The Direct Health Cost Assessment of Firearm Injuries at the Kenyatta National Hospital

PRESENTATION AT THE 10TH WORLD CONFERENCE ON INJURY PREVENTION AND SAFETY PROMOTION

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INTRODUCTION

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• The global community has recognized injury and violence as major causes of morbidity and mortality.
• WHO now has a department dedicated to and violence and injury prevention and UN has recognized armed violence as an impediment to the attainment of MDGs by 2015.
• One of the emerging concerns is the increasing use of firearms both by criminals and law enforcement officers, in suicides and by youths.
The Kenyatta National Hospital

The largest referral Hospital in East and Central Africa

<table>
<thead>
<tr>
<th>Item</th>
<th>Figures</th>
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</thead>
<tbody>
<tr>
<td>Staff Capacity</td>
<td>6,000</td>
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<tr>
<td>Bed Capacity</td>
<td>1,800 beds</td>
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<tr>
<td>Average Annual Outpatient attendance</td>
<td>600,000 visits</td>
</tr>
<tr>
<td>Average Annual Inpatient attendance</td>
<td>89,000 patients</td>
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<tr>
<td>Average length of Stay</td>
<td>7 Days</td>
</tr>
<tr>
<td>Annual Budgetary allocation</td>
<td>Kshs. 2.6 billion</td>
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Assess the health cost of firearm injury incurred by survivors treated at KNH over a ten year period (1997-2006) and establish the immediate impact on the patients.

**Specific Objectives**

- Establish actual cost of treating firearm injury survivors at the Hospital
- Determine the period of time taken in hospital and rehabilitation of the survivors
- Describe the pattern of morbidity and mortality associated with firearm injuries
Previous studies in the area of SALW have largely focused on implication to national and regional security with a conspicuous neglect on direct impact on health, socioeconomic and psycho-emotional status of individuals.


The One bullet story (www.IPPNW.org) and in The Burden of Multiple Firearm Injuries in Africa (Odhiambo, WA., Guthua, SW. and Thanga, PW.: Multiple Firearm Injury: Case Report and Review of Literature on the Burden of Firearm Injury in Africa* Proceedings of the 8th World Conference on Injury and Safety Promotion, Durban.

compares the cost of managing the injuries in hospital with other essential services that could be provided with these funds.

WHO and Centre for Disease Control and Prevention (CDC) has recently developed a manual for Estimating the economic costs of injuries due to interpersonal and self-directed violence which is currently being piloted in a number of countries including Kenya. (Manual for Estimating economic costs of injuries due to interpersonal and self directed violence, WHO & CDC, 2008)

YPLL, DALYS ....
Cost of Gunshot Injuries
IN THE ONE BULLET STORY!
(KENYA)

• The cost of Treating one gunshot injuries could provide one year primary education for 100 children!
• Or provide a daily *ugali* meal to an average Kenyan family of six for 10 years
• Immunization of over 250 children against *measles, polio*,
• Sub-saharan Africa has the burden of over 70% of the more than 30million people carrying the AIDS virus in the world....Resources are extremely scarce!!!! ORPHANS

Odhiambo, Guthua, et al, [www.ippnw.org](http://www.ippnw.org)
Materials and Method

Descriptive study covering a period of 10 years retrospectively. (1997 – 2006)

• KNH has a central registry where all the inpatient files are maintained.

• The method of filing used is the Terminal Digit Filing System. When files of injured patients are received in the registry, they are categorized using the WHO 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10).

• Designated files were retrieved by the record clerks and set aside for the research assistants who went through the files and entered the relevant data in the pre-designed data collection sheet. *Mortality data only covered a period of seven years as files from earlier years had been weeded out of the registry.
Results

A total of 1,804 patients were recorded to have been admitted and treated for firearm injuries.
Males - 90%
Females - 10%
Most patients were 39 years or younger (80%).
Most vulnerable - 20-29 years (42%).
Annual trend of FAI admissions at KNH
Level of Education at Injury

- Primary: 43%
- Secondary: 33%
- College/Polytechnic: 12%
- University: 6%
- No formal education: 4%
- Not indicated: 2%
Occupational Status

- Employed: 44%
- Self-employed: 31%
- Retrenched: 7%
- Unemployed: 6%
- Other: 0%

Legend:
- Dependent
- Employed
- Self-employed
- Unemployed
- Retrenched
- Not indicated
- Other
Who/How the Injured was taken to KNH
Current KNH Charges

Daily bed charges- Ksh 450 (private wing Ksh. 2,200 – 5000)

• Theater charges- (khs.8000 (USD 100)per surgery.

• Cost of reconstruction plate range from Ksh 20,000- >Ksh 200,000

• Transfusion charges Ksh 500 per unit of blood

• ICU daily charges- Ksh 3000
Clinical Care and Surgical Management

• Eighty nine percent (1519) were admitted to the surgical wards, 7% were taken straight to the emergency theatre and 1% admitted to the Intensive Care Unit (ICU)

• Sixty eight percent (1154) of the patients were managed under general anaesthesia, 20% under local while 7% were conservatively managed.

• Three percent (44) of the patients had blood transfusion in the casualty, 69% were not transfused while this information could not be established in 28% of the records.
Immediate Danger!!
Clinical and Surgical Care

Specialists;

• As in-patients - 64% treated by general surgeons
  - 33% orthopaedic surgeon
  - 12% treated by cardiothoracic surgeons
  - maxillofacial surgeons and neurosurgeons operated on 7% each,
  - ENT and ophthalmologists attended to 3% and 2% respectively.

