatment in a hospital.[3]

Intimate partner violence is common in the female population and is a major concern, despite the fact that social awareness about intimate partner violence is high in Western countries. Intimate partner violence has been shown to affect 10% to 69% of women worldwide, and a WHO report confirms that most women are exposed to violence from intimate partners. Other studies have indicated that most women endure both physical and sexual violence in their own homes by an intimate partner.[8, 9, 10]

The lifetime prevalence of intimate partner violence ranges from 26% to 37%, and such violence is a major cause of illnesses in women who are abused.[3] A study conducted in ten countries showed that 13% to 61% of women had experienced physical violence.[11] Studies

conducted in Denmark found that 3.9% of adult women had been exposed to physical violence within the previous year, and that the perpetrator was a friend, current or former partner. The study found that intimate partner violence had decreased during the five-year study period but the statistics for physical violence remained the same.

Sexual assault has been shown to predominantly affect women and girls, and studies indicate that one in four women are sexually assaulted by a partner, while approximately 25% of adolescent females have experienced rape.[11] The statistics for the United States in 2002 revealed that more than 24 700 women and men were raped or sexually assaulted.[12] The study further revealed that 13% of reported rape and sexual assault victims were male.[12] These findings are in keeping with other statistics in the country which showed that both men and women are subject to intimate partner violence.[13] A survey conducted in Los Angeles showed that one in four women of Latin American descent were assaulted or raped by intimate partners, compared to one in fourteen men.[14] Relatively lower figures of rape but greater psychological abuse were noted in studies done in Greece and Turkey.[15] Studies in Japan indicated that 57% of women had suffered physical, sexual and psychological abuse from an intimate partner, and similar studies in Mexico showed that more than 50% of women who experienced physical abuse were also sexually assaulted by their intimate partners.[3]

When looking at triggers for intimate partner violence the findings were consistent globally. They included suspicion of infidelity, the woman's refusal of sexual intercourse, arguments about money or behaviour that was disobedient.[3] It should be kept in mind that the above figures do not represent the actual occurrence of domestic assault, due to the widespread problem of under-reporting.

1.3.2.2 Trends in interpersonal violence

Trends in violence-related injuries have been described in numerous studies done in the United Kingdom.[16, 17] When describing these trends, reference has been made to different days of the week, month and year. According to the literature reviewed, a definite increase in patients with violence-related injuries occurs over weekends (Saturday and Sunday), with a decrease towards midweek (Tuesdays, Wednesdays and Thursdays).[16] An increase in hospital attendance was shown in 66% of males and in 68% of females over the weekend.[16]

Attempts to identify trends in violence-related injuries according to seasonal variation have yielded differing results. Some studies indicate a seasonal variation explained by the increase in social interaction during the warmer periods, thus resulting in more violence-related injuries.[17] However this does not correlate with findings from a similar study carried out in the United Kingdom, which compared three-monthly aggregates for each season (spring, summer, autumn and winter); in this study no seasonal pattern in interpersonal violence was found.[16]

Another important aspect of studying time-related trends in violence is the use of calendar events, such as particular points in the year, public holidays, pay dates and sports events, to show changes in attendance of hospital patients with violence-related injuries. These periods have shown a greater number of attendances to the emergency department, [16] a likely reason being the greater social interaction during this period.

1.3.2.3 Weapons and injuries

It has been noted that the weapons used during acts of violence are associated with the type of interpersonal violence. During intimate partner violence and sexual assault, the use of feet, objects and fists are most frequently used, while in the case of individual violence weapons such as knives, and firearms are used.[3]

In the United States firearms were used in 66.1% of reported cases of assault, followed by sharp objects in 12.1% cases, and blunt instruments 5.8% cases.[7] Studies done in Switzerland showed that the use of weapons was not prevalent; adolescents reported that they used fists during altercations rather than firearms and knives.[18] Studies conducted in Denmark revealed that the use of feet has been shown to cause the most serious injuries when compared to other body parts, while the use of fists has been shown to cause the least severe injuries.[19]

Some difference in the type of injuries sustained by male and female victims has been established in various studies,[19, 20] although abrasions and contusions are the most common type of injury for both males and females.[20] Contusions are significantly related to female gender, and the reason postulated for this is the increased exposure of women to blunt trauma, strangulation or being physically forced against a wall or floor.[19] Men have been described in a Denmark study as being subject to kicks or broken glass.[19] Male victims experienced a greater extent of lacerations and incised wounds.

Fractures sustained during an assault are commonly fractures of the nasal bone (29%), dental fractures (27%), mandibular fractures (6%) and zygomal fractures (3%).[19] Wounds have been described as being probable defensive wounds if found on the upper limbs; studies have shown that predominantly females incurred more injuries on the upper limbs when compared to males. Injuries, which were due to active performance by the victim, also resulted in wounds on the upper limb. The most common injuries due to this were contusions on the dorsum of the hand and fractures of the fifth metatarsal bone.[19, 20]

Burn injuries due to interpersonal violence are notable in developing countries. Studies have shown that Jamaica has one of the highest incidences of burn injuries due to interpersonal violence, with victims commonly being male. Bangladesh and China show a predominantly female population being affected by burn injuries.[21] Most burn injuries were due to violent crime or domestic altercations.[22, 23]

1.3.2.4 Alcohol and interpersonal violence

The association between alcohol and intimate partner violence has been demonstrated in many studies carried out across the world. According to reports by victims of interpersonal violence, alcohol was associated in 35% of cases in the United States, 50% of cases in the United Kingdom, and 50% in Tianjin, China.[24] A study done in Russia also showed that victims of intimate partner violence stated that their partner's alcohol consumption led to the assault.[24] In the United Kingdom 58% of men convicted of rape stated that they had consumed alcohol prior to committing the offence.

According to a study done in Washington D.C., data from the National Crime Victimization Survey indicated that substance-related violence was most likely to involve alcohol. The study further showed that there was an increase in the percentage of victims who reported that the perpetrators had consumed alcohol, from one quarter in 1998 to one third in 2006.[25] Further studies in the United States showed that alcohol was present in approximately one third of all homicides.[7] European studies have shown that there is a strong association between increased alcohol intoxication and violence; this trend is apparent for both males and females.[26] Alcohol is considered as a risk factor for violent behaviour as it causes the user to feel un-inhibited, but much of this behaviour is considered to be socially learnt.

1.3.3 African picture of interpersonal violence

1.3.3.1 General trends in interpersonal violence

It is difficult to quantify the magnitude of interpersonal violence in Africa. The data needed to evaluate the problem includes complete records of mortality statistics, which, according to a report by the WHO, fewer than 10% of African countries possess.[3] According to the WHO, interpersonal violence in Africa has been one of the leading causes of death in the age group 15 to 29 years, and it is the eighth leading cause of burden of disease among the age groups of 15 to 29 years and 30 to 44 years.[27]

These statistics reflect the impact of interpersonal violence in South Africa, a country which has been described as having the highest rates of interpersonal violence-related burden in the world.[28] South Africa's homicide rates peak in males aged 15 to 29 years, at 184 per 100 000—nine times the global rate.[28] As mentioned earlier in this report, the literature does present evidence that individual violence is more prevalent in male than female populations worldwide.[3,8, 29] Young men have been noted to be more involved in risk taking behaviour, gaining status through fighting and these dominating ideas transcend to control over women. Physical violence has been described as a manner in which gender hierarchy is maintained and re-enforced.[30]

When analysing non-fatal injuries in South Africa, one study has shown that 54.9% of these injuries were caused by violence; it was further established that of these non-fatal injuries due to violence, 67.9% were due to social violence and 2.2% to sexual assault.[31] Another study found that approximately 3.5 million South Africans present to hospital with non-fatal injuries, and 50% of these injures are due to violence.[32]

An investigation into the seasonality of injuries in South Africa during the 2007 midwinter period (July to September) showed a male predominance, with 427 males and 59 females presenting to the emergency department with violence-related injuries.[33] According to a study on injuries in Gauteng, deaths due to violence predominantly occurred on Saturdays (22.7%) and Sundays (20.9%).[34] A similar finding of increased hospital attendance over weekends was found in a study conducted over the period of a year from 1988 to 1989.[35] This trend is consistent with that reported earlier in this report for global populations. Violent behaviour was also noted to be frequent during festive periods and often occurred in public places.[31]

Violent deaths in South Africa were found to occur chiefly between 20h00 and 01h00 (27.2%), or between 01h00 and 03h00 (10.6%).[34] The increase in interpersonal violence during evening and night was echoed in other studies as well.[35]

A study conducted in the Basotho Community in rural Lesotho over a one year period (1988 to 1989) focusing on the trend of interpersonal violence showed that there was an increase in assaults during the months of October and November.[35] Recent studies on deaths due to interpersonal violence in Gauteng show an increase in violent deaths over the months of August, September and December.[34] A possible variable trend in hospital attendance over a year in relation to various regions in southern Africa may explain this difference. The literature on seasonality of injuries in other African countries has not been fully explored.

What is known with greater certainty is that interpersonal violence is a major cause of mortality in Africa. In Uganda, injuries and violence have been ranked among the top six mortality causes; studies have shown that 13% to 21% of injury deaths are intentional.[36] Homicide in Nigeria was 9.3 times more common in males than female victims.[37] Further analysis of the trend in weapon-related injuries shows that 69.8% of firearm-related deaths in the Niger Delta, Nigeria occurred in the age group 10 to 39 years, with a peak of 37.5% of deaths occurring between the ages of 20 and 29 years.[38]

A study conducted in Kenya indicated that 87.9% of males and 11.6% of females were affected by interpersonal violence; the mean age was 29.9 years (SD 10.9).[39] An article describing interpersonal violence in Western Kenya indicated an equal likelihood of men and women suffering from violence-related injuries, but women would be more likely to suffer injuries from domestic violence or intimate partner violence.[40]

1.3.3.2 Interpersonal violence and its relation to gender

Males have been described as more at risk for interpersonal violence than females; young males are predominantly involved in violence-related deaths, as victims or as perpetrators.[41] The statistics for 1993 to 2005 showed that there were nearly seven times more male than female violent deaths in Gauteng.[41]

Sexual assault affects more than one and a half million South Africans each year, which has been described as one of the highest rates in the world.[42] Every year in South Africa, 55 000

rapes of women are reported to the police; some studies indicate that the reported rate is an estimated nine times lower than the actual figure.[31] A recent national survey in South Africa found that 33% of undisclosed rape cases were perpetrated by schoolteachers, 21% by relatives, 21% by strangers or recent acquaintances and 10% by boyfriends.[43] Studies conducted over a five year period (2000-2004) in the Transkei revealed that 831 cases of sexual assaults (rape) were reported, with children below the age of 15 years comprising 53.3% of the total study population.[41]

Women experience various forms of abuse. A study conducted at an antenatal clinic in Soweto, South Africa revealed that 29.8% of women reported emotional/financial abuse and physical abuse, 13% reported emotional/financial, physical and sexual abuse.[44] Other studies have shown that 40% to 50% of women report physical abuse from an intimate partner. Partner violence against women is a significant public health problem in South Africa, associated with health-risk behaviours and increased use of medical services.[45] Sexual assault has also been shown to affect South African males; one study revealed that 3.4% of young men have been raped by a man.[29] A study on men's health showed that men between the ages of 20 to 40 years were significantly more likely to have been raped. The study also revealed that attempted rape was reported by 16.8% of men.[46] Men who engaged in violent behaviour were shown to be more likely to have been raped as well as being guilty of rape.

In Nigeria, the prevalence of domestic violence has been estimated at between 46% and 81%.[47] Further studies in Nigeria indicate that 5% to 18% of young women are victims of rape. The under-reporting of cases of sexual assault in Nigeria is also noted, as victims are afraid of persecution because most perpetrators are classmates, boyfriends and gang members.[47]

Other studies on the prevalence of intimate partner violence in sub-Saharan Africa have estimated that physical violence is experienced by 24% of women in Zambia, 25% of women in Kenya, 30% of women in Uganda and 31% of women in Nigeria.[48] Findings from a WHO survey of women in Zambia found that 48.4% had experienced interpersonal violence by their partners.[3]

From the statistics reviewed above, it can be stated that intimate partner violence and sexual assault in African countries predominantly victimises the female population.

1.3.3.3 Mechanism and types of injuries due to interpersonal violence

The use of a weapon in interpersonal violence has been shown to increase the severity of a victim's injury, which may result in the need for further medical investigation and an increased use of health services.[33, 49] Injuries caused without a weapon often cause multiple superficial injuries but warrant no further investigation, as most patients are discharged from the emergency department immediately or after a period of observation.[33]

The National Injury Mortality Surveillance System (NIMSS) of South Africa indicated that 37% of fatal injuries in Gauteng during 2009 were due to firearms, 29.3% to sharp instruments and 26.5% to blunt force.[34]South Africa has one of the highest firearm death rates worldwide; studies have indicated that one third of all South African female homicides and 39% of male homicides are due to firearms.[32] South Africans have relatively high access to illegal firearms: the South African Police Services and the Metropolitan Police report a loss of approximately 3 700 firearms per year, which escalates the problem further.[32]

Violence trends studied at a Johannesburg hospital between 1985 and 2001 indicated an increase in firearm injuries. In 1996, 25% of injuries seen in hospital were due to firearms, but by 2001, this had risen to 29% with a concomitant decline in stab injuries.[49] More recent studies have provided further evidence of this trend. The most common mechanisms attributed to injuries sustained due to interpersonal violence in a non-political environment are as follows: firearms (17.8%), bottles (15.1%) and knives (14.1%).[33] Firearm-related injuries in Gauteng are reportedly the third highest rate in the world after Columbia and Venezuela, at 26.8/100 000.[50]

With the implementation of the Firearm Control Act in 2000, which regulates firearm ownership by promoting stricter eligibility and competency requirements, the number of homicides due to firearms has declined.[50] Whether the decline in homicides due to firearms has included female homicides has not yet been established.[50] Studies indicate that there is a prominence of firearms in gender-based violence, with the female homicide rate for South Africa in 2004 having been seven times that of the United States of America.[50] An association between legally owned firearms and an increase risk for intimate partner homicide has been shown in South Africa.[50]

The use of firearms during assault has also been noted in studies conducted in other African countries. A study conducted in Nigeria revealed that between 1994 and 2000, firearm injuries were the most common injuries.[37] Later studies in Kenya indicated that 6.7% of the 6 300 assault cases in 2004, and 9.7% of the 3 079 assault cases in 2005, were due to firearm injuries. Ugandan studies indicate that gunshots, blunt trauma, and cuts/stabs are the leading mechanisms of assaults.[36] Further analysis of the results of the studies in Uganda revealed that 15% of interpersonal violence-related injuries were caused by blunt force, 9% were due to stabs/cuts, and only 1% of injuries were due to gunshot wounds.[51]

Although the prevalence of firearm-related injuries is quite notable, studies also reveal that substantial injuries due to interpersonal violence are caused by burns. Studies in Nigeria, Uganda and Kenya reveal that acid burn injuries are common during interpersonal violence. In Uganda such attacks were perpetrated during robberies or during domestic arguments.[52] Studies conducted in Western Kenya found that 6.2% of injuries sustained during interpersonal violence were burns.[53]

Other notable weapons indigenous to South Africa are sjamboks, which are traditional whips. The use of sjamboks as weapons is prevalent during community violence or mob justice; 4% to 6% of all crimes in South Africa are dealt with in this manner.[54]

1.3.3.4 Alcohol and interpersonal violence

As discussed earlier, alcohol consumption has been shown in various studies to increase the risk of interpersonal violence. The association between intimate partner violence and alcohol use has also been established, [24, 55] up to 44% of victims of interpersonal violence believe that the perpetrators had consumed alcohol.[56]

The WHO report on intimate partner violence and alcohol revealed that 65% of women in South Africa experienced intimate partner violence when their partners consumed alcohol.[51] The prevalence of alcohol use was also demonstrated in a study conducted in three South African trauma units between 1991 and 2001.[24] It was shown that between 43% and 90% of the victims of interpersonal violence tested positive for alcohol.[24]

A study done in Nigeria found that there was an increase in youth violence during celebrations, and where the sale of alcohol was unrestricted or illicit drugs such as cannabis were available.[47] Studies in Western Kenya indicated that significant alcohol use was associated with assaults (51.3%).[53]

CHAPTER TWO

Research Methodology

2.1 HYPOTHESES FOR THE CURRENT STUDY

Based on the review of the empirical literature, several hypotheses were generated. It was anticipated that there would be an increase in the number of patients presenting to the emergency department over weekends, end of month periods and holidays, relative to weekday and mid-month periods.

With regard to patient demographics and by comparing male and female statistics, it was expected that physical assault with more serious injuries may show a male predominance, while the female population may be more affected by sexual assault and predominantly superficial injuries.

2.2 STUDY AIMS AND OBJECTIVES

2.2.1 Main purpose of study

The aim of the current study is to describe the trend and profiles of violence-related injuries in the community, from the perspective of an emergency department and crisis center at the Leratong Provincial Hospital in South Africa.

2.2.2 Objectives

- To determine whether there is a time-related trend or change in the profile of violence-related injuries amongst patients presenting to the emergency department and crisis centre, according to different times of the day, week, month and year.
- To compare the demographics of patients presenting with violence-related injuries during a one year period.
- To determine whether or not a weapon was used, and if so, the type of weapon.

- To investigate whether the use of alcohol was related to the violence-related injury, as noted in the hospital files.

2.3 MATERIALS AND METHODS

2.3.1 Study design

This study was a retrospective, descriptive study conducted by reviewing patient information from the hospital files. Relevant clinical information such as the victim's age and gender; the time, date and day of hospital attendance; the nature of injury; the presence or absence of alcohol; and the type of weapon (if any) was extracted. Verbal reports of physical and sexual interpersonal violence were included for examination in this study.

Each patient record was given a unique study number, and patient confidentiality was maintained at all times. The extracted information was recorded on a data sheet (see appendix).

