

**ADOLESCENT HOMICIDE VICTIMISATION IN JOHANNESBURG, SOUTH
AFRICA: EPIDEMIOLOGICAL PROFILE, SITUATIONAL CONTEXT AND
NEIGHBOURHOOD STRUCTURE**

by

Lu-Anne Swart

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Supervisor: Prof M Seedat

Co-supervisor: Prof J Nel

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DECLARATION

Student number: 573-131-3

I declare that **Adolescent homicide victimisation in Johannesburg, South Africa: Epidemiological profile, situational context and neighbourhood structure** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Lu-Anne Swart

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SUMMARY

Although interpersonal violence is the leading cause of nonnatural death among adolescents in South Africa, research is limited. This thesis examined homicides among adolescents (15-19 years) in the city of Johannesburg, South Africa, during the period 2001 to 2009. It aimed to describe the incidence and epidemiology; depict the situational contexts based on victim, offender and event characteristics, and to develop a situational typology of adolescent homicides; and to identify the structural factors associated with neighbourhood levels of adolescent homicide within the city. Four separate studies were conducted using data from the National Injury Mortality Surveillance System (NIMSS), police case records, and Census 2001. The results revealed an average annual homicide rate of 23.4/100 000, with firearm homicides decreasing considerably over the study period, while homicides due to sharp instruments and blunt force increased. The epidemiological results highlighted the vulnerability of male, and black and coloured adolescents. The typological analysis identified three categories of adolescent homicide, namely: 1) male victims killed by strangers during a crime-related event; 2) male victims killed by a friend/acquaintance during an argument; and 3) female victims killed by male offenders, and indicates the need for multiple and focused prevention strategies. Alcohol use was also prevalent, with 39% of the victims tested having positive blood alcohol concentrations (BAC). The characteristics found to be associated with alcohol-related homicides, specifically, male victims killed with sharp instruments in public places, over the weekends and during the evenings, and by a friend/acquaintance draw attention to both the harmful pattern of intoxication-oriented drinking and the risky situational contexts in which adolescents consume alcohol. Finally, the results also showed that the incidence of male and female adolescent homicides was greater in neighbourhoods characterised by poverty and deprivation, while female adolescent homicides were also higher in neighbourhoods marked by high concentrations of households where children were not living with their parents. Overall the results point to the urgent need for a comprehensive prevention strategy that targets adolescents, their families and communities, and also addresses weapon availability, alcohol use, and issues of masculinity and gender to reduce homicides among adolescents.

Key words: homicide; adolescents; South Africa; prevention; epidemiology; situational context; alcohol; neighbourhood; structural factors.

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INTRODUCTION

In South Africa, interpersonal violence among young people is a major concern (Seedat, van Niekerk, Jewkes, Suffla, & Ratele, 2009; Ward, Dawes, & Matzopoulos, 2012), and accounts for the majority (52.4%) of injury deaths among adolescents and young adults (15 to 24 years) (Prinsloo, 2007). The highest homicide rates are observed among young males aged 15 to 29 (184/100 000), nine times higher than the global rate (19.8/100 000) for males of the same age (Norman, Matzopoulos, Groenewald, & Bradshaw, 2007). Even though females are at lower risk of homicide, the rate of 22.5/100 000 among females aged 15 to 29 years indicates that South African females are five times more likely to be a victim than other females of the same age across the world (5.0/100 000) (Norman et al., 2007). Apart from the devastating consequences for the victims' families and communities, these violent deaths undermine the economic growth and social development of the country (Bowman, Matzopoulos, Butchart, & Mercy, 2008). Though there have been numerous responses to the problem of violence among young people, from government and civil society, investment in primary prevention in particular remains an urgent need in South Africa (Seedat et al., 2009).

Understanding and preventing interpersonal violence

The public health approach places a focus on primary prevention, emphasising the need for intervention before individuals are victimised or perpetrate violence, and takes a population-based perspective aimed at benefitting the largest number of people (Haegerich & Dahlberg, 2011; Rosenberg & Knox, 2005). In this regard, the public health approach provides a systematic, scientific procedure for understanding and preventing violence consisting of a four-step process that involves: 1) describing the problem by measuring the incidence, trends and epidemiological characteristics of violence (e.g. behaviours, injuries, and/or deaths); 2) identifying the factors that increase or decrease the risk for experiencing or perpetrating violence; 3) developing, implementing, and evaluating prevention strategies that target risk and protective factors; and 4) facilitating the dissemination and implementation of effective prevention strategies in communities and other appropriate settings (Dahlberg & Krug, 2002; Haegerich & Dahlberg, 2011).

According to the *World report on violence and health*, interpersonal violence can be defined as the intentional use of physical force or power, threatened or actual, against another person, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation (Dahlberg & Krug, 2002). Youth violence refers to

interpersonal violence committed by, to or between adolescents and young adults aged between 10 and 29 years and includes a broad spectrum of behaviours ranging from bullying to homicide (Mercy, Butchart, Farrington, & Cerdá, 2002). Youth violence is a problem worldwide. For example, the World Health Organisation (WHO) (2011) estimates that around 250 000 homicides occur among youth between the ages of 10 and 29 years of age each year, accounting for 41% of the annual total number of homicides globally. However, homicide rates for youth vary considerably among countries, with the rates typically highest in low- and middle-income countries or countries experiencing rapid social and economic change (Mercy et al., 2002; Pinheiro, 2006).

Yet there are very few studies to inform the development and implementation of contextually appropriate intervention strategies in low- and middle-income countries where prevention is most needed (Rosenberg, Butchart, Mercy, Narasimhan, Waters, & Marshall, 2006) and likely to be less costly than dealing with the consequences of violence (Dahlberg & Krug, 2002). In line with the public health approach, studies describing the epidemiology of violence and identifying the factors that contribute to its occurrence are among the first crucial steps required to develop an evidence base to inform prevention. In this regard, data on homicide, although only representing a small proportion of the spectrum of violence impacting youth, can provide a reliable indicator of the magnitude of serious violence within a country or community, and can be used to identify groups at high risk for violence and to monitor change over time (Dahlberg & Krug, 2002; United Nations Office on Drugs and Crime [UNODC], 2011).

With respect to identifying the contributory factors, much of the work on youth violence risk and prevention has been guided by Bronfenbrenner's (1979) ecological approach to development (e.g. Rosenberg & Knox, 2005; Ward et al., 2012). From this perspective, individual behaviour and development is assumed to be influenced by the social settings in which the individual lives, or participates in, and the extent and nature of the interaction between these settings. Specifically, violence is regarded as the outcome of the interplay of a variety of factors operating at the individual, relationship, community, and societal levels and therefore effective prevention requires identifying and intervening in the various factors across different levels of the ecological model (Dahlberg & Krug, 2002; Haegerich & Dahlberg, 2011; Mercy et al., 2002).

However, the factors that contribute to violence have been shown to differ in importance across stages of development (Dahlberg & Potter, 2001; Herrenkohl, Maguin, Hill, Hawkins, Abbott,

& Catalano, 2000) and therefore age and developmental stage are important considerations when attempting to identify or address the factors that contribute to violence (Gorman-Smith, 2012). Although the *World report on violence and health* defines youth as between the ages of 10 to 29 years (Mercy et al., 2002), definitions vary across cultures and countries. For example, the South African National Youth Policy defines youth as between the ages of 14 and 35 years. Generally though, the term 'youth' is a broad concept that encompasses young people at different stages of development, including adolescence and young adulthood. Adolescents are defined by the United Nations Children's Fund (UNICEF) (2011) and its partners (United Nations Population Fund [UNFPA], the World Health Organisation [WHO], and the Joint United Nations Programme on HIV/AIDS [UNAIDS]) as persons between 10 and 19 years. Due to the marked difference in development and experience between younger and older adolescents, UNICEF also differentiates between early adolescence (10 to 14 years) and late adolescence (15 to 19 years) (UNICEF, 2011). However, the specific age group that defines adolescence also varies across cultures and countries (UNICEF, 2011). Even though the age categories may vary, there is a need for studies that focus on specific developmental stages so that interventions can be tailored to individual developmental needs and target the various factors across different levels of the ecological model (Hawkins, Herrenkohl, Farrington, Brewer, Catalano, Harachi, & Cothorn, 2000; Mercy et al., 2002; Williams, Guerra, & Elliot, 1997).

Adolescents as an important target for homicide prevention

Countries worldwide, including South Africa, demonstrate a marked increase in the rates of homicide victimisation in the 15 to 19 year age group, indicating that adolescents are at a heightened vulnerability for interpersonal violence and represent an important target for prevention (Dahlberg & Potter, 2001; Donson, 2008; Pinheiro, 2006; Prinsloo, 2007). During this period, young people experience many physical, emotional, cognitive and social changes, with a move towards independence and the need to establish individual identity, values and skills in preparation for adulthood (including work, partnership, parenting, and citizenship) (Eccles & Gootman, 2002). Normative aspects of development, such as decreased parental and adult supervision, greater peer involvement, experimentation and risk-taking behaviour, provide adolescents with opportunities to shape their identities, test their decision-making skills, and develop realistic assessments of themselves and the world around them (Committee on the Science of Adolescence, 2011; Ponton cited in American Psychological Association [APA], 2002). These normative attributes of development also increase adolescents' exposure to a range of risky situations, including interpersonal violence and homicide. However, not all adolescents

become involved in violence. Understanding the factors that contribute to interpersonal violence, and homicide more specifically, is essential for the prevention and reduction of adolescent violent deaths in South Africa.

The ecological model: Factors contributing to interpersonal violence

As indicated earlier, the ecological model which consists of four different levels provides a framework for the organisation and explanation of the various factors that contribute to interpersonal violence (Dahlberg & Krug, 2002; Rosenberg et al., 2006).

Individual factors

The first level of the ecological model focuses on individual factors, such as biological, psychological, and behavioural characteristics, that increase the likelihood of a person being a victim or a perpetrator of violence (Dahlberg & Krug, 2002). This includes, for example, beliefs and attitudes supportive of violence, social cognitive deficits, poor emotional and behavioural control, and engagement in other forms of risk behaviour (e.g. alcohol use) (see Haegerich & Dahlberg, 2011; Hawkins et al., 2000; Mercy et al., 2002). Among the range of individual factors, sex, age, and race of the victim and offender have been most often studied with regard to homicide. These demographic factors are important because they are connected to particular role expectations, opportunities, and life experiences that influence a person's exposure and responses to risky situations that may result in lethal violence (Miethe & Regoeczi, 2004). International and South African research has shown that demographic groups are differentially affected by homicide (Mercy et al., 2002; Prinsloo, 2007; UNODC, 2011). Knowing the characteristics of adolescents who are more likely to be involved in interpersonal violence and homicide provides important information for the targeting of relevant prevention policies and programmes.

Relationship and situational factors

The second level of the ecological model concentrates on interpersonal relations and experiences that shape personality, beliefs and attitudes and, in turn, contribute to violent behaviour (Dahlberg & Krug, 2002). Peer relationships take on a specific intensity during adolescence and influence the risk for violence. In particular, associating with antisocial peers and gang membership increases the likelihood of violent offending and victimisation among adolescents (Curry, Decker, & Egley, 2002; Schreck, Fisher, & Miller, 2004; Taylor, Peterson, Esbensen, & Freng, 2007). Relationships with family also influence adolescents' risk for violence. For example, low parental attachment and poor parental monitoring and supervision of adolescents have been associated with violent behaviour (Gorman-Smith, Henry, & Tolan,

2004; Hoeve, Dubas, Eichelsheim, van der Laan, Smeenk, & Gerris, 2009). Furthermore, both attachment to parents and effective parental monitoring appear to be protective factors that moderate the harmful effects of exposure to community violence for adolescents (Gorman-Smith et al., 2004; Nash, Mujanovic, & Winfree, 2011).

Studies on homicide more specifically concentrate on the relationship or the situational context in which homicide occurs. This involves a focus on the aspects of the victim, the offender, the interpersonal relations between them, and the physical location and setting that contribute to the violent behaviour at the time of the homicide event (Kubrin, 2003; Miethe & Regoeczi, 2004). Accordingly, an examination of the situational contexts in which adolescent homicides occur in South Africa can offer important insight into the situational factors that should be targeted for prevention. Victim and offender demographics and event characteristics such as the victim-offender relationship, motives or precipitating circumstances for the violent behaviour, the presence of weapons, alcohol use, and the physical location are among the factors that should be considered when examining the situational contexts of homicide (Brookman, 2005; Miethe & Regoeczi, 2004; Pridemore, 2006).

Community factors

The third level of the ecological model represents the community contexts in which social relationships occur, such as schools and neighbourhoods (Dahlberg & Krug, 2002). In this regard, research has shown that homicides tend to be more prevalent in certain communities or neighbourhoods than others (e.g. Hannon, 2005; Kubrin, 2003; Peterson, Krivo, & Harris, 2000; Wang & Arnold, 2008). Neighbourhood structural factors, such as poverty or the lack of opportunities, seem to create conditions in neighbourhoods which ultimately lead to violent behaviour (Elliott, Wilson, Huizinga, Sampson, Elliott, & Rankin, 1996; Peterson et al., 2000; Sampson, 1997). Furthermore, factors such as economic deprivation, high residential turnover, and population heterogeneity can also lead to social disorganisation in a community which in turn contributes to violence (Bursik, 1988; Sampson & Groves, 1989). Accordingly, the socioeconomic structural conditions of the communities or neighbourhoods in which South African adolescents live and grow-up may be key explanatory factors, and may provide important targets for sustainable violence control and prevention.

Societal factors

The fourth level of the ecological model focuses on the larger societal factors that contribute to violence. Demographic and social changes, economic and social policies that maintain

socioeconomic inequalities between people, and cultural norms which support the use of violence are among the societal factors that create conditions conducive to violence among young people (Dahlberg & Krug, 2002). Adolescents growing up in low- and middle-income countries or socially transforming countries, in particular, appear to be exposed to multiple factors that compound their vulnerability for violence (Mercy et al., 2002; Pinheiro, 2006).

In South Africa, specifically, despite the transition to democracy in 1994, stark racially based socioeconomic inequalities persist as a result of apartheid's legacy. Consequently, many South African children and adolescents live in conditions marked by poverty and deprivation (Jamie, Bray, Viviers, Lake, Pendlebury, & Smith, 2011). Conditions are more severe in urban areas, where rapid urbanisation has also contributed to young people living in communities characterised by high levels of unemployment, inadequate housing, overcrowding, under-resourced schools and high levels of school dropout, the lack of social and recreational opportunities, and high levels of crime and violence (Leoschut, 2006; Panday, Ranchod, Ngcaweni, & Seedat, 2012; South African Cities Network, 2011). In addition to poverty and inequality, other social conditions, including patriarchal constructions of masculinity that encourage toughness, risk-taking, and defence of honour; exposure to abuse in childhood and inadequate parenting; access to firearms; and widespread alcohol use are acknowledged as among the factors that make young South Africans vulnerable to interpersonal violence, in particular homicide (Seedat et al., 2009).

However, while these social conditions are recognised as contributing to the high levels of violence among young South Africans, there has been little systematic investigation of the contributory factors associated with homicide, in particular homicides involving adolescents. Although there have been a number of recent studies on homicide in South Africa, these have primarily focused on the epidemiological characteristics and factors associated with homicide aggregated across all age groups (e.g. Kramer & Ratele, 2012; Ratele, 2010; Ratele, Swart, & Seedat, 2009) and adult female homicides (e.g. Abrahams, Jewkes, Martin, Mathews, Vetten, & Lombard, 2009; Mathews, Abrahams, Jewkes, Martin, & Lombard, 2009; Suffla, van Niekerk, & Arendse, 2008). Therefore, while it is known that homicide is a major cause of mortality for adolescents in South Africa (Burrows, Swart, & Laflamme, 2009; Prinsloo, 2007) considerably less is known about the characteristics and factors that contribute to its occurrence.

RESEARCH FOCUS AND AIMS

The present thesis was undertaken to improve our understanding of the contributory factors associated with adolescent homicide victimisation in South Africa with the intention of adding to a local evidence base that will inform the development and implementation of a comprehensive strategy to prevent these violent deaths. Considering the complexity of homicide, the thesis aims to provide information on the contributory factors at various levels of the ecological model that are associated with adolescent homicides in Johannesburg with the intention to inform intervention and programmatic decisions at the city level. The major research question of the thesis is: What individual, situational (including relationship), and community factors contribute to the incidence of adolescent homicide in the city of Johannesburg? Accordingly, the general research aims of the thesis are to:

- Portray the incidence and epidemiological profile of adolescent homicide
- Describe the situational attributes and contexts of adolescent homicide
- Identify the role of community structural factors on the incidence of homicide

To accomplish the research aims, the thesis is formed around four separate studies which address different issues related to adolescent homicide but when read together form a collective body of knowledge on adolescent homicide. In line with the general research aims of the thesis, the studies pursue the following research objectives:

Regarding the magnitude and epidemiological profile:

- To describe the incidence trends of adolescent homicide victimisation in Johannesburg over the period 2001 to 2009 (Study I)
- To describe the epidemiological characteristics of adolescent homicide victimisation, including the distribution of homicide across sex and race groups, external cause of death (weapon used), scene, temporal patterns, and the presence of alcohol (Study I)

Regarding the situational attributes and contexts:

- To describe adolescent homicide victims, their offenders, and characteristics of the event (Study II)
- To identify and describe the dominant types of situational contexts of adolescent homicide, based on the combinations or clustering of victim, offender, and event characteristics (Study II)

- To describe the blood alcohol concentration (BAC) levels of adolescent homicide victims at the time of death (Study III)
- To identify the victim, event, and offender characteristics associated with a positive BAC among adolescent homicide victims at the time of death (Study III)

Regarding the role of community factors:

- To determine the distribution of adolescent male and female homicide across neighbourhoods within the city of Johannesburg (Study IV)
- To assess whether neighbourhood structural characteristics are associated with levels of adolescent male and female homicides (Study IV)

Study population

Since the homicide rates in South Africa start to rise dramatically in the 15 to 19 year age group, adolescents within this age group were selected as the focus of this thesis (Donson, 2008; Prinsloo, 2007). Furthermore, all four studies focus on adolescent homicides occurring within the city of Johannesburg. Johannesburg was selected as homicide persistently ranks among the top causes of nonnatural death each year in the city (Donson, 2008; Prinsloo, 2007), and accounts for the largest proportion of nonnatural deaths among adolescents (Burrows et al., 2009).

Data sources

The four studies were based on data from three different sources – the National Injury Mortality Surveillance System (NIMSS), police case records, and Census 2001. Adolescent homicide deaths were drawn from the NIMSS, and the information on the victims (sex, age, race), external cause of death (weapon used), time (year, month, day, hour), and presence of alcohol was used in Studies I, II, and III while information on the neighbourhood where the homicide occurred was used in Study IV.

Police case records were used to obtain data on the offenders (age, sex and race), victim-offender relationship, and motivations or precipitating circumstances of adolescent homicides in Studies II and III. Police data was collected in 2009 and access was restricted to case records for the period 2001 to 2007 as more recent case dockets (2008 and 2009) were still likely to be open, either with the investigator or in court, and hence would be problematic to obtain.

The 2001 Census, which was the most recent at the time of conducting the studies, provided the data on population totals (denominator data) for the calculation of homicide rates in Study I and the data on the socio-structural characteristics of neighbourhoods in Johannesburg in Study IV. Although concerns may be raised about the completeness and accuracy, the 2001 Census provided the only detailed and comprehensive data on population demographics and neighbourhood characteristics for the city of Johannesburg.

As the primary data source for all four studies, a detailed description of the NIMSS follows. The other sources of data are described in greater detail in the respective studies.

NIMSS

The NIMSS was developed to provide epidemiological data on injury mortality in South Africa and uses existing medico-forensic investigative procedures at state medico-legal laboratories and forensic chemistry laboratories to collate information on injury deaths (Donson, 2008). The Inquests Act (Act 58 of 1959) requires all nonnatural deaths in South Africa to be reported to the police and subject to medico-legal investigation. For every nonnatural death that enters the forensic medico-legal system at the laboratories participating in the NIMSS, the forensic pathologists and forensic officers complete a single data form that records 21 items of information on the demographics of the victim (age, sex, and race), time of death, scene, and place (province, town, and suburb) of injury, external cause and apparent manner of death (homicide, suicide, accidental, undetermined) (Donson, 2008). The NIMSS classifies the external cause of death based on the WHO International Classification of Diseases (ICD). The *external cause* of death refers to the mechanism or circumstance that preceded the death (Donson, 2008). For homicide, the external cause refers to the method or weapon used to commit the homicide.

The *apparent manner* of death describes the intention prior to the injury that resulted in the death, and is divided into four categories: homicide (intentional interpersonal injury), suicide (intentional self-directed injury), accident (unintentional injury), and undetermined (Burrows, 2005). Since the final manner of death is only determined after police investigations and court proceedings, which can take between two to five years to complete, the NIMSS only records the *apparent manner* of death determined by the medical practitioner, and is for research purposes only (Burrows, 2005). As indicated, the NIMSS definition of homicide refers to intentional injuries inflicted by another person and thus excludes deaths due to culpable homicide, such as those relating to motor vehicle accidents. However, intentionality may be difficult to determine

(see Dahlberg & Krug, 2002; UNODC, 2011), especially soon after the injury event when contextual information is not always available and can only be obtained through police investigations. Therefore, deaths which may be due to reckless behaviour (e.g. accidental shootings) and self-defence are recorded as homicides.

Once all the data has been recorded on the forms, staff at the medico-legal laboratories then enter the data into a computerised database. At the end of each year, the data from all the participating medico-legal laboratories is sent to the Safety and Peace Promotion Research Unit (SAPPRU) which is co-directed by the Medical Research Council (MRC) and the University of South Africa (Unisa). Data on the BAC levels of the victim from the forensic chemistry laboratories is also sent to SAPPRU, where all the data are then combined. The NIMSS is a collaboration between the South African Department of Health (DoH) and SAPPRU, and maintains the ethical standards prescribed by the DoH, MRC and Unisa (Suffla et al., 2008).

The NIMSS system started collecting injury data in 1999 at ten medico-legal laboratories across the country. From 2001 to 2005 the system had full coverage of injury deaths in four major metropolitan cities in South Africa, namely Cape Town, eThekweni (Durban), Johannesburg, and Tshwane (Pretoria). In 2006, with the transfer of Forensic Pathology Services (FPS) from the South African Police Service to the provincial Departments of Health, several medico-legal laboratories discontinued participation. Since 2008 to date, NIMSS has had full coverage of all injury deaths in the province of Mpumalanga and southern Gauteng, which includes two major South African metropolitan cities, namely Johannesburg and Ekurhuleni.

Ethics approval

Ethics approval for the study was obtained from the Ethics Committee of the Unisa Psychology Department and approval was granted to access the relevant data from SAPPRU and the Gauteng South African Police Service.

Organisation of the thesis

Following on from the Introduction presented here, the thesis comprises of Studies I, II, III, IV, and the Conclusion. The first study: *Adolescent homicide victimisation in Johannesburg, South Africa: Incidence and epidemiological characteristics*, uses data from the NIMSS for the period 2001 to 2009 to describe the trends from 2001 to 2009 in incidence and external mechanism of homicides among adolescents 15 to 19 years old; the distribution of homicide across sex and

race groups; and characteristics of the homicide event, including the weapons used, the scene, temporal patterns, and the presence of alcohol.

The second study: *The situational context of adolescent homicide victimisation in Johannesburg, South Africa*, describes victim, offender, and event characteristics of adolescent homicides using data obtained from the NIMSS and police case records from 2001 to 2007. The study also reports on the dominant types of situational contexts of adolescent homicide and their prevalence, based on an empirical classification of distinctive combinations of victim, offender, and event characteristics.

The third study: *Alcohol consumption in adolescent homicide victims in the city of Johannesburg, South Africa*, describes the patterns of BAC at the time of death for adolescent homicide victims. Through logistic regression analysis of data obtained from NIMSS and police case records, the study also reports on the victim, offender, and event characteristics that were associated with positive BAC levels among victims at the time of death.

The fourth study: *Neighbourhood structure and adolescent homicide victimisation in Johannesburg, South Africa*, focuses on the geographical distribution of adolescent homicide victimisation. Based on the results of negative binomial regression on adolescent homicide data from the NIMSS (2001 to 2009) and neighbourhood-level data compiled from the 2001 Census information, the study reports on the neighbourhood socioeconomic structural characteristics associated with the occurrence of male and female adolescent homicides in Johannesburg.

Finally, the conclusion provides an overview of the main results of the four studies, followed by a discussion of the implications for prevention, the limitations of the research and recommendations for future research.

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STUDY I

ADOLESCENT HOMICIDE VICTIMISATION IN JOHANNESBURG, SOUTH AFRICA: INCIDENCE AND EPIDEMIOLOGICAL CHARACTERISTICS (2001-2009)

Although interpersonal violence is the leading cause of nonnatural death among adolescents in South Africa, studies providing accurate descriptions of the occurrence of homicide incidents among adolescent victims are limited. This study therefore describes the incidence and epidemiological characteristics of homicide among adolescents aged 15 to 19 years in Johannesburg based on data from the National Injury Mortality Surveillance System (NIMSS). A total of 590 adolescent homicides were registered during the period 2001 to 2009 corresponding to an average annual homicide rate of 23.4/100 000. The average annual rate was 39.8/100 000 for males and 7.9/100 000 for females. Black and coloured adolescents had the highest homicide rates. While firearms accounted for the majority of male and female deaths, there was a considerable decline in the firearm homicide rates over the study period. In contrast, homicide due to sharp instruments and blunt force increased. Public places such as streets were the predominant scenes for male deaths, while female homicides primarily occurred in residential locations. Most male homicides took place over weekend nights. Alcohol was also a prominent feature of homicides. The study results underscore the urgent need to develop and implement specific interventions directed at reducing homicides among adolescents and provide information for the targeting and monitoring of prevention strategies.

Key words: homicide; adolescents; South Africa; epidemiology; firearms.

Interpersonal violence among young people is a significant problem in South Africa (Seedat, van Niekerk, Jewkes, Suffla, & Ratele, 2009; Ward, Dawes, & Matzopoulos, 2012) and is the leading cause of nonnatural death among adolescents and young adults in the country (Prinsloo, 2007). With the dramatic rise in homicide rates from around the age of 15 years (Donson, 2008; Prinsloo, 2007) violence prevention interventions that are directed at adolescents are specifically required. A focus on this age group is especially important considering that adolescence constitutes a period of heightened vulnerability when young people face several developmental

and social challenges, including decreased adult supervision, greater peer influence, and increased experimentation which may place them at risk to a number of health-compromising behaviours, including involvement in violence (Committee on the Science of Adolescence, 2011; Dahlberg & Potter, 2001). In South Africa, in particular, supporting adolescents through investment in prevention is critically important, as many young people are exposed to adverse conditions including, for example, stark socioeconomic inequalities, high levels of poverty and unemployment, under-resourced schools, family disruption and inadequate parenting, and high levels of crime and violence within communities that exacerbate their vulnerability to involvement in violence (Leoschut, 2006; Panday, Ranchod, Ngcaweni, & Seedat, 2012; Seedat et al., 2009). Moreover, apart from premature death, violence during adolescence has been linked to impaired development and a range of psychosocial problems (Cooley-Strickland, Quille, Griffin, Stuart, Bradshaw, & Furr-Holden, 2009; Russell, Nurius, Herting, Walsh, & Thompson, 2010) that extend to adulthood, including a greater risk for further violent victimisation and perpetration (Liu & Kaplan, 2004; Smith, Ireland, & Thornberry, 2005). Therefore, preventing violence during adolescence might contribute to a reduction in the homicide rates in the country both among adolescents and adults. However, studies providing accurate descriptions of the occurrence and characteristics of homicide incidents among adolescent victims are limited in South Africa and, consequently, little information exists to inform the development and implementation of appropriate prevention strategies.

Although there have been a number of recent studies on homicide in the country, these have focused on the incidence and epidemiological characteristics of adult female (e.g. Abrahams, Jewkes, Martin, Mathews, Vetten, & Lombard, 2009; Mathews, Abrahams, Jewkes, Martin, & Lombard, 2009; Suffla, van Niekerk, & Arendse, 2008), adult male (e.g. Kramer & Ratele, 2012; Ratele, 2010), and child (Mathews, Abrahams, Jewkes, Martin, & Lombard, 2013) homicides. Research indicates that the kinds of victimisation and the social context, as well as the risk factors for violence, differ according to age and developmental stage (Dahlberg & Potter, 2001; Finkelhor & Ormrod, 2001; Finkelhor, Ormrod, & Turner, 2009; Herrenkohl, Maguin, Hill, Hawkins, Abbott, & Catalano, 2000) and therefore the epidemiological characteristics of adolescent homicide are likely to differ from those of adults and children.

