Author's response to reviews

Title: Demographic and circumstantial accounts of burn mortality in Cape Town, South Africa, 2001-2004: An observational register based study

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Version: 2 Date: 27 April 2009

Author's response to reviews: see over
Dear Nina

Re: MS: 3872691322537895
Demographic and circumstantial accounts of fatal burn injuries in Cape Town. A register based cross-sectional study

Many thanks for considering a revision of the above manuscript for publication in BMC-Public Health. My co-authors and I wish to thank you and the reviewers for the many useful comments provided. We have included an Abstract, adjusted the manuscript to meet the journals requirements, and indicated how each of the reviewer comments has been addressed. Please contact me if you have any further queries.

Yours sincerely

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Reviewer 1: Marc Jeschke

Major

1. The recommended title change has been made, as follows: ‘Demographic and circumstantial accounts of burn mortality in Cape Town, South Africa, 2001-2004. An observational register based study.’ The insertion of ‘South Africa’ was proposed by Reviewer 3; we have also inserted ‘burn mortality’ to ensure consistency of terminology, as also proposed by Reviewer 3.

2. We believe that the reviewer might have misunderstood the use of the two data sources. Thus we have clarified the Data Sources section and highlighted the uses of the two main sources. As indicated, the South African Census 2001 data provides population denominator data for the calculation of burn mortality rates. The Census 2001 is the most comprehensive and recent indicator of the populations in South Africa’s cities. The growth of the population data for 2002 to 2004 is based on methods developed by the Actuarial Society of South Africa (ASSA). The numerator data for burn mortality is from the National Injury Mortality Surveillance System (NIMSS). The NIMSS is a mandatory mortuary-based system and is regarded as the most comprehensive indicator of non-natural or externally caused mortality in Cape Town for which it has had full coverage since 2001. The NIMSS and the Census are independently implemented and maintained.

3. The limits of the Census in terms of certain age categories is stated on p. 16, and includes: an underestimate of the number of children below age five; an underestimate of the number of men relative to the number of women; an overestimate of the number of teenagers aged between 10 and 20; and an underestimate of the number in the white population. The first two are common features of censuses, particularly in developing countries. The ASSA model adjusts for this in the 2002, 2003 and 2004 population estimates.

4. The revision to the first sentence of the Materials and Methods section has been made, as follows: ‘The study is an observational register-based analysis of all types of burns for Cape Town over the period, 2001 to 2004.’ All types of burns are reported upon in the study. The NIMSS collates all burn types under a single description except electrocutions and explosive blasts; hence the separate reporting of these items.

5. Further elaboration of the registry process is detailed on p. 6: ‘Information for this system is collected by the police and forensic pathologists at each mortuary, and captured soon after the post-mortem, usually while the body is still in the mortuary. This information is entered into a computerised database by mortuary or NIMSS administrative staff.’

6. In South Africa, all patients that die as a result of an unnatural death, irrespective of whether they are treated in the public or private hospital sector, are subject to a medico-legal autopsy, which by law must be followed for all deaths known or suspected to have arisen from unnatural causes. These are registered in the NIMSS. This has been elaborated upon on p 6-7.
7. Figure 1 and the text ‘Figure 1 shows the distribution of the age of burn fatalities in Cape Town over the four-year period’ have now been relocated to the Results section, on p. 9.

8. The Figure 1 y-axis has been relabeled to read burn mortality rate. The data used in Figure 1 depicts age by year of age. Thereafter, Tables 1 and 2 and the corresponding text refer to specific age categories. The latter age categories were developed based on the distribution of burns (as indicated in Figure 1) and approximate those generated by human development theorists, as indicated on p. 8.

9. The ASSA model’s overall parameters are described in the last paragraph on p. 7.

10. The white/Asian population groups were combined because of the absence of burn mortality reported for these groups, the relative demographic similarities shared by these two groups, and the small number of Asians in Cape Town. This is indicated on p. 8.

11. A description of the demographics of the non-accidental cases are reported upon on p. 11, with a single childhood homicide case reported over the four years. The registry data are collected by the attending forensic pathologist based on the post-mortem and circumstantial information collected by the police at the scene of death.

12. There were no burn deaths reported over the four years for either white or Asian children. Table 1 now specifies this.

13. The burn mortality rates are stated as burn mortality per 100 000 person-years (with 95% confidence intervals); this is indicated in Table 1. As indicated, these rates are calculated based on burn mortality mandatorily registered at state mortuaries and population denominators derived from the South African Census.

