

**A PROFILE OF THE FATAL INJURY MORTALITIES AND SUICIDES  
AMONG CHILDREN AND YOUTH IN THE STELLENBOSCH  
DISTRICT**

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## Declaration

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## Opsomming

Daar is 'n groeiende getal sterfgevallen wat verband hou met Suid-Afrika se geweld- en beseringspandemie. Op 'n internasionale vlak het die Wêreld Gesondheid Organisasie (2000) ook aangemeld dat sulke sterftes styg. Ongeveer 5 miljoen mense sterf elke jaar as gevolg van beserings en duisende sukkel om van fisieke en sielkundige beserings te herstel (World Health Organisation, 2000).

Daar is 'n onrusbarend hoë insidensie van geweld, misdaad, en beserings wat lei tot sterftes in Suid-Afrika. Die impak van hierdie beserings plaas 'n geweldige las op die regering, gemeenskappe, families en selfs op individue. Die las van hierdie beserings en sterfsyfers val nie in gelyke mate op almal nie. In Suid-Afrika, dra lae sosio-ekonomiese gemeenskappe 'n baie groot deel van die gewig van hierdie epidemie. Hierdie studie bied 'n fokus op mortaliteit en beseringspatrone en die verwante risiko probleme vir kinders en die jeug in landelike distrikte wat grens aan stedelike gebiede.

Hierdie studie het ten doel om 'n epidemiologiese oorsig te gee van die fatale beserings, asook van selfmoord onder kinders en die jeug in die Stellenboschdistrik. Dit beoog om 'n beter begrip te ontwikkel van die probleemareas van sulke beserings en sterfgevallen, die oorsake hiervan en die gevolge; dit maak vergelykings op grond van ouderdom, geslag, ras en verwante veranderlikes. Die studie mik ook om die impak uit te wys van hoe alkoholgebruik en beserings van jeug verband hou met sterftes.

Data van die Stellenbosche staatslykhuis is geanaliseer van 591 kinders en jeugdige in die Stellenbosch distrik vir die periode 2001-2005. Daar is gebruik gemaak van die National Injury Mortality Surveillance System datavorm. Die uitslae van die studie het aangetoon dat vervoer-  
verwante sterftes 'n ernstige oorsaak van kommer is vir sowel kinders as jeug in landelike areas. Die noodsaaklikheid spesifiek van bewusmakingsinisiatiewe ten opsigte van padveiligheid word aanbeveel om hierdie hoë risiko situasie te voorkom.

Geweld-verwante sterftes as gevolg van 'n skerp voorwerp is uitgewys as 'n primêre oorsaak van sterftes onder die ouer jeugdige teenoor vuurwapens onder die stedelike ouer jeugdige.

Brand en verdrinking is uitgewys as beduidende oorsake van onberekende sterftes vir sowel kinders as jeug. Onder baba sterftes was versmoring 'n kommerwekkende bevinding. Dit was duidelik dat alkoholgebruik 'n beduidende rol speel in die sterftes van jeugdige.

Verskeie implikasies van die navorsingsbevindinge is geïdentifiseer vir die aandag van professionele mense in gesondheidsorg, beleidsontwerpers, regeringdepartemente en welsynsorganisasies om voorkomende programme te ontwerp om hierdie bevindinge teë te werk. Hierdie implikasies is krities vir die daarstelling van voorkomende intervensies om die veiligheid van kinders en jeugdige in landelike gebiede te bevorder.

## **Abstract**

South Africa's violence and injury death rates pandemic are steadily growing. Global estimates reported by the World Health Organisation (2000) have revealed that there is an increase in worldwide deaths. Approximately 5 million people die as a result of injuries each year and hundreds of thousands more are left physically or psychologically scarred (World Health Organisation, 2000). There are alarmingly high incidences of violence, crime and injury deaths in South Africa and the impact of these injury fatalities is imposing an immense burden on government, communities, families and even individuals. The burden of fatal injury mortalities has not fallen evenly. In South Africa, low socio-economic communities have borne the brunt of this epidemic. This study presents a focus on mortality and injury patterns and emerging problem areas for children and youth in a peri-urban setting. The aim of this study was to provide an overview of the fatal injury mortality and suicide data of children and youth in the Stellenbosch district, in order to develop a comprehensive understanding of the problem areas of injury deaths such as the main causes and consequences and age, sex, race and other pertinent comparisons. The study also aimed to consider the impact and relationship between alcohol abuse and youth injury deaths.

Mortuary data were compiled from 591 children and youth cases for the period 2001-2005 in the Stellenbosch district using the National Injury Mortality Surveillance System data form.

The present study highlighted several key findings. Transport-related deaths were indicated as a serious cause for concern among both children and youth in peri-urban settings. The importance of specific road safety awareness initiatives within peri-urban areas and among specific age groups were also indicated. Violence-related deaths were determined to be a leading cause of death among the older age groups in the youth category, with sharp force objects being the leading external cause of violent deaths. This highlighted an additional key finding reporting that sharp force objects death are a more serious cause for concern than firearm deaths in peri-urban areas, which challenges previous urban data.

Burns and drowning were indicated as pertinent cause of unintentional deaths among both children and youth within peri-urban areas. This was suggested to be due to the high use of paraffin enabled heating systems in house in peri-urban areas and the lack of safety surrounding materials such as matches in the home. In addition, suffocation deaths among infants were also identified as a concern.

Furthermore, the link between alcohol abuse among the youth age group was indicated by a key finding that alcohol is a prominent risk factor for fatal injury mortalities among youth. However more studies are needed to explore the effects and risks of other substances on youth fatal injury deaths.

Several implications of the research findings are identified for health care professionals, policy developers, government departments and non-government organisations to consider in reducing the mortality rates of children and youth. These implications are critical in informing preventative interventions and initiatives aimed at enhancing safety to children and youth living in peri-urban areas within South Africa.

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## CHAPTER ONE

*“Safety is a fundamental right. It is essential for the attainment of health, peace, justice and well-being.”*

### **8<sup>th</sup> World Conference on Injury Prevention and Safety Promotion**

#### **1.1 INTRODUCTION**

The world we live in is beset by high incidences of injuries and deaths that make the safety and security of persons a major global concern (8<sup>th</sup> World Conference on Injury Prevention and Safety Promotion, 2006). South Africa, specifically, has increasingly become one of the most dangerous and hazardous countries to live and work in due to the high levels of violent crime (HST Update, 1998). In recent years, being a victim of crime has become a common experience not only for adults but for children and adolescence both male and female as well, due to the increasing rate of violence and crime in the country. Statistics indicate that the rates of rape, murder, robbery, and violent theft are higher in South Africa than most other countries and this violence and crime is resulting in numbers of people, especially children and youth, being killed or left injured everyday (Abrahams & Jewkes, 2005). Despite these alarming statistics, no effective injury prevention and control interventions have been implemented to prevent people and citizens of the country from becoming yet another statistic.

Media headlines and previous research have tended to focus on politics as the main cause of violence in South Africa. More recent literature has, however, shown that most violent injuries and deaths arise from everyday personal incidents. Hence many people’s expectations that order will return after a political settlement has been ill-founded (Nell & Williamson, 1993). The majority of these injuries and deaths caused by everyday incidences of violence and crime typically occur beyond the public eye, and thus it is difficult to accurately ‘see’ the problem (Matzopoulos, Seedat, Marais & Van Niekerk, 2004). The Crime, Violence and Injury Lead Programme of the Medical Research Council have

subsequently asserted that, since injuries and mortalities are such a pervasive feature of South African life, they have become priority public health concerns.

South Africa's population in 2001 consisted of 44.8 million people, half of whom were children and adolescents below the age of 19 years (Statistics South Africa, 2001). Fatal injuries, mortalities and suicides are also affecting our children and youth resulting in increasing deaths in the 0 to 24 years age group. The children and youth of South Africa are incessantly being exposed to many risks and social stressors such as availability of weapons, exposure to violence and crime, increased divorce statistics, increasing suicide and death due to AIDS, alcohol and drug exposure and chronic poverty (Poggenpoel & Myburgh, 2002). The exposure to these risk factors and social stressors may be predisposing our children and youth to engage in substance use, unprotected sex, unhealthy eating habits, violence and crime (Youth Risk Survey, 2002). Behaviours such as these are generally adopted during the developmental phase of adolescence and some (such as substance experimentation) may even be considered as a normal part of the adolescent's developmental process. However, when these behaviours transcend beyond experimentation and lead to violence, crime, injuries and mortalities to oneself and others, they become cause for concern. These behaviours may result in many of the social and educational problems that confront our country's children and youth such as failure to complete high school, unemployment, joining gangs, crime and even death (Youth Risk Survey, 2002). Invariably these behaviours impact on the health, well-being and development of children and young people and their communities.

At the personal level, all individuals progress through phases of development across the lifespan. Development can be defined as systematic changes and continuities in the individual that occur between conception, through childhood, adolescence and adulthood, to death (Sigelman & Rider, 2003). These changes are orderly, patterned and relatively enduring. Development also involves continuities which are the ways in which we as unique individuals remain the same or continue to reflect our past (Sigelman & Rider, 2003).

The phases of infancy, toddlerhood and childhood are characterised by a period of growth, whereas adolescence is characterised by a period of exploration leading to a transition into adulthood. Children's development is affected by psychosocial and biological factors and by

genetic inheritance. A child's development consists of several interdependent domains, including sensory-motor, cognitive and social-emotional. The first few years of life are particularly important because vital development occurs in all domains and this may affect later development. Moreover, risk factors operating in the social context exert a major influence on the developing child or adolescent.

While there is no single factor or cause of the high mortality rate among children and youth, neglect and alcohol abuse seem to play a major role. In South Africa deaths occurring from alcohol use and abuse are on the rise among youth specifically and have become a major cause for concern. The reality is that alcohol is seen as a socially accepted substance for partying, entertainment, bonding and confidence boosting and more importantly youth turn to drinking as a way of escaping from the horrors of their everyday lives (Meel, 2006). Statistics show that even those with the legal amount of alcohol in their blood have a substantially increased risk of being killed (Meel, 2006).

According to Meel (2006), the most common alcohol-related crimes were transport accidents (17%) and crimes of violence (15%). Alcohol is still the most commonly abused substance and is one of the most significant public health problems in South Africa today (Parry, 2001). However, the problem of violence and alcohol abuse is a fragile and volatile one, as it is dependent on the available methods of recording and analysis. Thus in the absence of a sustained epidemiological surveillance and risk factor analysis system such as the National Injury Mortality Surveillance System (NIMSS), violence and mortality will revert to an unanalysed and therefore unmanageable mass that cannot be prevented, but only controlled (Buthary, Seedat, Blanche & Hummer, 2000).

Rakshika Bhana (2002) contends that South Africa has been, and is still, undergoing various socio-economic and political transitions, which are also impacting directly on the lives of young people. The socio-economic and political transitions have led to many children and youth being left to live in environments and conditions which contain many social stressors. Currently the South African society is exposed to many social stressors such as high inflation rates, increased divorce statistics, increasing suicide and death due to AIDS and chronic poverty (Poggenpoel & Myburgh, 2002). These social stressors contribute to and increase the

violence and crime within our society. Often the psychological price of these social stressors is the erosion of humanity, strong feelings of inferiority, defencelessness, insecurity, fear and helplessness, as well as a live-for-the-moment mentality (Burnett, 1999). According to Burnett (1999), societal requirements of school achievement and generation of income have a psychological impact on children and youth. These norms make it difficult for children and youth to experience success and self-respect in society causing them to have a negative self-perception. This in turn socialises them on to the street, where violent behaviour and crime are the norm and a way of experiencing an alternative success (Burnett, 1999). Often violence and crime are also just a means to an end, a survival strategy or the only life some children and youth know how to live.

Crime and violence exact a heavy toll on society and place a significant financial burden on the public health system (Youth Risk Survey, 2002). According to Matzopoulous, Prinsloo, Butchart, Peden and Lombard (2004), national and local government, service planners, non-governmental organisations, policy makers and the media are increasingly calling for a comprehensive approach to address the epidemic of injury, fatalities and violence in South Africa; however, this has been compromised due to the lack of available and efficient data and research. The available data and studies focus mainly on either political violence or sexual and intimate partner violence and the consequences of this form of violence in terms of the risks of HIV. However, a number of these studies have indicated that those who are most at risk of violence and crime are the children and youth of our country, specifically young black males (HST Update, 1998).

Matzopoulous et al. (2004) have asserted that important information has been missing from the national vital statistics on the causes of death since 1991 (The National Injury Mortality Surveillance System, 1999). Because of this gap in the system, the NIMSS was established in 1999 by the Medical Research Council and the UNISA Institute for Social and Health Sciences. The NIMSS System has been tracking and providing more comprehensive information about deaths due to external causes for the past eight years. More comprehensive data will also shed more light on how and why children and adolescents are increasingly becoming mortality statistics.

## **1.2 RATIONALE FOR THE PRESENT STUDY**

Health sector injury data are necessary and in demand due to the fact that injury is one of the major causes of death among people, especially children and adolescents, in South Africa. These injuries and mortalities result in high costs for families, communities, government and the society as a whole (NIMSS, 2001). Health sector research which focuses on injury mortality and morbidity is crucial for the effective design, co-ordination and implementation of health interventions, prevention control, policy formulation and service delivery (Global Forum for Health Research, 2001). One of the stated objectives of the 8<sup>th</sup> World Conference on Injury Prevention and Safety Promotion held in Durban in 2006 was to place more focus and emphasis on establishing and emerging areas of academic interest in the injury prevention sector (8<sup>th</sup> World Conference on Injury Prevention and Safety Promotion, 2006). Various South African sectors are reiterating this need for relevant data as a means for rigorous policy calibration and intervention (NIMSS, 2003).

The gap in the system emphasises the urgent need for quality empirically generated data on the fatal injury burden of mortality, especially in peri-urban and rural areas such as the Stellenbosch district. This need for quality data should not be ignored, as current policy decisions tend to be informed by limited data, skewed media reports and political considerations (Global Forum for Health Research, 2001). This urgent need for data includes the consideration of the prevalence and causes of child and adolescent fatal injuries and deaths within a peri-urban area, as previous literature has focused mainly on urban data. Furthermore, there is a need to determine whether childhood and youth fatal injuries and mortalities are associated with particular risk factors operative during these developmental phases in the individual's lifespan and to determine what circumstances play a role in these fatal injuries and deaths within the specific developmental phases. In addition, there is a need to ascertain the degree to which alcohol use is linked to the increase in fatal injuries, deaths and suicides among particularly the adolescent age group. This study aims to generate data that will have direct implications for policy formulation, injury prevention and control interventions and service delivery: it has been asserted that effective intersectional development cannot occur without a firm and rigorous research foundation including the

provision of timely injury surveillance data on the: who, when, what and how of fatal and non-fatal injuries (NIMSS, 2003).

The current study seeks to determine the prevalence, magnitude and patterns of fatal injury mortalities and suicides among children and youth specifically in the Stellenbosch region. By extending the NIMSS to the Stellenbosch district, we will be able to respond more effectively and efficiently to the need for peri-urban data in the health sector. The expansion of the NIMSS to the Stellenbosch region will also contribute to the phased development and improved morbidity and disability data for Stellenbosch district and, in turn, for the national South African data. The expansion of the NIMSS and this study would also lend itself toward data on the risk and determination of injury mortality and morbidity, the burden of injury and the costs of injuries and in addition, to the development of prevention and intervention models, for children and youth (NIMSS, 2001). In addition, the extension will also provide comparative data for a peri-urban area. Thus information on the prevalence, magnitude, patterns, cause and consequences of fatal injuries among children and youth in Stellenbosch has value as it can be effectively used to identify problem areas, prevent injuries and thus save lives in this area. In addition, the data can inform and determine local intervention programmes and advocacy issues.

The information generated from this study will be of important relevance to various Government departments such as the Department of Health and the Department of Safety and Security, as well as for various non-government organisations and police and investigation departments and officials. The utility of the information of this study lies in the pointers that it will provide for improving the prevention and control of injuries and deaths within the Stellenbosch region, among children and youth (NIMSS, 2001).

In addition, it will provide relevant data to evaluate the impact and effectiveness of direct (e.g. gun law enforcement) and indirect (e.g. socio-economic development) interventions and measures which are expected to reduce major causes of fatal mortality and morbidity within the Stellenbosch region (NIMSS, 2001). Furthermore this study will provide relevant data as to the major problem areas, new trends and magnitude of fatal injuries and suicide mortalities

within Stellenbosch, which can be utilised to develop new and innovative control and prevention interventions for schools, youth organisations and police committees.

The ability to plan effective injury prevention strategies is dependent upon understanding the magnitude of the problem (Bartolomeos & Peden, 2003). The lack of reliable and detailed information on the circumstances leading to non-natural injuries and suicides among children and youth in peri-urban areas, such as Stellenbosch and the Helderberg, limits the ability to gain this understanding and in essence limits the ability to develop appropriate prevention interventions for children and youth in peri-urban areas. Furthermore, in South Africa there is a paucity of research into the epidemiology of fatal injuries among children and youth in peri-urban areas.

### **1.3 BROAD AIMS OF THE STUDY**

The aims of this study are to explore and determine the following:

- The prevalence, magnitude and patterns of fatal injury mortalities and suicides among children and youth in the Stellenbosch region between the years of 2001 to 2005.
- The differences and similarities within non-natural injury mortalities and suicides among six developmental age groups, namely infancy, toddlerhood, childhood, early adolescence, late adolescence, and early adulthood to promote the timeous development of adequate prevention measures and intervention programmes which will in turn help evaluate direct and indirect violence and injury prevention and control methods (NIMSS, 2001).
- The differences and similarities within non-natural injury mortalities and suicides between the sexes across the adolescent developmental age groups.
- The effects, risks and implications of alcohol misuse and abuse on the youth among specific age groups (ages 10 to 24) through the mortality data.
- The comparisons between Stellenbosch fatal injury mortality and suicide data to other dominant urban regions such as Cape Town, Durban, Johannesburg and Tshwane/Pretoria and,

- To consider the implications of the findings and how these can be utilised for policy formulation, prevention control, health interventions and service delivery.

#### **1.4 OUTLINE OF RESEARCH**

The National Injury Mortality Surveillance System has found that nationally the majority of fatal injury victims are youth and young adults between the ages of 15 and 44 years old (NIMSS, 2005). The data has shown that more men will be victim to death due to non-natural injury than females (NIMSS, 2005). These deaths also generally occur earlier in males than in females (NIMSS, 2005). In addition, the leading cause of death among children aged 0 to 4 years old is burns and pedestrian fatalities, among those aged 5 to 14 the leading cause of death was transport fatalities and homicide followed by accidents was the leading cause of death among 15 to 24 year olds (NIMSS, 2005).

The first annual report covered 14,829 fatal injuries registered at ten mortuaries in five provinces- namely, Eastern Cape, Northern Cape, Kwa-Zulu Natal, Gauteng and the Western Cape, and only represented 25% of all the non-natural deaths in the country. Thus the National Injury Surveillance System sought to progressively expand its geographical and case coverage until all injury deaths are included in what is intended to be an ongoing system for the epidemiological surveillance of fatal injuries (NIMSS, 1999). By 2004, a total of 31,446 deaths was covered from thirty-six mortuaries representing 40% of all non-natural deaths in the country. Through this expansion the NIMSS is on its way to being an established system that registers all non-natural fatal injury deaths that occur annually within all areas of South Africa.

The data of the NIMSS has also shown interesting findings for alcohol as a risk factor. It was found that the majority of victims of non-natural mortality due to homicide or accidents have elevated or positive blood alcohol content (NIMSS, 2005), whereas the majority of victims in both suicide and unintentional injuries (such as drowning and burns etc) have zero blood alcohol content (NIMSS, 2005).

The National Injury Mortality Surveillance System is, however, still largely based on the coverage of urban data. The question is whether there are differences in patterns of injury and mortality between urban and rural settings across the life span. Therefore, there is a need to expand the system to include data from rural and peri-urban areas as well. This need supports the addition of the Stellenbosch mortuary data to the NIMSS since 2001. There is also a need for obtaining distinct data for the Stellenbosch and Helderberg areas, as they represent unique peri-urban areas near the Cape Town metropole and to also expand the coverage of the NIMSS. Furthermore, Stellenbosch and the Helderberg data are needed in order to draw comparisons between local peri-urban data with urban and national patterns.

The current study analyses the mortality data for the Stellenbosch and Helderberg region for the period 2001-2005. Specifically the prevalence, magnitude and patterns of fatal injury mortalities and suicides among children and youth in the Stellenbosch region will be analysed.

## **1.5 THESIS OUTLINE**

The introductory chapter presents the context and rationale for the present study. The chapter also provides an understanding of the broad aims of the dissertation, as well as an outline of the relevant areas of research. Furthermore, it provides a content outline of the chapters which will make up the dissertation. Chapter Two presents a survey of the literature relevant to the focus of this study, and provides a broad framework for the understanding of fatal injuries and suicide among children and adolescents. Child and adolescent stages of development are discussed, as well as alcohol as a potential risk factor.

In Chapter Three, the NIMSS and data collection forms, as the method of data collection for the present study are introduced, and explained in-depth. Procedures for data collection, ethical requirements and the limitation of the data and study will be presented. Furthermore, a discussion on the quality, validity and reliability of the data and the study will be included. In Chapter Four the research findings will be presented. The findings will be presented under the following categories: factor A (age) which will be presented at six levels: 0 to 1 year old group (infancy), 1 to 4 year old group (toddler hood), 5 to 9 year old group (childhood), 10 to

14 year old group (early adolescence), 15 to 19 year old group (late adolescence) and a 20 to 24 year old group (early adulthood); B (sex) which will be presented at two levels: male and female; C (population group) which will be presented at five levels: Black African, Coloured, White, Asian and Unknown; and D (blood alcohol content) which will be presented at three levels: zero blood alcohol content (0g/100ml), blood alcohol content below the legal limit (<0.05g/100ml) and blood alcohol content above the legal limit (> 0.05g/100ml). Blood alcohol concentration levels will only be considered for youth aged between 10 and 24 as testing deceased blood alcohol concentration levels is not standard procedure for those under the age of 10, unless there is a suspicion of toxicity. Summary tables of the research findings will be provided. The results for the Stellenbosch region will also be compared with other dominant urban regions such as Cape Town, Durban, Johannesburg and Tshwane/Pretoria.

In Chapter Five, the research findings and results are discussed and examined. The research findings will be used to compare the differences and similarities within non-natural injury mortalities among six developmental age groups, namely infancy, toddlerhood, early school-age, middle school age, early adolescence, late adolescence including a comparison of the differences and similarities within non-natural injury mortalities and suicides between the sexes. The risks and implications of alcohol abuse on youth (i.e. aged 10-24 years) fatalities will also be discussed. In addition, the research findings pertaining to alcohol and blood alcohol content levels of victims are discussed and alcohol is examined as a contributory risk factor to fatal injuries and suicides among youth in the Stellenbosch region. Furthermore, a discussion follows presenting the use of this data to help evaluate direct and indirect violence and injury prevention and control methods. In addition, this chapter will present the resulting implications of the study and recommendations will be made targeting health care professionals, government and organisations and potential researchers to effectively intervene in the causes of death and injury to children and youth within the Stellenbosch region. Recommendations for future research are suggested. In addition, comments are made regarding the limitations of the study. The dissertation ends with the presentation of a summary of the present study.

## CHAPTER TWO

### 2.1 INTRODUCTION

In the past decade South Africa has consistently had one of the highest rates of recorded homicide in the world. Other categories of both violent and property crime have also been recorded at similarly high levels. Rates of murder in 2004 were estimated to be 33.3 cases per 100,000 population, rape 83.5 cases per 100,000 and house-breaking 493.9 cases per 100,000 (Parry, Plüddemann & Leggett, 2004). While incidences of most serious crimes appear to be levelling off or decreasing, the incidence of crime in South Africa remains unacceptably high and is a serious threat to this country. In order to create changes and develop crime prevention interventions and strategies, it is important to understand the causes behind crime, fatal injuries and mortalities. While various studies have been conducted in urban areas, there is a lack of research in rural and peri-urban areas in South Africa.

In this chapter a broad framework for understanding fatal injuries, mortalities and suicides among children and adolescents will be presented. In addition, relevant information on developmental phases from infancy to young adulthood will be discussed. Furthermore, potential risk factors such as exposure to violence, alcohol and substance abuse and availability of firearms will be explored. The chapter will conclude with a discussion on the present prevention and control interventions and their effectiveness as local and national government and non-government organisations have been criticised for their lax attitude towards developing and implementing prevention programmes and control interventions. Notwithstanding the attempts of the NIMSS to establish a national system to record fatal injuries and mortalities on an annual basis since 2000, there is a gap in the system specifically with few rural and peri-urban areas included. This has resulted in a dearth of empirical data to evaluate mortality data and statistics in rural and peri-urban areas. This data is an important and necessary tool to develop much needed prevention programmes and control interventions particularly in the case of children and adolescents.

## **2.2 DEFINITIONS OF TERMS**

This research begins with a differentiation of the main concepts utilised in this study, as a lack of concise definitions stands in the way of scientific evaluation of theory and replication (Salomone & Palmer, 1978). The following terminology is used throughout the study and is briefly defined and contextualised below.

**SURVEILLANCE** is a process that involves the ongoing and systematic collection, analysis and interpretation of data relating to the occurrence of a health event and the timely dissemination of this information to those who need to know and those who need to apply it. In the National Injury Mortality Surveillance System the health events that are described are attributable to injuries and are described as non-natural deaths (NIMSS, 2001).

**MORTALITY** is the state or condition of being subject to death, inclusive of the relative frequency of deaths in a specific population that is the death rate.

**NON-NATURAL** deaths include all deaths that were not due to, or may not have been due to natural causes and that in terms of the Inquest Act are subject to medico-legal investigation. The non-natural deaths have been grouped by external causes of death and apparent manner of death (NIMSS, 2001).

An **INJURY** can be defined as damage to a person caused by an acute transfer of energy or by a sudden absence of heat or oxygen (NIMSS, 2001).

The **APPARENT MANNER** of death describes the intention prior to the injury that resulted in the death. The apparent manner of death is divided into five different categories, namely: homicide, suicide, accident, natural and undetermined death. Note that the apparent manner of death is determined by the forensic pathologists who perform the autopsies and the final manner of death is only determined after court proceedings (NIMSS, 2001).

The NIMSS definition of **HOMICIDE** refers to intentional injuries inflicted by another person (perpetrator). This definition excludes deaths due to culpable homicide since the NIMSS data

are geared towards prevention initiatives, and intentional and unintentional injuries require different types of intervention (NIMSS, 2001).

SUICIDE refers to fatal self-inflicted intentional injuries (NIMSS, 2001).

UNINTENTIONAL INJURY deaths include all other unintentional non-transport injuries such as those due to burns, falls, poisoning and drowning (NIMSS, 2001).

UNDETERMINED deaths are those where the medical examiner is unable to determine whether the manner of death was due to homicide, suicide, transport or unintentional injuries, or due to natural causes (NIMSS, 2001).

The EXTERNAL CAUSE of death refers to the mechanism, circumstance or event that preceded the death. Examples of the external cause of death include, firearms, stabbing, motor vehicle accidents, drowning, burns, poisoning and railway casualties all of which may result in injury and eventually death (NIMSS, 2001).

TRANSPORT deaths are normally also unintentional injury deaths, but may include deaths due to culpable homicide. Since the NIMSS data are geared towards prevention initiatives, all transport deaths have been grouped together to facilitate international comparison and the development and evaluation of prevention programmes (NIMSS, 2001).

ROAD TRAFFICE INJURY is any injury due to crashes originating, terminating or involving a vehicle partially or fully on a public highway (World Health Organisation, 1992).

VIOLENCE is any relation, process or condition by which an individual or group violates the physical, social and/or psychological integrity of another person or group (Lockhat & Van Niekerk, 2000).

CRIMINAL OFFENCES/CRIMES are any illegal action or behaviour harmful to the individual and to society which constitutes a transgression of the law, to which is linked sentencing by a court of law after a hearing and conviction (Bezuidenhout, 2006).

This study will use SEX rather than GENDER to distinguish between male and female deaths. In general the term sex refers to the distinctive physiological features related to being male or female whereas the term gender comprises different occupational, social and psychological attributes that are attributed to being male or female. The latter concept depends on societal norms and is not internationally comparative (NIMSS, 2001).

DEVELOPMENT can be defined as systematic changes and continuities in the individual that occur between conception, through childhood, adolescence and adulthood, to death (Sigelman & Rider, 2003)

CHILDHOOD is a period including any persons under the age of 18 who have not had adult status legally conferred on them and who qualify for certain special provision within common law (Lockhat & Van Niekerk, 2000). In section 28(3) of the Constitution, it refers to a child as anyone under the age of 18 years.

ADOLESCENCE is a period of transition between childhood and adulthood (Wait, Meyer & Loxton, 2005).

## YOUTH

The term youth or young people is used as a statistical artefact to refer specifically to those aged 15-to 24 years old. This is done for ease of comparison, as it is the age grouping for which most data are available. Youth, however, also has a sociological meaning of a transition stage between childhood through adolescence to adulthood which tends to expand the age group to one of 10-to 24 years old. Various international organisations such as World Health Organisation (WHO) and UNICEF use the age categories of 0-1, 1- 4, 5- 9, 10-14, 15-19, and 20-24. These age categories will be used in this study in order to produce internationally comparative data.

The STELLENBOSCH CATCHMENT AREA, as obtained from the South African Municipal Demarcation Board (2002), consists of the whole district of Stellenbosch including the Helderberg. Thus the city specific selection or catchment area parameters will include Stellenbosch, Kayamandi, Cloetesville, Strand, Somerset West, Macassar and Helderberg.

These will fall into two separate groups: group one will consist of Stellenbosch district including Stellenbosch, Kayamandi, Cloeteville and Strand. The second group will consist of the Helderberg region inclusive of Helderberg, Somerset West and Macassar. Paarl, Franschoek, Groot Drakenstein and Grabouw do not fall within the Stellenbosch catchment area for the purposes of this study and will thus be excluded.

## **2.3 INJURY AND MORTALITY**

### **2.3.1 Introduction**

There are alarming high incidences of violence, crime, injuries and deaths across the globe. People are exposed to these injuries, violence and mortalities every day in their roads, in their leisure and in their home environments (Towner, 2005). In 1998, a study reported that at least three and a half million people die from injuries worldwide and many more are disabled each year (Forjuoch, Zwi & Mock, 1998). In 2000, the WHO reported an increase in worldwide deaths stating that about 5 million persons died as a result of injuries and of those deaths twice as many were males. Fifty percent of the world's injury related mortality occurs in young people aged between 15-44 years, the most economically productive members of the global population, resulting in many years of potential life and resources being lost (World Health Organisation, 2000).

The WHO (2003) found that approximately 90% of the world's injury related deaths take place in poorer countries. In 1999, Ghaffer, Hyder, Mastoor and Shaikh found that a significant proportion, approximately 1/3 of the acute patient load in hospitals in Africa was due to injuries. Despite the global acknowledgement of injuries being a major public health concern, limited attention has been given to this matter in Africa (Forjuoch et al., 1998). This is partly due to a lack of interest and the co-existence of other competing public health problems, such as HIV/AIDS.

The impact of injuries in South Africa, measured in terms of deaths, morbidity and disability, is extremely high and imposes an immense burden on families, government and society (Forjuoch et al., 1998). According to Charles Nqakula, Minister of Safety and Security

(2008), there has been an overall decrease of 6.4% in the incidence of crime for the 2007/2008 period. However, the statistics still remain high. Of these crimes, it is of particular significance to acknowledge the decrease of 4.7% in the occurrence of murders and the decrease of 6.9% of illegal possession of firearms (Charles Nqakula, 2008). However, drug-related crime has increased by 3.3% and the crime among and against children and youth in particular has significantly increased during the 2007/2008 period.

The majority of these injury deaths occurs in low socio-economic countries such as in Africa and, although infectious and communicable diseases are extremely important causes of death, low socio-economic countries have a heavy burden of non-infectious disease with trauma being a leading cause of mortality and morbidity (Lett, Kobusingye & Sethin, 2002). According to Charles Nqakula (2008), the phenomenon of informal settlements has also created conditions of crimes of need, where residents often submit to the temptation of violence and crime to satisfy certain needs.

The Global Burden of Disease study estimated that 15 million of the 50 million deaths that occur annually are due to injury and predicts that the magnitude of the injury problem will continue to increase (Lett et al., 2002). Towner (2005) states that, the burden of unintentional injuries and mortalities are not evenly spread and thus disproportionately affect some people more than others. These inequalities find their greatest expression in differences between higher income countries and middle and lower income countries. He intimates that the gap between injury rates of the most affluent and the most disadvantaged in society provides some measure of preventability and shows that there is considerable scope for improvement and intervention (Towner, 2005).

In an earlier study, Peek-Asa, Zwerling and Stallones (2004) found that traumatic injuries are a major public health concern in the United States of America. In 2004 injuries were the leading cause of death in the United States among those aged 1 to 45 years. The study reported that rural populations had shown disproportionately higher injury mortality rates than urban populations (Peek-Asa et al., 2004). Rural fatality rates were more than twice as high as urban rates in the case of a wide range of injuries, comprising of motor vehicle accidents,

traumatic injuries, drowning, unintentional firearm injuries, residential fires, electrocutions and suicides (Peek-Asa et al., 2004).

Lett et al. (2002) found that injury deaths and disability tend to occur disproportionately in both the young and the poor and these injuries result in high medical costs, and are a leading cause of loss of productive life, resulting in a large socio-economic loss. However, despite these studies showing high numbers of injuries and death due to non-infectious diseases in Africa and South Africa, communicable diseases still tend to attract more attention from the public, the media, policy makers and fundraisers, than injury morbidity and mortality in both high and low income countries (Lett et al., 2002). In addition, many of the international agencies that influence health policy and the allocation of resources in low income countries place very little priority on injuries and thus little action is taken to prevent injuries in the countries where the rates are highest (Lett et al., 2002). The Lett et al. study (2002) highlighted that funding for HIV/AIDS and other sexually transmitted diseases is 400 times greater than that for injury. This may, however, be due to injury specialists not successfully convincing policy makers and the public that injuries can be controlled and prevented.

