



Original communication

## Drowning in Pretoria, South Africa: A 10-year review



N.K. Morris, L. du Toit-Prinsloo\*, G. Saayman

University of Pretoria, Department of Forensic Medicine, Private Bag X323, Arcadia, 0007, South Africa

## ARTICLE INFO

## Article history:

Received 10 August 2015

Received in revised form

5 October 2015

Accepted 24 October 2015

Available online 5 November 2015

## Keywords:

Bodies retrieved from water

Childhood deaths

Drowning

Emhysema aquosum

Hemolytic staining of the aorta

Medico-legal investigation of death

## ABSTRACT

Drowning is classified as the 3rd leading cause of accidental deaths worldwide and is deemed to be a preventable cause of death. Bodies retrieved from a water medium pose several challenges to the forensic pathologist with the diagnosis of drowning being primarily one of exclusion. The aim of this study was to do a retrospective descriptive case audit of bodies retrieved from water and immersion related deaths, which were investigated at the Pretoria Medico-Legal Laboratory (PMLL) over a 10 year period (January 2002 through December 2011). A total of 346 cases were identified for inclusion into this study. In 6% (20) of these cases, the death was not related to drowning; in 14% (48) no clear cause of death could be ascertained and in 278 cases (80%) the cause of death was considered to have been due to drowning. Infants (under 1 year, of age) constituted 41 (15%) of the cases; toddlers (aged 1–2 years) comprised 52 (19%) cases; children (aged 2–13 years) 49 (18%) cases; adolescents (aged 13–18 years) comprised 10 (3%) cases; adults (above 18, years) made up 126 (45%) of the cases. The majority of the drownings, occurred in swimming pools [125 cases (38%)]. In infants 23 (56%) of, drownings occurred in swimming pools followed by buckets [7 cases (17%)]. Sixty-nine per cent of toddler drownings (36 cases) occurred in swimming, pools. In the adult population, 40 (32%) of cases occurred in pools and 35 cases (28%) in rivers. Positive blood alcohol results were recorded in 48, (42%) out of 113 cases where the test was requested, 40 (35%) of these, cases higher than 0.05 g per 100 ml. This study suggests that many drowning deaths in Pretoria may be preventable by introducing greater public awareness of the risks and instituting relatively simple, protective measures.

© 2015 Elsevier Ltd and Faculty of Forensic and Legal Medicine. All rights reserved.

## 1. Introduction

There are several definitions for drowning in the literature. The World Health Organization (WHO) defines drowning as a “process of experiencing respiratory impairment from submersion/immersion in liquid”.<sup>1</sup> Roll states that “death by drowning is the result of hampering of respiration by obstruction of mouth and nose by a fluid medium (usually water)”.<sup>2</sup> In 2011, Richards asserted that “drowning is responsible for significant preventable morbidity and mortality worldwide, causing more deaths than war”.<sup>3</sup> A 2012 UNICEF report classified drowning as the 3rd leading cause of accidental deaths worldwide (with approximately 359 000 fatalities) whilst the WHO has reported that the highest rates of drowning worldwide are in Africa (stated to be 10 to 13 times higher than rates documented for the United Kingdom or Germany).<sup>3–5</sup>

Bodies retrieved from a water medium pose several recognized challenges to the forensic pathologist. In essence, the diagnosis of drowning is one of exclusion. Scenes of death may be difficult to evaluate, whilst decomposition of bodies will add to diagnostic challenges. In the study reported by Ambade et al 31.2% of bodies retrieved from water were decomposed, as opposed to 1.6% of all other cases admitted to the mortuary.<sup>6,7</sup> There are no pathognomonic features to diagnose drowning at autopsy. External signs indicative of immersion include (amongst others) “washer-woman” changes of the skin and a plume of froth at the nostrils.<sup>6,8–10</sup> Internal examination may also reveal non-specific findings such as pleural effusions and an increase in lung weights.<sup>6,8,10</sup> Intimal staining of the aorta has been reported to be present in 5% of cases.<sup>11</sup> Even histological findings in lung sections are regarded as non-specific for drowning.<sup>10</sup> Although all of these features may be non-specific, there are clear advantages in conducting a full autopsy in cases of presumed drowning; this enables the pathologist to at least observe and record the presence (or absence) of such non-specific findings which may be associated with drowning or immersion and to identify the presence of

\* Corresponding author. Tel.: +27 (0) 12 323 5298 (work), +27 (0) 83 406 4056 (mobile); fax: +27 (0) 12 323 0921.

E-mail address: [lorraine.dutoit@up.ac.za](mailto:lorraine.dutoit@up.ac.za) (L. du Toit-Prinsloo).

underlying natural disease processes (which could have precipitated the event or contributed to the demise of the victim).<sup>12</sup> In addition, the possible presence and causative association of medication and drugs (such as alcohol) can be investigated.<sup>10,12–14</sup>

Drowning is seen as a preventable death, according to the UNICEF report on drowning in children, stating that “Drowning is a significant, preventable cause of death among children in Low and Middle Income Countries. The challenge is to transform this previously unidentified public health issue from a neglected issue to one addressed by national, regional or global level programs.”<sup>4</sup> Bamber et al. reported on 28 infants and children who died over a 16 year period in the region of London, in the UK, from 1995 to 2010.<sup>15</sup> In this study the majority of children could not be resuscitated, 70% of drownings occurred at home (in baths or swimming pools) and in 91% of cases no adult supervision was present at the time of the incident.<sup>15</sup> Many childhood deaths by drowning could have been prevented by appropriate education and with interventions such as erecting fences around swimming pools.<sup>15</sup> From China however, Fang et al. reported that the majority of childhood drownings from 2001 to 2005 (72% of cases) occurred in natural bodies of water with only 3% occurring at home.<sup>16</sup>

