The prevalence of intentional and unintentional injuries in selected Johannesburg housing settlements

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Intentional and unintentional injuries were reported to be the second leading cause of Disability Adjusted Life Years in South Africa in 2000. We present household experiences of such injuries in 5 impoverished housing settlements in Johannesburg, Gauteng Province. Data for this study were extracted from the database of the Health, Environment and Development (HEAD) project. The incidence of reported intentional injuries was determined to be double that of unintentional injuries. Households in the Hospital Hill and Riverlea settlements reported the highest prevalence of stabbing and gunshot incidents. We concluded that impoverished South African neighbourhoods bear a high burden of intentional injury; surveillance mechanisms are required to inform prevention strategies at an individual, a community and a societal level.

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Injuries add considerably to the global burden of ill health. Around 16% of all disabilities and 9% of all deaths worldwide occur as a result of intentional and unintentional injuries.[1] Intentional injuries include interpersonal, self-inflicted, or group-instigated acts of violence, and unintentional injuries include road traffic incidents, falls, drowning and poisoning.[1]

In 1996, a World Health Assembly resolution declared violence a leading public health priority worldwide.[2] Violent crime is a major international social challenge, with developing countries most affected.[1] In 2004, the international violence-related mortality rate was approximately 9/100 000, and constituted the leading cause of death among the age group 15 - 44 years.[3] In the same year, the violence-related mortality rate in Africa was approximately 25/100 000 – more than double the global rate.[3] Within countries, the rate of violent crime experienced by the poor is usually higher than that experienced by middle and upper socio-economic communities.[1]

The Gini coefficient highlights the degree of socio-economic polarisation in South Africa. Economic and social inequalities (such as in housing, education and employment) may fuel interpersonal violence and conflict.[3] In 2008/9, the murder rate in South Africa was roughly 37/100 000.[4] In 2000, a Burden of Disease survey reported that intentional and unintentional injuries were the second leading cause of disability-adjusted life years (DALYs),[5] accounting for 14% of a total of 16 million DALYs.[4] We present household experiences of intentional and unintentional injuries in 5 impoverished housing settlements in Johannesburg, Gauteng Province.

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Methods

Data were extracted from the database of the Johannesburg-based Health, Environment and Development (HEAD) study. The HEAD project has collected data from households annually since 2006. Dwellings were randomly selected before the study commenced, and a suitable respondent (household member aged 18 years and older) was interviewed in August of each year about living conditions and the health of household members. Although the sample size varied, the same total of 808 dwellings across the 5 study sites was targeted for interviews each year.[6]

Structured questionnaires were used to collect information on: socio-demographic status, migration patterns, perceptions of housing and neighbourhood conditions, physical activity and health status, and experience of violence. Several questions required the participant to report whether any household member had experienced any significant (i.e. a cause of concern) injury or death, attributable to a predetermined list of causes, in the previous 12 months. The end point of the significant injury was not quantified; therefore we were unable to determine related morbidity or mortality. The term 'incident' therefore encompassed the injury spectrum. Specific questions to differentiate domestic violence from interpersonal violence were not included.

The 5 HEAD study sites were Riverlea (a low-cost, mass-based housing development constructed in the early 1960s), Braamfischerville (a low-cost, mass-based housing development built in the early 1990s), Hospital Hill (an informal settlement near the western boundary of the City of Johannesburg), Hillbrow (a densely populated, high-rise, inner-city area) and Bertrams (an old inner-city suburb in Johannesburg, characterised by mixed commercial-residential development).[6]

Data were captured using double data entry by 2 different data encoders, and processed with assistance from the Biostatistics Unit of the Medical Research Council. The statistical package Stata Release 10.0 was used for data analyses. Covariates from 2006 to 2009 were analysed cumulatively; survey analysis methodology was employed to mitigate the dependencies within the survey data. The categorical data were analysed using Pearson chi-square or Fisher's exact tests, as deemed appropriate. Normally distributed continuous data were

analysed with a Student's *t*-test, and non-normal distributions were evaluated using a Mann-Whitney test.

Results

Study households

From 2006 to 2009, a total of 1 805 interviews were successfully conducted across all HEAD study sites. The number of successfully conducted interviews declined from 524 in 2006 to 386 in 2009. The principal reason for this was non-availability of a suitable respondent at the time of fieldwork visits. Xenophobic violence that occurred in South Africa in 2008 may also have contributed to the declining sample size, especially in Hillbrow and Bertrams, where many international migrants reside.[7] In most sites, the majority of respondents were women. The heads of each household varied significantly in age among the sites (*Svy*, $p<0.001$); from a median age of 50 years in Riverlea (IQR, 41 - 57 years), compared with 32 years in Hillbrow (IQR, 28 - 38 years). In Hospital Hill, 55% of households reported a monthly income below ZAR 1 000 (~USD 145), compared with 18% in Hillbrow (*Svy*, $p<0.001$).

Intentional and unintentional injuries

Levels of intentional injuries reported for each site for the study period are summarised in Table I. Using a recall period of 1 year, at least 5% of households across all study sites reported that a member had been assaulted or stabbed. The highest prevalence of stabbing injuries was reported in Hospital Hill ($n=37$ or 10% of households) and in Riverlea ($n=25$ or 9%) ($p=0.128$). These two neighbourhoods, along with Braamfischerville, also recorded the highest level of gunshot incidents (approximately 6%), which was significantly higher than the remaining areas (*Svy*, $p<0.03$). Most incidents of rape were reported in Braamfischerville and Hospital Hill; 5% ($n=23$) and 4% ($n=13$) of households, respectively (*Svy*, $p=0.06$). The levels of suicide deaths were similar across all study sites (*Svy*, $p=0.13$): 5% in Riverlea ($n=11$), 4% in Bertrams ($n=9$), 3% in Braamfischerville ($n=15$) and 3% in Hospital Hill ($n=11$).

