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Incidence of Penetrating Injury Related Deaths in the Transkei Sub-region of South Africa (1996–2015)

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Abstract

Background: Trauma is a leading cause of death in South Africa. Penetrating injuries are the cause of a high number of these traumatic deaths.

Objective: To study the incidence of deaths related top enetrating injury in the Mthatha region of South Africa.

Method: A record review was undertaken of all medico-legal autopsies performed from 1996 to 2015 at Mthatha Forensic Pathology Laboratory.

Results: Between 1996 and 2015 autopsies were performed on 22952 victims of unnatural death. Of these, 8 368 (36.45%) were killed by penetrating injuries. Anaverage of 62 deaths per 100 000 of the population were caused per year by penetrating trauma. The ratio between males and females affected was 6.7:1 in this study. Most victims of penetrating injuries (37.38%) were young people between the ages of 21 and 30.

Conclusion: The high incidence of death caused b ypenetrating injuryin the Transkei sub-region of South Africa (1996–2015) indicates that the situation needs urgent intervention to save lives.

Keywords: Cytotoxicity; Endothelium; Glyoxal; Proliferation.

Introduction

Penetrating trauma is becoming increasingly common in parts of the world where it was previously rare.[1] A study carried out at metropolitan hospital in South Africa (2011) showed that penetrating thoracic trauma has a high mortality rate of 30% insubjects with stab wounds and 52% inthose with gunshot wounds.[2] Less than a quarter of patients with a penetrating cardiac injury reach the hospital alive. Gunshot wounds of the thorax remain more lethal than stab wounds.[2] A recent (2015) study carried out in Durban by Moodley et al. has also shown that the rate of penetrating trauma remains high, although it is being overtaken by blunt trauma.[3]

Trauma in South Africa was already described as a malignant epidemic over two decades ago, and this remains an apt term. [4] The trauma burden in South Africa issignificant and the country experiences over 30,000 trauma-related deaths annually.[5] Interpersonal violence has always been a major contributor to trauma-related deaths in South Africa.[6] Violence and firearms are common features of South African society.[5] In 27 developed countries, there was a significant positive correlation between guns per capita per country and the rate of firearm-related deaths. The number of guns was a strong and independent predictor of firearm-related death

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in a country. The hypothesis that guns make a nation safer is no longer true.[8]

Although interpersonal violence exists in every society, the WHO estimated that 90% of it occurs in low-and middle-income countries.[9] South Africa's unique political history and resulting social and economic inequalities have been identified as some of the possible factors contributing to the high rate of interpersonal violence.[10] Several other factors reported to be associated with violent death include poverty, lack of education, unemployment, alcohol abuse, substance abuse and power (male dominance).[11]

The purpose of this study is to determine trends in deaths as a result of penetrating injuries, and to highlight the causative factors in the Transkei sub-region of South Africa. It will also discuss prevention of these deaths.

Materials and Methods

This is a retrospective descriptive study from the autopsy register of Mthatha Forensic Pathology Laboratory. The Mthatha Forensic Pathology Laboratory is the only laboratory in this region catering for more than half a million of the population in the region of Mthatha. It is attached to the Nelson Mandela Academic Hospital, which is the only teaching hospital in this province. This again is attached to the Walter Sisulu University Medical School; all medico-legal cases in this region of South Africa are examined there. A total number of 27 036 autopsies were conducted between 1993 and 2015. The details of names, addresses, age, gender, date of autopsy and cause of death were recorded in the post-mortem register. Fourteen forensic officers are engaged in collecting corpses round the clock from 17 police stations in four municipalities. These are the OR Tambo, Mhlontlo, Chris Hani and Mbashe municipal areas, comprising about 200 square kilometres (Fig. 1).

The OR Tambo municipality is the largest, and is covered fully by ten police stations. Mhlontlo municipality has four police stations, Chris Hani municipality two and Mbashe municipality one. The combined population was 400,000 in 1993, but it has been increasing by an average of 3% annually since then. We excluded conceptus material and foetuses, as their age and gender were not indicated in the post-mortem registers. Stab wound and firearm injuries combined are classified as penetrating injuries.