In South Africa, drowning related fatalities were reported to be the 5th leading cause of accidental deaths in 2010, with 1428 such deaths documented by Statistics South Africa.<sup>17</sup> Donson et al. reported on unintentional drownings in urban South Africa for the period 2001–2005 and recorded the drowning rate for Pretoria as being 1.4/100 000 and the drowning rate amongst the 0–4 year old age group as being 6.9/100 000.<sup>18</sup> Richards indicated that drowning is the second cause of injury mortality in children under 15 years of age.<sup>3</sup>

As relatively little has been reported in the literature on drowning deaths in South Africa, it was the aim of this study to review the institutional records at a large (inland) urban medico-legal mortuary in South Africa, where the death was deemed to be related to probably or possibly due to immersion in a fluid medium. This study may add to our overall understanding of the problem and may help to identify patterns or trends in drowning deaths, especially amongst the pediatric population group and may assist in implementing effective preventative measures.

## 2. Methods

A retrospective descriptive case audit was conducted at the Pretoria Medico-Legal Laboratory (PMLL) spanning a 10 year period (January 2002 through December 2011) and reviewing records of cases admitted as probable/possible drowning deaths, including all cases which presented as (deceased) bodies retrieved from water, cases where resuscitation had been applied/attempted at the site of immersion and cases where a person who suffered immersion had been admitted to hospital, but did not survive. Demographic details, location of drowning/immersion and selected medico-legal autopsy findings were recorded. Pretoria is the capital city of South Africa and is a large modern city with a population of approximately 2 million people. The study was approved by the Research and Ethics Committee of the Faculty of Health Sciences of the University of Pretoria.

## 3. Results

A total of 346 cases were identified for inclusion in this study, including all cases which initially presented to us as possible or probable deaths due to drowning. Overall, the total number of bodies admitted to the mortuary over the study period was 23 050. The study cases constituted between 1.1 and 1.8% of the annual case load at the PMLL. Upon conclusion of the medico-legal

autopsy and investigation, 278 of the 346 cases were considered to have died due to drowning, thus collectively comprising 1.2% of the case load. The drowning cases contributed between 0.8% and 1.6% to the total case load. Fig. 1 displays the number of drowning cases per year and shows its relation to the total case load. The trend shows a sharp decline towards 2006, a slight increase and followed by a plateau.

### 3.1. External cause/circumstance of death (n = 346)

In 20 (6%) of the 346 cases a specific cause of death other than drowning was identified, most of these cases being related to traumatic injury. In 48 (14%) cases no specific or probable cause of death could be established at autopsy. In 80% (278) of cases the final cause of death was deemed to have been due to (or consistent with) drowning (Fig. 1). Decomposition was present in 45 (13%) of all study cases. Of the 48 cases where no cause of death could be established, 34 (71%) showed signs of decomposition and of the 278 cases where drowning was deemed to be the cause of death, 11 cases (4%) showed signs of decomposition.

### 3.2. Deaths due to drowning (n = 278)

#### 3.2.1. Demographic details

There were 59 (21%) females and 219 (79%) males. Although racial profiling may be problematic and contentious, 197 (71%) of cases were deemed to be Black, 68 (24%) were White, 10 (4%) were Colored and 3 (1%) were deemed to be Asian. Overall, children accounted for 152 (55%) of cases. More specifically, infants (younger than 1 year of age) comprised 41 (15%) of the cases, toddlers (aged 1–2 years) constituted 52 (19%) of cases, young children (aged 2–13 years) numbered 49 (18%) and adolescents (aged 13–18 years) numbered 10 (3%). Adults (above 18 years) accounted for 126 (45%) of the cases. Overall, ages ranged from less than one year to 85 years with a mean age of 16.3 years. In the adult population (above 18 years), the mean age was 34.5 years. The demographic details are depicted in Table 1.

#### 3.2.2. Seasonal/month-on-month incidence

On a month to month basis, most drownings occurred in December [48 (17%)], followed by January and February (Fig. 2). These are our summer months, which collectively accounted for 111 (40%) of all drownings, whilst spring (September–November) yielded 68 (24%) cases, autumn (March–May) had 53 (19%) and winter (June–August) 46 (17%) cases.

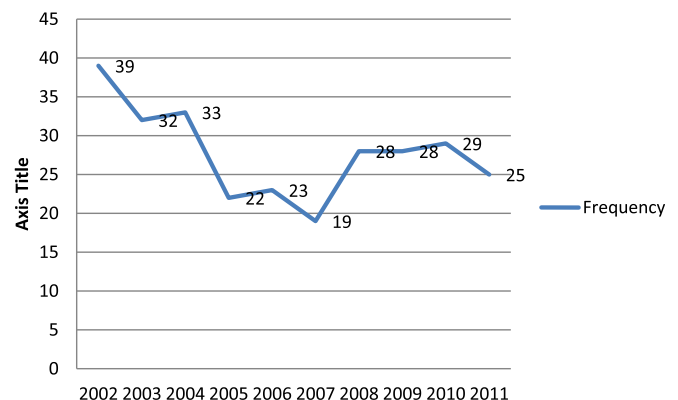


Fig. 1. Trend in the number of drownings over the study period.

Download English Version:

<https://daneshyari.com/en/article/101709>

Download Persian Version:

<https://daneshyari.com/article/101709>

[Daneshyari.com](https://daneshyari.com)