Research

How should we measure maternal mortality in the developing world? A comparison of household deaths and sibling history approaches

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Objective A reduction in the maternal mortality ratio (MMR) is one of six health-related Millennium Development Goals (MDGs). However, there is no consensus about how to measure MMR in the many countries that do not have complete registration of deaths and accurate ascertainment of cause of death. In this study, we compared estimates of pregnancy-related deaths and maternal mortality in a developing country from three different household survey measurement approaches: a module collecting information on deaths of respondents' sisters; collection of information about recent household deaths with a time-of-death definition of maternal deaths; and a verbal autopsy instrument to identify maternal deaths.

Methods We used data from a very large nationally-representative household sample survey conducted in Bangladesh in 2001. A total of 104 323 households were selected for participation, and 99 202 households (95.1% of selected households, 98.8% of contacted households) were successfully interviewed.

Findings The sisterhood and household death approaches gave very similar estimates of all-cause and pregnancy-related mortality; verbal autopsy gave an estimate of maternal deaths that was about 15% lower than the pregnancy-related deaths. Even with a very large sample size, however, confidence intervals around mortality estimates were similar for all approaches and exceeded ±15%.

Conclusion Our findings suggest that with improved training for survey data collectors, both the sisterhood and household deaths methods are viable approaches for measuring pregnancy-related mortality. However, wide confidence intervals around the estimates indicate that routine sample surveys cannot provide the information needed to monitor progress towards the MDG target. Other approaches, such as inclusion of questions about household deaths in population censuses, should be considered.

Keywords Maternal mortality; Data collection/methods; Autopsy/methods; Interviews; Households; Bangladesh; Developing countries (*source: MeSH, NLM*).

Mots clés Mortalité maternelle; Collecte données/méthodes; Autopsie/méthodes; Entretien; Ménages; Bangladesh; Pays en développement (*source: MeSH, INSERM*).

Palabras clave Mortalidad materna; Recolección de datos/métodos; Autopsia/métodos; Entrevistas; Hogares; Bangladesh; Países en desarrollo (*fuente: DeCS, BIREME*).

الكلمات المفتاحية: معدل وفيات الأمهات، تجميع المعطيات، طرق تجميع المعطيات، الصفة التشريحية، طرق الصفة التشريحية، المقابلات، السكان، بنغلاديش، البلدان النامية. (المصدر: رؤوس الموضوعات الطبية، المكتب الإقليمي لشرق المتوسط)

Introduction

Improving maternal health is one of six health-related Millennium Development Goals (MDGs);[1] the target is to reduce maternal mortality ratios (maternal deaths per 100 000 live births (MMR) by three-quarters between 1990 and 2015. The

International statistical classification of diseases and related health problems, tenth revision (ICD-10) defines a maternal death as a "death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the

pregnancy or its management but not from accidental or incidental causes."[2] In addition to maternal deaths, the ICD-10 introduced a new category of "pregnancy-related death", defined as any death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of cause.

For countries in the developing world, which often lack complete registration of deaths and accurate ascertainment of cause of death (COD), it is not clear how progress towards the MDG target can be monitored since there is no consensus about how to measure maternal mortality in such circumstances. Measurement of MMR in countries that lack such registration presents special problems because maternal deaths are not only quite rare, but also difficult to identify.[3]

Methods of measuring MMR

Various methods have been proposed to resolve these problems.[4] Reproductive age mortality surveys[5] (RAMOS) use different sources of information (e.g., death registers, burial records, midwives' reports and hospital records) to compile the most complete count possible of maternal deaths. However, such surveys are expensive and difficult to mount in the absence of a reasonably complete initial list of deaths.

Indirect sisterhood method

Graham et al.[6] proposed an indirect sisterhood method suitable for inclusion in household sample surveys. This method uses reports by adults about aggregate numbers of surviving sisters and of sisters who have died, with additional questions about the timing of death relative to pregnancy for adult sisters. This method thus identifies pregnancy-related deaths (i.e., those that occurred during pregnancy, delivery, or in the 2 months after delivery) rather than maternal deaths.