2.3.2 Study site

This study was conducted at Leratong Provincial Hospital, which is a Level II/Regional hospital situated in Gauteng, South Africa. The other relevant levels of care in South Africa are Level I/ district hospitals and Level III/ tertiary hospitals. Leratong Hospital services the population in the West Rand, which is estimated at 1.5 million people, of which 82% of the population have no health insurance. The population is described as being in the lower socio-economic spectrum. No crime statistics for the area that Leratong Provincial Hospital serves was available for the period that was being considered in this study. Leratong Provincial Hospital also serves as a referral centre to two district hospitals and one psychiatric hospital, 44 fixed facilities clinics, 4 satellite clinics and 10 mobile clinics within the district. The emergency department of Leratong Provincial Hospital provides treatment for cases of physical violence, the crisis centre of Leratong Provincial Hospital provide services for cases of sexual assault.

2.3.3 Study population

The subjects included all patients presenting to the emergency department and crisis centre with a history of assault, and with the type of injuries stated.

2.3.4 Sampling

The data collection focused on a one-year period, 1st January 2009 to 31st December 2009. A systematic random sample of the records was undertaken by selecting every 1 in 10 files from the emergency department and crisis centre register; this was expected to yield a total of approximately 817 records. If a file was not found the next file number was selected. This sample size was sufficient to produce a reliable audit of the patients presenting with the type of injuries that needed to be studied.

Inclusion criteria:

- Files coded in the emergency department register with the term ‘assault’ was used in this study

Exclusion criteria:

- Patients aged less than 10 years were not included in this study as this would constitute child abuse
- Patients aged more than 65 years were not included in this study as this would constitute geriatric abuse
- Both the above mentioned exclusion criteria would require a separate study

2.3.5 Data Coding

To facilitate data collection, codes were assigned to various dimensions of information recorded in the patient files. These were as shown in Table 1 below.

Table 1: Data codes assigned to hospital records.

Month	**Week of the month**	**Day of the week**	**Gender**	**Types of injuries**	**Weapon used**	**Presence of alcohol (as stated in notes)**
January=1	(1st - 7th of the month) = week 1	Monday=1	Male=M	Penetrating=1	Blunt object=1	Yes=1
February=2	(8th - 14th) = 2	Tuesday=2	Female=F	Blunt=2	Body part=2	No=2
March=3	(15th – 21st) = 3	Wednesday=3		Gunshot=3	Firearm=3	Not recorded=3
April=4	($\geq 22^{nd}$) = 4	Thursday=4		Sjambok=4	Bottle/Glass=4	
May=5		Friday=5		Sexual Assault=5	Knife=5	
June=6		Saturday=6		Burn=6	Other=6	
July=7		Sunday=7		Other=7	Not known=7	
August=8						
September=9						
October=10						
November=11						
December=12						

2.3.6 Data collection

The file numbers of patients presenting with assault-related injuries between 1 January 2009 and 31 December 2009 were extracted from the emergency department register and crisis centre register. Every tenth file number from each register was considered, and the corresponding files were then retrieved from the hospital records department and the crisis centre records department.

Data collection was done using a data spreadsheet; the data-coding sheet shown in the previous section was used as a key when recording the information. Patients' injuries were classified according to the type of wound rather than the mechanism of injury, with the exception of gunshot and sjambok injuries. Even though the latter two injuries can be classified as penetrating and blunt respectively, for the purpose of this study each was recorded in its own category.

Table 2: Classification of injuries

1.Penetrating	These are injuries which produce a "division in the full thickness of the skin with well defined edges".[57] Injuries such as incised wounds and stab wounds are considered to be penetrating injuries.
2.Blunt / non-penetrating	These injuries are produced by a blunt object, and "the extent of the injury is dependent primarily on the force applied and the nature of the weapon used".[57] These types of injuries do not cause a division in the full thickness of the skin and the edges are irregular. Injuries such as scratches, abrasions, haematomas or contusions, bruises, lacerations, fractures, and head injuries or concussions are classed as blunt injuries
3.Gunshot	These are penetrating / perforating injuries caused by a firearm projectile.
4.Sjambok	The sjambok is a heavy leather whip which may produce multiple bruises and contusions.[57]
5.Sexual assault	This is a violent, gender-neutral act and "involves unwanted, non-consensual sexual contact ranging from kissing to rape".[58]
6.Burns	Burn injuries may be superficial (only involving the epidermis), partial thickness (involving epidermis and dermis) or full thickness (involving epidermis and dermis and extending into subcutaneous tissue).[59]

2.3.7 Data analysis

The statistical software STATA 11® was used for all data analyses. All categorical variables, such as gender and age group, were summarised using frequencies or percentages, and continuous variables were summarised by mean, median and standard deviation (SD). Possible associations between age and gender of the patient with the type of injury inflicted and the weapon used were investigated by the use of chi-squared tests of independence.

Alpha was set at 0.05, which means that a p-value of < 0.05 would indicate a statistically significant difference in the sets of data being analysed. A p-value of 0.05 or less indicates that differences in the datasets were extremely unlikely to be obtained merely by chance (i.e. there is only a 5% or lower possibility that such extreme differences would be obtained by chance). Therefore it is most likely that a systematic influence was operating which would account for the observed pattern of results.[60]

The trends in injuries according to patient demographics, type of injury and other factors were summarised with time-series plots.

2.4 ETHICAL CONSIDERATIONS

Ethics clearance for this study was obtained by the Human Research Ethics Committee (Medical), University of the Witwatersrand. The researcher was issued with Ethics Clearance Certificate No. M10513 (see Appendix).

CHAPTER THREE

Results

3.1 INTRODUCTION

According to data compiled on a monthly basis from hospital registers, a total of 7 145 patients presented to the emergency department at Leratong Provincial Hospital during 2009 with interpersonal violence-related injuries. An additional 1 568 patients presented with sexual assault issues to the crisis centre at Leratong Hospital during the same year.

Data for this study was extracted from a total of 740 hospital files from the emergency department and crisis centre at Leratong Hospital. This selection was based on systematic random sampling of 1 in 10 files of the entire population presenting to the hospital with a history of interpersonal violence and with the type of injuries stated. Only subjects between the ages 10 and 65 years of age were included in this study. Of the hospital files initially drawn from the database, 131 files were not included in this study, as they did not satisfy the above-mentioned inclusion criteria. The totals described in the results chapter may exceed 100% due to rounding off.

3.2 DEMOGRAPHICS

This section will present the findings about the distribution of injuries due to interpersonal violence according to age and gender.

3.2.1 Age and gender distribution

Of the 740 cases of interpersonal violence analysed, 236 (32%) of the victims were female and 502 (68%) of the victims were male (see Figure 1 below). The mean age of the study population was 28 years (SD 9.7), with the youngest victim of the study population being 11 years and the oldest being 61 years. A difference was noted in the mean age of the victim according to gender: the mean age for females was 26.6 years (SD 11) and the mean age for

males was 28.7 years (SD 9). The results indicate that there is a statistically significant difference between the mean age for males and females (t= -2.79, p-value 0.0055). Males have a statistically significantly higher mean age (28.7 years) than females (26.6 years).

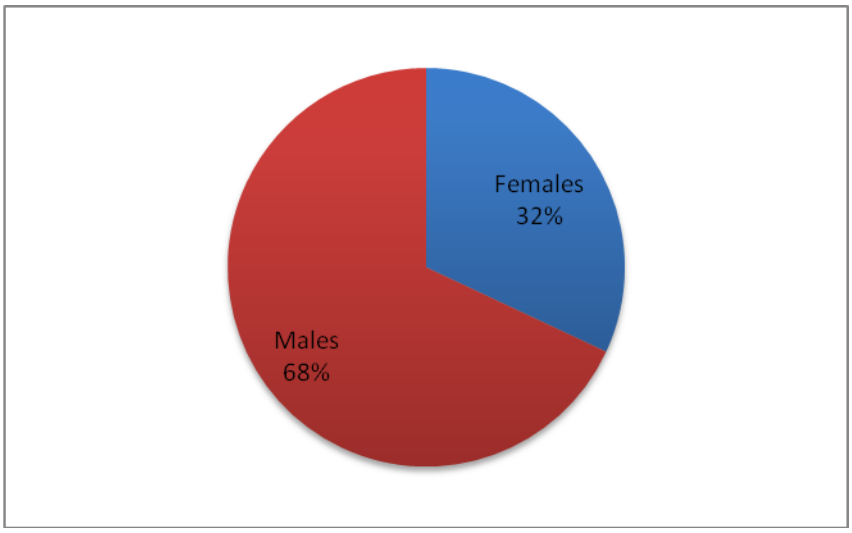


Figure 1: Demographics of patients presenting with interpersonal violence-related injuries at Leratong Provincial Hospital, 2009 (N=740)

3.2.2 Trend in interpersonal violence by age group

The distribution of injuries due to interpersonal violence was analysed in relation to patients' age group, with a secondary analysis according to gender and age group. A significant difference (p value < 0.01) was found according to age, with a peak prevalence showing in the age group 20-29 years for the study population. This age group represented 45% of violence-related injuries, with the next highest age group being 30-39 years (22% of all cases); see Figure 2. The age group which was least represented in the sample was 50-56 years at 3.2% of the sample.

When analysing the prevalence of interpersonal violence according to age groups in the female sub-sample, the following result was noted: peaks in the age groups 10-19 years (31.4%) and 20-29 years (34.3%). A decline in interpersonal violence-related injuries was noted after the age of 29 years (see Figure 3).

The data was then analysed by age group for the male sub-sample, and again a peak in hospital attendance was noted in the age group 20-29 years, representing 50% of all male victims of interpersonal violence. As noted in the female population a decline in interpersonal violence-related injuries was seen after the age of 29 years (Figure 4).

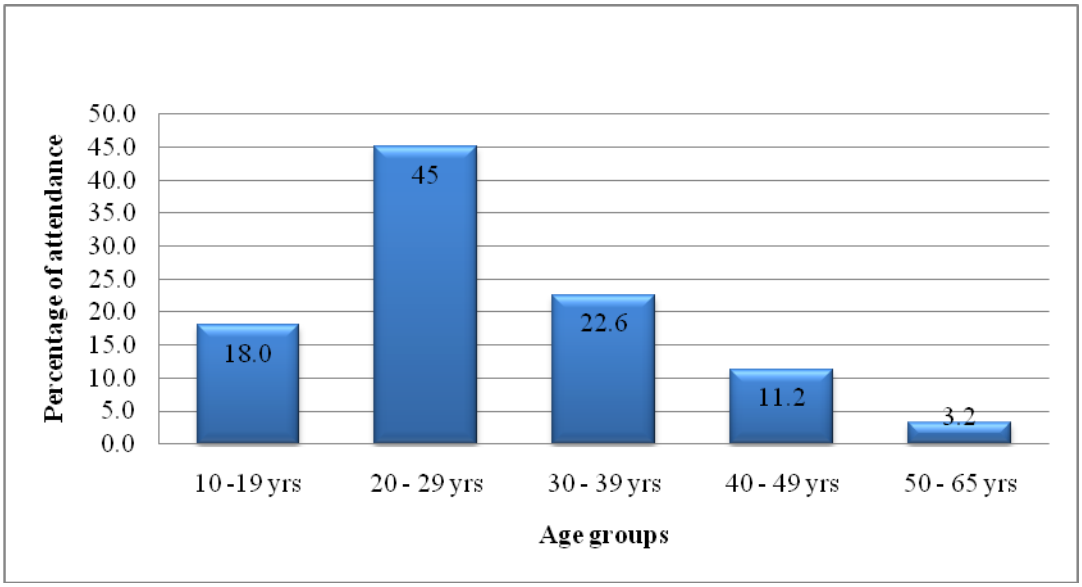


Figure 2: Age of patients attending hospital due to interpersonal violence injury; Leratong Provincial Hospital, 2009 (N=740)

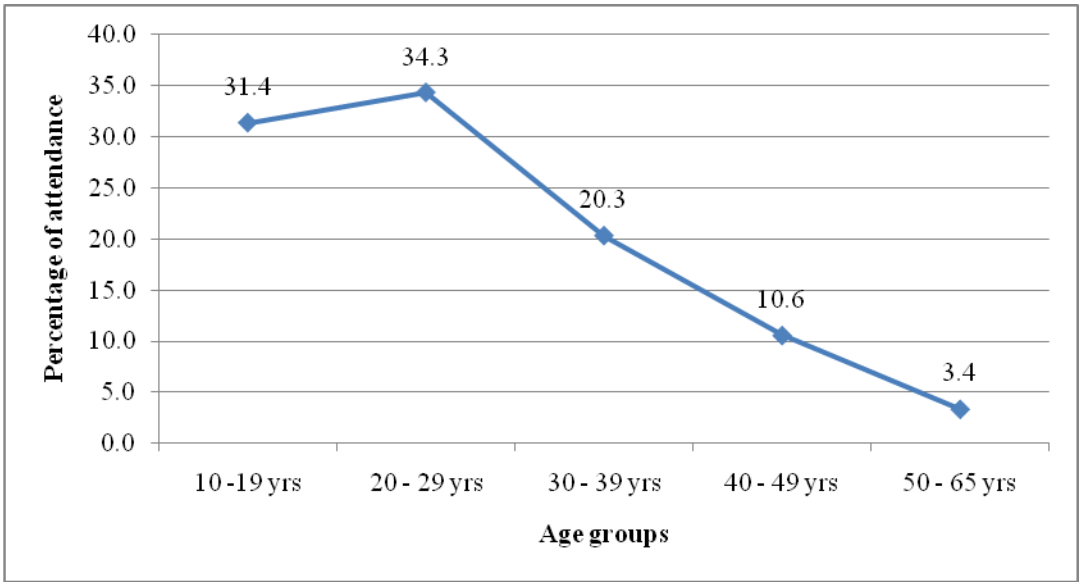


Figure 3: Trend in hospital attendance among female victims of interpersonal violence, according to age groups; Leratong Provincial Hospital, 2009 (N=236)

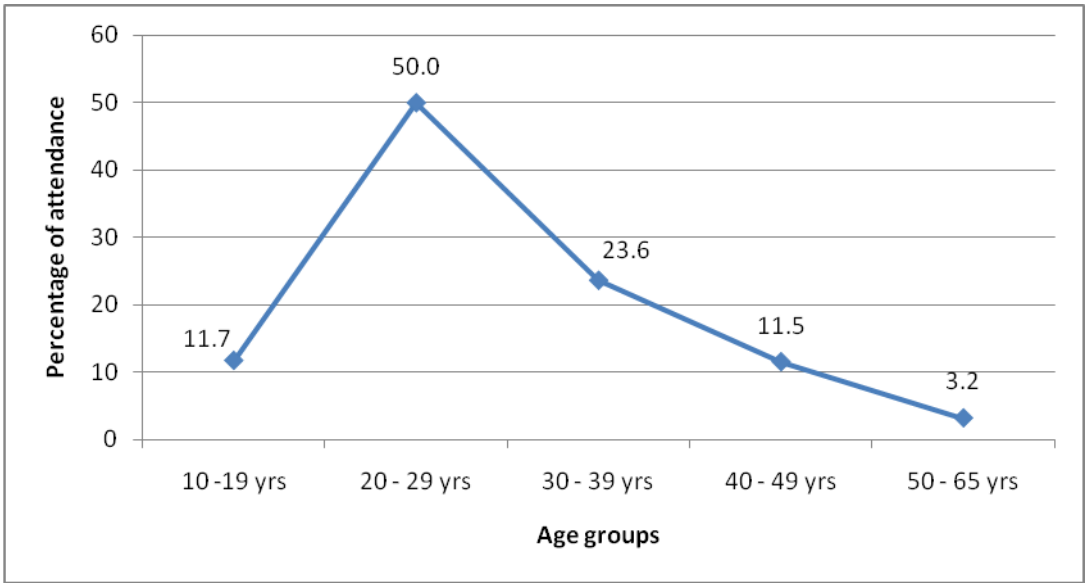


Figure 4: Trend in hospital attendance among male victims of interpersonal violence, according to age groups; Leratong Provincial Hospital, 2009 (N=502)

3.2.3 Summary

The study sample consisted of 236 female victims and 502 male victims of interpersonal violence. The mean age of the sample was 28 years (SD 9.7); the mean age for female victims was 26.6 years (SD 11) and the mean age for male victims was 28.7 years (SD 9 SD). Peaks in attendance were noted in the age group 20-29 years, representing 45% of the total study sample (both genders).

3.3 TIME-RELATED TRENDS IN INTERPERSONAL VIOLENCE

The trends in hospital admissions related to interpersonal violence were analysed in relation to day, week and month. The results are presented in this section.

3.3.1 Trend in interpersonal violence by day of the week

The greatest number of hospital visits by victims of interpersonal violence was on Saturday (25.3%) and Sunday (23.7%); see Figure 5 below. For all other weekdays, the percentages of

interpersonal violence injuries were noted to be far lower (ranging from 7% to 14.7%). Friday, Saturday and Sunday collectively accounted for 62.5% of interpersonal violence injuries for the week, compared with 37.8%, which was accounted for collectively on Monday, Tuesday, Wednesday and Thursday.