Injuries and mortalities are a pervasive feature of South African life and have become a priority in public health (Matzopoulos et al., 2004). Thus national and local government, service planners, non-governmental organisations and the media are increasingly calling for a comprehensive approach to address the epidemic of injury and violence in South Africa in order to convince international organisations and policy makers to put more funds and attention into non-infectious and injury mortalities (Matzopolous, Prinsloo, Butchart, Peden & Lombard, 2006).

### **2.3.2 Homicide**

Homicide is an intentional injury inflicted on a person by another person. Despite national data showing decreases in the violent crimes and homicides, youth violence and youth homicide remains a serious problem. Each year over 1.6 million people worldwide lose their lives to violence, one of the leading causes of death for people aged 15 to 44 years old (World Health Organisation, 2008). This translates to a global rate of 28.8% deaths per 100 000

population (Prinsloo, Matzopoulos, & Sukhai, 2001). Violent deaths also account for 14% of deaths among males and 7% of deaths among females (World Health Organisation, 2008).

The Federal Bureau of Investigations in the USA released data indicating that 10% of the 20,000 homicides reported yearly are committed by individuals under the age of 18 years old (Feder, Levat & Dean, 2007). In 1999, juveniles accounted for 16% of all violent crime arrests and in 2001, 5,486 young people aged 10 to 24 were murdered, averaging 15 youth deaths each day (Centre for Disease Control & Prevention, 2004).

In South Africa there are approximately 20,000 violent killings each year and on average two South African children die every day from gunshot wounds (Economist, 2005). Homicide is the leading cause of death for male youths between the ages of 15 and 21 years in South Africa (Booyens, 2006). Despite the fact that youth are the main victims of homicide, they tend to also be the frequent perpetrators (Prinsloo et al., 2001). More and more children and youth are being shot each day. Booyens (2006) argues that the most important explanation for the youth homicide in South Africa is the availability of firearms, as firearm violence is highest between the individuals aged 15 to 24 years old and then tends to decrease in young adulthood (Booyens, 2006). The Red Cross Children's Hospital in Cape Town makes reference to an epidemic of gun violence as the number of youngsters with gunshot wounds presenting at the hospital has quadrupled in the past four years (Booyens, 2006).

Violence displayed by young people has become one of the most visible forms of violence within society. Youth violence deeply harms not only its victims, but also their families, friends and communities. The effects of youth violence are seen not only in deaths, illnesses and disability, but also in terms of quality of life as violence involving young people adds greatly to the costs of health services, reduces productivity, disrupts a range of essential services and generally undermines the fabric of society (Booyens, 2006). Other factors that contribute to violence and weapons being used for crimes are the settling of conflict, protecting oneself and gang welfare, poverty, substance abuse, family pathology/dysfunction and the impulsive nature of youth.

The vast majority of gunshot injuries and death occur in the 13 to 19 year old age group and occur with low velocity weapons (Hutt, van As, Wallis, Numanoglu, Millar & Rode, 2004). A significant amount of gunshot injuries are now being seen among children younger than 13 years and the incidence continues to increase (Hutt et al., 2004). Of these gunshot injuries, 67% of the children were male and the most common reason for circumstances of injury was being caught in the cross-fire of a gun fight (Hutt et al., 2004).

According to Prinsloo et al. (2001), the rates of violent death in low to middle income countries (32.1/100,000) were more than twice that of high income countries (14.4/ 100,000). It was reported that firearms accounted for 54% of homicides nationally and 28% of all non-natural deaths, making firearms the leading cause of non-natural death for the economically active group aged 15 to 64 years (Prinsloo et al., 2001). Cape Town's homicide rate (88 per 100,000) was among the highest of the five cities in South Africa and firearms have been the largest single contributor in Cape Town in the three years, spanning from 1999 to 2002, accounting for an average of 44% of homicides (Prinsloo et al., 2001). According to Prinsloo et al. (2001), young people in the 15 to 24 year age group were significantly more likely to be victims of firearm rather than non-firearm homicides.

The South Africa Police Services crime statistics purport that the South African homicide rate is dropping slowly (Economist, 2005). Notwithstanding this decline, South Africa's homicide rate is still one of the world's highest (Economist, 2005). The Economist (2005) also attributes the high homicide rate to easily available guns, as guns are the weapons used in nearly half of all murders. Police have set up stricter rules and systems in order to try and get rid of the surplus of firearms (Economist, 2005). The Police Service is destroying all the unregistered guns and setting up road blocks to check cars and vehicles for illicit firearms (Economist, 2005). In addition, new firearm laws have been implemented to make it harder to own a weapon legally (Economist, 2005). Some argue that these stricter laws will only increase the demand for black-market firearms. However, organisations such as Gun-Free South Africa are convinced that the supply will eventually decline (Economist, 2005).

Nelson Mandela argues in the World Report on violence and health that violence is a legacy that reproduces itself, thus new generations learn from the violence of previous generations,

as do victims learn from victimisers. This is due to the fact that the social conditions that nurture violence and crime are allowed to continue within the country (Nelson Mandela, 2002). According to the World Report on violence and health, the only way to decrease the incidences of violence, crime, mortalities and suicides is to change the social conditions and the attitudes of people within our country (Krug, Dahlberg, Mercy, Zwi & Lonzano, 2002).

### **2.3.3 Suicide**

Suicide is a fatal act of self-injury undertaken with a conscious self-destructive intent (Mitchell, Mitchell & Berk, 2000). Suicide ranks consistently among the top 10 causes of death in official statistics (Flisher, Liang, Laubscher & Lombard, 2004), and the data for youth suicides is as equally chilling as youth homicides (Feder, Levat & Dean, 2007).

In the year 2000, suicide accounted for approximately 0.4 - 0.9% of all deaths. This percentage is on the rise specifically among the youth and young males (Mitchell et al., 2000). Worldwide around 1,000 people commit suicide every day and thus suicide is already a major medical and public health issue (Mitchell et al., 2000). An American study reported that in 2001, 3,971 young people aged 15 to 25 years committed suicide making it the third leading cause of death in this age group nationwide (Feder et al., 2007). In South Africa, non-natural death was the leading cause of death in 1994, and suicide accounted for approximately 8% of the non-natural deaths in the first quarter of 1999 (Flisher et al., 2004).

Burrows and Laflamme (2005) argue that the political and social-economic transitions are impacting on health and that the urban and economically developed areas are most at risk and thus affected due to the fact that they are most susceptible and open to change. Their argument states that social, economic and health development has not been uniform across regions and this inconsistency is likely to have affected diverse social groups and communities differently. The differences across cities are therefore, not only found in the composition of the population, in city growth and economic factors, but also in health status and people's access to health care services and the suicide rate is a result of such factors (Burrows & Laflamme, 2005).

Burrows and Laflamme (2005) also found that suicide rates were most often highest among White individuals and males and that Black individuals consistently have the greatest difference between male and female rates across cities. The explanation given for these findings is the lack of an external source of blame for hardships combined with expectations of a high quality of life for Whites, compared to Asians and Coloureds who adhere to religions proscribing suicide and to Blacks who have close family ties and cultural taboos against suicide (Burrows & Laflamme, 2005). They concluded that the city does matter for the magnitude and distribution of suicide mortality across race and sex groups and the method of suicide used and thus highlights the importance of locally based suicide research (Burrows & Laflamme, 2005).

The Flisher et al. (2004) study reported 1,507,836 deaths of people aged 15 years and older between the years 1980 and 1990. Of these deaths, 16,389 (1.1%) were due to suicide. Of these suicides, 7,312 occurred in the White, Coloured and Asian populations (Flisher et al., 2004). This study's findings are consistent with Burrows and Laflamme's (2005) study that found that suicide rates were highest in the White population and also that the suicides among males were higher than those among females.

According to Flisher et al. (2004), a possible explanation for the higher suicide rate in males may be due to a greater male propensity towards lethality of the suicide method, occupational stress and alcohol abuse. The suggestions for the racial differences in suicide mortality in South Africa (i.e., highest in the White population) include decreased resilience and lack of external source of blame for hardships, expected high quality of life, and cultural and religious beliefs in other population groups (Flisher et al., 2004). A significant increase in youth suicides, specifically among White youth, in South Africa was also found in Flisher et al.'s study (2004). The possible risk factors may consist of drug and alcohol abuse, an increase in family dissolution and the changing role of men and women in society (Flisher et al., 2004).

Little is known about the suicide trends in South Africa and there is uncertainty regarding the relative importance of suicide across socio-demographic groups which makes it difficult to plan appropriate research and prevention programmes (Burrows & Laflamme, 2005). The

NIMSS has recently collected and made available surveillance data for several regions in the country allowing for certain comparisons to be made across these regions. However, most of this data is based on urban regions. Hence one of the aims of this study is to investigate suicide rates and proportional mortality trends in a peri-urban region, specifically Stellenbosch. The data for this study will include suicide cases occurring in the Stellenbosch region from the beginning of 2000 until the end of 2005, the date of the latest available data.

### **2.3.4 Accidents**

#### **2.3.4.1 Transport & Road Traffic Injuries**

The research into transport and road safety in developing and low income countries is scarce, especially in Africa, which is inconsistent with the magnitude of the problem. Lagarde (2007) reported that 90% of all road traffic injury deaths occurred in low and middle income countries and he predicts that by the year 2020 road traffic injuries will rank as high as third among the causes of morbidity and mortality.

A road traffic injury (RTI) is any injury due to crashes originating, terminating or involving a vehicle partially or fully on a public highway or road (World Health Organisation, 1992). It was reported in 2008 that more than 3,000 people die on the world's roads every day and tens of millions of people are injured or disabled from road traffic accidents every year (World Health Organisation, 2008). An earlier survey reported that road traffic injuries account for 1 million deaths each year and about 10 million people are injured and/or disabled in road traffic accidents throughout the world, particularly in low and middle class countries (Department of Health, 2002).

In 2000, an estimated 1.26 million people worldwide died as a result of road traffic injuries (Lagarde, 2007). Developing countries accounted for 85% of the global deaths due to transport injuries in 1998. Of those killed, children accounted for 96% (Department of Health, 2002).

Road traffic injury death rate is highest in Africa with a statistic of 28.3 per 100,000 population and it has been estimated that 59,000 people lost their lives in road traffic

accidents in Africa in 1990. By 2020 this figure will have increased to 144,000 (Lagarde, 2007). Traffic accidents and road traffic injuries were estimated to have cost South Africa roughly 14 billion rand per year which is an immense cost burden (Youth Risk Survey, 2002). Transport related injuries tend to occur substantially more among the poor and disadvantaged due to the fact that these are the people that tend to use public transport (Matzopoulos, Peden, Bradshaw & Jordaan, 2006). Pedestrians and passengers of public transportation tend to be the most affected people of road traffic accidents in Africa (Lagarde, 2007). This can be explained by a mix of incompatible users with communities living within the vicinity of roads or the lack of pavements along large urban streets. The severity of road traffic accidents is also likely to be much greater in Africa because of the poor transport conditions such as a lack of seat belts, overloading of vehicles, overcrowding, hazardous vehicle environments, un-roadworthy vehicles and a poor public transportation service (Lagarde, 2007).

Road traffic accidents cause over one million fatalities per year, with many millions more non-fatally injured or disabled. The WHO predicts that road traffic injuries will be the third leading cause of disability-adjusted life years (DALYs) lost, meaning that it will cause more DALYs to be lost every year than HIV/AIDS, TB, lower respiratory infectious, or war (World Health Organisation, 2004). While the problem of road traffic injuries is global, it is particularly acute in developing countries where rapid motorisation threatens to produce an epidemic of immense proportions (World Health Organisation, 2004).

Road block surveys estimated that 49.9% of front seat and 92.4% of back seat passengers travelling in light motor vehicles on the South African roads do not wear seatbelts, despite the fact that it is mandatory (Youth Risk Survey, 2002). Of these results it was concluded that an overwhelming 85.7% of youth do not wear their seatbelts when driven by someone else and an alarming 78.6% do not wear their seatbelts when driving themselves, thus showing that an overwhelming majority of adolescents do not comply with the legal requirements (Youth Risk Survey, 2002).

In addition, to the hazardous public transport and lack of seatbelt usage, there is the worry of driver, passengers and pedestrians using and abusing alcohol and other substances while travelling. Matzopoulos et al. (2006) reported that in the 1990's transport fatalities accounted for 30% of all injury mortalities in Cape Town and more than half had positive

blood alcohol levels. Adolescent pedestrian injuries are likely to present a similar profile to that of adults, where alcohol and other forms of substance abuse appear to be important contributory factors in road traffic injuries and motor vehicle accidents (Youth Risk Survey, 2002). It is estimated that 11% of all pedestrians on South African roads exceed the breath alcohol limit of 0.24 mg/litre of breath (Youth Risk Survey, 2002). The Department of Health (2002) reported that between 40% and 50% of vehicle-pedestrian collisions in urban areas and between 30% and 40% of vehicle-pedestrian collisions in rural areas involve pedestrians jaywalking or walking under the influence of alcohol or drugs.

Among pedestrian deaths, 60% had elevated blood alcohol concentration and it was found that after office hours 16% of pedestrians had blood alcohol levels equal to or greater than the legal driving limit of 0.05 g/100 ml of blood, and that pedestrians accounted for 72% of adult transport-related deaths (Youth Risk Survey, 2002). It was also found that 10.6% of learners walked along side the road after drinking alcohol (Youth Risk Survey, 2002). More alarming was that one month after the survey more than 1 in 3 (34.5%) learners drove in a vehicle with a driver who had been drinking alcohol and 7.8% drove themselves after drinking (Youth Risk Survey, 2002).

The WHO's is working with governmental and non- governmental partners, such as the Arrive Alive Campaign, around the world to raise the profile of the preventability of road traffic injuries and promote good practices related to helmet and seat-belt wearing, not drinking and driving, not speeding and being visible in traffic (World Health Organisation, 2008).

#### 2.3.4.2 Railway Casualties

Public and private transport injuries are an important cause of death and disability in the less developed, lower income countries (Lerer & Matzopoulos, 1996). According to the Department of Transport, over 2.8 million South Africans commute daily in overcrowded and unsafe public transport and of these at least 15% use trains on the railway (Bowman, Seedat & Matzopoulos, 2007). The city of Cape Town Metropole has an extensive railway system which is reputed to have a high level of injury and violence.

The impact of violence on train commuters was reported in a study conducted by the MRC in 1995 and this epidemiological study reported 125 incidents of non-fatal violence and 43 cases of fatal violence on the trains between the stations along the Cape Metropole railway (Lerer & Matzopoulos, 1996). The railway fatalities in South Africa are an important sub-set of transport accidents, accounting for between 11% and 14% of all transport mortalities (Matzopoulos et al., 2006). This situation is untenable as trains are regarded in industrialised countries as one of the safest and most affordable means of public transport, however, in South Africa this form of public transport results in 400 deaths yearly (Matzopoulos et al., 2006).

Many of the railway casualties are associated with suicidal behaviour, collisions with motor vehicles, overcrowding, criminality, gross risk-taking by commuters (such as train surfing) and commuters' excessive use of alcohol and other substances (Matzopoulos et al., 2006). This exposure to violence whilst travelling to work is likely to influence workers' psychological health and may begin to have immense repercussions economically through decreased productivity and outputs and secondly the violence on the public trains places stress and strain on the transport sector to increase safety which ultimately influences expenditure (Bowman et al., 2007).

In peri-urban areas, the situation of informal settlements developing next to railway lines substantially increased the number of pedestrians at risk (Matzopoulos et al., 2006). These conditions are the result of past apartheid land policy, which aimed to create a vast distance between poor peri-urban settlements and places of employment and by the 1980s, railway lines were increasingly bordered by informal settlements and pedestrian traffic control was neglected (Lerer & Matzopoulos, 1996).

It is reported that intoxicated pedestrians tend to engage in dangerous activities, such as crossing the lines at stations, hanging from or jumping into and out of moving trains and even worse being struck by oncoming trains while crossing the lines.

Lerer and Matzopoulos' study in 1996 found that alcohol and/or substance abuse was associated with all of the railway injuries. Blood alcohol testing was done on 79% of the people who died and almost half in the violence, falls-from-train, and struck-by-train

categories had raised blood alcohol concentrations. Alcohol intoxication was apparent in all categories of railway injury, especially struck-by-train (39%), falls-from-train (35%), and violence fatalities (40%), whereas in suicidal acts and other fatalities 27% and 28% of the individuals respectively were intoxicated (Lerer & Matzopoulos, 1996). Intoxicated commuters were also the preferred victims of criminal violence, unable to defend themselves and often thrown from moving carriages (Lerer & Matzopoulos, 1996).

A more recent study confirms that the percentage of intoxicated fatalities is alarming, with more than half of the railway pedestrians and passenger fatalities having blood alcohol contents that exceeded 0.05g/100ml (Matzopoulos et al., 2006).

### **2.3.5 Unintentional Injuries**

These types of fatal injuries and injury mortalities tend to occur more often among people in the rural informal settlements and those that fall within the lower socio-economic status. This is due to the fact that low-income settlements are often environmentally degraded, are further from health care services, have limited recreational facilities and have environmental overcrowding (Munro, van Niekerk & Seedat, 2005). The causation and risk factors of these types of injuries and deaths are many and form an essential part of the injury prevention knowledge base (Munro et al., 2005).

#### **2.3.5.1 Drowning**

Drowning is a significant cause of disability and death (Shepherd, 2008). Drowning is a process resulting in primary respiratory impairment from submersion in a liquid medium (2002 World Congress on Drowning cited in Shepherd, 2008). Annually approximately 150,000 deaths are reported worldwide from drowning with an annual incidence of probably closer to 500,000 (Shepherd, 2008).

In the United States, drowning deaths account for more than 8,000 deaths per year, with 1,500 of these deaths occurring in children (Shepherd, 2008). In 1997, the National Centre for Health statistics found drowning second only to motor vehicle accidents as the most common cause of injury and death in children aged between 1 month to 14 years old (Shepherd, 2008).

In 2002, the Centres for Disease Control and Prevention reported that 3,447 individuals had died due to unintentional drowning with 1,158 (34%) of these individuals younger than 19 years old (Shepherd, 2008). In 2004, there were 3,984 unintentional fatal drowning in the United States, averaging 9 people per day (Department of Health and Human Sciences, 2006 cited in Shepherd, 2008). In addition, for every death from drowning, an estimated 4 individuals are hospitalised and 14 individuals visit the emergency rooms (Shepherd, 2008).

Another study reported that in 2001, it was reported that 859 children ages 14 and under died as a result of unintentional deaths and children ages 4 and under accounted for more than 60% of these deaths ([www.usa.safekids.org](http://www.usa.safekids.org), 2004). In 2002, nearly 2700 children ages 14 and under were treated in hospital emergency rooms for unintentional drowning-related incidents ([www.usa.safekids.org](http://www.usa.safekids.org), 2004). In addition, to these statistics 15% of children are admitted for near-drowning and die in hospital and of the children that survive 20% suffer severe permanent, neurological disability ([www.usa.safekids.org](http://www.usa.safekids.org), 2004).

These unintentional drowning deaths show a bimodal distribution with an initial peak in the toddler age group and a second peak in adolescent to young adults (Shepherd, 2008). In the toddler age group most incidents tended to occur in bathtubs or swimming pools, whereas in the adolescent and young adult group (15 to 24 years old) the majority of cases occurred in natural bodies of water (Shepherd, 2008). The majority of drowning and near drowning occur in residential swimming pools and in open water sites ([www.usa.safekids.org](http://www.usa.safekids.org), 2004).

However, children can drown in as little as one inch of water and are therefore at risk of drowning in wading pools, bathtubs, buckets, diaper pails and toilets. More than half of drownings among infants (under age 1) occur in bathtubs ([www.usa.safekids.org](http://www.usa.safekids.org), 2004).

Drownings in this age group also occurred in toilets and buckets). More than half of drownings among children ages 1 to 4 are pool-related and children ages 5 to 14 most often drown in open water sites ([www.usa.safekids.org](http://www.usa.safekids.org), 2004).

Since 1984, more than 327 children, 89% between the ages of 7 months and 15 months, have drowned in buckets containing water or other liquids used for mopping floors and other household chores . It is estimated that 30 children drown annually in buckets. More than 10% of childhood drownings occurred in bathtubs and the majority of these occur in the absence of adult supervision. This study also reported that since 1983 there have been at

least 104 deaths and 162 non-fatal incidents involving baby bath seats in bathtubs (www.usa.safekids.org, 2004).

The Department of Health and Human Sciences found that in 2004 the main risk groups of drowning deaths were males and children. In 2004, males accounted for 78% of fatal unintentional drowning deaths in the United States and children younger than 4 years old accounted for 26% of these drowning deaths (Shepherd, 2008). Children ages 4 and under have the highest drowning death rate (two to three times greater than other age groups) and account for 80% of home drownings. Male children have a drowning rate 2 to 4 times that of female children, however, females have a bathtub drowning rate twice that of males. In addition, low-income children are at greater risk from non-swimming pool drownings (www.usa.safekids.org, 2004).

Drowning fatality rates are higher in southern and western states than in other regions of the United States and rural areas have higher death rates than urban or suburban areas, in part due to decreased access to emergency medical care (www.usa.safekids.org, 2004). Shepherd (2008) found racial differences in drowning deaths and reported that the overall rate for African American children is 1.7 times higher than that for White American children. Black males ages 5 to 9 have a swimming pool-related drowning rate 4 and a half times that of their white counterparts and Black males ages 10 to 14 have a swimming pool-related drowning rate 15 times that of their white counterparts (www.usa.safekids.org, 2004).

South African statistics indicate that about 70% of the South African population are not proficient swimmers and that drowning accounts for the second highest cause of accidental death amongst children under the age of 15 years (www.swimsa.co.za, 2008). Sixty percent of these drownings happen in rural South Africa typically around rivers, lakes and dams (www.swimsa.co.za, 2008). Approximately 95% of drownings involve South Africans from historically disadvantaged communities and more than 56% of cases involve children under the age of 15, with the majority drowning within a meter of the edge of the water (www.swimsa.co.za, 2008).

### 2.3.5.2 Burns

Burns are an important cause of childhood mortality, injury disability and psycho-social trauma in young children, especially those aged between 1 and 5 years (Van Niekerk, 2006) with more than 1,300 young children dying each year as a result of burn injuries. The NIMSS identified a total of 164 childhood burn injury cases that were registered by 32 state mortuaries in 2001, and of those 143 cases were analysed (Van Nierkerk, 2006). The results indicated that burns resulted in 14.1% of the recorded unintentional childhood fatalities. The majority of victims were Black (88.2%) and Coloured (9.9%) children, with most deaths 54.6% recorded between birth and 6 years of age (Van Niekerk, 2006).

The Red Cross Children's Hospital data indicated that there was an average annual rate of 6 burn injuries per 10,000 children, aged 12 years and younger and that the incidence of burn injuries is greater in boys than it is in girls for all ages (Van Niekerk, 2006). According to Van Niekerk (2006), low socio-economic status of the family, low education levels of the mother and psychosocial stress in the family have all been linked to increased risks for childhood burn injuries.

The number of burn injuries in the Western Cape, especially children is distressing. Approximately 1,000 children are treated in the burns unit at the Red Cross Children's Hospital each year ([www.pbp.org.za](http://www.pbp.org.za), 2008). Burn related injuries are the 3<sup>rd</sup> most common cause of death in children under the age of 14 years old in South Africa ([www.pbp.org.za](http://www.pbp.org.za), 2008). In Cape Town most burn injuries occur in toddlers between the ages of 1 and 2 years old ([www.pbp.org.za](http://www.pbp.org.za), 2008). Children are severely affected by burns and child burn survivor suffers not only physical damage and trauma but also emotionally and mentally ([www.pbp.org.za](http://www.pbp.org.za), 2008). Burn injuries are emotional one of the most traumatic in that once medical treatment is completed burn survivors are often ostracised in their community which causes them to withdraw as an active member of society ([www.pbp.org.za](http://www.pbp.org.za), 2008).

According to Hyder, Kashyap, Fishman and Wali (2004), it needs to be emphasised that burn injuries are not 'accidents', but are preventable in most cases with proper interventions. The WHO (2002) estimated between 17,000 and 19,000 deaths by fire among the 0-4 year age group in 2001 in Africa. Estimates indicate that at least 300,257 new cases of burns in Sub-Saharan Africa annually, with approximately 18,000 to 30,000 children 0-4 years die from

burns each year (Hyder et al., 2004). This study found that the majority of burn injuries in children occurred in the home and thus family interventions could have important effects in decreasing deaths due to burns (Hyder et al., 2004). It was found that in many cases younger children in the household are watched over by their older siblings while the parents are working and for this reason, interventions on burn safety would have to include specific physical interventions targeting adolescents and adults of the whole family unit (Hyder et al., 2004). In addition, the establishment of organised day-care or school facilities may provide a safe and productive environment for children, thereby limiting their exposure to hazards (Hyder et al., 2004).

In the United States, approximately 1.5 million individuals sustain burn injuries each year. Burn injuries are the 4<sup>th</sup> leading cause of accidental death in children with 5,500 deaths annually (Ollendick & Schroeder, 2003). Of the cases that sustain burn injuries, 7,000 individuals are hospitalised and approximately 50% of these victims are children and adolescents and 38% are under the age of 15 years old (Ollendick & Schroeder, 2003). Children and youth are disproportionately affected with two-thirds of all fatalities occurring in those less than 15 years of age (Ollendick & Schroeder, 2003). The study also found sex differences in burn injuries and mortalities; the male to female ratio is 2:1 (Ollendick & Schroeder, 2003). In children less than 5 years old, more than 50% of all paediatric cases are due to burn injuries whereas in youth, fires and burn injuries are the third leading cause of death and second only to motor vehicle accidents (Ollendick & Schroeder, 2003).

The manner in which children are injured varies according to the child's level of development. Between 75% and 80% of burn injuries in infants are due to scalds from liquid spills and bathing, and in the first 2 years of life, 95% of all burns occur indoors (Ollendick & Schroeder, 2003). As motor abilities increase toddlers are at risk of pulling down hot liquid and food spills and from hot tap water (Ollendick & Schroeder, 2003). The burn injuries in toddlers also seem to occur mainly indoors or in the home. Pre-school and school age children are often injured in experimental play with lighters, matches and kitchen devices (e.g. stoves while during adolescence 60% of burn injuries occur outside of the home and only 20% are due to scalding injuries within the home (Ollendick & Schroeder, 2003).

Munro et al. (2005) reported in their study that fatal injuries and mortalities from burns, especially in children and youth are due to the lack of parental supervision, access to hot liquids and heating equipment.

#### 2.3.5.3 Falls

In New York, fall-related injuries are the leading cause of injury hospitalisations among children ages 0-14 years old and adults 25 years and older (New York Department of Health, 2008). Falls also account for the leading cause of unintentional injury deaths for those 45 years and older (New York Department of Health, 2008). In addition, to fatal injuries and mortality, falls can result in serious injuries such as traumatic brain injuries and fractures (New York Department of Health, 2008). This makes for a heavy financial burden to fall-related injuries with a yearly cost of 1.3 billion in New York hospitals alone (New York Department of Health, 2008).

Falls vary depending on the age and developmental phase of the individual. In childhood falls can be an everyday occurrence and is a leading cause of fatal injuries (New York Department of Health, 2008). The most common causes of fall-related hospitalisation for children include slipping, falling from beds or from stairs/steps (New York Department of Health, 2008).

For children, falls were attributed to their characteristics and developmental phases of curiosity and exploration for example wanting to climb a tree and then falling or wanting to run and then slipping (Munro et al., 2005). An important risk factor was the lack of parental supervision especially among those aged 2 to 10 years as many times children were left unattended as their parents were still at work or had gone to the shop (Munro et al., 2005).

Fall-related injuries in older adults often lead to hospitalisation beginning the downward spiral that can result in long-term disability and death (New York Department of Health, 2008). Approximately 25% of 70 year olds experience at least one fall per year, rising to 35% in the over 75 age category (Health & Age, 2008). The common injuries resulting from falls in older persons include brain injuries and fractures and over 60% of these falls that lead to hospitalisation, occur in the home (New York Department of Health, 2008).

It is concluded that falls are a common cause for childhood injuries; however, they are not one of the main causes leading to childhood mortality, whereas in those older than 65 years, falls tend to be a main cause of disability and death.

#### 2.3.5.4 Poisoning

A poison is any substance that is harmful to your body when ingested, inhaled, injected, or absorbed through the skin (Centres for Disease Control & Prevention, 2008). Poisonings can be either intentional or unintentional. If the person taking or giving a substance did not mean to cause harm, then it is an unintentional poisoning, which includes the use of drugs or chemicals for recreational purposes in excessive amounts, such as an “overdose” and includes the excessive use of drugs or chemicals for nonrecreational purposes, by a toddler (Centres for Disease Control & Prevention, 2008). Whereas intentional poisoning is the result of a person taking or giving a substance with the intention of causing harm, this category includes suicide and assault by poisoning. When the distinction between intentional and unintentional is unclear, poisonings are usually labeled “undetermined” in intent (Centres for Disease Control & Prevention, 2008).

In 2005, 23,618 (72%) of the 32,691 poisoning deaths in the United States were unintentional, and 3,240 (10%) were undetermined (Centres for Disease Control & Prevention, 2008).

Unintentional poisoning ranked second only to motor vehicle crashes as a cause of unintentional injury death in 2005. Among people 35 to 54 years old, unintentional poisoning caused more deaths than motor vehicle crashes in 2005. Furthermore in 2005, 5,833 (18%) of the 32,691 poisoning deaths were intentional; of which 5,744 were suicides and 89 were homicides (Centres for Disease Control & Prevention, 2008).

In 2006, unintentional poisoning caused about 703,702 emergency hospital visits and almost 25% of these unintentional emergency room visits resulted in hospitalisation (Centres for Disease Control & Prevention, 2008). Bronstein et al., (2007) study reported that 2 million unintentional poisoning or poison exposure cases occurred in the year 2006. Intentional poisoning accounted for 220,924 emergency room visits of which 216,358 involved self-harm and 3,982 were assaults cases (Centres for Disease Control & Prevention, 2008). Of the 216,358 self-harm poisoning incidences, 75% resulted in hospitalisation (Centres for Disease Control & Prevention, 2008).

The Centres for Disease Control and Prevention (2008) reported gender, age and racial differences for unintentional poisoning deaths in 2005. They found that men were 2.1 times more likely than women to suffer poison injuries or mortalities. The peak age of poison deaths tends to occur in older adults aged 45 to 49 years old, however, the lowest mortality rates were among children less than 15 years old. Racial differences showed that African Americans had the highest death rates due to poisoning in the United States. In 2006, men were 1.5 times more likely than women to have unintentionally poisoned themselves and the highest rates were in the 40 to 49 year old age group. Thus the gender difference decreased from 2005 to 2006 (Centres for Disease Control & Prevention, 2008).

Differences were also found in intentional poisonings among those who committed suicide in 2005. The Centres for Disease Control & Prevention (2008) reported that men were 1.3 times more likely than women to commit suicide by poisoning themselves, and whites were 3.6 times more likely than blacks to have committed suicide due to poison. The peak age group of 45 to 49 years old showed the highest mortality rates which was the same as that for unintentional poisoning deaths (Centres for Disease Control & Prevention, 2008). In 2006, of those who intentionally harmed themselves with poison, women were 1.6 times more likely than men and the peak age was 15-19 years old, with a secondary peak in the 40-44 age group (Centres for Disease Control & Prevention, 2008).

Statistics given by the Canadian Safety Council reported that poisoning ranked next to falls and motor vehicle collisions as the third most frequent type of injury leading to hospitalisation in Canada and according to the Canadian Institute for Health Information, there were 28,581 poisoning cases admitted to Canadian hospitals in 1999-2000, out of a total 197,002 admissions for all injuries (Centres for Disease Control & Prevention, 2008).

The financial burden of poison deaths is enormous. In 2000, poisonings in the United States led to \$26 billion in medical expenses and made up 6% of the economic costs of all injuries (Centres for Disease Control & Prevention, 2008). Of this 26 billion dollars, males accounted for 75% of the total costs of poisoning injuries (\$19 billion) and females accounted for 25% of the total costs of poisoning injuries (almost \$7 billion) (Centres for Disease Control & Prevention, 2008).

Pesticide poisoning is a serious health problem and has been reported that an estimated 1 to 5 million cases of pesticide poisoning occur each year, resulting in 20,000 fatalities among agricultural workers (Department of Health, 2005). Pesticides are designed to kill, reduce and repel insects, weeds, rodents and other organisms that can threaten public health and national economies, however, when improperly used or stored these chemical agents can also harm humans and the key risk factors are cancer, birth defects and damage to both the nervous and endocrine systems (Department of Health, 2005). Poisoning due to pesticide is a notifiable condition in South Africa and since 2001, a total of 1,462 cases and 72 deaths have been reported to the Department of Health (Department of Health, 2005). The data indicate that the age specific incidence of pesticide poisoning shows a distinct pattern and a peak in the 15 to 19 year old age group (Department of Health, 2005). The data also show that the African population had by far the highest incidence accounting for 79% of all the cases reported in the country, followed by the Coloured (13%), White (6%) and Asian (1%) population groups (Department of Health, 2005).

In South Africa, aspiration and ingestion of foreign bodies and substances are significant contributors to childhood morbidity and mortality (van As, Chen, Millar & Roole, 2003). Of children who ingest foreign objects and substances, 80% are under the age of 3 years and are identified as the fifth most common cause of patients presenting to the Red Cross War Memorial Children's Hospital Trauma Unit (van As et al., 2003).

## **2.4 CHILDREN AND YOUTH**

### **2.4.1 Introduction**

Media headlines such as '4 youth were arrested and charged with murder, a 16-year-old boy allegedly attacked 4 people', 'An 11-year old and his 9-year old friend raped a 5-year old girl', 'A 14-year-old boy was arrested in a bar for drinking', 'Pupils between the ages of 14 and 17 were caught at school consuming alcohol' and 'Children as young as 9 years of age are being admitted to clinics with drug and alcohol problems', illustrate that children and youth in South Africa are becoming increasingly involved in violence both as victims and as perpetrators.