Graham et al. argued that reporting would be of high quality because sisters tend to keep in touch with one another, and that because of high fertility in the survey settings, the sample size would be amplified since women would on average have more than one sister to report on. The focus was on pregnancy-related deaths, not because such deaths were of more interest than maternal deaths, but because pregnancy-related deaths could be identified by apparently simple questions about the timing of a death relative to pregnancy. However, Shahidullah[7] in a study in Bangladesh found that 20% of pregnancy-related deaths of sisters were not reported as such. Shahidullah argued that as a result of this underreporting the resulting measure might actually approximate maternal mortality. The indirect nature of the method, being based on aggregate numbers of sisters, means

that estimates obtained reflect averages of MMR over a period of more than 20 years before the survey. In populations with declining fertility — a situation now common in the developing world — the average would be more likely to reflect conditions earlier in this 20-year period rather than towards the end of these two decades.

Direct sisterhood method

Rutenberg & Sullivan[8] proposed a direct sisterhood method, based on a detailed sibling history obtained from each respondent. The sibling history includes the name and sex of each child born to the respondent's mother, together with current age for living siblings or, for dead siblings, age at death and number of years since death. To identify pregnancy-related deaths, reports of the death of a sister or sisters of reproductive age trigger additional questions about the timing of death relative to pregnancy. This approach has been widely applied by the Demographic and Health Surveys (DHS) programme. Because individual information is obtained about each sister, estimates can be calculated for defined time periods, although for household surveys covering samples of 10 000 households or fewer, the time periods need to be long, typically 7 years or more, to avoid very large confidence intervals (CI) around the estimates.

Trussell & Rodriguez[9] show that multiple reports on the same sister (for example, four surviving siblings all reporting on the death of their one sister) do not bias results as long as the mortality risks of sisters are independent of one another. If mortality risk were correlated, then sibling groups with a high mortality risk will have more deaths, leaving fewer potential respondents than in sibling groups with low mortality, resulting in a downward bias.

An evaluation of the DHS approach[10] showed a common pattern whereby estimates for a period 0–6 years before a survey were frequently higher than the estimates for a period 7–13 years before the survey, suggesting a possible problem of underreporting of deaths that occurred many years before the survey. It should be noted that both sisterhood approaches aim to measure the ICD-10 concept of pregnancy-related mortality rather than maternal mortality, on the grounds that respondents would not easily be able to

distinguish between maternal and non-maternal deaths that occurred during or shortly after a pregnancy.

Household deaths method

Another proposed method uses questions included in a population census (or household survey with a very large sample) about deaths in each household during some reference period prior to the census, with additional questions about the timing of deaths of women of reproductive age relative to pregnancy.[11] This approach can also use the reported deaths as a trigger for a verbal autopsy (VA) to attempt to identify ICD-10 defined maternal (as opposed to pregnancy-related) deaths. Experience with measuring all-cause mortality with retrospective questions in a census about recent household deaths has indicated some problems with underreporting;[12] however, standard methods exist for evaluating the completeness of reporting of adult deaths, and in many cases, for making adjustments.[13] An assessment[11] of the household deaths approach found that it was essential to evaluate the completeness of reports of deaths, and to make adjustments if necessary.

Despite appraisals of individual methods to measure maternal mortality, no systematic comparisons across methods have previously been done because a range of methods had not been applied to a single population. In 2001, a very large nationally-representative sample survey, the Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS), was conducted, with one of its main objectives being to compare the sisterhood and household deaths methods. In this paper, we compare estimates of pregnancy-related deaths and maternal mortality from three different measurement approaches: direct sisterhood (pregnancy-related); household deaths with timing of death relative to pregnancy (pregnancy-related); and household deaths with COD (maternal).