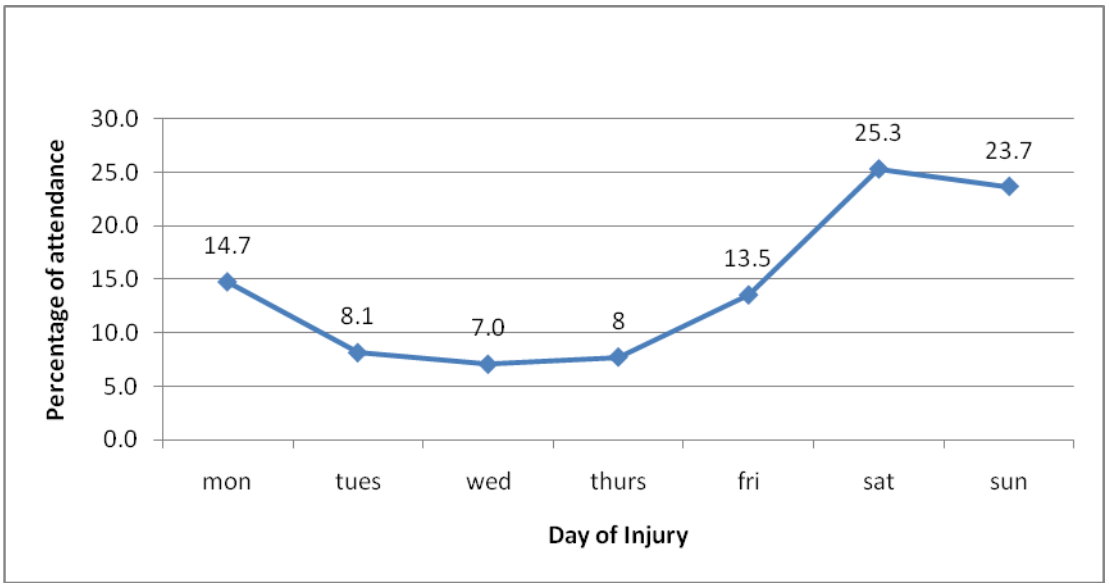


Figure 5: Distribution of interpersonal violence injuries by day of injury; Leratong Provincial Hospital, 2009 (N=740)

A significant difference (p value < 0.01) was found on analysis of hospital attendance based on gender and day of the week. Most female victims with injuries due to interpersonal violence presented to Leratong Provincial Hospital on Mondays (20.8%) and Fridays (19.5%), while male victims with injuries due to interpersonal violence showed an increased attendance over Saturday (31%) and Sunday (26.8%). From Mondays through Fridays, the number of female patients exceeded the number of males, while on Saturdays and Sundays the number of male admissions exceeded those of females (see Figure 6).

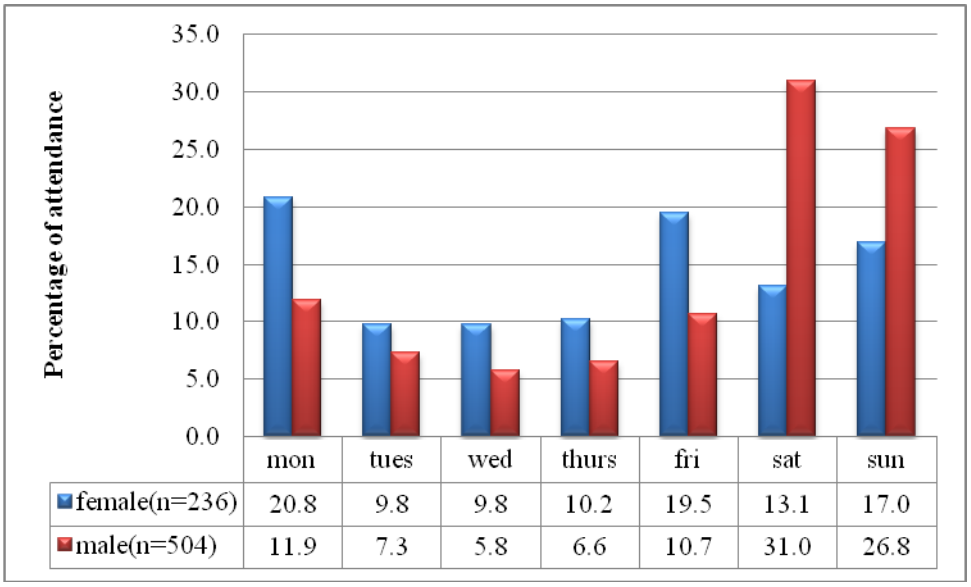


Figure 6: Trend in interpersonal violence by gender and day of the week; Leratong Provincial Hospital, 2009 (total N=740)

3.3.2 Trend in interpersonal violence by week of the month

In order to analyse the data, the days of the month were divided into weeks as follows:

- week 1: 1st to 7th day of the month
- week 2: 8th to 14th
- week 3: 15th to 21st
- week 4: 22nd to end of the month.

A high proportion (31.5%) of interpersonal violence injuries were noted in the last week of the month during 2009 (Figure 7). A steady decline in attendance was noted from the first week to the third week, with a peak in the fourth week.

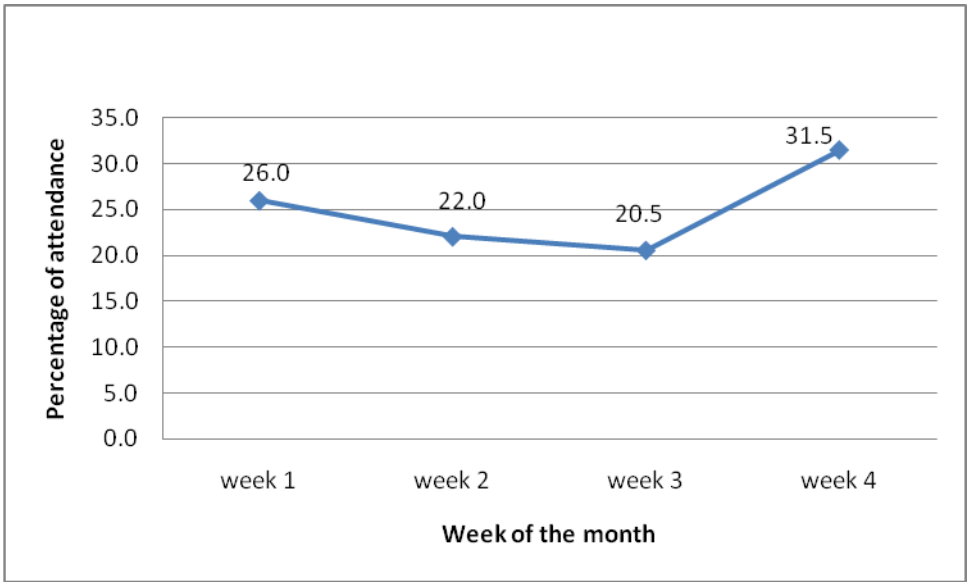


Figure 7: Trend in interpersonal violence attendance by week of the month; Leratong Provincial Hospital, 2009 (N=740)

3.3.3 Trend in interpersonal violence by month

The data for the 740 study sample files at Leratong Provincial Hospital was analysed according to month of admission. Peaks in hospital attendance due to interpersonal violence were noted for the months of May (9.5%), November (12%) and December (10.7%) (Figure 8). The lowest number of hospital attendances for victims with injuries due to interpersonal violence occurred in February, which is the shortest month of the year (Figure 8).

A male predominance in attendance was noted throughout the year (Figure 9). In other words, more males attended the emergency department or crisis centre than females during every month of 2009. The greatest discrepancies were in August and November; in both of these months, the male admissions were nearly four times the female admissions.

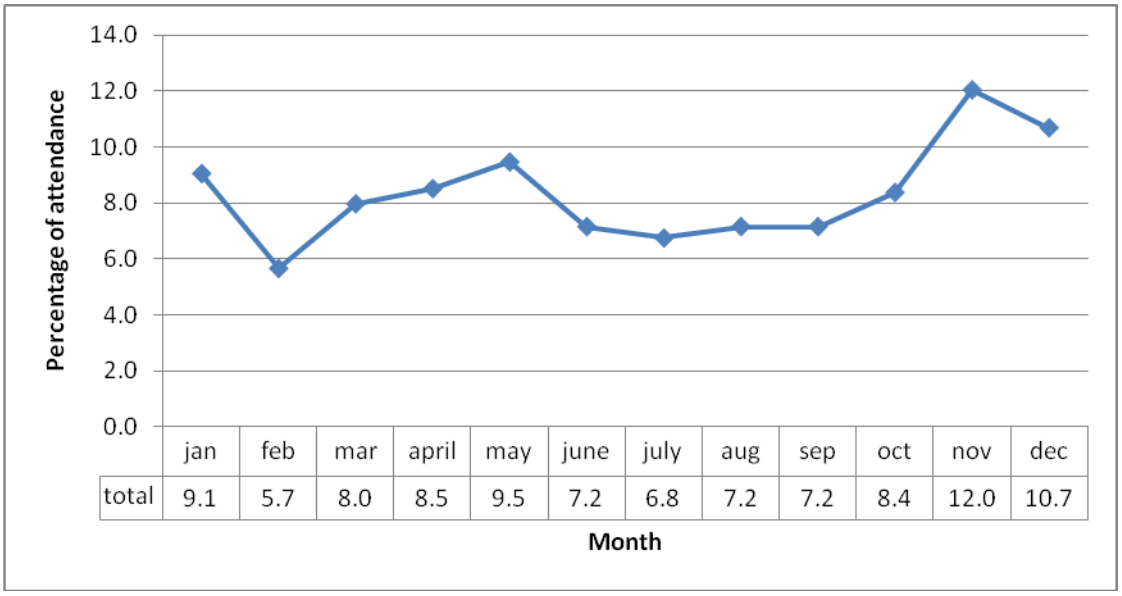


Figure 8: Trend in interpersonal violence attendance by month; Leratong Provincial Hospital, 2009 (N=740)

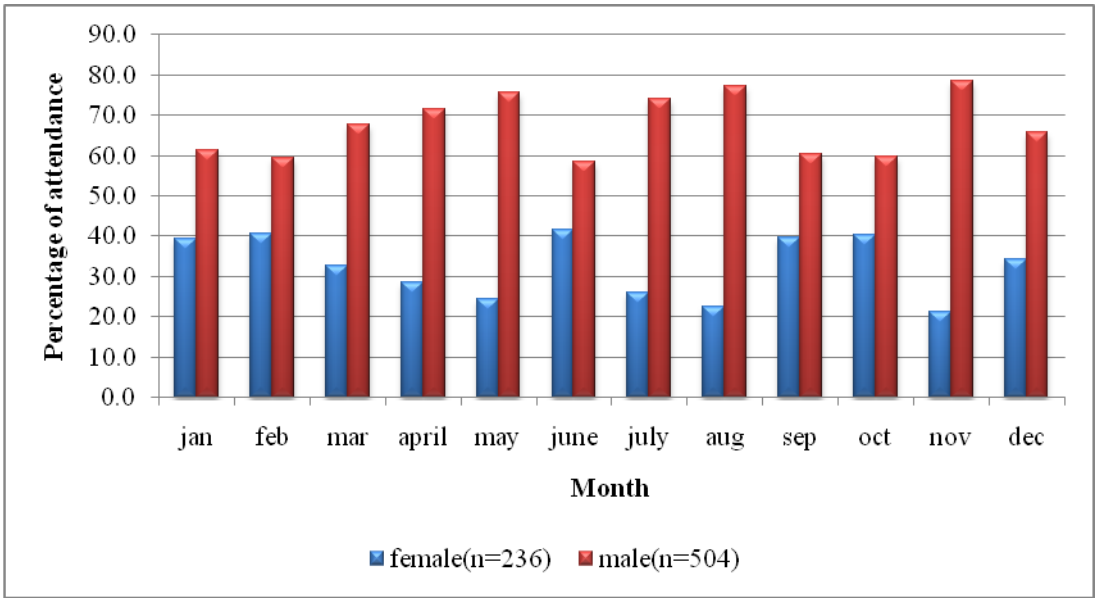
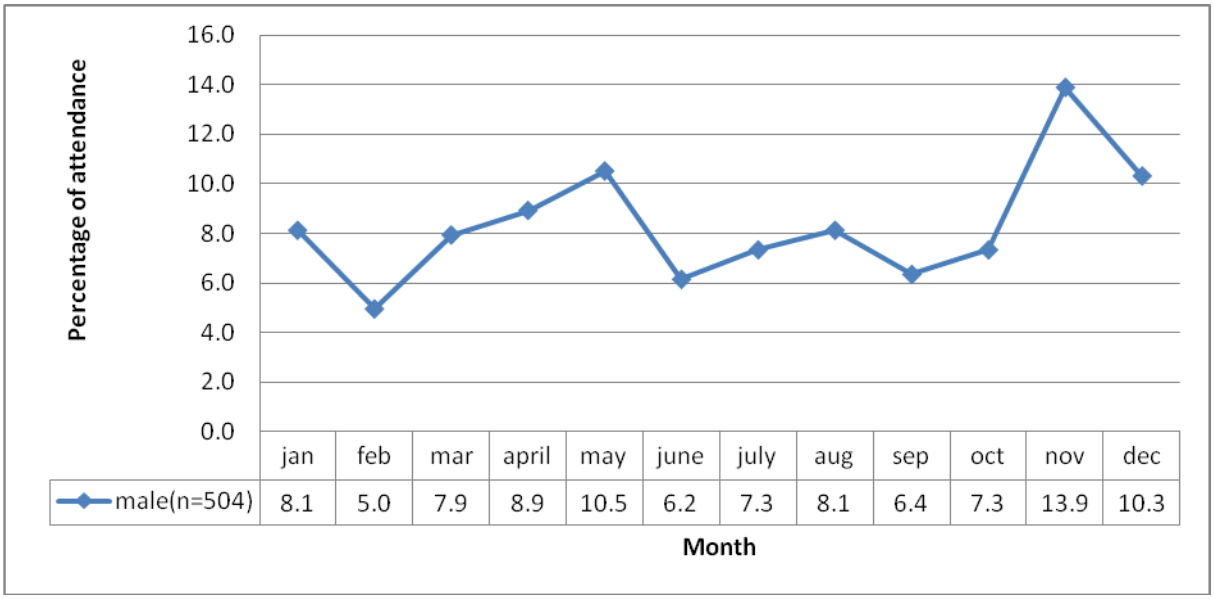


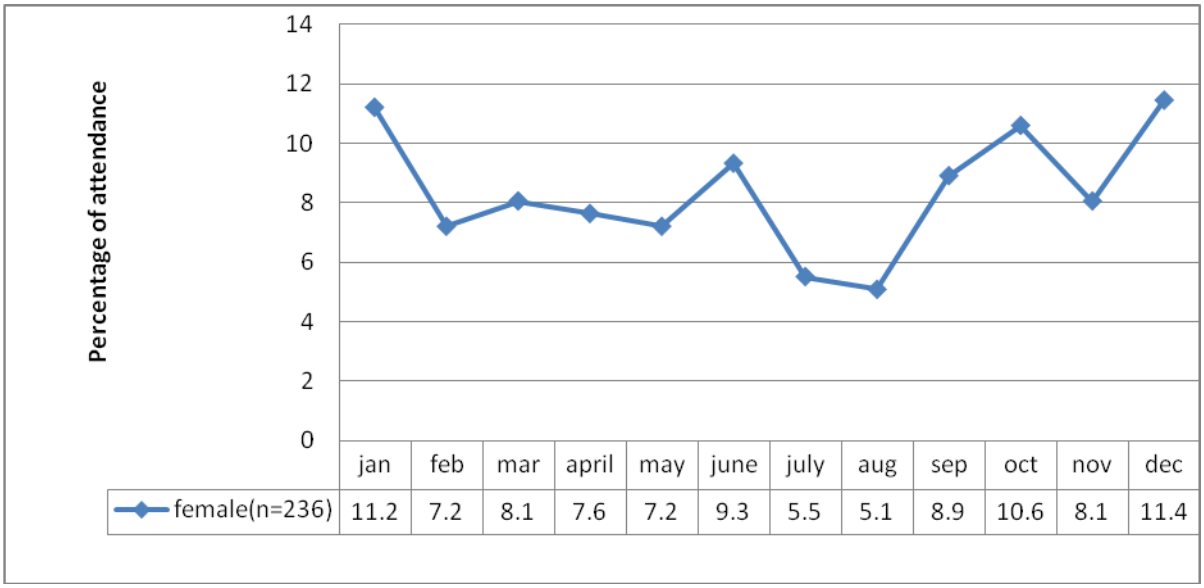
Figure 9: Proportion of male and female victims of interpersonal violence by month; Leratong Provincial Hospital, 2009 (total N = 740)

Peaks in attendance for the male sub-sample were noted in the months of May (10.5%), November (13.9%) and December (10.3%) (Figure10). Peaks in attendance for the female study population were noted for the months of January (11.2%), October (10.6%) and December (Figure11).



	jan	feb	mar	april	may	june	july	aug	sep	oct	nov	dec
male(n=504)	8.1	5.0	7.9	8.9	10.5	6.2	7.3	8.1	6.4	7.3	13.9	10.3

Figure 10: Trend in hospital attendance due to interpersonal violence, by month, in the male study population; Leratong Provincial Hospital, 2009 (N = 504)



	jan	feb	mar	april	may	june	july	aug	sep	oct	nov	dec
female(n=236)	11.2	7.2	8.1	7.6	7.2	9.3	5.5	5.1	8.9	10.6	8.1	11.4

Figure 11: Trend in hospital attendance due to interpersonal violence, by month, in the female study population; Leratong Provincial Hospital, 2009 (N= 236)

3.3.4 Trend in interpersonal violence according to time of day

Of the 740 files selected, 7 did not have the time of attendance stated, thus only information from 733 files were analysed. A significant difference (p value < 0.01) was noted on analysing the data according to the time of the day when the hospital attendance took place. An uneven increase in attendance was noted from 08h00, with a peak in attendance at 10h00 (Figure 12).