It is difficult to determine the cause of death in cases of advanced putrefied human remains, and such cases are therefore also excluded from the study. The terms 'stab wound' and 'stab injury' are used interchangeably and mean the same; 'gunshot' and 'firearm' injuries are also used interchangeably. All cases of penetrating (both stab and firearm) injuries are recorded. Data were collected on a sheet of paper designed to record the post-mortem number, year, gender and cause of death. These data were transferred to the Excel computer program and analysed by using the SPSS computer program.

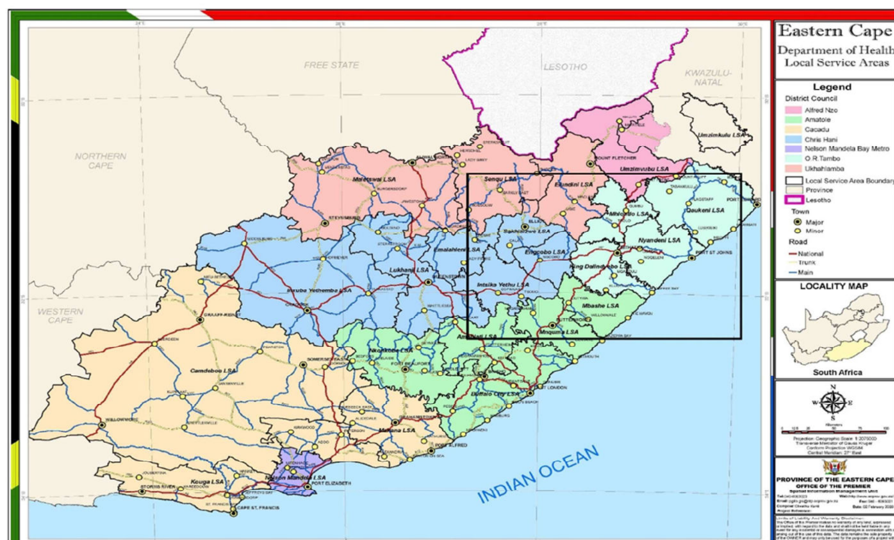

Fig. 1: Map of Transkei sub-region of South Africa catering population by Forensic pathology Laboratory indicated by a square.

Results

Between 1996 and 2015 autopsies were performed on 22,952 victims of unnatural death. Of these, 8 368 (36.45%) were killed by penetrating injuries (Table 1). Anaverage of 62 deaths per 100,000 of the population per year were caused by penetrating trauma (Table 2). The highest incidence (81.7 per 100,000) was in 1999 and the lowest (48.8 per 100,000) in 2009 (Table 2 and Fig. 2). The average rate of penetrating injury deaths was 54 per 100,000 per yearamong males, and eightper 100,000 per year amongfemales (Table 2 and Fig. 2). Among males the highest death rate was 69/100,000 in 1999, and the lowest was 44.2/100,000 in 2009 (Table 2 and Fig. 2). Among females the highest death rate was 13.4/100,000 in 2000, and the lowest was 4.6/100.000 in 2009 (Table 2 and Fig. 2).

Table 1: Ranks of percentage of cause of death by gender in Umtata area, South Africa (1996-2015).

Rank	Males (n = 18176)		Females (n = 4776)		Total (n = 22952)	
	Cause of death	n (%)	Cause of death	n (%)	Cause of death	n (%)
1	Penetrating	7280 (40.05)	MVA	1563 (32.72)	Penetrating	8368 (36.45)
2	MVA	4121 (22.67)	Penetrating	1088 (22.78)	MVA	5684 (24.76)
3	Assault	2173 (11.95)	Poisoning	481 (10.07)	Assault	2538 (11.05)
4	Hanging	1335 (7.34)	Assault	365 (7.64)	Hanging	1502 (6.54)
5	Drowning	914 (5.02)	Drowning	303 (6.34)	Drowning	1217 (5.30)
7	Collapse	783 (4.30)	Collapse	259 (5.42)	Collapse	1042 (4.53)
8	Poisoning	540 (2.97)	Burns	242 (5.06)	Poisoning	1021 (4.44)
9	Burns	389 (2.14)	Lightening	170 (3.55)	Burns	631 (2.74)
10	Fall from height	333 (1.83)	Hanging	167 (3.49)	Fall from height	446 (1.94)
11	Lightening	261 (1.43)	Fall from height	113 (2.36)	Lightening	431(1.87)
12	Gas suffocation	47 (0.25)	Gas suffocation	25 (0.52)	Gas suffocation	72 (0.12)
All causes of death		100%	All causes of death	100%	All causes of deaths	100%