Methods

Data source

The BMMS was conducted in early 2001 under the authority of the Bangladesh National Institute for Population Research and Training, with technical assistance from Johns Hopkins University, the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) and ORC Macro (Opinion Research Corporation).

The survey was carried out in each of two clusters in a nationally-representative stratified random sample of 808 primary sampling units (134 urban wards and 674 rural unions). A total of 104 323 households were selected for participation, and 99 202 households (95.1% of selected households, 98.8% of contacted households) were successfully interviewed.

The household questionnaire included a household listing, background information, and questions about all household deaths (name and sex of deceased person, age at death in completed years) since April 1997. For deaths of women aged 13–49 years, follow-up questions were asked about whether the woman was pregnant, giving birth, or had given birth in the 2 months before her death. In interviewed households, a total of 106 789 ever-married women aged 13–49 were eligible for individual interview, and 103 796 (97.2%) were interviewed.

The questionnaire collected background information, a birth history, and, as the second section of the instrument, a sibling history listing every sibling born to the respondent's mother, and recording sibling's sex, age in completed years if alive, age at death and number of years since death if dead, with additional questions about the timing of death relative to pregnancy for sisters who died at ages of 13–49 years. The third survey instrument consisted of a COD including both closed- and open-ended questions about symptoms and circumstances observed around the deaths of household females aged 13–49 years. The BMMS survey instruments and procedures are described in more detail elsewhere.[14]

Calculation of maternal mortality and pregnancy-related mortality

We report on two ICD-10 defined measures related to maternal mortality: the pregnancy-related mortality ratio (PRMR) and the MMR. We have calculated the PRMR because one of the methods of interest is not in practice used to measure the MMR because of the impracticality of applying a COD instrument to the respondent who is unlikely to have first-hand knowledge of the circumstances surrounding her sister's death.

We calculated each measure using the formulae shown in Box 1. We obtained data on the number of live births for the appropriate periods from the birth history. The time period for which

Box 1. **Methods to calculate pregnancy-related mortality ratio (PRMR) and maternal mortality ratio (MMR)**

$$PRMR\,(t_1 - t_2) = \frac{PRD\,(t_1 - t_2)}{LB\,(t_1 - t_2)} \times 100\,000$$

$$MMR\,(t_1 - t_2) = \frac{MD\,(t_1 - t_2)}{LB\,(t_1 - t_2)} \times 100\,000$$

$PRD\,(t_1 - t_2)$ = number of pregnancy-related deaths in the period t_1 to t_2.
$MD\,(t_1 - t_2)$ = number of maternal deaths in the period t_1 to t_2.
$LB\,(t_1 - t_2)$ = number of live births in period t_1 to t_2.

PRMR and MMR are calculated from the household deaths is 1998–2000; the time periods for which PRMR is calculated from sister deaths are 1986–90, 1991–95, 1996–2000 and 1998–2000. In both the household deaths and the sisterhood approaches, we identified pregnancy-related deaths through questions about the timing of reported deaths relative to pregnancy. Maternal deaths are identified from the household deaths by a follow-up COD instrument applied to all deaths of women aged 13–49 that occurred between April 1997 and the survey interview.

We have estimated standard errors for PRMRs and MMRs using the Jackknife repeated replication method, appropriate for complex statistics such as the MMR estimated from cluster sample designs such as the BMMS. The Jackknife repeated replication method derives estimates of complex statistics from several replications of the parent sample; every replication calculates the statistic of interest based on all but one of the sample clusters, the variance of the overall estimate being calculated on the basis of the variability of the results of the replications.[15] The estimated variance, thus, takes into account the effects of clustering.