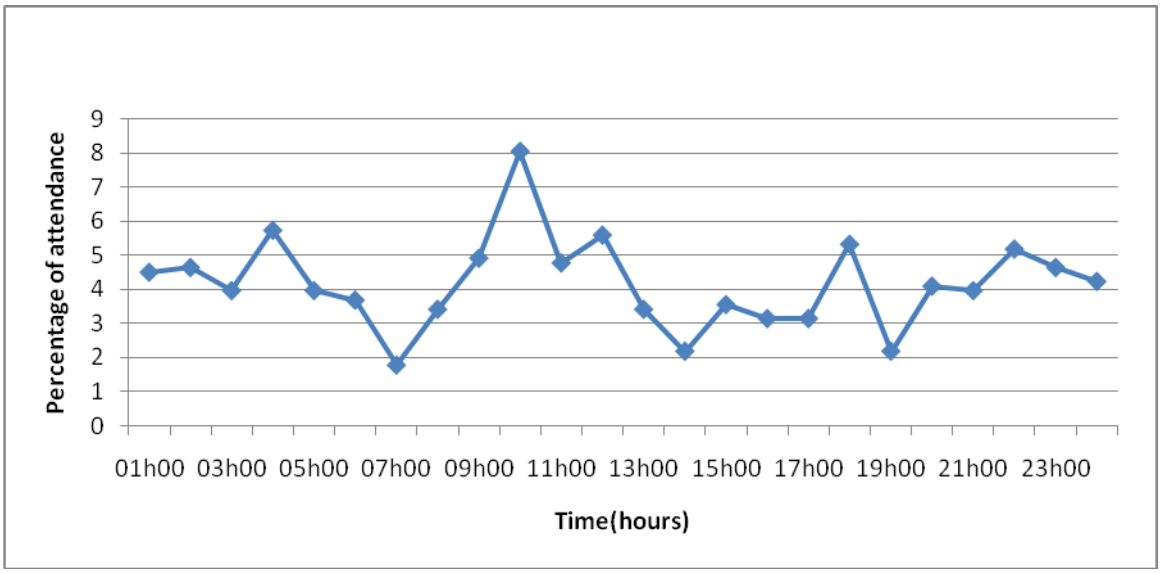


Figure 12: Trend in hospital attendance due to interpersonal violence over 24 hours; Leratong Provincial Hospital, 2009 (N=733)

For a more detailed analysis, time periods were divided into three intervals: 08h01-16h00; 16h01-00h00; 00h01-08h00. On further analysis of the data according to these three time intervals, it was noted that the peak time for victims of assault to attend the hospital was between 08h01 and 16h00 (263); however, the number of patients was similar for the other two time periods of 16h01 to 00h00 (232) and 00h00 to 08h00 (238). See Figure 13.

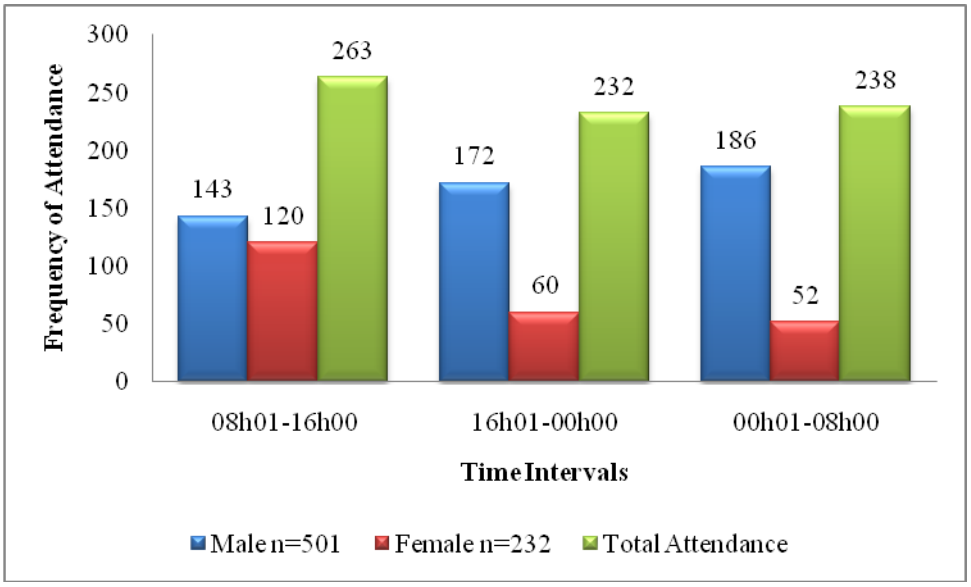


Figure 13: Trend in hospital attendance due to interpersonal violence by time interval; Leratong Provincial Hospital, 2009 (N=733)

In terms of gender, attendance by female victims was predominant between 08h01 and16h00, a total of 120 female victims, compared to the rest of the day (Figure 13, 14). When the data was analysed for male victims according to time of day, a peak in attendance after 16h00 was noted, with a total of 358 male victims (Figures 13, 14 & Table 3).

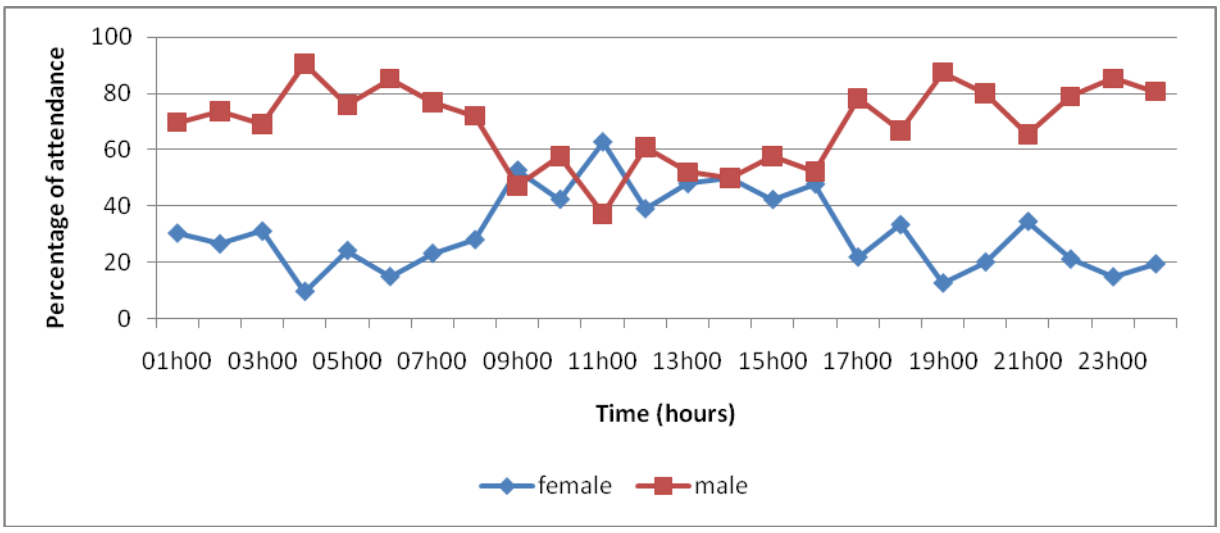
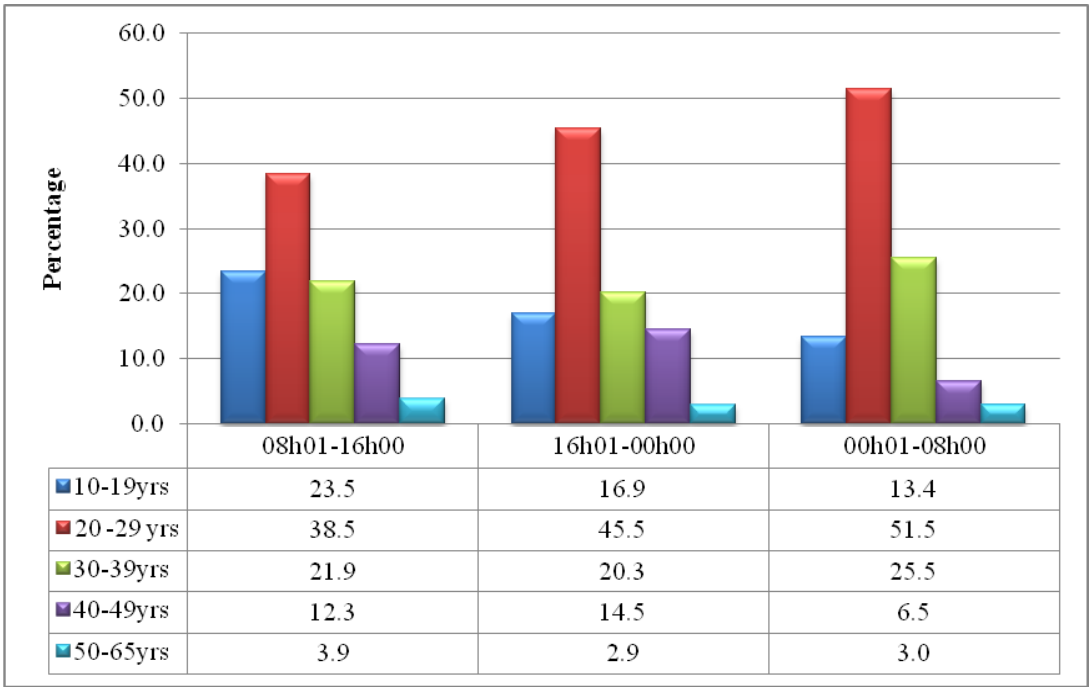


Figure 14: Trend in hospital attendance due to interpersonal violence over 24 hour period in relation to gender of victim; Leratong Provincial Hospital, 2009 (total N=733)

Table 3: Distribution of injuries sustained in relation to time; Leratong Provincial Hospital, 2009

Time period	Male n=501	Female n=232	Total Attendance
08h01-16h00	143	120	263
16h01-00h00	172	60	232
00h01-08h00	186	52	238
	501	232	733

With regard to age group, hospital attendance of victims in the age group 20-29 years was consistently the highest of all age groups during the 24-hour period, while the age group 50-65 years consistently had the lowest attendance. There was a peak in attendance (51.5%) for the 20-29 year-old group after midnight (Figure 15).



	08h01-16h00	16h01-00h00	00h01-08h00
10-19yrs	23.5	16.9	13.4
20-29 yrs	38.5	45.5	51.5
30-39yrs	21.9	20.3	25.5
40-49yrs	12.3	14.5	6.5
50-65yrs	3.9	2.9	3.0

Figure 15: Distribution of age groups in relation to time; Leratong Hospital, 2009 (N = 733)

3.3.5 Summary

For the total sample (N=733), the greatest percentage of hospital attendance by victims of interpersonal violence was seen on Saturday and Sunday. This is accounted for by the fact that there were more males than females in the sample (501 males and 232 females), and most male victims of interpersonal violence attended hospital over Saturday or Sunday. In contrast, most female victims of interpersonal violence attended hospital on Monday and Friday.

A high proportion of interpersonal violence injuries were noted in the last week of each month. Peaks in overall attendance of the study population occurred in the months of May, November and December.

Victims of interpersonal violence attended the hospital in roughly equivalent numbers throughout each 24-hour period (with 33.5% attending between 08h01 and 16h00, 33% between 16h01 and 00h00, and 31.5% between 00h01 and 08h00). Attendance by female victims was predominant during 08h01 and 16h00, while male victims showed an increase in attendance after 16h00. The attendance of victims in the age group 20-29 years was consistently the highest of all age cohorts during the 24-hour period, with a peak in attendance after midnight.

3.4 TRENDS IN INJURIES

3.4.1 Type of injury

A total of 740 files were analysed for trends associated with type of injury. The analysis yielded the following results (see Table 4 below):

- blunt injures were the most frequently occurring injuries due to interpersonal violence, accounting for 44.5% of the total injuries
- penetrating injuries were prevalent in 34.5% cases
- only 3.2 % of all injuries were due to gunshot
- victims of sexual assault comprised 14.5% of the total sample
- sjambok injuries accounted for 1.9% of the total injuries
- burn injuries constituted 0.1% of the total

- dentition injuries and injuries that could not be otherwise categorised accounted for 1.4% of the total injuries.

Table 4: Prevalence of injuries due to interpersonal violence at Leratong Hospital, 2009 (N= 740)

Type of Injury	Frequency	Percentage
1 (penetrating)	255	34.5
2 (blunt)	329	44.5
3 (gunshot)	24	3.2
4 (sjambok)	14	1.9
5 (sexual assault)	107	14.5
6 (burns)	1	0.1
7 (other)	10	1.4
Total	740	>100.00 (Total >100% due to rounding off)

Due to the small number of gunshot and sjambok injuries, these were combined with 'penetrating injuries' and 'blunt injuries' respectively for further analysis.

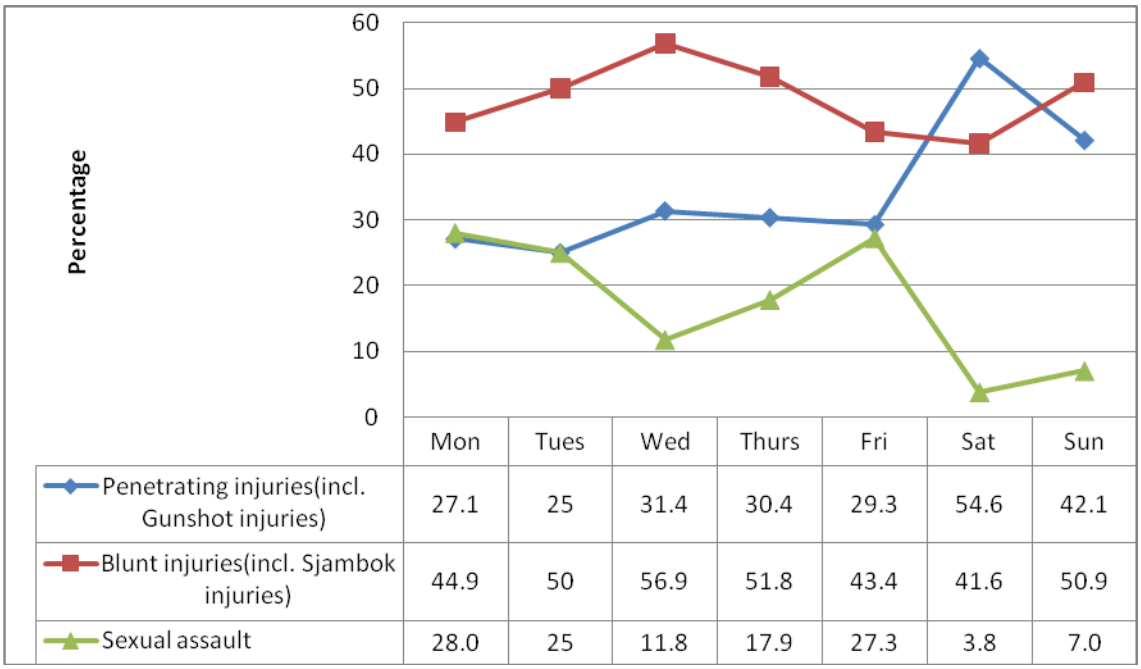
The relationship between type of injury sustained and gender of victim was found to be statistically significant (p value < 0.01). Penetrating injuries (including gunshot) showed a male predominance (89.2%), while sexual assault showed a female predominance (100%) (see Table 5 below). When sexual assault was excluded, females were found to be more affected by blunt injuries (28.6%) than penetrating injuries (10.8%).

Table 5: Nature of injuries due to interpersonal violence in relation to patient gender; Leratong Provincial Hospital, 2009 (N=729; 11 cases were omitted: 10 dentition/other injuries and 1 burn injury)

Type of Injury	Male	Female	Total
Penetrating Injuries (incl. gunshot)	249	30	279
Blunt injuries (incl. sjambok)	245	98	343
Sexual Assault	0	107	107
Total	494	235	729

3.4.2 Injury trend in relation to the day of the week

A statistically significant result (p value < 0.01) was noted in the analysis of injuries by day of the week at Leratong Provincial Hospital. The number of blunt injuries peaked on Wednesdays (51.8%), while penetrating injuries peaked on Saturdays (54.6%). Sexual assault injuries peaked on Mondays (28%) and Fridays (27.3%) (see Figure 16).



	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Penetrating injuries(incl. Gunshot injuries)	27.1	25	31.4	30.4	29.3	54.6	42.1
Blunt injuries(incl. Sjambok injuries)	44.9	50	56.9	51.8	43.4	41.6	50.9
Sexual assault	28.0	25	11.8	17.9	27.3	3.8	7.0

Figure 16: Distribution of injuries due to interpersonal violence by day of the week; Leratong Provincial Hospital, 2009

3.4.3 Injury trend in relation to the weeks of the month

The pattern of injury type sustained in different weeks of the month was analysed, and no statistically significant results emerged (p value = 0.492). The most common type of injury for all four weeks of the month was blunt injury, followed by penetrating injury and then sexual assault. A slightly rise in blunt injuries was noted during the second week, but this increase was not statistically different from the number of injuries sustained in the other three weeks (Figure 17).

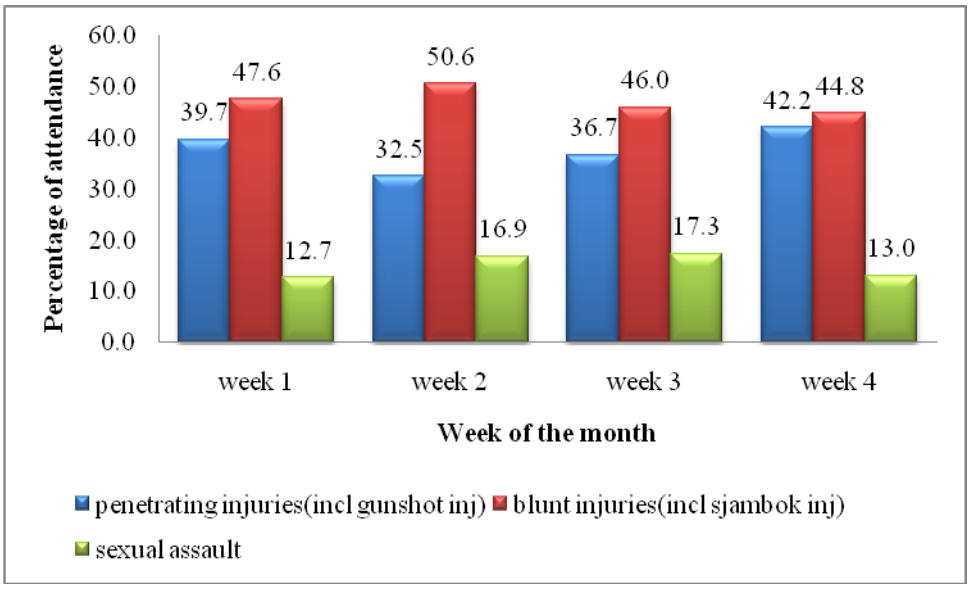


Figure 17: Distribution of the different types of injuries in relation to the weeks in a month; Leratong Provincial Hospital, 2009

When analysing the prevalence of the different injuries separately, penetrating injuries showed a slight peak in the fourth week, blunt injuries showed a peak in the second week, and sexual assault peaked during the second and third week (Figure 18). However, it must again be noted that these differences do not imply statistically significance and may rather merely indicate a transient trend.

