Reviewer’s report

Title: Domestic water carrying and its implications for health: a review and mixed methods pilot study in Limpopo Province, South Africa

Version: 2 Date: 9 July 2010

Reviewer: Christine Moe

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General Comments: Although it is widely recognized that manual water collection and transport imposes a physical burden, it is difficult to find systematic studies that attempt to describe and quantify this burden. This study is a useful example of this type of work and appears to be novel. The implications of domestic water carrying are usually considered in terms of time spent by women and children for collecting water and absenteeism from school that results from water collection responsibilities. However, this study attempts to examine two different aspect of water carriage – perceived exertion and self-reported pain. Data collection methods included semi-structured interviews, video recordings of water collection and carrying by individual study subjects, GPS measurements of the distance between the water source and the home, the height and weight measurements of the study subjects and the weight of the filled water container.

Overall, this is an interesting and generally well-written paper, but it leaves the reviewer with several questions:

Major Compulsory Revisions/Comments:

1) Are the methods sound?
   • Perceived exertion appears to be measured by a standard method but this should be explained more.
   • The calculation of Newtons of force for head loading needs to be explained.
   • The description of the analyses of the video recordings does not explain if the observer was trained in evaluating muscular-skeletal movements, body postures, etc. These analyses were done twice, but by the same investigator. So this does not really provide a quality check or reduce the potential bias by the observer.

2) Are the data and results correctly interpreted?
   • Is it scientifically justifiable to attribute the self-reported back, neck and shoulder pain to water carrying practices? What about the impact of other activities and manual labor that this study population may engage in, such as hoeing, weeding, carrying goods to and from the marketplace, and carrying young children?
   • Please see my comments below about the discussion.
3) How is this paper significantly different from what appears to be a similar paper, involving two of the three authors, that is already in epublication stage by another journal? (please see information below from PubMed)

Child Care Health Dev. 2010 Jun 1. [Epub ahead of print]
How do children perceive health to be affected by domestic water carrying?
Qualitative findings from a mixed methods study in rural South Africa.
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Abstract

Abstract Background Nearly 50% of South African children lack access to clean safe water and many regularly carry water loads. The health effects of carrying water have not been well researched or considered when estimating the burden of disease due to suboptimal water supply. Improved access to safe water has potential to create important health and economic benefits, by reducing childhood exposure to risk factors for injury or disease. The aim of this study was to identify which domains of health children perceive as affected by water carrying.

Methods Qualitative research was used within a broader mixed methods design to investigate children's perceptions about health and water carrying in Limpopo Province, South Africa. Qualitative data from eight semi-structured interviews and three 'natural group meetings', involving a sample of 30 children, were analysed using the framework approach of Ritchie and Spencer. The results were mapped to the International Classification of Functioning Disability and Health (ICF).

Results Children broadly conceptualize and describe health to include the functions they perform and activities in which they participate. They perceived water carrying as impacting upon health in various ways, for example to make life better by facilitating water usage, or to make life worse through accidents and pain. Children's accounts demonstrate that they can identify and explain complex interactions between activities, participation and health. Conclusions The ICF framework facilitates the communication of children's perceptions of health and of relationships between health and water carrying. The model thus derived from their views incorporates not only commonly accepted conceptualizations of health condition, body structure and physiological function, but also of functioning through activities and social participation. Children's accounts suggest a possible association between water carrying and symptoms typical of musculoskeletal disorders. However, further research into the strength of association between water carrying and musculoskeletal disorders is needed.

In addition to these major comments, there are a number of specific issues that need to be further explained – please see specific comments below.

Methods:

4. Pg 8, 2cd para explains that video recording captured data on “body postures adopted during lifting and handling as well as while carrying containers”. How was this data used in the analyses? The results only distinguish between those
who carried the water container on their head and those who did not. Were there any subjects who carried the weight on their shoulders by using a type of yoke to balance two containers?

5. Pg 9, 2cd para: The description of the analyses of the video recording explains that each of the four subtasks was timed twice and an average subtask time was calculated for each study subject. However, it is not clear why this level of detail was necessary because the results only report carrying time.

6. Pg 11, 3rd para: It is not clear how Newtons and “compressive force” were calculated or their significance. The use of the term “compressive force through the cervical spine” should be explained in this context. Is this a standard medical term or musculoskeletal term? What is the significance of “compressive force through the cervical spine”? What is the normal range and what is dangerous?

7. It is surprising that the investigators did not calculate kcal of energy expended on water collection. It seems likely that they have the data to do this calculation, and it would be another interesting result.

Results:

8. There are an excessive number of tables and figures in this paper given the amount of data that was collected. Some of these are not necessary.

9. Table 1 – it would be more interesting to see the age distribution of the water carriers than the mean, sd, min and max.

10. Table 2 and 3 – it would be more interesting to see the variables “Distance” and “total weight carried” graphed as distributions rather than reporting the mean, sd, min and max.

11. Table 4 – what is the utility of the frequency ratio column? Isn’t it sufficient to give the total number of respondents and the point prevalence?

12. The data in Table 5 could simply be reported in the text in a single sentence.

13. The significance of the data in Figure 2 is not explained. The only sentence about this figure states “Of the children observed carrying water, older children tended to carry high container weights and therefore higher loading forces.” This seems like a pretty obvious finding and does not require a graph.

Discussion:

14. The Discussion Section is too long given the nature and size of this study and the results. It gives the impression that the authors are over-interpreting their results. Also the literature review both in the introduction and the discussion is generally weak.

15. Page 15, first para: The authors explain that “how and why pain is reported will vary in different cultural and social contexts…” but then they start this paragraph with the findings from a Danish study that found women are more
likely to report pain than men. This seems like a very inappropriate citation because the lives of women are very different in these two cultures.

16. The discussion focuses quite a bit on the young water carriers but little mention is made about elderly water carriers. Table 1 indicates a maximum age of 64 years. It is likely that the cumulative effects and injuries from water carrying will be more obvious in the older water carriers.

Minor Essential Revisions:

17. Pg. 5: The first two bullets seem to be about the same and are stated in a circuitous manner. Please rephrase to be more direct and consider combining these two bullets.

18. Pg. 5, 2cd para, first sentence: specify Limpopo Province, South Africa

19. Pg. 8, 2cd para: change “principle” to “principal”. Spell out “WSP”

20. Top of pg 13: the p-value is reported as p>0.0000. This must be a typographical error.

21. Pg 15, first para: This is a VERY LONG sentence! “It may be relevant that women ….significant psychological and functional morbidity” Also note typographical error of the word “morbidity”.

22. Pg 16, 2cd para: Another VERY LONG sentence! “Compression forces generated…carry the heavier loads.”

23. Pg 17, first sentence: The term “developed country settings” is usually not used because it is considered biased. Consider replacing with “high-income country settings” or similar terminology.


Discretionary Revisions:

25. Table 2 – spell out “DWC” used in the title

26. The abbreviations “TDCT”, “CW/BW%” and “RPE” should be explained in footnotes for Tables 6 and 7.

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
- I declare that I have no competing interests.