Verbal autopsy

The COD instrument used was developed specifically for the BMMS, and it draws on experience with instruments used in the ICDDR,B Matlab Health and Demographic Surveillance System (HDSS).[16] COD was attributed on the basis of independent reviews by two physicians; in the event of disagreement, the COD instrument was reviewed by a third physician. As has been noted by several authors,[17,18] a VA is only a very approximate way of identifying causes of death, particularly in adults. Validations,[18] however, have found VAs

to have high sensitivity and specificity in identification of pregnancy-related deaths of women aged 13–49 years, quite high sensitivity and specificity in identification of external causes of death, which will represent a substantial proportion of non-maternal pregnancy-related deaths, and quite high sensitivity and specificity in identification of direct maternal causes of death.

Evaluating the quality of data on household deaths

It was not possible in this study to apply the formal methods to evaluate coverage of adult deaths proposed by the United Nations,[13] because of lack of appropriate national population age-distribution data. Therefore, we assessed the quality of recording of household deaths and sister deaths by comparing age-specific all-cause mortality rates with rates for the same years from the Matlab HDSS comparison area.[14,19] Mortality conditions in the comparison area may not be representative of Bangladesh as a whole, but data quality for the HDSS is believed to be excellent, the HDSS provides the only authoritative information on adult mortality available for Bangladesh, and the comparison area has not been the focus of special health interventions.

Ethics approval

This research was approved by all relevant ethics review bodies, and informed consent was obtained from all survey participants.

Results

Fig.1 compares on a log scale the female age-specific mortality rates from household deaths and sister deaths for the period 1998–2000 with the corresponding rates from the HDSS. The rates are remarkably similar, although the two sets of survey rates are slightly higher for

most age groups than those from Matlab. Likewise, agreement is close for male mortality (results not shown).

Table 1 shows overall PRMR and MMR (with 95% CI) by approach and time period. PRMR for the period 1998–2000 derived from the two methods are remarkably similar. MMR derived from data from the household deaths survey and COD is substantially lower, indicating that about 15% of pregnancy-related deaths were incidental to the pregnancy, and thus not maternal deaths as defined by ICD-10. This percentage is close to the range of 10–13% reported by AbouZahr.[4] The sisterhood estimates for periods 1986–90, 1991–95 and 1996–2000 provide some suggestion of a downward trend in mortality over this time, although differences between the estimates are not significant. By comparison, Ronsmans et al.[20] report MMR averaging 508 and 449 for the Matlab MCH/FP and comparison areas, respectively, for 1986–90, and estimate an annual rate of decline in both areas of about 2% per year.

The household deaths with COD approach allows the estimation of MMRs by maternal characteristics such as age and parity, and characteristics of the household. Fig. 2 shows the MMRs by 5-year maternal age groupings, and Fig. 3 shows the MMR by number of previous live births. The patterns are striking: MMR rises sharply with age, and is significantly higher for women aged 40 years and over than for women younger than 25 years. MMR is significantly higher for births to women with no preceding live births than for women with one or two previous live births, and is higher again (although not significantly so) for births to women with five or more previous live births. These patterns by both age and parity are similar to those noted in two nationally-representative

Fig. 1. **Female age-specific mortality 1998–2000: Matlab comparison area, Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS) household deaths and BMMS sibling histories**
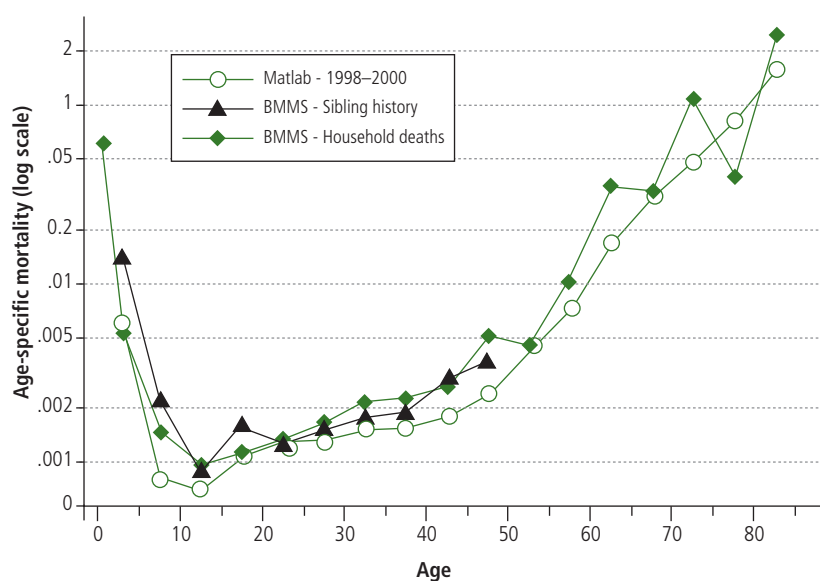
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RAMOS studies conducted in Egypt in 1992 and 2000.[21,22]