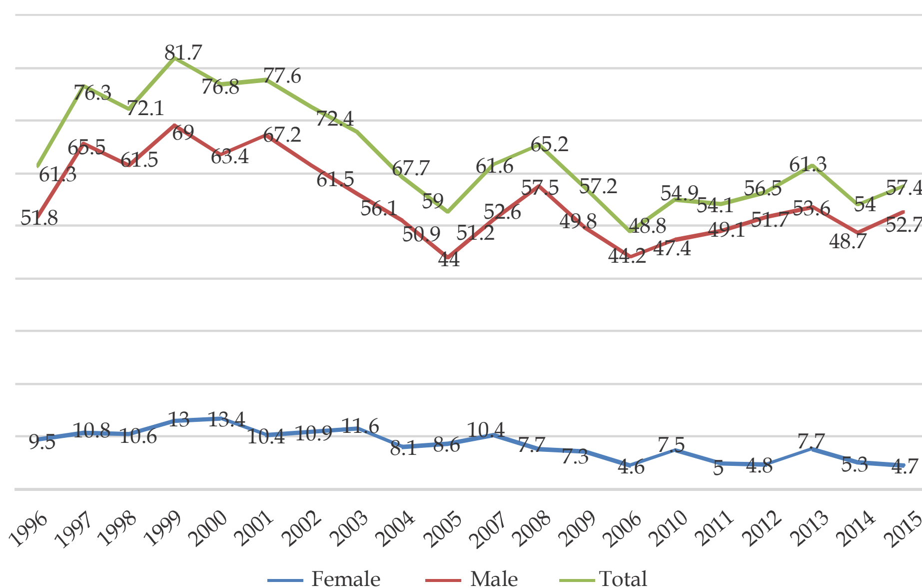

Fig. 2: Year wise pattern of deaths as a result of penetrating injuries in the Transkei sub-region of South Africa from 1996 to 2015 (n = 8368).

Table 2: Incidence of deaths as a result of penetrating wound in the Transkei subregion of South Africa from 1996 to 2015 (n = 8368).

year	Estimated population	Females (n = 1088)	Females (per 100,000)	Males (n = 7280)	Males (per 100,000)	Total (n = 8368)	Total (per 100,000)
1996	439091	41	9.5	223	51.8	264	61.3
1997	452264	49	10.8	295	65.5	344	76.3
1998	465832	49	10.6	283	61.5	332	72.1
1999	479807	61	13.0	331	69.0	392	81.7
2000	494201	66	13.4	311	63.4	377	76.8
2001	509027	52	10.4	336	67.2	388	77.6
2002	524298	57	10.9	320	61.5	377	72.4
2003	540027	63	11.6	303	56.1	366	67.7
2004	556227	45	8.1	280	50.9	325	59.0
2005	720304	62	8.6	317	44.0	379	52.6
2006	741913	77	10.4	379	51.2	456	61.6
2007	764171	59	7.7	437	57.5	496	65.2
2008	787096	57	7.3	389	49.8	446	57.2
2009	810708	37	4.6	358	44.2	395	48.8
2010	835030	63	7.5	394	47.4	457	54.9
2011	860081	43	5.0	422	49.1	465	54.1
2012	885883	42	4.8	455	51.7	497	56.5
2013	912460	70	7.7	488	53.6	558	61.3
2014	939833	50	5.3	453	48.7	503	54.0
2015	968028	45	4.7	506	52.7	551	57.4
Average	648810	51.4	4.8	345.2	54.0	396.3	62.0

Table 3: Age distribution among victims of penetrating injury in both gender in the Transkei sub-region of South Africa from 1996–2014 (n = 7750).

Age group	No. of males (%)	No. of females (%)	Total number (%)
1–10	71 (0.91)	32 (0.41)	103 (1.32)
11–20	1369 (17.66)	164 (2.11)	1533 (19.78)
21–30	2668 (34.42)	229 (2.95)	2897 (37.38)
31–40	1289 (16.63)	165 (2.12)	1454 (18.76)
41–50	706 (9.10)	160 ((2.06)	866 (11.17)
51–60	342 (4.41)	119 (1.53)	461 (5.94)
61–70	182 (2.34)	85 (1.09)	267 (3.44)
71–80	92 (1.18)	52 (0.67)	144 (1.85)
> = 81	10 (0.12)	15 (0.19)	25 (0.32)
Total	6729 (86.82)	1021 (13.17)	7750 (100)

Males are outnumbered at aratio of 6.7:1 in this study (Table 2 and Fig. 2). Most (37.38%) victims of penetrating injuries were young people between the ages of 21 and 30 years (Table 3 and Fig. 3).