In line with the overall aims of the thesis, the current study describes the incidence, trends and epidemiological characteristics of homicide among adolescents aged 15 to 19 years in Johannesburg during the period 2001 to 2009 with a view to contributing to a local evidence base that will inform the development and monitoring of prevention policies and programmes.

First, the subsequent section provides a brief overview of the South African literature on the epidemiology of homicide. The method and data used in the study are then described, followed by a presentation of the results from the analyses conducted. Finally, the results are discussed with reference to the aims of the study, previous South African research, study limitations, and implications for future research.

The epidemiology of homicide in South Africa

Studies that have examined the incidence and epidemiological patterns of homicide in South Africa have revealed that males constitute the overwhelming majority (88%) of homicide victims (Ratele, Swart, & Seedat, 2009) with the highest rates observed among males aged 15 to 29 (184/100 000) (Norman, Matzopoulos, Groenewald, & Bradshaw, 2007). Even though females are at lower risk for homicide, the rate of 24.7/100 000 obtained in a national study on femicide indicates that South African females are six times more likely to be a victim than other females across the world (Abrahams et al., 2009). In contrast to adults and adolescents, homicides among children (under 15 years) tend to be equally distributed between males and females (Mathews et al., 2013). While most homicide victims are black¹, national studies have reported that men and women among the coloured race group have the highest rates in South Africa (Abrahams et al., 2009; Thomson, 2004) – a pattern which is also evident among adolescents in a study that used data aggregated for South African cities (Burrows, Swart, & Laflamme, 2009).

With respect to weapon use in homicide, firearm-related fatalities accounted for the majority (55.1%) of homicides across the major urban areas of South Africa during 2001 to 2005 (Ratele et al., 2009). A similar pattern is evident among adolescents, with 48% of male and 53% of female homicides the result of firearms (Burrows et al., 2009). Injuries caused by sharp instruments (26.2%) and blunt force trauma (23.5%), on the other hand, appear to be the primary causes of death in homicides involving children (Mathews et al., 2013). However, it appears that the pattern of weapon use in homicide has changed in South Africa over the past years. For instance, the National Injury Mortality Surveillance System (NIMSS) has reported a decline in firearm homicides over the period 2001 to 2005 for most of the major urban areas in South Africa which were reflective of decreases in overall city-level homicide rates (Prinsloo, 2007). More recent data from NIMSS reveals that in 2007 nearly 40% of homicides were

¹ The racial terms “black”, “coloured”, “Indian”, and “white” were created through apartheid laws to refer to various race or population groups. The use of these terms does not imply acceptance of the apartheid assumptions on which these labels were based or that genetically distinct racial groups exist. The terms are used because of their significance as a result of the differential manner in which apartheid laws impacted, and continue to impact, on the lives of various groups of South Africans.

committed with sharp objects and just over a third resulted from gun shots (Donson, 2008). Whether firearm homicides have continued to decline over recent years and whether this has had an impact on the overall homicide rates, particularly among adolescents, is unclear.

In one of the few studies to examine the patterning of homicide in terms of place, Ratele and colleagues (2009) reported that private dwellings (27.9%) and streets (25.5%) comprised the predominant scenes of homicide. The majority of homicides in South Africa tend to occur over the weekends (58%) and at night (62.8%) (Ratele et al., 2009). Furthermore, Ratele and colleagues (2009) found that the night time pattern was consistent across the major cities in South Africa, and across sex and all age groups (except for females aged 0 to 14 years). Consistent with the homicide peak over recreational periods (weekends and night time), alcohol plays a major role, with most victims (between 50% and 55%) testing positive for alcohol (Prinsloo, 2007; Ratele et al., 2009).

For the most part, the abovementioned studies have used data aggregated across all age groups and therefore it is uncertain whether the identified patterns and characteristics are similar for adolescent homicides. Furthermore, the studies have also relied on national level data or data aggregated for the major urban areas in South Africa, yet the incidence and characteristics of homicide varies quite considerably across the cities (Burrows et al., 2009; Prinsloo, 2007). Accordingly, to better understand the incidence and epidemiology of adolescent homicide in South Africa the current study focuses on homicides that occurred among adolescents aged between 15 and 19 years in the city of Johannesburg. Specifically, the study objectives are to describe the trends from 2001 through to 2009 in incidence and method of homicide and to describe the epidemiological characteristics, including the distribution of homicide across sex and race groups, external cause of death (weapon used), scene, temporal patterns, and the presence of alcohol.

METHOD

The city of Johannesburg was selected for the study as homicides persistently rank among the top causes of nonnatural death each year in the city (Donson, 2008; Matzopoulos, 2004; Prinsloo, 2007). The city of Johannesburg is one of eight metropolitan municipalities in South Africa and constitutes the economic centre of the country. With a population estimated at just over 4.4 million, Johannesburg is the most populated city in South Africa (Statistics South Africa, 2012a). Most (54.5%) of Johannesburg's residents are younger than 30 years, with

adolescents aged between 15 and 19 years making up 7.1% of the total city population (Statistics South Africa, 2012b).

Data source

Homicide data on adolescents aged 15 to 19 years for the Johannesburg municipal area during the period 2001 to 2009 were extracted from NIMSS (see Introduction p.9 for a detailed description of NIMSS). The data included the victims' sex and race, the external cause of death (method or weapon used), the scene of the homicide, the date and time of death, and the victims' blood alcohol concentration (BAC) levels at the time of death.

Data analysis

Age-specific rates for all adolescent homicides and homicides by external cause were used to examine the incidence over the study period. The rates were calculated for each year from 2001 through to 2009 by dividing the number of adolescent homicide cases for each year by the age-specific (15 to 19 years) population estimated for the city of Johannesburg for that year, and multiplied by 100 000. Similar to the method used to calculate homicide rates in other South African studies (Matzopoulos, 2004; Prinsloo, Matzopoulos, & Sukhai, 2003), the 2001 Census population estimates for the city of Johannesburg were used for 2001 (Statistics South Africa, 2003) and were adjusted for the years 2002 through to 2009 using the provincial population growth rate based on estimates obtained from the Actuarial Society of South Africa (2003).

Homicide rates by sex and race group were also computed following the procedures outlined above, and averaged for the nine year period to examine the distribution of adolescent homicides across demographic groups. Descriptive statistics, such as frequencies, means, and percentages, of adolescent homicides occurring over the nine year period for external cause of death, scene of homicide, time (month, day, and time), and BAC levels were computed separately for males and females, and, where relevant, proportions were compared using Pearson χ^2 . All analyses were conducted using IBM SPSS Statistics for Windows, Version 20.0.

RESULTS

Incidence of adolescent homicide

A total of 590 adolescent (between 15 and 19 years) homicides were registered by NIMSS for Johannesburg during the period 2001 to 2009, yielding an average annual homicide rate of 23.4/100 000. Figure 1 reveals a fluctuating trend for adolescent homicides over the nine year

study period, with the rate having dropped quite sharply from 27.0/100 000 in 2001 to 19.3/100 000 in 2002, then it steadily climbed back to 26.7/100 000 in 2008 (with the exception of the low rate noted in 2005), and then declined again to 21.4/100 000 in 2009.

Figure 1 also depicts the age-specific homicide rates by external mechanism of death and reveals a considerable decline in firearm homicides over the nine year period, with the rate having dropped from 18.2/100 000 in 2001 to 4.8/100 000 in 2009. However, while firearm homicides decreased, homicides as the result of sharp instruments and blunt force increased from 2001 (6.5/100 000 and 1.1/100 000, respectively) to 2009 (9.3/100 000 and 5.5/100 000, respectively).

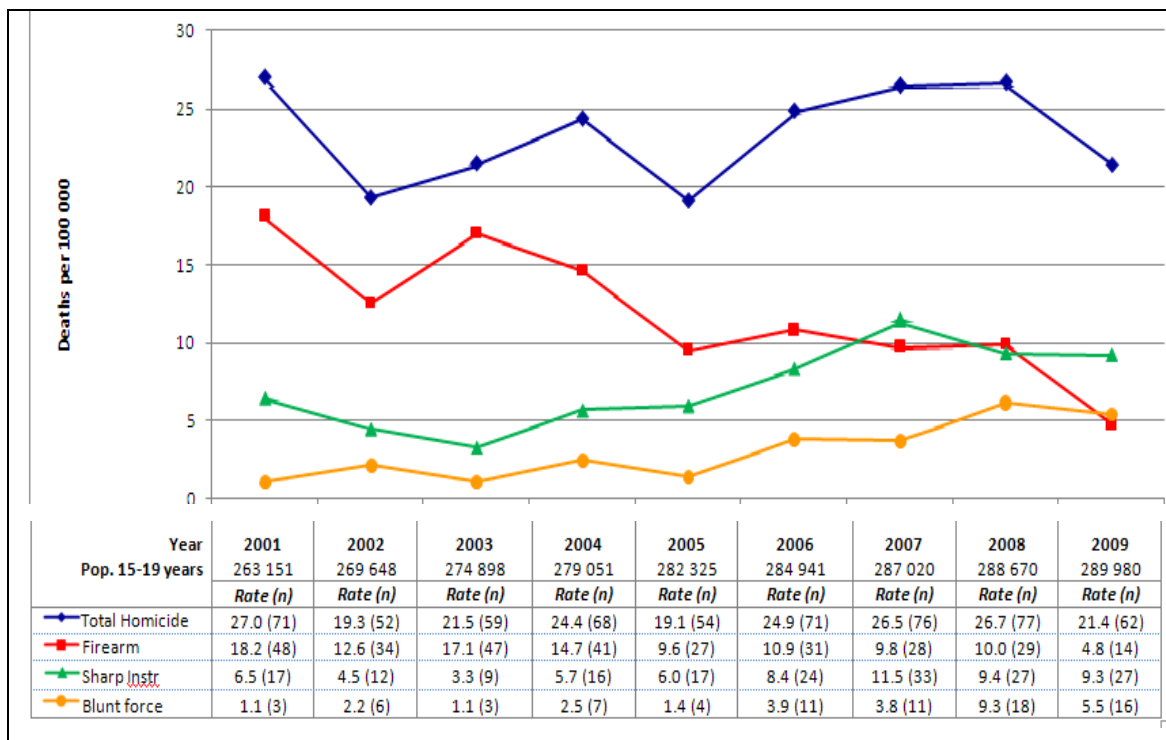


Figure 1. Homicide rates for adolescents (15-19 years) by weapon used, Johannesburg 2001-2009

The distribution of adolescent homicide by sex and race

Sex

Males were most often the victims of homicide and accounted for 82.7% (n=488) of all the adolescent cases over the study period. The average annual homicide rate for males was

39.8/100 000 compared to 7.9/100 000 for females. On average, for every female homicide that occurred there were 5.0 male homicides.

Race

Of the 588 (99.7%) homicides where race was known, the overwhelming majority of victims were black (88.1%, n=518), followed by coloured (8.2%, n=48), white (2.2%, n=13), and Indian (1.5%, n=9) victims. The average annual homicide rate for race and sex is shown in Figure 2. Adolescent males had higher homicide rates than adolescent females, and although this pattern was evident across all race groups the difference varied from 3.4 male deaths for every female death among white adolescents to 7.7 male deaths for every female death among Indian adolescents.

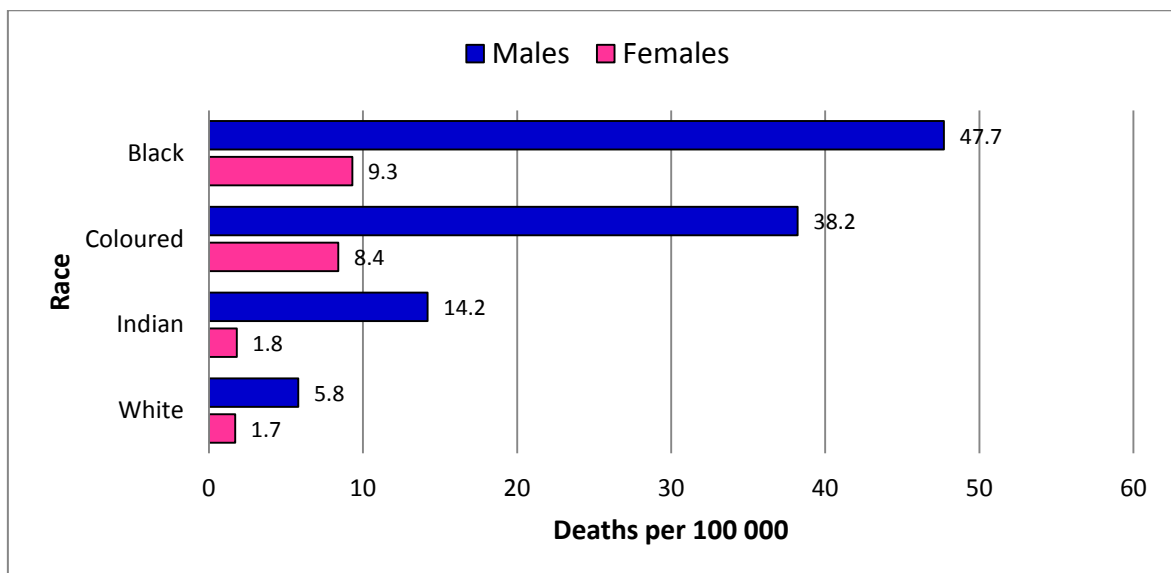


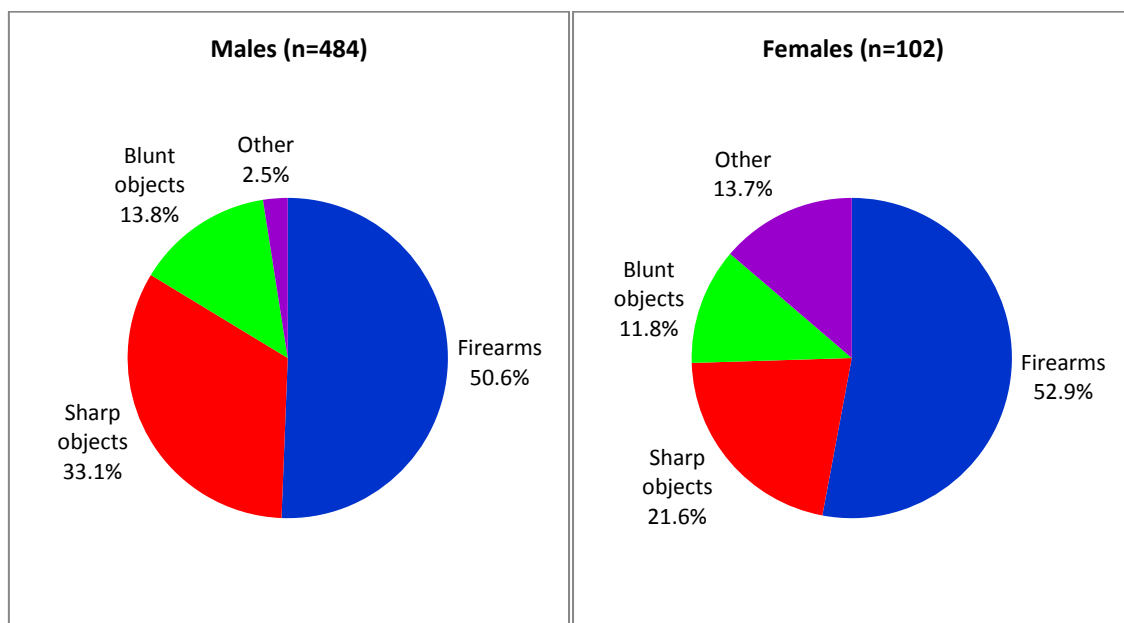
Figure 2. Average annual homicide rates for adolescents (15-19 years) by race and sex, Johannesburg 2001-2009

Among males, the average annual rate for black (47.7/100 000) and coloured (38.2/100 000) adolescents were considerably higher than those for same-age males in the Indian and white race groups (14.2/100 000 and 5.8/100 000, respectively). The rate for black and coloured adolescent males was 8.2 and 6.6 times that of white adolescent males, and 3.4 to 2.7 times that of Indian males. As in the example of males, black and coloured adolescent females also had considerably higher homicide rates compared to their Indian and white counterparts. The average annual homicide rate for black and coloured adolescent females was approximately five times that of same-age females in the Indian and white race groups.

Circumstances of adolescent homicide

Weapons or method used

External cause of death was recorded for 586 (99.3%) of the adolescent homicides. Firearms were the most common external cause of homicide for both males (50.6%, n=245) and females (52.9%, n=54), followed by the use of sharp objects (33.1%, n=160 for males; 21.6%, n=22 for females) (see Figure 3). Another 13.8% (n=67) of male and 11.8% (n=12) of female adolescent homicide victims were killed with blunt objects. Other external causes of adolescent homicide deaths, which included strangulation, poisoning, burns, and push from a height, accounted for 2.5% (n=12) of male and 13.7% (n=14) of female homicides.



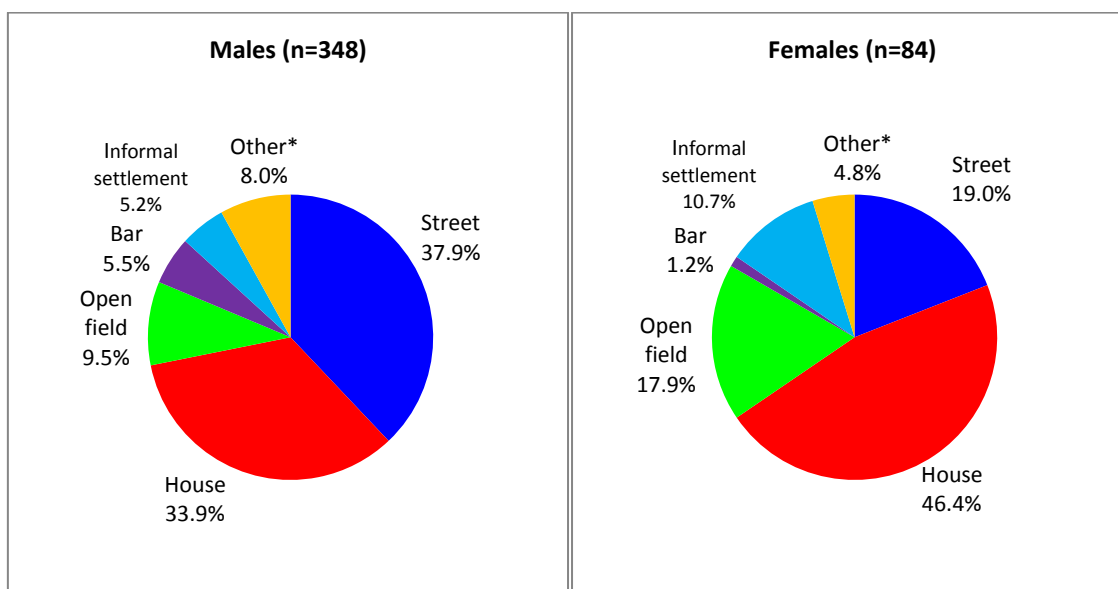
*Other category included strangulation, poisoning, burns, and push from a height.

Figure 3. External cause of homicides for adolescents (15-19 years) by sex, Johannesburg 2001-2009

Scene of adolescent homicides

Scene of injury was recorded for 432 (73.2%) of the adolescent homicides. Of these recorded cases, the main scenes of homicide were private homes (36.3%, n=157) and streets (34.3%, n=148). Another 11.1% (n=48) of homicides took place in open fields, 6.2% (n=27) in informal settlements, and 4.6% (n=20) in bars or taverns. Other homicide scenes, which included parks and sports areas, shops and retail areas, schools, construction and industrial sites, railway lines/stations, and prisons, accounted for the remaining 7.4% (n=32) of homicide cases. Very few homicides (<1%, n=3) took place on school property. Figure 4 shows the distribution of

scenes for homicides for males and females separately. A significantly higher proportion of male victims (37.9%, n=132) were killed in the streets compared to female victims (19.0%, n=16) ($\chi^2 = 10.713$, $df = 1$, $p = .001$), while the proportion of female victims (46.4%, n=39) killed in homes was significantly higher than the proportion of male victims (33.9%, n=118) ($\chi^2 = 4.585$, $df = 1$, $p = .032$).



*Other category predominantly includes retail areas, railway lines/stations, and prisons.

Figure 4. Scene of homicides for adolescents (15-19 years) by sex, Johannesburg 2001-2009

Adolescent homicides by month, day, and time

Limited information was recorded for the date and time of the violent injury event, and therefore the date and time of the subsequent death is reported instead. While death would have occurred at the time of injury for a majority of cases, some victims may have died hours or days after the event itself, and this bias must be kept in mind when reading the results focused on temporality. There were no clear patterns by time of year. The month with the most homicides was December (10.0%, n=59) followed by November (9.5%, n=56), and June (9.3%, n=55).

Figure 5 shows the day of death distribution for adolescent male and female homicides. Among males, homicide deaths occurred more often over the weekend (58.6%, n=286), peaking on Saturdays (23.8%, n=116), then Sundays (21.3%, n=104), and Fridays (13.5%, n=66). Although homicide deaths among females also peaked on Saturdays (17.6%, n=18) and Sundays (20.6%, n=21), female homicide deaths also showed a notable volume on Mondays (16.7%, n=17) and Thursdays (17.6%, n=18).

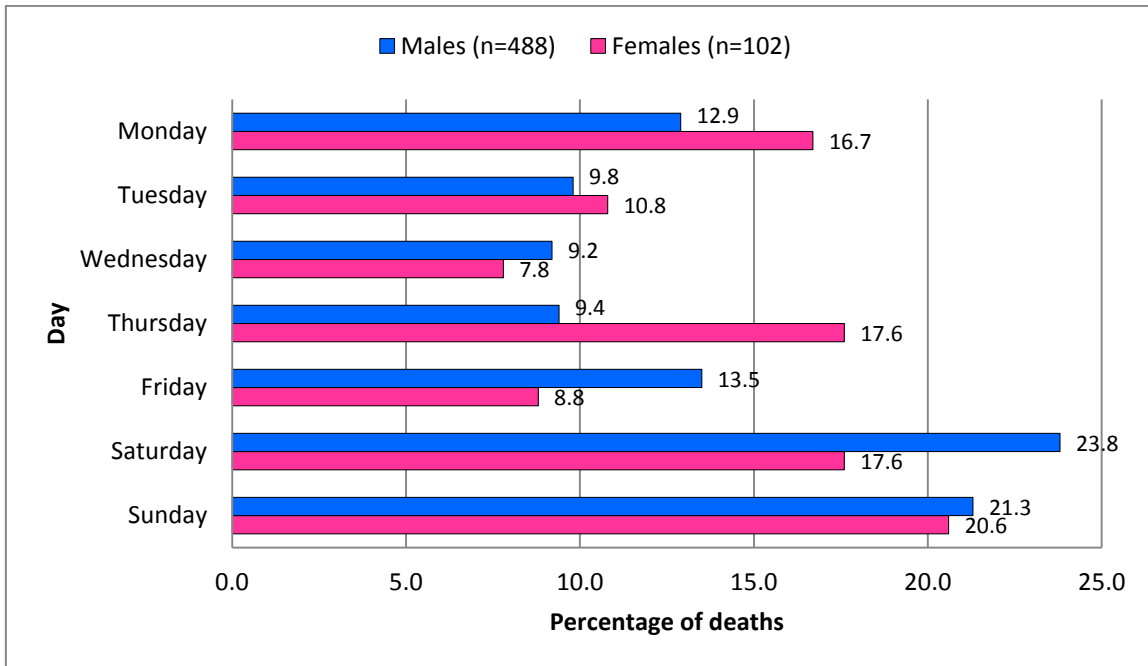


Figure 5. Day of homicide death for adolescents (15-19 years) by sex, Johannesburg 2001-2009

Time of death was recorded for 554 (93.9%) of the adolescent homicides. Figure 6 shows that among male victims, time of death peaked during the evening from 19h00 to 02h00 in the morning. More than two thirds (67.7%) of the male homicide deaths occurred at night time between 18h00 to 05h59. Among female victims, time of death peaked at two intervals namely from 06h00 to 08h00 in the mornings and again in the evenings from 18h00 to midnight.

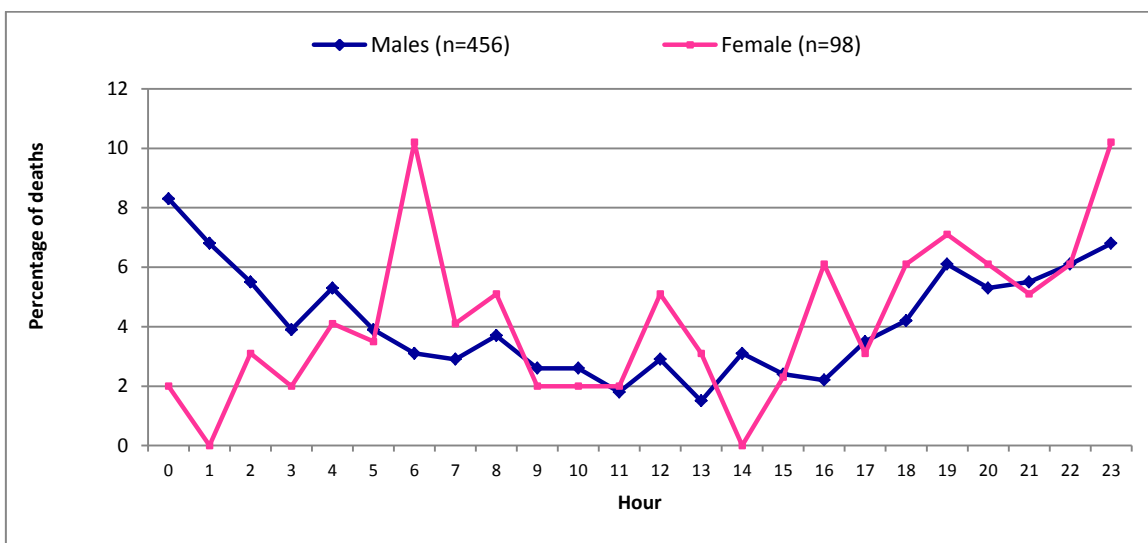


Figure 6. Time of homicide deaths for adolescents (15-19 years) by sex, Johannesburg 2001-2009

Blood alcohol concentration (BAC) levels

BAC data was available for 323 adolescent homicides. Of these cases, 39.3% (n=127) tested positive for alcohol, with a mean concentration of 0.12 g/100 ml (S.D.=0.07).

DISCUSSION

The study reports a total of 590 adolescent (15 to 19 years) homicides in Johannesburg for the 2001 to 2009 period, yielding an average annual homicide rate of 23.4/100 000. Despite the fluctuating trend of homicide occurrence, the study recorded an overall decrease of adolescent homicide in Johannesburg from 27.0/100000 in 2001 to 21.4/100 000 in 2009. A considerable decline in firearm homicides was noted over the nine year period, with the rate dropping from 18.2/100 000 in 2001 to 4.8/100 000 in 2009. This result is consistent with the decrease in overall firearm homicides reported for the major urban areas in South Africa, especially the city of Johannesburg (Prinsloo, 2007) and may, in part, be attributed to the various firearm amnesties implemented in South Africa between 1994 to 2005 and the new Firearm Control Act which came into effect in 2004 (Gun Control Alliance [GCA] South Africa, 2006; King, Proudlock, & Michelson, 2006). Nonetheless, the decline in firearms homicides was not matched by a decline of similar extent in the total homicides for adolescents in this study due to the steady increase of homicides as a result of sharp instruments and blunt force injuries from 2001 (6.5/100 000 and 1.1/100 000, respectively) to 2009 (9.3/100 000 and 5.5/100 000, respectively).

The homicide rate of 39.8/100 000 found for adolescent males in this study is consistent with the high overall rates reported for South African males, and is more than four times higher than the global rate (9.06/100 000) and more than double the African region rate (15.64/100 000) estimated for adolescent males (15 to 17 years) (Pinheiro, 2006). However, while high, the male homicide rate found in this study is not as high as the rates estimated for males aged 15 to 19 years in some Latin American countries such as El Salvador (157/100 000) and Brazil (83/100 000) (United Nations Children's Fund [UNICEF], 2012). Furthermore, the rate is also not as high as the rates reported among males of a similar age group in some South African cities such as Buffalo City (70.6/100 000) and Cape Town (76.4/100 000) (Burrows et al., 2009). Although the homicide rates reported in the recent studies mentioned above may not be strictly comparable with the rates found in the current study because of differences in the age categories used to define adolescents, or because they are not based on city-level data, they offer some insight into the levels of adolescent homicide in Johannesburg relative to the national and international situation.