Violence can be described as the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development or deprivation (Youth Risk Survey, 2002). Developing countries and economies in transition have shown an increase in their homicide rate, and these have been associated with increases in the use of guns as a method of attack (Youth Risk Survey, 2002).

According to the 2001 national census, 52% of the population in South Africa are below the age of 25 years (Samara, 2005). The national figure for the Western Cape is 47% (Samara, 2005). Children and youth in South Africa are vulnerable groups, specifically Black Africans as they have been significantly impacted by the apartheid system. Children and youth growing up in the apartheid era, or the so called 'culture of violence' were subjected to malpractices and deleterious effects such as pass laws, forced removals, disruption of family units, inferior or no schooling, lack of compulsory education, lack of parental supervision and used as child labourers. These debilitating conditions may have led to marginalisation, frustration and aggression, which predisposed them to become involved in acts of violence and crime (Bezuidenhout, 2006). In particular Cape Town youth are faced with a range of hardships from violence and violence-related trauma to a disproportionate share of the area's socio-economic crisis especially on the Cape Flats, where most of the city's youth are and most of the crime occurs (Samara, 2005).

Despite the dawning of a new era of democracy in South Africa, many previously disadvantaged families are still enduring the pressures and difficulties associated with factors such as poverty and competition in the work market where skills and training are a requirement (Bezuidenhout, 2006). Thus, democracy has brought with it drastic changes for children and youth, such as requiring individuals to function at a skills level for which the past did not prepare them for (Bezuidenhout, 2006).

According to Rakshika Bhana (2002), South Africa is undergoing various socio-economic and political transitions. These transitions have impacted on the lives of young people leaving them to live in environments and conditions which contain many social stressors, such as high inflation rates, increased divorce statistics, increasing suicide and death due to AIDS and chronic poverty (Poggenpoel & Myburgh, 2002). These social stressors contribute to and

increase the violence and crime within our society. Often the psychological price of these social stressors is the erosion of humanity, strong feelings of inferiority, defencelessness, insecurity, fear and helplessness, as well as a live for the moment mentality (Burnett, 1999).

The psychological impact on children and youth is that they are exposed to social contexts in which it is difficult to experience success and develop self-respect according to the norms of society which set school achievement and the generation of income as requirements. This leads to the development of negative self-perception and socialises them onto the street, where violent behaviour and crime are the norm and a way of experiencing an alternative success (Burnett, 1999). Often violence and crime become internalised as a way of surviving.

A recent survey of Mitchell's Plain and Khayelitsha found unemployment in the Cape Flat townships to be 46% overall but over 60% were between the ages of 16 and 30 years old (Samara, 2005). Elected officials, community members and the youth themselves often point out that the key to unravelling the problem of crime and gangsterism in the city lies in creating alternatives for youth and establishing social, economic and psychological support services necessary for their healthy integration into their communities (Samara, 2005). A focus on children and youth is therefore crucial and necessary in order to understand the politics behind crime and suicide within South Africa.

Rachel Bray (cited in Samara, 2005) points out that the perception of youth criminality and deviance is part of an underlying notion among society that childhood and youth are dangerous developmental periods of life. Young people are considered vulnerable, but also rebellious and potentially delinquent in nature (Samara, 2005). Due to these reasons, there is a perceived need to organise and control the youth in order to regulate their behaviour and to prevent social disorder (Samara, 2005).

#### **2.4.2 Developmental Phases**

All humans go through several developmental phases during their lives and each developmental stage brings about new challenges (Bezuidenhout, 2006). According to

Sigelman and Rider (2003), development can be defined as systematic changes and continuities in the individual that occur between conception and death. These changes are orderly, patterned and relatively enduring and the continuities involve the ways in which we remain the same or continue to reflect our past (Sigelman & Rider, 2003). Development is age-graded and hierarchical in nature (Ireland, Smith & Thornberry, 2002). Thus a toddler needs to acquire a set of specific skills that facilitate subsequent appropriate development. According to Sigelman and Rider (2003), this occurs in stages, which is a period in life characterised by a particular set of abilities, motives, behaviour manifestations and emotions that occur together and form a coherent pattern which differentiates it from other stages. Each new stage incorporates the gains made during the earlier stages and at each new stage the individual is confronted with a unique problem that requires the integration of personal needs and skills with the social demands of their culture. The end product is a new orienting mode, and a new set of capabilities for interacting with others which has been influenced by cultural factors (Sigelman & Rider, 2003). However, inappropriate development or mal-development at an early age is likely to have a ripple effect on subsequent age-appropriate development that may persist into childhood (Ireland et al., 2002). According to Wait et al. (2005), the mastery of developmental tasks contributes to the person's resources for coping with social expectations and the challenges of life. The accomplishment of these skills leads to increased mastery of the environment.

The developmental stages that are relevant to this study are as follows: 0 to 1 years old (infancy), 1 to 4 years old (toddlerhood), 5 to 9 years old (childhood), 10 to 14 years old (early adolescence), 15 – 19 years old (late adolescence) and 20 -24 years old (early adulthood). I will be using these age groups as they are comparable to the International WHO Data.

Infancy is a period or phase of dramatic rapid growth (Wait et al., 2005). Infants have the ability to interact with people, the capacity to learn and by the age of 2 the fundamentals of movement, language and concept formation can be observed. The infant is able to socialise, is purposeful, can walk by him or herself, has acquired manual skills and is ready to acquire language, thus they begin to integrate simple responses into co-ordinated and meaningful patterns of social behaviour (Wait et al., 2005). Toddlerhood is associated with physical

activity, being busy, cognitive accomplishments, such as language production, and forms of playful fantasy. During this phase children grow increasingly aware of their own individuality and wilfulness, due to a powerful need to define and assert themselves. New motor and cognitive abilities allow toddlers to move around freely in their environment and to accept the challenges of a wide variety of exploratory activities. It is also a phase known for its self-regulation and increasing awareness of dependence and independence (Wait et al., 2005).

According to Ireland et al. (2002), childhood is a time of rapid development across a number of domains. Childhood is a period of influence which opens up new opportunities such as the ability to attend school, have contact with friends, as well as social evaluation and opportunities for success and failure (Wait et al., 2005).

During this phase, the lifestyle, values and beliefs of the child's family may be challenged by the broader community and variables such as family, school, peer-group, neighbourhoods and media can potentially influence the child's self-concept. There is also a vast growth in the child's physical, cognitive, emotional and social abilities and development (Wait et al., 2005). Healthy psychosocial development in early childhood is characterised by the young child's initiative to explore their environment by asking questions and literally exploring and in becoming increasingly curious in their way of participating purposefully in the environment (Wait et al., 2005). According to Ireland et al. (2002), children's normal and healthy development can be disrupted by exposure to any type of abusive conditions and may lead to maladaptive behaviours, including delinquency and drug use, in adolescence. The maltreatment or exposure may possibly cause ramifications in developmental domains which will further inhibit the development of age-appropriate behavioural expectation and contribute to long-term consequences (Ireland et al, 2002). Studies comparing maltreated with non-maltreated children have indicated higher rates of cognitive impairment, problems in social development, emotional problems and behavioural problems. Long-term behavioural consequences of early childhood maltreatment may develop because the maltreatment alters the way in which the victim processed social information and social cues and these deficits affect school adaptation and peer relationships with implications for development of anti-social and problematic behaviour later in life (Ireland et al., 2002).

Children's development consists of several interdependent domains, including sensory-motor, cognitive and social-emotional (McGregor et al., 2007). According to McGregor et al. (2007), more than 200 million children under the age of 5 years old fail to reach their potential in cognitive development because of poverty, poor health, poor nutrition and deficient care. Research shows that in later childhood these children will have poor levels of cognition and education both of which are linked to later employment (McGregor et al., 2007). Thus poverty and poor nutrition are related to unemployment, crime and increased mortality. In developing countries, an estimated 99 million children of primary-school age are not enrolled and of those enrolled, 22% do not complete their primary-school education. The study also reports that of the 559 million children under the age of 5 in developing countries, 126 million are living in extreme poverty and 156 million are stunted in their development (McGregor et al., 2007). According to McGregor et al. (2007), disadvantaged children in developing countries who do not reach their developmental potential are less likely to be productive adolescents and adults. Thus poverty is associated with reduced years of schooling, and studies show that on average each year of school increases one's wages by 9.7% (McGregor et al., 2007).

Adolescence which consists of early and late adolescence for the purposes of this study is a period of transition between childhood and adulthood (Wait et al., 2005). Early adolescence is described as normally beginning at puberty. In psychological terms it is the phase characterised by aspects such as emotional maturity and emotional independence of parents, the development of a certainty about an own identity, the ability towards abstract thinking, an own value system and the ability to establish mature love relationships and friendships (Wait et al., 2005). The early adolescent period emphasises intellectual development, competence and a growing interest and investment in work (Wait et al., 2005). During this phase children spend a great deal of their time learning and practising the skills and norms that are valued by their society and community, whether these skills and norms be reading, sports skills or violence. The abilities that children obtain in this phase are related to social and work-ethic values and they develop a more realistic image of themselves and their social values. During this period children learn to consider and communicate with others and this social, intellectual and emotional development strengthens them psychologically and prepares them for the challenges of adolescence. However, children who cannot handle social, emotional and

school demands manifest anxiety, behavioural and developmental problems which have the potential to create risks in future personality and emotional development (Wait et al., 2005).

According to Walker et al., (2007), large numbers of children from developing countries are exposed to community and political violence. Children are frequently exposed to multiple and accumulative risks which increasingly compromise their development. Studies of young South African children and youth who were exposed to violence show higher levels of post-traumatic stress disorder, aggression, attention problems and depression and thus there is a crucial need for interventions with younger children and youth (Walker et al., 2007).

According to Walker et al., 2007, the negative effects of exposure to violence are likely to increase when family cohesion or the mental health of the primary caregiver is disrupted.

According to an urban study, exposure to violence, witnessed or directly experienced related to both children's self-reports of distress and parents absence of distress in their children. Symptoms included loneliness, sadness, loss, inattention, disrupted sleep, nightmares, anxiety and fear (Barbarin, Richter & Thea de Wet, 2001). The effects of violence may play a role in relationships with peers in the form of emotional withdrawal and aggressive behaviour (Barbarin et al., 2001). American research on children and adolescents suggests that both direct and vicarious exposure to violence produce an array of psychological effects that intensify as the social and relational distance between the child and the victim decrease (Barbarin et al., 2001). The main effects of exposure to violence in these young children occurred in the domains of attention, aggression and anxiety-depression. The study suggests that family life may be a protective factor from the effects of violence for children.

Accordingly, the child's experience of violence is largely a function of the family's ability to serve as a barrier to the disturbances (Barbarin et al., 2001). This may be dependent on the quality of the family relationships and the amount of support and other social resources available to the child through the family (Barbarin et al., 2001). The study suggests that community-based and family-focused interventions underscore the value to children of expanding those programs that promote positive adaptation and mental health in communities where children are likely to be exposed to violence. Thus Barbarin et al. (2001) report that schools can play an especially important role by incorporating into their curriculum programmes that promote favourable self-appraisal and enhance children's capacity for self-reflection and coping skills. Such programmes challenge the norms about aggression as the

principal means of dealing with a problem and will also help in the reduction of post-traumatic stress and depressive symptoms.

Whereas late adolescence and early adulthood are periods in which a variety of relatively permanent decisions have to be made, such as deciding on a career and a moral code which will direct their adult life (Wait et al., 2005). This phase comes to an end through a gradual commitment to a personal integration of values, beliefs, goals and abilities into a holistic identity. This phase is also marked by the development of a strong emotional tie or relationship with another person and the development of independence from parents (Wait et al., 2005).

Adolescence is also a time of exploration, opportunity and risk (Youth Risk Survey, 2002). The consequences of adolescence risky behaviours are serious and dangerous and tend to include: assaults; traffic accidents; suicides; teenage pregnancies; and infectious diseases such as sexually transmitted infections, including HIV and AIDS (Youth Risk Survey, 2002). Many of these risk behaviours can lead to psycho-social problems including depression and anxiety (Youth Risk Survey, 2002).

### **2.4.3 Injury and Mortality**

#### 2.4.3.1. Introduction

South Africa has been gripped by a wave of youth violence. Official statistics indicate that 90% of the world's 11 million under 5 deaths take place in 42 under-resourced countries, of which South Africa is one (Krug, Patrick, Pattison & Stephen, 2006). The Inkatha Freedom Party (2008) reported that South Africa is now not only the crime capital of the world with the highest levels of crime in respect of the most morally repugnant crimes, which is bad enough in itself, but that children and youth have also become hardened criminals.

Public concern about child and adolescent violence is greater than ever before as violence has become a serious health concern (Daane, 2003). Evidence shows that children and adolescents are engaging in violence and violence-related behaviour at home, in the

community and at school (Daane, 2003). There is also evidence of interpersonal violence against children and adolescents often by other youths (Daane, 2003). The National Institution for Crime Prevention and the Rehabilitation of Offenders (NICRO) (1999) reported that police arrested 36,700 children aged 19 and under in the Western Cape. These numbers dropped over the next two years but halfway through 2002, the number of children arrested stood at 20,000, with estimates predicting it to be 41,000 by the end of the year (NICRO, 2002). More children and youth are arrested in the Western Cape Province than anywhere else in the country and that children, as young as 12 and 14 years have committed deeds so violent and cruel they have resulted in the deaths of equally young and vulnerable victims (NICRO, 2007).

Despite the transition, inequality and deprivation are still the primary experience of township children and youth and for many the only way for them to achieve real change is through participation in collective violence (Dissel, 1997). Crime and violence remain prevalent in the townships and many youth become involved in criminal activities. These youth use weapons and arms in order to carry out these criminal activities or in fights between different groups (Dissel, 1997).

Despite the political promise of a 'better life for all' some fourteen years ago, employment opportunities have not substantially increased and many of the youth are still on the streets rather than in a school (Dissel, 1997). The majority of South Africans are still impoverished and frustration has resulted from the non-delivery of material benefits by the government. This has led many youth to seek opportunities to acquire wealth by alternative means (Dissel, 1997). Crime is an obvious alternative and the availability of guns under R100.00 has led to an increasing tendency toward violent crimes. In South Africa increasing numbers of young people are being sent to prison. According to Dissel (1997), there are more than 12,000 juvenile prisoners in the country, many of whom are serious offenders.

However, the most crippling aspect of this exceptionally high level of violence experienced in South Africa among our youth is that violence and violence-related behaviour have come to be expected and may even have become normalised in society and among community members (Lockhat & van Niekerk, 2000). According to Lewis and Hamber (1997), South

Africa is referred to as a 'culture of violence' meaning a society which endorses and accepts violence as an acceptable and legitimate means to resolve problems and achieve goals. Statistics seem to support the view that South Africa has become a statistically normal feature of everyday life in the urban and rural settings and South African children and youth are by no means exempt from this violence (Hamber & Lewis, 1997). The South African Police Service (SAPS) estimates that 43% of South Africa's youth are at risk of becoming offenders, thus nearly half of the youth may at one time or another pass through the criminal justices system (Booyens, 2006). Analyses point to the characteristic risk factors of socio-economic deprivation, adverse housing conditions, dysfunctional families and substance abuse (NICRO, 2007).

Hussey (1997) argues that many fatal injuries and mortalities are preventable and thus the potential to dramatically reduce youth injury mortality is great. However, before more effective prevention programmes can be developed, significant gaps in our understanding of the causes of youth injury mortality needs to be filled.

#### 2.4.3.2 Main causes of death for children and youth

Child and adolescent injuries and mortalities specifically due to violence are a global public health concern, despite the fact that public perceptions and media presentations of fatal injuries and mortalities are generally distorted and unrepresentative (Lawrence & Fattore, 2004). According to the WHO's Global Burden of disease data, around 875,000 children and adolescents under the age of 18 years died as a result of an injury, violence and/or crime (World Health Organisation, 2008). For every one of these youth that dies, there are thousands more victims of injury or violence and crime left to live with disabilities and/or psychological scarring (World Health Organisation, 2008).

Globally, an average of 565 children, adolescents and young adults between the ages of 10–29 years die every day through interpersonal violence (Department of Health, 2002). Non-fatal violence (violence that does not result in death but in youth needing treatment at a hospital) is reported as being 20–40 times higher than homicide rates, and increases greatly in mid-adolescence and young adulthood (Department of Health, 2002).

In the United States, injuries are the leading cause of death in children and teenagers. The leading causes of unintentional injury vary by age and include drowning, poisoning, suffocation, burns, falls and motor vehicle, bicycle and pedestrian accidents (Schnitzer, 2006). Childhood injuries are responsible for approximately 16 000 deaths each year in the United States and Schnitzer (2006) argues that most of these injuries are preventable through modifying the child's environment, and having parents engage in safety practices.

Schniter (2006) found that the most injury-related deaths in infants (66%) are the result of suffocation. This may be because infants are placed in sleeping environment that does not meet the guidelines for infancy safety. In toddlers almost one-third of injury-related deaths are the result of motor vehicle accidents and more than one-fourth of drowning, whereas falls and poisoning are the leading causes of non fatal injuries in this age group (Schniter, 2006). Burns also contribute significantly to the mortality rate in toddlers. Motor vehicle accidents (58%) account for most of the fatal injuries in school age and falls, bicycle and pedestrian accidents account for the majority of non fatal injuries (Schniter, 2006). In adolescents motor vehicle accidents are the leading cause of injuries due to the fact that teenage drivers have high crash rates because of their inexperience and risky driving practice (Schniter, 2006).

An earlier study in 1997 found racial difference in that there was a higher mortality rate for homicide among African American youths compared to White American youths. The homicide rate among 15 to 24 years old African Americans is more than 7 times the rate for similarly aged White youths (Hussey, 1997). It is widely hypothesised that racial differentials in mortality are largely due to underlying racial differentials in socio-economic status (Hussey, 1997). The results of the study showed that relative to White youth, young African Americans were much more likely to exhibit the risk factors expected to increase injury mortality risk. African American youths were more than 4 times as likely to fall into the lowest income category (Hussey, 1997). Hussey (1997) found that the African American youth were more than 5 times more likely than White youths to become homicide victims.

A South African study revealed that 3.5% of victims of violence were younger than 14 years compared to 21.9% aged 14-21 years (Department of Health, 2002). Another South African cross-sectional study revealed that more than 50% of all boys and girls had experienced violence, either as victims or perpetrators (Department of Health, 2002). Additionally, a significant number of participants, especially males, believed that violence was a normal component of relationships, particularly those who had witnessed domestic violence in their homes (Department of Health, 2002). In terms of violence and aggressive behaviours on school property, 9.2% of learners carried weapons on school grounds (Department of Health, 2002). The Department of Health (2002) reported that 14.9% were threatened or injured by someone with a weapon, 9.2% threatened someone else with a weapon, and 19.3% engaged in a physical fight. Consistent with international findings, almost one-third of South African learners had been involved in some form of violence (Department of Health, 2002). Internationally males are 2-3 times more likely to have been involved in violence, whereas in South Africa they are 1.6 times more likely (Department of Health, 2002).

According to Bradshaw, Bourne and Nannan (2003), the level of mortality is a fundamental indicator of child health and understanding the causes of death among children provides insight as to how it can be reduced. The 1998 Demographic and Health Survey found that the infant mortality rate was 45 per 1000 live births for the preceding 10 years and the National Burden of Disease Study estimated just over half a million deaths which 106,000 were of children under the age of 5 years old and a further 7,800 were children aged 5 to 14 years (Bradshaw et al., 2003). By 2000 the infant mortality rate had risen to 60 per 1,000 live births and the under 5 year's old mortality rate had risen to 95 per 1,000.

The top causes of death for those under the age of 5 years were natural or non-fatal causes with HIV/AIDS accounting for 40% of the deaths (Bradshaw et al., 2003). Of the fatal injuries deaths in children under the age of five, road traffic accidents accounted for 1.1%, followed by burns accounting for 1%, while homicide and violence accounting for 0.6% and drowning accounted for 0.5% of the deaths (Bradshaw et al., 2003). A large number of these natural and non-natural deaths are preventable through proper delivery of primary health care approaches, whereas the other causes of death are associated with socio-economic status and poverty. These deaths are also preventable through the provision of access to clean water

basic sanitation, and parent psycho-education and more appropriate community-based prevention interventions (Bradshaw et al., 2003).

According to Bradshaw et al. (2003), as children get older the external causes of death (e.g. road traffic injuries, and drowning) tends to rise in importance. This is particularly noticeable among boys who die in greater numbers than girls (Bradshaw et al., 2003). Among those children aged 10-14 years old, road traffic injuries are the leading cause of death, homicide and suicides also featured in the top cause of death among this age group (Bradshaw et al., 2003). In this older age group causes such as HIV/AIDS are no longer the major cause for concern.

A study in Cape Town reported that 9.8% of males and 1.3% of females in secondary schools reported carrying knives to school during the previous 4 weeks of school (Department of Health, 2002). Another feature of violent behaviour among adolescents and young adults is the association with gang membership which is reported predominantly among males (Department of Health, 2002). Gang-violence was reported to account for approximately 10% of fatal assault cases and 14.3% learners admitted to being members of gangs (Department of Health, 2002). In a more recent study, Daane (2003) found that 16 to 19 year olds have the highest rate (91%) of violent victimisation for any age group and the second highest violent victimisation group was 12 to 15 year olds at a rate of 82%. In a 1998 study, 28% of the high school students reported being threatened by weapons (Maguire & Pastore cited in Daane, 2003). These students ranked crime and violence as the social problem about which they worried most. A more recent nationwide study of youth risk behaviours carried out in the USA found that in 1999, 5% of the students were absent from school as they felt unsafe at school or unsafe travelling to and from school (Kann et al., 1999).

Lawrence and Fattore's (2004) study aimed to examine whether there are distinct patterns in the deaths of a subsection of adolescents between the ages of 13 and 17 years old. This study found that the types of fatal assaults that occur during childhood follow developmental perspective related to the life stages of the child (Lawrence & Fattore, 2004). The rates of fatal assault also changed according to the developmental stages of the child. Other studies done in New South Wales showed a pattern that one third of the childhood fatal assaults

occurred in infancy and one-third in the teenage years (Lawrence & Fattore, 2004). It was also found that after middle childhood, the rate of fatal assaults increases to 1.8 deaths per 100,000 young people aged 15 to 17 years old, and this rate continues to increase for older teenagers and peaks in the early to mid twenties (Lawrence & Fattore, 2004). This study also reported that weapons were an important contributory factor in the killings however, there was differentiation between male killings and female killings. Nearly all the male killings involved a weapon (9 out of 11), whereas weapons were only used in several of the female killings (3 out of 7). In addition, they found that the majority of deaths occurred in someone's home rather than public or undetermined places (Lawrence & Fattore, 2004).

Regardless of these high numbers of violent crimes, injuries and mortalities among children and adolescent within schools, their communities and homes, relatively few perpetrators are punished or arrested and prevention interventions and strategies are low on government and policy makers' priority lists.

## **2.5 NATIONAL INJURY MORTALITY SURVEILLANCE SYSTEM**

The Crime, Violence and Injury Lead Programme was established as injuries and mortalities are pervasive features of South African life and priority public health concerns. The NIMSS was developed in 1999 by the Medical Research Council (MRC) and the UNISA Institute for Social and Health Sciences to gather mortality data and statistics (NIMSS, 1999). The annual report of the NIMSS is a mortuary-based system capturing twenty-one information items describing the epidemiology of fatal injuries. Despite the obvious importance of such information, it had been missing from the national vital statistics on cause of death since 1991, and there were no indications that the situation would change in the near future (NIMSS, 1999). Thus the NIMSS was established to fill this gap in the structure by providing more comprehensive information about deaths due to external causes (NIMSS, 1999).

The first annual report in 1999 covered 14,829 fatal injuries registered at ten mortuaries in five provinces- namely, Eastern Cape, Northern Cape, Kwa-Zulu Natal, Gauteng and the Western Cape, which only represented 25% of all the non-natural deaths in the country.

Thus the NIMSS aimed to progressively expand its geographical and case coverage until all injury deaths are included in what is intended to be an ongoing system for the epidemiological surveillance of fatal injuries (NIMSS, 1999). By 2004, a total of 31,446 deaths was covered from thirty-six mortuaries representing 40% of all non-natural deaths. The NIMSS is still largely based on the coverage of urban data. Therefore, there is a need to expand the system to include data from rural and peri-urban areas as well. Through this expansion the NIMSS is on its way to being an established or institutionalised system that registers all non-natural fatal injury deaths that occur annually within all areas of South Africa.

The information provided in the NIMSS reports is collated from existing investigative procedures at mortuaries, state forensic chemistry laboratories and the courts (NIMSS, 2001). All deaths due to external causes are included, and this enables an overview of the manner in which the different categories of external causes contribute to the profile of non-natural mortality in men, women, youth and children (NIMSS, 2001). The NIMSS data collection form records information including the date of the post-mortem, the date and time of the death, the age, population group and sex of the victim. It also records the scene of the injury, which includes the categories such as private house, informal settlement, roads, railways tracks, schools, sea, beaches and lakes, prison, medical service areas and farms, to mention a few. In addition, to this information the external cause or circumstance of injury and the apparent manner of death are provided. The external causes of injury include the categories such as firearm discharge, sharp and blunt objects, drowning, burns, suffocation, poisoning, hanging, gassing, motor vehicle collisions, bicycle or motor bike accidents, abortion, medical surgery, railway causality, aviation, and natural causes to list a variety. The apparent manner of death is divided into five categories - namely, homicide, suicide, accident, undetermined and natural. In addition, the data form also records data on alcohol and other substance levels in the victim's blood which is received from the forensic laboratories.

In 1999, of the 14,829 non-natural deaths recorded, 21% were female and 79% were male (NIMSS, 1999). The ratio of male to female deaths was 3.8 male deaths for every female death (NIMSS, 1999). The population group category showed that 3% of all the cases were Asian, 11% were White, 17% were Coloured and 69% were Black African (NIMSS, 1999). The majority of the victims were young adults, with 36% of all cases falling within the ages

of 15 to 29 and 37% between 30 to 44 years (NIMSS, 1999). Only 7% of the victims were aged 0 to 4 years, 14 % were aged 45 to 59 years and 6% were 60 years and older (NIMSS, 1999).

The leading manner of death was homicide, which accounted for 46% of all cases, following with accidents that accounted for 34% and suicide 8% (NIMSS, 1999). The apparent manner of death for 12% of all cases could not be determined and therefore was indicated as undetermined (NIMSS, 1999). The dominant manner of death from age 0 to 14 years was accidents and for youth it was homicide (NIMSS, 1999). Deaths due to suicide were the least common in all age groups (NIMSS, 1999). The main external cause of death was firearms which overshadowed all other external causes and accounted for 3,906 of the 14,824 cases and motor vehicle accidents followed with 3,684 deaths (NIMSS, 1999). Burns were the leading cause of death for infants younger than the age 1 and from ages 0 to 4 years; burns and pedestrian motor vehicle accident deaths ranked first and second (NIMSS, 1999). The leading external cause of death for those aged 5 to 14 years old was pedestrian motor vehicle accidents and drowning, whereas firearms were ranked the highest cause of death for the age group 15 to 64 years (NIMSS, 1999).

In 2000, 18,876 deaths were covered which constituted 24-29% of all non-natural deaths (NIMSS, 2000). Male deaths constituted 13,556 of the total number of cases whereas female deaths constituted 3,011 of the total number of cases, demonstrating as in 1999 there were far more male deaths than female deaths (NIMSS, 2000). The leading manner of death was homicide in 2000 (NIMSS, 2000). The leading manner of death for those aged between 0 to 14 years was accidents, whereas for the age group 15 to 24 year olds, homicide was most dominant (NIMSS , 2002).

The top five external causes of death for the year 2000 were firearms, sharp objects, pedestrian motor vehicle accidents, blunt objects and burns in rank order (NIMSS, 2000).

The leading external cause of death for those aged 0 to 4 years was burns, whereas pedestrian motor vehicle accidents was most dominant among those aged 5 to 14 years (NIMSS, 2000).

The leading external cause for victims 15 years and older was firearms (NIMSS, 2000).

In 2001, fatal injuries due to violence and motor vehicle collisions were identified as a top South African public health priority (NIMSS, 2001). The case load for 2001 increased drastically to 25,361 collected from thirty-two mortuaries in the five provinces and the data accounted for 37-39% of all non-natural deaths (NIMSS, 2001). Of the non-natural deaths 80.5% were male and 19.5% of the cases were female, confirming a far higher death rate among males than females (NIMSS, 2001). Of the 25,024 cases, where population group was known, Black Africans constituted 73.6% of cases, Coloureds 12.3%, Whites 11.2% and Asians 2.9% (NIMSS, 2001).

Again, the majority of victims were young adults, with 36.4% of cases being aged 15 to 29 years and 35.9% aged 30 to 44 years of age (NIMSS, 2001). Only 4% of the victims were younger than five years old, 3.8% were between the ages of 5 to 14 years, 14% were 45 to 59 years and 5.9% were 60 years and older (NIMSS, 2001). The leading apparent manner of non-natural death in 2001 was homicide for males and unintentional injury for females where the majority of homicide deaths were inflicted by firearms, followed by sharp objects, and mostly occurred in private homes (NIMSS, 2001). The dominant manner of death for those aged between 0 to 4 years was unintentional deaths, whereas homicide and suicide was most dominant among the youth and young adults (NIMSS, 2001). The leading cause of unintentional death in children aged 1 to 4 years were burns and drowning, while pedestrian motor vehicle accidents was most common for those between the ages of 5 and 14 years (NIMSS, 2001). The blood alcohol levels of victims were particularly elevated in firearm and sharp object homicides and among pedestrians and drivers who died in motor vehicle collisions (NIMSS, 2001).

Furthermore, in 2002, the fourth annual report of the National Injury Mortality Surveillance System reported a total of 32,890 cases from thirty-seven participating mortuaries, which represented 35-40% of all non-natural fatalities in South Africa (NIMSS, 2002). Of the cases recorded in the South Africa catchment area for 2002, 80.6% were male and 19.4% were female (NIMSS, 2002). The leading apparent manner of non-natural death in South Africa for 2002 was homicide which accounted for 45.4% of all fatal injuries and where the most common manner of death for males was homicide, whereas it was transport accidents for females (NIMSS, 2002). The leading manner of death amongst the 0 to 14 year old age

group was transport related (38.9%), whereas amongst the 15 to 24 year olds it was homicide (56.3%). The leading external cause of death was firearms (29%), followed by sharp force object injuries (14.5%) and pedestrian motor vehicle collision fatalities (11.5%) (NIMSS, 2002). The external cause of death by age was categorised as follows: for those aged between 0 to 14 years, firearms accounted for 38.5% of deaths, hangings accounted for 77.1%, pedestrian motor vehicle accidents accounted for 61.7% and drowning accounted for 36.1%, while burns accounted for 31.5% of the deaths (NIMSS, 2002). While for those aged between 15 and 24 years, firearms accounted for 54.9% of deaths, sharp objects accounted for 33.5%, hangings was 49.5%, while pedestrian motor vehicle accidents accounted for 31.6% and burns accounted for 38.2% of deaths (NIMSS, 2002). On average the majority of victims of non-natural fatalities had positive or elevated blood alcohol content levels. Those who tested positive showed an average blood alcohol concentration of 0.18g/100ml (NIMSS, 2002).

In 2003, a total of 31,921 fatalities were covered, thus the National Injury Mortality Surveillance System data represented 35% of all injury deaths in South Africa for 2003 (NIMSS, 2003). In 2003, there were 4.4 male deaths to every female death consistent with previous years (NIMSS, 2003). The most common apparent manner of death was violence which constituted 48% of all cases, followed by transport accidents which made up 30% of all the cases (NIMSS, 2003). The dominant manner of death among the age group 0 to 14 years old was transport related (42.9%) and among those aged 15 to 24 years old was violence (57.9%) (NIMSS, 2003). The leading external cause of death was firearms (27.9%), followed by sharp object injuries (14.8%), pedestrian motor vehicle accidents (12%) and blunt object injuries (7.1%) (NIMSS, 2003). The data showed that the majority of violent and transport injury death victims tested positive for alcohol (NIMSS, 2003).

The sixth annual National Injury Mortality Surveillance System report in 2004, recorded 31,446 non-natural deaths at thirty-five mortuaries among the provinces of which 79.9% were male and 20.1% were female (NIMSS, 2004) (refer to Table 1). The leading cause of death among males was homicide, whereas the transport collisions were the leading cause of death among females (NIMSS, 2004). Accidental injuries were the most common apparent manner of death constituting 39.8%, followed closely by deaths due to violence at 39.3% (NIMSS,

2004). The dominant manner of death for those aged 0 to 14 years was transport related deaths (38.4%), followed by unintentional injury deaths (31.5%), whereas for the 15 to 24 years olds it was again violence (51.7%) (NIMSS, 2004). The leading external cause of death was consistent with the previous reports, showing that firearms accounted for 22.7%, followed by sharp object injuries at 14.7% and pedestrian accident at 12.8% (NIMSS, 2004). The leading external cause of death for the age group 0 to 14 years was firearms (28.8%) followed by blunt force injury (18.2%) which differed from previous years (NIMSS, 2004). The dominant external causes of death fro those aged 15 to 24 stayed consistent with the previous years showing firearms to be most dominant at 45.3%, followed by sharp object injury accounting for 39.2% of the deaths (NIMSS, 2004).

See Table 1 for a comparative summary of the NIMSS data for the period 1999-2004.

