Averted health burden and functional recovery at the MSF Trauma Centre in Kunduz, Afghanistan, prior to its closure in 2015

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A human tragedy

- On October 3rd, 2015, a US airstrike hit MSF Kunduz Trauma Centre in Afghanistan; 42 lives, including 14 MSF hospital staff, were lost.

A public health disaster

- The 92-bed hospital was the only facility with comprehensive trauma care capabilities, including physical therapy and psychological counselling, for hundreds of thousands of people living in northern Afghanistan.
Objectives

For the Kunduz Trauma Centre, prior to its destruction, to:

- Estimate the health burden averted by surgery
- Describe functional rehabilitation of patients through physiotherapy
Methods

- **Study design:**
  Retrospective analysis of standardized surgical and physiotherapy databases.

- **Study population and period:**
  All patients admitted
  - From September 2011 to August 2015 for health burden averted by surgery (disability-adjusted life years, DALYs).
  - From January 2015 to June 2015 for functional rehabilitation of trauma through physiotherapy.
DALYs

- Disability-Adjusted Life Years quantify the burden of disease, combining morbidity and mortality.
- One DALY is one lost year of “healthy” life:

**DALY**
Disability Adjusted Life Year is a measure of overall disease burden, expressed as the cumulative number of years lost due to ill-health, disability or early death.

\[
\text{DALY} = \text{YLD} + \text{YLL}
\]

- YLD: Years Lived with Disability
- YLL: Years of Life Lost

Healthy life → Disease or Disability → Early death → Expected life years
DALYs averted by surgery

In this study: **DALYs averted** by surgery were estimated by:

1. Calculating the DALYs that **would have been lost** without surgery ("counterfactual DALYs")

2. Calculating the DALYs that **were actually lost even with surgery**

3. **Averted DALYS** = counterfactual DALYs – actual DALYs
DALYs averted by surgery - calculation

- Severity weights were assigned to conditions:
  - 1.0 if the condition was considered to be fatal ≥95%,
  - 0.7 if fatal between <95% and ≥50%,
  - 0.3 if fatal between <50% and ≥5%,
  - 0 if fatal <5% of the time.

- Surgical efficacy weights were assigned to procedures:
  - 1.0 if procedure had a ≥95% chance of cure,
  - 0.7 if the chance of cure was <95% but ≥50%,
  - 0.3 if the chance of cure was <50% but ≥5%,
  - 0 if the chance of cure was <5%.
Functional (in)dependence was assessed using a culturally adapted scoring system.

- 20 items were included in the score, divided into upper and lower limb function.
- Every item is rated 1-5, giving a score of 5-50/limb and 10-100/patient

Evolution of pain
### Functional rehabilitation – scoring

<table>
<thead>
<tr>
<th></th>
<th><strong>Lower Limbs</strong></th>
<th><strong>Upper Limbs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Locomotion</strong></td>
<td>Walking (indoor)</td>
<td>Hygiene</td>
</tr>
<tr>
<td></td>
<td>Walking (outdoor)</td>
<td>Wash</td>
</tr>
<tr>
<td></td>
<td>Going up stairs</td>
<td>Grab cup of tea</td>
</tr>
<tr>
<td></td>
<td>Going down stairs</td>
<td>Drinking</td>
</tr>
<tr>
<td><strong>Transfers</strong></td>
<td>Sit up</td>
<td>Dexterity</td>
</tr>
<tr>
<td></td>
<td>Stand up</td>
<td>Grab pen</td>
</tr>
<tr>
<td></td>
<td>Sit down</td>
<td>Opposition thumb</td>
</tr>
<tr>
<td></td>
<td>(occidental toilet)</td>
<td>Eating</td>
</tr>
<tr>
<td></td>
<td>Lie down</td>
<td>Activities</td>
</tr>
<tr>
<td><strong>Toilet</strong></td>
<td>Full squat</td>
<td>Carry object with the 2 hands</td>
</tr>
<tr>
<td><strong>Pray</strong></td>
<td>Kneeling (sitting)</td>
<td>Comb hair</td>
</tr>
</tbody>
</table>
Results – surgery (2011-2015)

6,685 patients, 13,970 operations; 17,928 procedures.
Results:
Patient characteristics and mortality

- 86% of patients were male, and the median age of patients who required surgery was 21 years.

- The perioperative death rate decreased from 7.2 per 1,000 operations in 2011 to 1.3 per 1,000 in 2015 ($P=0.03$).
**Results:**

**Disability-Adjusted Life Years**

More than 154,250 DALYs were averted by surgery

<table>
<thead>
<tr>
<th>Unintentional, non-violent trauma</th>
<th>Patients</th>
<th>DALYs averted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>(%)</td>
</tr>
<tr>
<td>Other unintentional injuries</td>
<td>2,265</td>
<td>(34.0)</td>
</tr>
<tr>
<td>Road traffic crashes</td>
<td>2,122</td>
<td>(31.9)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,387</td>
<td>(65.7)</td>
</tr>
<tr>
<td>Violent trauma</td>
<td>2,276</td>
<td>(34.0)</td>
</tr>
<tr>
<td>Gunshots</td>
<td>1,459</td>
<td>(23.9)</td>
</tr>
<tr>
<td>Land mines, bomb blasts</td>
<td>569</td>
<td>(10.3)</td>
</tr>
<tr>
<td>Assault, rape, torture</td>
<td>248</td>
<td>(2.3)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,685</td>
<td>(100)</td>
</tr>
</tbody>
</table>
Results: Functional rehabilitation

As an example, functional rehabilitation for lower limb fractures
Results: Functional rehabilitation

- Over the study period (Jan-Jun 2015), 92% of admitted patients benefited from physiotherapy.

- Among patients with sufficient follow-up data:
  - At inpatient exit: 33% became independent, while 50% remained with a mild dependence.
  - At outpatient exit: 79% became independent
Results: Functional rehabilitation

- Pain decreased under the physiotherapy programme:

![Graph showing pain score distribution across different settings and time points.](image)
Orthopaedic, plastic and basic neurosurgery
Conclusions

- The health burden averted by the hospital (DALYs averted) and restoration to functional independence was huge (vital in a setting like Kunduz).

- Closure of the hospital is critically missed:
  - The MoPH regional hospital offers only 27 beds for trauma care (96 were available in KTC).
  - Physiotherapy remains an important challenge.

- Access to essential trauma care for victims of armed conflict is a human right; special protection for the wounded, sick, and medical personnel and facilities during war must be guaranteed.
Our appreciation...

In Memory Of Our 14 MSF Colleagues, Kunduz, 3 October 2015

Abdul Maqsood, Abdul Salam, Mohibullah, Naseer Ahmad, Mohammad Ehsan Osmani, Lal Mohammad, Najibullah, Shafiqullah, Aminullah Bajawri, Abdul Satar Zaheer, Ziaurahman, Abdul Nasir, Zabiullah, Tahseel
And thanks...
Thank you!