Discussion

The target for the fifth MDG, the improvement of maternal health, is to reduce the maternal mortality ratio by three-quarters from 1990 to 2015. To monitor progress towards this target, accurate measurement of MMR over time is necessary. However, there is no consensus about how measurement should be implemented, either in countries with complete civil registration systems — but where substantial proportions of maternal deaths may not be classified as such — or in countries that do not have complete registration of deaths, in which measurement is generally attempted through sample surveys. Furthermore, it should be noted that the MDG-5 target

is expressed in terms of MMR reduction, but measurement methods developed for developing countries often focus on the PRMR rather than the MMR, because of the difficulty in differentiating between maternal and other pregnancy-related deaths in household surveys.

Estimates from sample surveys are affected by two types of error: sampling error, which is a function of the size and design of the sample, and can be estimated statistically; and non-sampling error, which arises from errors in data collection or processing, and can often only be assessed by comparison with external sources. In this analysis of different types of data relevant to the estimation of MMR (or its proxy, the PRMR), we have estimated sampling errors using standard methods, and we have attempted to assess non-sampling errors

Table 1. **Pregnancy-related mortality ratios (PRMR) and maternal mortality ratios (MMR) by data collection method and time period**

	Sisterhood		Household deaths		Household deaths with verbal autopsy	
	Woman–years of exposure	PRMR (95% confidence interval)	Woman-years of exposure	PRMR (95% confidence interval)	Woman-years of exposure	MMR (95% confidence interval)
1998–2000	617 758	400 (337–462)	358 007	382 (305–460)	358 007	322 (253–391)
1996–2000	1 003 288	449 (400–498)	N/A[a]	N/A	N/A	N/A
1991–1995	844 074	485 (438–532)	N/A	N/A	N/A	N/A
1986–1990	653 932	514 (453–574)	N/A	N/A	N/A	N/A

[a] N/A = not available.

through examinations of both internal and external consistency. However, consistency does not prove validity (although inconsistency does demonstrate lack of validity), and we have no external measure of known validity against which to compare our results. Thus, although the internal and external checks on consistency are very satisfactory, we cannot demonstrate conclusively that our estimates are valid.

In terms of internal consistency, estimates of PRMR for 1998–2000 from the household deaths approach and the sisterhood approach in the BMMS are very similar in size, although the sisterhood estimates have somewhat greater sampling precision, with 95% CI of ±15% as opposed to ±20% from the household deaths survey. The advantage of the sisterhood approach in terms of sampling precision is approximately consistent with the fact that the woman-years of exposure recorded by the sisterhood approach were 70% greater than those recorded by the household deaths approach. It should be noted that the consistency of the two estimates is not a consequence of both types of data being collected in the same households. The deaths reported by the two approaches will generally not be the same: respondents will generally be reporting on deaths of sisters in households other than their own, often separated by a substantial distance, whereas in the case of the household deaths approach the deaths are those in the reporting household.