YEAR	NON-NATURAL DEATHS RECORDED	F	M	LEADING MANNER OF DEATH (OVERALL)	LEADING MANNER OF DEATH (CHILDREN)	LEADING MANNER OF DEATH (YOUTH)	MAIN EXTERNAL CAUSE OF DEATH (OVERALL)	MAIN EXTERNAL CAUSE OF DEATH (CHILDREN)	MAIN CAUSE OF DEATH (YOUTH)
1999	14 829	21% 3 114	79% 11 715	Homicide (46%) Accidents (34%) Suicide (8%)	Accidents	Homicide	Firearms (26%)	Pedestrian MVC, burns, drowning	Firearms
2000	18 876	3 011	13 556	Homicide	Accidents	Homicide	Firearms	Burns, pedestrian MVC	Firearms
2001	25 361	19.5% 4 945	80.5% 20 416	Homicide (male) Unintentional injury (female)	Unintentional deaths	Homicide/ Suicide	Firearms Sharp Objects	Burns, drowning, pedestrian MVC	Firearms
2002	32 890	19.4% 6 381	80.6% 26 509	Homicide (45.4%) Transport (female)	Transport related	Homicide	Firearms (29%) Sharp objects (14.5%) Pedestrian MVC (11.5%)	Firearms (38.5%), Hanging (77.1%), Pedestrian MVC (61.7%), Drowning (36.1%), Burns (31.5%)	Firearms (54.9%) Sharp objects (33.5%), Hangings (49.5%), Pedestrian MVC (31.6%) Burns (38.2%)
2003	31 921	Not available	Not available	Violence (48%) Transport (female)	Transport related	Violence	Firearms (27.9%) Sharp objects (14.8%) MVA (12%) Blunt objects (7.1%)	Firearms	Firearms
2004	31 446	20.1% 6 321	79.9% 25 125	Accidental injury (39.8%) Violence (39.3%)	Transport (38.4%) Unintentional Injury (31.5%)	Violence (51.7%)	Firearms (22.7%) Sharp objects (14.7%) Pedestrian MVC (12.8%)	Firearms (28.8%) Blunt force injury (18.2%)	Firearms (45.3%) Sharp force injury (39.2%)

**Table 1: Comparative NIMSS data over the six years (1999-2004)**

The National Injury Mortality Surveillance System data of the six year period between 1999 and 2004 confirm that a high percentage of children aged between 0 to 10 die as a result of burns, drowning or pedestrian motor vehicle accidents, and the youth aged between 10 and 24 die mainly as a result of violence and suicide. The HST Update (1998) presented an article confirming that the youth, and specifically young Black African males are the most at risk of violence and mortality in South Africa. The youth in South Africa comprise approximately 43% of the country's total population of 44.8 million and according to the NIMSS homicide and violence accounted for the greatest percentage of deaths followed by road traffic accidents and suicide among those aged 15 to 24 years old (NIMSS, 2003). These morbidities and mortalities result in significant costs not only for the individuals, but also to their families, communities, health services, government and inevitably society as a whole.

## **2.6 POSSIBLE VIOLENCE AND CRIME RISK FACTORS**

Children and youth learn the use of violence through many sources. Both individual and societal factors affect and influence children and adolescents to display and conduct violent behaviours and crime, which may lead to fatal injuries and mortalities. Towner (2005) states that some of the major variations that occur in injury, mortality and morbidity reflect the individual's age, gender, socio-economic status, cultural and ethnic group and the place in which they live.

### **2.6.1 Exposure to Violence**

Exposure to violence, particularly violence in the home and communities, has dramatic negative effects on children and youth. These effects may cause both emotional scars and violent or delinquent behaviour (Daane, 2003). Children and adolescents encounter violence in their homes, in their communities and in their schools. In addition, to this exposure to violence they also see images of violence, crime and mortality on the television, in the video games and in the movies (Daane, 2003). The majority of children and youth in South Africa and in a peri-urban area such as Stellenbosch's communities are exposed to violence, fatal injuries and mortalities at some level. This exposure has been directly correlated to the

attributes approving of violence and violent behaviour (Owen & Straus, cited in Daane, 2003).

Living in a violent community creates stress and depression in children and adolescents, which is a significant predictor of aggressive and violent behaviour (O'Keefe, cited in Daane, 2003). This is particularly true for males (Daane, 2003). Children and adolescents who have been exposed to violence and violent behaviour are at a greater risk of becoming violent offenders or displaying violent behaviour. Both exposure to and being a victim of violence are associated with children's aggressive and violent behaviour (Cauffman, Feldman, Waterman & Steiner, cited in Daane, 2003).

Flannery, Singer and Wester (2001) compared dangerously violent adolescents with a group of non-violent adolescents and found that dangerously violent adolescents reported higher levels of exposure to violence and victimisation. In addition, exposure to crime, violence and mortality is also related to significant stress, depression and other mental health disorders in both children and youth (Cauffman et al., cited in Daane, 2003). Depression, stress and mental health disorders may then increase the children and adolescents' risks for violent and aggressive behaviour (Daane, 2003). This also increases the potential of suicide among the children and youth

### **2.6.2 Societal approval of violence**

Children and adolescents learn that violence is acceptable in certain situations not only by frequent exposure to violence and crime but also through observing the approval of violence (Daane, 2003). Children observe the approval of violence in various settings such as in the community, at home and even in their schools. Students at a school strongly approved of the use of violence as a means for self-defence (Daane, 2003). The students also approved of the use of violence for status maintenance, conflict resolution and punishment (Daane, 2003). The use of violence is acceptable due to the lack of action and consequences taken by teachers, parents and community members when they observe verbal assaults, pushing and physical contact between persons (Daane, 2003). This implied approval of violence teaches children and adolescents a destructive way in which to deal with conflict (Daane, 2003).

In addition, a large number of studies have shown that violence in media is a significant contributory factor to aggressive behaviour in children and adolescents (Feder et al., 2007). This research also indicates that the youth are spending more time with violent media such as TV programmes, video games and even music videos (Feder et al., 2007).

### **2.6.3 Alcohol and Substance Abuse**

Alcohol is considered a socially accepted drink for partying and entertaining, whereas substances such as drugs are less acceptable, but are becoming more and more acceptable among youth. Alcohol and substance use and abuse have been reported to lead to violence, thus the WHO suggests that in order to reduce the crime and violence, especially among youth, we need to reduce the availability of alcohol and substances (Meel, 2006). The WHO estimates that there are about 2 billion people who consume alcoholic beverages and 76.3 million with diagnosed alcohol use disorders (Meel, 2006). Rates of injury and injury-related death have been shown to be elevated substantially in samples of heavy drinkers and alcoholics (Mann, Suurvali & Smart, 2001).

According to Bonomo, Carolyn, Wolfe, Lynskey, Bowes and Patton (2001), on the one hand adolescent experimentation with alcohol is widely regarded as a normal part of adolescent development without adverse consequences, whereas on the other hand, early drinking appears to raise risks for progression to problem use in young adulthood. Their findings indicated that the short-term outcomes of adolescent alcohol misuse included physical injury, aggression, offences for violence or driving while intoxicated and high-risk sexual behaviour (Bonomo et al., 2001). In addition, they reported that injuries under the influence of alcohol were more than twice as likely in those reporting high dose drinking, frequent drinking or anti-social behaviour and three times more likely in those with drinking peers (Bonomo et al., 2001). One in four deaths of European men in the group aged 15-29 years are related to alcohol and in parts of Europe the figure is as high as one in three people (Meel, 2006).

In South Africa, people consume well over 6 billion litres of alcohol beverages per year and the prevalence of misuse is likely to be as much as 30% among certain groups (Meel, 2006). In addition, binge drinking among youth, especially males, is a major problem (Meel, 2006).

Alcohol abuse has been estimated to cost South Africa in an excess of R9 billion per year and the social costs of alcohol and substance related trauma, accidents and mortalities in South Africa far exceed the revenue collected (Meel, 2006).

Meel (2006) found that intoxication is a major factor behind the high percentage of motor vehicle accident injuries and mortalities, violent crime and suicide attempts. The study conducted in Johannesburg found that of 104 subjects, 39% had criminal convictions, the majority of which were committed while the subjects were intoxicated (Meel, 2006). The common alcohol/ substance abuse crimes were reported to be driving related at 17% and crimes of violence accounting for 15% (Meel, 2006).

According to the Department of Community Safety (2007), alcohol enjoys great popularity and special significance across class, social and ethnic groups in the Western Cape. This alcohol misuse results in serious health and social problems such as crime, violence, family dysfunction, risky sexual behaviour thus increases in HIV/AIDS, STI's and foetal alcohol syndrome, road-related deaths and other physical, psychological and mental illnesses, among the people in the Western Cape (Department of Community Safety, 2007).

Research undertaken by the MRC reported that 1 in 3 males and 1 in 5 females in Grade 11 (approximately aged 16 – 20) in Cape Town engaged in binge drinking and 80% of adolescent drinkers had been drunk at least once (Department of Community Safety, 2007). Over one quarter of drinkers in the Western Cape drink at risky levels over the week end and more than 1 in 2 non-natural deaths in Cape Town in 2002, had alcohol levels 0.05g/100ml and more than 1 in 3 patients seen at trauma units in Cape Town in 2001 had alcohol levels of 0.05g/100ml (Medical Research Council, 2007).

In a recent study from Cape Town, 60% of trauma patients showed positive alcohol levels on breath analysis, 28% were classified as problem drinkers, or possible chronic alcoholics on the basis of questionnaires and, on urine analysis, 40% of patients were found to have used at least one illicit drug in the recent past (Meel, 2006). In South Africa, 76% of all deaths after violence have been shown to be alcohol related and 70% of drivers with illegal blood alcohol levels account for nearly 30% of non-fatal and 47% of fatal driver deaths and injury to

drunken pedestrians show even greater alcohol relatedness, as pedestrian accidents account for 72% of traffic deaths (Meel, 2006).

Alcohol is the most prevalent substance of abuse among youth and many youth are experiencing the consequences of alcohol misuse which include emotional and physical development, increased risk of being a victim of violence, becoming pregnant, getting STD's or failing at school (Department of Community Safety, 2007). In adolescents, alcohol, drugs and tobacco play an important role in interpersonal violence and delinquent behaviour (Daane, 2003). Lowry et al. (1999) found that tobacco, alcohol and dagga use were associated with increased school violence, violence-related behaviour and victimisation. It was also found that the mere availability of illegal drugs on school property was associated with increased school violence (Lowry et al., 1999). Most of the children and adolescents using drugs and alcohol that displayed violent behaviour found it acceptable to use violence as a means of resolving conflict (Cirillo et al., 1998). Meel (2006) reported that there was a significant association between younger males, alcohol use and criminal behaviour. The Department of Community Safety (2007) reported that among 18 and 24 year old males, those who binge drink are more than twice as likely to have committed a violent crime.

According to Bonomo et al. (2001), the common risk factors for problematic alcohol use in adolescents are quantity, frequency of drinking, social disadvantage, family dysfunction, peer affiliations and tendency toward anti-social behaviours. While there is no single factor or cause of the high mortality rate among youth, alcohol and substance abuse seems to fall on the top of the priority list. In South Africa deaths occurring from alcohol use and abuse are on the rise specifically among youth and have become a major cause for concern. Statistics show that even those with the legal amount of alcohol in their blood have a substantially increased risk of being killed (Meel, 2006).

The Department of Community Safety has called for a strategy to prevent and deal effectively with the negative impact of alcohol and substance abuse as there is a critical need for one in the province. According to the WHO, the hazardous and harmful uses of alcohol have become an important risk to health. The MRC estimated that alcohol contributes 7% to the burden of death and disability in South Africa, 40% of the total alcohol related burden

occurring in the area of homicide and violence and 15% to road traffic accidents (Department of Community Safety, 2007).

#### **2.6.4 Availability of weapons/firearms**

The availability of firearms contributes to the higher level of criminal and violent behaviour among individuals. A wide range of crimes may involve the use of firearms from robbery and rape to unintentional injuries. In the United States nearly 40% of all households contain at least one firearm and each year more than 20 000 children and youths under the age of 20 are killed or injured by a firearm (Feder et al., 2007).

According to a United Nations survey of 69 countries, South Africa has one of the highest firearm related homicide rates in the world per 100,000 people ([www.sacc-ct.org.za/statistics.html](http://www.sacc-ct.org.za/statistics.html), 2008). South Africa has approximately 1.9 million licensed gun-owners who amongst them, own more than 3 million guns. Of these, approximately 1% are stolen each year, thus approximately 30,000 guns enter the illegal firearms trade each year (Mufamadi, 1996). The high level of crime linked to firearms in South Africa is due to various reasons. The domestic arms industry produces a large number of small arms, including hand guns and markets them aggressively at homes and in the community. Because many people in the communities have feeling of insecurity, there is a high demand for guns, both legal and illegal (Mufamadi, 1996).

An analysis on the 1996 police figures showed that most firearm-related murders and attempted murders occurred in KwaZulu Natal (32% and 28% respectively), followed by Gauteng (30% and 25%), Eastern Cape and Western Cape, whereas the Northern Cape experienced the lowest number of firearm-related murders and attempted murders (1%) ([www.sacc-ct.org.za/statistic.html](http://www.sacc-ct.org.za/statistic.html), 2008). Police figures showed that small arms are the most commonly used firearms in firearm related murders and attempted murders ([www.sacc-ct.org.za/statistic.html](http://www.sacc-ct.org.za/statistic.html), 2008). The Minister of Safety and Security reported that a total of 29,694 firearms were reported lost and stolen in 1998, which is an average of over 80 guns a day ([www.sacc-ct.org.za/statistic.html](http://www.sacc-ct.org.za/statistic.html), 2008). Of these 29,694 guns stolen in 1998, only

1,764 (6%) were recovered in that year and the rest, by definition, fell into criminal hands ([www.sacc-ct.org.za/statistic.html](http://www.sacc-ct.org.za/statistic.html), 2008).

Furthermore in 1996, 9,586 people were found to be in unlawful possession of a firearm, increasing to 10,065 in 1997 ([www.sacc-ct.org.za/statistic.html](http://www.sacc-ct.org.za/statistic.html), 2008). In 1996, 51,005 cases of robbery involved a firearm. This figure increased to 69,501 in 1998 ([www.sacc-ct.org.za/statistic](http://www.sacc-ct.org.za/statistic), 2008).

According to Hutt et al. (2004), there is a wealth of evidence linking gun ownership levels with paediatric gun-shot related mortality. Miller (cited in van Niekerk, 2004) showed that 5-14 year old children living in states with high levels of gun ownership were 16 times more likely to die from unintentional firearm injuries. However, while the evidence against uncontrolled ownership of guns mounts, children continue to be injured or killed by bullets, there is increasing pressure to improve surveillance of gunshot injuries, preventative strategies and support legislation against gun ownership (Hutt et al., 2004).

Despite the effects by the Department of Safety and Security and the South Africa Police Services, the number of guns are increasing annually in South Africa, with the Central Firearms Register receiving about 18,000 to 20,000 new applications monthly ([www.sacc-ct.org.za/statistic.html](http://www.sacc-ct.org.za/statistic.html), 2008). It is estimated that there are 11 to 13 million firearms in South Africa, 4 million legally owned, 5 million belonging to the South African National Defence Force and Police Service and 1 to 4 million being illegally held ([www.sacc-ct.org.za/statistic.html](http://www.sacc-ct.org.za/statistic.html), 2008). If these statistics are not shocking enough, youth are being issued with firearm licences and the Minister of Safety and Security reported that in 1998, 2,723 people of 16 years of age were issued with firearm licenses ([www.sacc-ct.org.za/statistic.html](http://www.sacc-ct.org.za/statistic.html), 2008). Thus South African professionals need to lobby the government at all levels for legislation to reduce gun ownership and impose tougher penalties on offenders (Hutt et al., 2004).

### **2.6.5 Low Self-esteem**

Self-esteem is linked to violence in various ways. Self-esteem is a factor in the use of violence because children and adolescents with low self-esteem may be more likely to engage in aggressive and violent behaviour than children and youth with high self-esteem or positive feelings about themselves (Lowenstein, cited in Daane, 2003).

Very aggressive and violent children and adolescents tend to have negative relations with family and friends and more likely to feel rejected by their parents and teachers (Daane, 2003). Generally the aggressive children and adolescents are those more likely to be teased and bullied in school by their peers (Daane, 2003).

### **2.6.6 Socio-Economic Status**

Socio-economic status is a hierarchical continuum that takes into account the lifestyles, attitudes and values that defines a person's position in society (Birken, Parking, To & Macarthur, 2006). In South Africa, as in most nations, socio - economic status or social disadvantage is associated with increased morbidity and mortality (Myer, Ehrlich, & Susser, as cited in Doolan et al., 2007). Rates of both intentional and accidental injury are at least 1.5 times higher in urban communities than in rural communities, and there is evidence to suggest substantial socio-economic variations in both the degree of violence and the forms of violence experienced (Myer et al., as cited in Doolan et al., 2007). In addition, violence against women is a major component of violent crime, which occurs predominantly in poorer communities (Myer et al., as cited in Doolan et al., 2007). Furthermore, Hussey (1997) found that homicide risk tended to increase as socio-economic status or income decreased.

The association between socio-economic development and injury patterns shows that three-quarters of all road traffic deaths occur in low-income countries and similarly that the homicide rate for low- to middle-income countries is estimated to be three times higher than that of high-income countries (13.6 compared to 4.3 per 100,000 population) (Seedat, 2002). For African countries the homicide rate is eleven times higher than the homicide rate for high-income countries (Seedat, 2002).

International and national research studies indicate that children in low-income neighbourhoods are at greater risk to sustaining accidental injuries than those living in middle to high income areas (Doolan, Ehrlich & Myer, 2007). Living in a household in a wealthy suburb compared to living in a household in the poorer suburbs was found to be a significantly protective factor against the experience of violence (Doolan et al., 2007).

In a recent study it was reported that employment of the household head reduced the odds of a violent death by 64% and thus it was found that employment and education were risk factors for violence at the individual level, whereas being in the wealthiest areas was protective against violence (Doolan et al., 2007). In addition, community members perceived low socio-economic status to be one of the main risk factors associated with experiencing violence (Swartz & Seedat, 2001).

In terms of youth and adolescents, Booyens (2006) reported that youth offenders tend to come from a lower socio-economic class and their home lives are characterised by familial and parental pathology, including parental separations, violence and physical abuse and neglect. Furthermore, socio-economic status seems to be a risk factor due to the fact that children and adolescents from a lower socio-economic status are generally more likely to have witnessed extreme violence and/or been the target of such violence, which in turn increases their risk of manifesting violent and criminal behaviour (Booyens, 2006). Thus there is sufficient evidence to show that socio-economic status is a possible risk factor associated with being a victim and/or a perpetrator of violence, injuries and mortality.

## **2.7 PREVENTION AND CONTROL INTERVENTIONS**

### **2.7.1 Introduction**

According to the Department of Safety and Security (2000), crime affects the quality of life of every South African. Thus reducing crime and building safer communities must be a priority for all of us in this country (Department of Safety & Security, 2000). In order for this to happen, crime prevention needs to be initiated at the community level. Community psychology as a discipline is particularly invested in prevention as a focus for intervention. Community crime prevention strategies are a framework for the crime prevention activities

that will make the communities safer (Department of Safety & Security, 2000). Crime prevention strategies argue that crime is not caused by any one event, but rather results from a combination of many factors (Department of Safety & Security, 2000).

Community psychology is not easily defined in a single definition thus it will be defined as involving the identification of the psychological needs and problems of deprived communities, the adaptation of existing techniques, methods and principles to different cultural groups, the development of appropriate strategies of intervention to enhance mental health, promoting competence and well-being, while gaining active participation and resource collaborating within communities and furthermore training and empowering community workers to extend psychological skills to the broader community (Nelson & Prilleltensky, 2005). Community Psychology focuses on the strengths of people living in adverse conditions, as well as the strengths of communities rather than focusing on individual or community weakness and problems (Nelson & Prilleltensky, 2005). By focusing on weakness and problems, people are placed in a subordinate position to whoever is suggesting they need monitoring and correction, whereas focusing on people's strengths enables them to build upon their pre-existing resources, capacities and talents (Nelson & Prilleltensky, 2005).

Community psychology emphasises the importance of prevention and early intervention. Its goal is to promote competence and well-being through self-help, community development and social and political action (Nelson & Prilleltensky, 2005). The community psychology perspective does not view behaviour as maladaptive, but rather as adaptive, in the best way possible, to oppressive and stressful conditions (Nelson & Prilleltensky, 2005).

Community based crime prevention involves responding to a few priority problems, using targeted multi-agency programmes. These programmes aim to address the causes of and opportunities for particular crime problems (The Department of Safety & Security, 2000). These programmes should also enforce laws, ensuring that order is maintained in the day to day activities of the community and reduce public fear of crime (The Department of Safety & Security, 2000). The community based crime prevention strategies suggest that the solution to crime must be based on the factors that cause crime. Thus the process of planning and designing community crime prevention strategies is based on four stages. Stage one is to

carry out a community safety audit in order to identify the crime problems and the offenders and understand the social and physical characteristics of the community (The Department of Safety & Security, 2000). Stage Two involves developing a strategy and identifying possible supports and solutions, and stage three involves the managing and implementation of the strategy, by developing a project plan with goals and objectives and ensuring that the community has the resources (The Department of Safety & Security, 2000). The last stage, stage four involves monitoring and evaluating the strategy (The Department of Safety & Security, 2000).

Prevention and intervention also has its roots in the field of public health sector. The community psychology perspective aims for early prevention and intervention programmes which strive to reduce the prevalence and incidence of a problem in a population or community and then aims to provide a secondary prevention and intervention which involves an early detection of the problem whereas, the public health perspective to prevention aims to reduce the environmental stressors and enhance individuals resistances to those stressors (Nelson & Prilleltensky, 2005).

However, despite growing recognition of injury and its consequences as a priority public health threat, our social and scientific responses and investment in prevention, specifically in peri-urban and rural areas has remained inadequate (Niekerk & Duncan, 2002).

The public health model seems to serve as the core conceptual framework for guiding the development of specific injury priorities and injury prevention and intervention responses and programmes across the globe (Niekerk & Duncan, 2002). This model involves four sequential steps and is adopted as an initial conceptual framework to guide the approach to the injury and mortality problem in Africa as it allows for the identification and facilitation of indigenous best practices to injury surveillance, epidemiology, injury prevention and policy development, all of which are critical priorities for researchers, policy makers and practitioners (Niekerk & Duncan, 2002).

The first step in the public health model is to determine the magnitude, scope and characteristics of the injury problem. In South Africa, especially in the peri-urban and rural

areas, there is a relative absence of extensive, reliable national data on the magnitude, extent and patterns of injury mortality and morbidity and without the injury information, the platform required for injury prevention and control interventions are limited and arguably ineffective (Niekerk & Duncan, 2002).

The second step of the public health model highlights the identification of risk and protective factors associated with injury mortality and morbidity, particularly those factors that are potentially modifiable which involves identifying risk and protective factors for violent or injury conducive attitudes, behaviour, settings, and products (Niekerk & Duncan, 2002). The third step utilises the information about causes and risk factors to injury, to design, pilot test, and evaluate injury prevention interventions and aims to develop interventions based largely upon information obtained from the previous steps, and testing these interventions (Niekerk & Duncan, 2002).

The final step is to implement the best interventions that reach the broadest scale and these are interventions that have been proven to be or are most likely to be effective (Niekerk & Duncan, 2002).

When prevention and control interventions are developed for children and adolescents they need to consider the fact that children lack judgment and experience and so cannot be expected to avoid injury on their own. Thus it is the responsibility of government and policy makers to take into consideration the specific developmental needs of children and adolescents and each particular stage as research has shown that safety information alone does not give the caregiver the competency to implement safety practices. Indications are that multifaceted, multidisciplinary models of childhood injury prevention methods are needed to be effective because of the many different types of injuries and the risk factors associated with them (Gulotta & Finney, 2000).

According to Seedat (2002), a multi-dimensional approach is encouraged to include educational, regulatory and structural interventions, where educational strategies aim to heighten individuals awareness about risks, triggers and possible prevention measures, such as mass media campaigns and parent effectiveness training, whereas regulatory interventions include legislative and environmental measures that alter the relationships between

individuals, situations, and harmful products for example laws and policies, visible policing, controlled access to liquor outlets and lighting of high-risk areas. In addition, structural interventions focus mainly on developing safe built environments to minimise opportunity for injuries and mortalities such as stabilising informal housing settlements through provision of basic health and sanitary facilities (Seedat, 2002).

### **2.7.2 Prevention and control interventions at present**

The recently prioritised national focus on fatal injury mortalities and morbidity has drawn attention to the need for robust and focused injury prevention and control interventions (Bender, Niekerk, Seedat & Atkins, 2002). Although there has been a spate of injury prevention and control initiatives hosted by the non-governmental, community-based, religious, and government organisations, most of these have been implemented in an unsystematic, unrelated and uncoordinated manner (Bender et al., 2002). The implementation of the vast number of injury prevention and control interventions has limited South Africa's efforts to identify effective practices in the prevention of injury, specifically injury among children and adolescents (Bender et al., 2002). Despite this, there is an increasing number of initiatives that have embraced the perspective that argues that injuries are not inevitable outcomes of daily living, but are in fact preventable and while a great deal of support for injury prevention infrastructure in Africa and South Africa, still needs to be generated, it is refreshing to see the growth in injury prevention endeavours on the continent (Stevens, 2003).

Many violence prevention programmes have emphasised teaching specific skills and encouraging the development of a range of emotional capacities. These intervention strategies include techniques to manage conflict, promote empathy and control anger and impulsive behaviour (Feder et al., 2007). Bhana (2002) argues that in order to reduce and prevent morbidity and mortalities which arise from violent behaviour patterns and lack of life skills, more urgency and importance should be generated around acknowledging that the school environment is of utmost importance for children and youth to acquire knowledge and life skills that equip them to make informed practical and emotional life decisions.

One community injury prevention response initiated was a home visitation programme in four low-income communities (Odendaal, Atkins, van Niekerk & Seedat, 2004). The overall aim of the programme was to identify, control and reduce child injury and injury risks in participating homes. The intervention focused on burns, falls, poisoning and traffic injuries and child development, specifically to highlight children's developmental needs in low-income settings (Odendaal et al., 2004).

The WHO has started a World Health Day which aims to raise awareness about the health impact and social and economic costs of particular injuries, highlighting particular vulnerabilities of certain groups, emphasising that effective action requires political commitment at the highest level of government and partnerships bridging many sectors of society (World Health Organisation, 2004).

Furthermore, there has been community based interventions focusing on Alcohol Abuse Reduction in the Western Cape, in the form of the Western Cape Alcohol Strategy. The Alcohol Strategy is a plan for action to minimise the harmful impacts of alcohol and focuses specifically on alcohol misuse (Department of Community Safety, 2003). The Department of Community Safety (2003) states that this strategy should also integrate with broader initiatives focusing on substance misuse in general, crime prevention and poverty alleviation.

Thus the information that will arise from this study is only a single component in progressing towards a safer and injury-free city. This study will therefore, represent a challenge to researchers, local government, non-governmental organisations, community based organisations and practitioners to explore and discuss the ways by which such information can be utilised and translated into the creation of concrete injury prevention policies and practices for the children and youth within the Stellenbosch district.

## **2.8 SUMMARY**

Research on fatal injury mortality and morbidity has focused on urban areas and mainly the adult age group. There is a need for strong empirical data on childhood and adolescent fatal injury mortality and morbidity in peri-urban and rural areas such as the Stellenbosch district.

There has also been several injury prevention and control interventions initiated, however, the majority of these interventions have not been effective due to their basis on inefficient data statistics. Thus this study aims to provide strong empirical data to fill this gap in the system.

This chapter has given a broad framework for the understanding of fatal injuries, mortalities and suicides among children and adolescents, while providing relevant information on developmental phases from infancy to young adulthood. Furthermore, potential risk factors such as exposure to violence, alcohol and substance abuse and availability of firearms have been discussed and the chapter has concluded with a discussion on the present injury prevention and control interventions and their effectiveness.

## **2.9 RESEARCH AIMS**

Whereas the broad aims of the present study have been delineated on page 7, the following specific epidemiological data will be determined:

- The leading apparent manner of death of infants, toddlers, children, early adolescents, late adolescents and early adults respectively;
- The leading external causes of death;
- Sex differentiation with regard to non-natural deaths;
- Population group differentiation with regards to non-natural deaths;
- Patterns of death with regard to time of day, day of week and month of year;
- Presence of alcohol (in blood content) in deaths due to homicide and accidents, and
- Presence of alcohol (in blood content) in deaths due to suicides and unintentional injuries.

The findings of the study will also be compared with data from urban settings from the NIMSS to draw out comparisons between peri-urban and urban profiles regarding non-natural deaths.

In the next chapter, the research methodology of the study will be presented.

## **CHAPTER THREE**

### **3.1 INTRODUCTION**

This chapter will present the research design and methodology utilised in the study. The chapter will also define the population from which the sample was drawn and discuss the measuring instruments, namely the National Injury Mortality Surveillance System (NIMSS) data collection form, used in the study. The procedures that were followed for data collection, as well as the ethical requirements and considerations will be discussed. In addition, a discussion on the quality, validity and reliability of the measuring instruments and procedures will be presented. A brief overview will be provided about the different statistical techniques and analyses used to analyse the data.

The study adopts an epidemiological approach and is part of an archival study which seeks to determine pertinent incidence and prevalence rates of the causes of non-natural mortalities for the age cohorts 0 to 24 years. The study covers the years 2001 to and including 2005. The Stellenbosch mortuary linked up with the NIMSS project in 2001 and the 2006 data was not available at the time that the study was conducted. The nature of the data reported in chapter four conforms closely with the manner in which the NIMSS data have been reported on an annual basis.

#### **3.2.1 Population**

The population targeted in this study included all non-natural injury mortality caseloads from the Stellenbosch mortuary, in the Western Cape, during the years spanning from 2001 to, and including 2005. An approximated total of 2,000 fatal injuries are registered for the Stellenbosch region for these years (The Crime, Lead and Injury Programme, 2007). The Stellenbosch mortuary is situated in Stellenbosch in the Western Cape and is categorised as a peri-urban area that is a rural area around or surrounding a town or city. Stellenbosch is located approximately 60km north east of Cape Town.

The NIMSS makes provision to register perpetrator information and context for violence of homicide and suicide. The collection of this data, however, can only occur after court investigations and proceedings are concluded and thus the data that was gathered from the Stellenbosch mortuary is purely victim based for the purpose of this study (NIMSS, 1999).

### **3.2.2 Sample**

A caseload of 591 non-natural injury mortalities was included in the study. The sample size is smaller than the amount of deaths recorded as the present study focuses on fatal injury mortalities and suicides among children and youth only and not for the whole population. Thus various criteria were set and the cases that met these criteria were extracted from the amount of deaths recorded to form the sample size of 591 cases.

The following criteria were set for inclusion of cases in the sample of the study:

- Between the ages of, and including, 0 years and 24 years.
- A victim of crime or non-natural injury mortality.
- The Stellenbosch district catchment area according to the specific set parameters.
- Have available blood alcohol content data (in the case of adolescent mortalities).

## **3.3 METHOD OF DATA COLLECTION**

### **3.3.1 Measuring Instrument**

The instruments used in this study were the Stellenbosch mortuary information records and the NIMSS data collection form. The Stellenbosch mortuary information records consist of a set of books which contain all the injured populations information and data. Information on all mortalities registered at the mortuary was transferred from these records on to the NIMSS data collection form. The NIMSS form records 21 items of information describing the: who, what, when, where and how of fatal injuries for all deaths that enter the forensic medico-legal system in thirty-six participating facilities (NIMSS, 2006). The blood alcohol content and substance level in the victim's blood is received at the MRC from the forensic laboratories.

### **3.3.2 National Injury Mortality Surveillance System (NIMSS) Data Collection Form**

The NIMSS data collection form was developed in 1999 by the MRC and the UNISA Institute for Social and Health Sciences to gather mortality data and statistics (NIMSS, 1999). The NIMSS system currently collects data from 36 mortuaries in seven provinces – namely, Eastern Cape, Gauteng, Kwa-Zulu Natal, Mpumalanga, Northern Cape, North West and the Western Cape (NIMSS, 2006).

The NIMSS data collection form records 21 items of information and classifies the external cause of death based on the International Classification of Disease Version 9 (ICD 9) and assigns a probable manner of death (that is, homicide, suicide, unintentional, natural or undetermined) code to each case (NIMSS, 2003). Spatial and temporal data are recorded, as well as the presence of alcohol and other substances within the victims' blood (NIMSS, 2003). The NIMSS data collection forms are completed by forensic pathologists and entered by clerks and secretarial staff at the participating mortuaries before being sent to the MRC (Butchart et al., 2001).

The NIMSS data collection form records information including the date of the post-mortem, the date and time of the death, the age, population group and sex of the victim. It also records the scene of the injury, which includes the categories such as private house, informal settlement, roads, railways tracks, schools, sea, beaches and lakes, prison, medical service areas and farms, to mention a few. In addition, to this information the external cause or circumstance of injury and the apparent manner of death are provided. The external causes of injury include the categories such as firearm discharge, sharp and blunt objects, drowning, burns, suffocation, poisoning, hanging, gassing, motor vehicle collisions, bicycle or motor bike accidents, abortion, medical surgery, railway causality, aviation, and natural causes to list a variety. The apparent manner of death is divided into five categories - namely, homicide, suicide, accident, undetermined and natural. In addition, the data form also records data on alcohol and other substance levels in the victim's blood, which is analysed using standard headspace gas chromatography at the state chemical forensic laboratories and attached to the post-mortem reports. The NIMSS data collection form is a standardised form

and has been used for many years and is considered to be a reliable and valid measuring instrument. Refer to Appendix A for a copy of the NIMSS data collection form.

### **3.4 PROCEDURE FOR DATA COLLECTION**

In this study the NIMSS data collection form was utilised at the Stellenbosch mortuary, in the Western Cape, to record the relevant and necessary data. The researcher, over a period of four months, manually transferred and recorded the information from the Stellenbosch mortuary information records to the NIMSS data collection forms.

Once the researcher had collected the necessary data, it was sent to the MRC's Crime, Violence and Injury Lead Programme for capturing by MRC staff. The data was captured into the existing computer programmes SPSS and Excel and then cleaned by the data capturers. The cleaning of the data involved checking that all the data collected were correct and complete. The collected, cleaned and captured data were then added to the existing data held at the MRC by the Crime, Violence and Injury Lead Programme for the Stellenbosch mortuary region. The available blood alcohol content and substance data was provided by the forensic laboratories.

The MRC-UNISA Crime, Violence & Injury Lead Programme data request form was then completed and sent to the senior research scientist at the Crime, Violence and Injury Lead Programme at the MRC, requesting the relevant and appropriate data so that it could be released to the researcher for the purposes of this study.

