

Standard World Health Organisation (WHO) data on drowning: A cautionary note concerning undetermined drowning

MD, PhD Philippe Lunetta^{1,2}, MD, MPH Tsung-Hsueh Lu³ and MD, MPH Gordon S Smith⁴

Department of Forensic Medicine, University of Helsinki, Finland¹, Injury Prevention Unit, National Institute for Health and Welfare, Finland², Research Center of Health Data and Institute of Public Health, Taiwan³, Department of Epidemiology & Public Health, University of Maryland, USA⁴

Background

Standard WHO data for drowning are available for many countries worldwide but furnish no reliable figures on the global burden of drowning because most developing countries collect no or inadequate data on water-related mortality. WHO-reported unintentional drowning rates vary widely between countries, but international comparisons are generally possible only for non-boating drowning based on narrowly defined WHO data. Standard WHO data include neither drowning from natural calamities nor boating-related drowning, nor land-transport drowning. Moreover, WHO statistics do not account for unintentional drowning concealed under the category of 'undetermined' drowning, i.e. unintentional or purposely inflicted. Studies on drowning classified as undetermined are exceedingly rare, with cross-country comparisons limited to few countries.

Aims

The main aims of this study are to assess: a) cross-country differences in undetermined drowning deaths, b) reasons for discrepancy in undetermined drowning rates among countries.

Material and Methods

The latest available ICD-10 data on unintentional non-boating drowning deaths (codes W65–W74), boating-related drowning (V90, V92), and undetermined (Y21) drowning for each country were extracted from the WHO mortality database. Crude drowning rates were calculated using the last WHO estimate population and the proportion of undetermined drowning was calculated by country.

Results

As of August 2010, of the 193 member countries, 100 (51.8%) submitted mortality data to the WHO using ICD-10 codes for drowning. All 100 have data on non-boating unintentional drowning, boating-related and undetermined drowning. Only countries (n=72) with more than 20 unintentional drowning cases were considered in this study.

We found a large discrepancy between countries regarding percentage of all drowning classified as undetermined, in 29 countries less than 5%, in 15, 10–24%, in 8, 25–50%, and in the remaining 3 >50%. In Asia, undetermined drowning ranged from <1% in Thailand to 37.4% in Korea, in Africa from 29.2% in Egypt to 86.9% in South Africa, in Europe from <1% in Italy to 44.7% in the UK, in North America from 6% in the USA to 14.4% in Canada, and in South America from <1% in Chile to 20.9% in Argentina. Undetermined drowning rates across countries vary, based on levels of evidence (beyond reasonable doubt, balance of probabilities) required by judicial systems to assess the intent, whether intent is determined by medical staff or legal professionals, on inadequate transfer of data to statistic offices, low frequency of medico-legal investigations, and on inter-examiner differences. Despite accurate scene investigations, collection of extensive information about the victim, and comprehensive medico-legal autopsies, intent may remain undetermined due to factors inherent in single drowning cases, such as lack of reliable witnessing and difficulty in linking victim's background to the actual drowning.

Conclusions

The WHO undetermined-drowning category accounts for significant artifact differences in unintentional drowning rates between countries, leaving unintentional drowning rates underestimated without considering undetermined drowning. To minimize this discrepancy, physicians must better report information useful for codification, causes and manner of death should be systematically transmitted to statistic offices after medico-legal investigation; differences between intent needed for judicial purpose and probable intent should be clear on death certificates. Specific training for certifiers and coders should focus on standardizing the approach to borderline cases, when circumstances and individual background allow no unequivocal determination of the intent.

Corresponding Author

Dr Philippe Lunetta
Associate Professor
National Institute for Health and Welfare, Injury Prevention Unit
& University of Helsinki, Department of Forensic Medicine
Kytösuontie 11
Helsinki South Finland Finland 300
Email: philippe.lunetta@helsinki.fi
Telephone: +358 9 19127447