Both approaches also seem to have estimated overall female adult mortality well. The decision about which approach to use to obtain a recent estimate of PRMR should, therefore, be based on considerations of convenience rather than accuracy, and the household deaths approach requires the collection of much less information than the sisterhood method. However, the BMMS included an extremely large sample of respondents; much larger than should be considered feasible as part of a routine monitoring system. Because of the sample size, both the household deaths approach and the sisterhood approach were able to produce PRMR estimates for a 3-year period with a precision much the same as those derived for 7-year periods from most demographic and health surveys. The BMMS experience does not provide guidance as to how well a household deaths approach might work if the reference period for deaths was increased to 7 years, so the sibling history approach may be preferable for demographic and health surveys of average size.

The sisterhood approach yielded plausible estimates of PRMR for three 5-year periods before the survey, indicating a gradual, but non-significant, decline over time. These results contrast with experience with DHS sibling histories, which generally show implausible and often sharp increases in PRMR.[10] We postulate that this difference in performance is a consequence of the fact that measurement of maternal mortality was

a major focus of the BMMS, whereas it is only one of many measurement goals of DHS. The BMMS thus gave the sibling history greater emphasis than in most DHS. For example, the sibling history was the second section of the BMMS questionnaire, whereas it is typically the last module of a more lengthy DHS questionnaire. Also, the sibling history may have received greater emphasis in training of interviewers and field supervision than would be the case for an average DHS.

A major advantage of the household deaths approach is the ability to combine it with the application of a COD to attempt to identify maternal, as opposed to all pregnancy-related, deaths. Although it may be possible in principle to include a COD with a sibling history by asking respondents about the signs and symptoms surrounding deaths of sisters, such accounts would usually be second hand and of doubtful accuracy. Another advantage of the household deaths approach is the ability to link characteristics of the woman, such as parity, and household characteristics at the time of the survey (although not at the time of her death), such as economic condition, to the risk of maternal death.

We conclude that the sisterhood approach remains a viable option for surveys of 30 000 households or less in high-fertility populations; from such samples, estimates must be made for long time periods in order to achieve acceptable levels of sample precision, and the household deaths approach remains untested for such long recall periods. In large surveys and population censuses, by contrast, the household deaths approach has considerable advantages. Irrespective of approach, emphasis must be placed on the relevant part of the survey instruments in interviewer training and field supervision to ensure that non-sampling errors are minimized.

The sampling errors from the BMMS indicate that even in household surveys with large samples, neither the sibling history nor the household death approach can be used to monitor progress towards the MDG target for maternal mortality with any degree of precision: even with a sample size of 100 000 households, the 95% CI around the 3-year estimates exceeds ±15%, and a decline in the sisterhood-based point estimate of the PRMR of 22% (514–400) from 1986–90 to 1998–2000 fails to reach statistical significance. Although

Fig. 2. **Maternal mortality ratios by age group: Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS), 1998–2000**[a]
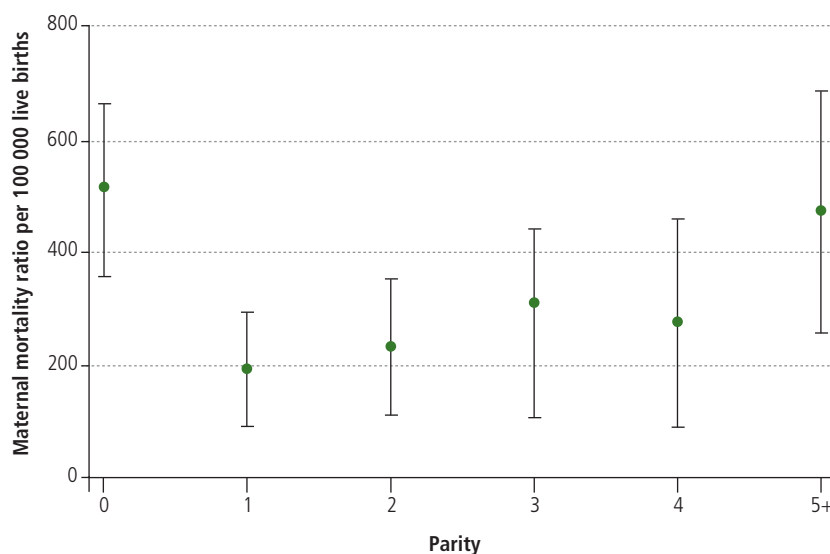

[a] Vertical bars show 95% confidence intervals.