### **3.5 RESEARCH DESIGN**

The purpose of the study was to conduct a profile of fatal injury mortalities among children and adolescents in the Stellenbosch region. The study adopted a quantitative methodology, namely a cross-sectional design, using an existing data collection form. A cross-sectional design involves the collection of information from any given sample (in this case the injured sample) at one occasion. In other words, a cross-sectional design involves the collection of information of people of different age groups on a measure of interest, which are then

compared (Sigelman & Rider, 2003). The dependent variable is the fatal mortalities within the Stellenbosch region. The four independent variables or factors are A (age) which is presented at six levels or categories: a 0 to 1 year old group (infancy), a 2 to 4 year old group (toddler hood), a 5 to 9 year old group (early school age), 10-to 14 year old group (middle school age), a 15-to 19 year old group (early adolescence) and a 20-to24 year old group (late adolescence); B (sex) which is presented at two levels: male and female; C (population group) which is presented at five levels: Black African, Coloured, White, Asian and Unknown; and D (blood alcohol content) which is presented at three levels: zero blood alcohol content (0g/100ml), blood alcohol content below the legal limit (<0.05g/100ml) and blood alcohol content above the legal limit (> 0.05g/100ml). The alcohol concentration levels were only analysed for those individuals 10 years and older as for ages under 10, the collection of blood alcohol levels is not a standard procedure and is only considered in those cases where toxicology is a warranted.

### **3.6 ETHICAL CONSIDERATIONS**

Prior approval to conduct the study was obtained from the MRC's Crime, Violence and Injury Lead Programme and the Stellenbosch mortuary. Various precautions were taken to ensure that the anonymity and confidentiality of the designated population and sample data was protected during the data collection procedures. The required and necessary permission and consent was granted by the Stellenbosch Mortuary, Forensic head office and the MRC.

No personal information such as names, addresses, family details, identity numbers or any information that could affect court proceeding outcomes or identify the individuals whose data were captured is made available in this study. Only the researcher had access to all the data.

### **3.7 DATA ANALYSIS**

The data were statistically analysed by means of the computer-analysis programme, Statistical Package for the Social Sciences (SPSS) and Excel. Demographic data, mean ranks, medians and standard deviations were analysed by obtaining frequency distribution summaries and

descriptive statistics of the injured sample. Various statistical procedures including a frequencies and cross-tabulations were used to analyse the statistical data and make comparisons between various factors and variables. The cross-tabulations and frequencies also provided necessary information as to interactive effects of variables. The threat of experimenter effects (that is, any biasing effects in the study due to the actions of the researcher) were controlled for by automation (that is, a standardised data capturing form – NIMSS data collection form) and procedures for obtaining and recording the data, increasing the validity and reliability of the data. Unclear or ambiguous data were checked with officials at the mortuary and with the MRC.

The results of the study are reported in the next chapter.

## **CHAPTER FOUR**

### **RESULTS**

#### **4.1 INTRODUCTION**

The results to the aims of this study are reported in this chapter. The results will be reported in terms of the research hypotheses. Additional findings pertaining to the study will also be reported in this chapter. In addition, comparative data will be presented on the urban settings and the similarities and differences between urban and peri-urban data will be discussed. The data obtained from the Stellenbosch Mortuary records and the NIMSS data collection form were statistically analysed by means of the Statistical Package for the Social Sciences (SPSS).

#### **4.2 DEMOGRAPHIC INFORMATION**

This section presents analyses of the demographic data gathered from the non-natural injury mortalities and suicides registered at the Stellenbosch Mortuary.

##### **4.2.1 The Population**

The population targeted in this study included all non-natural injury mortality and suicide caseloads from the Stellenbosch mortuary, in the Western Cape, during the years spanning from 2001 to, and including 2005. A total of 2,253 fatal injury mortalities and suicides were registered at the Stellenbosch mortuary in this period, of which 1,981 cases fell under the Stellenbosch municipal area and the neighbouring areas of Strand, Somerset West and Macassar. Stellenbosch, Strand and Somerset West are situated in the Western Cape and are regarded as a peri-urban area, which is a rural area surrounding a town or city.

##### **4.2.2 Sample**

A caseload of 591 non-natural injury mortalities and suicides were included in the study, once exclusion criteria of age, catchment area and being a perpetrator rather than a victim of crime

were factored in. The sample of fatal injury mortalities and suicides (n = 591) are distributed among the years as follows:

- one hundred and two (17.3%) within the 2001 cohort
- one hundred and forty-two (24.0%) within the 2002 cohort
- eighty-eight (14.9%) within the 2003 cohort
- one hundred and fourteen (19.3%) within the 2004 cohort
- one hundred and forty-five (24.5%) within the 2005 cohort.

Research (NIMSS, 2000; NIMSS, 2003; World Health Organisation, 2008; Department of Health, 2002) has indicated that more males will be victim to death due to non-natural injury than females. In this study four hundred and twenty-six (72.1%) of the 591 cases for the five year period were males, whereas one hundred and fifty-seven (26.6%) were females and eight (1.4%) were undetermined.

In terms of population group (used by the government for statistical purposes), the majority of the sample, two hundred and eighty (47.4%), were Black, followed by Coloured accounting for two hundred and fifty-nine (43.8%) of the cases, while forty-three (7.3%) were White and nine (1.6%) were unknown or undetermined. Of the 591 non-natural mortalities and suicides, none was of the Asian population group.

#### **4.3 RESEARCH FINDINGS**

Given the essentially epidemiological nature of the study the data was mainly at a nominal level of analysis. The findings will be presented under the following categories: (1) Apparent manner of death, (2) external cause of death, (3) deaths due to violence or crime, (4) suicide deaths, (5) transport-related deaths, (6) other unintentional injury deaths. These categories will be analysed according to specific factors.

These factors are as follows: Factor A (sex) which will be presented at two levels, namely male and female; Factor B (age) which will be presented at six levels, namely - 0 to 1 year old group (infancy), 2 to 4 year old group (toddlerhood), 5 to 9 year old group (childhood), 10- to 14 year old group (early adolescence), 15- to 19 year old group (late adolescence) and a 20- to

24 year old group (early adulthood); Factor C (population group) which will be presented at five levels, namely Black African, Coloured, White, Asian and Unknown; Factor D (year of death) which will be presented at 5 levels, namely 2001, 2002, 2003, 2004 and 2005; Factor E (month of death) at 12 levels, namely January, February, March, April, May, June, July, August, September, October, November and December; Factor F (day of the week), namely Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday; Factor G (time of day) which will be presented at 24 levels according to the actual time of day; Factor H (scene of injury) presented at number of levels and; Factor I (blood alcohol content) which will be presented at five levels, namely, zero blood alcohol content (0g/100ml), blood alcohol content below the legal limit (0.01- 0.04), blood alcohol content just over the legal limit (0.05-0.14), blood alcohol level above legal limit (0.15-0.24) and blood alcohol concentration at high and risky levels (>0.25g). The blood alcohol content levels will only be analysed for the age groups from early adolescence, late adolescence and early adulthood as this data is only collected from youth 10 years and older. Summary tables and graphs of the research findings will also be provided.

The threat of experimenter effects (that is, any biasing effects in the study due to the actions or subjectivity of the researcher) was minimal due to the archival nature of the research. The researcher merely transferred data from the Stellenbosch mortuary records to the NIMSS data collection form. Incomplete or problematic data were discussed with the relevant mortuary officials or the MRC staff member to protect the integrity of the data and the research process. The degree of automation in using the standardised data capturing form – (NIMSS data collection form) and procedures helped to enhance the validity and reliability of the data.

#### **4.3.1 APPARENT MANNER OF DEATH**

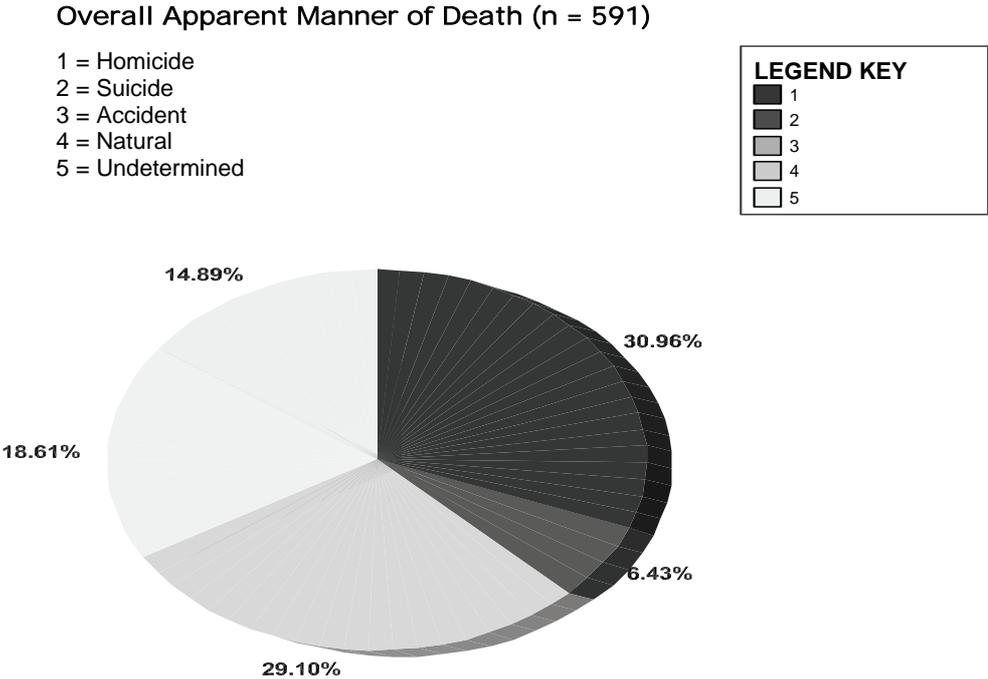
##### **Overall apparent manner of death**

The most common apparent manner of non-natural death, for the five year period, spanning from 2001 to, and including 2005, for the age group 0 to 24 years was homicide accounting for 31% of the injury deaths, followed by transport accidents which accounted for 29.1%.

Natural deaths accounted for 18.6% of the deaths, whereas 14.9% of the deaths were undetermined. In addition, suicide accounted for the least amount of deaths at 6.4%.

The overall apparent manner of death is presented diagrammatically in Figure 1.

**Figure 1. The Overall Apparent Manner of Death (N=591)**



**Patterns of Apparent Manner of death**

The most non-natural injury deaths occurred in the year 2005, accounting for 145 of the 591 (24.5%) of the cases, followed by 142 (24%) of deaths in 2002. Of the remaining cases, 2004 accounted for 114 (19.3%) and 2001 and 2003, accounted for 102 (17.3%) and 88 (14.9%) of non-natural injury deaths in the catchment area respectively.

In 2001, the leading cause of apparent manner of death was homicide (36.3%), followed by accidents which accounted for 24.5%. Natural deaths accounted for 19.6% and undetermined

deaths accounted for 14.7%, whereas suicides accounted for only 4.9% of the non-natural injury deaths in 2001.

The leading cause of apparent manner of deaths in 2002 was homicide (28.9%), followed closely by transport deaths at 27.5%. Thirty three (23.2%) of the deaths for 2002 were undetermined. Of the remaining cases, 12% were natural deaths and 8.5% were suicide deaths.

Over the five year period the least amount of deaths occurred in 2003. The majority of deaths in 2003 were due to homicide and violence (36.4%) and again was followed closely by transport and transport-related deaths at 29.5%. Suicides (2.3%) accounted for the least amount of non-natural injury deaths in 2003. Natural and undetermined deaths accounted for 14.8% and 17% of deaths respectively.

Refer to Table 2 for a summary of the data.

**Table 2. Apparent manner of death per year**

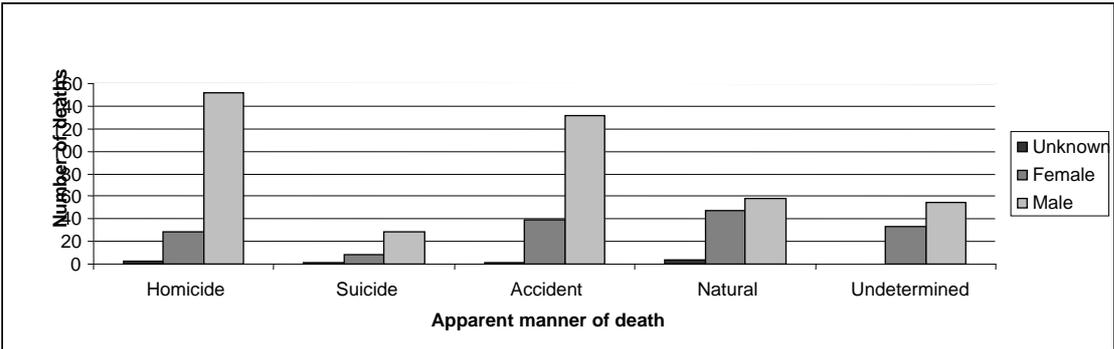
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
<b>Homicide</b>	37 (36.3%)	41 (28.9%)	32 (36.4%)	30 (26.3%)	43 (29.7%)
<b>Suicide</b>	5 (4.9%)	12 (8.5%)	2 (2.3%)	10 (8.8%)	9 (6.2%)
<b>Accident</b>	25 (24.5%)	39 (27.5%)	26 (29.5%)	43 (37.7%)	39 (26.9%)
<b>Natural</b>	20 (19.6%)	17 (12%)	13 (14.8%)	26 (22.8%)	34 (23.4%)
<b>Undetermined</b>	15 (14.7%)	33 (23.2%)	15 (17%)	5 (4.4%)	20 (13.8%)
<b>Total</b>	102 (100%)	142 (100%)	88 (100%)	114 (100%)	145 (100%)

**Apparent Manner of Death by Sex**

In eight (1.4%) of the 591 cases of non-natural injury deaths, the sex was undetermined. Of the remaining 583 cases of non-natural injury deaths, male deaths accounted for 426 (72.1%) of the cases, with females accounted for 157 (26.6%) of the deaths. The ratio indicates that there were 2.7 male deaths for every female death. The leading cause of death among males was homicide accounting for 152 (83.0%), followed by transport deaths 132 (76.7%).

Whereas the leading manner of death among females was natural 48 (43.6%), followed by transport deaths 39 (22.6%). There were 5.2 male deaths for every female death due to violence deaths. The male: female ratios for suicide, transport and other unintentional deaths injuries were, 3.6, 3.38, and 1.4, respectively. The patterns of apparent manner of death by sex is presented diagrammatically in Figure 2.

**Figure 2. Patterns of Apparent Manner of Death by Sex (N=591)**



In all of the five years, spanning 2001 to and including 2005, male deaths were higher than female deaths in each of the five apparent manner of death categories except for natural deaths in 2005 where the female deaths were more than for the males and for the undetermined deaths in 2005 which were equal for both males and females. In all five years the least amount of deaths for both sexes was for suicides, where as violence and transport deaths seem to account for the majority of male deaths in all five years and transport accidents for females. See Table 3.

**Table 3. Patterns of Apparent Manner of Death by Sex for 2001-2005**

	Homicide		Suicide		Transport		Natural		Undetermined	
	M	F	M	F	M	F	M	F	M	F
2001	32	5	3	2	20	5	11	9	9	5
2002	37	4	9	2	25	14	10	7	19	14
2003	24	7	2	0	22	4	12	0	12	3
2004	25	4	8	2	33	9	14	10	5	0
2005	34	9	7	2	32	7	11	22	10	10

### **Apparent Manner of Death, by Age**

The mean age of children and youth aged between 0-24 years at death was 12.82 years old. The majority of deaths occurred among infants younger than one, and of the remaining cases older than 1 year, the average age of death was 17.37 years old.

The leading apparent manner of death among the six age groups was as follows:

- **0-1 years** – natural (15.56%), followed by undetermined deaths (10.15%)
- **2-4 years** – transport (2.19%)
- **5-9 years** – transport (3.21%)
- **10-14 years** – transport (3.89%)
- **15-19 years** – violence (8.62%), followed by transport (6.09%)
- **20-24 years** – violence (19.62%), followed by transport (11.67%)

### **Apparent Manner of Death by Population Group**

The majority of non-natural injury deaths occurred among Black people (47.3%), followed by Coloured people (43.8%). Of the remaining deaths, 7.3% occurred among White people while the classification of 0.16% was unknown. The majority of homicides occurred among Blacks (57.9%), followed by the Coloureds accounting for 39.3% of the violent deaths. Suicide and transport deaths were highest in the Coloured population group accounting for 44.7% and 51.7% respectively. Natural deaths were highest among the Black population group (57.2%). The White population group accounted for the lowest amount of deaths in each category. Refer to Table 4 for a summary of death per population group.

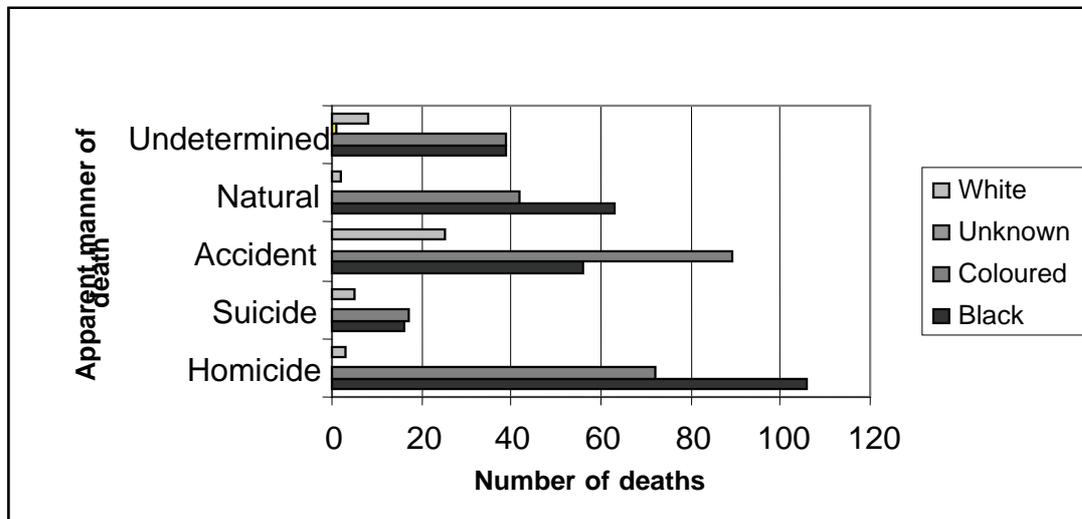
**Table 4: Apparent manner of death by population group (N=591)**

						Total
	Homicide	Suicide	Accident	Natural	Undetermined	
<b>RACE</b>	2	0	2	3	1	8
Black	106	16	56	63	39	280
Coloured	72	17	89	42	39	259
White	3	5	25	2	8	43
Unknown	0	0	0	0	1	1
Total	183	38	172	110	88	591

**Patterns of Apparent Manner of Death, by Population Group**

The majority of deaths accorded among the Black population group in each year, followed by deaths in the Coloured population group. The White population group accounted for the least amount of deaths in each year. The patterns of apparent manner of death in terms of population group is represented diagrammatically in Figure 3.

**Figure 3. The Apparent Manner of Death by Population Group (N=591)**



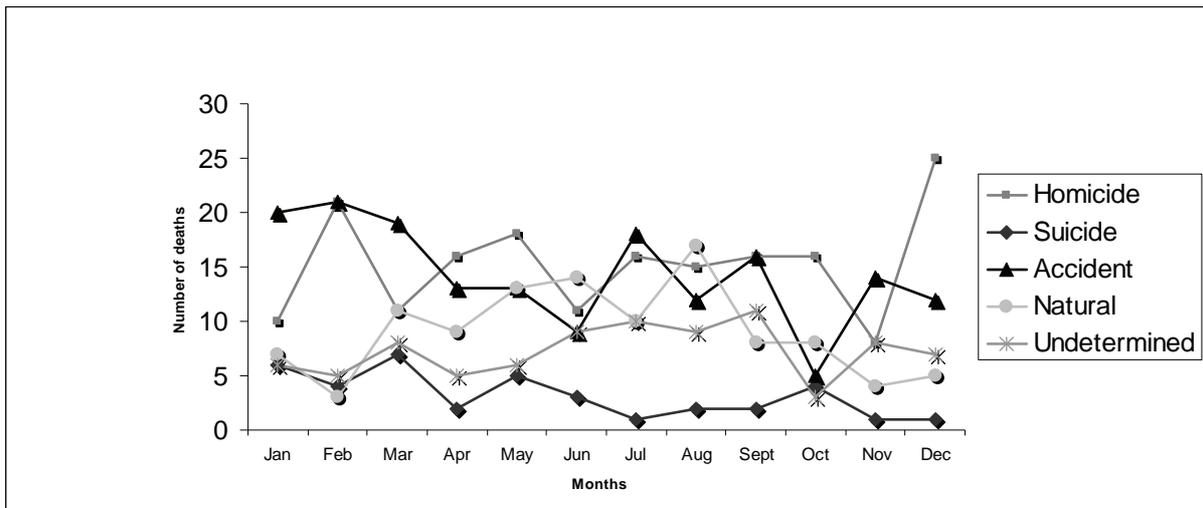
**Apparent Manner of Death by Month**

The most common month for apparent manner of death is as follows:

- Homicide/Violence was December (13.66%), followed by February (11.47%);

- Suicide was March (18.42%), followed by January (15.78%);
- Transport-related deaths was February (12.2%), followed closely by January (11.62%); and
- Deaths from other unintentional injuries occurred in the winter months of June (11.73%), July (10.2%) and August (13.26%).

**Figure 4. The Apparent Manner of Death by Month (N=591)**

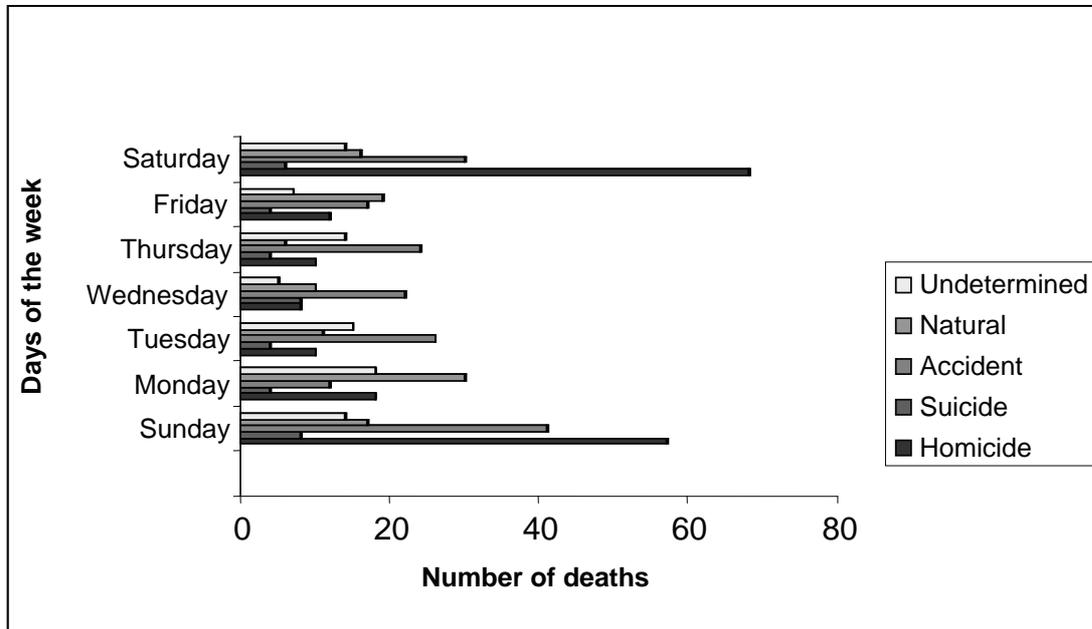


### Apparent Manner of Death by Day of the Week

The most common days for death from:

- Homicide/ violence was Saturday (37.15%), followed by Sunday (31.14%);
- Suicide was Sunday and Wednesday (21.05%), followed by Saturday (15.78%);
- Transport-related deaths was Sunday (23.83%), followed by Saturday (17.44%); and
- Other unintentional injuries were Monday (24.24%), followed by Sunday (15.65%).

**Figure 5. The Apparent Manner of Death by Day of the Week (N-591)**



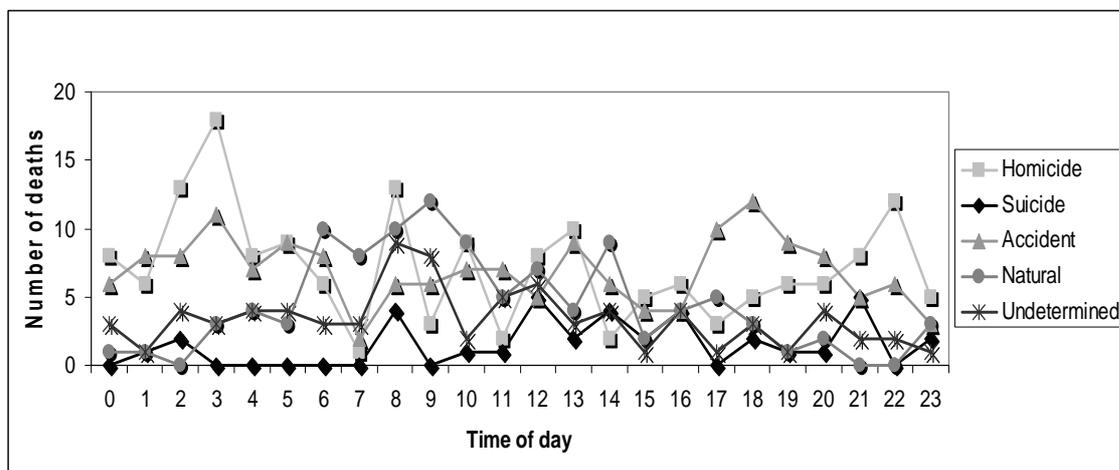
**Apparent Manner of Death by time of day**

The peak time(s) for deaths were:

- Homicide was 02h00 – 03h00, followed by 21h00 – 22h00;
- Suicide was 12h00 – 14h00, followed by 20h00 – 21h00;
- Transport-related deaths was 17h00 – 20h00, followed by 01h00 – 03h00; and
- Other unintentional injury deaths were 08h00 – 09h00.

See Figure 6 for a representation of apparent manner of death by time of day.

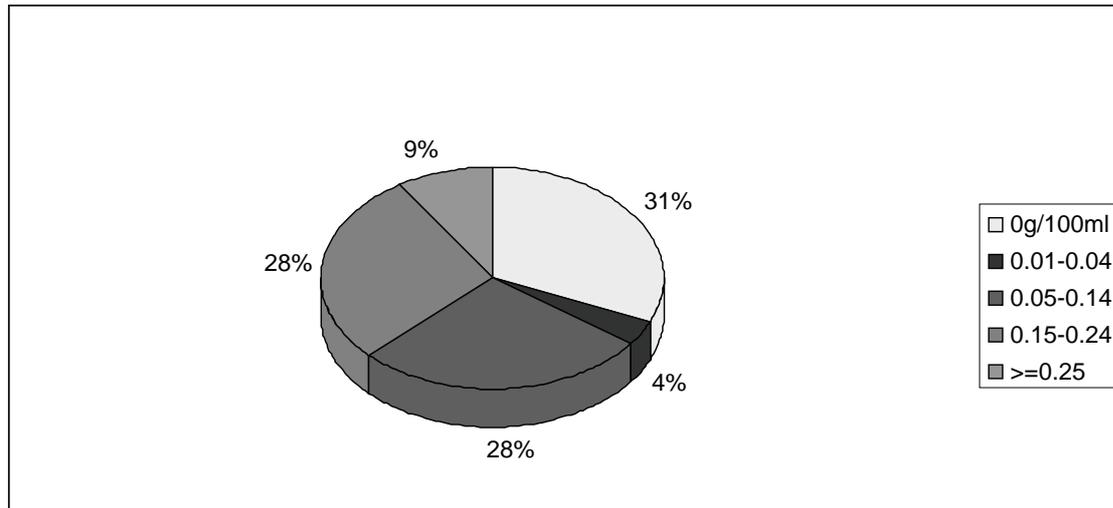
**Figure 6. The Apparent Manner of Death by Time of Day (N=591)**



**Apparent Manner of Death by Blood Alcohol Concentration (BAC)**

Blood Alcohol Concentration (BAC) is obtained in all mortality and suicide cases over the age of 10 years. Blood alcohol tests are only done on those persons younger than 10 years of age, if there is a suspicion of toxicology or poisoning. The blood alcohol concentration was obtained in 272 (46%) of the 591 cases. Of these cases 266 (98%) were over the age of 10 years old. The average blood alcohol concentration level was 0.09 (+/- 0.1g/100ml). The majority of victims of non-natural injury mortality cases tested alcohol positive (53.7%), whereas 123 (46%) cases tested negative or were under the legal alcohol limit. More fatalities tested alcohol-positive among the violence-related (33.5%) and transport-related (15.1%), whereas the majority of victims of suicide and unintentional deaths had blood alcohol concentration levels of below the legal limit or zero. The comparative levels are indicated in Figure 7 and Table 5 below according to the apparent levels of death.

**Figure 7. Blood Alcohol Concentration Levels In The Sample (BAC) (N=272)**



**Table 5. The Apparent Manner of Death By Blood Alcohol Content**

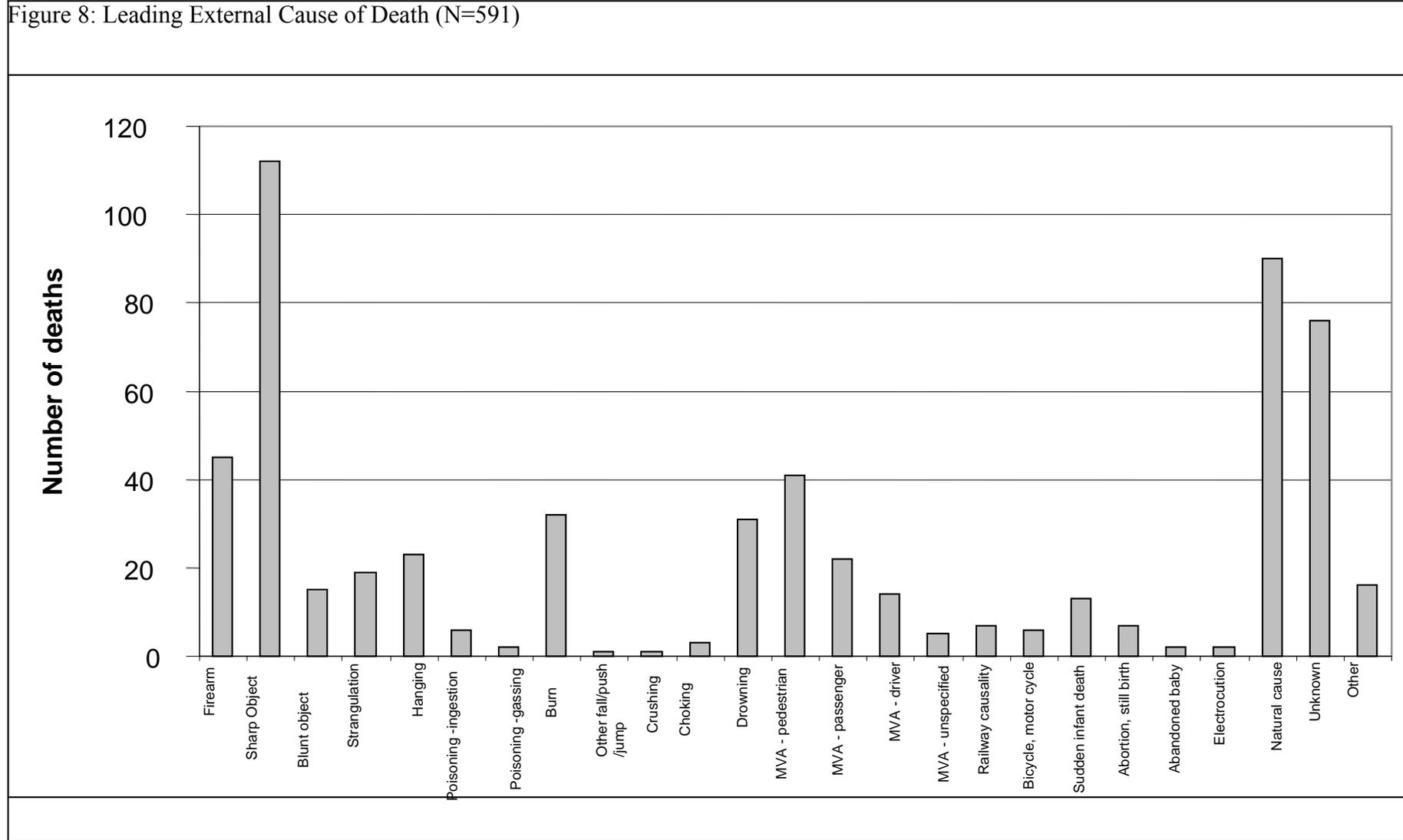
	Homicide	Suicide	Accident	Other
<b>0g/100ml</b>	44	25	44	6
<b>0.01-0.04</b>	5	1	4	0
<b>0.05-0.14</b>	39	2	19	0
<b>0.15-0.24</b>	39	2	15	3
<b>&gt;=0.25</b>	13	1	7	2

#### **4.3.2 EXTERNAL CAUSE OF DEATH**

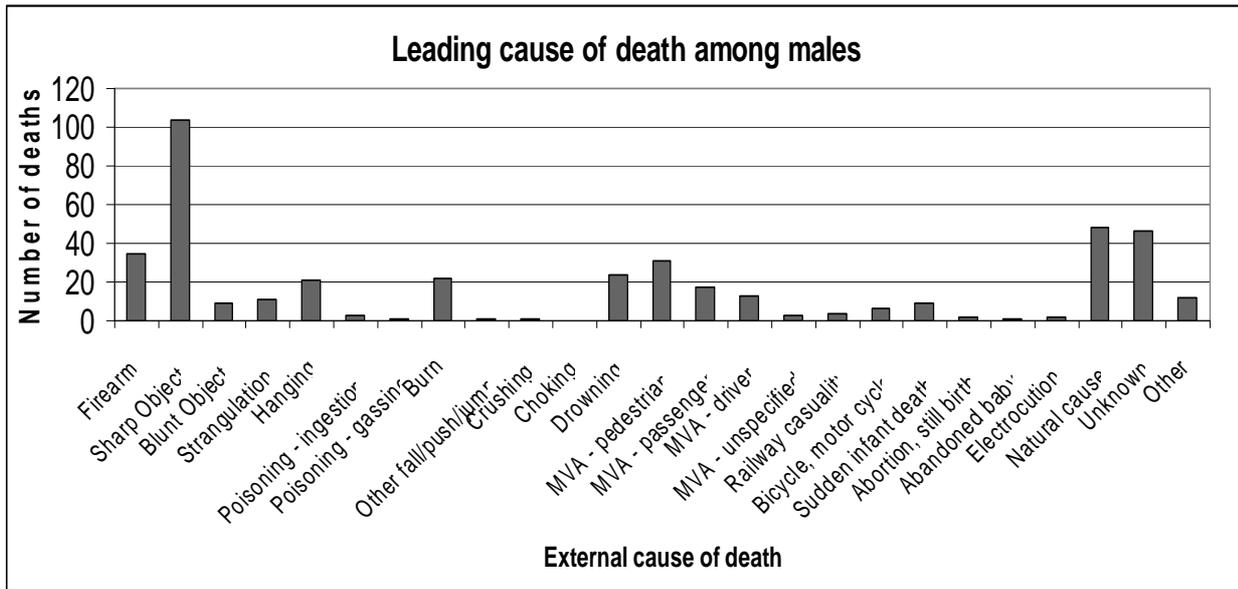
##### **Overall External cause of death**

The cause of death was unknown in 76 of the 591 cases. Of the remaining deaths, the leading external cause was sharp objects (19%), followed by natural cause deaths (15.2%), firearms (7.6%), and pedestrian fatalities (6.9%). These statistics are presented in Figure 8.