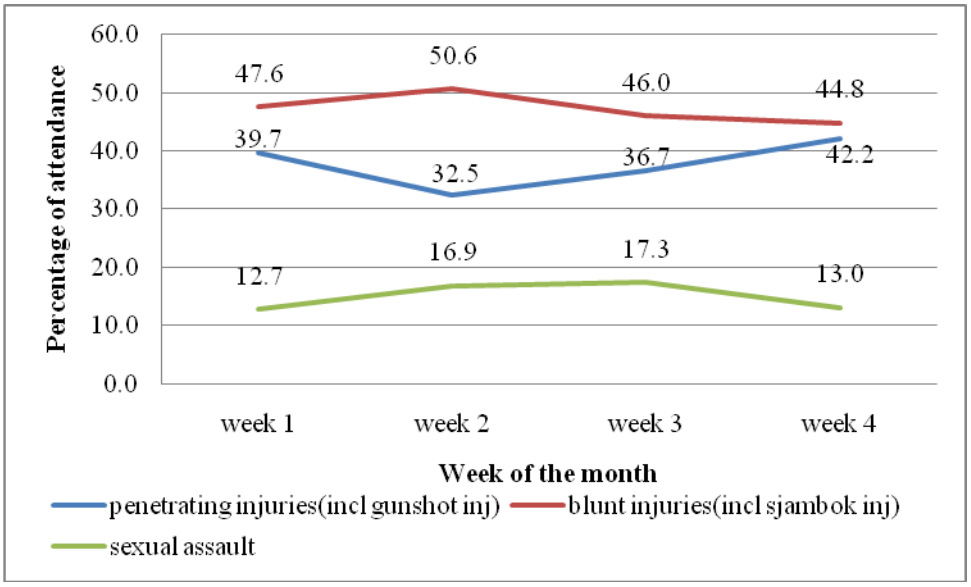


Figure 18: Prevalence of injuries in relation to the weeks in a month; Leratong Provincial Hospital, 2009

3.4.4 Injury trend in relation to month

A significant difference (p value =0.017) was seen on analysis of the trend of injuries over the year-long 2009 period at Leratong Provincial Hospital (Figure 19). Peaks in penetrating injuries were noted over May (51.5%) and November (51.1%), while blunt injuries peaked in February (57.1%) and October (59%). An increase in sexual assaults was noted in February (23.8%) and March (21.1%) in proportion to other injuries occurring during the month. The entire sample was used for this analysis (victims aged 10 to 65 years). (See figure 19 below).

When analysing the actual figures it can be seen that victims with sexual assault presented predominantly during December (12), March (12), January (10), February (10) and October (10). (see Table 6)

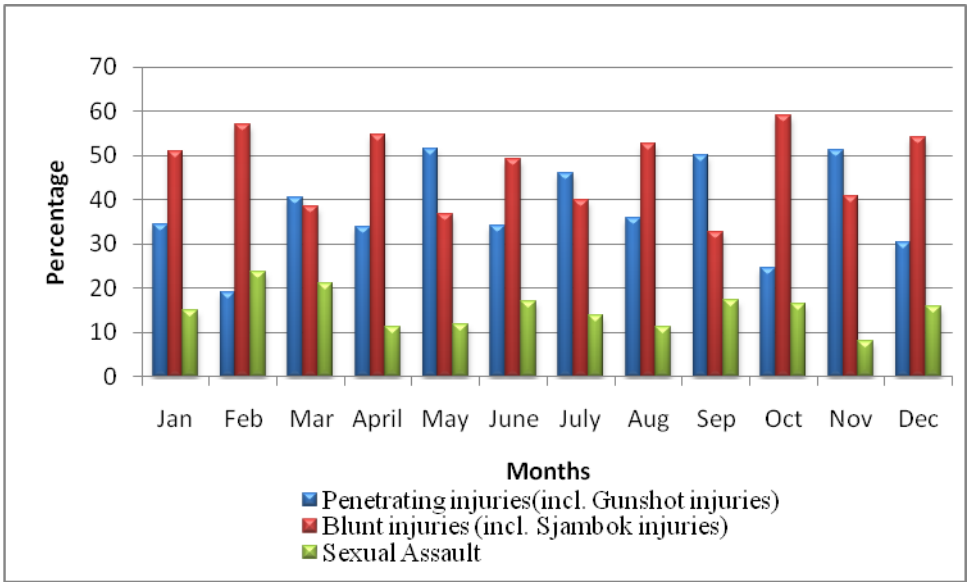


Figure 19: Proportion of injuries by month due to interpersonal violence; Leratong Provincial Hospital, 2009

Table 6: Frequency of injuries occurring by month due to interpersonal violence; Leratong Provincial Hospital, 2009

	Penetrating injuries(incl. Gunshot injuries)	Blunt injuries (incl. Sjambok injuries)	Sexual Assault	Total
Jan	23	34	10	67
Feb	8	24	10	42
Mar	23	22	12	57
April	21	34	7	62
May	35	25	8	68
June	18	26	9	53
July	23	20	7	50
Aug	19	28	6	53
Sep	26	17	9	52
Oct	15	36	10	61
Nov	45	36	7	88
Dec	23	41	12	76
	279	343	107	729

3.4.5 Injury trend in relation to time of day

On analysis of data pertaining to the types of injuries of victims of interpersonal violence and their time of presentation at the hospital, a significant difference (p value < 0.01) was noted.

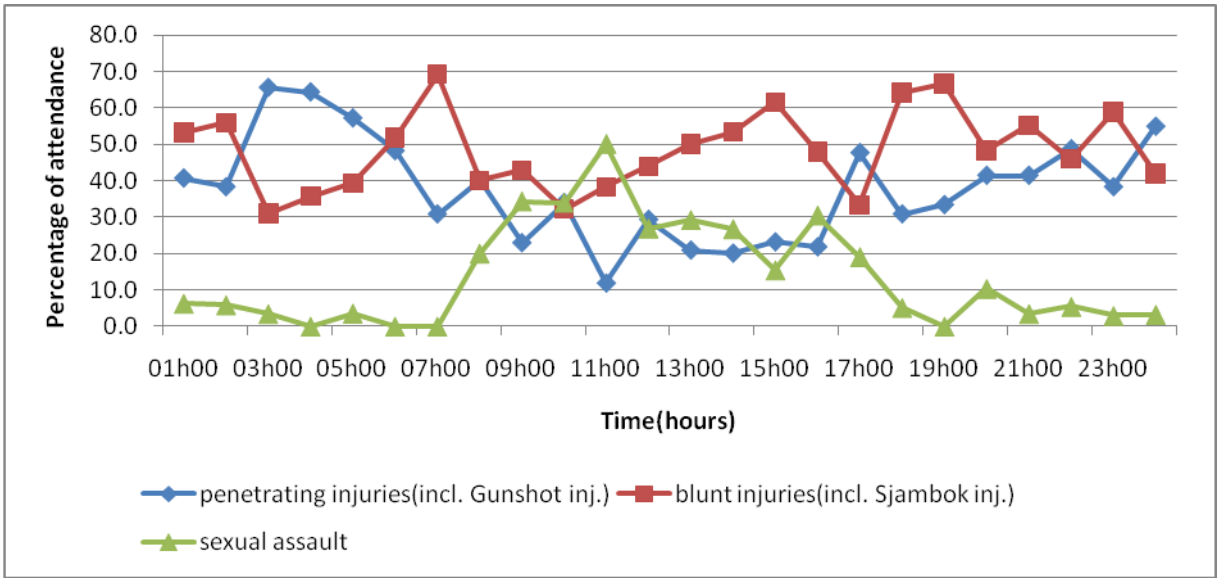


Figure 20: Trend in injuries due to interpersonal violence over 24 hours; Leratong Provincial Hospital, 2009

Penetrating injuries peaked between 03h00 and 05h00 and gradually declined during the rest of the day until 17h00, from which time there was an increase in attendance until midnight. Blunt injury cases peaked at 07h00 and 18h00 to 19h00 and were at their lowest at 03h00, 10h00 and 17h00. Victims of sexual assault most often presented at hospital at 11h00, and to a lesser extent between 09h00 and 10h00 and again at 16h00. (See Figure 20 above).

For further analysis, the time of day was divided into the following intervals: 08h01-16h00; 16h01-00h00; and 00h01-08h00. This yielded the following results (see Figure 21):

- penetrating injury cases increased in occurrence after 16h01, with a peak between 00h01and 08h00 (50.7%)
- blunt injury cases increased in occurrence from 16h01 to midnight (52.7%)
- sexual assault cases showed an increase during normal working hours 08h01 to 16h00 (32%), with a decline after 16h01.

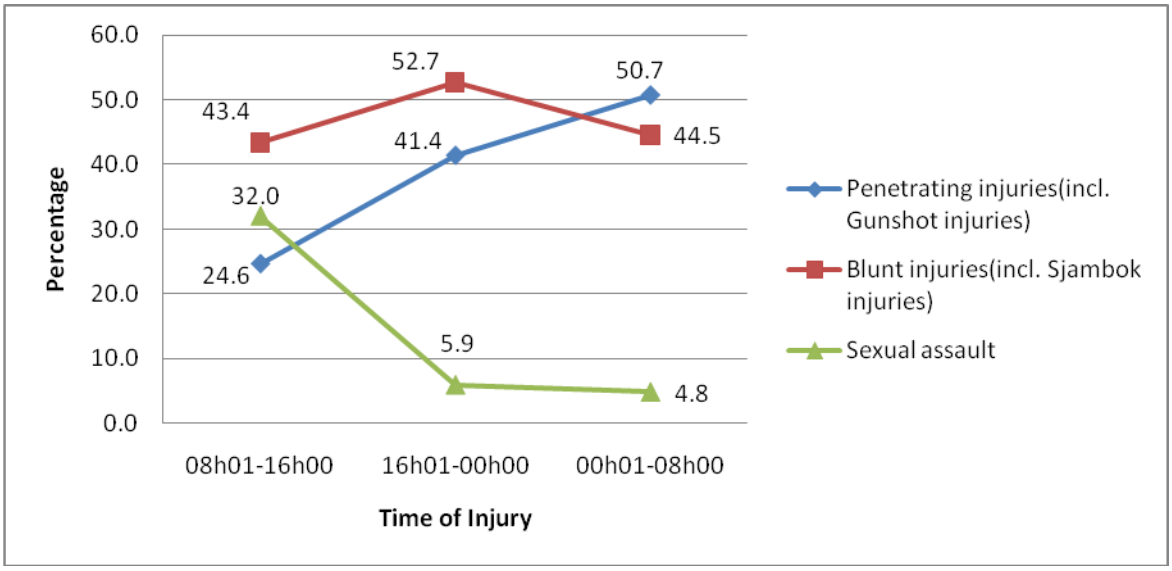
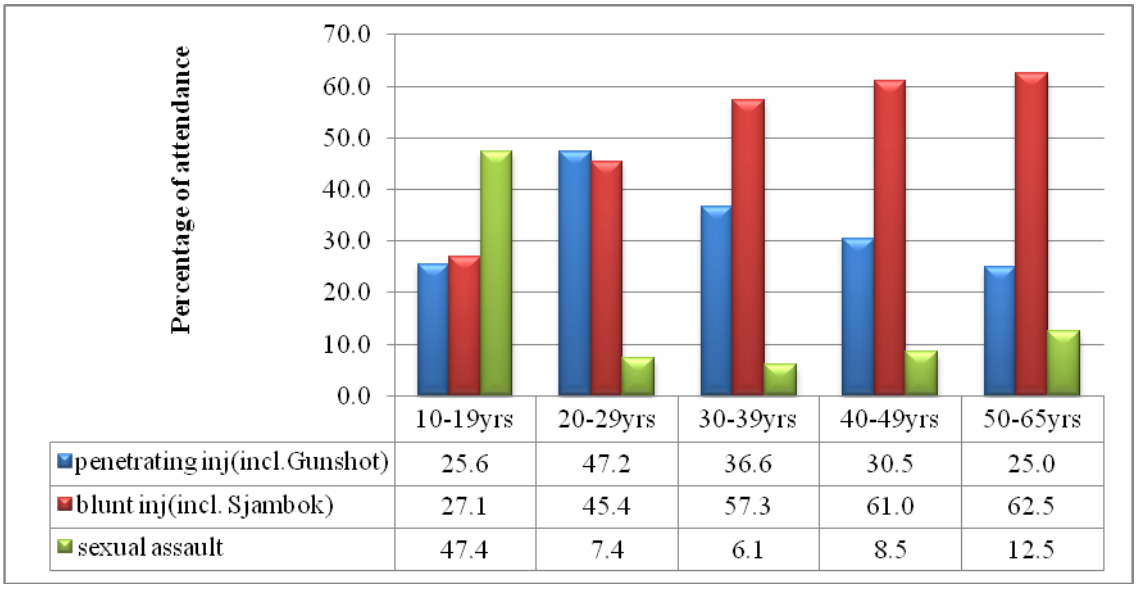


Figure 21: Proportion of injuries due to interpersonal violence in relation to time of day; Leratong Provincial Hospital, 2009

3.4.6 Injuries and age groups

When analysing the types of injuries sustained in relation to the age groups, a significant difference (p value < 0.01) was found. Sexual assault was the most common type of injury in the age group 10-19 years. Blunt injuries were the most common type of injury for victims aged between 30 and 65, with a gradual increase being noted as age increased. There was a corresponding gradual decline in penetrating injuries during the same ages (30 to 65 years). The age group 20-29 years was slightly more affected by penetrating injuries than by blunt injuries (Figure 22).



	10-19yrs	20-29yrs	30-39yrs	40-49yrs	50-65yrs
penetrating inj(incl.Gunshot)	25.6	47.2	36.6	30.5	25.0
blunt inj(incl. Sjambok)	27.1	45.4	57.3	61.0	62.5
sexual assault	47.4	7.4	6.1	8.5	12.5

Figure 22: Proportion of injuries in relation to age groups; Leratong Provincial Hospital, 2009

3.4.7 Summary

Blunt injuries were the most frequently occurring injuries due to interpersonal violence in the study population. Penetrating injuries including gunshot injuries showed a male predominance and sexual assault a female predominance. With the exclusion of sexual assault, female victims were seen to be more affected by blunt injuries.

Blunt injuries showed a peak in occurrence on Wednesdays, penetrating injuries showed a peak on Saturdays and sexual assault showed peaks on Monday and Friday. Blunt injuries showed predominance in all four weeks of the month, with a slight peak in the second week. Penetrating injuries showed a peak during the fourth week of the month, while sexual assault showed a peak during the second and third weeks of the month.

Peaks in the occurrence of penetrating injuries were noted over May and November, while blunt injuries peaked in February and October. An increase in sexual assault was noted over the month of February in the study population. With regard to time of the day, cases of penetrating injury showed an increase after 16h01 with a peak between 00h01 and 08h00. Sexual assault cases were at their highest during normal working hours (08h01-16h00) with a decline after 16h00. Blunt injuries showed a peak between 16h01 and midnight.

Sexual assault was prevalent in the age group 10-19 yrs, while blunt injuries gradually increased between the ages 30 and 65 with a corresponding decline in penetrating injuries. The age group 20-29 years was noted to be affected predominantly by penetrating injuries, with blunt injuries being a close second.

3.5 CONTRIBUTORY FACTORS

3.5.1 Weapons

From the total 740 files, information from 633 files was analysed; the 107 cases of sexual assault were excluded as no information on weapons was recorded for them. For the sample of 633, it was found that:

- 11.4% of the injuries were attributed to blunt objects
- 10.7% were due to bottle / glass
- 8.2% were caused by knives
- More injuries were caused by the use of body parts (7.4%) than by firearms (3.8%).

Unfortunately, in 53.9% of the cases the type of weapon was unknown, with a further 4.6% falling under the weapon category of 'other'. See Figure 23 below.