555 (30.9%) patients were seen by a doctor of a special discipline as out patients (after discharge); 40% were attended by general surgeons, 37% by orthopaedic surgeons, Neurosurgeons 5%, cardiothoracic 4%, while maxillofacial surgeons and ophthalmologists managed 3% and 2% respectively.
Range of fee charged per patient for various procedures at KNH over the 10-year period (Ksh)

<table>
<thead>
<tr>
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<th>Minimum Fee</th>
<th>Maximum Fee</th>
<th>Average Fee Per Patient</th>
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<tbody>
<tr>
<td>Total Charged/patient</td>
<td>50</td>
<td>618302</td>
<td>18487.6</td>
</tr>
<tr>
<td>Deposit Paid/patient</td>
<td>100</td>
<td>35000</td>
<td>5420</td>
</tr>
<tr>
<td>Daily Charges/patient</td>
<td>100</td>
<td>13950</td>
<td>823</td>
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<tr>
<td>Medication/ patient</td>
<td>30</td>
<td>49450</td>
<td>2521</td>
</tr>
<tr>
<td>Surgery per patient</td>
<td>100</td>
<td>50000</td>
<td>3503</td>
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<tr>
<td>Physio-therapy/patient</td>
<td>50</td>
<td>21600</td>
<td>598</td>
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<tr>
<td>Dressing/patient</td>
<td>30</td>
<td>23250</td>
<td>978</td>
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<tr>
<td>X-ray per patient</td>
<td>100</td>
<td>10600</td>
<td>1348</td>
</tr>
<tr>
<td>Counselling per patient</td>
<td>200</td>
<td>2100</td>
<td>1040</td>
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<thead>
<tr>
<th></th>
<th>Days</th>
<th></th>
<th>340</th>
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<tbody>
<tr>
<td>Longest Period in Hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Number of days in Hospital</td>
<td>Days</td>
<td></td>
<td>18</td>
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</tbody>
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Annual Mortality trend

![Graph showing the annual mortality trend from 2000 to 2006. The trend starts at 10 in 2000, drops to 7 in 2002, increases to 8 in 2003, 9 in 2004, 18 in 2005, and 24 in 2006.](image-url)
Discussion

About 60% of Nairobi’s population live in slum and slum-like settlements (Warah, 2004). No road or infrastructure in slum.

Household survey undertaken by the Ministry of Health in 2003 found that only 12% of households in Nairobi owned cars, and 35.4% of households owned telephones.

The majority of residents rely on public transportation, usually in the form of matatus (minibus taxis) and buses.

KENYA Household Expenditure and Utilization Survey Report 2003
The Kibera Slums in Nairobi
The Figures

• KNH figures are government subsidized and far below the actual cost of patient management. Using the WHO guidelines, we can estimate the cost of treatment at KNH.

• The cost of medico-legal investigations is not possible from this study.

• It is also not possible to factor in the cost of transportation as less than one percent used ambulance services.

• Private hospital bed charges average Ksh 5000; an average of 18 days in hospital translates to Ksh 90,000 per patient at private hospital rate.

• Theater Charges; A study by Odhiambo et al over a two year period from the same hospital established that FAI surgical operations lasted two hours on average. At a private hospital in Nairobi theater fee is charged at Ksh. 300 per minute which translates to Ksh.36,000 in two hours.

• The recommended Surgeon’s fee by the Medical Practitioners and Dentists Board range from Ksh.30,000 to Ksh 180,000 working with an average figure, the average Surgeon’s fee is Ksh 105,000. The anaesthetist’s fee averages Ksh 35,000 per surgical procedure.
• Drugs or medications, implants cost an average of Ksh 160,000 per patient.
• X-rays & imaging are estimated to cost on average Ksh. 8,000 per patient.
• The above costs total Ksh. 434,000 per patient and constitute about two-thirds of the cost of managing each patient who survived firearm injury and was treated at the KNH.
• The additional one third of the cost is accrued on other clinical management requirements; physiotherapy, blood transfusion, counselling, rehabilitation, out-patient follow up and other unspecified expenses. The total actual cost of managing a single firearm injury at KNH can therefore be objectively estimated at Ksh. 651,000 this equivalent to USD 8,700. (USD 1 = Ksh. 75)

*The estimate is subject to the limitations of a lengthy retrospective study.
More Figures

According to the Kenya Bureau of Statistics 2006 report, the urban poverty line in Nairobi was Ksh 2648 (USD 35) per month with 44% of the city population living below this line.


The average hospital bill for FAI-survivors of KSh18,488 (USD245) was on average seven times more than the monthly urban poverty line. For the fatal FAI cases the average hospital bill of Ksh. 57,045 (USD 760) was twenty one times the monthly poverty line or twice the annual level of poverty.
Same old data!
8 year old Turkana girl in ICU
Frustration remarks!

Firearm injuries impart direct and indirect costs on individuals and society. These include those that can be quantified and those that are impossible to give a socioeconomic tag. Such non-quantifiable costs include psychological trauma associated with permanent disability, loss of a loved one or simply the trauma of the experience that may include the post traumatic stress disorder. *May be if we keep walking we shall confirm that the earth is not flat, but must we go the full circle?? Are all these data necessary to convince the Thomases of the Burden of FAI.*
Acknowledgements: University of Nairobi Medical Students - Sheila, Baraza, James, Charles and Muthoni; The Director KNH, Registry Staff and Safety 2010.

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THANK YOU