Discussion

Transkei has the unique distinction of having produced a political leader of national and international repute, yet it has a long-standing history of violence. Long before any contact with whites, there were some vicious wars among black tribes. Using violence to deal with problems has a long, long history. At atime the people fought fearlessly againstthe apartheid regime, but now that freedom has been won the violentmentality is unchanged. Most of the black nations actually comprise many tribes. The tribe is not the entire nation. I don't know how many Xhosa tribes there are, but the Zulu nation, for example, is made up of round about 300 tribes. In fact, some pretty serious fighting among different tribes in the same nation has not been uncommon!

The majority of the people belong to the Xhosa in this region. In olden days the culture of the Xhosa people very much demanded respect for

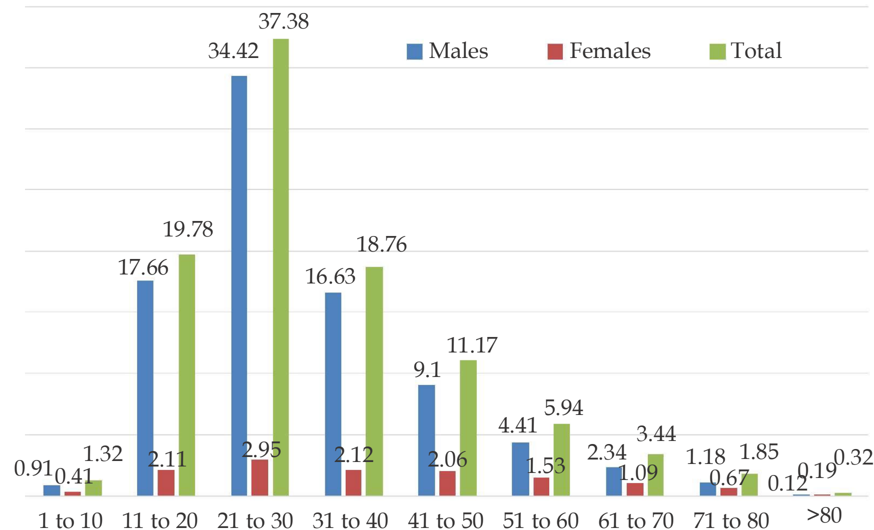

Fig. 3: Pattern of penetrating injuries in different age groups among both gender in the Transkei sub-region of South Africa from 1996 to 2014) (n = 7750).

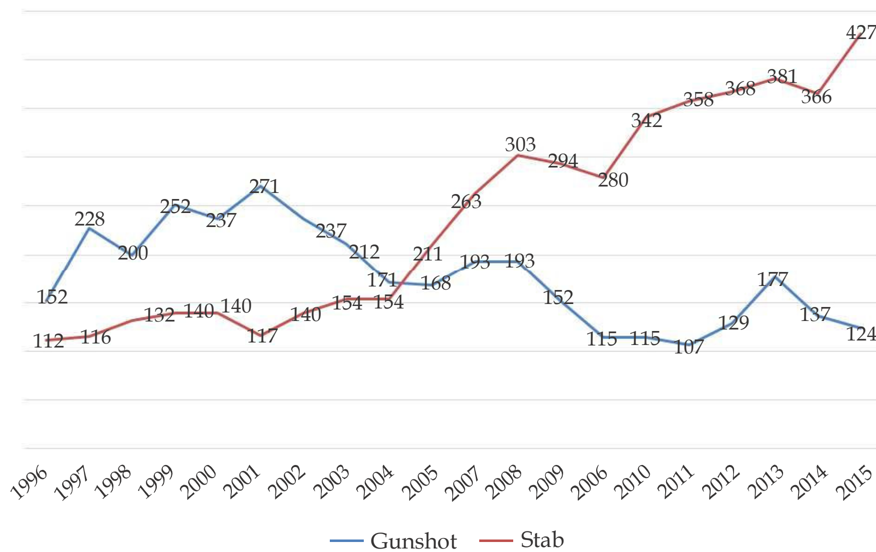

Fig. 4: The number of stab and gunshot related deaths among both gender from 1996 to 2015 (n = 8368).

the elderly, and looking after family and extended family members, but now things have changed. Families are fragmented and are not caring for their own children and family members. This could be a result of the impact of apartheid, which needs to be sorted out overtime. The areais rural to semirural, with poor infra-structure such as roads, hospitals and transport systems; this affects people's lifestyle.

