
A Tale of Two Cities: Distribution of blunt force injury deaths in Nelson Mandela Bay and the City of Tshwane (2001-2007)

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Violence and injury in South Africa

• South Africa is a violent society e.g. murder at 34.1 per 100,000 population (2009/10)

• Violent injuries - the second leading cause of death and lost disability-adjusted life years in South Africa – 157.8/100,000 population (2000)

• Developing countries shoulder a higher burden of fatal injuries; with an urban bias

• Unemployment, poverty, patriarchy, exposure to violence, access to firearms, alcohol and drug abuse are contributing factors

Incidence of all homicides and blunt force homicides in South Africa (2001-07)

Sources: NIMSS & Statistics South Africa
Violence-related deaths in other developing countries

- **Jamaica** (2006): more than 66% (firearms), sharp objects (25%); blunt objects included with ‘other’ mechanisms (6%)
- **Pakistan** (2002): 85% (firearms), blunt objects (3%)
- **Bangladesh** (2004): less than 10% of women died of beatings and torture; blunt force is not specifically mentioned as a mechanism
- **Tanzania** (2005): firearms (12.2%), blunt objects (24.3%)
- **South Africa** (2001 to 2007): 15% of all homicides was due to blunt force, firearms (45.3%).

Small geographical areas and fatal injuries

- A need for epidemiological research to determine the aetiology of violence
- Research in higher income countries - neighbourhood socio-economic composition, socio-economic inequalities, area-based differences, social differences
- Housing conditions, child dependency and socio-economic barriers associated with burn injuries
- **Suicides**, with age, ‘race’ and geographical location
- Unemployment a risk factor for violence; relative wealth appeared to be protective at individual level
- High prevalence of violence in poor areas, associations with psychological ill-health
Key Terms

- **Socio-economic determinants** – the structural determinants and conditions of daily life namely income, services, access to health care, schools and education, conditions of work and leisure, homes, communities, rural/urban settings – which impacts one’s chances of leading a flourishing life

- **External causes of death** – the mechanism that preceded an injury-related death, e.g firearms, stabbing, blunt force, motor vehicle collisions, etc., all of which may result in injury and eventually death

- **Blunt force homicides** - can be equated to the crime of murder; the unlawful, intentional killing of another human being, by means other than firearm discharge, sharp objects, etc.

Aims

1. To generate an **epidemiological profile** of homicides (especially blunt force homicides) in South African cities
2. To determine whether **geographic variations in blunt force homicide** incidence exist between smaller geographical areas and if these variations are correlated with measures of deprivation
3. To determine if there is a **raised frequency of blunt force homicides** cases in small geographic areas closest to the epicentre of blunt force homicides and to correlate these with measures of deprivation
4. To determine if ‘**clustering**’ is evident amongst areas with similar levels of blunt force homicides and to correlate these with measures of deprivation.
Objectives for this paper

- To create a Geographic Information System (GIS) database of blunt force deaths at the sub-place level for the two cities;
- To create an indicator of deprivation at the sub-place level;
- To determine the correlation between the blunt force homicide incidence rankings and the deprivation ranking of sub-places.
### Data available for the study

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<td>Sub-places (Census)</td>
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### Description of NIMSS variables

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<th>Description</th>
<th>Variable</th>
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<td>Age of the deceased at death</td>
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<tr>
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<td>OTHSUBURB</td>
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#### Geographical elements

- Small geographical areas - example

#### Temporal elements

#### Personal characteristics

Social science that makes a difference
Enumeration Areas (EAs)

Characteristics:
- Smallest census data collect unit
- Official population data for 1996 census only

Datazones (deprivation rankings)

Characteristics:
- National deprivation rank (1-22164)
- Rank 1 = Most deprived
- Deprivation ranking within each city can be established (most to least deprived)
- Population totals must be extrapolated
Census subplaces

- Household data: Dwelling type, source of heating, water, number of rooms, etc.
- Individual data: Age, gender, disability, citizenship, disability, employment status, income, first language, employment sector, etc.

Subplace (3 units)

Characteristics
- Census 2001 reporting domain
- Household and individual characteristic
- Many sub-places have names

Mortuary data included in NIMSS

- Five mortuaries function within the municipal boundaries of the two cities
- City of Tshwane
  - Tshwane (Pretoria)
  - Ga-Rankuwa
- Nelson Mandela Bay
  - Gelvandale
  - New Brighton
  - Mount Road
Methods

- Create GIS database from the spatial and non-spatial data available
- Assign deprivation rankings to sub-places
- Geo-code blunt force deaths to subplaces
- Calculate incidence (2001 base population)
- Rank all subplaces in terms of incidence (Lowest incidence gets Rank 1)
- Rank all subplaces in terms of its national deprivation rank (highest rank gets Rank 1)
- Calculate correlation coefficient, case by case differences and absolute differences
- Map and present the results

Blunt force injury deaths (2001-7)
(Deaths per 100000 persons)
Results - Nelson Mandela Metropolitan Municipality

• A correlation coefficient of -0.06 exists between the rankings for blunt force deaths incidence and the deprivation ranking of sub-places

• These preliminary results show a deviation away from assumptions on the link between interpersonal violence and levels of deprivation of small areas

• The areas that buck the trend are geographically identifiable

Multiple Deprivation Ranking – Nelson Mandela Bay

Ranking for the city by datazone
Incidence of blunt force deaths – Nelson Mandela Bay (2001-7)

Map of absolute differences in rankings – Nelson Mandela Bay
Small areas with high incidence and low deprivation rankings - NMBM

Small areas with low incidence and high deprivation rankings - NMBM
Results - City of Tshwane

- A correlation coefficient of -0.22 exists between the rankings for blunt force deaths incidence and the deprivation ranking of sub-places
- These preliminary results show a deviation away from assumptions on the link between interpersonal violence and levels of deprivation of small areas
- The areas that buck the trend are geographically identifiable
Incidence of blunt force deaths – City of Tshwane (2001-7)

Deaths per 100 000 persons

Map of absolute differences in rankings – City of Tshwane
Small areas with high incidence and low deprivation rankings – City of Tshwane

Small areas with low incidence and high deprivation rankings – City of Tshwane
Limitations of the study

• Variable geo-coding rate, absolute dependence on quality of the data
• Forced exclusion of inaccurate placenames and use of ‘colloquialisms’
• Cases from outside the municipalities or the country
• Deaths late in a particular year is recorded in a subsequent year
• Looking at blunt force deaths in isolation – no comparison with firearm and sharp force deaths

Prospects for the study

• Incidence of blunt force deaths estimates can be calculated at a small area level
• The individual characteristics of victims (age, gender, etc) and circumstances can be matched to the area profile
• Sub-local picture is emerging that may direct safety promotion activities going forward
• Different perspective to interpersonal violence is likely to emerge in South African cities
Acknowledgements

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