The rates of selected unintentional injuries reported by HEAD study respondents are summarised in Table I. Overall, the levels of reported unintentional injuries were considerably lower than those of intentional injuries. Most road traffic incidents, including motor vehicle, pedestrian and cycling incidents, occurred in Braamfischerville (27 households or 7%) and Riverlea (25 or 9%). Although more than double that in the 3 remaining neighbourhoods, the difference was not statistically significant (*Svy*, $p=0.12$). More incidents of poisoning were reported in Hospital Hill ($n=8$ or 2%) and Braamfischerville ($n=9$ or 2%) than in other HEAD study sites (*Svy*, $p=0.39$). Injuries caused by falling were reported by households in Riverlea (23 or 6%), Hospital Hill (19 or 5%), Bertrams (15 or 7%) and Braamfischerville (24 or 5%).

Discussion

This study shows the burden of intentional injuries borne by households in the HEAD study sites, and that they outweigh the burden of unintentional injuries. During the study period, 250 incidents of unintentional injury were reported, compared with 531 incidents of intentional injury (more than double). This proportion differs from the South African National Injury Mortality Surveillance System (NIMSS) report, where unintentional injuries caused two-thirds of non-natural deaths.[8] HEAD study respondents reported that physical assault was most frequently experienced, followed by stabbing and gunshot incidents. South Africa has no comprehensive injury surveillance system, making it difficult to accurately ascertain the extent of injury-related morbidity and mortality.

The injury-related burden is exceedingly high in a country already fraught with a high prevalence of communicable diseases, poverty and unemployment.[5] Hospital Hill, the poorest of the HEAD sites, consistently reported the highest number of stabbings, gunshots, and physical and sexual assaults.

Our finding of significant variation in the prevalence of intentional injury across neighbourhoods implies that strong local-level information systems and action programmes could assist in effective and cost-efficient targeting of violence prevention efforts in high-risk areas. We argue that, to date, violence has not been considered a public health priority in South Africa, despite the serious and detrimental implications for individuals, families and society, and the burden of treatment on the health system.[1]

Table I. Incidence of intentional and unintentional injuries by neighbourhood, 2006 - 2009

	Neighbourhood, *n*/*N* (%)										
Injury typology	Hospital Hill		Riverlea		Braamfischerville		Bertrams		Hillbrow		*p*-value
Intentional											
Assault	54/373	(15)	39/379	(10)	50/482	(10)	29/227	(13)	24/313	(8)	0.05
Stabbing	37/374	(10)	33/380	(8)	31/482	(6)	18/227	(8)	15/315	(5)	0.13
Gunshot	22/379	(6)	20/386	(5)	34/491	(6)	10/232	(4)	6/317	(2)	0.03*
Rape	13/373	(4)	11/380	(3)	23/481	(5)	5/226	(2)	2/315	(1)	0.06
Suicide	11/373	(3)	18/379	(5)	15/480	(3)	9/226	(4)	2/315	(1)	0.13
Unintentional											
RTI†	8/272	(3)	25/280	(9)	27/363	(7)	6/161	(4)	9/187	(5)	0.12
Burns	12/376	(3)	14/379	(4)	14/483	(3)	10/227	(4)	6/312	(2)	0.61
Poison	8/375	(2)	3/379	(1)	9/483	(2)	2/227	(1)	0/312	(0)	0.39
Fall	19/374	(5)	23/379	(6)	24/483	(5)	15/228	(7)	10/312	(3)	0.59
Drowning	1/366	(0)	1/377	(0)	2/483	(0)	2/226	(1)	0/308	(0)	0.62

*p-value significant to the 5% level

†RTI = road traffic incidents.

Conclusion

This study shows that impoverished South African neighbourhoods bear a high burden of intentional injury. There are no surveillance mechanisms to quantify injury typology and prevalence among neighbourhoods. A multi-disciplinary public health approach requires data to inform an effective focus on prevention at an individual, a community and a societal level.

Limitations

Reporting bias was likely as the reports of intentional injuries may be inaccurate and under-reported. The sample size of obliging households is progressively decreasing, which may detract from the robustness of findings.

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SAMJ 100 years ago

Dr. P. J. van Coller, Molteno, favours us with the following note of a case of quinine idiosyncrasy:—

"Patient was a man, aged 28. About twelve hours previous to being seen he had taken one tabloid of three syrups, put up by Messrs Burroughs, Wellcome and Co. Dr. van Coller found the penis enormously swollen, with a blister on the glans about the size of a shilling, and three others on the dorsum. There were small blisters between the toes and on the upper surfaces of one or two. Large red patch on inner aspect left thigh, and smaller one on left thumb. Several blisters on soft palate and corners of mouth. All the patches were very painful, and very itchy. Patient gave the history that ten years before he had had large red patches on left thigh, back of right leg and thumb, which had lasted three or four days, and had had similar attacks two or three times a year. In 1904, about half-an-hour after drinking a wineglassful of quinine wine, he had felt an oppressive feeling, and within an hour painful and itchy patches had appeared Had used powders and lotions without relief, and a chemist had told him it was due to the quinine. A year later similar symptoms happened after taking a 'shandy' made with tonic water, this time affecting toes as well, the attack lasting six or seven days. Since then had had two similar but worse attacks after drinking tonic water. In 1898 had a like attack with blisters also on the penis, after using a quinine pessary, but there were no blisters on mouth or soft palate. The treatment was opening the blisters, about four ounces of serous fluid being drawn from penis alone, dressing with borofax, boracic gargle and soft food."