Systematic Review of Non-Utstein Style Drowning Terms

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Disclosure

Justin Sempsrott / Andrew Schmidt –
  Founders - Lifeguards Without Borders
  Active Members – American Red Cross Volunteer Lifesaving Corps

Acknowledgements

- Wesley Forred, RN Research Analyst
- Las Vegas Emergency Medicine Residents
Background

• Third leading cause of death globally
• Fourth leading cause of death in the United States
• Leading cause of death for ages 1-4

Data collection has been plagued by underreporting

- Data lacking from low and middle-income countries which account for >95% of reported drowning deaths
- 2002 WHO: data collected from 4 of 42 Sub-Saharan African countries
- 2007 ILSF: data collected from 16 of 67 member countries
Background

• Until 2002- No universal definition for drowning
  • Confounds data collection

• Papa L, Hoelle R, Idris A
  • Review of 43 articles from 1966 to 2002
  • Found 33 different definitions for “drowning” and “near-drowning”
**Background**

**Drowning**
- “If a patient dies within 24 h of being submersed in water”
- “Death certificate says drowning as cause of death”
- “Patients who died by submersion in water or of related complications”

**Near Drowning**
- “If a patient lives for at least 24 h after being submersed in water”
- “Patients admitted after asphyxiation due to submersion in water”
- “Survival beyond 24 h after cardiorespiratory arrest following submersion in water”

2002 World Congress on Drowning
- Established universal definition
- Called for Utstein style of reporting
  - Morbidity
  - No Morbidity
  - Mortality
- Recommended discontinuation of terms like “silent”, “wet”, “dry”, and “near drowning”
Universal Definition

• “The process of experiencing respiratory impairment as the result of submersion/immersion in a liquid medium.”

• Adopted in 2005 by WHO, AHA, ILCOR

Do non-Utstein style terms persist in the medical literature since the development of a universal definition?
Objective

This systematic review identifies the prevalence of Non-Utstein Drowning Term Use (NDTU)

- “wet”, “dry”, “near”, “active”, “passive”, and “secondary” drowning
- Peer-reviewed medical literature since the publication and dissemination of uniform reporting guidelines

Methods
Data Sources

- IRB approved systematic review following the Cochrane methodology
- Search using Medline/Pubmed® and Web of Science®
  - English language
  - Published January 1, 2003 - July 15, 2010
  - Search terms:
    - “drowning”, “dry drowning”, “drowned”, “wet drowning”
    - “active drowning”, “silent drowning”, “secondary drowning”

Cochrane Methodology

- Systematic Review:
  - Collates all evidence that fits pre-specified eligibility criteria in order to address a specific research question
- Cochrane Collaboration
  - Prepares, maintains, and promotes systematic reviews to inform healthcare decisions
  - Based on Cochrane Handbook for Systematic Reviews of Interventions
Cochrane Reviews are now the “gold standard” for systematic reviews in such key publications:

• The Lancet
• New England Journal of Medicine
• British Medical Journal
• Journal of the American Medical Association

Routinely appear in these as well as in specialized medical journals.

Cochrane Methodology

The Cochrane Review Process:

1. **Defining the review question** and developing criteria for including studies.
2. **Searching** for studies
3. **Selecting** studies and collecting data
4. **Assessing risk of bias** in included studies
5. **Analyzing** data and undertaking meta-analysis
6. Addressing and **reporting bias**
7. Presenting and **interpreting** results
### Data Selection

- Titles and abstracts searched with Endnote Web®

**Inclusion criteria:**

<table>
<thead>
<tr>
<th>Articles relevant to:</th>
<th>Title contained:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Public health</td>
<td>- “Drowning”</td>
</tr>
<tr>
<td>- Impact</td>
<td>- “Immersion”</td>
</tr>
<tr>
<td>- Surveillance</td>
<td>- “Submersion”</td>
</tr>
<tr>
<td>- Treatment</td>
<td>- Any term related to:</td>
</tr>
<tr>
<td>- Pathophysiology</td>
<td>- Water injury,</td>
</tr>
<tr>
<td>- Prevention</td>
<td>- mortality, or safety</td>
</tr>
</tbody>
</table>
Data Selection

Exclusion criteria

- Purely forensic or microbiologic articles
- Opinion/editorial pieces
- Non-peer reviewed publications
- Non-human studies
- Inability to obtain full text reference

Data Extraction

Demographic

- Date of publication
- Name of journal
- Primary medical specialty of journal
- Impact factor

Outcome

- Presence of non-Utstein drowning terms (NDTU)
- Presence of any drowning definition
- Conflicting use of any drowning terminology
Data Extraction

- Non-Utstein drowning terms considered “not present” if:
  - Used in a historical context
  - Used to describe that the terms are no longer recommended
- For articles that were found to have NDTU, the cited half-life was recorded

Outcomes

Primary Measure
- Prevalence of Non-Utstein Drowning Term Use (NDTU)

Secondary Measures
- Prevalence of the exact Utstein-style drowning definition
- The median impact factor and cited half-life of journals with NDTU
- Type of Journal
Results