14. The M:F ratio of 0.6 in black children aged 3-6 implies a lower rate amongst males at that age; see p. 10 changed to: ‘Overall, male childhood rates are higher than those for females across all the childhood age categories’; and elaborated on p. 11 as: ‘In childhood, more male than female cases were reported, except for the 3 to 6 year age group; with increasing differences reported in the two older groups of children’. As now indicated, there were no fatal occurrences amongst white and Asian children.

15. The inverted U-shaped distribution is consistence with the overall concentration of burn mortality in the middle period of life. The current study indicates that within this inverted U-description of overall burn mortality is a smaller bi-modal distribution specifically amongst children around 3 and thereafter 9 year olds.

16. The South African Census has indicated that there is a likely minor under-estimation of children aged below five; and an over-estimate of the number of teenagers aged between 10 and 20. The ASSA model adjusts for this in the 2002, 2003 and 2004 population estimates.

17. The phrase, now reads ‘childhood burn mortality rate’ with mortality inserted as proposed.

18. The description on p. 9 (now p. 11) reports on male to female rate ratios within the specific population groups and over the life span. Table 1 indicates that black followed by coloured males sustained the greatest burn mortality rates. Table 2
indicates that the male to female rate ratios are greatest for black and coloured males as opposed to females in the same population group.

19. The available forensic information on the date and time of injury is more limited; therefore we report on the date and time of death instead, an estimate of which is made by the attending pathologist. This is noted in the manuscript on p. 12: ‘The study reports on time of death instead of injury. Death would probably have occurred at the time of injury for a majority of cases; however some victims will have died hours or days after the injury itself, a bias to be noted when reading Figure 2. ‘Death would probably have occurred at the time of injury for a majority of cases, however some victims will have died hours or days after the injury itself. This bias must be kept in mind when reading Figure 2.’

Minor

1. The National Injury Mortality Injury Surveillance System (NIMSS) is noted in full in the Abstract and then again at its first mention in the body of the manuscript, on p.6.

2. We have edited and clarified this sentence, which now reads: ‘Fire related mortality rates are especially high in South East Asia (11.6 deaths per 100 000); but also high in the Eastern Mediterranean (6.4/100 000) and Africa (6.1/100 000).’

3. The summaries for each Figure and Table presented have been briefly elaborated upon and are included in the text adjacent to each of the Figures and Tables.

4. All the Tables have been reformatted to provide a clear distinction between the rows and columns; a footnote specifying the % proportion indicated is included for Table 3.

Discretionary

1. There is at present no comprehensive indication of burn morbidity for Cape Town, or South Africa as a whole.

2. The number of person-years of observation is briefly defined in the 1st paragraph of p. 8.

3. The overall absolute number of cases is now included in Table 1.

4. Data for whites and Asians are now included. All cases, irrespective of the population group would by law have to be assessed by a state forensic pathologist who makes an official determination of the cause of death.

5. The authors have included the absolute numbers of burn fatalities in Table 1.

6. The importance of further analyses on the contributions of the socio-economic determinants of burn mortality are acknowledged in the Abstract and Conclusions, but are recommended for future research.

Reviewer 2: Bishara Atiyeh

This Reviewer’s Report is generally positive. We have addressed the following:

2. We have indicated NIMSS in full in the Methods section.

6. The manuscript, in particular the Discussion, has been edited to remove any repetitions.

7. An Abstract has now been added.
Reviewer 3: Brenda Shields

Major Compulsory Revisions

1. An Abstract has been included.
2. Background:
   a. The language to this section has been rewritten and edited as proposed.
   b. The first paragraph has now been restructured and amended, with the following added: “There is no indication of the extent of global burn morbidity or hospitalizations across the lifespan, although over half a million paediatric hospitalizations are estimated to occur each year” see p. 4, 1st paragraph..
   c. As proposed, the sentence detailing the prevalence of burn injury is relocated, see p. 4, 1st paragraph.
   d. The section on burn occurrence and prevention in HICs and LMICs has been enhanced with illustrations of this research cited, see p. 4, 2nd paragraph.
   e. The rational for conducting the study in Cape Town, South Africa is stated in the 4th paragraph of the Background.
   f. The sentence beginning with “An epidemiological basis…” has been moved as proposed, see the 4th paragraph of the Background. We have also reworded the start of this paragraph as suggested by the reviewer.
   g. The concluding paragraph of the Background outlines the objectives of the study and has been more concisely restated.
3. Materials and methods:
   a. The section has now been edited to read more concisely.
   b. This section now starts with ‘Data source’, followed by a brief indication of the use of burn mortality data from the NIMSS and a statement of the study design utilized.
   c. The sub-section ‘Study site’ has been deleted as requested.
   d. The specified data descriptions in the Methods section, see di and dii below, have been moved to the Results section.
      i. The sentence that refers to the 22 136 NIMSS records has been moved to p. 9, as the first sentence under the heading: ‘Injury distribution by age, sex and population group’.
      ii. Figure 1 has been moved, as has the text ‘Figure 1 shows the distribution…’ originally on p.6, now to p. 9.
   e. The authors have made changes to ensure consistent use of terminology; we refer where possible to burn ‘mortality’ as opposed to fatality throughout the manuscript; in a number of cases for linguistic reasons, we use ‘fatality’.
   f. ‘Data treatment’ has been changed to ‘Data analysis’.
   g. The description of the statistical analyses has been elaborated, see p. 8.
   h. The level of significance was not specified. The analyses uses rate ratios (RR) with 95% confidence intervals (CI), to test for the significance of differences between the reported rates and rate ratios, see p. 8.
4. Results:
a. The study uses the overlap between CI ranges as an indicator of significance between respective rates and rate ratios (Brandtsatter, E, 1999).\footnote{E. Brandtsatter (1999). Confidence intervals as an alternative to significance testing. Methods of Psychological Research Online, vol. 4(2). Downloaded on the 17 April 2009 at http://www.dgps.de/fachgruppen/methoden/mpr-online/issue7/art2/brandstaetter.pdf}

b. The study uses a number of sub-categories in the analyses; burn mortality rate by age group, gender and population group are all reported, see Table 1.

c. Specific information on the mechanisms of burn death is not available via the NIMSS. The NIMSS collates all burn types under a single description (as ‘burns’) except for electrocutions and explosive blasts. The NIMSS did not document any burn suicides for 2001-2004 in Cape Town.

d. See explanation in 4.c above; there is no comment field that specifies the mechanism of injury.

5. Discussion

a. The Discussion acknowledges the smaller concentration of burn mortality amongst very young black children, see on p. 14. However, it is noted that the overall childhood burn mortality rate of 3.6 per 100 000 person-years is significantly less than those for all other age categories, except the 51+ group.

b. A number of specific interventions have been specified for the reduction of burn mortality in Cape Town, including infrastructural interventions involving housing safety standards, paraffin safety and others, see p. 16.

c. The paragraph on p.14 beginning with ‘This increased risk of death’ has been deleted.

d. The Conclusion includes inserts on the study findings pertaining to alcohol involvement and child burn mortality. The Conclusion also includes a statement on the male age group at highest risk.

e. The ratio of males to females is accommodated in the burn mortality rates reported on Table 1 and the male to female rate ratios described in Table 2. We indicated the relative sizes of the different age groups in the Discussion, highlighting the size of the youth and adult groups.

f. A subsection on \textit{Strengths and limitations} has been included at the end of the Discussion, with all relevant descriptions moved into that section, see p. 16.

Discretionary Revisions

1. We have added ‘South Africa’ after ‘Cape Town’ in the title.

Minor essential Revisions

1. ‘World Health Organization’ is spelt in full in the first paragraph of the Background where it first appears.

2. NIMSS is described in full on p. 6.

3. The changes to the Denominator section, now on p. 7 have been made as proposed.
4. The space insert has been made as proposed in the first sentence of the ‘Injury distribution by age, sex and population’ section, now on p. 9.
5. The sentence, now on p.17, 2nd paragraph and starting with ‘This study is not able to clarify’ has been altered as proposed.
6. The units for the rates in Table 1 have been added in a footnote to the Table 1.
7. The format for Table 1 has been adjusted to accommodate the specified text.
8. The age unit used in Table 2 is specified in the Table Title.
9. The Title for Table 3 is adjusted.
10. The Table format has been altered to accommodate the specified text.
11. In Table 4, the burn mortality rates are described as mortality per 100 000 person-years.
12. The months to each season have been added in Table 4.
13. The units for “Age” and for “100 000” have been added to Figure 1.
14. Terminology in the Tables has been made more consistent.