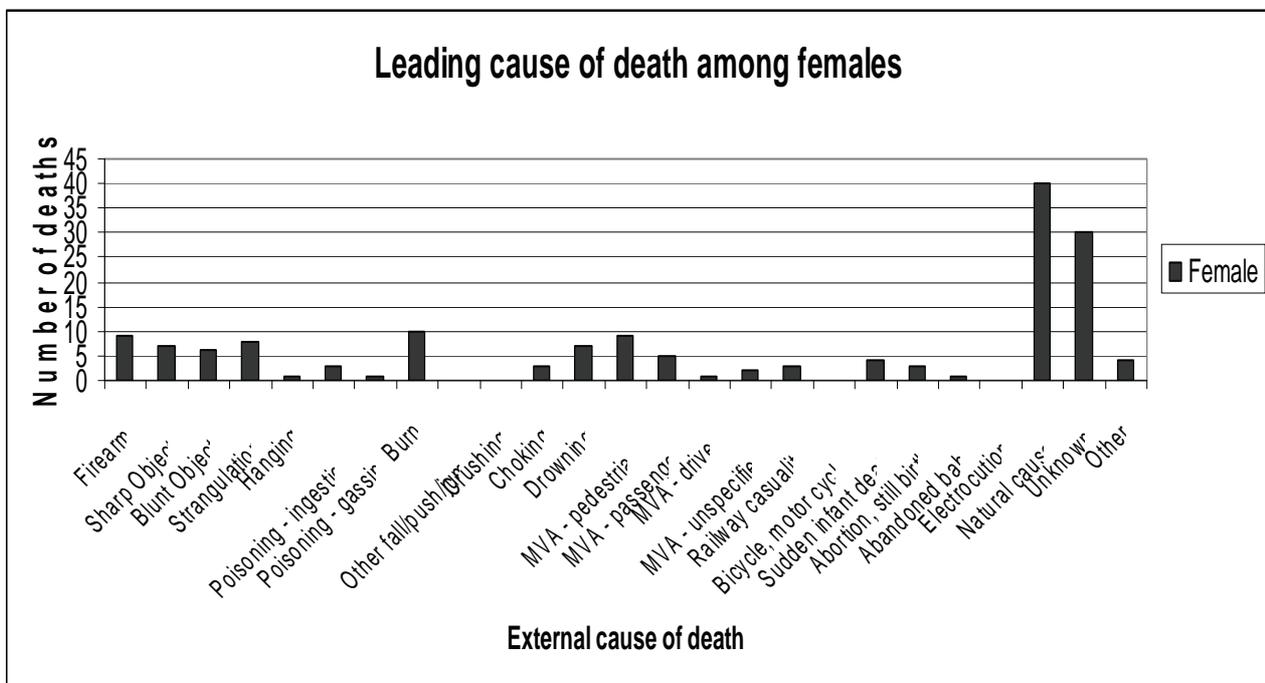
Figure 8: Leading External Cause of Death (N=591)



**Figure 9. Leading Cause of Death among Males**



**Figure 10. Leading Cause of Death among Females**

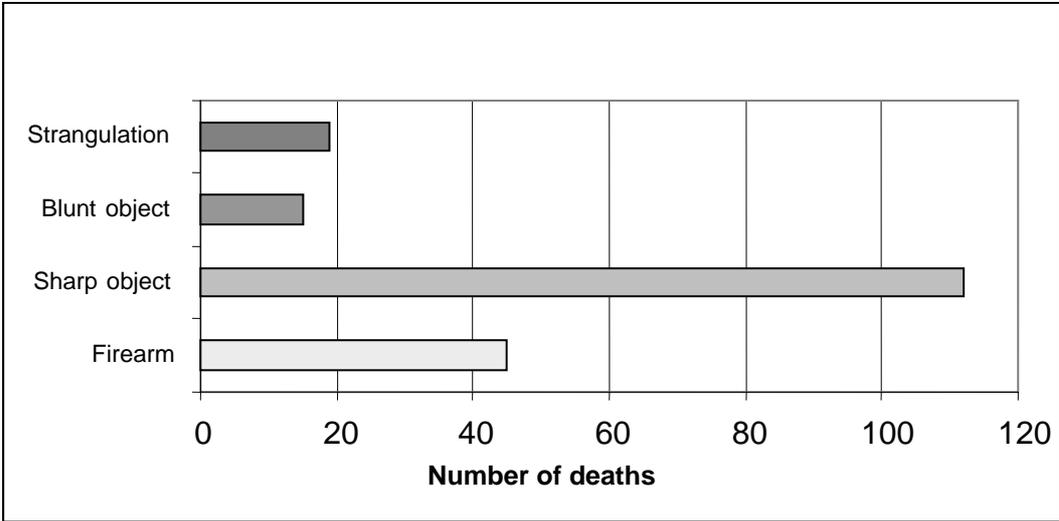


### 4.3.3 VIOLENCE

#### Overall Violence-related deaths

Of the 591 cases there were 191 (32.3%) violence-related deaths. The leading external cause of violence-related death was sharp force injuries (58.6%), followed by firearms (23.5%), strangulation (9.9%) and blunt force injuries (7.8%). The overall violence-related deaths are reported diagrammatically in Figure 11.

**Figure 11. The Leading External Cause of Violence-Related Deaths (N=191)**

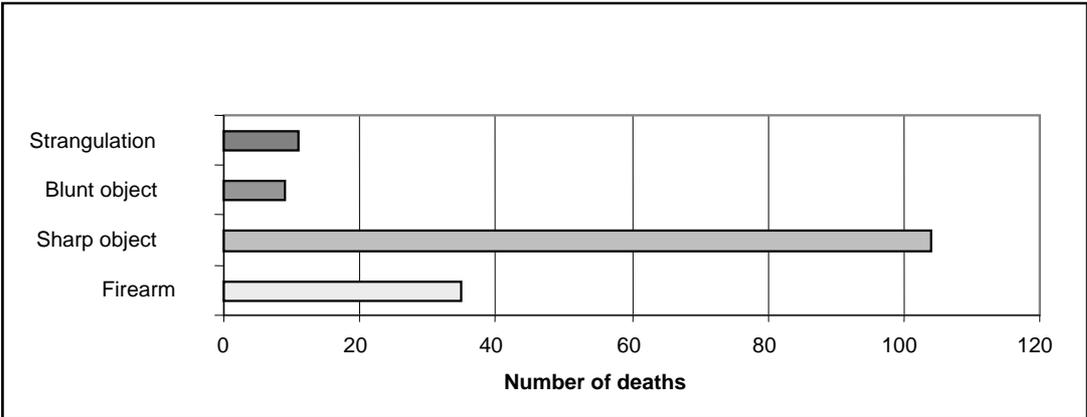


#### External cause of violent death by sex

There were 5.3 male deaths as a result of violence for every female death. Sex was unknown in 2 of the 191 cases. Among males the cause of death was unknown in 2 (1 %) of the 591 cases. Of the remaining male deaths, the leading external cause of death was sharp force injuries (65.4%), followed by firearms (22%), strangulation (6.9%), and blunt force injuries (5.6%).

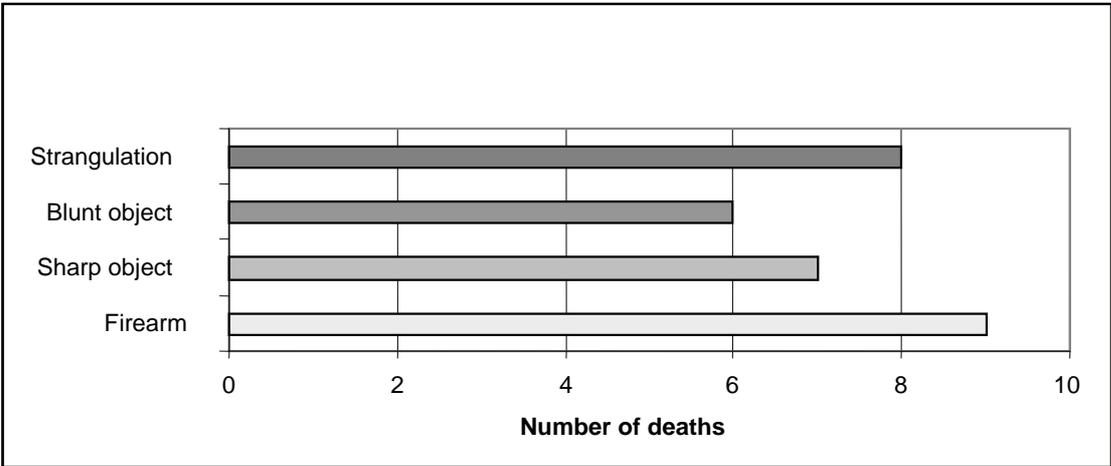
Refer to Figure 12 for a diagrammatical representation of these results.

**Figure 12. The Leading External Cause of Violence-related Deaths among Males**



Among females the cause of death was unknown in 0 of the 191 cases. Of the remaining deaths, the leading external cause was firearms (30%), followed by strangulation (26.7%), sharp force injuries (23.3%), and blunt force injuries (20%). See Figure 13 for the leading causes of violence-related deaths for women.

**Figure 13. The Leading External Cause of Violence-related Deaths among Females**

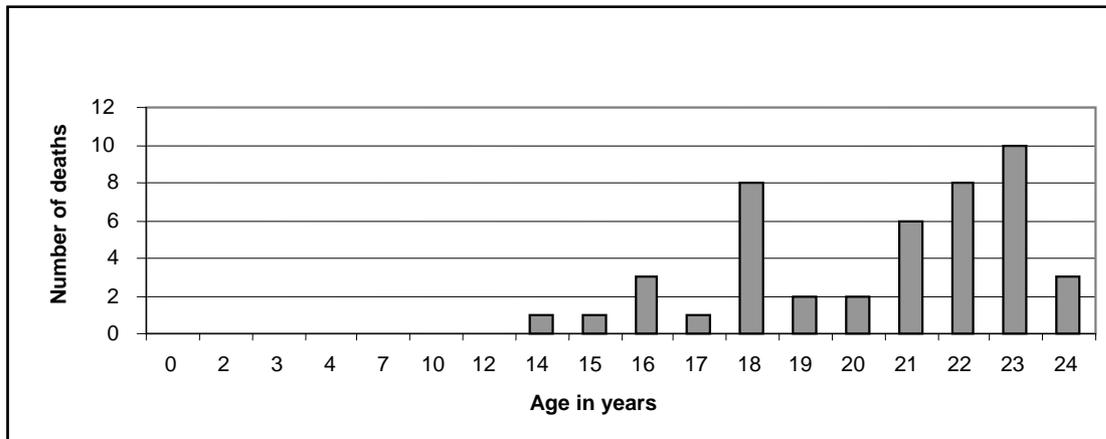


**External cause of violent death by age group**

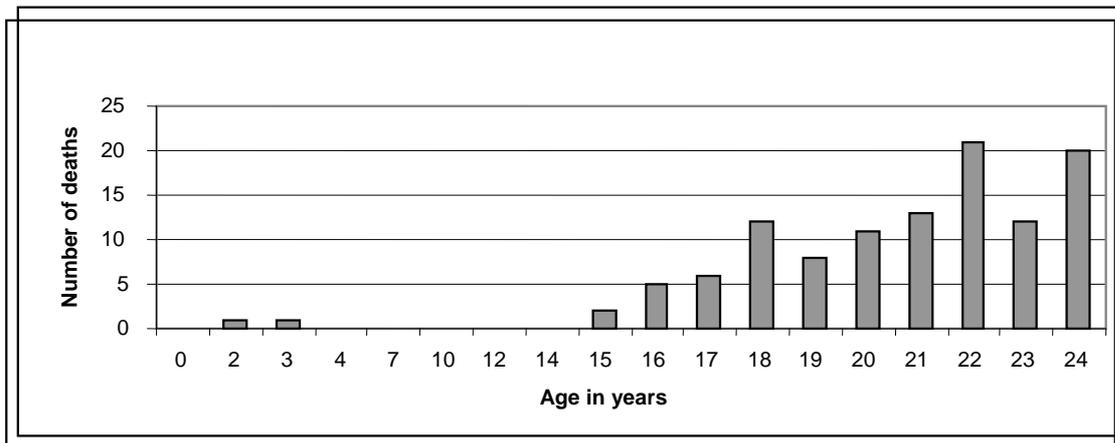
The average age at death was 13.72 years. The majority of violence-related deaths occurred in those youth over the age of 15 years (86.3%). Leading external causes of violence-related deaths were as follows in various age groups:

- **0-1 year** – Strangulation (94.1%)
- **2-4 years** – Sharp force injury (66.6%)
- **5-9 years** – Strangulation and blunt force injury (50%)
- **10-14 years** – Blunt force injury (50%)
- **15-19 years** – Sharp force injury (62.2%), followed by firearms (28.3%)
- **20-24 years** – Sharp force injury (68.7%), followed by firearms (25.8%)

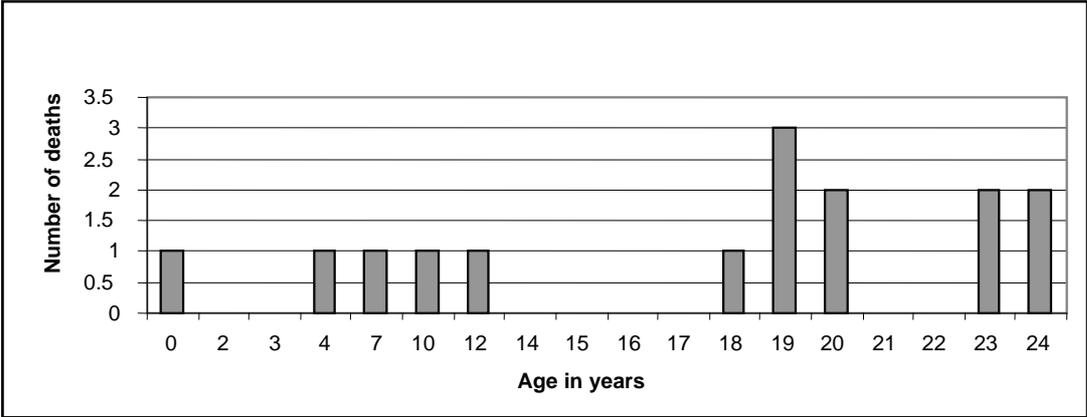
**Figure 14. Deaths by Firearm by Age**



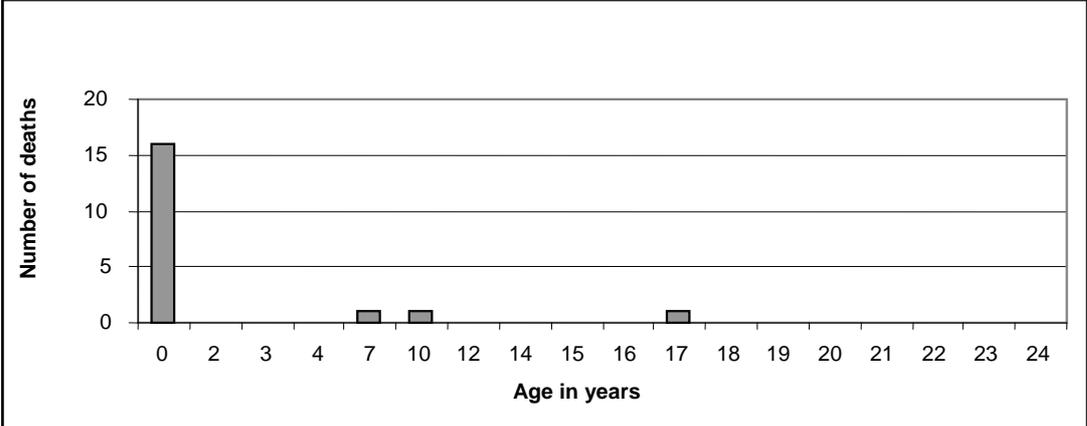
**Figure 15. Sharp Force Injury Deaths by Age**



**Figure 16. Blunt Force Injury by Age**



**Figure 17. Strangulation by Age**

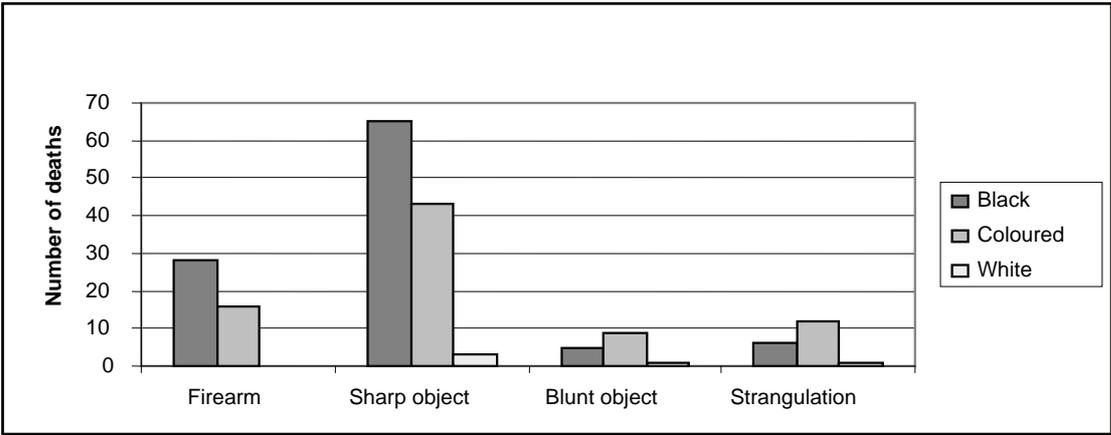


**Violent deaths by population group**

The majority of violence-related deaths occurred among the Black population group (54.4%), followed by the Coloured population group (41.8%). The least amount of violent deaths occurred in the White population group (2.6%). The leading violent death among the Black population group was sharp force injury (62.5%), followed by firearms (26.9%). For the Coloured population group, sharp force injury (53.7%) was the leading cause of violent death, followed by firearms (20%). The leading cause of violent deaths in the White population group was sharp force injury (60%).

Violence-related deaths in terms of population groups is presented diagrammatically in Figure 18.

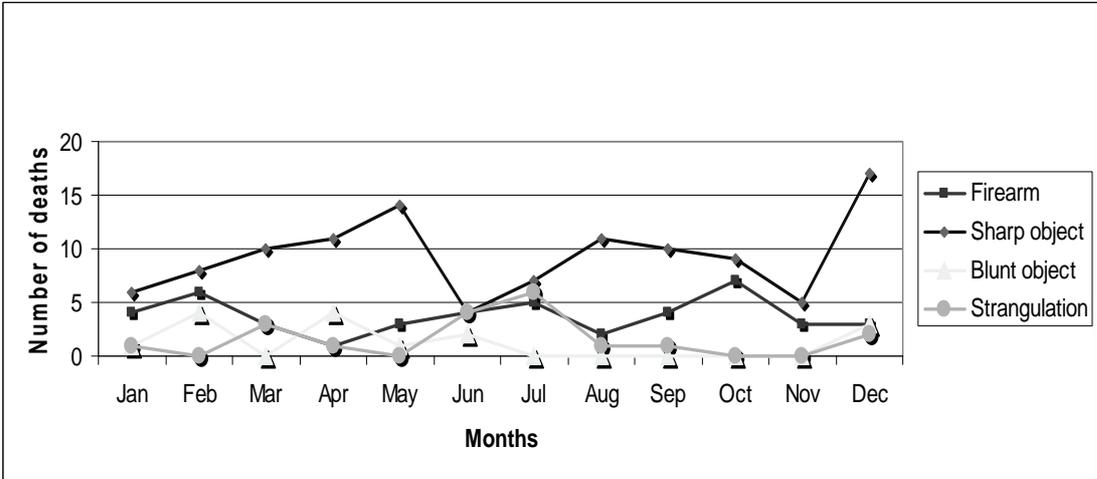
**Figure 18. Violence-related Deaths by Population Group (N=191)**



**Violent-related deaths by month**

The most common month for violence-related deaths was December (13%), followed equally by February, May and July (9.4%). The most common month for firearm deaths was October (15.5%), followed by February (13.3%). The most common month for sharp force injury deaths was December (15.1%), followed by May (12.5%), whereas the most common months for blunt force injury deaths was February and April (26.6%). The most common month for strangulation deaths was July (36.8%), followed by June (31.5%).

**Figure 19. Violence-related deaths by month (N=191)**



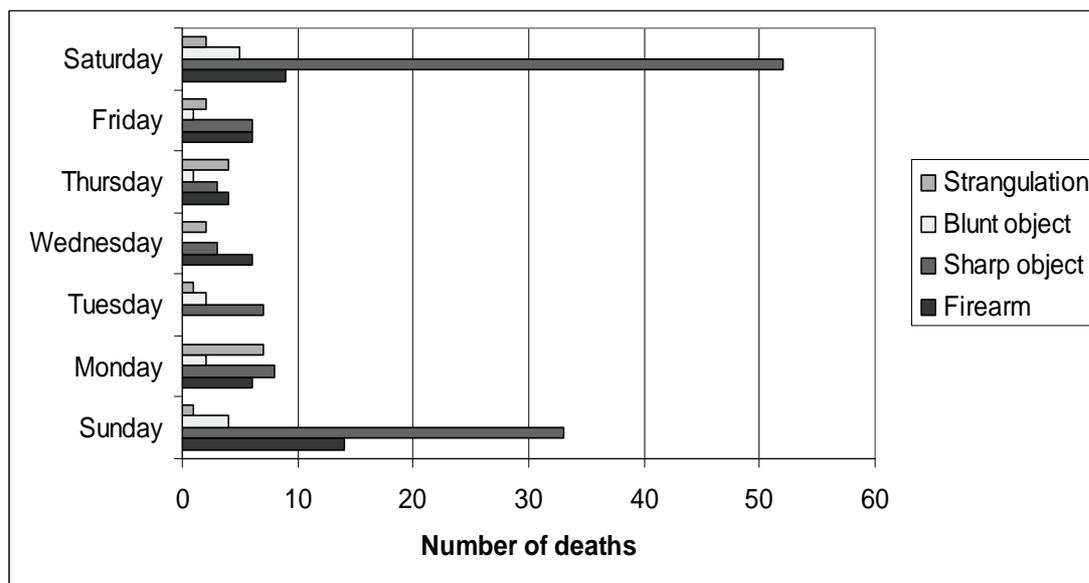
## Violence-related deaths by days of the week

The most common day of death from violence-related deaths was Saturday (35.6%), followed by Sunday (27.2%).

The most common day of death from violence-related deaths for the following:

- **Firearm** was Sunday (31.1%), followed by Saturday (20%);
- **Sharp Force Injury** was Saturday (46.4%), followed by Sunday (29.4%);
- **Blunt Force Injury** was Saturday (33.3%), followed by Sunday (26.6%); and
- **Strangulation** was Monday (36.8%), followed by Thursday (21%).

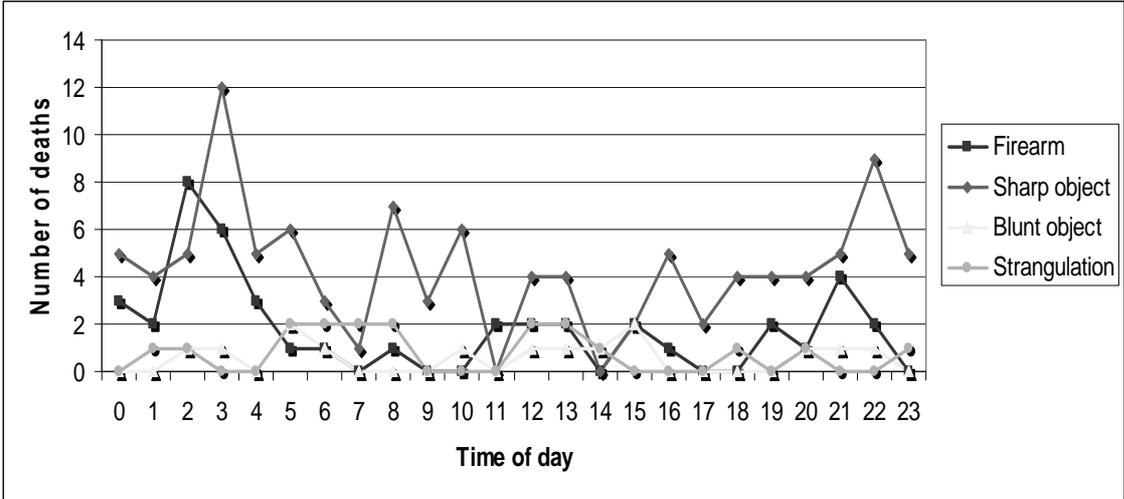
**Figure 20. Violence-related deaths by day of the week (N=191)**



**Violence-related deaths by time of the day**

The peak periods for violence-related deaths was 02h00 – 03h00 (18.8%), followed by 21h00 – 22h00 (12.2%). Refer to Figure 21 for a diagrammatical representation.

**Figure 21. Violence-related deaths by time of day (N=180)**



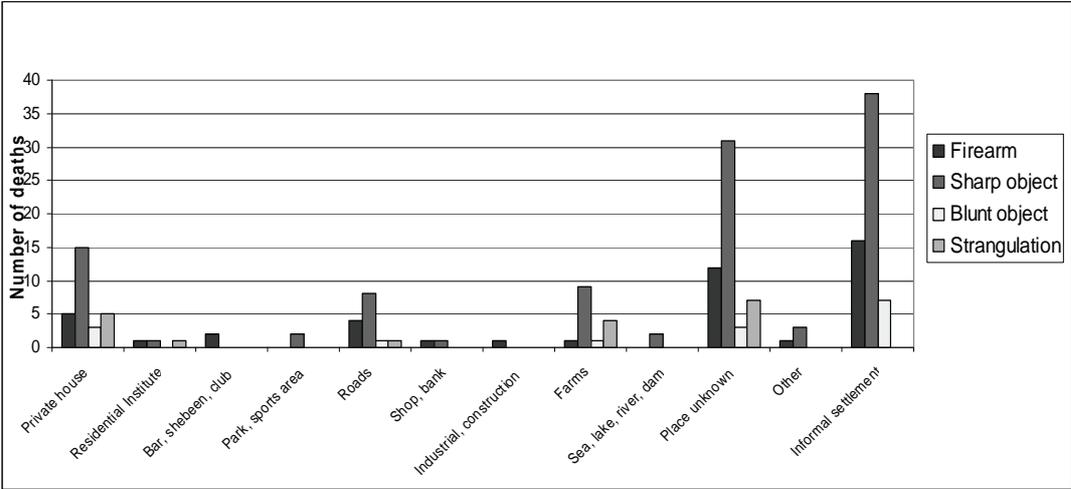
**Violence and Blood Alcohol Concentration (N=138)**

More victims of sharp force violence (75.8%) tested alcohol-positive than among the other victims of violent deaths. For firearm deaths 42% of victims tested alcohol-positive, whereas only 25% in blunt force violence tested alcohol-positive.

**Violence-related deaths by scene of injury**

The scene of death was unknown in 53 (28.3%) of the 187 violence-related death cases. Of the remaining deaths, the most common scenes were informal settlements/squatter camps (32.6%), followed by private houses and yards (14.9%), farm and primary production areas (8.1%) and road, street and highways (7.4%).

**Figure 22. Violence-related deaths by scene of injury (N=191)**

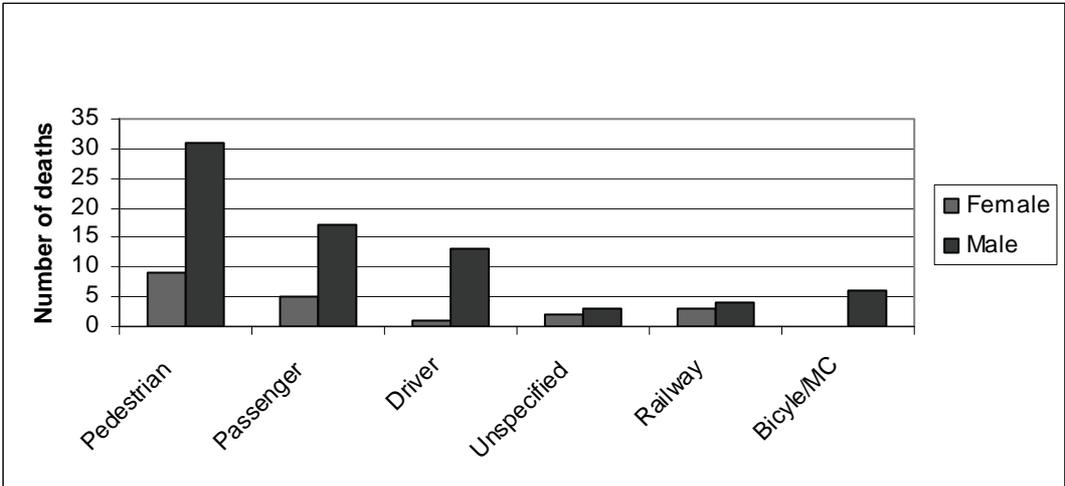


**4.3.4 TRANSPORT – RELATED DEATHS**

**External cause of transport-related death, by sex**

There were 3.7 male deaths as a result of transport for every female death. Most deaths among males were pedestrian fatalities (43.1%), followed by passenger deaths (23.1%), motor vehicle driver fatalities (14%), and railway casualties (7.3%). Among females the leading transport-related death was pedestrian (9.4%), followed by passenger deaths (5.2%), and railway casualties (3.1%). One of the 95 transport-related deaths was unknown as to sex of the victim.

**Figure 23. External Cause of Transport-related Deaths by Sex (N=95)**



### **External cause of transport-related deaths by age**

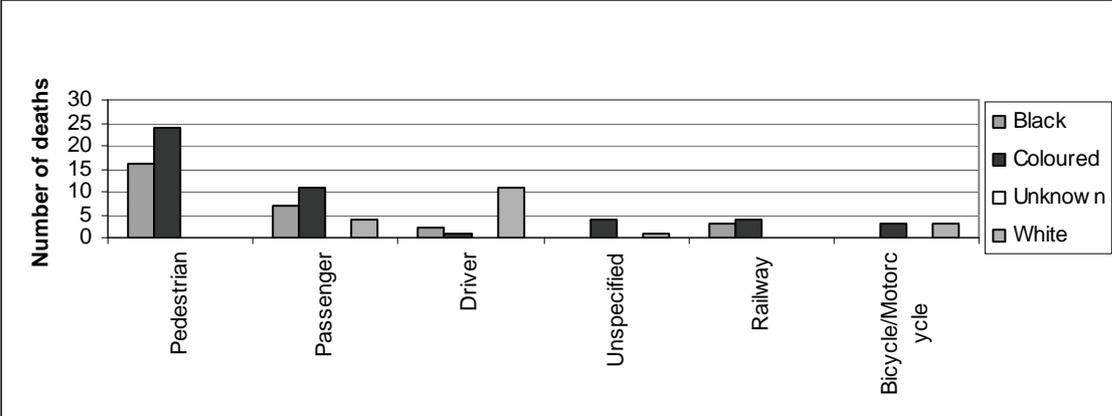
Of the 95 cases, the average age was 22 years old. The leading external cause of transport-related deaths in the various age groups was as follows:

- **0-1 years** – pedestrian fatalities (3.1%);
- **2-4 years** – pedestrian fatalities (3.1%), followed by passenger fatalities (1%);
- **5-9 years** – pedestrian fatalities (8.4%), followed by passenger fatalities (2.1%);
- **10-14 years** – pedestrian fatalities (6.3%);
- **15-19 years** – pedestrian fatalities (9.4%), followed by passenger fatalities (6.3%), and motor vehicle driver fatalities (4.2%); and
- **20-24 years** – passenger fatalities (13.6%), followed by pedestrian fatalities (12.6%), and motor vehicle driver fatalities (10.5%).

### **External cause of transport-related deaths by population group**

Transport-related deaths were unknown in 1 of the 95 cases. The majority of transport-related deaths occurred among the Coloured population group (49.4%), followed by the Black population group (29.4%). The least amount of transport-related deaths occurred in the White population group (20%). The leading transport death among the Coloured population group was pedestrian fatalities (16.8%), followed by passenger fatalities (7.3%), and railway casualties (3.1%). For the Black population group, pedestrian fatalities (25.2%) were the leading cause of transport-related death, followed by passenger fatalities (11.5%), and railway casualties and unspecified motor vehicle accidents (4.2%). The leading cause of transport-related deaths in the White population group was motor vehicle driver deaths (11.5%), followed by passenger fatalities (4.2%).