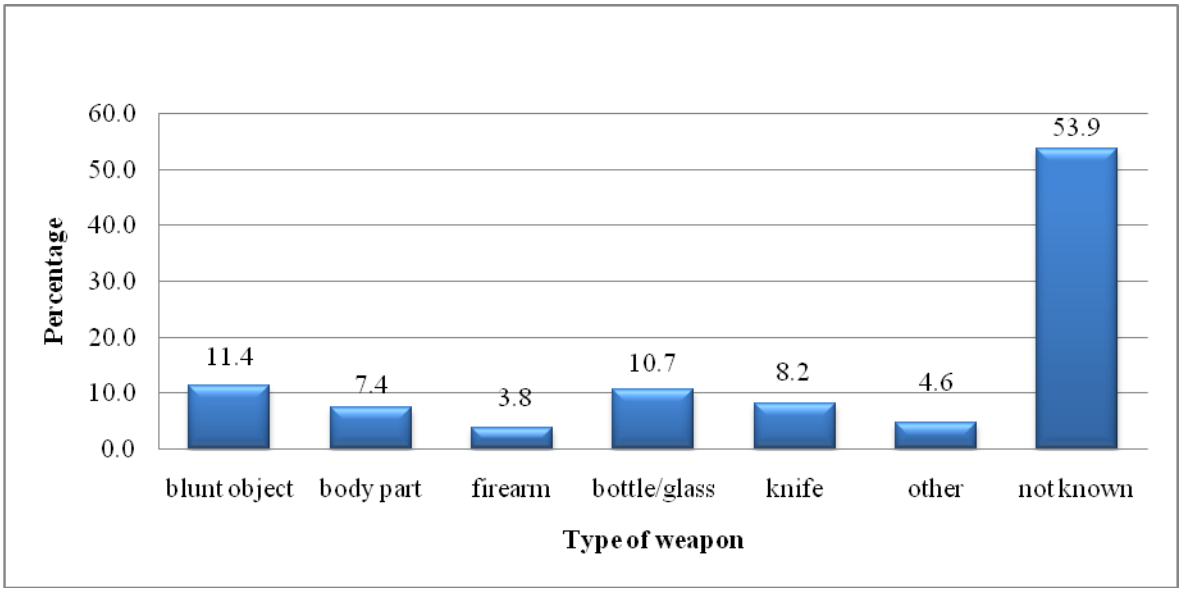
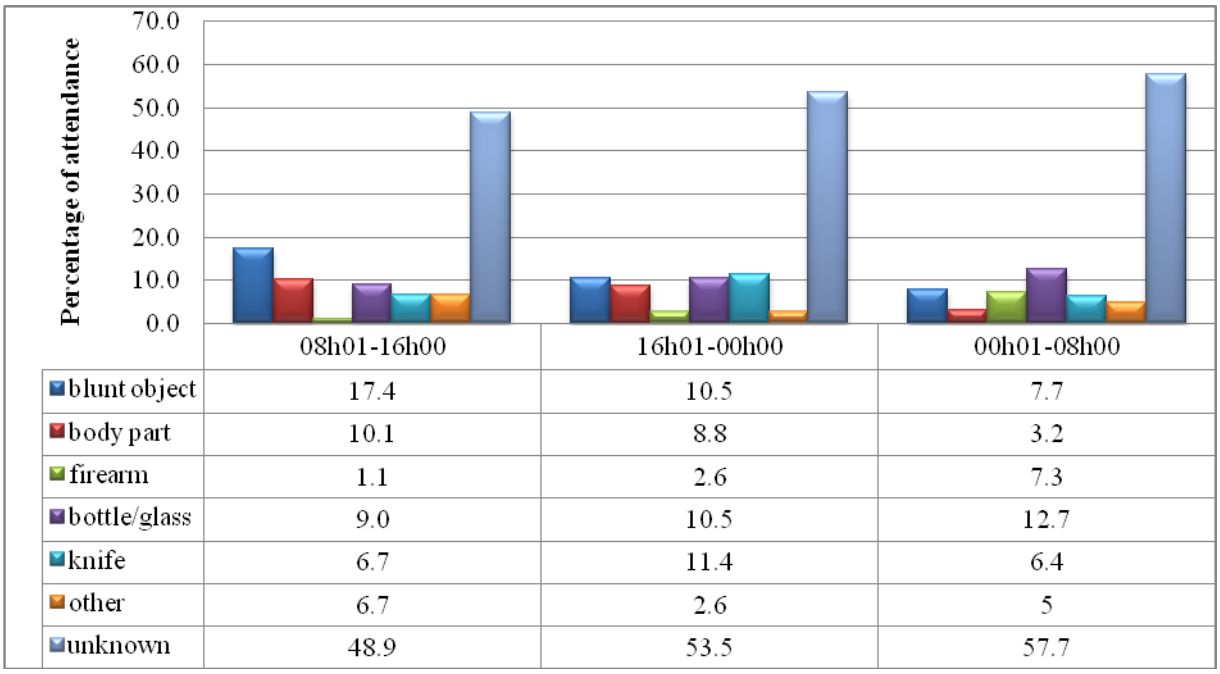


Figure 23: Distribution of injuries in relation to weapon; Leratong Provincial Hospital, 2009 (N = 633)

A significant difference (p value < 0.01) was found on analysis of time and weapon. Of the weapons that were known, the following findings emerged (see Figure 24 below):

- blunt objects caused 17.4% of the injuries during 08h01 to16h00
- injuries occurring between 16h01 and midnight were quite often caused by knives (11.4%)
- injuries due to bottles / glass were often seen after midnight (12.7%)



	08h01-16h00	16h01-00h00	00h01-08h00
blunt object	17.4	10.5	7.7
body part	10.1	8.8	3.2
firearm	1.1	2.6	7.3
bottle/glass	9.0	10.5	12.7
knife	6.7	11.4	6.4
other	6.7	2.6	5
unknown	48.9	53.5	57.7

Figure 24: Distribution of injuries due to various weapons in relation to time of presentation at Leratong Provincial Hospital, 2009 (N = 633)

On further analysis of weapons in relation to time, injuries sustained due to knives showed a peak at 19h00, with high numbers of cases also presenting at 21h00 and to a lesser extent at 22h00 and 03h00. Injuries sustained due to the use of bottles / glass showed a gradual increase between 04h00 and 08h00, but peaked at midnight. Firearm-related injuries showed a peak at 04h00 (Figure 25).

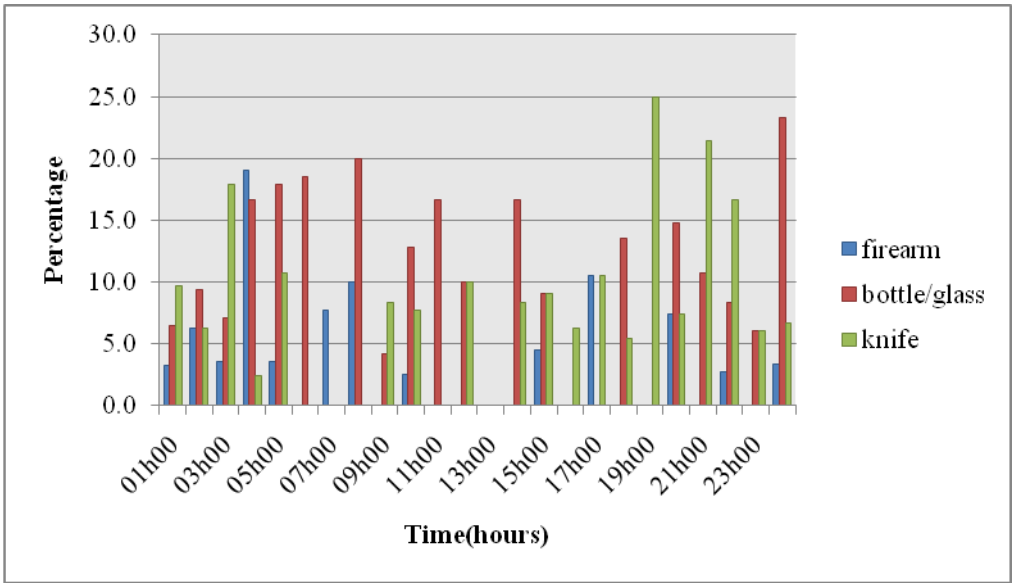


Figure 25: Distribution of injuries due to firearms, bottles / glass and knives in relation to time at Leratong Provincial Hospital, 2009 (N=633)

Cases presenting with injuries due to blunt objects were most frequent between 13h00 and 16h00, with the peak occurring at 16h00. Injuries due to the use of the perpetrator's body parts (e.g. feet and hands) peaked at 09h00 and again at 18h00 (see Figure 26).

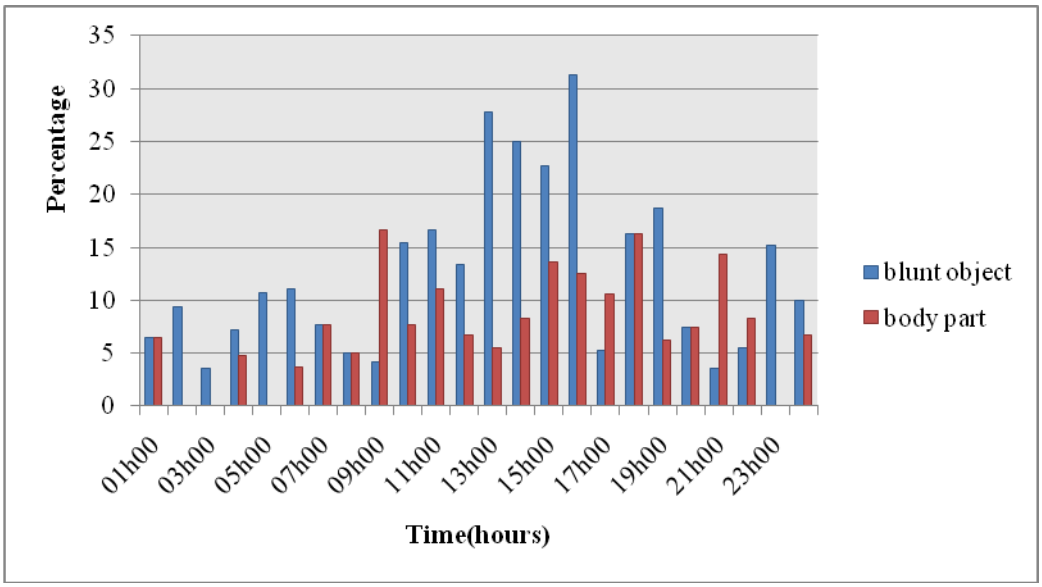


Figure 26: Distribution of injuries due to blunt objects and body parts in relation to time at Leratong Provincial Hospital, 2009 (N=633)

3.5.2 Alcohol

Sexual abuse cases were excluded for this stage of analysis because none of their files included any information about alcohol use. Thus, only 633 files were analysed, although the majority of these files also did not state whether alcohol had been present or not. Nonetheless, the analyses of the data regarding alcohol use in relation to time of day and month of the year yielded statistically significant results.

A significant difference (p value < 0.01) was noted in relation to the presence of alcohol according to time of day. Although the majority of files did not state whether alcohol was present or not, for the cases where alcohol use was reported there was an increase in hospital attendance between 00h00 (midnight) and 08h00 compared to other time intervals (see Figures 27)

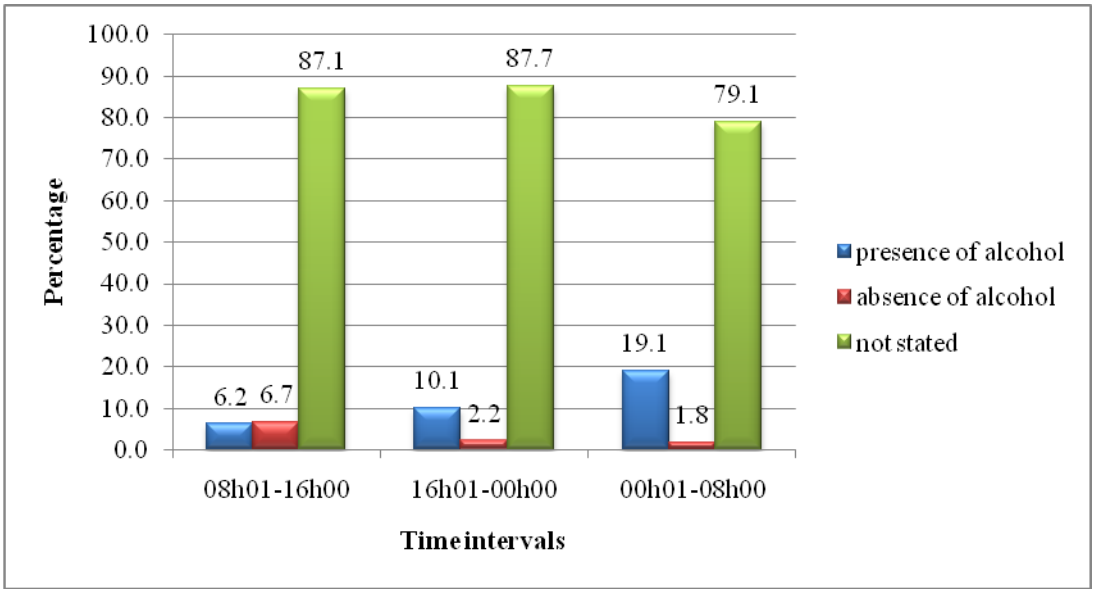


Figure 27: Relation between alcohol use and time of attendance at Leratong Provincial Hospital, 2009 (N=633)

Unfortunately, the above statistics only provide evidence of the inconsistency and inadequacy of hospital records. Due to the very large number of cases in which it was not stated whether alcohol had been used or not, no inferences can be made about the actual trends of alcohol use in the community prior to or during interpersonal violence. The statistically significant difference that was found on analysing this particular dataset only shows that the hospital staff's record-taking about alcohol use differed significantly from one month to the next; it appears that the record-taking system was particularly haphazard and unreliable in this area.

3.5.3 Summary

At Leratong Provincial Hospital in 2009, blunt objects were found to cause most of the injuries seen between 08h01 and 16h00; knives caused most of the injuries seen between 16h01 and midnight, and bottles / broken glass caused most of the injuries seen between midnight and 08h00. The presence of alcohol was noted predominantly between midnight and 08h00. Inadequate hospital records about whether or not alcohol had been used prevented further meaningful analysis of the data with regard to alcohol use and interpersonal violence.

CHAPTER FOUR

Discussion and recommendations

4.1 INTRODUCTION

The results described in the previous chapter suggest that there were several trends in injuries resulting from interpersonal violence, which were seen at Leratong Provincial Hospital during 2009. These trends are discussed in the following sections.

4.2 TIME-RELATED TRENDS

4.2.1 Months of the year

This study has demonstrated that interpersonal violence is a major healthcare issue at Leratong Provincial Hospital. As shown in section 3.3.3, hospital attendance due to interpersonal violence was consistent throughout the year, with an increase over the months of November and December. This finding is in keeping with results from the United Kingdom where an increase in attendance was noted over holiday periods.[16] In Nigeria studies also showed an increase in violence-related injuries over festive period. A possible explanation for the increase in hospital attendance due to interpersonal violence during holidays is that festivities and holidays involve greater social interaction and usually increased alcohol consumption.

On further analysis of the results, hospital attendance by males with injuries arising from interpersonal violence was noted to increase during the months of May (10.5%), November (13.9%) and December (10.3%). For females, the greatest attendance took place during the months of January (11.2%), October (10.6%) and December (11.4%).

When comparing these findings to those of other South African studies, a similarity is noted in the increased attendance for males in May. Studies at a Johannesburg trauma unit

conducted during mid-winter also showed a male predominance in patients with injuries due to interpersonal violence.[33] The statistics from the annual report on fatal injuries in Gauteng, based on the National Injury Mortality Surveillance System (NIMSS) for 2009, show a similar increase in mortality over the month of December (9.1%), although August had the highest mortality due to violence, at 9.3%.[34] The increase in both male and female hospital attendance during December can be attributed to the holiday period with its increased social interaction. The results also show an increase in blunt injuries during December, with a comparatively greater female attendance during this month.

In February, there were more cases of sexual assault relative to blunt or penetrating injuries (see section 3.4.4). It must be noted that this is a proportional statement only, and does not necessarily imply that more cases of sexual assault actually took place in February than in any other month. February was the month in which the lowest number of penetrating injuries was recorded at the hospital, which would automatically increase the proportion of both sexual assault and blunt injury cases relative to the total number of violence-related cases. In addition, hospital attendance by female victims was substantially lower in February than during the December to January period (section 3.3.3; Figure 11). It has already been shown that all victims of sexual assault were female in the current sample (section 3.2.1). Thus, there were *fewer* sexual assaults in February than in the months of December and March, despite the fact that proportionally more of the February cases were sexual assault. (Section 3.4.4 Figure 20, Table 6)

The increase in sexual assault over the month of February is indeed difficult to explain. February is a late summer month and it is the shortest calendar month in the year. It can be hypothesized that this factor (and perhaps others not identified here) may contribute to a change in the monthly patterns for the most common type of injury resulting from interpersonal violence; these avenues of explanation would require further investigation. October was another peak month for females to attend hospital, though once again it is not clear whether most of their injuries were associated with sexual or other assault.

Penetrating injuries were predominant at Leratong Provincial Hospital in the month of November in the male population (section 3.4.1). Male victims, according to the literature on interpersonal violence, are prone to individual violence notably in public places, and the use

of weapons is notable in youth violence. The link between these factors and the month of November, which is often a hot summer month, would require further investigation.

4.2.2 Days of the week

The current study found that there was an increase in hospital attendance for victims of interpersonal violence over the weekend period compared to weekdays. This finding is consistent with the results of studies done in the United Kingdom.[16] The greater social contact over weekends could once again be a possible reason for the increased number of interpersonal violence cases presenting over this period. In addition, this trend may be partly attributed to violence-related injuries sustained during criminal activity. The South African Police Annual Report shows that there is an increase in street robberies over Fridays and Saturdays.[61] Because of the association between crime and violence in South Africa, it is highly likely that the study population includes a sector of the community that has been exposed to crime, possibly robberies, and who then present to the emergency department due to injuries sustained during the incident. Crime statistics in this area cannot be substantiated, as the data is not known. It can be hypothesized that this increase could be due to crime rates. However, the collection of crime statistics in this area was not part of the realm of this study and thus further research needs to be done.

As hypothesized, an increase in hospital attendance was noted during the end-of-month period, which correlates with the calendar event of pay day as described in a United Kingdom study.[16] An association between pay dates and violent behavior can thus be made. Other social attitudes of individuals will be further discussed later in this chapter under the topic of contributory factors.

A difference was noted on comparing the occurrence rates of different types of injuries, with blunt injuries showing a peak on Wednesday rather than the weekend. In contrast, penetrating injuries were prevalent over the weekend period with a peak on Saturday. A possible explanation for this difference could be the lack of weapon carrying over the weekday period as compared to the weekend; during the week, more injuries are seen which are due to bottles or broken glass and knives (see section 3.4.2). These findings may also be linked to the increase in male hospital attendance over the weekend, since male victims have been shown to sustain a greater percentage of penetrating injuries compared to female victims (see section 3.4.1, Table 3). However, more males than females also sustain blunt injuries. The only type

of injury, which was more often seen in females, was those associated with rape and sexual assault (section 3.4.1).