This is probably the first autopsy report in South Africa covering specifically a rural region and involving a large sample size over a study period of 20 years. Only a few reports have been published on penetrating injuries in South Africa. Most of them are either case reports or discuss specific organ and system injuries, based on hospital study. Deaths related to penetrating injuries are considered an urban problem in South Africa, mostly limited to metropolitan cities such as Cape Town, Johannesburg, Durban and Bloemfontein, but this is not true;its incidence is no lower in rural regions.

Penetrating injuries arethe leading cause of death among all unnatural deaths. Such injuries cause about one-third 8 368 (36.45%) of all unnatural deaths (Table 1). Murder is apainful event, affecting not only the victim and the family, but also the community as a whole. It elicits great emotion, evidenced by the fact that the funeral service of

a murder victim is quite different from that of a person who died for another reason. Despite this, people seem oblivious to the problem and to turn a blind eye to this crime in this part of the country. Sadly, this is because they have seen this heinous crime being perpetrated so often that they tend to accept it as an unavoidable part of day-to-day life.

The average murder rate in the area as a result of penetrating injuries is 62 per 100,000 of the population per year (Table 2). There is insufficient published literature on fatalities as a result of penetrating injuries to compare with it, but it seems to be the rate of deaths as a result of penetrating is the highest in South Africa, as well as in the world. A mortuary-based published study (2014) showed that out of 1 105 trauma-related deathsin Durban, 69.4% were caused by blunt trauma, followed by 30.4% penetrating injuries.[6] The worst year was 1999, when the highest rate (81.7/100,000) of deaths as a result of penetrating traumawas registered (Table 2 and Fig. 2). Contrary to the conflict suggested by these statistics, no major episode occurredin this region in 1999, except for afight aboutcattle theft between the population of Qumbu and Tsolo.

The community has also been disappointed by the government, of which they had higher expectations, based on promises in the 1994 election. The lowest number of deaths was recorded in 2009, when the death rate came down to 48.8/100,000 of the population (Table 2 and Fig. 2). The average death rate was 54 per 100,000 among males, which is about four-fifths (87%) of the total number of deaths for this reason (Table 2 and Fig. 2). Women have better survival skills than their male counter parts. About seven men die for ever one woman who passes away as a result of penetrating injuries (Table 2 and Fig. 2). Women are generally not violent, and most of those killed were killed by their intimate partners. Several studies published have shown that South Africa has a high rate of women being murdered by their intimate male partners.[12] Guns play a significant role in violence against women in South Africa, most notably in killings by their intimate partners.[13]

The changing trend ininjuries and the method of causing them is quite obvious in this study (Fig. 4). It is not clear what is causing this change, but the implementation of the Gun Control Act in 2002 could be presumed to bean important factor in effecting are markabler eduction in the number of deaths as a result of firearm injuries. It does not mean that the total number of murders has decreased. Surprisingly, the number of deaths as a result of injuries caused by sharp-pointed objects has increased, and this has neutralised the benefit of gun control in this region (Fig. 4). However, firearm injuries are more lethal than stab injuries, and penetrating trauma is more lethal than blunt trauma.[4] Pre-hospital deaths caused by penetrating injuries could be reduced by providing efficient emergency care. The hospitals must be equipped to deal with these cases of emergency with trained staff. A study conducted by the author (2004) in the same region showed that 12% of pre-hospital deaths were preventable.[14] Chest and abdominal injuries due to penetrating trauma frequently cause death.[6] Injuries to vital organs such as the heart and lungs are more problematic, and saving these injured patients is really a challenge in this region, as paramedic services as well as expertise are lacking.