The female homicide rate (7.9/100 000) found in this study is also high compared to females of a similar age group (15 to 17 years) globally (3.28/100 000), and is comparable with that of the African region (9.45/100 000) which has the highest female homicide rates among the regions (Pinheiro, 2006; United Nations Office on Drugs and Crime [UNODC], 2011). However, when compared to other cities in South Africa, the adolescent female homicide rate found in this study is slightly lower than those reported for females of a similar age group in Cape Town (10.4/100 000) and Buffalo City (9.6/100 000) (Burrows et al., 2009).

The much higher proportion of male (82.95) than female homicide victims found in this study is consistent with national and global patterns (Mercy, Butchart, Farrington, & Cerdá, 2002; Prinsloo, 2007; UNODC, 2011). Constructions of masculinity which include notions of dominance and fearlessness, and encourage the use of violence and engagement in high-risk behaviours, such as alcohol (mis)use, the carrying of weapons, gang membership, and crime, have been identified as contributing to the disproportionate involvement of males in homicides in South Africa (Ratele, 2008; Ratele, 2010; Seedat et al., 2009). Peer pressure to conform to dominant forms of masculinity may be especially intense during adolescence when fitting in, acceptance, and approval are important aspects of this stage of development.

Black and coloured adolescents, male and female, had considerably higher rates of homicide compared with their Indian and white counterparts, with the highest rates recorded among black victims. This pattern differs to some extent from other national and city aggregated studies in the country that reveal the coloured population to be the most vulnerable (Abrahams et al., 2009; Burrows et al., 2009). However, it is consistent with the racial patterns of homicide reported for the city of Johannesburg (Kramer & Ratele, 2012) suggesting that the racial structure of homicide is city-specific in South Africa. The differences in homicide levels between the various race groups are likely to be explained by the marked socioeconomic inequalities prevalent in the country, which are largely a legacy of the previous system of apartheid. International studies have found that differences between race groups in homicide levels result from the socioeconomic inequalities and the different living circumstances with regard to poverty, family disruption, and educational economic opportunities (Jones-Webb & Wall, 2008; Phillips, 2002; Vélez, Krivo, & Peterson, 2003). The high concentration of homicide among certain race groups appears to be linked to the concentrated effects of economic deprivation and social isolation (Kubrin & Weitzer, 2003; McCall, Land, & Parker, 2010).

Despite the substantial decrease in firearm homicides over the nine year study period, firearms accounted for the majority of adolescent male (50.6%) and female (52.9%) homicides. The high proportion of firearm homicides among males is consistent with other South African studies (Burrows et al., 2009; Kramer & Ratele, 2012; Prinsloo et al., 2003). In contrast, the proportion of females killed by guns is much higher than that reported in a national study among females, where under a third of homicides were committed with the use of firearms (Abrahams et al., 2009). However, the proportion is consistent with other findings on females of a similar age group in South Africa (Burrows et al., 2009) and suggests that adolescent females may be more at risk of firearm homicides than their older female counterparts. Sharp instruments and blunt force instruments were also common methods of homicide, and their use steadily increased over the study period where, in the final year (2009), both exceeded the use of firearms.

The study found several differences among male and female victims regarding the scene and time of homicide. Public places, such as streets (37.9%), and private dwellings (33.9%) were the predominant scenes for male homicides, which tended to occur during the evenings (67.7%) and over the weekend (58.6%), times associated with leisure and recreation, and likely to involve high levels of alcohol consumption. Females on the other hand were more likely to be killed in a private dwelling (56.8%) suggesting that they were more likely to be killed by someone known, such as a family member or intimate partner. In their national study on femicide, Abrahams and colleagues (2009) found that around half of the victims were killed by an intimate partner. However, since fewer female adolescents are likely to be married or living with their partners the proportion of adolescent females killed by an intimate partner may differ from that of adult females.

Proportionately fewer adolescent victims were found to have tested positive for alcohol than reported in other studies (Prinsloo, 2007; Ratele et al., 2009), and this may be due to adolescents consuming alcohol on a less regular basis than adults. Nonetheless, the results of the current study show that alcohol consumption was common among adolescent homicide victims (39.3%) in the city of Johannesburg during 2001 to 2009. Alcohol consumption is an important situational factor that can provoke violent behaviour as well as diminish a person's capacity to recognise and appropriately respond to potentially dangerous circumstances and is shown to be associated with both the risk of homicide victimisation and perpetration (Darke, 2010; Kuhns, Exum, Clodfelter, & Bottia, 2013; Kuhns, Wilson, Clodfelter, Maguire, & Ainsworth, 2010).

Study limitations

The study has limitations related to underreporting of adolescent homicide. Although all non-natural deaths in South Africa are subject to medico-legal investigation, the NIMSS only records the *apparent manner* of death (i.e., whether homicide, suicide, accident or undetermined) determined by the medical practitioner at the time of the post-mortem. As police investigations and court proceedings have not yet been completed at this time, it is possible that a proportion of the cases classified as undermined include homicide cases. Furthermore, data on the age of the victims were missing for some of the cases recorded by NIMSS and this may also have resulted in some adolescents between the ages 15 and 19 years being excluded from the study.

CONCLUSION

This study examined the incidence and epidemiological characteristics of homicide among adolescents aged 15 to 19 years in Johannesburg during the period 2001 to 2009. The study estimated that an average of 39.8/100 000 adolescent males and 7.9/100 000 adolescent females died as a result of homicide per year over the study period. Black and coloured adolescents had the highest homicide rates. Although the study observed a considerable decline in firearm homicides and an increase in homicides as the result of sharp instruments and blunt force, firearms nonetheless accounted for the majority of male and female homicide deaths. Streets and private dwellings were the primary scenes for male deaths, while the majority of female homicides occurred in private dwellings. Most homicides took place over weekend nights with this pattern especially evident for male homicides. Alcohol was also found to be a prominent feature of adolescent homicides with 39.3% of the victims having tested positive for alcohol.

The high homicide rates found in this study underscore the urgent need for interventions in South Africa that are specifically directed at reducing homicides among adolescents. In this regard, the study results on the epidemiological profile of adolescent homicides provide important information for the development and monitoring of prevention strategies, particularly within the city of Johannesburg. Specifically, prevention efforts are required to pay particular attention to black and coloured adolescent males, and to address the availability of weapons and alcohol use among adolescents. Although not as high as the rates observed for male adolescents, strategies are also required to reduce the levels of homicide among female adolescents. Additional research is, however, required that captures the situational context of homicide, including victim and offender characteristics, the victim-offender relationship, and the motive for the homicide, and accordingly form part of the focus in Studies II and III that follow. Such

information is needed in order to gain a better understanding of the differences between male and female, as well as adolescent and adult, homicide victimisation and is essential for the targeting of prevention efforts.

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STUDY II

THE SITUATIONAL CONTEXT OF ADOLESCENT HOMICIDE VICTIMISATION IN JOHANNESBURG, SOUTH AFRICA

While studies have described the incidence and epidemiology of adolescent homicide victimisation in South Africa, little is known about the situational contexts in which they occur. This study aimed to describe the victim, offender, and event characteristics of adolescent homicide and to generate a typology based on the particular types of situational contexts associated with adolescent homicide in South Africa. Data on homicides among adolescents (15 to 19 years) that occurred in Johannesburg (South Africa) during the period 2001 to 2007 were obtained from the National Injury Mortality Surveillance System and police case records. Of the 195 cases available for analysis, 81.4% of the victims were male. Most of the offenders were male (89.7%) comprising of strangers (41.5%) and friends/acquaintances (36.9%). Arguments (32.8%) were the most common precipitating circumstances, followed by revenge (11.3%), robbery (10.8%), and acts of vigilantism/retribution for a crime (7.7%). Through the use of multiple correspondence analysis (MCA) and cluster analysis, the study identified three categories of adolescent homicide: 1) male victims killed by strangers during a crime-related event; 2) male victims killed by a friend/acquaintance during an argument; and 3) female victims killed by male offenders. The results can serve to inform the development of tailored and focused strategies for the prevention of adolescent homicide.

Key words: homicide; adolescents; situational context; victim characteristics; offender characteristics; South Africa; multiple correspondence analysis (MCA); cluster analysis.

Homicides are complex social situations that involve the interaction between victim and offender, and the physical location and setting that structures the activities of the victim and offender at the time of the event (Kubrin, 2003). Accordingly, more may be understood about the situational contexts in which homicide occurs through an examination of the victim, offender, and event characteristics (Miethe & Regoeczi, 2004; Pridemore, 2006). Furthermore, a

focus on the different ways in which various victim, offender, and event characteristics might converge, allows for certain categories or types of homicide with specific situational contexts to be identified. The categorisation of homicide in particular can assist in establishing the specific contributory factors for the tailoring and targeting of intervention efforts (Brookman, 2005; Flewelling & Williams, 1999).

Therefore, the present study focuses on generating a typology of adolescent homicide in South Africa with the intention of supporting discreet and focused prevention actions in contexts of scarce resources. The current response to adolescent homicide tends to assume a universal undifferentiated approach with insufficient attention given to victim, offender, and event characteristics of homicide. Much of what we know about adolescent homicide in South Africa is derived from studies on the incidence and epidemiology (e.g. Study I; Burrows, Swart, & Laflamme, 2009). This study is located within the larger focus of the thesis on contributory factors of adolescent homicide. Specifically, the current study examines homicides that occurred among adolescents (15 to 19 years) in Johannesburg (South Africa) during the period 2001 to 2007, and describes the victim, offender and events characteristics, and seeks to identify and describe the dominant types of situational contexts associated with adolescent homicide in South Africa. Before proceeding with the details of the study, the next section provides an overview of previous research on the victim, offender, and event characteristics associated with adolescent homicide, and is followed by a brief overview of the literature on the classification of homicide which informs the empirical framework of the current study.

Victim, offender and event characteristics

With regard to the victim and offender, demographics are among the characteristics most often reported in research. Sex, age, and race, are important characteristics to consider because they are connected to particular role expectations, opportunities, and life experiences that influence a person's exposure and responses to risky situations that may result in violence and homicide (Miethe & Regoeczi, 2004). In South Africa, like most other countries around the world (Mercy, Butchart, Farrington, & Cerdá, 2002; Pinheiro, 2006), males comprise the majority of homicide victims including those that occur among adolescents (Study I; Burrows et al., 2009). However, there are differences across countries in the proportion of male homicide victims, with the male to female rate ratio being higher in countries with high homicide rates (Mercy et al., 2002; United Nations Office on Drugs and Crime [UNODC], 2011).

Consistent with research from other countries, for example, Australia (Mouzos, 2001), Brazil (Filho, 2011), and the United States (Fox & Piquero, 2003), South African studies reveal that race groups are differentially affected by homicide, with blacks and coloureds, males and females, being more at risk of homicide than adolescents from the other race groups in the country (Study I; Burrows et al., 2009). While information on the offenders of adolescent homicides in South Africa is lacking, studies conducted in the United States suggest that the demographics of the offenders are similar to those of the victims, with the majority of adolescents being killed by adolescent males typically of the same race as the victim (e.g. Coyne-Beasley, Elster, Goodman, & Ford, 2004; Finkelhor & Ormrod, 2001).

Focusing on the event characteristics of homicides, this includes features of the social and physical context that influence the initiation and outcome of violent interactions between victim and offender (Miethe & Regoeczi, 2004). Some of the more fundamental event characteristics that are considered to play an important role include aspects of the victim-offender relationship, the number of offenders, motives or precipitating circumstances, physical location of homicide, and the type of weapon used (Brookman, 2005; Miethe & Regoeczi, 2004; Pridemore, 2006). While there is generally little research on the victim-offender relationship associated with adolescent homicides, studies in the United States have revealed that adolescent victims are predominantly killed by friends/acquaintances, followed by strangers, with relatively few adolescents being killed by family members or intimate partners (Coyne-Beasley et al., 2004; Finkelhor & Ormrod, 2001; Harms & Snyder, 2004). However, the victim-offender relationship may differ for adolescents from other countries around the world with both the *Global burden of armed violence* (Krause, Muggah, & Gilgen, 2011) and the *Global study on homicide* (UNODC, 2011) revealing that the proportion of intimate- and family-related homicides are higher in countries in Europe and Asia.

Similarly, while studies that have focused on adolescent homicides in the United States (Coyne-Beasley et al., 2004; Finkelhor & Ormrod, 2001) and Brazil (Sant'Anna & Lopes, 2002) suggest that the motives or precipitants for these homicides are varied and include interpersonal disputes or arguments, gang-related and drug-related homicides, and homicides that occur in the course of other crimes, such as robberies, the precipitating circumstances of homicides may also differ for adolescents from other countries in light of research revealing that the proportion of homicides associated with gangs or organised crime is significantly higher in countries in Central and South America (Krause et al., 2011; UNODC, 2011). Moreover, homicide rates related to robbery or theft also tend to be higher in countries with greater income inequality

(Krause et al., 2011). Though not focusing specifically on adolescents, in one of the few South African studies to examine the circumstances of homicide reported at six police station areas located in the major metropolitan areas of Johannesburg (1), Ekurhuleni (1), eThekweni (Durban) (2), and Cape Town (2), the Centre for the Study of Violence (CSV) (2008) found that for homicides where the circumstances were known, most (55%) were the result of arguments or spontaneous anger, followed by incidents that occurred in the course of another crime such as robbery, burglary, and rape (25%), while very few homicides were related to conflict between different groups such as gangs (1%).

While little recent research has reported on the locations where adolescent homicides occur, Study I suggests public places such as the street and entertainment venues, and residential dwellings are the primary locations where homicides among adolescents in South Africa tend to occur, which is similar to the locations reported for adolescents in a study in the United States (Coyne-Beasley et al., 2004). Relatively more international research exists on the types of weapons or methods used in adolescent homicides which suggests that there are regional variations in this regard, with homicides in countries in south and north America more likely to be committed with firearms, whereas homicides as the result of sharp instruments such as knives being more common in countries in Europe (Falbo, Buzzetti, Cattaneo, 2001; Harms & Snyder, 2004; Sethi, Hughes, Bellis, Mitis, & Racioppi, 2010; UNODC, 2011). Most homicide deaths among South African adolescents are the result of firearms (Study I; Burrows et al., 2009), although their use in homicides appears to be decreasing while the use of sharp instruments and blunt objects seems to be increasing (Study I).

Classification of homicides

Homicides vary considerably in terms of victim, offender and event characteristics, and researchers have used different classification strategies (see Flewelling & Williams, 1999) in the attempt to identify the factors that relate to specific homicide types. Brookman (2005), for instance, concentrates on the gendered nature of homicide, the relationship between participants, and the circumstances of the event. Focusing on male-perpetrated homicides in the UK, Brookman (2005) highlights the different circumstances surrounding masculine homicide (male-on-male) and femicide (men killing women). Among the different forms of masculine homicide, Brookman (2005) describes two distinct scenarios that appear to predominate, namely confrontational and revenge homicides. Confrontational homicides, which resemble Polk's (1993; 1999) description of "honour contests" in Australia, arise in response to relatively trivial disagreements between acquaintances or strangers, and tend to occur in public settings where

there is an audience, often comprising of other males, and where alcohol is a characteristic feature of the social context (Brookman, 2003; 2005). By comparison, revenge homicides are characterised by planned attacks where the offender seeks to avenge some perceived wrongdoing on the part of the victim, where weapons, such as firearms, are often secured and the victim sought out and given little or no chance to engage in an altercation (Brookman, 2003; 2005). Polk (1997) also identifies deaths that result from the commission of another crime as an equally distinctive form of masculine homicide.

In contrast to homicides that occur between men, femicides are more likely to involve intimate partners, and often occur in response to the breakdown of a relationship (Brookman, 2005). In the same way, studies disaggregating homicides according to the victim's sex, including those among adolescent victims, have also revealed differences in the situational contexts, with male victims more likely to be killed by acquaintances or strangers, by firearms, in public places, and to have used alcohol and/or drugs prior to their death, whereas female victims were more likely to be killed by someone they knew, such as a family member or intimate partner, in the home (Eckhardt & Pridemore, 2009; Muftic & Moreno, 2010; Snyder & Sickmund, 2006).

Most studies, though, have disaggregated homicides into different types along dimensions of either the victim-offender relationship or the motives for the homicide (e.g. Cao, Hou, & Huang, 2008; Last & Fritzon, 2005; Pizarro, 2008). In this regard, studies employing a victim-offender relationship typology have shown that these types comprise of distinct situational characteristics in that the closer the relationship between the victim and offender (e.g. intimate partners, family members, and friends/acquaintances) the more likely the homicide occurred at a residential location, involved expressive motives (e.g. anger-induced and goal is to harm the victim), and the use of physical violence or a weapon from the scene, whereas homicides among strangers were more likely to have occurred in public places, to have instrumental motives (e.g. crime-related), and to involve the use of weapons such as firearms (Cao et al., 2008; Last & Fritzon, 2005).

Similarly, studies that have disaggregated homicides into motive-related typologies have also reported differences with respect to victim, offender, and event characteristics (e.g. Miethe & Drass, 1999; Miethe & Regoeczi, 2004; Pizarro, 2008). For example, in a study conducted in the United States, Pizarro (2008) found that domestic, drug, robbery, and interpersonal dispute homicides were differentiated in terms of victim, offender, and event characteristics. More specifically, domestic homicides were more likely to involve younger victims (including child

abuse cases) and older offenders, to occur in residential locations, and were less likely to involve the use of firearms. Drug-related homicides were more likely to occur in public housing sites and involve the use of a gun, while dispute homicides were more likely to involve individuals who were alcohol or drug impaired at the time and typically intimate partners and family members, while robbery homicides were more likely to involve strangers and multiple offenders.

However, while the abovementioned studies have disaggregated homicides into different types along a particular dimension (e.g. victim-offender relationship), and then examined how each type differs from the other in terms of victim, offender, and event characteristics, a number of more recent studies have used a variety of similar statistical techniques to explore the multivariate associations between victim, offender, and event characteristics in order to classify homicides into distinct types. For example, Salfati (2000; 2003) used a multidimensional scaling technique to analyse the co-occurrence of 36 crime scene behaviours in a sample of British homicides and found that homicides could be differentiated along an expressive/instrumental dimension. Bijleveld and Smit (2006) used multiple correspondence analysis (MCA) to explore the multivariate relations between the victim, offender, and event characteristics of homicides in the Netherlands. They found that homicides could be structured along two dimensions, with the first dimension consisting of homicides that ranged from business-like, organised crime feuds to family-related issues, and the second dimension comprising of homicides that ranged from more planned attacks to anger-related killings that often took place in the course of a fight. While these statistical techniques allow for the examination of the multivariate relations among homicide characteristics and the dimensions along which homicides can be differentiated, they do not classify homicide into specific categories.

Accordingly, Kubrin (2003) used cluster analysis to specifically categorise homicide into types based on detailed victim, offender, and event information on homicides in the United States. Using 16 variables Kubrin (2003) identified four categories of homicide and their prevalence, namely general altercation (67%), felony (18%), domestic: male/female (9%), and domestic: female/male (6%). General altercation homicides typically represented arguments between male friends/acquaintances that turned into lethal violence, often involving the use of alcohol or drugs by the participants, and occurred in both public and residential locations. Felony homicides were distinct from general altercation homicides in that they primarily occurred as the result of robbery motives; otherwise they also involved male victims killed by strangers or

friends/acquaintances in public or private spaces. Domestic: male/female homicides involved female victims killed by intimate partners or male relatives usually due to anger motives, and tended to take place in private spaces. The final category, domestic: female/male consisted of females killing male partners in response to being assaulted or threatened.

While the above studies have used different methodologies, they nonetheless suggest that different types of homicide can be distinguished that comprise of different situational contexts based on the specific combination of victim, offender, and event elements. Therefore, with the intention of supporting prevention efforts in South Africa, the current study aimed to describe the victim, offender, and event characteristics of homicides that occurred among adolescents (15 to 19 years) in Johannesburg during the period 2001 to 2007. Furthermore, the study used MCA to explore the associations between victim, offender, and events characteristics, followed by cluster analysis to classify homicides into categories with the aim of developing a typology based on the dominant situational contexts of adolescent homicides.

METHOD

Data sources and cases

This study combined data from the National Injury Mortality Surveillance System (NIMSS) and police case reports in order to examine victim, offender, and event characteristics of homicides that occurred among adolescents aged 15 to 19 years in Johannesburg, South Africa, from 2001 to 2007. Data was collected in 2009 and, as the more recent cases (2008 and 2009) were still likely to be in progress through the criminal justice system, permission was granted by the office of the Gauteng Provincial Commissioner of the South African Police Service (SAPS) to access case dockets for the period 2001 to 2007 and therefore this study was limited to this time period.

NIMSS

Information on all deaths classified as homicide among adolescents 15 to 19 years in Johannesburg metropolitan city for the study period was obtained from the NIMSS (see Introduction p.9 for an overview of NIMSS) and included the police case numbers and police station details, and the demographics of the victim, scene of injury and external cause of death. A total of 451 adolescent homicides cases were drawn from the NIMSS and followed up via their police case numbers to their dockets to obtain additional information on the offenders and circumstances of the homicides.

Police case records

Police dockets are the case files containing all relevant information about a recorded criminal case, and generally include documentation of police investigations, witness statements, medico-forensic reports, and progress of the case through the criminal justice system. Accordingly, these reports provide incident-level information including demographic information on the victim, offender (if known), and the circumstances of the event (if known).

A list of the cases was then sent to the station commissioner at each of the relevant police stations, and once the officer, who had been appointed to the task, had retrieved the relevant case records an appointment was made to collect the information. With assistance of the docket clerks and, in some instances, the investigating police officer at the stations, data was collected directly from the dockets by the author and a fieldworker who was trained on data collection procedures and how to complete the data collection form. The data collection form was developed based on the additional information required to supplement the NIMSS data with regard to the situation or circumstances. This included sections dealing with: the victim (age, sex, race), known suspect/offender (age, race, sex), and the homicide event (time and place of murder, weapon used, relationship between victim and offender, circumstance and underlying motive). As part of the data collection process, researchers also created a narrative account for each incident describing the circumstances that led to the homicide, detailing how it occurred, and providing information on the victim and offender(s). The data was coded by the author, then entered into a computer and combined with the NIMSS data for analysis.

Of the 451 adolescent homicides that were drawn from NIMSS, 247 (54.8%) were followed up in police case records to obtain information on the offender and homicide circumstances (see Figure 7). The remaining 204 homicide cases were not accessed as a result of missing police case numbers or dockets that could not be found and hence were excluded from the study. An analysis showed no significant differences with respect to victim characteristics (age, sex and race) between the cases for which dockets were accessed and those cases for which dockets were not found. Of the 247 homicide cases where the police dockets were followed up, 52 (21.1%) of the cases had no information on the offender or circumstances of the homicide and were also excluded from the study. Therefore the study is based on 195 (78.9%) of the 247 homicide cases for which the required information was obtained.

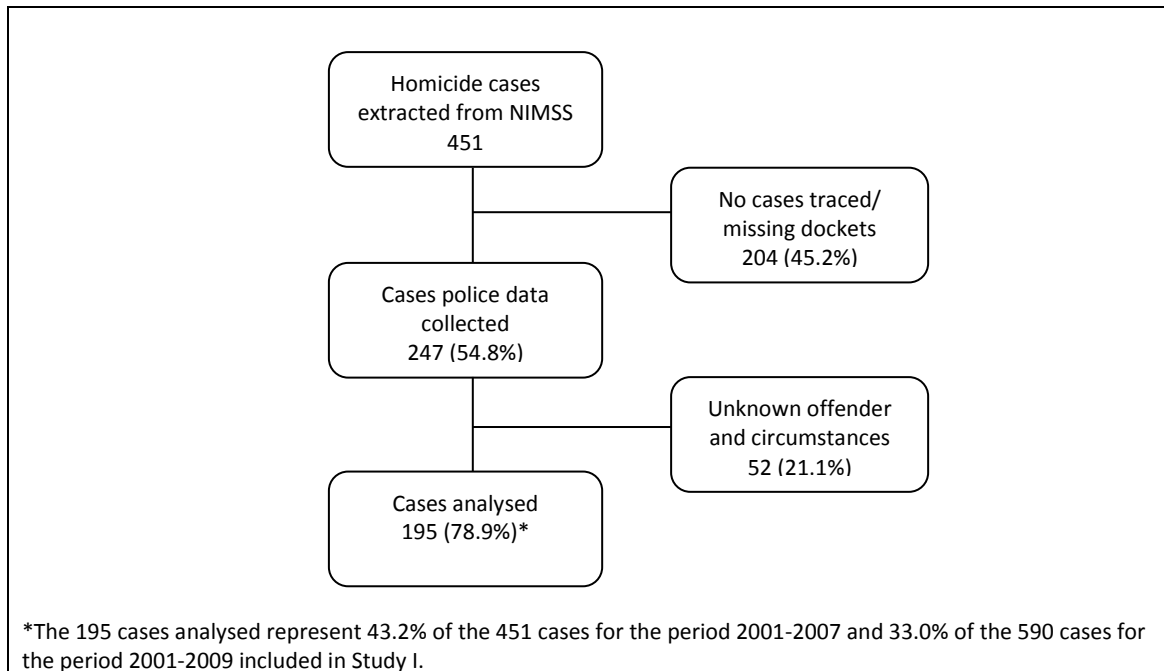


Figure 7. Case-flow diagram

Data analysis

Descriptive statistics of the key variables related to adolescent homicide victims (sex and race), the offender (sex, age, race, and relationship to the victim), and the event (number of offenders, event location/scene, weapon used, and precipitating circumstances/motive) were calculated in the form of frequency distributions and percentages.

Similar to the techniques used by Bijleveld & Smit (2006), MCA was used to investigate the relationship between eight categorical variables, namely victim's sex, offender's sex, offender's age, number of offenders, victim/offender relationship, scene, weapon, and precipitating circumstances. The variables pertaining to race were excluded from the analysis as an initial MCA revealed that they had low discriminatory power. MCA is a descriptive exploratory technique used to identify systematic relations between multiple categorical variables simultaneously (Aktürk, Gün, & Kumuk, 2007). It is a special case of principal component analysis of a contingency table that transforms chi-square distances between different variables into geometrical distances which are displayed graphically (Greenacre & Hastie, 1987). The results are interpreted on the basis of the relative positions of points and their distribution along the two dimensions; variables with similar distributions are presented as points that are close in space whereas those that are dissimilar are positioned apart. Although MCA does not assign the homicide cases to specific categories, it was used in the study to provide an illustration of the

relations between the various characteristics of adolescent homicide, namely the combinations of victim, offender, and offence attributes and the dimensions along which homicides can be differentiated.

A cluster analysis of the data was undertaken to classify adolescent homicide cases into specific categories based on combinations of offender, victim, and offence attributes. The TwoStep Cluster Analysis procedure is an exploratory tool designed to reveal natural groupings (or clusters). The SPSS TwoStep Cluster Analysis was chosen as the principle statistical analysis in the study because the procedure has the ability to analyse large datasets for both categorical and continuous variables. In the first step, cases are assigned to preclusters. The algorithm assigns each successive case, based on a distance, with a previously formed precluster or forms a new precluster. In the second step, the preclusters are clustered using the hierarchical clustering algorithm forming an optimal number of clusters based on the Schwarz Bayesian Criterion (Norušis, 2012). The following eight categorical variables were entered into the cluster analysis: victim's sex, offender's sex, offender's age, number of offenders, victim/offender relationship, scene, weapon, and precipitating circumstances. IBM SPSS Statistics for Windows, Version 20.0 was used for all the analyses.

RESULTS

Characteristics of adolescent homicide victims and their offenders

Of the 195 adolescent homicide cases that were analysed in the study, males comprised of 81.4% (n=158) of the victims. Most (89.7%, n=175) victims were killed by male offenders, 2.6% (n=5) by female offenders, and in 7.7% (n=15) of the cases the offender's sex was unknown. As shown in Table 1, 90.5% (n=143) of the male victims and 86.5% (n=32) of the female victims were killed by male offenders.