**Figure 24. External Cause of Transport-related Deaths by Population Group (N=95)**

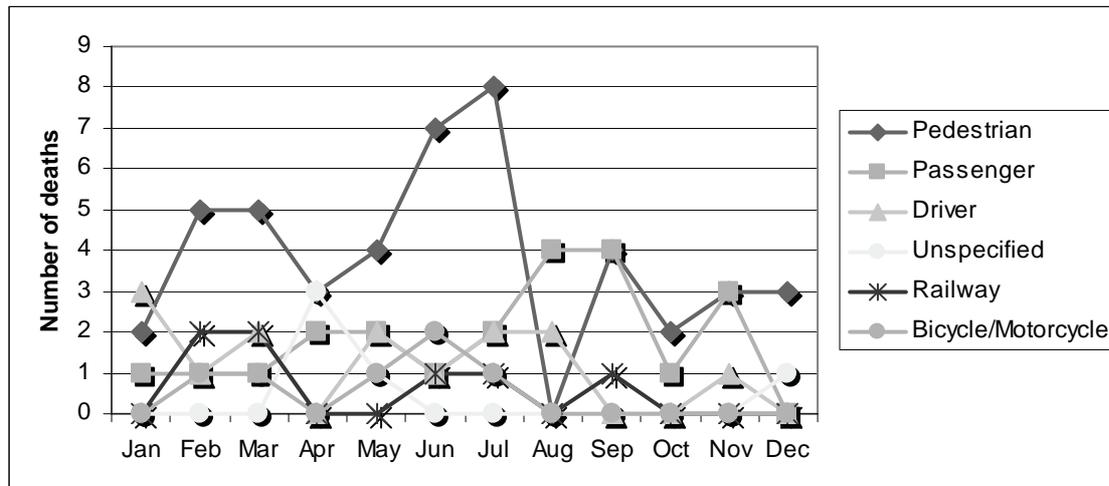


**External cause of transport-related deaths, by month**

The most common months for transport-related deaths was July (14.7%), followed by March (11.5%). The most common month for specific transport-related deaths was as follows:

- **Pedestrian** – was July (8.4%), followed by June (7.3%);
- **Passenger** – was August (8.4%), followed by September (4.2%), and November (3.1%);
- **Driver** – was January (3.1%);
- **Motor vehicle Accidents unspecified** – was April (3.1%);
- **Railway casualties** – was February and March (2.1%); and
- **Bicycle & Motorcycle** – was June (2.1%).

**Figure 25. Leading External Cause of Transport-related Deaths by Month (N=95)**

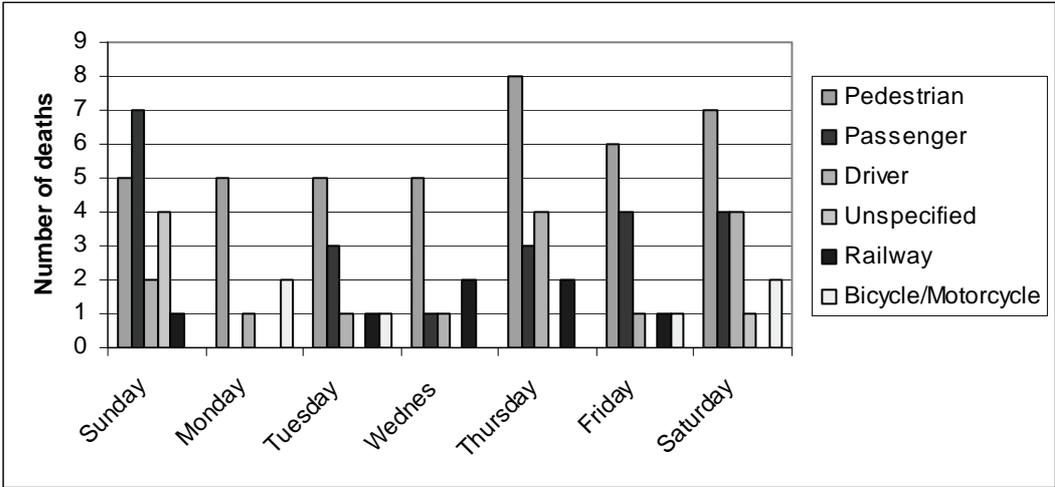


**External cause of transport-related deaths by day of the week**

The most common day of the week for death by transport was Sunday (20%), followed by Saturday (18.9%). The most common day for the external cause of transport-related death was as follows:

- **Pedestrian** – was Thursday (8.4%), followed by Saturday (7.3%);
- **Passenger** – was Sunday (7.3%), followed by Friday and Saturday (4.2%);
- **Driver** – was Thursday and Saturday (4.2%);
- **Motor vehicle Accidents unspecified** – was Sunday (4.2%);
- **Railway casualties** – was Wednesday and Thursday (2.1%); and
- **Bicycle & Motorcycle** – was Monday and Saturday (2.1%).

**Figure 26. Transport-related Death by Day of the Week (N=95)**



**Transport-related deaths and Blood Alcohol Concentration**

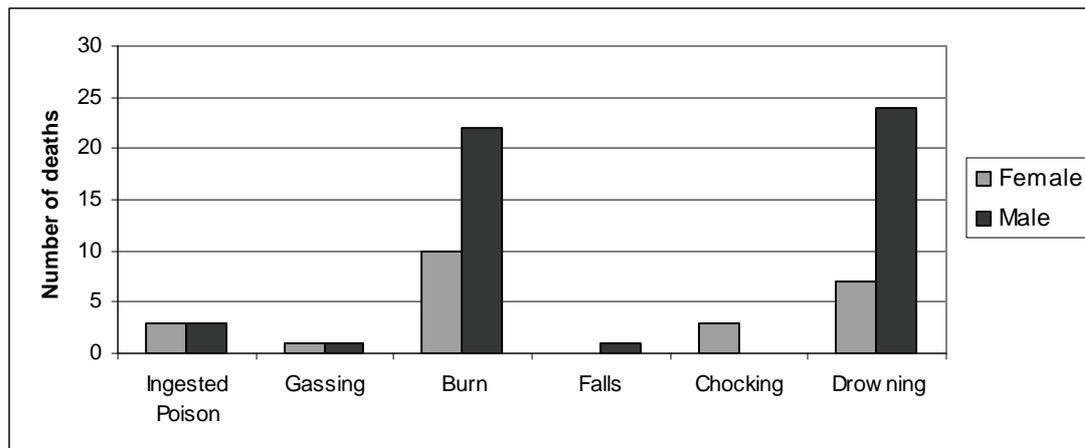
More pedestrians (11.5%) and passengers (6.3%) tested positive for alcohol in the blood than other transport deaths. More victims tested negative for alcohol in the blood for motor vehicle unspecified, railway casualties, driver fatalities and bicycle or motorcycle fatalities.

**4.3.5 UNINTENTIONAL FATAL INJURIES**

**External cause of unintentional death, by sex**

There were 2.1 male deaths as a result of unintentional injuries for every female death. Most deaths among males were drowning fatalities (47%), followed by burn deaths (39.2%). Among females the leading unintentional injury death was burns (41.6%), followed by drowning fatalities (29.1%).

**Figure 27. Leading Unintentional Injury Death by Sex (N=75)**

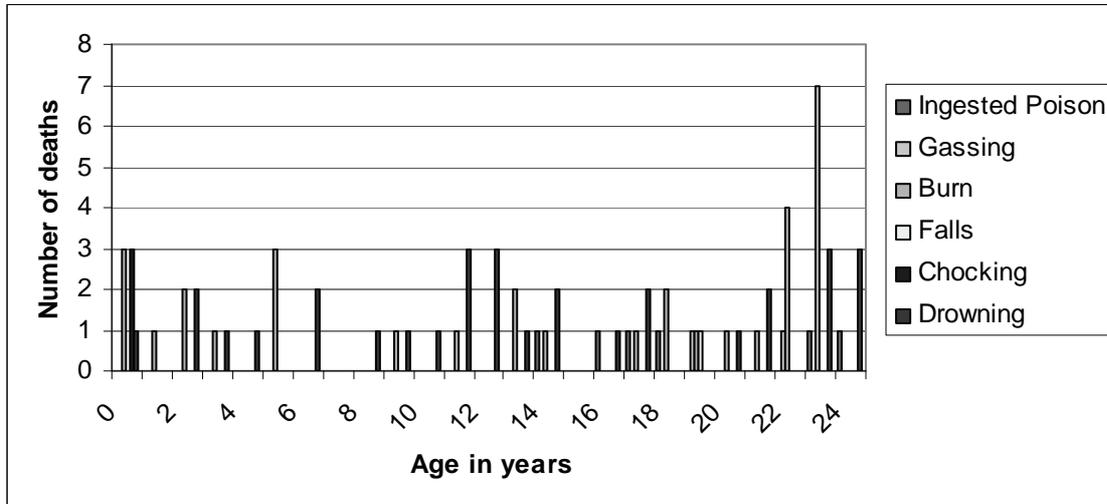


### **External cause of unintentional injury deaths by age**

The leading external cause of unintentional injury deaths in the various age groups were as follows:

- **0-1 years** – Burns (5.3%), followed by Choking deaths (4%);
- **2-4 years** – Drowning (5.3%), followed by Burns (4%);
- **5-9 years** – Burns and Drowning fatalities (5.3%);
- **10-14 years** – Drowning (10.5%), followed by burns (5.3%);
- **15-19 years** – Burns (5.3%), followed by Drowning deaths (4%); and
- **20-24 years** – Burns (13.6%), followed by Drowning deaths (9.5%).

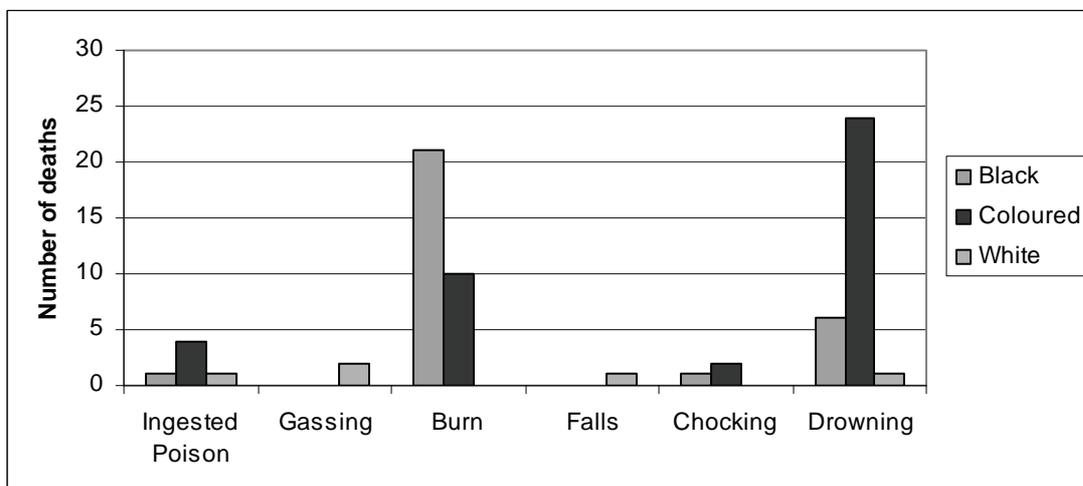
**Figure 28. Leading Unintentional Injury Death by Age (N=75)**



**External cause of unintentional injury deaths by population group**

Unintentional injury deaths were unknown in 1 of the 75 cases. The majority of unintentional injury deaths occurred among the Coloured population group (53.3%), followed by the Black population group (38.6%). The least amount of unintentional deaths occurred in the White population group (6.6%). The leading unintentional injury death among the Coloured population group was drowning fatalities (32%), followed by burns (13.3%). The leading cause of unintentional injury deaths for the Black population group was burns (28%), followed by drowning deaths (8%) whereas the leading cause of unintentional injury deaths in the White population group were gassings (2.6%).

**Figure 29. Leading Unintentional Injury Deaths by Population Group (N=75)**

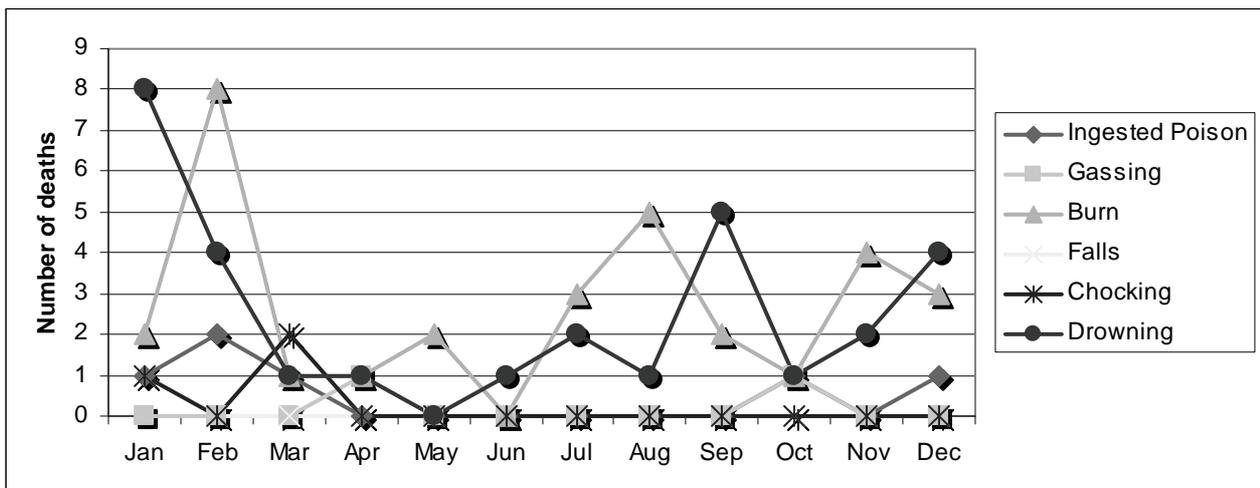


## External cause of unintentional injury deaths, by month

The most common months for unintentional injury deaths was February (18.9%), followed by January (17.5%). The most common month for unintentional injury deaths among the external causes of death was as follows:

- **Ingested poison** – was February (2.7%);
- **Gassing** – was April and October (1.3%);
- **Burns** – was February (10.8%), followed by August (6.7%);
- **Falls** – was January (1.3%);
- **Choking** – was March (4%); and
- **Drowning** – was January (10.8%), followed by September (6.7%).

**Figure 30. Leading Unintentional Injury Deaths by Month (N=75)**



## Unintentional injury deaths and Blood Alcohol Concentration

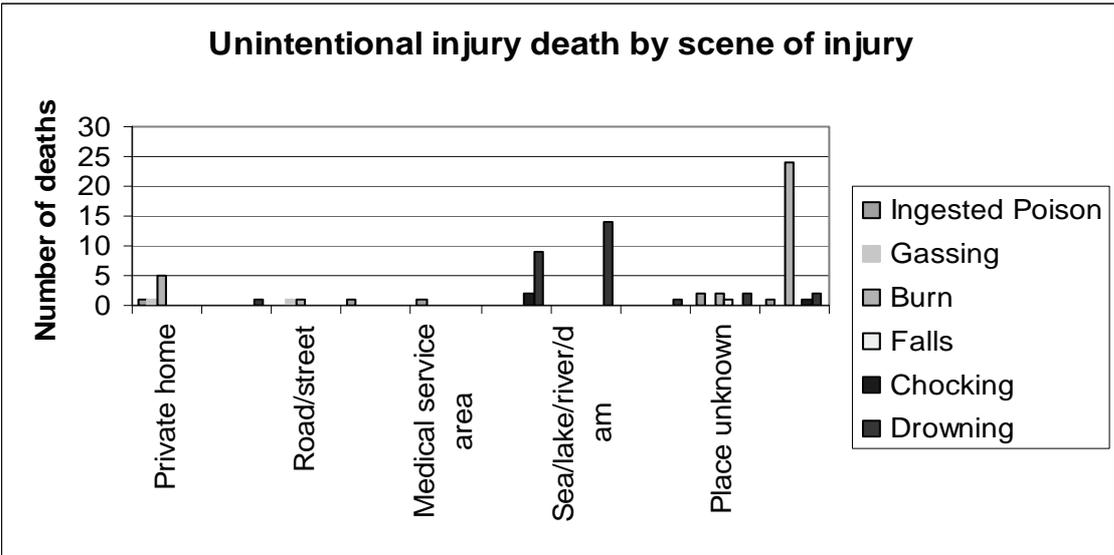
The majority of unintentional injury victims tested alcohol-negative. There were no victims of unintentional injury deaths of poisoning and falls that tested alcohol-positive.

**Unintentional injury deaths by scene of injury**

The most common scenes of unintentional injury deaths were as follows:

- **Ingested poison** – was place unknown (2.7%);
- **Gassing** – were private homes and roads (1.3%);
- **Burns** – were informal settlement (32.8%), followed by private homes (6.8%);
- **Falls** – place unknown
- **Choking** – was on farms (2.7%)
- **Drowning** – was sea, lake, rivers and dams (19.2%), followed by farms (12.3%)

**Figure 31. Leading Unintentional Injury Death by Scene of Injury (N=75)**



The additional pertinent results will now be presented and reported on.

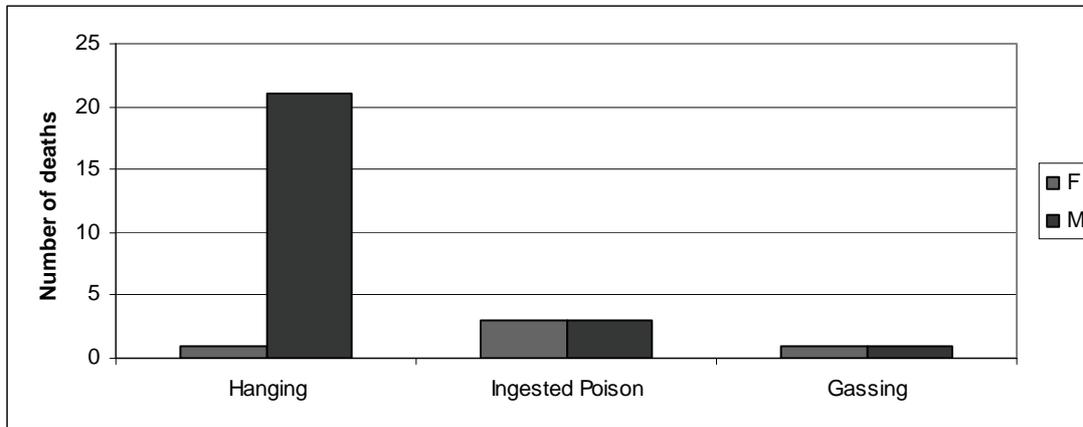
**4.3.6 SUICIDE DEATHS**

**External cause of suicide by sex**

There were 5 male deaths as a result of suicide for every female death. Among males the leading external cause was hanging (84%), followed by ingested poison (12%), and gassing

(4%). Among females, the leading external cause of suicide death was ingested poison (60%), followed by hanging and gassing (both 20%) respectively.

**Figure 32. Leading External Cause of Suicide by Sex (N=31)**

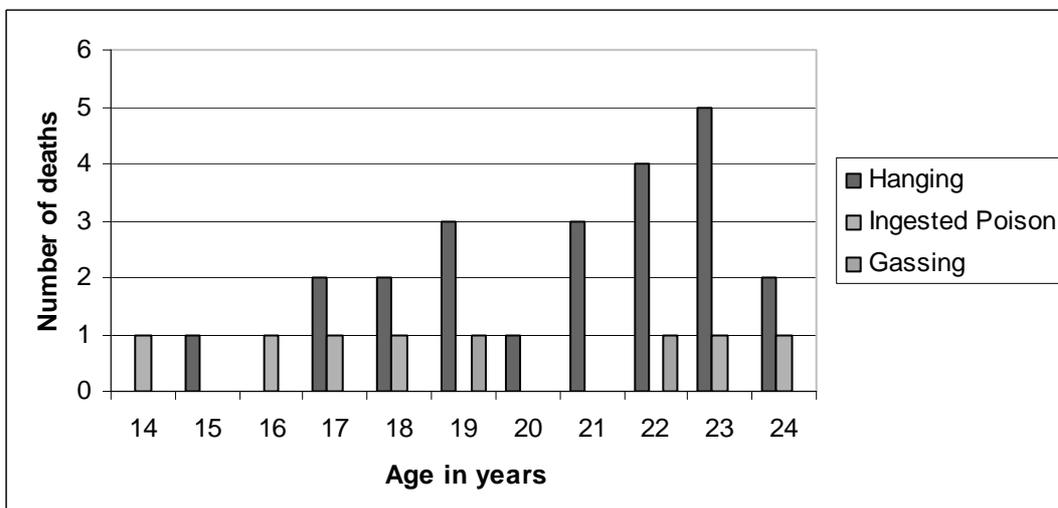


**External cause of suicide by age**

Of the 31 cases of suicide, the average age of 19.5 yrs. The leading external causes of death by suicide were as follows:

- **10-14 years** – ingested poison (3.2%)
- **15-19 years** – hanging (25%), followed by ingested poison (9.6%), and gassing (3.2%)
- **20-24 years** – hanging (48.3%), followed by ingested (6.4%), and gassing (3.2%).

**Figure 33. Leading External Cause of Suicide by Age (N=31)**

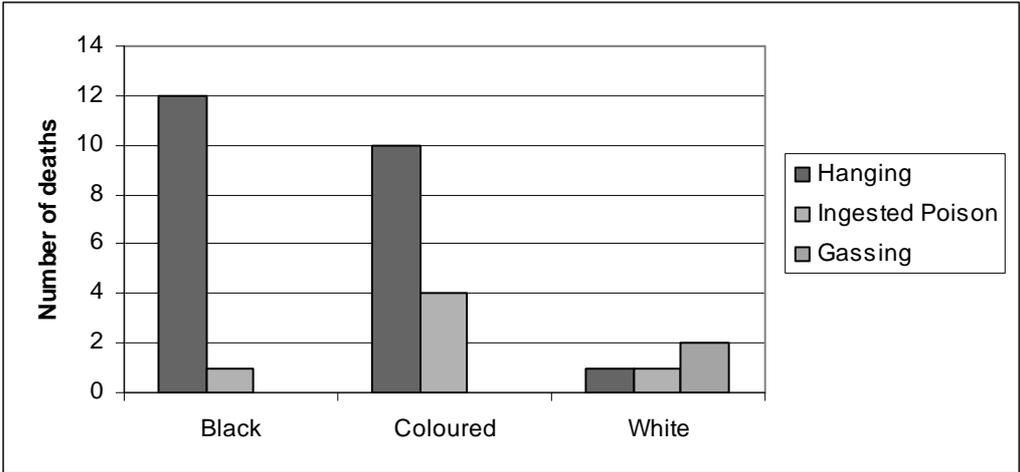


**Suicide by population group**

The majority of suicide deaths occurred among the Coloured population group (45.1%), followed by the Black population group (41.9%). The least amount of suicide deaths occurred in the White population group (12.9%). The leading suicide death among the Coloured population group was by hanging (32.2%), followed by ingested poison (12.9%). For the Black population group, hanging (38.7%) was the leading cause of suicide death, followed by ingested poison (3.2%).

The leading cause of suicide deaths in the White population group was gassing (6.4%), followed equally by hanging and ingested poison (3.2%).

**Figure 34. Leading External Cause of Suicide by Population Group (N=31)**

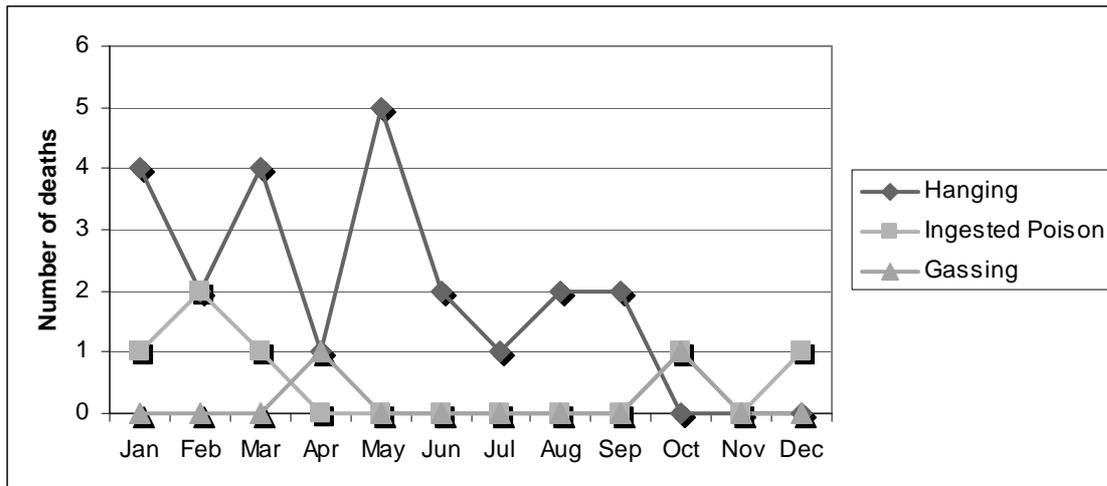


**Suicide deaths by month**

The most common months for suicide deaths were January, March and May (16%). The most common month for suicide deaths among the external causes of death was as follows:

- **Hanging** – was May (16%), followed by January (12.9%);
- **Ingested poison** – was February (6.4%); and
- **Gassing** – was April and October (3.2%).

**Figure 35. Leading External Cause of Suicide by Month (N=31)**

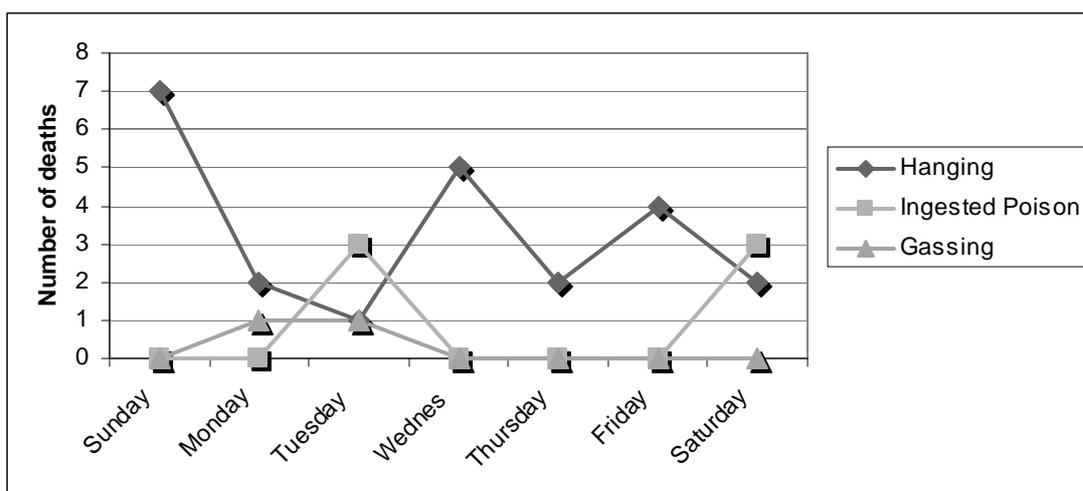


**Suicide by day of the week**

The most common day of the week for death by suicide was Sunday (22.5%). The most common day for the external cause of suicide death was as follows:

- **Hanging** – was Sunday (22.5%), followed by Wednesday (12.9%);
- **Ingested poison** – were Tuesday and Saturday (9.6%); and
- **Gassing** – was Tuesday and Wednesday (3.2%).

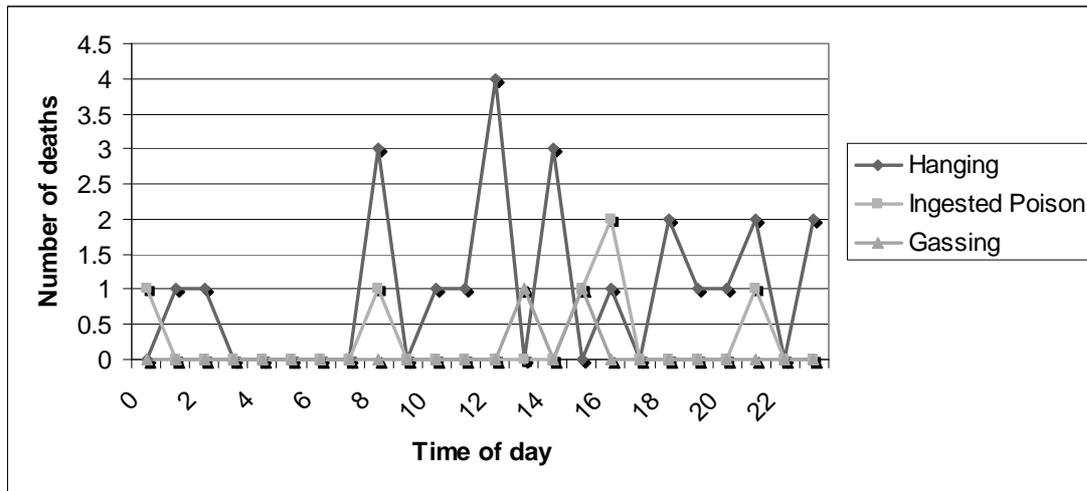
**Figure 36. Leading External Cause of Suicide by Day of the Week (N=31)**



## Suicide by time of day

The peak periods for suicide deaths were 08h00 – 09h00 (12.9%), 12h00 – 13h00 (12.9%) and 20h00 – 21h00 (12.9%).

**Figure 37 . Leading External Cause of Suicide by Time of Day (N=31)**



## Suicide and Blood Alcohol Concentration

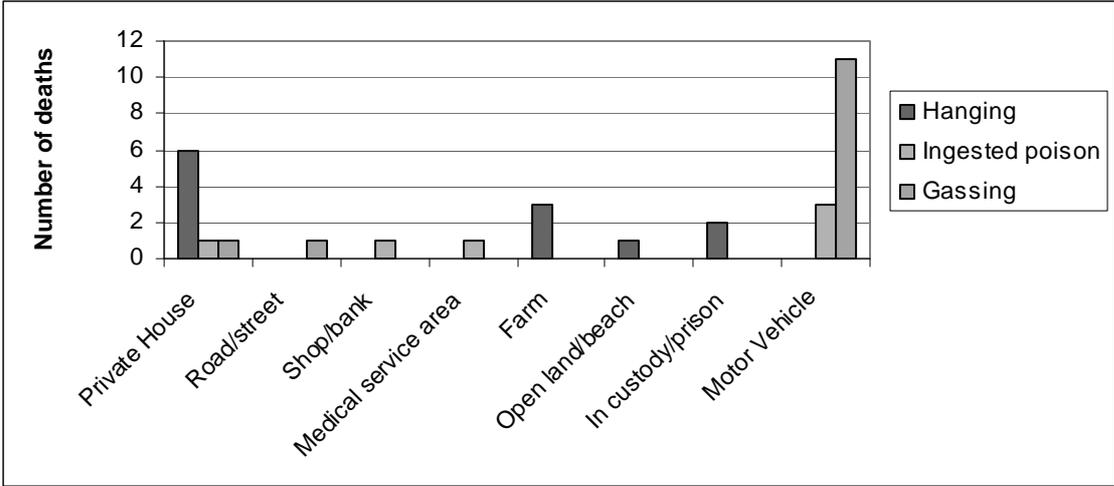
The blood alcohol concentration levels were unknown in 6 of the 31 cases. Of the remaining case only 16% of the victims tested alcohol-positive, whereas the majority of suicide victims (84%) of suicide deaths had zero blood alcohol concentration or were under the legal limit.

## Suicide by scene of death

The most common scenes of suicide deaths were as follows:

- **Hanging** – were private home (19.3%), followed by farms (9.6%);
- **Ingested Poison** – was in motor vehicles (9.6%); and
- **Gassing** – was motor in vehicles (35.4%).

**Figure 38. Leading External Cause of Suicide by Scene of Death (N=31)**



In the following section, comparative data between the Stellenbosch region and other urban areas will be presented.

**4.3.7 Comparative data between peri-urban and urban data on fatal injury mortalities and suicides**

The urban data from NIMSS indicates that male deaths are far higher than that of female deaths, reporting that there are approximately 2 to 4 times more male deaths than female deaths, due to non-natural injuries. The present peri-urban study reports the same pattern between male and female deaths, with male deaths rate being a great deal higher than that of the female death rate. Thus the urban and peri-urban data seem to support the same sex difference notion that male deaths occur far more than female deaths in terms of fatal injury mortalities.

The urban data set indicates a wider variety of apparent manner of death for children and youth, including homicide, transport, unintentional deaths and suicides, opposed to the peri-urban data which reports that homicide and transport are the overall leading causes of death among children and youth. The researcher speculates that interventions based on suicide may be more relevant to children and youth in urban areas than it would be to children and youth in peri-urban areas. However, this difference between the urban and peri-urban data

could be due to the larger sample size of the urban area data as opposed to the peri-urban data and that the urban data is collected from various mortuaries, whereas the present study's data was collected at only one mortuary.

Homicide and transport-related deaths seem to be a common leading cause of death among children and youth both in urban and peri-urban areas, and thus prevention and control interventions need to focus on these problem areas.

The summary statistics for the mortuary data collected at the Stellenbosch Mortuary are presented in Table 6 whereas the urban data from the NIMSS database is presented in Table 7.