4.3 GENERAL TRENDS IN INJURIES

4.3.1 Type of injury and weapon

This study identified a trend in the type of injuries inflicted during interpersonal violence, namely a predominance of blunt injury due to blunt weapons. This is similar to the finding of a Ugandan study which identified blunt force as the most common injury mechanism.[36] In the current study, penetrating injuries were found to be caused primarily by bottles or broken glass and knives, in contrast to other studies which showed a predominance of gunshot injuries.[33, 34]

One possible reason for this difference may be the hospital setting. A Level III Trauma Centre in Johannesburg would have a different catchment population, and thus be exposed to a different patient demographic, compared with that of a Level II Provincial Accident and Emergency Department. Leratong Provincial Hospital, which was the context of the current study, is a Level II facility. The emergency medical services often triage injuries of greater severity to large trauma units in Level III hospitals instead of treating them in Level II emergency departments. This could be a possible reason for the difference in the findings.

Another possible explanation for the reduced number in firearm-related injuries at Leratong Hospital could be the Firearms Control Act, which was passed in 2000 and was effective from 2004. This act has placed stricter legislation on firearm ownership. The current study used data from 2009, thus the Firearms Control Act was already in force.

Another factor to consider as a possible explanation of the difference in findings is that the current study focused on the trend of interpersonal violence; thus, a broad scope of injuries was considered. Other studies may have included only or primarily ‘priority 1’ patients. The patient populations under study would therefore be somewhat different.

When comparing the current results to international studies, a difference is noted. Studies conducted in Denmark show similarities in terms of the low number of firearm-related injuries; however, the United States experiences a large percentage of firearm-related injuries.

The low incidence of injuries due to firearms and knives in Denmark may again be explained by legislation regarding the ownership of weapons, which allows for the wearing of firearms and knives in public only with a permit.[19]

Interestingly, injuries due to bottles or broken glass rather than knives resulted in the majority of penetrating injuries in the current study (see section 3.5.1). Similar findings of bottles causing more penetrating injuries than knives have been documented in other studies. [33] The prevalence of bottles or glass used in perpetrating violence-related injuries can be attributed to these objects being used rather opportunistically at the moment of the physical assault.

This study showed that there were 14 incidences of sjambok-related injuries; representing 1.9% of the study population. Although it represents a small percentage of the study population, the figure does show that community violence is a source of interpersonal violence injuries. The use of sjamboks during mob justice is quite notable [54], and the injuries sustained by victims are severe and they often require hospitalization.

Burn injuries in this study accounted for 0.1% of the injuries due to interpersonal violence. The finding of reduced prevalence of interpersonal violence injuries due to burns is similar on comparison was to studies done in the United States.[7] This however differs from findings in studies done in other African countries, where the prevalence of acid burns has been notable in Uganda, Kenya and Nigeria.[22] Possible reasons for the difference in findings could be under reporting of cases, failure to disclose the cause of the burn injury or triaging of patients with burn injuries by emergency medical services to hospitals with burn units thus resulting in the reduced incidence in this study.

4.3.2 Gender of victims

This study has shown that there is a definite difference in types of injuries in the male and female study population. Penetrating injuries were found to be prevalent in the male population; similar findings were noted in studies done at a Johannesburg Trauma unit.[43] The prevalence of blunt injuries in female victims found in the current study correlates with other studies done in South Africa [62] as well as a study done in Denmark.[19]

It has been widely documented that injuries due to interpersonal violence seen in female victims are predominantly due to intimate partner violence. As noted in a study done in the United States, the most common mechanism for intentional injury in the case of intimate partner violence was blunt trauma (38.9%) followed by stab injuries (28.7%) and injuries due to firearms (24.4%). The prevalence of intimate partner violence in the current study population could be a possible explanation for the high number of blunt injuries found in female victims of interpersonal violence.

Firearm-related injuries were not prevalent in the female population of the current study. The use of firearms in domestic assault has been documented in other studies done in South Africa,[50] where it has been shown that 25% of women report having been threatened by intimate partners with a firearm. It should be acknowledged that intimate partner violence is a major risk factor for mortality and morbidity in women, and every possible avenue for intervention should be explored.

The emergency department has been recognised as a potential tool for intervention especially in the case of intimate partner violence, as it is usually the first contact with the healthcare system that a female victim of interpersonal violence will have. A study done in Canada found that 44% of women who presented to the emergency department with violence-related injuries were murdered by their intimate partner within the next 2 years. In addition, 93% of women murdered by intimate partners had presented to the emergency department at least once for injuries.[63]

The results of the current study revealed that sexual assault was predominantly sustained by female victims of interpersonal violence. A high number of female victims who attended Leratong Provincial Hospital had been affected by sexual assault, and the entire group of sexual assault cases in the current study was female; no males in the current study had been victims of sexual assault. However, as other studies have indicated, both men and women can be sexually assaulted but women are at greatest risk. A possible reason for the lack of male sexual assault victims in the current study could be the non-disclosure of sexual assault in the male population served by Leratong Hospital. This hypothesis would require further investigation. The following section explores the theme of gender elements with regard to sexual assault and other forms of interpersonal violence in more detail.

4.4 INTERPERSONAL VIOLENCE AND RELATION TO GENDER

One explanation for the female predominance in sexual assault victimisation could be South African culture, whereby women are often viewed as being inferior to men and the use of violence by men is accepted in terms of defining their social roles. Unfortunately, studies done in South Africa have shown that gender inequality is still prevalent in South Africa.[49] In general, sexual violence has been shown to be prevalent in countries where there is greater gender inequality; men use rape as a means of re-enforcing a patriarchal gender hierarchy.[43, 63]

As hypothesized, a male predominance was noted in the current study population, which correlates with findings from other studies. Young males have been described as being the most at risk for interpersonal violence. This study found that 50% of the male sub-sample in the age group 20-29 years was affected by interpersonal violence.

This finding suggests that the male population that Leratong Provincial Hospital serves has the same attitudes towards resolving conflict, as does the rest of South Africa. The prevalence of individual violence in the male population in this study, and the difference in patient gender demographics, can be attributed to the relationship between masculinity and violence. Studies on interpersonal violence have identified that men often use violence as a means of defining social roles. Further exploration of this theme reveals that demonstrations of toughness results in increased risk-taking behaviour and thus men may resort to physical violence in order to maintain a gender hierarchy.[31] Young men in South Africa often use violence as a way of asserting their dominance, and consider violence as an accepted strategy for resolving conflict.[28]

The population that Leratong Provincial Hospital services can be described as being of a low socioeconomic status. This communal dynamic of poverty and inequality further compounds the problem, and is associated with yet more risk of violent behaviour. Material deprivation has been linked with increased family stress and thus contributes to increased violence behaviour during adolescence.[65]

In South Africa, the impact of political and social changes through conflict and repression resulted in increased rates of youth violence during apartheid. One explanation for the male predominance in violence-related injuries is that young men have been shown to be more affected than women by trauma and violence.[66] However, the current study shows that this male predominance is still prevalent even in a non-political (post-apartheid) environment. Such violence may possibly be attributed to broken community structures. With a breakdown in family and community structure, early involvement in violent behaviour is likely to result in injuries due to violence later in life.[67] In the current study, 11% of males aged 10-19 presented at hospital with injuries related to interpersonal violence. The Gauteng fatality rates reveal that the mode of death in 193 youth aged 10-19 years was due to violence.[34]

The mean age of males affected by interpersonal violence in the current study was 28.7 years, and the mean age for females was 26.6 years. A different South African study found that the mean age for females was 28.6 years and for males, the mean age was 29.3 years.[33] This may suggest that the population that Leratong Provincial Hospital serves is exposed to interpersonal violence at a slightly younger age. In the current study almost half of the sample was aged 19-29 years, which is similar to findings noted in a United Kingdom study where 17 in 1 000 patients in the age group 18-30 attended the emergency department with assault-related injuries.[43] This age group has been described as being the most at risk for interpersonal violence, and added to this there is increased risk-taking behaviour in this age group.

In the current study, of the 107 sexual assault cases analysed 100% of the victims were female, with the age group 10-19 years being the most affected.[43] This result correlates with findings from other studies done in South Africa; a study done recently showed that 40% of sexual assault victims were under the age of 18 years.[67] The prevalence of young female victims of sexual assault in the current sample is testament to this very disturbing trend in South Africa. A report by the WHO has shown that up to one third of adolescent girls suffer forced sexual initiation.[3]

Studies have also indicated that nearly 80% of 2.5 million women who were assaulted knew their attacker personally.[63] As shown in several studies, including in other African countries, a significant number of rape cases have been perpetrated by schoolteachers.

The number of sexual assault cases is probably higher than suggested by the current study, as under-reporting of sexual assault is rife.[29] There are various reasons for this. Many females find themselves economically dependent on the perpetrator, and due to their poor socioeconomic status such women find it difficult to report sexual assault.[42] The population that Leratong Provincial Hospital services is predominantly uninsured, which is one indication that the women in this area are of a low socioeconomic group.

4.5 CONTRIBUTORY FACTORS

4.5.1 Alcohol

A large percentage of patients' files did not indicate the presence or absence of alcohol. Various reasons can be postulated for this: fear of legal liability or litigation on the part of doctors working in the emergency department; most patients involved in violence are brought by emergency medical services with no accompanying relative or friend, thus very often collateral history is not available; blood alcohol levels or breath analysis are not routinely tested at Leratong Provincial Hospital.

Nonetheless, the data that was analysed showed an increase in hospital attendance after midnight in victims of interpersonal violence, with associated alcohol intoxication. An increase in penetrating injuries due to bottle / glass is also shown by the data during this period. Thus, an association between alcohol consumption and an increase in penetrating injuries due to bottle / glass can be tentatively established from these results. Although data on alcohol use was widely lacking in this study, it has been well-documented elsewhere that alcohol and illicit drug usage are prominent factors associated with assaults.[69] South Africa has been described as having one of the highest alcohol consumptions in the world per head, for individuals who consume alcohol, and the misuse of alcohol has been linked to intimate partner violence, rape and homicides.[31] The frequent association between alcohol and cocaine usage and violent, aggressive behaviour has been demonstrated in various other studies.[55]

The lack of accountability for acting violently when inebriated as been described as a possible reason for antisocial behaviour. This theme has been explored by social anthropologists and they have suggested that alcohol consumption and violent behaviour are 'socially learnt and

not universal'.[55] Alcohol has been shown to reduce inhibitions, to affect cognitive and physical functioning and to cloud judgement; it leaves individuals incapable of avoiding violent conflicts.[24, 55]

Alcohol is readily available for sale; approximately 80% of drinking taverns in South Africa are illegal.[24] It has been documented that public emergency departments treat a larger proportion of alcohol-related conditions than do private emergency departments, and this may be attributed to differences in demographic composition.[69]

4.5.2 Weapons

This study found that blunt objects such as sticks and metal rods were the most common assault weapons. This trend can be partly attributed to the use of items that are opportunistically found at the scene of the assault and used as weapons. The use of broken bottles as weapons has been highlighted in this study as it has been shown to be more prevalent than knives in causing penetrating injuries. Similar findings were noted in studies conducted in Denmark. Denmark, however, has strict legislation on weapon-carrying and thus has curbed gunshot injuries and knife-related injuries.

A discrepancy is noted when comparing the result for firearm prevalence, which comprised only 3.8% of the known weapons in the current study; firearms were also shown to have caused the least penetrating injuries. This finding differs greatly compared to that obtained from a Johannesburg trauma unit, where firearms were noted to be common weapons used in interpersonal violence-related injuries. The NIMSS studies confirmed that the leading cause of death was firearm injury in major cities like Johannesburg. Possible reasons for this discrepancy were discussed earlier in this study (see sections 1.3.2.3 and 1.3.3.3). However, it can further be postulated that firearm-related injuries decrease away from the inner city due to a relative lack of firearm ownership and illegal firearms, and Leratong Hospital is not situated in an inner city area. This hypothesis would require further investigation.

4.6 LIMITATIONS OF THE STUDY

Various limitations apply to the current study. The severity of injuries was not scored, and although the abbreviated injury scale (coding) has been used in other studies, sensitivity of

this system has not been established in studies with a small sample size. In addition, since no previous studies have been done at Leratong Provincial Hospital, a comparison of data could not be done.

Obtaining specific data is difficult in a hospital setting due to medical staff frequently not asking all the necessary questions, or patients' reluctance to disclose information. This is of particular importance in cases of intimate partner violence and alcohol-related interpersonal violence. Also, due to the great number of patients presenting at Leratong Hospital, it is indeed difficult to obtain a detailed history from each person and thus vital information is often omitted. This situation suggests that an improvement of data collection tools is needed in order to improve data recording.

Another limitation of this study is that the time of the patient's presentation at the emergency department does not represent the actual time that the assault occurred. Most patients living in the community that Leratong Provincial Hospital services are poor, and thus have to wait on the emergency medical services to take them to hospital. Also, as mentioned earlier, patients with minor injuries (i.e. injuries that only require dressing or suturing) may go to the local clinics or a Level I hospital, such as Dr Yusuf Dadoo Hospital, for treatment, and would not be seen at Leratong Provincial Hospital. Patients with severe injuries may be triaged by emergency medical services to a Level III hospital (see section 4.3.1) such as Chris Hani Baragwanath or Helen Joseph Hospitals for treatment. Finally, this study did not include deaths due to interpersonal violence that occurred at the scene of the incident or prior to the victim arriving at hospital.

A methodological limitation encountered in this study was that the criteria used to select patient files included systematic selection, such that only 1 file in every 10 had a chance of being selected. This reduced the randomness of the sample and introduced selection bias. Furthermore, some of the selected files had to be excluded due to insufficient data.

For the above reasons, this study cannot claim to represent with complete accuracy the entire population exposed to interpersonal violence in the geographical area of Leratong Hospital. Furthermore, the findings of this study should not be generalised to any other population or time period. Finally, the study was exploratory and descriptive in nature, which means that while it identified some important trends these cannot be conclusively confirmed, statistically, on the basis of the current data.

Despite its limitations, this study has provided some useful information about the trends and profiles of interpersonal violence injuries in the area that is serviced by Leratong Provincial Hospital. It has made a contribution to the literature on non-fatal injuries due to interpersonal violence in South Africa. Most of the previous studies dealt with victims of interpersonal violence who had complicated and severe injuries, whilst few studies have dealt with small-scale injuries and the injury trend. The current study has attempted to rectify this situation by including a wider range of patients and injuries.

4.7 CONCLUSION AND RECOMMENDATIONS

It can be concluded that interpersonal violence is a cause of a large number of injuries and thus is a contributor to the overburdened health care sector in South Africa. With regard to the trends in interpersonal violence at Leratong Provincial Hospital, the following points have been established:

- Leratong Provincial Hospital experienced a large number of injuries due to interpersonal violence throughout the year of 2009, with an increase in injuries over November and December.
- The majority of injured patients presented at hospital in the last week of the month.
- As found in other studies, Saturday and Sundays experience the most attendances due to interpersonal violence. The greater social interaction during this period is the most likely reason for the increase in incidences of injuries due to interpersonal violence.
- In terms of patient demographics, an overall male predominance was noted.
- Sexual assault victims were overwhelmingly female.

The findings of this study also show that a majority of the patients seeking medical attention for injuries due to interpersonal violence over the weekend were male. This finding correlates with studies done in other African countries and internationally. Young males are at risk for individual violence, and the statistics of this study are consistent with that pattern. Male victims of interpersonal violence were also shown to be subjected to more violent types of injuries (i.e. penetrating injuries) than female victims. These types of injuries were caused predominantly by bottles or broken glass.

The association between the use of alcohol and injuries due to bottles / broken glass has also been noted in this study. It can be deduced that alcohol contributes to antisocial behaviour, especially in males, and this leads to violence. The bottle / glass in which the alcohol is served can thus also become an opportunistic weapon during the assault. Section 3.5.2 discussed the problem of incomplete record taking with regard to the reported use of alcohol prior to incidents of interpersonal violence. Given that this is an area of intense concern in South Africa, it is regrettable that the data about alcohol use was so incomplete. The main finding of the current study was that the patients' hospital files were extremely inconsistent in this regard, with statistically significant differences being found for the *reporting* about alcohol use in various months of the year. No conclusions or investigations could be made about the actual use of alcohol in the community.

Female victims of interpersonal violence were subjected to predominantly blunt injuries and sexual assault. The prevalence of both of these types of injury in female victims suggests that intimate partner violence is prominent. A greater importance should be placed on further investigation of intimate partner violence for the population that Leratong Provincial Hospital services. In order to obtain more accurate statistics, appropriate avenues need to be explored whereby sufficient detail can be obtained to ensure that a follow-up can be made.

Females were clearly more affected by sexual assault, as no male victims were documented for the duration of this study and drawn for the selected randomised sample. This may be a result of male victims failing to report sexual assault due to feelings of 'male pride', or it may be the less likely scenario that there were genuinely no occurrences of male-victim sexual assault during 2009.

The prevalence of sexual assault among young females highlights the need for re-defining the role of South African women, and gender roles in general. This can be possibly achieved by focusing on education with the aim of changing adverse cultural practises.[70] The health consequences of assault have been shown to affect victims in the short as well as long term, and can potentially lead to substance abuse as well as the need for further health care. Thus strategies should be in place to prevent such interpersonal violence injuries. Services

addressing the needs of victims of sexual assault should be implemented not only at Leratong Provincial Hospital but also in community clinics as well so as to ensure continuity of care.

This study indicated that young adults were significantly affected by interpersonal violence. These adults represent the working youth, and their involvement in violence leads to a loss of productivity, which negatively influences the South African economy. The youth seem to be affected by a lack of social structure, and the absence of positive father figures impacts on the formative years of young men in particular, resulting in behaviour that is reckless. The risk factors for this age group need to be further established, and the necessary social changes would need to be implemented in order to curb this problem.

The WHO recommendations on reducing risk factors include taking steps that will alter individual risk. This can be done by focusing on the family unit rather than just the community level. Healthy family environments need to be fostered and greater social support needs to be available for families experiencing difficulties.[64] By addressing inequalities in society, violent behaviour can be reduced; however, this kind of large-scale change can only be undertaken at a national level and filtered down to the family level. From the viewpoint of a provincial hospital, greater social cohesion must be encouraged, as must the commitment of the community to impose restraint on its own risk factors for violence.