Table 1. Victims and offenders of adolescent homicide by sex, Johannesburg 2001-2007

Offenders	Victims		
	Male (n=158) n (%)	Female (n=37) n (%)	Total (n=195) n (%)
Male	143 (90.5)	32 (86.5)	175 (89.7)
Female	2 (1.3)	3 (8.1)	5 (2.6)
Unknown	13 (8.2)	2 (5.4)	15 (7.7)

Table 2 presents the victim-offender sex relationship for the 180 adolescent homicide cases for which the offender's sex was known and reveals that the majority (79.4%) of adolescent

homicides were all male encounters. Almost four out of five homicides, for which records were available, involved a male killed by another male, and just less than one in five (17.8%) involved a female killed by a male.

Table 2. Victim-offender sex relationship in adolescent homicide (%), Johannesburg 2001-2007 (n=180)

Offenders	Victims		
	Male	Female	Total
Male	79.4	17.8	97.2
Female	1.1	1.7	2.8
Total	80.5	19.5	100.0

Table 3 shows the distribution of adolescent victims by age of offenders. Around one out of five (21.5%, n=42) of the offenders were aged between 12 and 19 years, 31.3% (n=61) were between 20 and 29 years of age, 6.7% (n=13) were between 30 and 39 years, 4.6% (n=9) were 40 years or older, and in the remaining 35.9% (n=70) of the cases the offender's age was unknown. In general, offenders were older than the victims, with this pattern more evident for female victims than male victims. For male victims, 25.3% (n=40) of the offenders were between the ages of 12 and 19 years, while 38% (n=60) were 20 years and older. In contrast, only 5.4% (n=2) of the female victims were killed by an offender aged between 12 and 19 years, while 62.2% (n=23) were killed by an offender older than 19 years.

Table 3. Adolescent homicide victims by age of offenders, Johannesburg 2001-2007

Offender's age	Victims		
	Male (n=158) n (%)	Female (n=37) n (%)	Total (n=195) n (%)
12-19 years	40 (25.3)	2 (5.4)	42 (21.5)
20-29 years	46 (29.1)	15 (40.6)	61 (31.3)
30-39 years	8 (5.1)	5 (13.5)	13 (6.7)
40+ years	6 (3.8)	3 (8.1)	9 (4.6)
Unknown	58 (36.7)	12 (32.4)	70 (35.9)

In regard to race, most adolescent homicide victims were black (88.7%, n=170), followed by coloured (7.7%, n=18), Indian (2.1%, n=4), and white (1.5%, n=3) victims. Although information was not available in 11.8% (n=23) of cases, the distribution of offenders by race reveals a similar pattern to that of the victims (see Table 4). The majority of offenders were black (80.0%, n=156), followed by coloured (5.6%), Indian (2.1%, n=4), and white (0.5%, n=1)

offenders. Accordingly, most of the homicides were intra-racial with 94.8% (n=163) of the cases (n=172) where the offender's race was known having involved a victim and offender from the same race group.

Table 4. Victims and offenders of adolescent homicide by race, Johannesburg 2001-2007

Offender's race	Victims				Total (n=195) n (%)
	Indian (n=4) n (%)	Black (n=170) n (%)	Coloured (n=18) n (%)	White (n=3) n (%)	
Indian	2 (50.0)	2 (1.2)	0	0	4 (2.1)
Black	1 (25.0)	149 (87.6)	5 (3.2)	1 (33.3)	156 (80.0)
Coloured	0	0	11 (61.1)	0	11 (5.6)
White	0	0	0	1 (33.3)	1 (0.5)
Unknown	1 (25.0)	19 (11.2)	2 (11.1)	1 (33.3)	23 (11.8)

Characteristics of the homicide event

Victim-offender relationship

Table 5 presents the distribution of adolescent homicides by the victim-offender relationship. In 46.2% (n=90) of the homicide cases the offender was known to the victim, most often as a friend/ acquaintance (36.9%, n=72), then an intimate partner (6.2%, n=12), or a family member (3.1%, n=6) (sibling, father or uncle), while in 41.5% (n=81) of the cases the victims were killed by strangers. The offender's relationship to the victim was unknown in the remaining 12.3% (n=24) of the cases. Table 5 also illustrates differences among male and female victims with respect to their relationship to the offender. For example, male victims were more often killed by strangers (44.3%, n=70) and friends/acquaintances (39.9%, n=63), whereas intimate partners (32.4%, n=12) and strangers (29.7%, n=11) constituted the main offenders in female homicides.

Table 5. Adolescent homicides by victim-offender relationship, Johannesburg 2001-2007

Offenders	Victims		Total (n=195) n (%)
	Male (n=158) n (%)	Female (n=37) n (%)	
Intimate Partner	0	12 (32.4)	12 (6.2)
Family	4 (2.5)	2 (5.4)	6 (3.1)
Friend/Acquaintance	63 (39.9)	9 (24.3)	72 (36.9)
Stranger	70 (44.3)	11 (29.7)	81 (41.5)
Unknown	21 (13.3)	3 (8.1)	24 (12.3)

Number of offenders

In the majority (61.0%, n=119) of adolescent homicides the offender acted alone, just over a third (36.4%, n=71) involved multiple offenders, and in the remaining 2.6% (n=5) of the cases the number of offenders was unknown.

Motives or precipitating circumstances

Table 6 shows the distribution of adolescent homicides by motive or precipitating circumstances, including a description and case examples. Almost a third (32.8%, n=64) of all the cases were the result of arguments or altercations, this being the leading precipitating circumstance of adolescent homicides. Revenge was the second most common motive accounting for 11.3% (n=22) of the homicide cases. This was followed by a range of motives or precipitants that were associated with a crime context, namely robberies (10.8%, n=21), vigilantism/retribution for a crime (7.7%, n=12), sexual assault (5.1%, n=10) and self-defence (4.6%, n=9). Other motives or precipitating circumstances, which occurred less frequently, involved activities at an initiation school (1.9%, n=3), discipline (1.9%, n=3), reckless behaviour/accidental (5.2%, n=5), and bystanders (4.5%, n=7). For the remaining 20.0% (n=39) of the cases the information provided in the police case records was either insufficient or unclear with respect to establishing the motive for the homicide.

Scene

Streets were the most common scene for adolescent homicides (42.1%, n=82), followed by private dwellings (26.2%, n=51), bars/night clubs (9.7%), and open land (8.2%, n=16). Other homicide scenes accounted for 10.8% (n=21) of the cases and included places such as parks/sports areas, shops, schools, construction and industrial sites, railway lines/stations, and prisons. In 3.1% (n=6) of the cases the scene of the homicide was unknown.

Weapon used

Firearms were the weapons most often used in adolescent homicides (43.1%, n=84), followed by sharp objects, such as knives and broken bottles (40.5%, n=79), and blunt objects (e.g. sticks, hammers, stones, fists and feet) (12.8%, n=25). Other weapons used in adolescent homicides included strangulation (2.6%, n=5) and poisoning (0.5%, n=1) and in one case (0.5%) the weapon used was unknown.

Table 6. Motives or precipitating circumstances: Description and case examples

Motive	n (%)	Description	Case examples
Argument	64 (32.8)	The homicide took place during an argument, fight, or incident of spontaneous anger. The circumstances are similar to those described by the CSV (2008) but do not include homicides in revenge for an earlier argument. These homicides are comparable to "confrontational" homicides described by Brookman (2005) in that the victim and offender were involved in a spontaneous dispute and engaged together in a violent confrontation that resulted in the death of one of the participants.	# 27: The victim and three friends were drinking at a tavern when the suspect walked passed and bumped the table, knocking over their drinks. The victim and his friends demanded that the suspect buy them more drinks, but the suspect said that he didn't have the money. The victim and suspect argued and then pushed each other. They then moved outside to the street where they continued to fight when the suspect produced a gun and shot the victim. # 123: A group of friends were sitting together when one, the suspect, accused one of them, the victim, of stealing R10 from him. He then picked on the victim. They fought and the suspect took a knife, stabbed the victim, and ran away. # 146: The victim and his friend, the suspect, were arguing over a bottle of juice that the suspect refused to share with the victim, when they started fighting and victim took out a knife which the suspect then grabbed and stabbed the victim. # 285: The victim and three of his friends were at a party, when the victim met up with a young woman who apparently promised that she would leave with the victim at the end of the party. However, the young woman left to go home with two of her neighbours instead, starting an argument between the victim, his friends and the neighbours. This developed into a fight during which one of the neighbours, the suspect, took a knife and stabbed the victim.
Revenge	22 (11.3)	The offender killed the victim to avenge some wrong-doing (non-crime related). These homicides typically involve some planning, where "weapons [are] often secured and the victim sought out and given little or no chance to engage in an altercation" (Brookman, 2005, p.124). A homicide motivated by an earlier argument was coded as revenge if the offender left the scene for a period of time, and returned with a weapon and killed the victim.	# 3: The victim was sitting in the street with a group of friends when a car pulled up and three men and a woman got out. One of the men shot the victim while the woman kicked him, and then they climbed back into the car and drove off. The victim had apparently harassed and assaulted the woman when she had been walking alone in the street earlier that day. # 114: The victim was with his friend, the suspect, when the victim "mistakenly" hit the suspect in the face with a piece of cardboard. The friend went home, returned with a knife and stabbed the victim. # 121: The victim went out with her friends and, when she returned home later that evening, her ex-boyfriend, with whom she had recently ended a relationship, had been hiding in wait outside her house in the dark; he stabbed the victim while she was walking to the front door of her house.
Robbery	21 (10.8)	The homicide occurred during a robbery or burglary, where the victim was killed by the offender(s) of the crime.	# 52: The victim and his friend were sitting in a car when they were held up by two men who demanded their cell phones and money. The victim was shot during the incident. # 292: The victim was shot when their house was broken into.
Sexual Assault	10 (5.1)	The homicide involved a victim who had been sexually assaulted.	# 216: The victim and her two friends were raped by four unknown men. After the rape the men had beaten the woman with rocks killing the victim.
Self-defence	9 (4.6)	The victim was the original offender of a crime and was killed to protect oneself or another person from apparent harm.	# 164: The victim attacked a security officer and made off with the security officer's firearm. The security officer called for support and chased after the victim. When the security officer caught up to the victim, the victim stopped, turned around, and pointed the firearm at the officer. At the same time the back-up security officer arrived, and when he saw the victim pointing the gun at his colleague he shot the victim. # 376: The victim and his friend attempted to rob the suspect. When the victim stabbed the suspect, the suspect managed to take out a firearm and shoot the victim.

Table 6 (cont.). Motives or precipitating circumstances: Description and case examples

Motive	n (%)	Description	Case examples
Vigilantism/ Retribution for a crime	12 (6.2)	The victim was killed as an act of retribution for a crime that had been committed (CSVR, 2008).	# 219: The victim was attempting to steal a car when the owner saw him and called on community members to assist in apprehending the victim. When the community members caught up to the victim, they assaulted the victim who died on the scene. #332: The victim was severely beaten by a group of community members who apparently witnessed the victim rob a young woman walking in the street.
Initiation school- related*	3 (1.5)	The homicide occurred during the activities that took place at an initiation school.	# 307: While at initiation school, the victim complained about feeling “weak” and the leaders beat him with sticks. When the leaders realised that the victim was not breathing and that they could not revive him after several attempts, they cleared the scene, sent the other boys home, and fled the scene.
Discipline- related	3 (1.5)	The homicide occurred in the context of an adult offender attempting to discipline or punish the victim for misconduct.	# 329: The victim and his four friends were questioned and severely beaten by the victim’s uncle who alleged that they had stolen his gun. Later during the day, when the victim became ill, the uncle took him to the hospital where he subsequently died from his injuries.
Reckless behaviour/ Accidental	5 (2.6)	The homicide occurred as a result of reckless or negligent behaviour and was unintentional.	# 360: The victim was with his three friends when one of the friends showed them a firearm which he had just bought for R500, and the firearm discharged killing the victim.
Bystander	7 (3.6)	The victim was killed in a violent confrontation between other individuals or groups, in which the victim had no involvement.	# 117: The victim, a passenger in a motor vehicle, was shot and killed when two motorists, who had climbed out of their vehicles, were arguing in the street and one of them produced a firearm. # 246: There was a shootout at a hostel and several bystanders, including the victim, were shot.
Unclear	39 (20.0)	These were homicides where the case file information was insufficient to determine the motive or precipitating circumstances.	# 40: The victim and his friend were walking in the street when a man approached them and shot the victim and ran away. Whether this was an act of revenge or a possible robbery was unclear. # 133: The victim was shot by her boyfriend but no information explained why he had killed her.

* Initiation schools are part of the cultural practices in South Africa, and are protected by the Constitution. Male initiation is used as a transitional rite of passage from ‘boyhood to manhood’, and the schools are regarded as cultural educational institutions where male initiates are taught the values inherent in courtship, social responsibility, discipline and acceptable conduct, as well as about their culture. In recent years, initiation schools have been beset by a number of problems, including injuries and deaths among initiates, which has led to a public inquiry in order to seek solutions to the issues surrounding the practice of initiation (Commission for the Promotion and Protection of the Rights of Cultural, Religious and Linguistic Communities, 2010).

The situational contexts of adolescent homicide

A multiple correspondence analysis (MCA) was used to investigate the relationship between eight variables, namely victim’s sex, offender’s sex, offender’s age, number of offenders, victim/offender relationship, scene, weapon, and precipitating circumstances. Figure 8 provides a graphic representation of the variables included in the analysis according to the first two dimensions emerging for the MCA. The total variance accounted for by the first two dimensions was 62.1%. Dimension 1 (horizontal axis) differentiates homicides by precipitating circumstances or motives (.676), victim-offender relationship (.614), offender’s age (.532), offender’s sex (.462), and number of offenders (.455). Dimension 2 (vertical axis) separates male victims from female victims (.555) and distinguishes homicides by precipitating

circumstances or motives (.491), victim-offender relationships (.374), scene (.358), offender's age (.374), and weapon used (.306).

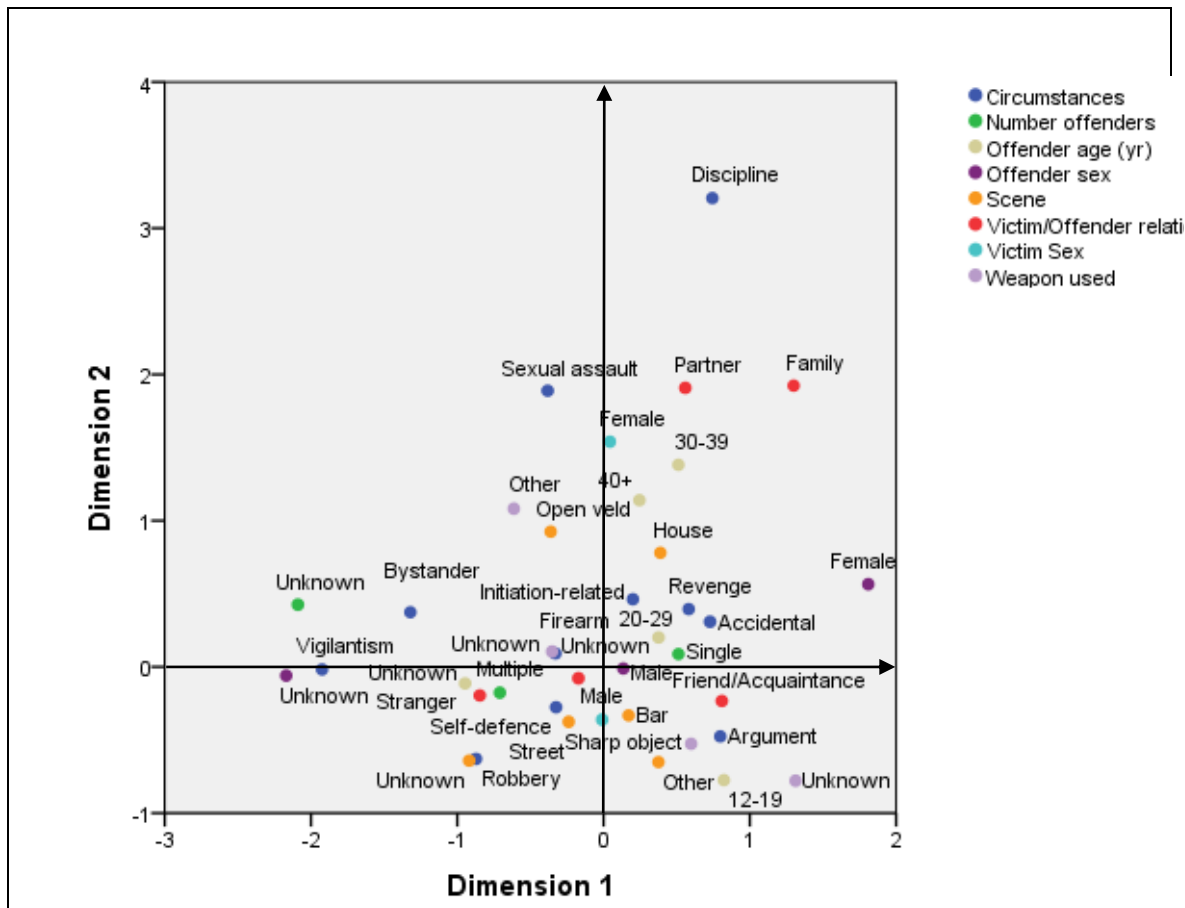


Figure 8. Multiple correspondence analysis: Factorial plan 1-2

From the graphic representation formed by dimensions 1 and 2 in Figure 8, some general patterns can be discerned regarding the clustering of homicide characteristics. Starting in the top right hand quadrant, three variables, namely homicides involving discipline-related motives or circumstances, family members, and female offenders are positioned on the right side, relatively far from other homicide variables suggesting that these three characteristics are unique among adolescent homicides. Moving downwards along the vertical axis in the top right hand quadrant, homicides involving female victims are positioned with homicides involving intimate partners, sexual assault, offenders over the age of 30 years, private homes, open land, and other weapons such as blunt force and strangulation being placed close by suggesting that there are a number of homicides that have these characteristics in common. Further down the vertical axis, homicides involving male victims are located in the bottom quadrants. Positioned in the quadrant left of

male homicide victims are several variables that could be considered close to each other including homicides committed by strangers, multiple offenders, where the age and sex of the offender is unknown, that occurred as a result of robberies or self-defence, and took place in the streets. In the quadrant to the right of male homicide victims, variables that are close by are those related to homicides involving arguments between friends/acquaintances that took place in bars or night clubs and other venues, sharp objects and those involving adolescent offenders. Other variables, such as male offenders, unknown victim-offender relationships, firearms and unknown weapons, and offenders aged 20-29, are placed more centrally indicating that they occur more typically and thus form part of several clusters.

Following on from the results of the MCA, a cluster analysis was used to classify adolescent homicides into distinct categories based on the combination of victim, offender and offence attributes. Table 7 shows that the cluster analysis yielded three distinct types of situational contexts.

Category 1: Male victims killed by male strangers during a crime-related event

Category 1 was the largest, consisting of 42.1% ($n = 82$) of the 195 homicide cases analysed in the study. Category 1 homicides have the following characteristics: male victims (96.3%, $n=79$), male offenders (81.7%, $n=67$), a victim-offender relationship of strangers (80.5%, $n=66$), multiple offenders (59.8%, $n=49$), crime-related precipitating circumstances or motives (robbery, vigilantism/revenge for a crime, and self-defence combined) (50.0%, $n=41$), occurred in the streets (57.3%, $n=47$), and involved the use of firearms (61.0%, $n=50$). Crime-related circumstances appeared to be a particular distinguishing feature, with all the homicides that occurred as a result of robbery, vigilantism/retribution for a crime, or self-defence comprising part of this category. Furthermore, the majority of cases where the offenders' details were unknown, especially with regard to sex (100.0%, $n=15$), age (81.4%, $n=57$), victim-offender relationship (54.2%, $n=13$), and number of offenders (80.0%, $n=4$), as well as the majority of those cases where the motives were unclear (64.1%, $n=25$) were part of this category.

Category 2: Male victims killed by a male friend/acquaintance during an argument

The second category consisted of 40.0% ($n = 78$) of the 195 homicides cases. Category 2 homicides are characterised as follows: male victims (93.6%), male offenders (93.6%) of a young age (88.5%) (12-19 years and 20-29 years combined), victim-offender relationship of friend/acquaintance (78.2%), single offender (87.2%), precipitated by argument-related circumstances (69.2%), occurred in the streets (39.7%) and in residential dwellings (25.6%),

and sharp instruments were the weapons most often used (69.2%). Category 2 homicides differ from those in Category 1 with respect to the victim-offender relationship, number of offenders involved, precipitating circumstances, and weapons used. In addition, fewer of category 2 homicides occur in the streets and more occur in residential dwellings than those in category 1. Both categories, however, predominantly consisted of homicides that involve male victims and offenders.

Table 7. Distribution of homicide characteristics (column %) in each category

Characteristics		Category	1	2	3
			n=82	n=78	n=35
Victim's sex	Male		96.3	93.6	17.1
	Female		3.7	6.4	82.9
Offender's sex	Male		81.7	93.6	100.0
	Female		0	6.4	0
	Unknown		18.3	0	0
Offender's age	12-19 years		7.3	44.9	2.9
	20-29 years		15.9	43.6	40.0
	30-39 years		2.4	5.1	20.0
	40+ years		4.9	1.3	11.4
	Unknown		69.5	7.1	25.7
Offender's relationship	Intimate partner		0	0	34.3
	Family member		0	3.8	8.6
	Friend/Acquaintance		3.7	78.2	22.9
	Stranger		80.5	7.7	25.7
	Unknown/Unclear		15.9	10.3	8.6
Number of offenders	Single		35.4	87.2	62.9
	Multiple		59.8	12.8	34.3
	Unknown		80.0	0	2.9
Precipitating circumstance	Argument		7.3	69.2	11.4
	Revenge		6.1	15.4	14.3
	Robbery		25.6	0	0
	Sexual Assault		0	0	28.6
	Self-defence		11.0	0	0
	Vigilantism/Retribution for crime		13.4	0	2.9
	Initiation school-related		0	1.3	5.7
	Discipline		0	0	8.6
	Accidental		0	6.4	0
	Bystander		6.1	0	5.7
	Unclear		30.5	7.7	22.9
Scene	House		14.6	25.6	54.3
	Bar/Tavern		9.8	12.8	2.9
	Street		57.3	39.7	11.4
	Open veld		6.1	2.6	25.7
	Other		7.3	16.7	5.7
Weapon used	Unknown		4.9	2.6	0
	Firearm		61.0	26.9	37.1
	Sharp instrument		24.4	69.2	14.3
	Other		14.6	2.6	48.6
	Unknown		0	1.3	0

Category 3: Female victims killed by a male offender

This category consisted of 17.9% (n=35) of the 195 cases analysed. Category 3 homicides have the following characteristics: female victims (82.9%), male offenders (100.0) typically older than the victim (71.4%), offenders were known to the victim (65.8%) (intimate partners, friends/acquaintances, and family members), single offenders (62.9%), and occurred in residential dwellings (54.3%). Category 3 homicides are distinct from category 1 and 2 homicides in that they primarily involved female victims. Homicides involving sexual assault and discipline-related motives were over-represented as all were part of this category. Furthermore, it is important to note that none of the sexual assault homicides were committed by intimate partners. Other weapons, such as blunt force and strangulation, accounted for almost half (48.4%, n=15) of these killings, while firearms accounted for just over a third (35.5%, n=11).

DISCUSSION

This study examined the situational context of adolescent homicide with a specific focus on describing the victim, offender and event characteristics, and generating a situational typology of adolescent homicides in South Africa based on the unique combinations of victim, offender, and event characteristics with the intention of supporting the development of tailored and focused prevention efforts in the country.

With regard to the descriptive results on victim and offender characteristics, the study showed that the majority (79.4%) of adolescent homicides were male-on-male encounters, mostly committed by young offenders (between the ages of 12 and 29 years) (52.8%), typically of the same race as the victim (94.8%) which is similar to the patterns observed in the United States (Coyne-Beasley et al., 2004; Finkelhor & Ormrod, 2001; Harms & Snyder, 2004) where research on the characteristics of victims and offenders of adolescent homicide is currently available.

Also consistent with research from the United States, the current study found that a large proportion of adolescents were killed by someone known to them (46.2%), primarily friends/acquaintances (36.9%) (Coyne-Beasley et al., 2004; Finkelhor & Ormrod, 2001; Harms & Snyder, 2004). However, a substantial proportion of adolescents in the current study were also killed by strangers (41.5%), which is noticeably higher than the proportion reported for adolescent homicides in the United States (15 to 23%) (Coyne-Beasley et al., 2004; Harms & Snyder, 2004).

The study also revealed that the motives or precipitating circumstances for adolescent homicides were quite varied, including, for example, arguments, revenge, robbery, acts of vigilantism/retribution for a crime, sexual assault, and self-defence. While arguments, robberies, and sexual assaults also appear to be among the more common motives or precipitants of adolescent homicides in the United States (Coyne-Beasley et al., 2004; Finkelhor & Ormrod, 2001) and Brazil (Sant'Anna & Lopes, 2002), acts of vigilantism/retribution for a crime appear to be unique to the current study, although similar forms of violence have been reported in other countries in Africa such as Ghana (Adinkrah, 2005) and Tanzania (Ng'walali & Kitinya, 2006). Furthermore, unlike the studies from the United States (Coyne-Beasley et al., 2004; Finkelhor & Ormrod, 2001) and Brazil (Sant'Anna & Lopes, 2002) gang-related or drug-related motives were not a feature of adolescent homicides in this study. Since this study only focused on homicides in Johannesburg, it is quite possible that gang-related homicides may be more prevalent in other cities in South Africa, especially in the Western Cape (Kinnes, 2000; van Wyk & Theron, 2005). Nonetheless, the findings regarding the motives and precipitating circumstances of adolescent homicide in this study are similar to the circumstances identified in a study of homicides in selected areas in four major South Africa urban centres (CSV, 2008).

With respect to the location and weapon used in the homicide, the patterns identified in the current study were consistent with previous research on adolescent homicide in South Africa (Study I; Burrows et al., 2008) with public places, such as streets, and residential dwellings among the primary locations where homicides occurred, and firearms (43.1%) and sharp instruments (40.5%) constituting the weapons most often used.

The study also presented a typological analysis of adolescent homicides based on two methods of multivariate analyses of specific victim, offender, and event characteristics. Specifically, MCA was used to explore the relationship between the eight categorical variables, namely, the victim's sex, offender's sex, offender's age, number of offenders, victim/offender relationship, the motive or precipitating circumstances, scene, and weapon used. The results were depicted graphically in a two-dimensional solution which illustrated the clustering of certain victim, offender, and event characteristics and the dimensions along which homicides could be differentiated. The first dimension mainly differentiated homicides according to motive and victim-offender relationship, with homicides ranging from those committed in a crime-related context, such as acts of vigilantism, robberies and self-defence committed by strangers, to homicides motivated by revenge and arguments that occurred between friends/acquaintances and family members. The second dimension mainly distinguished homicides on the basis of the

victim's sex, motive and victim-offender relationship, ranging from male victims killed by strangers or friends/acquaintances during robberies or arguments to female victims killed during a sexual assault or by intimate partners. In this regard, the first dimension appears to resemble aspects of the instrumental/expressive motive dimension reported in other multivariate studies of homicide (Bijleveld & Smit, 2006; Salfati, 2000; 2003) while the second dimension is similar in some respects to Brookman's (2005) distinction between masculine forms of homicide and femicide.

In accordance with the discriminating dimensions shown in the MCA, the cluster analysis identified three predominant types of situational contexts associated with adolescent homicide based on distinctive combinations of victim, offender, and event characteristics: 1) male victims killed by strangers during a crime-related event (42.1%); 2) male victims killed by a friends/acquaintances during an argument (40.0%); and 3) female victims killed by male offenders (17.9%). Though the three categories identified in this study are characterised by unique combinations of situational characteristics, they all share in common that they are predominantly committed by male offenders.

The first and largest category which was constituted primarily of male victims killed by male strangers during a crime-related event is similar to the form of masculine homicide identified by Polk (1997) which consists of homicides that result from the commission of another crime, where the victim of a robbery, for example, is killed by the offender or where the initial offender who is attempting to commit the crime is killed in self-defence or by a citizen or the police who happen to come across the scene. Accordingly, this category comprised of all the homicides committed during the course of a robbery, in self-defence, and as acts of vigilantism/retribution for a crime. Furthermore, the majority of homicides in this category were committed by strangers and multiple offenders, occurred in the streets, and involved firearms which is consistent with the patterns found in other studies that reveal that robbery homicides are more likely to involve strangers and multiple offenders (Pizarro, 2008) and studies indicating that stranger homicides are more likely to have instrumental motives, occur in public places, and involve the use of weapons such as firearms (Cao et al., 2008; Last & Fritzon, 2005).