**Table 6. Peri-urban data (2001-2005)**

YEAR	NON-NATURAL DEATHS RECORDED	F	M	LEADING MANNER OF DEATH (OVERALL – children & youth)	MAIN EXTERNAL CAUSE OF DEATH (OVERALL(2001-2005)- children & youth)
2001	102	26	75	Homicide (36.3%) Transport (24.5%)	Sharp force object (19%), Natural (15.2%) Firearm (7.6%) Pedestrian Fatalities (6.9%)
2002	142	41	90	Homicide (28.9%) Transport (27.5%)	
2003	88	14	72	Homicide (36.4%) Transport (29.5%)	
2004	114	25	85	Transport (37.7%) Homicide (26.3%)	
2005	145	50	94	Homicide (29.7%) Transport (23.4%)	

**Table 7. NIMSS Urban data (1999-2004)**

YEAR	NON-NATURAL DEATHS RECORDED	F	M	LEADING MANNER OF DEATH (CHILDREN)	LEADING MANNER OF DEATH (YOUTH)	MAIN EXTERNAL CAUSE OF DEATH (CHILDREN)
1999	14 829	3 114	11 715	Accidents	Homicide	Pedestrian MVC, burns, drowning
2000	18 876	3 011	13 556	Accidents	Homicide	Burns, pedestrian MVC
2001	25 361	4 945	20 416	Unintentional deaths	Homicide/ Suicide	Burns, drowning, pedestrian MVC
2002	32 890	6 381	26 509	Transport related	Homicide	Firearms (38.5%), Hanging (77.1%), Pedestrian MVC (61.7%), Drowning (36.1%), Burns (31.5%)
2003	31 921	Not available	Not available	Transport related	Violence	Firearms
2004	31 446	6 321	25 125	Transport (38.4%) Unintentional Injury (31.5%)	Violence (51.7%)	Firearms (28.8%) Blunt force injury (18.2%)

The discussion of the results are presented in the next chapter.

## CHAPTER 5

### DISCUSSION

*Crime affects the quality of life of all South Africans, and thus reducing crime and building safer communities must be a priority to all of us*

Department of Safety and Security (2000)

#### 5.1 Introduction

Fatal injury mortalities and suicides among children and youth in South Africa are among the highest recorded in the world. These fatal mortalities and suicides are exacting a tremendous toll on families, communities and society at large and are placing a significant financial burden on the public health system. The high rate of fatal injury mortalities and suicides among children and youth is disturbing on account of the fact that many of these deaths and injuries are preventable through appropriate prevention and control interventions. The public health model avers that in order to develop these interventions, there needs to be efficient data providing the magnitude, scope and characteristics of the injury problem.

In the light of the aforementioned statement, the main purpose of this study was to explore the main causes and consequences, prevalence and magnitude of fatal injury mortalities and suicides among children and youth in the peri-urban area, Stellenbosch, in the Western Cape. Furthermore, the study aimed to determine the differences and similarities within non-natural injury mortalities and suicides among six developmental age groups and among sex, as well as the relationship between alcohol misuse and fatal injury mortalities and suicides among youth aged 10-24 years.

The current study considered the following specific epidemiological data

- The leading apparent manner of death of infants, toddlers, children, early adolescents, late adolescents and early adults respectively;
- The leading external causes of death;

- Sex differentiation with regard to non-natural deaths;
- Population group differentiation with regards to non-natural deaths;
- Patterns of death with regard to time of day, day of week and month of year;
- Presence of alcohol (in blood content) in deaths due to homicide and accidents, and
- Presence of alcohol (in blood content) in deaths due to suicides and unintentional injuries.

The findings of the study were also compared with data from urban settings from the NIMSS to draw out comparisons between peri-urban and urban profiles regarding non-natural deaths.

## **5.2 General**

Over a five year period, fatal injury mortalities and suicides accounted for a total of 1,981 deaths in the Stellenbosch and Helderberg areas. Approximately thirty percent of these deaths (N=591) occurred among children and youth in the peri-urban area.

## **5.3 The prevalence, magnitude and patterns of non-natural mortalities**

The leading apparent manner of death and the leading external cause of death were determined using frequencies and cross-tabulations in the SPSS statistical programme.

The present study found that the leading apparent manner of non-natural death was homicide accounting for 31% of all deaths with the leading external cause being sharp force injuries (58.6%), followed by firearms (23.5%).

This confirms the findings of the WHO (2008), which reported that violence and homicide were the leading causes of death both around the world and in South Africa. Transport-related accident deaths accounted for 29.1% of the injury deaths and was the second main cause of fatal deaths. Of these deaths the majority were pedestrian fatalities (43.1%), followed by passenger deaths (23.1%). Hence the study's findings are consistent with that of both the WHO data and the NIMSS data which found that homicide and violence-related deaths are the main cause of death, followed by transport-related deaths among children and youth.

Of the total 591 cases, the main external cause of death was sharp objects (19%), followed by natural causes (15.2%) and firearms (7.6%). The NIMSS data reports that the leading external cause of violent deaths is firearms and the leading external cause of transport-related deaths is passenger fatalities. However, the findings of this study are inconsistent with the previous literature as it indicates that sharp force injuries rather than firearms are the leading external cause of death for violence-related deaths in peri-urban areas, and that pedestrian fatalities are more common among children and youth than are passenger fatalities.

The researcher speculates that the differences in results from previous studies could be a function of the rural context of the current study. It is likely that guns are less accessible in rural than in urban communities resulting in a higher incidence of death by sharp object. It might well be that the new firearm legislation and licensing control enforced by the government and the has been successful in reducing the amount of firearms available to children and youth. A similar shift in comparative urban data may support such a conclusion.

The increase in pedestrian fatalities of these age groups was not unexpected. Children in rural or peri-urban communities are more likely because of socio-economic factors and poor public transport systems to walk whether to and from school, or the shops, sports field or church. Many peri-urban roads are not clearly marked, have no pavements, have poor or no lighting and are hazardous for pedestrians to cross because of higher permitted speed limits. There may also be a lack of appropriate supervision of children and youth while on the road or using public transport (Lagrade, 2007). Parents may be neglecting their children, whether due to socio-economic reasons or alcohol abuse (Lagrade, 2007).

#### **5.4 Differences and similarities of fatal injury mortalities and suicides among the six developmental age groups**

The results of the present study reported that the age of children and youth, dying as a result of violence, injury and crime, is decreasing, with the average age of death being 12.82 years. Previous research findings have indicated that the majority of fatal injury mortalities and suicides will occur among the youth and young adults. The WHO's Burden of Disease data

estimated that 875,000 children and youth under the age of 18 years lost their lives as a result of violence, crime and injury, and many more were left physically and psychologically injured (World Health Organisation, 2008). The present findings confirm and support this research.

The present study's findings also confirm the findings of The Department of Health (2002) which reported that the incidences of violent deaths rates among children and youth are increasing drastically each year. A South African study reported that 3.5% of deaths due to violence occurred in those younger than 14 years and 21.9% occurred in the older youth ages of 14-21 years old (Department of Health, 2002). Earlier this year the Minister of Safety and Security reported from the 2007/2008 government crime statistics, that even though the overall mortalities had decreased, there was a high increase in the amount of deaths among the children and youth of South Africa which was a cause for concern. The current study confirms that death rates for children and youth in peri-urban communities are also increasing.

A study conducted in the United States reported that the leading causes of fatal injury mortalities among children and youth tend to vary by age (Schnitzer, 2006). The current study found that the majority of infants died due to suffocation, whereas the main cause of deaths among toddlers resulted from motor vehicle accidents and drowning. Burns also contributed to many of the deaths among these two age groups. A global study found that the leading causes of deaths for infants and toddlers were natural deaths rather than fatal injury deaths (Bradshaw et al., 2003).

The present study confirmed that the majority of deaths among infants (age 0-1 years) were natural causes. That many of the infant deaths were due to suffocation is alarming and may be due to cramped living conditions where the infant shares the same bed with the parents. Further studies would need to investigate whether alcohol may have been a factor.

Of the fatal injury deaths, however, the findings reported that road traffic injuries were the leading cause of death followed by burns, homicides and drowning. The NIMSS data reported that burns were the leading cause of death among infants and toddlers. Whereas for

the older developmental age groups, early adolescence and late adolescence, natural cause were no longer a concern, but fatal injuries such as motor vehicle accidents, homicides and suicides were the leading causes (Bradshaw et al., 2003).

The present study found that those among the toddler age group died mainly due to road traffic accidents rather than natural causes, suffocation or burns. Road traffic injuries were the leading causes of death for those in the developmental age groups, childhood and early adolescence, which confirms previous findings. For the older developmental age groups, late adolescence and early adulthood, the leading causes of fatal injury deaths were violence-related, such as homicide followed by road traffic accidents. The latter results do not support the findings of the previous global study which found that road traffic accidents were more of a concern than violence-related deaths, but does support the previous findings from the NIMSS which found that homicides were the leading cause followed by road traffic accidents in the later developmental age groups.

In terms of apparent manner of death, namely homicide, suicide, accidents, unintentional deaths, the present study reports the following:

#### a) Homicide

The present study reported that sharp force objects was the leading cause of violence-related deaths whereas studies such as Booyens (2006) argued that the explanation

for the youth homicide in South Africa is the availability of firearms, as firearm violence is highest between the late adolescent and early adulthood developmental age groups. Another study conducted at the Red Cross Children's Hospital in Cape Town reported that the number of youngsters with gunshot wounds presenting at the hospital has quadrupled in the past four years. An earlier study reported that the majority of firearm injuries and death occur in the 13 to 19 year old age group and a significant amount of firearm injuries are now being seen among children younger than 13 years and the incidence continues to increase (Hutt et al., 2004). According to Prinsloo et al. (2001), young people in the 15 to 24 year age group were significantly more likely to be victims of firearm rather than non-firearm homicides.

The present study indicates that in peri-urban communities, youth homicide is more likely to be by sharp object.

In addition, the present study found that strangulation is the leading cause for infant and the childhood phases, whereas sharp objects is the leading cause for toddlers, late adolescents and early adulthood age groups. The early adolescent age group differs from all the other age groups, with blunt force injury as the leading cause of violent death.

#### b) Suicide

The present study reports that the average age for suicide deaths is 19.5 years of age. No suicides occurred in those younger than 14 years old thus supporting the previous study's findings. Of the suicides, hanging was the leading cause among the late adolescent and early adulthood age groups, whereas the early adolescent age group differed again with the leading cause of suicide being ingested poison. The present study seems to support a previous American study which reported that the majority of suicides occurred among young people aged 15 to 25 years (Feder et al., 2007). Further studies would be important to substantiate the significance of suicides as a leading cause of deaths among these ages.

#### c) Road Traffic Accidents

In terms of road traffic accidents, the present study reported that the leading cause of transport related deaths, for all the developmental ages groups', was pedestrian fatalities, except for the early adulthood where the leading cause was passenger fatalities followed by pedestrian mortalities. Thus all five developmental age groups, infancy, toddlerhood, childhood, early adolescence and late adolescence show similarities in terms of transport-related deaths. This may well be due to the absence of road safety factors in peri urban communities (such as the absence of pavements, lighting, pedestrian crossings, and lower speed limits). Increased road safety awareness of children and youth is clearly warranted.

The WHO (2008) estimated that more than 3000 people die on the world's road every day. A study conducted in South Africa reported that pedestrians and passengers, specifically of

public transportation, are the people most affected by road traffic accidents (Matzopoulos et al., 2006). Thus the present study confirms the findings of previous research.

#### d) Unintentional Injury Deaths

The present study found that drowning and burns are the two most common unintentional injury causes of death among children and youth. The findings indicate that burns were the leading cause of death among the infant, childhood, late adolescent and early adulthood developmental phases. These were all followed by drowning, except for the infancy age group which was followed by choking. Drowning was indicated to be the leading cause of unintentional injury death among the toddler and early adolescent age groups and these were followed by burn deaths.

The present study is in agreement with previous South African statistics which indicate that drowning accounts for the second highest cause of accidental death amongst children under the age of 15 years and that 56% of these cases involve children under the age of 15 (www.swimsa.co.za, 2008). A United States study reported that drowning accounted for more than 8000 deaths per year, of which 1,500 occurred among children (Shepherd, 2008). Drowning in the United States was the most common unintentional injury death cause for children aged between 1 and 14 years old. Another study reported that 859 children ages 14 and under died as a result of unintentional deaths and children ages 4 and under accounted for more than 60% of these deaths (www.usa.safekids.org, 2004) thus indicating that children aged 4 and under have the highest drowning death rate (two to three times greater than other age groups). Thus the present results confirm the American findings that drownings are a common and serious cause of unintentional injury deaths with children however, it was not found to be the leading cause within a peri-urban setting.

The NIMSS data indicated that burns resulted in 14.1% of the recorded unintentional childhood fatalities with most deaths (54.6%) recorded between birth and 6 years of age (van Niekerk, 2006). A South African study reported that burn related injuries are the 3<sup>rd</sup> most common cause of death in children under the age of 14 years old and that in Cape Town most burn injuries occur in toddlers between the ages of 1 and 2 years old (van Niekerk, 2006). The present study's findings support that burns are a leading cause of unintentional death

among children and youth in peri-urban communities as well. This may be due to the higher use of paraffin enabled heating systems in per-urban homes and risk factors such as inadequate paraffin storage..

The present study shows similarities between the infant and toddler developmental age groups; they tend to have the same leading causes of death. The results show that there are differences between the childhood age group and the other developmental age groups, whereas the early adolescent age group tends to vary depending on the category of apparent manner of death. Finally the two older developmental age groups, late adolescence and early adulthood show many similarities in the leading causes of death. Thus it seems to justify that prevention and control interventions need to be aimed and developed with specific age groups in mind, and that infant and toddlers, children and youth all need different interventions appropriate for specific risk factors commensurate with each of the three age groups.

### **5.5 Differences and similarities of fatal injury mortalities and suicides among the sexes**

Internationally males are 2-3 times more likely to have been involved in violence and violence-related deaths (Department of Health, 2002). The present study confirms the other research, that more males will be victim to death due to non-natural injury than females. Nationally the NIMSS data reported higher rates of death for males than females for a five year period. In 1999, the ratio of male to female deaths was 3.8 male deaths to every female death. In 2000, male deaths constituted 4.5 times more than female deaths and in 2001, 80.5% of non-natural deaths were male while only 19.5% of the deaths were female. The ratios for 2002 and 2003 were similar to that of both the years 2000 and 2001. In 2004, the ratio seemed to decrease but only slightly with male deaths accounting for 79.9% of the cases and female deaths accounting for 20.1%.

The ratio of male to female deaths in the present study was similar to that of the international research. However, this was fairly lower than previous South African findings, with 2.7 males deaths for every female death. The researcher speculates that the slightly lower ratio to previous national studies could be that previous research was conducted among all age groups

whereas the present study only included cases in the age groups from 0-24 years old. It is likely that the ratio would be greater if adults were also included in the study.

#### a) Homicide

The WHO (2008) reported that violent deaths account for twice as many male deaths as female deaths. The present study indicates a high sex difference for homicides with 5.2 male deaths for every female death. For violence-related deaths the leading cause of death among males was sharp force injuries, whereas the leading cause among females was firearms. This finding is inconsistent with the NIMSS data as it reports that firearms are the leading cause of violence-related deaths among males.

#### b) Suicide

A study conducted with suicide cases found that suicides among males were higher than those among females (Mitchell et al., 2000). The present study reports that the leading cause of suicide death among males was hanging, whereas the leading cause among females was ingested poisoning which confirms that there are sex differences among suicide deaths. According to Flisher et al. (2004), a possible explanation for the higher suicide rate in males may be due to a greater male propensity towards lethality of the suicide method, occupational stress and alcohol abuse. The ratio for suicides deaths was very high and confirm the previous findings. The sex difference between males and females for suicide deaths were 5 male deaths for every female death.

#### c) Transport-Related Deaths

The present study indicates that the ratio for transport-related deaths is 3.7 male deaths for every female death. The leading cause of transport-related deaths among both males and females was pedestrian fatalities followed by passenger deaths. Thus the present study indicates that there are similarities between male and female transport-related deaths.

#### d) Unintentional Injury Deaths

The present study reported a sex difference ratio for unintentional injuries deaths. The reported sex difference ratio was that there were 2.1 times more male unintentional deaths than female deaths. Thus confirming other studies conducted on unintentional injury deaths which also found higher rates for males than for females. In particular one study reported that male children have a drowning rate 2 to 4 times that of female children (Shepherd, 2008), whereas another study conducted with burn patients found that the sex difference ratio for males to female burn deaths was 2:1. Thus the present study supports the previous research in terms of sex differences ratios for unintentional injury deaths.

In addition, the present study reports that the leading unintentional injury death among males was drowning, followed by burn fatalities, whereas for females burn fatalities were more common than drowning.

The present study shows that there are sex differences among all the apparent manner of death categories in terms of the ratio of death, with all categories reporting more male deaths than female deaths. There are also differences among the leading causes of deaths among these categories for males and females, except for the transport-related deaths where the leading causes of death were the same.

#### **5.6 The relationship between alcohol misuse and fatal injury mortalities and suicides among the youth aged 10-24 years**

The Blood Alcohol Concentration is obtained for all mortalities and suicides in those victims over the age of 10 years as a standard procedure, and is only done in younger victims when there is suspicion of toxicity.

In South Africa, the consumption of alcohol is quite high with well over 6 billion litres of alcohol beverages per year (Meel, 2006). The present study found that the average blood

alcohol concentration level was 0.1/100ml and that the majority of victims of non-natural injury fatalities tested alcohol positive (53.7%) whereas 46% were under the legal alcohol limit. Alcohol appears to play a role in non-natural fatalities in peri-urban settings. Thus the present study confirms previous NIMSS data which reported that most victims of non-natural fatalities tested alcohol positive rather than negative for blood alcohol. The NIMSS data reported in 2001 that blood alcohol levels of victims were particularly elevated in firearm and sharp object homicides and among pedestrians and drivers who died in motor vehicle collisions. In 2002, the NIMSS study found that on average the majority of victims of non-natural fatalities had positive or elevated blood alcohol content levels and those who tested positive showed an average blood alcohol concentration of 0.18g/100ml. In addition, the NIMSS data showed that the majority of violent and transport injury death victims tested positive for alcohol in 2003. A Cape Town study reported that more than 1 in 2 non-natural deaths, had alcohol levels of 0.05g/100ml (Medical Research Council, 2007). A study reported that intoxication is a major factor behind the high percentage of motor vehicle accident injuries and mortalities, violent crime and suicide attempts (Meel, 2006).

#### a) Homicide

The present study reports that more victims of violence-related fatalities tested alcohol-positive. More victims of sharp-force object fatalities and firearm deaths tested alcohol-positive, whereas for blunt object deaths and strangulation most of the victims tested alcohol-negative. This supports previous South African findings which reported that 76% of violence-related deaths have shown to be alcohol related (Meel, 2006).

The researcher speculates that there seems to be a relationship between overall violence-related deaths and alcohol misuse among the youth, however, this relationship seems to vary depending on the external cause of violence-related deaths. Thus the present study determined that the majority of victims due to homicide between the ages of 10-24 years of non-natural mortality have elevated blood alcohol content.

## b) Suicide

The present study supports the findings that the majority of victims (older than 10 years) in suicide have zero blood alcohol content, as it found that the majority (84%) of suicide victims had blood alcohol levels either below the legal limit or zero blood alcohol concentration. Thus alcohol was not a discernible factor in suicide cases, which is at variance with the Flisher et al. (2004) study. That alcohol was not a factor is probably due to the lower age limit of the current study.

## c) Transport-Related Deaths

The present study reported that the majority of transport-related death victims tested alcohol-positive. Furthermore the present study found that more pedestrians and passengers tested positive for alcohol than did drivers and other transport death victims. Thus the present study confirms previous literature which reported that 70% of drivers with illegal blood alcohol levels accounted for nearly 30% of non-fatal and 47% of fatal driver deaths and that drunken pedestrians' showed even greater alcohol relatedness, as pedestrian accidents account for 72% of traffic deaths (Meel, 2006).

In addition, the Youth Risk Survey (2002) estimated that 11% of all pedestrians on South African roads exceed the breath alcohol limit of 0.24 mg/litre of breath. The Department of Health (2002) reported that between 40% and 50% of vehicle-pedestrian collisions in urban areas and between 30% and 40% of vehicle-pedestrian collisions in rural areas involve pedestrians jaywalking or walking under the influence of alcohol or drugs. Another study reported that among pedestrian deaths, 60% had elevated blood alcohol concentration and that pedestrians accounted for 72% of adult transport-related deaths (Youth Risk Survey, 2002). Thus the present results support the previous findings that alcohol is a factor with both driver and pedestrian fatalities.

The present studies findings however, seem to differ with the previous research on railway casualties as these victims tested alcohol negative, where previous research states that alcohol plays an important role in railway casualties. The researcher speculates that there is this

difference from previous studies as the previous research was based on all age groups and adults more than likely use the railways more than children and youth.

#### d) Unintentional Injury Deaths

The present study supports the research that victims of unintentional injury deaths will have a zero or negative blood alcohol concentration. The study found that the majority of unintentional injury death victims tested alcohol negative and there were no victims of poisoning and falls that tested alcohol-positive.

The researcher speculates that there is a relationship between alcohol misuse and certain mortalities such as violence and transport related deaths among youth, but that there is no relationship between suicide and unintentional deaths and alcohol for the youth.

### **5.7 Implications of study**

Early discussions of fatal injury mortalities and suicides were limited to literature which focused mainly on urban data. Since the Global Forum of Health Research (2001) has argued that there is a need for health sector injury data, as injury is a major cause of death among people, specifically children and youth in South Africa. Studies have indicated that the majority of children and youth deaths occur in under-resourced communities (Krug et al., 2006) and within areas of a lower socio-economic status (Hussey, 1997). This indicates the need for quality empirical data on fatal injury mortalities in peri-urban and rural areas.

The findings of the study indicate the following implications:

#### **5.7.1 Road safety awareness appears to be very warranted for all age groups**

The present study indicated that the majority of toddlers, children and early adolescents, aged 2 to 14 years old, the main cause of death is transport-related. The researcher speculates that the high transport-related death rate among children and youth may also be due to children walking around in the streets by themselves due to a lack of parental supervision.

The results of previous studies have indicated that transport-related deaths are a major cause for concern and have predicted that by 2020 road traffic injuries will rank among the top three causes of morbidity and mortality (Largarde, 2007). The present study confirms that transport-related deaths are high up on the priority list as the leading cause of death for those victims aged 10-19 years old in the Stellenbosch and Helderberg area are transport-related. Most of these transport-related deaths occur among pedestrians and passengers. Largarde (2007) reports that this may be due to the poor public transport conditions or lack of seat belt use, overloading and overcrowding of vehicles, hazardous vehicles (open top bakkies used to transport people), hazardous environments (i.e. potholes, no pavements) and un-roadworthy vehicles.

The researcher suggests that various actions can be taken. Firstly there should be stricter legislation requiring people to check the roadworthiness of their cars more often and stricter enforcement of road rules such as overloading and the use of seat belts. Government also needs to improve the public transport services in order to make them safer for people to use.

In addition, special focus should be given to particular transport-related deaths such as pedestrian and driver prevention initiatives. Thus the researcher suggests that separate road safety awareness interventions be developed for pedestrians and other transport-related concerns. Pedestrian programmes could include: awareness training at primary and high schools; reflector badges for clothes and school bags; pedestrian crossing at high risk areas; and speed limit reduction in high accident areas.

The researcher speculates that the prevention interventions such as the 'Arrive Alive Campaign' has had an impact which shows in the decrease of motor vehicle driver deaths, however, these interventions need to be adapted in order to prevent pedestrians and passenger fatalities, as these are now the main causes of transport-related deaths.

### **5.7.2 Suffocation of infants is of concern in peri-urban settings and these deaths are preventable**

The present study reported that the majority of infants died due to suffocation, whereas a global study found that the leading causes of deaths for infants were natural deaths rather than fatal injury deaths (Bradshaw et al., 2003). The present study confirmed that the majority of deaths among infants (age 0-1 years) were natural causes, however, many of the infant deaths were due to suffocation which is alarming as these are preventable. The researcher suggests that suffocation deaths may be due to cramped living conditions where the infant shares the same bed with the parents, this is preventable through more efficient service delivery and psycho-education on safety awareness for infants.

### **5.7.3 Death by sharp object is more prevalent**

The present study indicates that sharp force object and blunt force injury deaths are a serious concern among children and youth in the peri-urban area, more so than firearm deaths whereas previous urban data has supported the notion that firearm related violence deaths are the leading cause of death among youth and adults. The availability of firearms has been shown to contribute to the higher level of criminal and violent behaviour among individuals. According to South African statistics (2008), our country has one of the highest firearm related homicide rates in the world and a wide range of crimes have been reported to involve the use of firearms, such as homicides, suicides, rapes and robbery. More shockingly, however, the Minister of Safety and Security (2006) has reported that firearm licences have been issued to youth as young as 16 years old. However, despite these alarming firearm statistics, violent deaths caused by sharp force objects are more prevalent in the peri-urban setting. Educational programmes on violence prevention, conflict management, fostering respect for human rights, and the like can be utilised as strong preventative initiatives.

The researcher speculates that either the Central Firearms registration system has taken effect in the peri-urban area of Stellenbosch, else the availability of firearms is not as high in peri-urban areas as in urban areas. Despite this, the research still suggests that the legislation for gun ownership be made stricter (e.g. by raising the age that one is allowed to own a gun) and

tougher penalties be imposed on offenders. In addition, the researcher suggests that stricter rules be enforced at school, disallowing learners to carry weapons such as guns, knives or any sharp object.

#### **5.7.4 Alcohol plays a role in majority of accidental and intentional death**

The WHO (2006) reported that alcohol and substance abuse have been indicated to lead to violence, and suggest that in order to reduce the crime and violence, there needs to be a reduction in the availability of alcohol and substance to young people. A study reported that rates of injury and injury-related deaths have been shown to be elevated substantially in heavy drinkers and alcoholics (Mann et al., 2001). Another study reported that injuries under the influence of alcohol were more than twice as likely in high dose drinkers, frequent drinkers and three times more likely in those with drinking peers (Meel, 2006).

The present study reported that there is a relationship between alcohol misuse and injury deaths due to violence and transport among youth in a peri-urban area. Thus the researcher speculates that alcohol is a prominent risk factor for fatal injury mortalities among youth. More studies are needed to explore the effects and risks of other substances on youth fatal injury deaths. It is clear that alcohol awareness programmes are imperative in rural areas where alcohol abuse continues to be rife- an unfortunate artefact of oppressive practices in the past. The researcher suggests that when laws and policies on alcohol and substance abuse are being developed this relationship between alcohol and youth deaths be taken into consideration so that stricter laws can be enforced. In other words the researcher recommends that the legal drinking age be increased from 18 years to 21 years old as this could help prevent many violence and transport-related deaths among the youth in South Africa.

#### **5.7.5 Drowning and Burns are areas of concern with children and youth**

The present study reported that drowning and burns are the two most common unintentional injury causes of death among children and youth. Further studies need to be conducted to ascertain the site and circumstances for these preventable deaths.

Thus prevention interventions need to focus specifically on burn and drowning deaths as these are major causes for concern among children and youth. The researcher suggests that home visitation programmes or safety psycho-education be done in terms of risk factors associated with burning. In terms of drowning deaths the researcher suggests better structures be enforced to protect children and youth from drowning in farm dams, river and at the beach in the sea. These could include locked gates; lifeguards and no entry and no swimming signs in all languages. Initiatives should also be undertaken to teach children particularly living in farm labour communities how to swim.

### **5.7.6 Implications for prevention**

The present study has generated data on the: who, what, when and how of fatal injury mortalities and suicides among children and youth in a peri-urban area. The study has extended the NIMSS to the Stellenbosch districts, which has made it more possible to respond effectively and efficiently to the need for peri-urban data in the health sector, by providing quality and comparative data. Thus the present study has contributed to the phased development and improved mortality data for the Stellenbosch region, as well as to the national South African data. And in turn has broadened the knowledge and understanding of child and youth injury fatalities and suicides in a peri-urban area.

In terms of policy formulation, prevention control and health interventions and service delivery the researcher suggests there be an investment in community psychology as the focus for intervention. The community based crime prevention strategy developed by the Department of Safety and Security suggests that the solution to crime should be based on the factors that cause crime. The first stage of this process is to identify the causes, prevalence and magnitude of the problem. The public health model supports this strategy by suggesting that the first step is to determine the magnitude, scope and characteristics of the injury problem. The present study has provided data and information for the first stage of these models. The researcher encourages more research focusing on fatal mortalities and suicides of children and youth in peri-urban areas. The researcher recommends that the present study's data be used to design, develop and adapt prevention interventions developed from urban data to make them more effective for children and youth in peri-urban areas.

In addition, the researcher suggests that a specific intervention for children and youth be implemented which is after-school services or facilities and programmes. It is suggested that more of these services be made available to the schools for children, youth and families or that government put more funding into the services already available so that children and youth have a safe place to be supervised until their parents come home from work. This could help to reduce the amount of transport-related, unintentional and violence-related deaths that occur due to the lack of parental supervision.

### **5.7.7 Additional Implications**

The present study supported the urban data in terms of sex differences, as male deaths are far higher than female deaths in both urban and peri-urban areas. The present study also reports that most of the deaths occur among the Black and Coloured populations. Violence-related deaths occurred mainly in the Black population whereas suicides and transport-related deaths occurred mostly in the Coloured population.

In terms of the violence-related deaths the present study supports the previous urban data. However, it does not support the previous research in terms of suicides, as previous research has reported that suicide deaths occur mainly among the White male population, whereas the present study reports that suicides occur mainly among Coloured and Black males.

Furthermore the present study reported on the when of fatal injury mortalities and suicides. The data indicates that most violence-related deaths, transport-related deaths and suicides occur over the festive season months such as December, January and March (i.e. Christmas, New Years and Easter), whereas the unintentional injury deaths (i.e. burns etc) and natural deaths occur more in the winter months of June, July and August. In addition, most of the deaths and suicides seem to occur over the weekend (i.e. Saturday and Sunday). Prevention intervention developers should take this into consideration when developing appropriate prevention and control programmes.

## **5.8 Limitations and Recommendations**

A major limitation of the current study is that the sample was drawn from only one mortuary in the peri-urban part of the Western Cape with a small sample (N = 591). Thus this study may be limited in its generalisability to children and youth from areas other than a peri-urban area. Furthermore, the data collection procedures were based solely on the NIMSS data collection form and data were mainly at the categorical or nominal level.

This limited the kinds of data analyses that could be conducted. The replication of the study with a larger sample including more than one peri-urban mortuary and using more than one data collection method would confirm and enhance the results of the present study and allow for more sophisticated analyses.

Of the sample, blood alcohol concentration was only available for two hundred and sixty six (45%) of the cases. Thus continued research into the relationship between alcohol misuse and child and youth mortalities and suicides in peri-urban areas is warranted and recommended. Notwithstanding these limitations, the results of the present study confirmed previous literature and findings, as well as suggest that continued research on child and youth mortalities and suicides in peri-urban areas is warranted.

Further research utilising qualitative data can help to illuminate some of the mortality patterns, attendant risk factors and how these deaths may be prevented. Another limitation is the epidemiological approach of the study and thus further quantitative research can be used to examine comparative data based on sex, gender, and age. Further studies should also consider including more rural towns or districts to allow for more distinctive urban-rural differences in mortality data to be investigated

## **5.9 Conclusion**

People of all ages, but specifically children and youth are exposed to injuries, violence and mortalities every day in their roads, in their communities, at their school and even in their place of safety, their home environments (Towner, 2005). Despite the alarming fatalities due

to fatal injuries and suicides among children and youth, little has been done in terms of research and prevention interventions in the peri-urban settings.

Through a quantitative inquiry the present study aimed to explore and determine the prevalence, magnitude and patterns of fatal injury mortalities and suicides among children and youth in the Stellenbosch region between the years of 2001 to 2005.

This included exploring and determining the main causes and consequences of fatal injury mortalities and suicides among children and youth in a peri-urban area. Firstly the study highlighted that transport-related deaths were a serious cause for concern among both children and youth in peri-urban settings. The importance of specific road safety awareness initiatives within peri-urban areas and among specific age groups was indicated. Violence-related deaths were determined to be a leading cause of death among the older age groups in the youth category, with sharp force objects being the leading external cause of violent deaths. This highlighted a key finding that sharp force objects death are a more serious cause for concern than firearm deaths in peri-urban areas, which challenges previous urban data.

Burns and drowning were indicated as pertinent cause of unintentional deaths among both children and youth within peri-urban areas. This was suggested to be due to the high use of paraffin enabled heating systems in house in peri-urban areas and the lack of safety surrounding materials such as matches in the home. In addition, suffocation deaths among infants were identified as a concern.

The link between alcohol use and abuse among the youth age group was intimated. Consideration of this link was indicated by the key finding that alcohol is a prominent risk factor for fatal injury mortalities among youth. However, more studies are needed to explore the effects and risks of other substances on youth fatal injury deaths. More significantly, intervention initiatives are earnestly warranted to address this concern.

Past urban fatal injury mortality research was presented providing a broad understanding of the context of fatal injury deaths. A comparison between the previous urban data and the present peri-urban data was presented and discussed. It was identified that there were more male deaths than female deaths in both urban and peri-urban settings. However, the urban

data seemed to differ from the peri-urban data in terms of suicide findings as suicide deaths were far more pertinent in the urban settings than in the peri-urban area. This, however, may have been due to the smaller sample size in the peri-urban area. The comparison found that homicide and transport-related deaths were the leading cause of deaths among children and youth in both urban and peri-urban settings.

This present study, therefore, provided a deepened understanding on the: who, what, when and how of fatal injury mortalities and suicides among children and youth in a peri-urban area. Furthermore, the study extended the NIMSS to the Stellenbosch regions, which has made it more possible to

respond effectively and efficiently to the need for peri-urban data in the health sector, by providing quality and comparative data. The present study has, therefore, made a contribution to the phased development and improved mortality data for the Stellenbosch region, as well as to the national South African data. And in turn has broadened the knowledge and understanding of child and youth injury fatalities and suicides in a peri-urban area.

The research findings have implications that need to be addressed specifically by health care professionals, policy developers, government departments and non-government organisations. Implications were considered critical in impacting prevention interventions and initiatives aiming to provide safety to children and youth living in peri-urban areas within South Africa.

In light of the devastating and alarming death statistics among children and youth in South Africa, the challenge of providing effective prevention and control interventions which provide safety and enhance the quality of life and improve service deliver, may seem an overwhelming task. However, with solid and empirical research data, initiatives that foster the safety and development of children and youth particularly in peri-urban and rural communities can be devised to ensure that their fundamental right to safety for the attainment of health, peace, justice and well-being can be achieved.

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