Any future studies that are undertaken in this field should, if possible, include data on the severity of injuries, a longer time frame, and the use of all records for data collection rather than a set percentage of patient files. This would reveal more information on the trends of interpersonal violence injuries.

Patient study no	Time	Month	Week	Day	Gender	Age	Type of injury	Alcohol	Weapon

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

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Dr Amashnee Saimen

CLEARANCE CERTIFICATE	**M10513**
PROJECT	A description of the type of injuries occuring from interpersonal violence and their possible relation to the time of the month in communities in south Africa.
INVESTIGATORS	Dr Amashnee Saimen.
DEPARTMENT	Department of Emergency Medicine
DATE CONSIDERED	20/05/2010
DECISION OF THE COMMITTEE*	Approved unconditionally

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

DATE 31/05/2010 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Dr G Gordon

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...

Faculty of Health Sciences
Medical School, 7 York Road, Parktown, 2193
Fax: (011) 717-2119
Tel: (011)717-2075/6

Reference: Ms Tania van Leeve
E-mail: tania.vanleeve@.wits.ac.za
20 October 2010
Person No: 9402887T
TAA

Ms AL Saimen
19 Asanja Complex
Hummingbird Avenue
Allens Nek
1709
South Africa

Dear Ms AL Saimen

Master of Science in Medicine (Emergency Medicine): Change of title of research

I am pleased to inform you that the following change of title of your research report for the degree of **Master of Science in Medicine (Emergency Medicine)** has been approved:

FROM: *A description of the type of injuries occurring from interpersonal violence and the possible relation to the time of the month in communities in South Africa*

TO: *An audit of injuries resulting from interpersonal violence at the Leratong Provincial Hospital, in 2009.*

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

Faculty of Health Sciences
Medical School, 7 York Road, Parktown, 2193
Fax: (011) 717-2119
Tel: (011)717-2075/6

Reference: Ms Tania van Leeve
E-mail: tania.vanleeve@.wits.ac.za
19 November 2010
Person No: 9402887T
PAG

Ms AL Saimen
19 Asanja Complex
Hummingbird Avenue
Allens Nek
1709
South Africa

Dear Ms Saimen

Master of Science in Medicine (Emergency Medicine): Approval of Title

We have pleasure in advising that your proposal entitled "*An audit of injuries resulting from interpersonal violence at the Leratong Provincial Hospital, in 2009*" has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

OFFICE OF THE CHIEF EXECUTIVE OFFICER
LERATONG HOSPITAL

Enq. : **DR.L.M.MPYE**
☎ : (011) 411-3508
📠 : (011) 410-8421
E-mail : **Mike.Mpye@gauteng.gov.za**

TO WHOM IT MAY CONCERN
RE: RESEARCH REQUEST BY DR.SAIMEN

Permission is hereby granted for Dr.Saimen to conduct her research as proposed. She is being granted unrestricted access to patient files pending the necessary ethics approval.

Yours truly,

DR.L.M.MPYE
CLINICAL EXECUTIVE
/jve
2009-12-02

HEALTH REGION A: WEST RAND DISTRICT
1 Adcock Street, Chamdor
Private Bag X2078, Krugersdorp, 1740
Tel: (011)411-3500, Fax (011)410-8421



SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

BIOSTATISTICS UNIT

Private Bag X385, Pretoria, South Africa,
Tel: 012 339 8615, Fax: 012 339 8582
URL: www.mrc.ac.za/

04 May 2010

To Whom It May Concern:

This letter confirms that the following student (s):

Amashnee Saimen

from the Division of Emergency Medicine, University of the Witwatersrand discussed his/her/their project: **'A description of the type of injuries occurring from interpersonal violence and their possible relation to the time of the month in communities in South Africa'** with me.

I confirm that I will assist with the statistical analysis of the data. The study will be conducted at Leratong Provincial Hospital in Gauteng, and will all patients' records covering a one-year period between January – December, 2009. It is expected that there will be about 4000 records of patients presenting with violence related injuries.

All categorical variables such as gender and age group will be summarised using frequency/percentages and continuous variables by means, median and standard deviations. Associations between gender and age group of the patient with type of injury and weapon used will be investigated by chi-squared tests of independence. Injury trends over time by demographics, injury type and other factors will be summarised with time series plots. A p-value of less than 0.05 will indicate significant dependence or differences. The statistical package STATA 11 will be used for all the analyses.

Yours sincerely,

Samuel OM Manda, PhD (email: Samuel.manda@mrc.ac.za)
Senior Specialist Biostatistician

REFERENCES

1. World Health Organization. Gender, women and health. World Health Organization, 2011 http://www.who.int/gender/whatisgender/en/index.html (accessed 20/05/2011)
2. Peden M, McGee K, Sharma G. The injury chart book: a graphical overview of the global burden of injuries. Geneva: World Health Organization, 2002.
3. World Health Organization. World report on violence and health: summary. Geneva: World Health Organization, 2002.
4. Norman R, Matzopoulos R, Groenewald P, Bradshaw D. The high burden of injuries in South Africa. Bulletin of the World Health Organization. 2007 Sept; 85(9):695-702.
5. World Health Organization. World health report reveals economic costs of interpersonal violence. Geneva: World Health Organization, 2004
6. Krantz G, Garcia-Moreno C. Violence against women. Journal of Epidemiology and Community Health. 2005 Oct; 59(10):818-821.
7. Karch DL, Dahlberg LL, Patel N, Davis TW, Logan JE, Hill HA et al. Surveillance for violent deaths: national violent death reporting system,16 states 2006. Surveillance summaries. Morbidity and Mortality Weekly Report. 2009 Mar; 58(SS01):1-44.
8. Steen K, Hunshaar S. Gender and physical violence. Social Science and Medicine. 2004 Aug; 59(3):567-571.
9. Butchart A, Brown D. Nonfatal injuries due to interpersonal violence in Johannesburg-Soweto: incidence, determinants and consequences. Forensic Science International. 1991 Dec; 52(1):35-51.
10. Garcia-Moreno C, Jansen HAFM, Elisberg M, Heise I, Watts CH. Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. Lancet 2006 Oct; 368(9543):1260-1269
11. Helweg Larsen K, Sørensen J, Bronnum-Hansen H, Kruse M. Scandinavian Journal of Public Health. 2010 Aug; [Epub ahead of print]
12. Chapleau KM, Oswald DL, Russel BL. Male rape myths: the role of gender, violence and sexism. Journal of Interpersonal Violence. 2008 May; 23(5):600-615

13. Schumacher JA, Coffey SF, Norris FH, Tracy M, Clements S, Galea S. Intimate partner violence and Hurricane Katrina: predictors and associated mental health outcomes. Violence and Victims. 2010; 25(5):588-604
14. Garcia L, Hurwitz EL, Kraus JF. Acculturation and reported intimate partner violence among Latinas in Los Angeles. Journal of Interpersonal Violence. 2005; 20:569
15. Papadakaki M, Tzamalouka GS, Chatzifotiou S. Seeking for risk factors of intimate partner violence in a Greek national sample: the role of self esteem. Journal of Interpersonal Violence. 2009 May; 24(5):732-750
16. Sivarajasingam V, Corcoran J, Jones D, Ware A, Shepherd J. Relations between violence, calendar events and ambient conditions. Injury. 2004 May; 35(5):467-473.
17. Rock DJ, Judd K, Hallmayer JF. The seasonal relationship between assault and homicide in England and Wales. Injury. 2008 Sep; 39(9):2047-1053.
18. Exadaktylos AK, Evangelisti A, Anghern F, Keller U, Dopke K, Ringger A, et al. Measuring attitudes, behaviours and influences in inner city victims of interpersonal violence: a Swiss emergency room pilot study. Journal of Trauma Management Outcomes. 2010; 4:8
19. Brink O, Vesterby A, Jensen J. Patterns of injuries due to interpersonal violence. Injury. 1998 Oct; 29(9):705-709.
20. Faergemann C, Lauritsen JM, Brink O, Skov O. Trends in deliberate interpersonal violence in the Odense Municipality, Denmark 1991-2002: the Odense study on deliberate interpersonal violence. Journal of Forensic and Legal Medicine. 2007 Jan; 14(1):20-26.
21. Young RL, Ho WS, Ying SU, Burd A. Chemical assaults in Hong Kong: a 10-year review. Journal of the International Society for Burn Injuries. 2002 Nov; 28(7):651-290
22. Mannan A, Ghani S, Clarke A, Butler PEM. Cases of chemical assault worldwide: A literature review. Journal of the International Society for Burn Injuries. 2007 Mar; 33(22):149-154
23. Olaitan PB, Jiburum BC. Chemical injuries from assaults: an increasing trend in developing country. Indian Journal of Plastic Surgery. 2008 Jan-Jun; 41(1):20-23
24. World Health Organization. Interpersonal violence and alcohol. http://www.who.int/violence_injury_prevention/violence/world_report/factsheets/pb_violencealcohol.pdf (accessed 03/12/2010)

25. Franklin FA, La Veist TA, Webster DW, Pan WK. Alcohol outlets and violent crime in Washington DC. The Western Journal of Emergency Medicine. 2010 Aug; 11(3):283-290
26. Schnitzer S, Bellis MA, Anderson Z, Hughes K, Calafat A, Jaun M, et al. Nightlife violence: a gender-specific view on risk factors for violence in night life settings; a cross-sectional study in nine European countries. Journal of Interpersonal Violence. 2010; 25(6):1094-1112
27. Zavala DE, Hazen JM. Understanding violence, the role of injury surveillance systems in Africa. Geneva: Geneva declaration secretariat, 2009
28. Norman R, Bradshaw D, Schneider M, Jewkes R, Mathews S, Abrahams N et al. Estimating the burden of disease attributable to interpersonal violence in South Africa in 2000. (Scientific Letter: letter to the editor). South African Medical Journal. 2007 Aug; 97(8):653-4.
29. Krantz G, Garcia-Moreno C. Violence against women. Journal of Epidemiology and Community Health. 2005 Oct; 59(10):818-821.
30. Seedat M, van Niekerk A. Violence and injuries in South Africa: prioritising an agenda for prevention. Lancet. 2009 Sep;374(9694):1011-1022
31. Goosen J, Bowley DM, Degiannis E, Plani F. Trauma care systems in South Africa. Injury. 2003; 34(9):704-708
32. Seedat M, Van Niekerk A, Jewkes R, Suffla S, Ratele K. Health in South Africa 5, violence and injuries in South Africa: prioritizing an agenda for prevention. Lancet. 2009; 374:1011-1022
33. Asbury S, Goosen J, Boffard KD. Patterns of interpersonal violence at an urban South African trauma unit. Annals of Emergency Medicine. 2008 Apr; 51(4):490.
34. Donson H, editor. A profile of fatal injuries in Gauteng 2009: Annual report for Gauteng based on the National Injury Mortality Surveillance System. MRC-UNISA safety and peace promotion research unit. Medical Research Council, 2010
35. Van Geldermalsen AA, van der Stuyft P. Interpersonal violence: patterns in a Basotho community. Journal of Tropical Medicine and Hygiene. 1993 April; 96(2):93-99
36. Mutto M, Lett R, Lawoko S, Nansamba C, Svanstrom L. Intentional injuries among Ugandan youth: a trauma registry analysis. Injury Prevention. 2010; 16: 333-336

37. Akang EE, Akinremi T, Oje EM, Oluwasola AO, Ipadeola TO. Pattern of coroner's autopsies at ring road state hospital, Ibadan, Nigeria: a retrospective study (1994-2000). Medicine, Science and the Law. 2009 Apr; 49(2):117-122
38. Seleye-Fubara D, Etebu EN, Bob-Yellowe E. Pathology of firearm mortalities in the Niger Delta region of Nigeria: a study of 136 consecutive autopsies. Medicine, Science and the Law. 2009 Jan; 49(1):51-55
39. Odhiambo WA, Guthua SW, Chindia ML, Macigio FG. Pattern and clinical characteristics of firearm injuries. East African Medical Journal. 2008 Mar; 85(3):107-112
40. Raaey ML, Odero W, Mell MJ, Waxman M, Fife RS. Injuries from interpersonal violence presenting to a rural health center in Western Kenya: characteristics and correlates. Injury Prevention. 2009 Feb; 15(1):36-40.
41. Meel BL. Homicide trends in the Mbatha area between 1993-2005. South African Medical Journal. 2008; 98:477-480
42. Meel BL. Incidence of HIV infection at the time of incident reporting, in victims of sexual assault between 2000-2004, in Transkei, Eastern Cape, South Africa. African Health Sciences. 2005 Sep; 5(3):207-217
43. Jewkes R, Levin J, Mbananga N, Bradshaw D. Rape of girls in South Africa. Lancet. 2002; 359:319-320
44. Dunkle K, Jewkes R, Brown H. Prevalence and patterns of gender-based violence and revictimization among women attending antenatal clinics in Soweto, South Africa. American Journal of Epidemiology. 2004 Feb;160(3):230-239
45. Gass JD, Stein DJ, Williams DR, Seedat S. Intimate partner violence, health behaviours and chronic physical illness among South African women. South African Medical Journal. 2010 Sep; 100(9):582-585
46. Jewkes R, Sikweyiya Y, Morrell R, Dunkle K. Understanding men's health and use of violence: interface of rape and HIV in South Africa. MRC policy brief June 2009. Gender and Health Research Unit. MRC. South Africa
47. Okulate GT. Interpersonal violence cases reported to the police: a Nigerian study. Journal of Interpersonal Violence. 2005 Dec; 20(12):1598-1610
48. Lawoko S. Predictors of attitudes towards intimate partner violence: a comparative study of men in Zambia and Kenya. Journal of Interpersonal Violence. 2008; 23:1056

49. Bowley DM, Khavandi A, Boffard KD, Macnab C, Eales J, Vellema J et al. The malignant epidemic: changing patterns of trauma. South African Medical Journal. 2002 Oct; 92(10):798-802.
50. Abrahams N, Jewkes R, Mathews S. Guns and gender-based violence in South Africa. South African Medical Journal. 2010:100; 586-588
51. Demyttenaere SV, Namsamba C, Ngqanwa A, Mutto M, Lett R, Razet T. Injury in Kampala, Uganda: 6 years later. Canadian Journal of Surgery. 2009 Oct; 52(5):E146-150
52. Asariaa J, Kobusingyeb OC, Khingib BA, Balikuddembeb R, Gomezc M, Beveridge M. Acid burns from personal assault in Uganda. Journal of the International Society for Burn Injuries. 2004 Feb; 30(1):78-81
53. Odero W, Polsky S, Urbane D, Carel R, Tierney WM. Characteristics of injuries presenting to a rural health centre in Western Kenya. East African Medical Journal. 2007 Aug; 84(8):367-373
54. Proctor M, Carter N, Barker P. Community assault-the cost of rough justice. South African Medical Journal. 2010 Mar; 99(3):160-161
55. Jewkes R. Intimate partner violence: causes and prevention. Lancet. 2002 April; 359:1423-1429
56. World Health Organization. Intimate partner violence and alcohol fact sheet. http://www.who.int/violence_injury_prevention/violence/world_report/factsheets/ft_intimate.pdf (accessed 03/12/2010)
57. Els T. Pathology of assault (DVD). South Africa: University of the Witwatersrand, Division of Emergency Medicine; 2010.
58. Fitzpatrick KM. Sexual assault. In: Rakel RE, editor. Textbook of family medicine. Philadelphia: Saunders; 2007.
59. Schwartz LR, Balakrishnan C. Thermal burns. In: Tintinalli JE, Gabor K, Stapezynski J, editors. Tintinalli's emergency medicine; a comprehensive study guide. New York: McGraw-Hill; 2004
60. Norman GR, Streiner DL. Biostatistics: The bare essentials. 3rd ed. USA/CT: People's Medical Publishing House; 2008
61. South African Police Service. The crime situation in South Africa. Annual report 2009/2010.http://www.saps.gov.za/saps_profile/strategic_framework/annual_report/2009_2010/3_crime_situation.pdf (accessed 7/11/2010)

62. Mathews S, Abrahams N, Jewkes R. Injury patterns of female homicide in South Africa: findings from a National study. Journal of Trauma 2009 Jul;67(1):168-172

63. Crandall ML, Nathens AB, Rivara FP. Injury patterns among female trauma patients: recognizing intentional injury. The Journal of Trauma. 2004 Jul; 57(1):42-45

64. World Health Organization. Preventing violence: a guide to implementing the recommendations of the World Report on Violence and Health. Geneva World Health Organization; 2004

65. Nasr I, Sivarajasingam V, Jones S, Shepherd J. Gender inequality in the risk of violence: Material deprivation is linked to higher risk for adolescent girls. Emergency Medicine Journal. 2010 Nov; 27(11):811-814

66. Byarugaba J, Kielkowski D. Reflections on trauma and violence-related deaths in Soweto, July 1990-June1991. South African Medical Journal. 1994 Sep; 84(9):610-614

67. Suffla S, van Niekerk A, editors. Crime, violence and injury prevention in South Africa: Developments and challenges. Medical Research Council / University of South Africa: Crime, Violence and Injury Lead Programme. Medical Research Council; 2004

68. Smith K, Bryant-Davis T, Tillman S, Marks A. Stifled voices: Barriers to help-seeking behavior for South African childhood sexual assault survivors. Journal of child sexual abuse. 2010 May; 19(3):255-274

69. Cherpitel CJ, Bond J, Ye Y, Borges G, MacDonald S, Giesbrecht N. A cross-national meta-analysis of alcohol and injury: data from the Emergency Room Collaborative Alcohol Analysis Project. Addiction. 2003 Sep; 98(9): 1277-1286

70. Flury M, Nyberg E, Riecher-Rössler A. Domestic violence against women: definitions, epidemiology, risk factors and consequences. Swiss Medical Weekly. 2010 Sep; 10:w13099