Males account for a high murder rate, and most murders (54/100,000–87%) were committed with penetrating objects in this sub-region of Transkei in the study period between 1996 and 2015. (Table 2 and Fig. 2). This is higher than 'Global status reports' of the WHO (2014) showed that males account for 82% of all homicide victims.[15] The highest percentage (37.38%) of young male murder victims in theage group from 21 to 30 years were victims of penetrating injuries (Table 3 and Fig. 3). It is generally expected that people will beless involved in serious crime with increasing age. This is probably because people become less emotional and wiser with age, as tendency of committing crime has lowered as age advances (Table 3 and Fig. 3). It is sad that 103 (1.32%) children under the age of 10 years were also killed by penetrating injuries in this region of South Africa in the study period (Table 3 and Fig. 3). The explanationis hypothetical but it is possible that this is related to the problem of multiple partnerships among Transkeians. Hospitals frequently have to deal with quarrelsin families about thelegitimacy of a child, and people approach medical personnel to carry out DNA testing. This could result in fighting between couples and the child could become the unfortunate victim.

Several factors playing a role in causing the high number of deaths as a result of penetrating injuries, such as poverty, alcoholism and mental status. All factors are synergistic and complement oneother to cause crime. Poverty is severe in the former Bantustans such as the Transkei region. Seventy-three percent of the rural people in the Eastern Cape were living on less than ₹300 per month in 2005/2006 and more than half of them on less than ₹220 per month.[16] A poor man often becomes either

a perpetrator or a victim of homicide inthe search for food. They take risks every day to procure their meal. They are also at a disadvantage when they need medical treatment because they are so poor. It is a vicious cycle; being poor, one is more prone toviolence, and violence propagates poverty. Weal thier people are associated with a decrease in the risk of violent death.[17] The poor often also consume excessive amounts of alcohol in an attempt to deal with the problems of poverty. Alcohol consumption rates in South Africa are the highest in the world, and are continuing to rise.[18] South Africa is a hard-drinking country. It is reckoned that the population consumes in excess of 5 billion litres of alcohol annually.[19]About half (49.5%) of traumatic deaths are related toalcohol in the Transkei region.[20] Alcohol and psychiatric illnesses both have a cause and effect relationship. A third of South African suffer from mental health disorders. More than 17 million people in South Africa are dealing with depression, substance abuse, anxiety, bipolar disorder and schizophrenia.[21] Trauma-related deaths arealso compounded by the high HIV infection rate in this region, which poses an even bigger threat to the country than does violence.[22]

There is no deterrent to committing murder in South Africa. Most perpetrators and victims are from slum areas, and they want to go to jail. Outside prison they do not have food to eat and potable water to drink. Prison is acomfortable place, as they are provided with comfortable beds to sleep, hot water showers, radio and television to watch, with three full meals. To them it is like living in a five-star hotel. It has been suggested that the death penalty should be re-introduced in South Africa to control the rate of murder, but although this is not feasible, a less harsh, but effective, punishment needs to be found soon. The South African government much prefers talking about road traffic accidents rather than murder and would prefer to side-line the issue of murder. This must not be allowed to happen. Government musttake action more firmly. People are killed by others every day, many more than those killed in road traffic accidents. Murder must always be criticised in a civilised society. It is not an unfortunate event that cannot be prevented, such as death by lightning! A single murder costssociety and the nation as a whole dearly economically and socially. Politicians must understand this issue and developan action plan to stop this trend.

Limitations

Despite the assistance of Statistics South Africa, it is difficult to estimate the actual population in South Africa as a whole and the region in particular accurately, because of the awkward geographical position of police stations and the fluctuating migration numbers. The annual growth in population is accepted as 3%, which may not be strictly accurate in view of the lack of precise death and birth ratios. However, the author has tried to estimate the rate as accurately as possible.

Conclusion

There is a high incidence of deaths as a result of penetrating injuries in the Transkei sub-region of South Africa over a 20-year study period (1996-2015). Nevertheless, the homicide rate as a result of penetrating weapons is at least two to three times higher than in the rest of South Africa, and three to four times higher than the international average. There is an urgent need to curb the occurrence of these death by government planning to set up acontrol system, policing to carry out investigations more quickly and fast-tracking the justice system to meet outharsher punishment to the perpetrators of these crimes. Revamping the health care system both at pre-hospital level and at hospital level in this sub-region of Transkei in South Africa is also crucial.

Ethical Issues

The author has ethical permission for collecting data and publication (approved project No. 4114/1999) from the Ethical Committee of the University of Transkei, South Africa.

Acknowledgment

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