The second category of homicides was comprised of male victims killed by a male friend/acquaintance during an argument that escalated into lethal violence. These homicides appear to have much in common with the masculine form of confrontational homicides

described by Brookman (2003; 2005) and Polk (1993; 1999) that involve spontaneous confrontations in response to relatively trivial disagreements. However, while Brookman (2003; 2005) and Polk (1993; 1999) indicate that confrontational homicides are equally likely to involve friends/acquaintances or strangers, very few of the homicides comprising category 2 in this study were committed by strangers (7.7%) with the majority involving friends/acquaintances (78.8%). This finding is more consistent with studies that reveal that homicides among participants who know each other, such as friends/acquaintances, are more likely to involve expressive motives (to be anger-related) than homicides among strangers, which are more likely to involve instrumental motives (Cao et al., 2008; Kubrin, 2003; Last & Fritzon, 2005). The majority of these homicides were committed with sharp instruments (69.2%) and may reflect the spontaneous nature of these homicides where the participants use weapons that are easily available (Last & Fritzon, 2005). Furthermore, similar to Kubrin's (2003) results on argument-related homicides, category 2 homicides were likely to occur in places such as the streets and bars/shebeens, as well as in private locations such as residential dwellings. Although not examined in the current study, several studies have highlighted the use of alcohol by either the victim or the offender or by both of them as an important feature of argument-related homicides (Brookman, 2003; 2005; Kubrin, 2003; Pizarro, 2008; Polk, 1993; 1999).

The third category consisted of female victims killed by male offenders and comprised 17.9% of the total of adolescent homicide cases. The majority of female homicides occurred in the home (54.3%) and were committed by an offender known to the victim (65.8%), including intimate partners (34.3%), friends/acquaintances (22.9%), and family members (8.6%) which is similar to the patterns described for female homicides in countries such as the UK (Brookman, 2005), Russia (Eckhardt & Pridemore, 2009), and the United States (Muftic & Moreno, 2010; Snyder & Sickmund, 2006). Furthermore, almost half (48.6%) of the victims were killed by other methods such as blunt force (physical assault) and strangulation which corresponds with studies that suggest that the closer the relationship between the victim and offender the more likely the attack involves the use of physical force (Last & Fritzon, 2005). This also points to female vulnerability with respect to the greater physical strength of male offenders. As indicated above, category 3 homicides were most frequently committed by intimate partners (34.3%). This proportion is much lower than that reported in a recent national study on femicide in South Africa where half of the female victims were killed by an intimate partner (Abrahams, Jewkes, Martin, Mathews, Vetten, & Lombard, 2009) and suggests that there are differences in respect to the situational contexts in which female adolescents and adults are killed. All the sexual

assault homicides involved female victims and comprised 28.6% of the homicides in category 3, which is almost twice the proportion (16.3%) of suspected rape homicides reported nationally among female homicide victims (Abrahams, Martin, Jewkes, Mathews, Vetten, & Lombard, 2008) further pointing to differences in the situational circumstances of adolescent and adult femicides. Moreover, sexual assault homicides may be differentiated from intimate partner homicides on the basis that they are more likely to be committed by strangers (Abrahams et al., 2008).

A possible limitation to the study is that some of variables entered into the cluster analysis should have been excluded. For example, the overwhelming majority of offenders were male (89.7%) and hence this variable was unlikely to discriminate among types of homicide. The offender's age was "unknown" in more than a third (35.9%) of the cases and perhaps should also have been excluded from the cluster analysis. However, a large proportion of homicides are committed in unknown circumstances or by strangers, where details of the offenders are often unknown. In this regard, homicide studies have shown that the "unknown" category with respect to offender characteristics and circumstances follows a pattern. For example, in the CSVR (2008) study in South Africa, an examination of the victims and events of homicides occurring in the category of "unknown" circumstances revealed a strong resemblance to the category of homicides that occurred in the course of another crime. A study in the United States (Petee, Weaver, Corzine, Huff-Corzine, & Wittekind, 2001) revealed that homicides where the victim-perpetrator relationship was "unknown" were most frequently consistent with stranger homicides. In the current study, "unknown" offender variables were more common for Category 1: Male victims killed by male strangers during a crime-related event. For example, 69.5% of the offenders' ages were unknown in Category 1 homicides, a pattern that is consistent with previous studies that show a relationship between "unknown" offender details and stranger and crime-related homicides. Furthermore, by including offenders' age in the cluster analysis, the current study showed that a high proportion of Category 2 type homicides, which involved male victims killed by male friends/acquaintances during an argument, also consisted of young offenders; specifically 44.9% of the offenders were adolescents (aged between 12 and 19 years) and another 43.6% were young adults between 20 and 29 years. For category 3 homicides, female victims killed by a male offender, the majority of offenders (71.4%) were older than the victim. Thus the offenders' age is patterned across the three homicide categories and has implications for prevention.

One of the major limitations of this study is the number of homicide cases that had to be excluded because they could not be followed-up via police case dockets. Other South African studies on homicide have encountered similar problems (e.g. Abrahams et al., 2009). This clearly points to the need for improved management and integration of data that is currently collected in the country. In addition the study focuses specifically on adolescent homicide in Johannesburg; therefore, the situational contexts found in this study may be different from those homicides among adolescents in other cities in South Africa. For example, the issue of gang violence may be more relevant to the city of Cape Town (Kinnes, 2000; van Wyk & Theron, 2005).

CONCLUSION

This study examined the situational context of adolescent homicide with a particular focus on generating a situational typology of adolescent homicides based on victim, offender and event characteristics. The MCA showed that homicides could be differentiated along two dimensions, primarily according to motive or precipitating circumstances, victim–offender relationship, and the victim’s sex. In line with these dimensions, the cluster analysis assigned the homicide cases into three distinct categories: 1) male victims killed by strangers during a crime-related event; 2) male victims killed by a friend/acquaintance during an argument; and 3) female victims killed by male offenders. The typology developed in this study reflects three different situational contexts that are distinct with respect to victim, offender, and event characteristics, and accordingly the results can serve to inform the development of tailored and focused interventions that consider the specific dimensions associated with each of the three categories of adolescent homicide. Future research should, however, focus on the role played by alcohol in adolescent homicides, as alcohol use appears to be an important situational factor that can precipitate violence.

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STUDY III

ALCOHOL CONSUMPTION IN ADOLESCENT HOMICIDE VICTIMS IN THE CITY OF JOHANNESBURG, SOUTH AFRICA

Alcohol is involved in a substantial proportion of adolescent homicides in South Africa. To better understand the role of alcohol, the present study sought to describe the blood alcohol concentration (BAC) of adolescent homicide victims and to identify the victim, offender, and event characteristics associated with a positive BAC at the time of death. Data on 323 adolescent (15 to 19 years) victims killed in Johannesburg during 2001 to 2009 who had been tested for the presence of alcohol were obtained from the National Injury Mortality Surveillance System (NIMSS). Data included victim demographics, weapon used, scene, and time of death. Data on offender demographics, victim-offender relationship, and motivation for the homicide were obtained from police records. Alcohol was present in 39.3% of the homicide victims, and of these 88.2% had a BAC level equivalent or in excess of the South African limit of 0.05g/100ml for intoxication. A positive BAC was significantly more common in male and older adolescent victims; in victims killed with sharp instruments, in public places, over the weekends, and during the evenings; and in victims killed by a friend/acquaintance. Multivariate analysis revealed that the victim's sex (male) and age (older adolescent), weapon used (sharp instruments), weekend and night time were independently positively associated with a positive BAC in homicide victims. The results point to alcohol use as an important target for the prevention of adolescent homicides, and can inform the design of appropriate interventions.

Key words: Alcohol; blood alcohol concentration; homicide; adolescents; South Africa.

Alcohol consumption is widely associated with interpersonal violence, and is recognised as an important contributing factor to violent behaviour, including homicide (Bye, 2012; Mercy, Butchart, Farrington, & Cerdá, 2002). In the case of homicide, research has consistently revealed that a substantial proportion of offenders and/or victims were drinking alcohol at the

time of the event (Darke, 2010; Kuhns, Exum, Clodfelter, & Bottia, 2013; Kuhns, Wilson, Clodfelter, Maguire, & Ainsworth, 2010). For example, in a review of the toxicology of homicide studies conducted in several countries around the world, including Australia, Ireland, South Africa, and the United States, Darke (2010) reported that between 33-66% of the offenders and between 40-50% of the victims were affected by alcohol at the time of the homicide. Furthermore, per capita alcohol consumption patterns appear to be highly correlated with homicide rates (Bye, 2008; Ramstedt, 2011; Rossow, 2001; 2004), with this relationship significantly stronger in countries with intoxication-oriented drinking patterns than in countries where drinking is moderate (Bye, 2008; Rossow, 2001).

South Africa has one of the highest adult (≥ 15 years) per capita alcohol consumption levels (12.4 L) in the world (Rehm, Room, Monteiro, Gmel, Graham, Rehn, Sempos, Frick, & Jernigan, 2004). Drinking large amounts per occasion or drinking to intoxication is common (Parry, 2005; Peltzer & Ramlagan, 2009). This intoxication-oriented drinking pattern is also evident among adolescents, with the *South African Youth Risk Behaviour Survey 2008* revealing that 33.5% of male and 23.7% of female secondary school learners had engaged in binge drinking (five or more drinks per occasion) in the past month (Reddy, James, Sewpaul, Koopman, Funani, Sifunda, Josie, Masuka, Kambaran, & Omardien, 2010). Alcohol is also involved in a significant number of homicides in South Africa. Research using data from the National Injury Mortality Surveillance System (NIMSS) has shown that approximately 58% of homicide victims have positive blood alcohol concentrations (BACs) (Donson, 2008; Prinsloo, 2007). Similarly, a study based on NIMSS data revealed that of the blood samples examined for BAC among adolescent homicide victims aged between 15 to 19 years, 50% of the cases in 2002 and 54% of the cases in 2008 had positive BACs (Ramsoomar & Morojele, 2012). With interpersonal violence being the leading cause of death among adolescents and young adults (Donson, 2008; Norman, Matzopoulos, Groenewald, & Bradshaw, 2007; Prinsloo, 2007), research on the relationship between alcohol and interpersonal violence is particularly important for the design and implementation of preventive strategies to reduce these violent deaths.

The current study sought to gain a better understanding of the relationship between alcohol use and adolescent homicide by examining the BAC levels of adolescent homicide victims (15 to 19 years) in Johannesburg during the period 2001 to 2009 and by identifying victim, event, and offender characteristics associated with a positive BAC among homicide victims at the time of death. In doing so, the current study builds on Study I of the thesis which focused on the incidence and epidemiological characteristics of adolescent homicide and revealed that 39.3%

of the victims had positive BACs at the time of death, and Study II which focused on the situational contexts of adolescent homicide and identified three dominant situational typologies based on the combination of victim, offender, and event characteristics. In particular, an understanding of the victim, offender, and event characteristics associated with alcohol-related homicides can provide important information on the individual and situational risk factors that should be targeted for prevention, and accordingly supports the overall aim of the thesis to contribute to a local evidence-base that will inform the design and implementation of policies and intervention strategies to prevent adolescent homicides. The next section provides a brief explanation of the relationship between alcohol and homicide and a review of previous research on the characteristics of alcohol-related homicides. This is followed by a description of the method and data used in the study, then the presentation of the results, and finally, the discussion of the results.

Explaining the relationship between alcohol and violence

The pharmacological effects of alcohol appear to play an important role in the co-occurrence of alcohol and violence. The effects of alcohol, such as increased psychomotor stimulation; reduced anxiety and ability to notice inhibitory cues; increased emotional sensitivity; and impaired cognitive functioning including an inability to interpret information accurately and to communicate effectively, increase the likelihood of violent responses in conflict situations (Collins & Messerschmidt, 1993; Giancola, Josephs, Parrott, & Duke, 2010; Hoaken & Stewart, 2003; Pihl, Assaad, & Hoaken, 2003), while impaired judgement and reduced capacity to recognise and appropriately respond to potentially violent situations increase the risk for victimisation (Abbey, 2002; Collins & Messerschmidt, 1993). Due to their still developing physiology and inexperience, adolescents may be more vulnerable than adults to the pharmacological effects of alcohol (Ramsoomar, Morojele, & Norris, 2013).

However, alcohol use by itself is not sufficient to account for violence. Rather, research suggests that alcohol-related violence is the result of the pharmacological effects of alcohol in interaction with a number of variables, including: the characteristics of the individual drinker (e.g. age, gender, drinking pattern, and beliefs or expectations that drinking alcohol causes aggressive behaviour); the situational context in which drinking occurs (e.g. locations characterised by a concentration of intoxicated peers and low levels of monitoring and guardianship); and the sociocultural environment (e.g. attitudes and expectations that promote drinking to intoxication and support or tolerate the use of violence in situations of intoxication) (Graham, Leonard, Room, Wild, Pihl, Bois, & Single, 1998; Miles, 2012).

Thus, while the pattern of intoxication-oriented drinking evident among South African adolescents (Reddy et al., 2010) may partly explain the high levels of alcohol-related homicide among adolescents in the country, other factors including the characteristics of the individuals involved and the event itself are also likely to play a contributory role (Graham, Bernards, Osgood, & Wells, 2006; Wells & Graham, 2003). Therefore, studies that identify the specific victim, event, and offender characteristics associated with alcohol-related homicides are also important to further our understanding of the relationship between alcohol consumption and homicide (Pridemore & Eckhardt, 2008).

Victim, event, and offender characteristics associated with alcohol-related homicides

Although not focusing specifically on adolescents, several studies from different countries, including Australia (Carcach & Conroy, 2001; Darke & Duflou, 2008; Dearden & Payne, 2009), Brazil (Andreuccetti, de Carvalho, Ponce, de Carvalho, Kahn, Muñoz, & Leyton, 2009), Russia (Pridemore & Eckhardt, 2008) and the United States (Goodman, Mercy, Loya, Rosenberg, Smith, Allen, Vargas, & Kolts, 1986) have shown that certain characteristics of the victim, event, and offender are associated with a higher probability of alcohol consumption at the time of the homicide.

With regard to the demographic characteristics of the victims, studies have shown that male victims are significantly more likely to have consumed alcohol at the time of the killing than female victims (Andreuccetti et al., 2009; Darke & Duflou, 2008; Goodman et al., 1986). Adolescent and adult homicide victims are also more likely to have positive BACs than children (under 15 years) and older adult (over 60 years) victims (Andreuccetti et al., 2009; Goodman, 1986). With regard to the victim's race, however, study results appear to be more inconclusive. For example, while a study conducted by Goodman and colleagues (1986) in the United States found that black victims were more likely than white victims to have consumed alcohol at the time of the homicide, a meta-analysis of alcohol toxicology findings among homicide victims in 61 studies (most from the United States) found no association between the victim's race and BAC levels (Kuhns et al., 2010).

The characteristics of the homicide event also appear to play a role in differentiating between alcohol and non-alcohol-related homicides. Homicides resulting from sharp instruments compared with those resulting from the use of other weapons have a greater likelihood of involving victims and/or offenders who have been drinking alcohol (Andreuccetti et al., 2009; Dearden & Payne, 2009; Goodman et al., 1986). Furthermore, homicides occurring in public

places, such as at recreational venues or in the streets, also appear to be more likely to involve alcohol (Dearden & Payne, 2009; Goodman et al., 1986), while homicides taking place in residential locations, particularly the victim's home, are less likely to be alcohol-related (Dearden & Payne, 2009). However, this association is related to the social context in which drinking typically occurs and may differ across cultures and countries. For example, in a study conducted in Russia, which has a less developed bar culture than countries such as the United States and where drinking is more likely to occur in private settings, no significant relationship was found between event location and alcohol-related homicides (Pridemore, 2004; Pridemore & Eckhardt, 2008). Nonetheless, despite the differences with respect to location, studies from various countries have consistently reported that homicides occurring on the weekends and in the evening hours are more likely to involve alcohol than those homicides occurring at other times (Andreuccetti et al., 2009; Dearden & Payne, 2009; Goodman et al., 1989; Pridemore & Eckhardt, 2008).

Certain offender characteristics have also been shown to be more prevalent in homicides involving alcohol. A number of studies have found that homicides committed by friends/acquaintances are more likely to involve the use of alcohol (Carcach & Conroy, 2001; Goodman et al., 1986) while those committed by strangers are less likely to involve the use of alcohol (Goodman et al., 1986; Pridemore & Eckhardt, 2008). Dearden and Payne (2009), however, found that homicides committed by both friends/acquaintances and strangers had an increased likelihood of alcohol involvement. As to the motive or precipitating circumstance, studies are generally consistent in revealing that homicides occurring in the context of arguments are more likely to involve alcohol, whereas homicides occurring in the context of robberies or other instrumental crimes are less likely to involve alcohol (Carcach & Conroy, 2001; Darke & Dufrou, 2008; Goodman et al., 1986; Pridemore & Eckhardt, 2008).

Considered together, the victim, event, and offender characteristics of alcohol-related homicides appear to have much in common with 'male honour contests' (Polk, 1999) and confrontational homicides (Brookman, 2003, 2005), forms of masculine (male-on-male) homicide that arise from relatively trivial disagreements between acquaintances or strangers, which tend to occur in scenes of leisure activity or public settings where there is a concentration of young males, and where alcohol is a characteristic feature of the social context. In this respect, the characteristics that have been shown to be associated with alcohol-related homicides are also similar to the second of the three adolescent homicide situational typologies identified in Study II which comprised of male victims killed by means of sharp instruments by male friends/acquaintances

during an argument, and suggest that alcohol consumption may also be an important feature of these homicides.

Aside from homicides that involve male participants, homicides between intimate partners also appear to be associated with alcohol use by one or both of the partners involved (Dearden & Payne, 2009; Pridemore & Eckhardt, 2008; Sharps, Campbell, Campbell, Gary, & Webster, 2001). In their study of intimate partner femicide in the United States, Sharps and colleagues (2001) found that around 18% of the victims compared with 59.7% of offenders had used alcohol at the time of the incident, suggesting that the increased risk of victimisation is primarily a function of the offender's, rather than the victim's, use of alcohol. In contrast, a recent study on femicide in the Western Cape in South Africa found that the majority (62.1%) of women who were killed had a high BAC at the time of their death (Mathews, Abrahams, Jewkes, Martin, & Lombard, 2009) indicating a pattern of alcohol use among female homicide victims in South Africa that differs from those reported in the United States. Moreover, Mathews and colleagues (2009) found that several characteristics of the victim, event, and offender were significantly associated with the victim's BAC levels at the time of death, including the victim's age (under 29 years), being killed by an intimate partner, with sharp instruments or by blunt force, in a rural setting, in a public space, and on a weekend.

While the abovementioned studies show that certain characteristics of the victim, event, and offender appear to be more prevalent in alcohol-related homicides, considering that the pattern and situational contexts of drinking differ across cultures and countries, and may also differ between adults and adolescents, studies that specifically focus on alcohol-related homicides among adolescents in South Africa are required to inform the prevention of these homicides in this country. Accordingly, the current study aimed to describe the blood alcohol concentration (BAC) levels of adolescent (15 to 19 years) homicide victims killed in Johannesburg during the period 2001 to 2009, and to identify the victim, event, and offender characteristics associated with a positive BAC among adolescent homicide victims at the time of death.

METHOD

Data on all cases of adolescent (15 to 19 years) homicides that occurred in Johannesburg during the period 2001 to 2009 were drawn from NIMSS. The NIMSS collects information on nonnatural deaths based on medico-forensic investigative procedures at state medico-legal laboratories and forensic chemistry laboratories (see Introduction p.9 for a full description of NIMSS). A total of 590 adolescent homicides were registered by NIMSS for Johannesburg

during the period 2001 to 2009. BAC results were not available for 267 (45.3%) of these cases, primarily due to blood alcohol tests not usually being requested at the time of the post-mortem if the victim had received medical treatment, was hospitalised or died more than four hours after the injury event. An analysis revealed no significant differences in the demographics (sex, age, and race) between the cases for which BAC data was available and the cases for which such data was unavailable. The study was based on the 323 (54.7%) homicide cases for which BAC results were available. For each of the 323 homicide cases, the data extracted from NIMSS included information on the victims' level of BAC and demographic details (sex, age, and race), external cause of death (method or weapon used), scene, day and time of death, and police case number and police station.

Information on the offender's demographics, victim-offender relationship, number of offenders, and motives or precipitating circumstances for the homicide was obtained from police case records. This involved the follow up of the adolescent homicide cases registered by NIMSS via their police case number to their dockets. A police docket contains information on a recorded criminal case, and includes documentation of police investigations, witness statements, medico-forensic reports, and the progress of the case through the criminal justice system. In the case of homicide, these dockets provide incident-level information which includes details on the victim, offender (if known) and circumstances of the event (if known). Data was collected in 2009 (see Study II p. 43 for a more in depth description of data collection tools and procedures), and as the more recent cases (2008 and 2009) were still likely to be open and in progress through the criminal justice system, permission was granted by the office of the Gauteng Provincial Commissioner of the South African Police Service (SAPS) to access case dockets for the period 2001 to 2007. This included 245 (75.8%) of the 323 homicide cases registered by NIMSS for the period 2001 to 2009. Of these 245 homicide cases, 104 (42.5%) police case records were not accessed as a result of missing police case numbers or dockets not being found. Therefore, the analysis on offender information is only based on the 141 (57.5%) homicide cases for which police case data was available.

Analysis

For this study, BAC was reported as grams per 100 ml consistent with standard practice for reporting in South Africa. To describe the BAC levels in adolescent homicide victims, BAC was divided into three categories as follows: negative; 0.01-0.4 g/100 ml; and ≥ 0.05 g/100ml and the percentage of adolescents by sex and age group was computed for each category. Mean BAC values were also computed separately for males and females.

To assess which victim, event, and offender characteristics were associated with a positive BAC in victims, BAC was divided into two categories: positive (any level above 0) and negative. Each victim, offender, and event characteristic was treated as a single independent variable, and was analysed with respect to the outcome variable using binary logistic regression to estimate crude odds ratios (ORs) and 95% confidence intervals (95% CI). A *p*-value of below 0.05 was considered significant. This was followed by a multiple logistic regression analysis, which included the victim and event variables that were significant in the bivariate analysis. Only the main effects of the independent variables were analysed. Offender variables were not considered for the multiple logistic regression analysis due to the smaller number of cases for which this data was available. Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 20.0.

RESULTS

Of the 323 adolescent homicide cases where blood alcohol levels were tested, 127 (39.3%) of the victims had a positive BAC with a mean concentration of 0.12 g/100 ml (S.D.=0.07). Of the 127 victims that tested positive for alcohol, the overwhelming majority (88.2%, *n*=112) met or exceeded the South African limit of 0.05g/100ml for legal intoxication. As illustrated in Figure 9, the predominant level for positive BAC was ≥ 0.05 g/100ml for both males and females across age groups, indicating that the majority of adolescents who had consumed alcohol, irrespective of their sex and/or age, were intoxicated at the time of death. Differences in the proportions of adolescents who had consumed alcohol were noted across sex and age groups, however, with the highest (49.7%) proportion of positive BACs found among male victims in the 18 to 19 year age group, followed by males aged between 15 to 17 years (30.3%), then females aged 18 to 19 years (25%), and females aged between 15 and 17 years (16%). Among male victims, a significantly higher proportion of older adolescents (18 to 19 years) had positive BACs than younger adolescents (15 to 17 years) (49.7% v 30.3%; $\chi^2 = 9.064$, *df*=1, *p*=.003), while the difference between older and younger female adolescents was not significant (25.0% v 16.0%; $\chi^2 = .684$, *df*=1, *p*=.408).

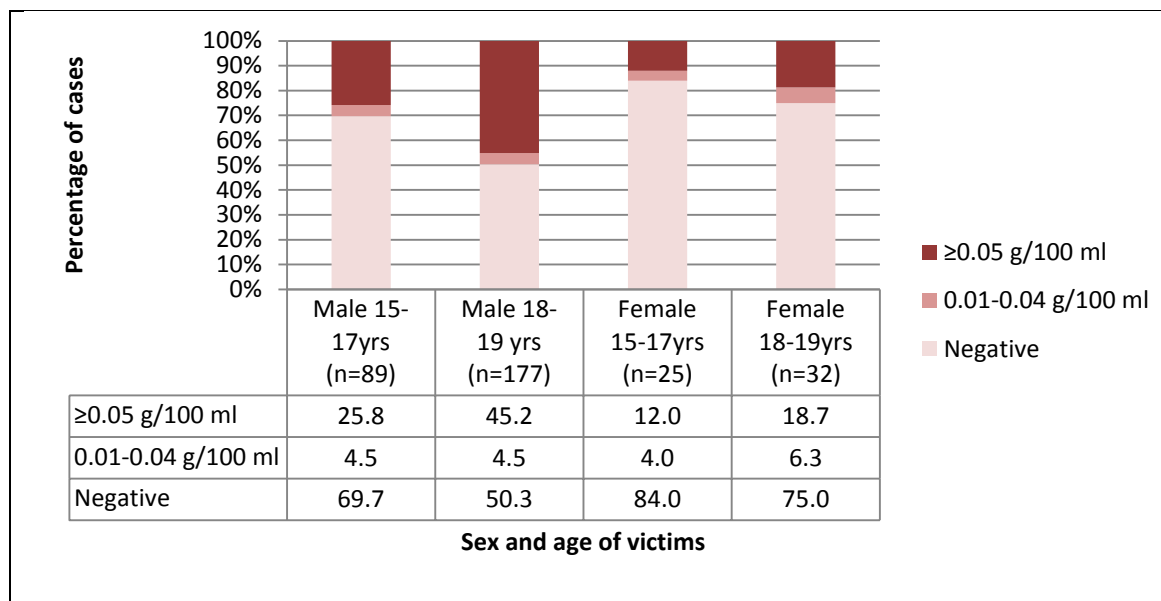


Figure 9. Blood alcohol concentration (BAC) levels in adolescent homicide victims by sex and age (n=323)

Table 8 presents the distribution of positive and negative BAC levels in adolescent homicide victims according to their demographics characteristics. The victim's sex and age were significantly related to BACs, while race did not attribute significantly to BACs. Male victims were significantly more likely to have positive BACs than female victims (43.2% v 21.1%; OR, 2.856 [95% CI 1.445 to 5.645]; $p=0.003$), and older victims aged between 18 to 19 years were also significantly more likely to have positive BAC levels (45.9%) than younger victims aged between 15 to 17 years (27.2%) (OR, 2.275 [95% CI 1.388 to 3.728]; $p=.001$).

Table 8. Blood alcohol concentration in adolescent homicide victims by demographic characteristics

Victim characteristics	n	Adolescent homicide victims			p
		Positive BAC n (%)	Negative BAC n (%)	Crude Odds Ratio (CI)	
Sex					
Male	266	115 (43.2)	151 (56.8)	2.856 (1.445-5.645)	.003*
Female	57	12 (21.1)	45 (78.9)		
Age					
18-19 years	209	96 (45.9)	113 (54.1)	2.275 (1.388-3.728)	.001*
15-17 years	114	31 (27.2)	83 (72.8)		
Race					
Black	283	107 (37.8)	176 (62.2)	.608 (.313 – 1.182)	.142
Other*	40	20 (50.0)	20 (50.0)		

*Other race category includes coloured, white and Indian.

Table 9 shows the distribution of positive and negative BAC in adolescent homicide victims according to the characteristics of the homicide event. Regarding weapon use, homicide incidents involving sharp instruments, such as knives, were significantly more likely (55.0%) to involve victims who had consumed alcohol at the time of the incident (OR=2.563, $p=.000$). This contrasted with victims who were killed by other methods, such as strangulation, burns, poisoning and pushed from a height, who were significantly less likely (12.0%) to have been drinking at the time (OR=0.418, $p=.010$). Victims killed with firearms were also less likely (35.1%) to have positive BACs, but the difference was not significant.

