

Suggestions to improve the collection of data on adult mortality in DHS surveys

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In recent years, the increasing need to monitor progress in maternal and AIDS-related mortality has reignited interest in the collection of data on the survival of close relatives. In DHS, a complete list of all brothers and sisters is collected from respondents aged 15-49, with information on their gender and survival status, their current age (for surviving siblings) or ages at death and years since death (for the deceased). Siblings' survival histories (SSH) are now one of the primary sources of information on adult mortality in countries with limited vital registration. For example, in the Global Burden of Disease 2010 Study, SSHs were the main source of information on adult survival in sub-Saharan Africa [22]. They are also increasingly used to estimate pregnancy-related mortality [23, 24], to evaluate the mortality impact of large global health initiatives such as PEPFAR [1] or to estimate the number of deaths due to conflict or genocide [10, 6]. However, sibling histories tend to under-estimate adult mortality [19, 13, 8], and revisions to the DHS questionnaire to limit omissions of siblings and to provide complementary mortality estimates would enable DHS to generate more accurate estimates.

The DHS questionnaire also makes it possible to estimate adult mortality from questions on the survival and residence of parents. Proportions of non-orphans classified by age can be converted into probabilities of dying through standard demographic techniques [7, 19]. However, this question is currently restricted to children up to age 17 in DHS, which greatly limits its use for mortality estimation.

The suggestions below are specific to countries where the registration of death is incomplete.

1. We suggest collecting parental life histories in the “Maternal and adult mortality” module, and by adding questions on the survival, years of death and ages at death of parents.

The following questions should be asked prior to eliciting the list of siblings:

- Is your mother still alive?
- If YES > How old is your mother?
- If NO > How many years ago did she die?
- If NO > How old was she when she died?

The same questions would be asked for the respondent's father to estimate male mortality. Both sets of questions should be included in the men's questionnaire as well.

This set of questions is minimal, the data are easy to collect, and the mortality estimates can be obtained using both direct and indirect techniques [11]. Asking these questions would present the following advantages:

- i. It would allow estimating trends in adult mortality. Because the questions would be asked of respondents aged 15-49, one could potentially obtain a trend in mortality over the last 50 years. By contrast, sibling histories are only useful for the last 15 years because the number of adult siblings of the respondents diminishes rapidly when the reference period extends further back in time.

- ii. It would provide mortality estimates up to age 75. Currently, DHS surveys can only provide mortality estimates up to age 50 or 60, because the respondents are aged 15 to 49 and they report on siblings of the same age on average. As a result, little information is available on old-age mortality [2]. In 2005-10, 49% of deaths in less developed countries occurred at age 60 and above, and this proportion will rise to 80% in 2050-55 [21].
- iii. It would yield more reliable estimates of adult mortality than those obtained from the parental survival data collected among children in the household questionnaire. Among children, a large proportion of fostered orphans are misclassified as non-orphans [4, 16, 18, 17, 12]. In the presence of adults, some interviewers do not always probe whether they are the true biological parents of the children observed in the households and automatically record all children as non-orphans [3]. Foster parents may also inadvertently underreport orphans, for instance if they do not understand that the questions concern biological parents [14]. This “adoption bias” is less pronounced among adult respondents.
- iv. In countries where HIV prevalence is high, adult mortality estimates derived from parental survival are biased by the transmission of HIV from mothers to children and the lower fertility of seropositive mothers. It is possible to adjust for these biases [20]. However, estimates derived from parental survivorship statistics collected among adults are less biased than those obtained from young respondents.
- v. Most censuses collecting data on orphanhood do not restrict the question to children. Asking adults about the survival of their parents could facilitate the comparisons and the reconstruction of trends in mortality.

The date of the mother’s death has been included in several sample surveys in the 1970s and 1980s in Latin America, and in one DHS conducted in 1987 in Burundi. It has been shown that this question provides more accurate estimates of the moment in time that corresponds to the mortality estimates than when this moment has to be estimated indirectly from the respondent’s age [5]. It also provides more recent estimates. This question is particularly useful in countries where mortality trends have been irregular, such as in Eastern and Southern Africa.

If it is thought that an important proportion of respondents will not know the year of death of their parents, an additional question for those unable to provide a date would be: ‘Was your mother/father alive at the time of your first marriage?’. This question was asked in some DHS surveys (Senegal in 1986, Burundi in 1987, Ghana and Uganda in 1988). Again, it has been shown that the resulting mortality estimates are more accurate than those obtained without any information on the timing of deaths; they provide more recent mortality than lifetime data and are less plagued by the adoption effect [17]. Alternatively, the question could be ‘Was your mother/father alive when your first child was born?’ to avoid problems related to the definition of the marriages.

2. We suggest adding a question to collect the household line number of adult siblings of the respondent.

Because all female aged 15-49 are eligible to the individual questionnaire, in many households questions on sibling survival are asked to several members of the same sibship. In some DHS

surveys (e.g. Niger 1992 and Senegal 1992), a question was asked at the end of the maternal mortality module to identify the respondent's sisters who lived in the same household (through their household line number). This question allowed identifying sibships that were duplicated in the data sets. Adding this question to all DHS surveys with a maternal mortality module could help evaluate the quality of the data through the inter-sister agreement in reports of their siblings' survival histories.

3. We suggest adding some recall cues prior to eliciting the list of siblings.

Several studies have evaluated mortality rates based on sibling survival data in comparison with estimates of the World Population Prospects (WPP) [13, 15] or with prospective mortality data from demographic surveillance sites [8]. They all conclude that sibling histories tend to underestimate adult mortality, partly because of omissions of some siblings. A recent validation study demonstrated that it is possible to improve the quality of the data with some modifications of the questionnaire [9]. The following recall cues could be added after MM3 ('How many births did your mother have before you were born?'):

- "Has your mother ever given birth to a boy or a girl who was born alive but later died?"
YES/NO
- "How many brothers have died?"
- "How many sisters have died?"
- "Sometimes we forget to mention a brother or sister because we did not reside with them for a long time or we do not see them very often. Is there any brother or sister who did not live with you for long or with whom you have few contacts?" If Yes, correct MM3.
- "We sometimes omit to mention a brother or sister because they were born from another union, that is to say, they have the same biological mother, but not the same father as you. Is there a sibling born from another biological father that you have not mentioned so far?"
If Yes, correct MM3.

4. We suggest including a question on violent mortality for each deceased person aged 12 or more.

In some surveys, a question is asked about violent mortality. For instance, in the DHS conducted in Zimbabwe in 2005-06, the following question was asked for all sisters who had died after age 12: "Was (NAME)'s death due to an accident or violence?" We propose to systematically include this question in the maternal mortality module and for all siblings who died above age 12 (males included). Violent or accidental deaths are more easy to identify than pregnancy-related mortality. According to estimates from the Global Burden of Disease 2010 Study, road injuries, self-harm and interpersonal violence were the second, fourth and sixth leading causes of deaths in developing countries among adults aged 15-49 in 2010 (<http://www.healthmetricsandevaluation.org/gbd/visualizations/gbd-arrow-diagram>).

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