Accessed for eligibility (n=1148)

Excluded (n=132)
  - Non-English language (n=119)
  - Full text unavailable (n=13)

Assessed for inclusion criteria (n=1016)

Excluded (n=789)
  - Did not meet inclusion criteria

Final cohort (n=227)
Results

Final Cohort

- 227 articles from 131 journals

Inter-rater reliability (IRR)

- Calculated for title/abstract screening and data extraction
- Kappa (95% CI) = 0.929 (0.88, 0.98)

Primary Measure

- Prevalence of non-Utstein drowning terms
  - 42.7% (35.6, 48.4) 95%CI
  - 97% attributable to use of “near-drowning”
  - The following terms were not found in any articles
    - “active drowning”
    - “silent drowning”
    - “passive drowning”
Results

Primary Measure

What about trend over time?

<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>NDTU (n)</th>
<th>NDTU (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>27</td>
<td>18</td>
<td>66.7</td>
<td>(46.0, 83.5)</td>
</tr>
<tr>
<td>2004</td>
<td>23</td>
<td>12</td>
<td>52.2</td>
<td>(30.6, 73.2)</td>
</tr>
<tr>
<td>2005</td>
<td>27</td>
<td>12</td>
<td>44.4</td>
<td>(25.5, 64.7)</td>
</tr>
<tr>
<td>2006</td>
<td>32</td>
<td>11</td>
<td>34.4</td>
<td>(18.6, 53.2)</td>
</tr>
<tr>
<td>2007</td>
<td>24</td>
<td>14</td>
<td>58.3</td>
<td>(36.6, 77.9)</td>
</tr>
<tr>
<td>2008</td>
<td>39</td>
<td>15</td>
<td>38.5</td>
<td>(23.4, 55.4)</td>
</tr>
<tr>
<td>2009</td>
<td>31</td>
<td>10</td>
<td>32.3</td>
<td>(16.7, 51.2)</td>
</tr>
<tr>
<td>2010</td>
<td>24</td>
<td>3</td>
<td>12.5</td>
<td>(2.7, 31)</td>
</tr>
</tbody>
</table>
Results

Secondary Measures

- Prevalence of the exact Utstein-style drowning definition

  • 37/227 (16%) contained any drowning definition
    • Of those, 18/37 48% (95%CI=32,64) used the Utstein-style definition.

Results

Secondary Measures

For articles with NDTU:

• Impact factor
  • A measure reflecting the average number of citations to articles published in science and social science journals
  • Measure of the # of times journals were cited in the previous two years
    • Median (IQR)= 1.53 (0.9- 2.7)
    • Range= (0.57 – 13.66)
Prevalence of NDTU by Journal Impact Factor

<table>
<thead>
<tr>
<th>Quartile</th>
<th>NDTU % (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest</td>
<td></td>
</tr>
<tr>
<td>Quartile 2</td>
<td></td>
</tr>
<tr>
<td>Quartile 3</td>
<td></td>
</tr>
<tr>
<td>Highest</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Journal Impact Factor</th>
<th>Journals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 (0.5-0.9)</td>
<td>Israel Med Assoc, Emer Med J</td>
</tr>
<tr>
<td>Q2 (1.0-1.5)</td>
<td>Circulation, BMJ</td>
</tr>
<tr>
<td>Q3 (1.6-2.7)</td>
<td>ILCOR, Neurology</td>
</tr>
<tr>
<td>Q4 (2.8-13.6)</td>
<td>J of Laryngology and Otology, Mycosis, Arch Disease in Childhood, Int Epidemiology Assoc, Pediatrics in Review, Post Grad Med, Eur J of Clin Microbial Inf Dis, Critical Care, Aus J of Rural Health, Aus and NZ J of Pub Health, Arch of Pathology and Lab Medicine, Pediatrics</td>
</tr>
</tbody>
</table>
Conclusions

Summary

• 42% prevalence of NDTU, 97% Near Drowning
  – Gradual decline except 2007

• 16% contained ANY drowning definition
  – 48% used WCD 2002 definition

• Persists across high and low impact journals
Conclusions

• Common usage of “Near-drowning”
• Persists in high and low impact journals
• Steady decline with peak in 2007
• No known targeted efforts to decrease usage
• Targets for editorial intervention

We would encourage *Journal of Emergency Medicine* authors and editors to adopt modern drowning terminology to promote uniformity and scientific rigor in this important topic.
Limitations

- English studies only
- Non-uniform definitions not extracted
- Relatively small sample size by year
- 95% CI’s crossed
- Trend unknown before 2003
Questions?

- **Justin@LifeguardsWithoutBorders.org** - Justin
- **OceanRscue@hotmail.com** - Andrew

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Cited Half Life

- A measurement used to estimate the impact of a journal. The number of publication years from the current year which account for 50% of current citations received. This figure helps you evaluate the age of the majority of cited articles published in a journal. Each journal's cited half-life is shown in the Journal Rankings Window. Only those journals cited 100 times or more times have a cited half life. (Ladwig & Sommese, 2005)

- Median cited half-life = 6.1 years