Table 9. Blood alcohol concentration in adolescent homicide victims by situational characteristics

Situational characteristics	n	Adolescent homicide victims		Crude Odds Ratio* (CI)	p
		Positive BAC n (%)	Negative BAC n (%)		
Weapon used					
Firearm	168	59 (35.1)	109 (64.9)	.693 (.442-1.084)	.108
Sharp instrument	100	55 (55.0)	45 (45.0)	2.563 (1.580-4.158)	.000*
Other	53	12 (22.6)	41 (77.4)	.418 (.214-.815)	.010*
Scene					
House	96	27 (28.1)	69 (71.9)	.497 (.297-.833)	.008*
Public place	110	55 (50.0)	55 (50.0)	1.958 (1.225-3.131)	.005*
Open land	26	8 (30.8)	18 (69.2)	.665 (.280-1.578)	.352
Unknown	88	37 (42.0)	51 (58.0)	1.169 (.710-1.924)	.539
Day					
Weekend	193	98 (50.8)	95 (49.2)	3.593 (2.179-5.924)	.000*
During the week	130	29 (22.3)	101 (77.7)		
Time					
Night	208	97 (46.6)	111 (53.4)	2.622 (1.533-4.482)	.000*
Day	96	24 (25.0)	72 (75.0)	.406 (.236-.682)	.001*
Unknown	19	6 (31.6)	13 (68.4)	.698 (.258-1.887)	.479

* Crude odds ratios indicate the odds that a victim's BAC was positive compared to the average of all other categories of that variable.

The homicide scene also discriminated between positive and negative BAC levels among homicide victims. Victims killed in public places, such as the streets or bars/shebeens, were significantly more likely (50%) to have positive BACs (OR=1.958, $p=.000$), while those killed in private homes were significantly less likely (28.1%) to have been drinking at the time (OR=.497, $p=.008$).

With regard to the time when the homicide occurred, the greater proportion (50.8%) of adolescent victims killed over the weekend tested positive for the presence of alcohol compared with those that were killed during the week (22.3%) (OR=3.593, $p=.000$). Adolescents killed at night between 18h00 and 05h59 also had a significantly higher probability (46.6%) of positive BACs (OR=2.622, $p=.000$), while adolescents killed during the day between 06h00 and 17h59

were significantly less likely (25.0%) to have been drinking at the time of the incident (OR=0.406, $p=.001$).

Table 10 consists of the distribution of positive and negative BAC levels in adolescent homicide victims by offender characteristics. None of the variables relating to the offenders' demographics, the number of offenders, or the motive for the homicide were found to be significantly associated with the victims' BACs. The relationship between the victim and offender, however, was found to be an important factor in differentiating alcohol-related homicides. Specifically, victims killed by friends/acquaintances were significantly more likely (60.5%) to have positive BAC levels (OR=2.415, $p=.019$). With respect to victims killed by an intimate partner, all were female and all had negative BACs. Similarly, victims killed by family members also all had negative BACs.

Table 10. Blood alcohol concentration in adolescent homicide victims by offender characteristics

Offender characteristics	n	Adolescent homicide victims		Crude Odds Ratio* (CI)	P
		Positive BAC n (%)	Negative BAC n (%)		
Sex					
Male	107	49 (45.8)	58 (54.2)	1.070 (.492-2.326)	.864
Female	2	1 (50.0)	1 (50.0)		
Unknown	32	14 (43.8)	18 (56.3)	.918 (.415-2.029)	.832
Age					
19 years and younger	25	13 (52.0)	12 (48.0)	1.381 (.581-3.283)	.465
20 years and older	50	20 (40.0)	30 (60.0)	.712 (.354-1.433)	.341
Unknown	66	31 (47.0)	35 (53.0)	1.127 (.580-2.191)	.724
Race					
Black	96	44 (45.8)	52 (54.2)	1.058 (.519-2.156)	.877
Other [#]	8	5 (62.5)	3 (37.5)	2.090 (.480-9.107)	.326
Unknown	37	15 (40.5)	22 (59.5)	.765 (.358-1.638)	.491
Relationship					
Intimate partner	7	0	7 (100.0)		
Family member	4	0	4 (100.0)		
Friend/Acquaintance	43	26 (60.5)	17 (39.5)	2.415 (1.159-5.031)	.019*
Stranger	43	18 (41.9)	25 (58.1)	.814 (.395-1.679)	.577
Unknown	44	20 (45.5)	24 (54.5)	1.004 (.491-2.053)	.992
Number of offenders					
Single	70	28 (40.0)	42 (60.0)	.648 (.333-1.263)	.203
Multiple	42	23 (54.8)	19 (45.2)	1.712 (.827-3.544)	.147
Unknown	29	13 (44.8)	16 (55.2)	.972 (.428-2.209)	.946
Motivation					
Argument	33	17 (51.5)	16 (48.5)	1.379 (.631-3.013)	.420
Revenge	15	9 (60.0)	6 (40.0)	1.936 (.650-5.767)	.235
Crime-related	33	11 (33.3)	21 (66.7)	.533 (.244-1.257)	.158
Other	7	3 (42.9)	4 (57.1)		
Unknown	54	24 (44.4)	30 (55.6)	.940 (.475-1.860)	.859

*Crude odds ratios indicate the odds that a victim's BAC was positive compared to the average of all other categories of that variable.

[#]Other race category includes coloured, white and Indian.

Multivariate analysis

The outcome of multivariate analysis for victim and event characteristics associated with the victims' BAC is shown in Table 11. As some of the variables were not mutually exclusive (i.e. sharp instruments and other weapons used, public places and houses, and night and day time) only those variables that were significantly positively associated with BAC levels in the bivariate analysis were used in the final model (see notes a, b and c in Table 12). When controlling for all other variables in the model, being a male victim ($p=.038$) between 18 and 19 years of age ($p=.004$); and being killed by a sharp instrument ($p=.000$), on a weekend ($p=.000$), at night ($p=.008$) continued to be significantly associated with BAC, while being killed in a public place ($p=.067$) was not significantly associated with BAC. Being killed over the weekend was the characteristic most strongly associated with positive BAC levels, followed by being killed by a sharp instrument.

Table 11. Multivariate logistic regression analysis: Victim and event characteristics associated with blood alcohol concentration (BAC) levels at time of death

Characteristics		Odds ratio (OR)	95% confidence intervals (CI)	<i>p</i>
Victim's Sex	Male	2.194	1.046-4.602	.038*
Victim's Age	18-19 years	2.269	1.297-3.970	.004*
Weapon used ^a	Sharp instrument	2.960	1.705-5.140	.000*
Scene ^b	Public place	1.639	.966-2.780	.067
Day	Weekend	3.142	1.843-5.358	.000*
Time ^c	Night	2.113	1.214-3.678	.008*

^a When sharp instrument was replaced with other weapon/method used in the model, all inferences remained the same. For other weapon/method used, OR=0.553 (95 % CI=0.268-1.143), $p=.110$.

^b When public place was replaced with house in the model, all inferences remained the same. For house, OR=0.484 (95 % CI=0.271-0.863), $p=.014$.

^c When night time was replaced with day time in the model, all inferences remained the same, except that the p value for public place decreased from .067 to .046 (OR=1.707, 95% CI=1.009-2.887). For day time, OR=0.446 (95 % CI=0.247-0.805), $p=.007$.

DISCUSSION

The current study sought to gain a better understanding of the relationship between alcohol use and adolescent homicide by examining the blood alcohol concentration (BAC) levels of adolescent homicide victims (15 to 19 years) who were killed in Johannesburg during the period 2001 to 2009 and who were tested for the presence of alcohol. Of the 127 (39.3%) adolescent homicide victims who had a positive BAC, the overwhelming majority (88.2%) exceeded the limit of 0.05g/100ml and were legally intoxicated at the time of the homicide. This result is consistent with the overall pattern of heavy episodic drinking or drinking to intoxication in South Africa (Parry, 2005; Peltzer & Ramlagan, 2009), which is also prevalent among

adolescents (Reddy et al., 2010). Furthermore, the results showed that certain victim, event, and offender characteristics were significantly associated with positive BAC levels in victims, and provide some insights into the individual and situational risk factors that contribute to alcohol-related violence, particularly homicide, among adolescents.

With regard to the characteristics of the victims, the significantly higher proportion of positive BACs found in male compared to female adolescent victims in the current study is consistent with international research (Andreuccetti et al., 2009; Darke & Duflou, 2008; Goodman et al., 1986) and also corresponds with the pattern of higher alcohol use and binge drinking reported among male than female adolescents in South Africa (Madu & Matla, 2003; Reddy et al., 2010). This pattern may be related to alcohol use being more culturally acceptable among males than females, particularly in black South African communities (Madu & Matla, 2003; Setlaletoa, Pisa, Thekisho, Ryke, & Loots, 2010). Similarly, the study result that older adolescent victims were significantly more likely to have positive BACs than were younger adolescents fits with local alcohol consumption patterns, where the prevalence of alcohol use and binge drinking among adolescents is shown to increase with age (Reddy et al., 2010). Nonetheless, it is noteworthy that 27% of the homicide victims who were younger than 18 years of age in the current study had positive BACs.

In terms of event characteristics, bivariate analyses revealed that the cause of death or weapon used, the location, day of the week and time of day were all significantly associated with alcohol-related homicides. In particular, the current study found that being killed by a sharp instrument was significantly associated with positive BAC toxicology reports in adolescent homicide victims. This result is consistent with previous local and international studies (Andreuccetti et al., 2009; Dearden & Payne, 2009; Goodman et al., 1986; Mathews et al., 2009) and may point to the impulsive or unplanned circumstances of alcohol-related homicides where the participants involved use whatever weapon is most convenient at the time (Andreuccetti et al., 2009). Sharp instruments, such as knives, are easily available and often carried as weapons. For example, the *South African Youth Risk Behaviour Survey 2008* revealed that almost a quarter (23.2%) of male secondary school learners had carried a knife in the past month (Reddy et al., 2010). Furthermore, in contexts of alcohol consumption, sharp objects such as the edge of broken bottles or glass in which alcohol is served can also be used as weapons.

Also in accordance with previous international and local research (Andreuccetti et al., 2009; Dearden & Payne, 2009; Goodman et al., 1986; Mathews et al., 2009), the results revealed that adolescents killed in public places were significantly more likely to have positive BACs at the time of death. In the current study, public places consisted of the streets and entertainment venues such as bars and shebeens. Drinking locations such as bars and shebeens are mostly unlicensed in South Africa and tend to operate outside the confines of official regulations. These venues are typically frequented by young people, especially young men, where excessive drinking is normative (Morojele, Kachieng'a, Mokoko, Nkoko, Parry, Nkowane, Moshia, & Saxena, 2006). Young people also tend to congregate outside these establishments where drinking takes place in the streets. The streets also serve as venues for parties such as street bashes which are usually organised by young people themselves and hence represent less controlled drinking environments. In this regard, previous research has suggested that alcohol-related violence is more likely to occur in drinking settings characterised by a high concentration of intoxicated individuals, a permissive environment (e.g. rowdiness and underage drinking), or a lower potential for supervision and guardianship (Felson, Savolainen, Bjarnason, Anderson, & Zohra, 2011; Graham et al., 2006; Wells, Graham, Speechley, & Koval, 2005). Therefore, the locations in which South African adolescents tend to consume alcohol constitute risky drinking locations and, in part, may account for the association between public places and alcohol-related homicide victimisation among adolescents in the current study.

Consistent with the results of most other research (Andreuccetti et al., 2009; Dearden & Payne, 2009; Goodman et al., 1989; Mathews et al., 2009; Pridemore & Eckhardt, 2008), the current study found that homicides which occurred on the weekend and/or at night were significantly more likely to involve a victim who had consumed alcohol prior to the event. This result also corresponds with the pattern and social context of alcohol consumption in South Africa where heavy drinking peaks on weekends (Parry, Plüddemann, Steyn, Bradshaw, Norman, & Laubscher, 2005) and where alcohol is used by young people, including adolescents, as a means of socialising and for recreational purposes (Madu & Matla, 2003; Morojele et al., 2006).

With respect to the offender characteristics, bivariate analyses revealed that the offender's relationship to the victim was the only variable that was significantly associated with positive BAC levels in homicide victims. The higher proportion of positive BACs in adolescents killed by friends/ acquaintances in the current study concurs with international research (Carcach & Conroy, 2001; Goodman et al., 1986) and is probably related to young people being more likely

to drink alcohol in the company of friends and peers. In South Africa, in particular, young men regard drinking as a way to connect with male friends and excessive drinking in these social situations is encouraged as a demonstration of masculine behaviour (Morojele et al., 2006; Setlalentoa et al., 2010). Where alcohol consumption and the social contexts in which it occurs are linked to displays of masculine behaviour, the likelihood of spontaneous confrontations that quickly escalate to violent behaviour appear to be heightened (Brookman, 2005).

Although more than half (51.5%) of the adolescents killed in the context of an argument had positive BACs at the time of death, unlike most previous studies (Carcach & Conroy, 2001; Darke & Duflou, 2008; Goodman et al., 1986; Pridemore & Eckhardt, 2008), this association was not significant. However, the analysis of offender characteristics in the current study was based on a limited number of homicide cases which may have contributed to fewer statistically significant associations among the respective variables. Nonetheless, many of the characteristics found to be associated with alcohol-related homicides in the current study, namely being a male victim, killed by a male friend/acquaintance, in public settings or scenes of leisure activity where there is a concentration of young intoxicated males, accord with the description of 'honour contests' (Polk, 1999) and confrontational homicides (Brookman, 2003; 2005) that involve spontaneous confrontations, in response to relatively trivial disagreement. In this respect, some of the characteristics that have been shown to be associated with alcohol-related homicides, namely being a male victim, being killed with sharp weapons, in public places, by friends/acquaintances are similar to the second of the three adolescent homicide situational typologies identified in Study II which comprised primarily of male victims (93.6%) killed by means of sharp instruments (69.2%), in public places such as the streets or bars/shebeens (52.5%), by male (93.6%) friends/ acquaintances (78.2%), during an argument (69.2%), and suggest that alcohol consumption might have been an important factor these homicides.

While previous studies have also found an association between intimate partner homicides and alcohol consumption, the limited number of intimate partner homicides in the current study precluded statistical analysis. Nevertheless, the victims killed by an intimate partner in the current study were all female and all had negative BAC levels. This pattern among adolescent homicide victims differs from the study of femicide in the Western Cape in South Africa which found that victims of intimate partner homicide were significantly more likely to have higher BAC levels than victims killed by non-intimates (Mathews et al., 2009). The study in the Western Cape included primarily adult women (14 years and older) while the current one specifically focused on adolescents (15 to 19 years) and therefore the difference in the results

regarding intimate partner homicides suggests that the situational contexts in which female adolescents drink alcohol and are killed may differ to some extent from those of adult women.

The multivariate analysis confirmed the importance of many of the victim and event characteristics shown to be associated with alcohol consumption among homicide victims in the bivariate analyses. Specifically, the victim's sex (male) and age (older adolescent), weapon used (sharp instruments), weekend and night time were independently positively associated with a positive BAC in homicide victims. Being killed over the weekend was the characteristic most strongly associated with alcohol consumption among victims, and highlights the relationship between leisure time and heavy alcohol consumption among adolescents in South Africa which ultimately may contribute to an increased vulnerability for involvement in violence and homicide. In general the results of the study are consistent with explanations that suggest both heavy alcohol consumption and situational factors play a major role in precipitating alcohol-related violence (e.g. Brookman, 2005; Graham et al., 2006; Dearden & Payne, 2009; Pridemore & Eckhardt, 2008; Wells et al., 2005).

One of the major limitations of the study concerns the representativeness of the sample analysed. BAC results were not available for 267 (45.3%) of the 590 adolescent homicide cases for the period 2001 to 2009 and, therefore, the results should be viewed within this limitation. Another shortcoming of the study was the limited number of homicide cases for which information on the offender and precipitating circumstances was available which may have contributed to the fewer statistically significant results in the bivariate analyses of these variables, and also prevented the inclusion of these variables in the multivariate analysis. Moreover, the study only examined alcohol consumption by the victim, and thus only addressed part of the overall role that alcohol plays in homicide. Further research is required that examines alcohol use among both the victim and offender in order to improve our understanding of alcohol-related homicides among adolescents. Finally, NIMSS provides information only on BAC toxicology results and therefore it was not possible to examine the role of substances other than alcohol. Other substances, for example, marijuana and cocaine, are also used by adolescents in South Africa (Flisher, Parry, Evans, Muller, & Lombard, 2003; Reddy et al., 2010; Taylor, Jinabhai, Naidoo, Kleinschmidt, & Dlamini, 2003) and have been associated with homicide in international studies (Darke & Duflou, 2008; Darke, 2010) and, therefore, it would be important to consider the role played by these substances in order to comprehensively address the problem of adolescent homicides in the country.

CONCLUSION

The current study sought to extend the research on adolescent homicide in Study I and Study II of the thesis by examining alcohol use among adolescent homicide victims, and the role played by victim, event, and offender characteristics. The study found that the vast majority (88.2%) of adolescent victims who had consumed alcohol were intoxicated at the time of the homicide. Moreover, the study found that a positive BAC among adolescent homicide victims was significantly more prevalent in male and older adolescent victims; in victims killed with sharp instruments, in public places, over the weekends, and during the evenings; and in victims killed by a friend/acquaintance. Accordingly, and in line with the overall aims of the thesis, the current study provides important information on the individual and situational risk factors that should be targeted for the prevention of alcohol-related homicide among adolescents which will ultimately lead to a reduction of homicides among adolescents in general. However, the causes of violence are complex and result from the interplay of factors at various levels, including the individual, relationship or situational, community, and societal levels. While studies I to III address the individual and situational levels of adolescent homicides, Study IV focuses on the community context of adolescent homicide.

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STUDY IV

NEIGHBOURHOOD STRUCTURE AND ADOLESCENT HOMICIDE VICTIMISATION IN JOHANNESBURG, SOUTH AFRICA

The socioeconomic structural conditions of communities in which young South Africans live may be an important contributor to the high levels of violence among young people in the country. However, little research exists on the influence of local area structural characteristics on levels of violence and homicide in South Africa. This study explores the relationship between neighbourhood structural context and adolescent (15 to 19 years) male and female homicide victimisation in Johannesburg between 2001 and 2009. Specifically, the study examined whether differences in neighbourhood characteristics such as economic disadvantage, family structure, housing density, residential mobility, and racial composition were related to levels of adolescent male and female homicides. The relationship was examined using negative binomial regression models, adjusted for spatial auto-correlation. The results show that neighbourhood concentrated disadvantage was associated with heightened levels of male and female adolescent homicide, while the prevalence of female-headed households was associated with lower levels of male and female adolescent homicide. Neighbourhoods characterised by greater levels of a lack of parental support were also associated with higher levels of female adolescent homicide. The results can be used to develop interventions that target high-risk communities.

Key words: Homicide; adolescents; neighbourhood; South Africa; social disorganisation; structural factors; poverty

Adolescent homicide rates vary considerably across countries, with the highest rates recorded in low- and middle-income countries or countries experiencing rapid socioeconomic change (Mercy, Butchart, Farrington, & Cerda, 2002; Pinheiro, 2006). Homicide rates also vary within countries, with urban environments such as cities having higher homicide rates than less densely populated areas (United Nations Office on Drugs and Crime [UNODC], 2011). Even within cities, homicides tend to be more prevalent in certain areas, especially in socioeconomically disadvantaged neighbourhoods (e.g. Hannon, 2005; Kubrin, 2003; Peterson, Krivo, & Harris,

2000; Wang & Arnold, 2008). Geographic variation in homicide rates, particularly at the community or neighbourhood level, suggests that characteristics of the physical and social context in which young people live and grow-up are important explanatory factors, and may provide important targets for sustainable violence control and prevention programmes.

South Africa is characterised by stark racially based socioeconomic inequalities and residential segregation as a result of apartheid's legacy. Many South African adolescents live in conditions marked by deprivation and adversity. Most (60.5%) South African children and adolescents (<18 years) live in poverty, and over a third (35.6%) live in households where there are no employed adults (Jamie, Bray, Viviers, Lake, Pendlebury, & Smith, 2011). Rapid urbanisation, due to natural population growth, internal and cross-border migration, has also contributed to many young people living in informal settlements on the periphery of cities, characterised by poverty, inadequate housing, limited facilities, high levels of overcrowding (South African Cities Network, 2011) and poor community cohesion (Emmett, 2003). In addition, many young people attend schools that are under-resourced, and grade repetition and school dropout are significant problems (Panday, Ranchod, Ngcaweni, & Seedat, 2012). Only about a third of youth leaving school each year do so with a completed high school education (Morrow, Panday, & Richter, 2005) and consequently many young people have limited employment opportunities.

Apartheid laws and policies have also had long-lasting effects on family structure in South Africa. In particular the migrant labour system, influx control and housing constraints resulted in children and parents being separated for considerable periods of time (Amoateng, Richter, Makiwane, & Rama, 2004; Emmett, 2003). Recent estimates indicate that only a third of South African children live with both their biological parents, while around 38.6% live with the mother only, 3.2% with the father only, and 24.4% live with neither parent (Jamie et al., 2011). Separation, divorce, and high levels of death, in particular, threaten the stability of South African families (Amoateng, et al., 2004). Child-headed households have increased partly as a consequence of high adult mortality rates due to the HIV/AIDS pandemic and high levels of traffic- and violence-related deaths (Norman, Matzopoulos, Groenewald, & Bradshaw, 2007; Richter & Desmond, 2008).

In light of this background, the socioeconomic structural conditions of the communities or areas in which young South Africans live may play an important contributory role in the high levels of violence and homicide evident in the country. Therefore, while the previous studies have provided information on the incidence and epidemiology of adolescent homicides within the

city of Johannesburg (Study I), the types of situational contexts based on the combination of victim, offender, and event characteristics (Study II) and the specific victim, offender, and event characteristics associated with alcohol-related homicides (Study III) among adolescents, the current study extends this research by focusing on the structural characteristics of the neighbourhoods in which these homicides occurred. Specifically, the current study seeks to establish whether and what structural characteristics of neighbourhoods influence adolescent homicide levels within the city of Johannesburg. The city of Johannesburg is one of eight metropolitan municipalities in South Africa. It is the largest and most densely populated city and comprises the economic centre of the country. Similar to other cities in the country, violence is a particular problem in Johannesburg, with homicides consistently ranking among the top causes of nonnatural death in the city (Donson, 2008; Prinsloo, 2007). Before proceeding with the details of the study, a brief overview of the theoretical approach and empirical evidence that provide a framework for the study is presented.

Social disorganisation theory and youth violence

Social disorganisation theory originates from the work of Shaw and McKay (1969) in the city of Chicago. Specifically, Shaw and McKay (1969) demonstrated that high rates of delinquency persisted in certain areas within the city over many years, regardless of changes in population, leading them to conclude that the causes of crime are located in the structural context of communities. Socioeconomic structural features, such as low economic status, racial/ethnic heterogeneity, and residential mobility, are viewed as disrupting the social organisation processes, namely the formation of stable social relationships, networks and institutions in communities, thus contributing to social disorganisation. Social disorganisation, defined as the inability of community residents to realise common values and maintain effective social controls (Bursik, 1988; Kubrin, 2010; Sampson & Groves, 1989), in turn results in increased levels of crime and violence.

Social disorganisation within a community has significant implications for the supervision and socialisation of children and adolescents (Elliot, Wilson, Huizinga, Sampson, Elliott, & Rankin, 1996; Sampson, 1997). In communities where there are few social ties, residents lack the capacity to provide supervision and guardianship for their own children as well as for other children in the neighbourhood. Unsupervised teenage groups that the community is unable to monitor may lead to higher rates of crime and violence. For example, Sampson and Groves (1989) found that unsupervised peer groups in a community had the largest overall influence on rates of violent offending and victimisation.

Moreover, socioeconomically disadvantaged communities tend to lack the capacity to develop and maintain basic institutions that play an important role in providing community cohesion and linking residents, particularly young people, to wider social institutions (Peterson et al., 2000). Residents are socially isolated from mainstream society, reducing conventional opportunities for economic advancement and status attainment (Elliot et al., 1996; Peterson et al., 2000; Sampson, 1997). Such conditions may contribute to the emergence of subcultural value systems that legitimate or tolerate acts of crime and violence as a means of status attainment (Sampson, 1997). Increased crime and violence, in turn, engenders fear and mistrust among residents, further undermining social cohesion and a community's capacity for social control. Therefore, socially disorganised communities lack the economic and social resources required to support young people's development and to protect them from involvement in violence.

Although social disorganisation theory may be criticised for being biased by a middle class point of view that portrays poorer neighbourhoods as disorganised and lacking social cohesion, the theory allows for the examination of the structural conditions of neighbourhoods and has informed much of the research on community context and its relation to crime and violence, including homicide.

Structural covariates and homicide

Poverty and economic deprivation, family structure, population density and size, residential mobility, and racial/ethnic composition are among the key structural measures of social disorganisation that have been investigated in relation to the geographic variation in rates of violence, particularly homicide (see Pridemore, 2002; Sampson & Lauritsen, 1994).

According to social disorganisation theory, poverty and economic deprivation impede the development of informal and formal ties in a community as well as the development and maintenance of basic institutional structures that provide community cohesion, social control, and connect individuals to mainstream values and goals (Peterson et al., 2000). In their landmark study of the structural covariates of homicide, Land, McCall, and Cohen (1990) found that various measures of absolute and relative poverty (median family income, percentage of families living below the poverty line, and the Gini index of family income inequality), racial composition (percentage of black people in the population), and family structure (percentage of children not living with both parents) were highly correlated, identifying a component index which they named 'resource deprivation/affluence'. The clustering of these variables reflects the concentration of disadvantage in poorer areas along with increasing social isolation (McCall,

Land, & Parker, 2010). Resource deprivation/affluence has shown to be consistently positively associated with overall homicide rates over time and across various geographical areas (Land et al., 1990; McCall et al., 2010).

Following on Land and colleagues (1990), recent studies use principal components or an index to capture concentrated poverty or disadvantage. Although the components of these indices vary somewhat across studies, concentrated disadvantage has shown the most consistent positive significant relationship with overall homicide rates, including different types of homicide, such as, general altercation, felony, domestic, gang and drug-related homicides, across various areas within cities (Hannon, 2005; Kubrin, 2003; Mares, 2010; Wang & Arnold, 2008). Furthermore, in one of the few studies specifically focusing on youth homicide, Strom and MacDonald (2007) found that city-level increases in socioeconomic disadvantage were positively associated with increases in black and white adolescent (15 to 19 years) homicide rates.

In contrast, an intra-city analysis of violent crime in South Africa, Breetzke (2010) observed that measures of economic deprivation were not significantly associated with violent crime levels across neighbourhoods in the city of Tshwane (Pretoria) in the Gauteng province. In this study measures of deprivation included 1) an inequality index (the proportion of aggregate household income in Tshwane that is located in a suburb divided by the proportion of all city residents located in a suburb); 2) a deprivation index based on the United Nations Development Programme's parameters for deprivation in five dimensions: i) the percentage of residents living in informal housing, ii) the percentage of households with no flush toilet, iii) the percentage of households with no water supply, iv) the percentage of households with no electricity, and v) the percentage of households with no refuse removal; and 3) the unemployment rate (the percentage of unemployed persons among the population aged 15 years and older). However, Breetzke's (2010) study reported on the relationship between deprivation and all contact crimes (attempted murder, rape, assault with intent to inflict grievous bodily harm, common assault, indecent assault, aggravated robbery and other forms of robbery). Further studies are needed in South Africa to examine the role of neighbourhood disadvantage on homicide specifically.

Family disruption is considered to reduce the capacity of the community to effectively control the behaviour of residents, especially adolescents (Elliott et al., 1996; Sampson, 1997; Sampson & Groves, 1989). Single parents are likely to experience greater financial and time constraints and thus are less able to engage in community activities that promote guardianship and supervision for their own children as well as the youth in the community in general (Sampson &

Groves, 1989; Sampson, 1997). Therefore, communities characterised by family disruption lack the social networks to effectively monitor and control the activities of local youth, which ultimately leads to an increase in risk behaviours, such as truancy and alcohol use, to more serious forms of crime and violence, including homicide (Sampson & Groves, 1989). Sampson and Groves (1989) found family disruption was the largest predictor of the prevalence of unsupervised peer groups in a community, which in turn had the largest overall effect on offender-based rates of personal violence and rates of personal violence victimisation. Generally, measures of family disruption are shown to be relatively consistent in their relationship with levels of homicide across different geographic units of analysis and over time (Beaulieu & Messner, 2010; Land et al., 1990; McCall et al., 2010), including levels of violence across neighbourhoods in the city of Tshwane in South Africa (Breetzke, 2010).

Population density and overcrowding are thought to contribute to anonymity, and therefore to impede the development of social cohesion and guardianship within a community (Krivo & Peterson, 2000). Measures of population density/size are among the structural covariates that are most consistently associated with overall homicide rates across cities, metropolitan areas, and states (Land et al., 1990; McCall et al., 2010). Population and housing density also appear to account for neighbourhood variations in violent crime levels (see Sampson & Lauritsen, 1994).

From a social disorganisation perspective, residential mobility or the turnover of people in a community discourages the development of social bonds among residents and makes it difficult for residents to identify outsiders, thus contributing to increased levels of crime and violence (Bursik, 1988). However, research on residential mobility and homicide levels has yielded inconsistent results. Wang and Arnold (2008) found that community areas and neighbourhood clusters with greater residential mobility (a factor capturing the variables of percentage of residents who moved into the area within the last five years and the percentage of homes occupied by renters) had lower levels of homicide, which is contrary to social disorganisation theory. In contrast, Thompson and Gartner (2014) found that residential stability (measured as an index comprising of the percentage of residents who had not moved in the past five years and the percentage of residents who owned their own homes) was significantly negatively related to homicide levels within neighbourhoods. The different results of the aforementioned studies may, in part, be due to the somewhat different measures used to assess residential mobility. On the other hand, it is possible that residential mobility may be related to specific types of homicide rather than all homicides. For example, Kubrin (2003) found that residential mobility (the percentage of persons aged five and over who have changed residences in the past five

years) was significantly positively related to felony type homicides but not to other types of homicide (e.g. domestic and altercation).

Regarding race and ethnicity, studies on homicide have tended to focus on heterogeneity or composition. Racial and ethnic heterogeneity is thought to increase communication and cultural barriers among community residents, thus obstructing the quest to solve common problems and reach common goals (Bursik, 1988). Studies have used various measures, with some combining race and ethnicity and others using measures such as the proportion of immigrants (i.e. non-citizenship) as an indicator of ethnicity. However, studies using an index measure to capture heterogeneity have shown conflicting results with regard to homicide (Strom & MacDonald, 2007; Wang & Arnold, 2008). In contrast, studies focusing on neighbourhood racial or ethnic composition, for example, the percentage of black or Hispanic residents, have found a strong positive relationship between this measure and rates of homicide and violent crime (Johnson & Chanchalat, 2003; Jones-Webb & Wall, 2008; Krivo & Peterson, 1996; Krueger, Bond Huie, Rogers, & Hummer, 2004). Moreover, research suggests that the association between neighbourhood racial or ethnic composition and homicide is largely accounted for by structural conditions of concentrated economic deprivation and social isolation (Avakame, 1997; Jones-Webb & Wall, 2008; Krivo & Peterson, 1996; Land et al., 1990; McCall et al., 2010). Therefore, differences in violence and homicide among various racial or ethnic groups appear to be linked to residential segregation and inequality in socioeconomic conditions (Avakame, 1997; Jones-Webb & Wall, 2008; Phillips, 2002; Vélez, Krivo, & Peterson, 2003).

In general, the empirical evidence shows support for social disorganisation structural features and suggests that these contextual characteristics provide important targets for the reduction and control of violence within communities. However, most of the evidence is based on research from high-income countries, particularly the United States. Therefore, area-based studies are also needed to determine the relevance of social disorganisation theory in low- to middle-income countries, such as South Africa, where homicide rates are much higher, and differences in the socioeconomic and demographic composition of communities need to be considered. The present study explored the relationship between neighbourhood structure and adolescent (15 to 19 years) male and female homicide victimisation in Johannesburg between 2001 and 2009. Specifically, the study examined whether differences in neighbourhood characteristics such as economic disadvantage, family structure, population density, residential mobility, and racial and ethnic composition were related to levels of adolescent male and female homicides. Hence, the study also aimed to discuss the results within social disorganisation theory.

METHOD

Unit of analysis

The unit of analysis for this study consisted of residential areas of the city of Johannesburg based on “subplace” names provided by South African Census data for 2001, which was the most recent data available at the time of the study. In the 2001 census, Johannesburg consisted of 684 demarcated subplaces. Of these areas, 132 areas that were in smaller zones were joined to comprise 40 residential areas because the homicide data lacked specificity. Another 84 were excluded from the analysis as they comprised of nature reserves, industrial parks, hospitals, universities, recreational areas, and areas with populations of less than 200. The final number of residential areas included in the analyses was 508.

Dependent variables

The dependent variables for this study were the number of male and female adolescent (15 to 19 years) homicide victims for the Johannesburg municipal area during 2001 to 2009. The number of homicides was pooled across a nine year period to add stability to the estimates and to ensure adequate homicide counts. Following the procedures advocated by Osgood (2000), the number of homicides was used rather than the rate because the numerator for the calculation of rates would have been 0 in the majority of cases with most neighbourhoods having no adolescent homicides for the selected period. In addition, the denominator would also have been relatively small, with the population of adolescents (15 to 19 years) somewhere between 200 and 2000 for most of the neighbourhoods, hence rates were likely to be unstable. The dependent variables were drawn from the NIMSS (see Introduction p.9 for a description of NIMSS).

Explanatory variables

Based on previous studies of homicide and the availability of data for the South African context, 14 explanatory variables were compiled from the 2001 Census information (Statistics South Africa, 2003) to reflect neighbourhood-level variations in economic and resource deprivation, family disruption, population density and housing, residential mobility, and racial/ethnic composition – structural conditions pertaining to social disorganisation theory.

The measures of neighbourhood economic deprivation included in the study were poverty (the percentage of households earning less than R9600 annually), unemployment (the percentage of persons unemployed in the 15 to 64 year age group), and low educational attainment (the percentage of residents who have not completed secondary school), which are similar to the

measures used in other homicide studies (e.g. Kubrin, 2003; Land et al., 1990; Strom & MacDonald, 2007; Wang & Arnold, 2008). An additional measure of educational attendance, namely percentage of 15 to 24 year olds who are currently enrolled in school or any form of tertiary education, was included to capture the current situation of young people's access to education in South Africa. Moreover, research suggests that secondary school dropout levels are linked to the incidence of homicide (Shihadeh & Flynn, 1996).

Four indicators of family disruption were included in this study. The first two, namely percentage of female-headed households and percentage of persons divorced aged 15 and older, have been used in prior research (e.g. Strom & MacDonald, 2007; Wang & Arnold, 2008). The last two measures were included as they are relevant to the South African situation, where a large proportion of children live in households without either parent (Jamie et al., 2011), with some children also living in child-headed households (Richter & Desmond, 2008). However, since the South African census data does not provide information on the number of children living with both, one or neither parent/s, and only provides information on household members' relationship to the head of the household, the percentage of 0 to 19 year olds who are children of the household head was used in this study, as this measure provides an indication of the proportion of children who are living with at least one parent. Child-headed households were measured as the percentage of households with the head aged less than 20 years.

Since information on the land area size was not available, the number of residents per number of household rooms (excluding kitchen and bathroom) was used as a measure of household density within each neighbourhood in the study. Furthermore, informal settlements within South Africa's cities typically consist of temporary dwellings with limited access to water, electricity, sanitation and refuse removal. Therefore, the percentage of households living in informal dwellings was included in the study as a measure of poor neighbourhood housing conditions.

As in previous studies, residential mobility was measured by population turnover (percentage of persons ages five and over who changed residences in the past five years) and renter-occupied dwellings (percentage of rented dwellings) (e.g. Kubrin, 2003; Wang & Arnold, 2008). Finally, similar to other studies, the percentage of black individuals was used as a measure of racial composition and percentage of non-citizens in the population was used to capture ethnic composition (e.g. Kubrin, 2003; Land et al., 1990; Wang & Arnold, 2008). Table 12 provides a description of the 14 variables and the minimum, maximum and mean values of each for the 508 suburbs incorporated in this study.

Table 12. Descriptions of the 14 explanatory variables used in the factor analysis, with mean value and range calculated for each of the 508 residential areas of Johannesburg

Variable	Description	Mean	Min	Max
Poverty and deprivation				
1. Low household income	Percentage of households earning less than R9600 annually	22.21	0.00	88.00
2. Unemployment	Percentage of persons unemployed in 15 to 64 year age group	13.57	0.00	58.30
3. Low educational attainment	Percentage of persons with less than Grade 12 aged 25 years and older	49.13	11.50	94.12
4. Educational attendance	Percentage of persons aged 15 to 24 years attending educational institution	78.02	15.00	100.0
Family disruption				
5. Female-headed household	Percentage of female-headed households	37.12	0.00	71.43
6. Divorced	Percentage of persons divorced aged 15 and older	5.14	0.00	14.96
7. Child-headed household	Percentage of households with head aged less than 20 years	0.86	0.00	20.68
8. Child of head of household	Percentage of children (0 to 19 years) who are the child of the head of the household	80.81	22.06	100.00
Population density and housing				
9. Household density	The number of residents per the number of household rooms (excluding kitchens and bathrooms)	.79	.32	3.81
10. Informal dwelling	Percentage of households living in informal dwellings	9.50	0.00	97.79
Residential mobility				
11. Population turnover	Percentage of persons ages five and over who have changed residences in the past five years	29.8	1.20	82.17
12. Rented dwellings	Percentage of renter-occupied dwellings	45.51	0.96	100.00
Racial/ethnic composition				
13. Black residents	Percentage of black residents	45.90	1.49	100.0
14. Non-citizenship	Percentage non-South African citizens	4.66	0.00	31.13

Measures of socioeconomic structural conditions tend to be highly correlated, posing the risk of multicollinearity in the statistical modelling process, which can lead to unreliable and unstable estimates of regression coefficients, making conclusions about the relative contribution of each explanatory variable problematic. Therefore, following the approach recommended by Land and colleagues (1990) to reduce potential multicollinearity, a factor analysis was conducted to consolidate the explanatory variables into a smaller number of factors. Specifically, the prevalence of the 14 contextual variables in all residential areas (n=508) were entered into an exploratory factor analysis (principal component), using orthogonal rotation (varimax with Kaiser normalisation). A four factor model was derived that explained 73.1% of the cumulative variance (see Table 13). These four neighbourhood factors comprised the explanatory variables in the study.

Table 13. Pattern matrix from factor analysis with factor loadings for explanatory variables

Variables	Factor 1	Factor 2	Factor 3	Factor 4
Rented dwellings	.802	.107	.135	.042
Low educational attainment	.779	.264	-.380	-.106
Low household income	.775	.383	-.293	.001
Informal dwellings	.769	.051	-.152	-.115
Unemployment	.763	.314	-.419	-.097
Educational attendance	-.762	.028	-.089	.141
Household density	.679	.432	-.207	-.159
Black residents	.610	.487	-.191	-.275
Child-headed household	.066	.857	.161	-.033
Child of head of household	-.348	-.675	.325	-.158
Non-citizenship	-.079	.045	.808	.053
Population turnover	-.099	-.091	.788	-.055
Female-headed household	-.057	.121	-.082	.911
Divorced	-.363	-.462	.177	.616

Note: Numbers in bold represent the highest loading of each variable on one factor.

Factor 1 accounted for 45.8% of the variance between the neighbourhood factors, consisting of the percentage rented dwellings, percentage low educational attainment, percentage low household income, percentage informal dwellings, percentage unemployed, percentage educational attendance, ratio household density, and percentage black residents. As these measures relate to conditions of poverty and deprivation, factor 1 was labelled “concentrated disadvantage”. The variables captured in this factor are similar to prior studies that show loadings of economic measures and percentage black in the population (Kubrin, 2003; Land et al., 1990) but differ from studies in that female-headed households did not load on this factor (Strom & MacDonald, 2007; Wang & Arnold, 2008).

Factor 2 accounted for 10.9% of the variance among the factors. Labelled “lack of parental support”, it comprised of the percentage child-headed households and percentage of 0 to 19 year-olds who were a child of the household head. Factor 3, labelled “residential mobility”, accounted for 8.8% of the variance and consisted of the percentage non-South African citizens and percentage population turnover. Factor 4, “female-headed households”, accounted for 7.7% of the variance and consisted of the percentage female-headed households and percentage divorced persons.

Regression analysis adjusting for spatial autocorrelation

Two negative binomial regression models were fitted to examine the relationship between neighbourhood characteristics and adolescent male and female homicides, respectively. As the dependent variables consisted of high zero and low homicide counts, a negative binomial

regression model was used to account for the highly skewed and over-dispersed count-level dependent variables (see Osgood, 2000).

As neighbourhoods tend to be spatially dependent, due to processes such as diffusion and exposure, the level of homicide in a neighbourhood is likely to influence the levels of homicide in surrounding neighbourhoods (Morenoff, Sampson, & Raudenbush, 2001), hence recent studies on homicide adjust for spatial autocorrelation (e.g. Kubrin, 2003; Mares, 2010; Thompson & Gartner, 2014). From a statistical standpoint, when spatial processes operate and are not accounted for, multivariate regression analysis may lead to false indications of significance, biased parameter estimates, and misleading suggestions of fit (Messner, Anselin, Baller, Hawkins, Deane, & Tolnay, 1999). A base map shape file for all the neighbourhoods in Johannesburg (based on the Municipal Demarcation Board City of Johannesburg Metropolitan Municipality map, June 2009) and a data table consisting of the number of homicides for each of the neighbourhoods were joined in GeoDa^{TM2} to create spatially lagged variables and test for spatial autocorrelation (see Anselin, 2005). A spatial weights matrix was constructed based on rook contiguity (neighbours were defined as sharing a common border) followed by the computation of spatially lagged variables for each of the dependent variables. Moran's I coefficient revealed a significant spatial association ($p < .01$), therefore spatial lag variables were created based on the predicted values of the dependent variables (see Kubrin, 2003) and incorporated into each of the regression models to control for spatial autocorrelation.

Furthermore, because the analysis used homicide counts, it was necessary to control for the variation in the size of the population at risk across neighbourhoods. This was accomplished by adding the natural logarithm of the population at risk as an offset variable with a fixed coefficient of one to the regression models. This strategy standardises the model by converting the counts of homicide into the equivalent of a rate for each neighbourhood (Osgood, 2000). The final regression model for adolescent male homicides consisted of the four neighbourhood factors, the spatial control, and the natural logarithm of the population at risk (i.e. adolescent males aged between 15 and 19 years) as an offset. For adolescent female homicides, the final regression model consisted of the four neighbourhood factors, the spatial control, and the natural logarithm of the population of adolescent females aged between 15 and 19 years as an offset. All analyses were conducted using IBM SPSS Statistics for Windows, Version 20.0.

² GeoDa is a software package that provides several statistical applications for spatial data analysis, and can be downloaded from <https://geodacenter.asu.edu/>.

RESULTS

Figure 10 illustrates the distribution of adolescent homicides across neighbourhoods over the nine year study period. A total of 590 adolescent (between 15 and 19 years) homicides occurred in Johannesburg during the period 2001 to 2009. Of these homicides, 34 (5.8%) were excluded from the analysis because of incomplete information on the suburb where the homicide occurred. Therefore, the regression models were based on a total of 457 male adolescent homicides and 99 female adolescent homicides respectively (Table 14).

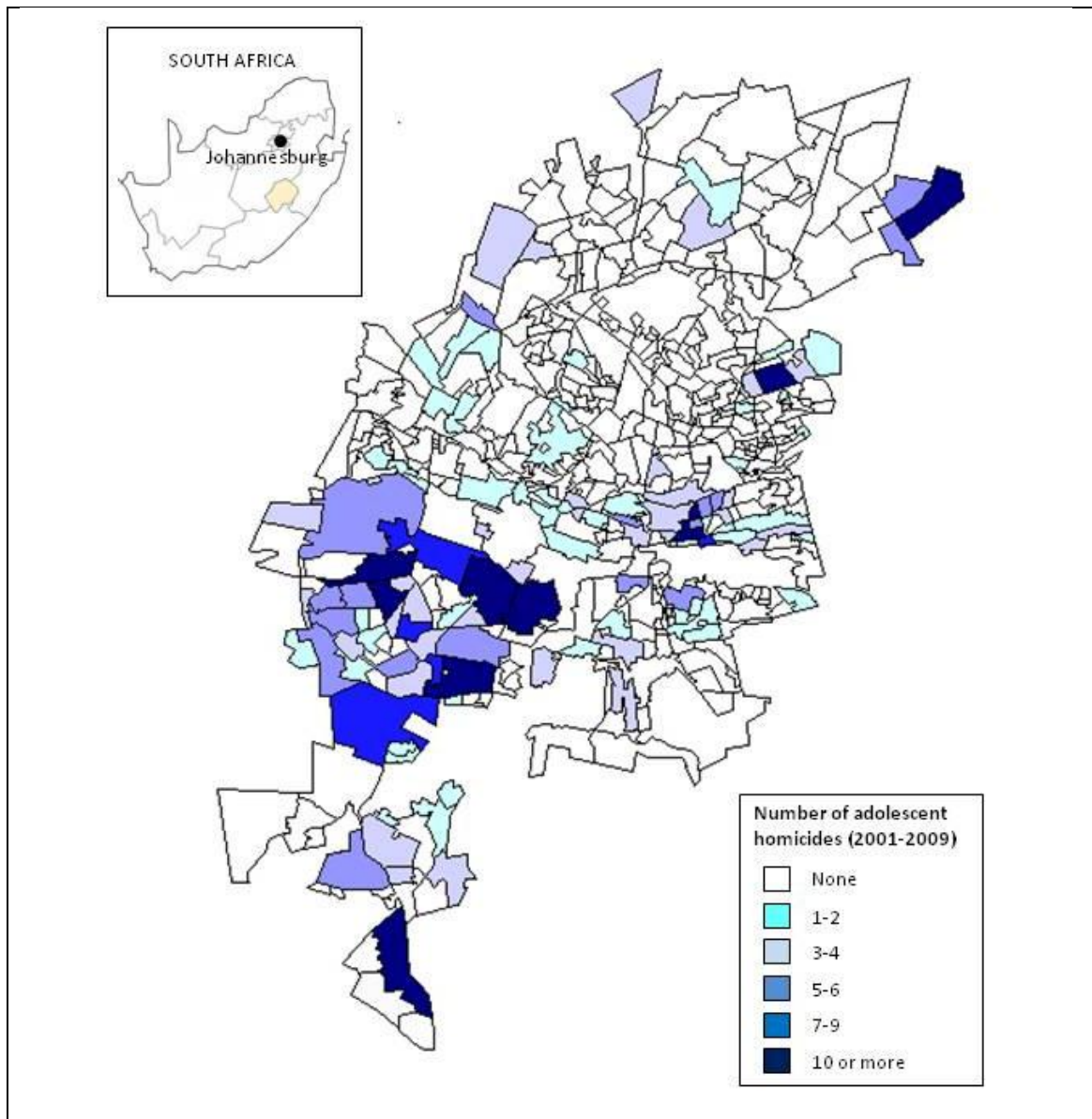


Figure 10. Neighbourhoods of the city of Johannesburg by number of homicides (2001-2009)

Table 14. Adolescent homicides per neighbourhood in Johannesburg 2001-2009 (N=508)

	Total	Mean	Standard Deviation
All homicides	556	1.09	3.954
Male homicides	457	.90	3.411
Female homicides	99	.19	.690

Table 15 presents the standardised coefficients and the standard errors for the negative binomial regression models explaining male and female adolescent homicides respectively in 508 Johannesburg neighbourhoods. As shown in the first column of Table 15, two of the four neighbourhood factors, concentrated disadvantage and female-headed households, were significantly related to male adolescent levels of homicide. Concentrated disadvantage, in particular, had a profound positive impact ($\beta = .595$, $p < .001$), with one unit change in concentrated disadvantage leading to an 81% increase in adolescent male homicide (following the method used by Kubrin [2003] percentage change = $100 \times [\exp (.595) - 1]$), while holding all the other variables in the model constant. Female-headed households, on the other hand, was significantly negatively related to male adolescent homicides ($\beta = -.321$, $p < .01$), with a unit increase in this factor being associated with a 27% decrease in these homicides, when all the other variables in the model are held constant. Neighbourhood factors, namely lack of parental support and residential mobility, and the prevalence of homicide in surrounding neighbourhoods were not significant in explaining male adolescent homicide.

Three of the neighbourhood factors were significantly related to female adolescent homicide. Concentrated disadvantage and lack of parental support were significantly positively associated with total homicide levels ($\beta = .344$, $p < .05$ and $\beta = .418$, $p < .01$), while female-headed households were significantly negatively associated with total homicide levels ($\beta = -.504$, $p < .01$). One unit change in concentrated disadvantage in the neighbourhood leads to a 41% increase in female adolescent homicides when holding other variables constant. Lack of parental support, in particular, has a severe effect on the homicide levels for female adolescents with one unit change in this factor contributing to a 52% increase in homicide, net of the other variables. In contrast, one unit change in female-headed households within the neighbourhood leads to a 40% decrease in the levels of female adolescent homicide, holding all else constant. Neighbourhood residential mobility and levels of homicide in adjacent neighbourhoods were not significantly associated with adolescent female homicide.

Table 15. Negative binomial regression results for neighbourhood characteristics on adolescent homicide (Johannesburg, 2001-2009)

Variable	Male Homicide		Female Homicide	
	B	SE	β	SE
Concentrated disadvantage	.595***	.0930	.344*	.1412
Lack of parental support	.196	.1012	.418**	.1204
Residential mobility	.062	.0910	-.130	.1482
Female-headed households	-.321**	.1112	-.504**	.1763
Spatial lag	-.019	.0345	-.325	.2604
Intercept (constant)	-5.913***	.1248	-.7.475***	.2244
Likelihood Ratio Chi-Square	63.027***		18.794**	

*=p<0.05, **= p<0.01, ***p<0.001

Overall, the results of the two regression models for male and female adolescent homicide were similar with the exception of lack of parental support which was only significantly associated with female homicide. Concentrated disadvantage was significantly positively associated with both male and female adolescent homicide, although its impact is greater for male homicide. In addition, the level of female-headed households in a neighbourhood was significantly associated with a reduction in both male and female adolescent homicide, with the effect being stronger for female homicides. Residential mobility and homicides in surrounding neighbourhoods were not significantly related to either male or female adolescent homicides.

DISCUSSION

This study examined the relationship between neighbourhood structural context and adolescent male and female homicide victimisation in Johannesburg between 2001 and 2009. The study revealed that neighbourhood concentrated disadvantage was associated with increases in adolescent male and female adolescent homicide, while the level of female-headed households is associated with reductions in adolescent male and female adolescent homicide. Furthermore, lack of parental support also contributes to increased levels of adolescent female homicide. Overall, the results underscore the importance of neighbourhood structural context, specifically concentrated disadvantage and family structure, in understanding levels of adolescent homicide and hence indicate that social disorganisation theory partly explains adolescent homicide in South Africa.

In support of social disorganisation theory, and consistent with prior research, concentrated disadvantage had a significant positive association with both male and female adolescent homicide (Kubrin, 2003; Land, et al., 1990; McCall et al., 2010; Strom & MacDonald, 2007;

Wang & Arnold, 2008). The loading of percentage black residents on the factor of concentrated disadvantage also suggests that the racially-based socioeconomic inequalities and residential segregation that continue to impact the lives of many South Africans, also contribute to the high levels of violence and homicide among young people.

Although the study found that family disruption with respect to female-headed households was significantly related to adolescent male and female homicides, the association was negative. Johannesburg neighbourhoods with higher concentrations of female-headed households have lower levels of adolescent homicide. This finding is contrary to social disorganisation theory which assumes that the financial and time constraints on single parents limit their ability to participate in community activities that build social bonds between residents that promote guardianship and supervision of local youth, which in turn contributes to increases in crime and violence (Sampson & Groves, 1989; Sampson, 1997). In this regard, several studies on homicide have shown that the measures of family disruption, namely female-headed households and divorce, are highly correlated with economic disadvantage (Land et al., 1990; Strom & MacDonald, 2007; Wang & Arnold, 2008). However, in the current study female-headed households and divorce did not correlate with measures of poverty and disadvantage. More specifically this study suggests that, after adjusting for a neighbourhood's economic context, high concentrations of female-headed households serve as a collective buffer against adolescent homicides. One possible explanation for this relationship may be that, in neighbourhoods with higher concentrations of female-headed households, ideologies of male dominance and control which have been linked to the high levels of violence in South Africa (Seedat, van Niekerk, Jewkes, Suffla, & Ratele, 2009), may be less prevalent. Nevertheless, caution should be exercised when interpreting these results as the measure did not include households with children.

Consistent with social disorganisation theory, the second factor related to family disruption in the current study, namely lack of parental support, is significantly positively related to adolescent homicides, but only for females. In neighbourhoods characterised by a concentration of children in households that lack the economic and emotional support and guidance provided by parents, children may be especially isolated from community residents and mainstream society which is likely to increase their vulnerability to violence. However, further research is required to understand the specific composition of such households and the mechanisms by which they contribute to levels of violence victimisation in the community, especially among female adolescents.

Lastly, residential mobility which is also a basic concept of social disorganisation theory was not significantly related to either adolescent male or female homicides. In this study residential mobility consisted of measures of population turnover and non-citizenship. Breetzke (2010) found that immigration, which included a measure on African non-citizenship, was significantly positively related to levels of violent crime across neighbourhoods in the city of Tshwane (Pretoria). It may be these measures are less relevant for adolescents than adults who are likely to be more mobile.

One of the major limitations of the study was its cross-sectional approach, and therefore the analysis does not account for the changes in neighbourhood structure over time. Over this study period the city of Johannesburg has experienced significant growth due to factors such as urbanisation, natural population growth, and migration, which will have contributed to changes in neighbourhood-level characteristics and boundaries. There is also a considerable lag between the neighbourhood characteristics based on census data for 2001 and the homicide data pooled over a nine year period from 2001 to 2009, and it is unclear how this may have affected the results. Therefore, longitudinal studies are required in order to capture the changes in community structure in Johannesburg and their influence on homicide levels, as well as to establish the structural features that persist over time. Another limitation of the study is that several homicide cases (5.8%) had to be excluded from the analyses because of incomplete information on the suburb where homicide occurred. In addition, the joining of some neighbourhood areas in the study, due to the lack of specificity in the homicide data, may also have affected the results, especially with respect to spatial autocorrelation.

CONCLUSION

This study examined the relationship between neighbourhood structural context and adolescent male and female homicide victimisation in Johannesburg between 2001 and 2009. Overall, the results underscore the importance of neighbourhood structural context, specifically concentrated disadvantage and family structure, in understanding levels of adolescent homicide and can serve to inform the development of interventions that target high-risk communities. Further research is, however, required that captures the different dimensions of family structure in South Africa and an understanding of their importance in affecting neighbourhood levels of adolescent homicide. In general, more research is needed that builds upon the analysis presented in this study for the purposes of achieving a better understanding of neighbourhood structural features that contribute to high levels of adolescent homicide in South Africa.

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CONCLUSION

In this concluding chapter an attempt is made to synthesise the key results that emerged across the four studies in this thesis, and to provide a comprehensive account of the individual, situational, and community level factors associated with adolescent homicide in Johannesburg. Specifically, the results regarding the general research aims of the thesis, namely to describe the incidence and epidemiological profile, situational context, and neighbourhood structure of adolescent homicide victimisation in the city of Johannesburg are presented. This is followed by a discussion of the implications for prevention, the limitations of the investigation, and recommendations for future research.

MAIN RESULTS

Incidence and trends of adolescent homicide

The research estimates an average annual homicide rate of 23.4/100 000 for adolescents in Johannesburg during the period 2001 to 2009. Despite the fluctuating trend in the occurrence of adolescent homicide in Johannesburg, there was an overall decrease in the rate from 27.0/100000 in 2001 to 21.4/100 000 in 2009, which may be attributed to the considerable decline noted in firearm homicides over the nine year period, with the rate dropping from 18.2/100 000 in 2001 to 4.8/100 000 in 2009. This trend is consistent with the decrease in overall firearm homicides reported for the major urban areas in South Africa, especially in the city of Johannesburg (Prinsloo, 2007) and may, in part, be a consequence of the firearm amnesties implemented in South Africa between 1994 to 2005 and the new Firearm Control Act which came into effect in 2004 (Gun Control Alliance, 2006; King, Proudlock, & Michelson, 2006). In contrast to firearm homicides, homicides as a result of sharp instruments and blunt force injuries steadily increased over the study period where, in the final year of the study period, both exceeded the use of firearms.

In general, the homicide rate among adolescents in Johannesburg is high compared with global rates. For example, the rate of 39.8/100 000 reported for adolescent males is more than four times higher than the global rate (9.06/100 000) and more than double the African region rate (15.64/100 000) estimated for adolescent males of a similar age group (15 to 17 years) (Pinheiro, 2006). Likewise, although much lower than the male rate, the homicide rate of 7.9/100 000 for females is high compared to females of a similar age group (15 to 17 years) globally (3.28/100 000), and is comparable with that of the African region (9.45/100 000) which

has the highest female homicide rates among the regions (Pinheiro, 2006; United Nations Office on Drugs and Crime [UNODC], 2011).

Demographic characteristics of adolescent homicide victims and their offenders

The investigation also identified distinct patterns regarding the demographic characteristics of adolescent homicide victims and their offenders. The overwhelming majority of adolescent homicide victims were male who accounted for 82.7% of all the adolescent homicide cases in Johannesburg over the period 2001 to 2009. Similarly, of the adolescent homicide cases that were available for analysis, the overwhelming majority (89.7%) of offenders were male, with 90.5% of the male victims and 86.5% of the female victims having been killed by male offenders. The higher proportion of males as victims and offenders is consistent with both national and global patterns (Mercy, Butchart, Farrington, & Cerdá, 2002; Prinsloo, 2007; UNODC, 2011). The disproportionate involvement of males in homicides in South Africa has been associated with the prevailing constructions of masculinity which include notions of dominance, fearlessness, respect and honour, and encourage the use of violence and the engagement in high-risk behaviours such as drinking alcohol to intoxication and the carrying of weapons (Ratele, 2008; Ratele, 2010; Seedat, van Niekerk, Jewkes, Suffla, & Ratele, 2009). Adolescent males may be especially vulnerable to peer pressure to conform to dominant forms of masculinity given the importance of fitting in, acceptance and approval during this stage of development.

Furthermore, a significant proportion of offenders were also young with 21.5% under 20 years of age and another 31.3% between 20 and 29 years of age. This age pattern is consistent with the results that reveal a significant proportion of male victims were killed by friends/acquaintances and points to the influential role played by male peers in encounters of violent behaviour.

With regard to race, while the majority (88.1%) of victims were black, the homicide rates were considerably higher in black and coloured adolescents, male and female, compared with Indian and white adolescents. The results also indicated the racial profile of offenders was similar to that of the victims, with 94.8% of the cases that were analysed having involved an offender from the same race group as the victim. The results also suggest that the higher rates among black adolescents may be linked to the conditions of concentrated poverty and deprivation in which they live and point to the marked socioeconomic inequalities prevalent in the country, which are largely a legacy of the previous system of apartheid. Several international studies

have also found that differences between race groups in homicide levels result from the socioeconomic inequalities and the different living circumstances with regard to poverty, family disruption, and educational economic opportunities (Jones-Webb & Wall, 2008; Phillips, 2002; Vélez, Krivo, & Peterson, 2003).

Situational contexts and typologies of adolescent homicide

The research identified three dominant types of situational contexts associated with adolescent homicides that were mainly differentiated on the basis of motive, victim-offender relationship and victim's sex, namely: 1) male victims killed by male strangers during a crime-related event, 2) male victims killed by a male friend/acquaintance during an argument, and 3) female victims killed by a male offender. While the three types or categories differ from each other with respect to certain victim, offender, and event characteristics, they all have in common that the majority were committed by male offenders.

The first category, male victims killed by male strangers during a crime-related event, was the largest category accounting for 42.1% of the homicides that were analysed and consisted primarily of male victims killed by male strangers in a crime-related context, including homicides committed during the course of a robbery, in self-defence, and as acts of vigilantism/retribution for a crime. Consistent with the patterns of robbery-related and stranger-related homicide by other international studies (e.g. Cao, Hou, & Huang, 2008; Last & Fritzon, 2005; Pizarro, 2008) these homicides primarily involved the use of firearms and occurred in public spaces such as streets. However, the proportion of adolescents killed in these homicides appears to be much higher than reported in other countries such as the United States, for example, where stranger-related homicides among adolescents are much lower than those committed by friends/acquaintances (Coyne-Beasley, Elster, Goodman, & Ford, 2004; Finkelhor & Ormrod, 2001; Harms & Snyder, 2004). In addition, incidences of vigilantism/retribution for a crime also appear to be more unique to South African adolescents, although similar forms of violence have been reported in other countries in Africa such as Ghana (Adinkrah, 2005) and Tanzania (Ng'walali & Kitinya, 2006). While the results point to the high vulnerability of South African adolescents for violent crime victimisation, it is important to note that some of the victims in these homicides were the original perpetrators of crimes, such as robberies and muggings, and were killed in self-defence or acts of vigilantism. Therefore, as indicated by the Centre for the Study of Violence and Reconciliation (CSV) (2010), crime-related violence is associated in part with young offenders. Moreover, acts of vigilantism/retribution for a crime also point to the divide and lack of confidence between the

public and the police in the country (Burger, 2011) and illustrate the acceptability of violence as a means to resolve problems.

The second category of homicides, male victims killed by a male friend/acquaintance during an argument, accounted for 40.0% of the homicide cases analysed. This is consistent with the study conducted by the CSVV (2008) which illustrated that argument-related violence accounts for a large proportion of homicides in South Africa. Category 2 homicides appear to have much in common with the masculine form of confrontational and honour contest homicides described by Brookman (2003; 2005) and Polk (1993; 1999) that involve spontaneous confrontations in response to relatively trivial disagreements. This confrontation is typically portrayed as a display of masculinity, where a male participant perceives that his character or honour has been challenged by another male and agrees to take up the challenge, so that both are actively engaged in the confrontation. Most of these homicides occurred in public places and were committed with knives. Displays of masculine behaviour are often encouraged in contexts where males are among their peers, and may partly explain the association between argument-related homicides and the involvement of male friends/acquaintances and public places. Furthermore, the presence of weapons such as knives, which are often carried by adolescent males (Reddy, James, Sewpaul, Koopman, Funani, Sifunda, Josie, Masuka, Kambaran, & Omaidien, 2010), increase the likelihood that arguments become lethal. The results on the role of alcohol consumption and adolescent homicide, which are discussed further on, also suggest that alcohol consumption may have played a role in these homicides.

The third category consisted of female victims killed by male offenders and comprised of 17.9% of the total of adolescent homicide cases. Similar to local (Abrahams, Jewkes, Martin, Mathews, Vetten, & Lombard, 2009; Suffla, van Niekerk, & Arendse, 2008) and international patterns (e.g. Eckhardt & Pridemore, 2009; Muftic & Moreno, 2010) the majority of female homicides were committed by an offender known to the victim (65.8%), including intimate partners (34.3%), friends/acquaintances (22.9%), and family members (8.6%); occurred in the home (54.3%); and involved the use of 'other' methods such as blunt force and strangulation (48.6%). However, the results do suggest that there may be some differences in the situational contexts of homicides between adolescent and adult females. For example, just over a third (34.3%) of the adolescent females were killed by an intimate partner which is much lower than the 50% reported in a national study on femicide in South Africa (Abrahams et al., 2009). Furthermore, apart from intimate partner homicides, another 28.6% of the homicides in category 3 involved sexual assaults, which is almost twice the proportion (16.3%) of suspected rape homicides

reported nationally among female homicide victims (Abrahams, Martin, Jewkes, Mathews, Vetten, & Lombard, 2008).

Alcohol use and the situational context of alcohol-related homicide

The results also indicated that alcohol use was common (39.3%) in adolescent homicide victims in Johannesburg. Moreover, among those victims testing positive for alcohol, BAC levels were exceptionally high indicating that the majority (88.2%) were intoxicated at the time of death. This result reflects the overall pattern of heavy episodic drinking or drinking to intoxication in South Africa (Parry, 2005; Peltzer & Ramlagan, 2009), which is also prevalent among adolescents (Reddy et al., 2010).

In addition, the results also highlighted aspects of the situational contexts in which adolescents, particularly males, consume alcohol that appear to heighten their vulnerability for involvement in alcohol-related violence. Specifically, positive BAC levels among adolescent homicide victims was significantly associated with male victims, older adolescents, being killed by a sharp instrument, in a public place, over the weekend and at night, and being killed by a friend/acquaintance. In many respects the characteristics associated with alcohol-related homicides resemble those described above in category 2 type homicides involving male victims killed by a male friend/acquaintance during an argument, and suggest an association between the two types of homicide situations. Drinking is viewed by young South African men as a way of socialising and connecting with their male friends where excessive drinking is encouraged as a display of masculine behaviour (Morojele, Kachieng'a, Mokoko, Nkoko, Parry, Nkowane, Moshia, & Saxena, 2006; Setlalentoa, Pisa, Thekisho, Ryke, & Loots, 2010). In these situations, heavy alcohol consumption or intoxication may increase the potential for misunderstandings and provocative behaviour and, where displays of masculine behaviour are encouraged, the likelihood of spontaneous confrontations that quickly escalate to violent behaviour appear to be heightened (Brookman, 2005).

Furthermore, the locations in which adolescents drink alcohol also appear to be associated with an increased risk of violence. Most alcohol-related homicide occurred in public spaces such as the streets and drinking venues such as bars and shebeens. These venues appear to be characterised by a high concentration of intoxicated individuals, a permissive environment (e.g. rowdiness and underage drinking), and a lower potential for adult supervision and guardianship which have been associated with the increased occurrence of alcohol-related violence (Felson,

Savolainen, Bjarnason, Anderson, & Zohra, 2011; Graham, Bernards, Osgood, & Wells, 2006; Wells, Graham, Speechley, & Koval, 2005).

Neighbourhood structure and adolescent homicide

Finally, the abovementioned homicides occur against the backdrop of specific structural conditions which can be viewed as distal drivers of adolescent homicide. More specifically the research showed that both male and female homicide levels occurred more frequently in poor and disadvantaged neighbourhoods in Johannesburg. Conditions of disadvantage include, for example, low household income, unemployment, low educational attainment, informal housing and overcrowding. The correlation between black residents and indicators of poverty and disadvantage also reveal that these homicides are more prevalent in black neighbourhoods and suggests that the racially-based socioeconomic inequalities and residential segregation that continues to impact the lives of many South Africans, also contribute to the high levels of violence and homicide among young people.

In addition, homicides among adolescent females were also more prevalent in neighbourhoods with high levels of child-headed households or households where children are not living with at least one biological parent. Female adolescents living in these communities may be more vulnerable due to the lack of economic and emotional support provided by parents and may be more isolated from the community. While the results indicate that these communities are important targets for the prevention of adolescent homicide, further research is required to understand the mechanisms within these communities that increase adolescent female risk for homicide so that appropriate interventions may be implemented.

The research showed that both male and female adolescent homicides were significantly less prevalent in neighbourhoods marked by greater levels of female-headed households. This is contrary to previous research that shows a high correlation between female-headed households and economic disadvantage, which in turn is associated with higher levels of homicide (e.g. Land, McCall, & Cohen, 1990; Strom & MacDonald, 2007; Wang & Arnold, 2008). The research undertaken in this thesis did not reveal a relationship between female-headed households and economic disadvantage. Even so, this does not explain why female-headed households were associated with a decrease in homicide levels. One possibility may be that in neighbourhoods with higher concentrations of female-headed households, ideologies of male dominance and control which have been linked to high levels of violence in the country (Jewkes, 2002; Ratele, 2008; Seedat et al., 2009) may be less prevalent.

IMPLICATIONS FOR THE PREVENTION OF ADOLESCENT HOMICIDE

The high rates of homicide reported for adolescents in Johannesburg in this thesis highlight the urgent need for intervention. Furthermore, the range of factors associated with adolescent homicide in the investigation calls for a comprehensive approach to effectively reduce these violent deaths. In this regard, the city and its neighbourhoods have a crucial part to play in the prevention of adolescent violence (Shaw, 2012). Specifically, effective prevention of adolescent homicide requires the city to develop strategic intervention plans based on empirical evidence of the issues that include a comprehensive and integrated approach involving different sectors, and specifically address adolescents' needs. The results suggest that interventions to prevent violence are required to pay special attention to adolescents in poor and disadvantaged communities and include programmes to support their families and communities.

Supporting positive and healthy child and adolescent development

This includes the implementation of preschool enrichment programmes, social development programmes, and academic enrichment programmes. These programmes focus on building skills and competencies for healthy adjustment among children and adolescents that can protect them from becoming involved in violence and crime by enhancing a positive sense of self, fostering skills in forming and maintaining positive relationships, teaching conflict-avoidance skills, and providing broader skills to improve academic success and employment opportunities (Sethi, Hughes, Bellis, Mitis, & Racioppi, 2010; Sullivan, Farrell, Bettencourt, & Helms, 2008). Although these programmes are primarily targeted at young children, evidence suggests that social development programmes targeted at adolescents can also be effective in promoting prosocial attitudes and reducing risk behaviours such as alcohol use, weapon carrying, and involvement in violence (Amodei & Scott, 2002; Sethi et al., 2010). While it is essential that social development programmes should form part of the school curriculum, other efforts are also required to reach out to school adolescents in order to reintroduce them to formal education through initiatives such as mentoring programmes, sports and youth activities, and life skills-based education (Pineiro, 2006).

Improving the quality of schools

Schools in disadvantaged neighbourhoods in particular need to be provided with the necessary support to ensure that they are properly managed and have adequate resources so that they can provide safe places of learning, promote positive social development and equip adolescents with the requisite academic competencies and capabilities for employment (Panday, Ranchod, Ngcaweni, & Seedat, 2012; Seedat et al., 2009).

Supporting and strengthening families

Adolescents who have close relationships with their parents and whose parents provide adequate monitoring and supervision are less likely to engage in violent behaviour (Gorman-Smith, Henry, & Tolan, 2004; Hoeve, Dubas, Eichelsheim, van der Laan, Smeenk, & Gerris, 2009). Furthermore, both attachment to parents and effective parental monitoring appear to protect adolescents from the harmful effects of exposure to community violence (Gorman-Smith et al., 2004; Nash, Mujanovic, & Winfree, 2011). In this regard, parent training programmes that are designed to improve parenting skills and strengthen relationships between adolescents and their parents have shown benefits in the prevention of violence (Chu, Farruggia, Sanders, & Ralph, 2012; Haggerty, McGlynn-Wright, & Klima, 2013). One example of such a programme that may be adapted for local use is the “Parents who care” programme implemented in the United States (Haggerty, Skinner, MacKenzie, & Catalano, 2007). The intervention consists of seven sessions and is based on the social development model, featuring activities designed to provide adolescents with the skills and opportunities to contribute to their families, and increase parental monitoring, reduce harsh parenting, and to promote bonding (Haggerty et al., 2013; Haggerty et al., 2007). In a two-year follow-up study, the programme demonstrated reductions in adolescent risk behaviours such as the initiation of alcohol and drugs, as well as a reduction in the frequency of violent behaviours (Haggerty et al., 2007).

However, while parent training may have benefits in improving the relationships between adolescents and their parents, many adolescents in South Africa do not live with their biological parents and some live in child-headed households. Therefore such programmes need to account for these different family situations. Attention also needs to be given to those neighbourhoods in the city with higher concentrations of child-headed households and children not living with their parents (this may include children living on the streets). The results in Study IV revealed that such neighbourhoods were associated with higher levels of female adolescent homicides. Children living in these circumstances may lack the economic and emotional support and guidance provided by parents, and may be especially isolated from community residents and mainstream society which could increase their vulnerability for violence. Although the South African Children’s Act proposes that child-headed households should be supported by an adult mentor, research suggests that unless adults with the appropriate skills and motivation are selected to carry out this task it is not likely to be in the services of the child (van Dijk & van Driel, 2009). Further research is required to understand the specific needs of these children in order to develop and implement appropriate interventions.

Building protective communities

Building protective communities would include initiatives that develop a community's capacity to engage in violence prevention. Specifically programmes that support the development of informal social control and social capital, for example, by teaching residents consensus organising strategies for building relationships with other residents and external stakeholders, helping residents identify and establish community norms that support pro-social behaviour and mutual trust, and providing residents with skills to enhance their self-efficacy and ability to directly intervene in inappropriate neighbourhood behaviours in a respectful and supportive manner, may increase their potential to engage in violence prevention (Ohmer, Warner, & Beck, 2010). Developing informal social control and social capital has been shown to reduce crime and violence in low-income neighbourhoods (Morenoff, Sampson, & Raudenbush, 2001; Sampson, Raudenbush, & Earls, 1997).

While social control and collective efficacy are important, other strategies in the form of policing and community development are also required to make communities more protective (Sabol, Coulton, & Korbin, 2004). In particular, a policing strategy needs to be implemented that specifically addresses the types of crime such as robberies, muggings, and acts of vigilantism that contribute to homicide in poor communities. Crime prevention in South Africa has primarily focused on dealing with the types of crimes that are prevalent in middle-class and affluent areas, which are different to those in low-income communities (CSV, 2010; Silber & Geffen, 2009). Furthermore, attention also needs to be paid to improving relations between the police and community, and this may also assist in the reduction of homicides related to acts of community vigilantism.

Community development projects to improve living conditions, such as housing and basic infrastructures, in disadvantaged neighbourhoods, particularly in informal settlements, also need to be implemented. In particular, the upgrading of the physical environment, including improved lighting, can reduce opportunities for crime and thus lead to a decrease in adolescent homicides. Developing businesses in economically disadvantaged areas may also have benefits for violence prevention by providing adolescents and other residents with opportunities for legitimate work and attachments to mainstream social institutions, while the increased economic activity may increase social interactions among residents and strengthen social institutions (Sabol et al., 2004).

Reducing access to weapons

Despite the decline noted in firearm homicides over the period of investigation, firearms were the leading cause of male and female homicides, and were especially prevalent in the homicides that occurred in crime-related situations. Although reformed gun-control legislation and firearm amnesties have been implemented in South Africa (Gun Control Alliance, 2006), further initiatives need to be implemented which could include regulations of firearm use that hold individuals more accountable for the loss of firearms and schemes to buy back firearms (Seedat et al., 2009). Apart from firearms, strategies are also required to reduce young people's access to other weapons, especially sharp instruments such as knives. In particular, the study showed that the use of sharp instruments increased over the study period, and were especially prevalent in homicides involving male friends/acquaintances, arguments, and alcohol use. Legislation prohibiting the carrying of knives in public places and the sale of drinks in non-glass containers in entertainment venues such as bars and night clubs could be useful in reducing some of the knife-related homicides. However, a substantial proportion of these homicides also occurred in the streets and in homes, and controlling young people's access to sharp instruments in these locations is far more difficult. In this regard, long-term strategies that focus on reducing the need for young people, especially adolescent males, to carry weapons are also important for a comprehensive approach to adolescent homicide reduction.

Reducing access to alcohol and drugs

The South African National Drug Master Plan 2013-2017 to reduce substance abuse and the related harm includes a number of promising initiatives such as increasing alcohol taxation, restrictions on alcohol advertising, and changing the minimum legal drinking age from 18 to 21 years of age which have been effective elsewhere in reducing alcohol consumption (Kelly-Weeder, Phillips, & Rounseville, 2011; Parry, Burnhams, & London, 2012; Wagenaar, Salois, & Komro, 2009) and could contribute to the reduction in alcohol-related violence and homicide. These interventions should be accompanied by a community-based approach that aims to educate residents about the risks of alcohol and the new laws to be implemented in order to gain their support. Other community engagement initiatives suggested by Seedat and colleagues (2009), such as taking action against unlicensed liquor outlets, those contravening regulations, and those operating near schools, could help to reduce alcohol-related violence among adolescents. In addition, as revealed in the study, a substantial proportion of alcohol-related homicides occurred in the street, over the weekend and at night. Therefore, initiatives involving community members and the police to provide improved monitoring and supervision over these risky periods could help reduce incidents of fatal violence. More research should also be

undertaken in order to understand the contribution of illicit drug use and violence among adolescents, particularly homicide.

Addressing issues of masculinity and gender violence

The much higher proportion of adolescent male involvement in homicides indicates that interventions with male youth are essential, and should include initiatives to address social norms regarding masculine behaviour, such as the carrying of weapons, the use of alcohol and violence, and notions of male domination. Such initiatives should be included in life-skills based education or social development programmes implemented in both primary and secondary schools and should form part of the school curriculum in South Africa. Life skills-based education also needs to be directed at developing anger management, conflict resolution, and negotiating skills. These initiatives are especially important for the reduction of male-on-male homicides involving arguments between friends/acquaintances and alcohol-related homicides. As part of a comprehensive approach, life skills-based education can be effective in reducing violence (Pinherio, 2006). Interventions also need to address the experiences of young men living in conditions of poverty and socioeconomic inequality which may limit opportunities for achieving successful masculinity and thus foster violence and crime (Ratele, 2008; 2010).

Life skills-based education can be useful for dealing with issues of dating and gender violence, and should form part of a comprehensive plan to reduce female adolescent homicides. For example, trials of the Safe Dates programme in the United States and the Youth Relationship Project in Canada, which also address dating violence, have reported positive results (Foshee, Bauman, Arriaga, Helms, Koch, & Linder, 1998). It is important that programmes seek to work directly with men and boys such as the Stepping Stones programme in Africa and Asia which is a life-skills training programme that addresses gender-based violence, relationship skills, assertiveness training and communication about HIV and has shown to be effective in reducing men's violence in intimate relationships (Jewkes, Nduna, Levin, Jama, Dunkle, Puren, & Duwury, 2008).

Strengthening policy responses

A range of policies have been developed in South Africa to deal with violence including, for example, the Children's Act No. 28 of 2005, the Domestic Violence Act No. 116 of 1998, the Sexual Offences Act No. 32 of 2007, and the Victim Empowerment Programme. The policy framework, however, has focused on criminal justice measures and services for victims and

needs to be expanded to include a focus on public health contributions and primary prevention (Seedat et al., 2009; van Niekerk et al., forthcoming). Furthermore, vulnerability to violence is associated with women and children, with little attention being paid to male and adolescent vulnerability (van Niekerk, Tonsing, Jacobs, & Ratele, forthcoming). Furthermore, despite the range of policies that have been developed greater effort and support are required to ensure they are put into practice, including an increase in the awareness of policies among government staff, other relevant stakeholders and the public; better coordination and collaboration; allocation of resources and skills; and improved monitoring and evaluation (Nel & van Wyk, 2013).

LIMITATIONS OF THE STUDIES

Missing data is one of the major limitations that could have introduced bias into the results of various studies in this thesis. In Study II, in particular, 45.2% of the total homicide cases (n=451) recorded by the NIMSS had to be excluded from the study because they could not be followed-up via police case dockets. Although the percentage of cases that could not be traced differs, other South Africa studies on homicide have encountered similar difficulties (e.g. Abrahams et al., 2009). Furthermore, of the police case records accessed, information on the offender and precipitating circumstances of the homicide were only available in 78.9% of the cases – a problem also identified in another South African study investigating the circumstances of homicide in South Africa (CSV, 2008). While it is unclear how this missing information might have influenced the situational relationships examined in the thesis, this prevented further analysis of the association between neighbourhood socio-structural characteristics and different types of situational contexts of homicide. In this respect, several homicide cases (5.8%) also had to be excluded from the analyses on neighbourhood structure and adolescent homicide because of incomplete information on the suburb where the homicide occurred, which may also have impacted on the results in Study IV. The problems with missing cases and information in this thesis clearly highlight the need for improved management and integration of data that is currently part of the medico-legal process in the country.

Other limitations relate to the cross-sectional design of the studies, in particular the study on neighbourhood structure and adolescent homicide presented in Study IV. Specifically, over the nine year study period the city of Johannesburg has experienced significant growth due to factors such as urbanisation, natural population growth, and migration, which have contributed to changes in neighbourhood-level characteristics and boundaries that were not taken into account in the analysis. In addition, the study relied on census data which are only collected once every ten years in South Africa. Consequently, there is also a considerable time lag

between the neighbourhood characteristics based on census data for 2001 and the homicide data pooled over the period from 2001 to 2009 which may have affected the results of the study. Furthermore, the cross-sectional design of the study also precludes the possibility of making causal inferences regarding neighbourhood factors and homicide. For example, due to the possibility of reverse causal effects, it is likely that homicide levels have an effect on economic disadvantage and other structural factors within an area (see Kubrin, 2003).

Finally, the results of the current study are limited in their generalisability to other South African cities. Studies show that the incidence and characteristics of homicide vary quite considerably across South African cities (Burrows, Swart, & Laflamme, 2009; Prinsloo, 2007), and therefore the situational contexts of adolescent homicides found in this study may be different from those adolescent homicides that occur in other cities in South Africa. For example, the issue of gang-related and drug-related homicides may be more relevant to the city of Cape Town. Similarly, the structural characteristics of neighbourhoods and the association with homicide levels are also likely to differ for specific cities in the country.

DIRECTION FOR FUTURE RESEARCH

Future studies should more thoroughly investigate the situational contexts of adolescent homicide identified in this thesis. The three types of situational contexts identified in Study II are quite broad and comprise of multiple subtypes. For example, the category consisting of female homicide victims killed by male offenders includes both intimate partner homicides and sexual assault homicides. Research in South Africa suggests that the situational context of intimate partner homicide differ from that of sexual assault homicides which are more likely to be perpetrated by strangers (Abrahams et al., 2008) and thus require different strategies for prevention. Similarly, the category comprising of male victims killed by male friends/acquaintances predominantly as the result of escalating disputes also includes homicides motivated by revenge for a previous act. The situational characteristics and dynamics of argument-related and revenge-related homicides are also quite different with the former more likely to involve spontaneous acts and the latter to be more planned and premeditated (Brookman, 2003). Furthermore, studies that focus on the interactions between victim and offender could also be useful in order to gain a better understanding of the factors and processes that cause arguments or confrontations between male friends/acquaintances to escalate and become lethal.

Further research is also needed to comprehend more fully the association between neighbourhood structural features and adolescent homicide. Specifically, future studies are required to corroborate the finding in Study IV that neighbourhoods with higher concentrations of female-headed households have lower levels of adolescent homicide, particularly since this finding is contrary to social disorganisation theory and prior international research (e.g. Land et al., 1990; Sampson & Groves, 1989; Strom & MacDonald, 2007). In addition, since female-headed households may be a protective factor, future research should also delve more thoroughly into the reasons for the association between female-headed households and neighbourhood levels of adolescent homicide as this may have important implications for prevention. Similarly, further research is also required to understand the positive relationship between neighbourhoods characterised by the lack of parental support and levels of female adolescent homicides. These neighbourhoods had higher concentrations of child-headed households and children who were not living with their parents (the latter may have included children living on the streets). Research in this regard should focus on the specific composition of such households and the mechanisms by which they contribute to levels of violence victimisation in the community, especially among female adolescents. In general, further research is required that captures the different dimensions of family structure within the city and an understanding of their importance in affecting neighbourhood levels of adolescent homicide.

Finally, longitudinal research is also required to monitor the incidence and trends of adolescent homicide in the city. In this regard, it would be important to establish whether the overall downward trend noted in Study I continues. More importantly, the upward trend noted in homicides committed by sharp instruments and blunt force needs to be monitored and research to determine the factors behind this upward trend should also be implemented. In addition, there have also been significant changes in the city of Johannesburg over the nine year study period including, for example, increased urbanisation, population growth, and infrastructural developments. Longitudinal studies that capture the changes in neighbourhood structure in the city and their influence on homicide levels are important for establishing the structural features that persist over time so that the link between structural factors and homicide can be more fully understood.

GENERAL CONCLUSION

The thesis has shown that the rates of adolescent homicide in the city of Johannesburg are high and require urgent intervention. Furthermore, the various studies have shown that the factors that contribute to adolescent homicide victimisation involve a complex range of individual,

situational, and socio-structural elements. From a prevention perspective, the results point to the need for the development of strategic intervention plans for the city, based on a comprehensive and integrated approach including initiatives to create safe spaces, reduce access to weapons and alcohol, address issues of masculinity and gender violence, reduce neighbourhood poverty and disadvantage, and assist children lacking in parental support. Further research is also required to appreciate more fully the diverse situational contexts of adolescent homicide to gain a better understanding of various family structures and their influence on homicide, so that the association between neighbourhood structure and adolescent homicides can be clearly understood. Research remains critical for the development of effective prevention efforts in the city of Johannesburg, and South Africa more generally, to reduce the levels of violent deaths among adolescents. Ultimately, the prevention of violence and homicide among adolescents requires an investment in adolescents, their families and their communities.

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