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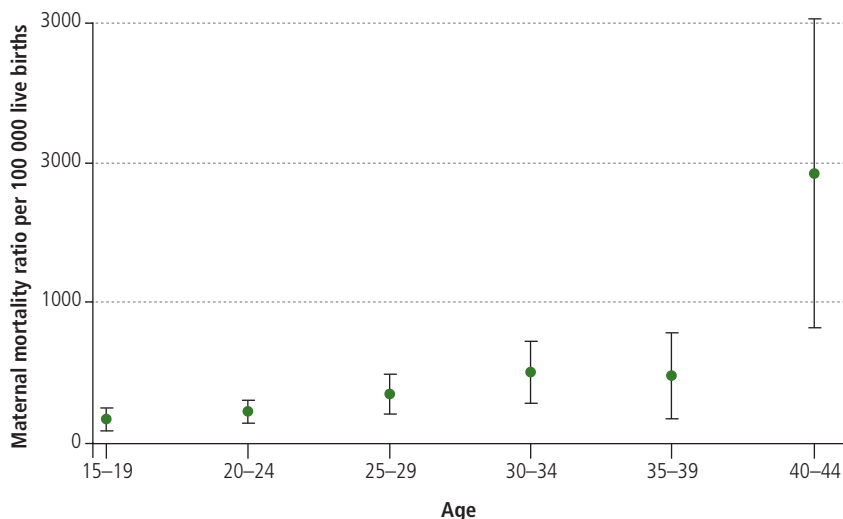
some argue that trends can be measured more satisfactorily than can absolute values, on the grounds that systematic errors may not change over time, this argument does not apply to random sampling errors.

On the assumption that a typical cost for a household survey is US$ 10 per household, a survey of 100 000 households would cost US$ 1 million, and is still unable to show a PRMR decline of 22% over 10 years to be significant. As a monitoring strategy, such surveys cannot be viewed as cost-effective. If the international community is serious about monitoring progress towards the MDG-5 target, one of two options must be pursued: improvement of civil registration, or promotion of the household deaths approach combined with a COD in national population censuses. Experience has shown progress on improving civil registration to be slow and uncertain. We conclude that in developing countries that lack complete and accurate registration of deaths, adequate monitoring of progress will require the widespread use of census questions to identify household deaths, with follow-up, perhaps on a sample basis where numbers of deaths are large, by

Fig. 3. **Maternal mortality ratios by parity: Bangladesh Maternal Health Services and Maternal Mortality Survey, 1998–2000[a]**

a Vertical bars show 95% confidence intervals.

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VA to identify maternal deaths. Relevant estimates of the marginal cost of including extra household-level questions in a census do not exist, but they are likely to be small compared with the total cost of a large sample survey. ■

Résumé

Comment mesurer la mortalité maternelle dans les pays en développement ? Comparaison entre les estimations obtenues par recensement des décès auprès des ménages et par analyse des antécédents familiaux

Objectif La réduction du ratio de mortalité maternelle (RMM) fait partie des six Objectifs du Millénaire pour le développement (ODM) en rapport avec la santé. Néanmoins, aucun consensus n'a été trouvé sur le manière de mesurer le RMM dans les nombreux pays qui n'enregistrent pas la totalité des décès et ne déterminent pas avec exactitude la cause des décès. La présente étude compare les estimations de la mortalité liée à la grossesse et de la mortalité maternelle dans un pays en développement fournies par trois méthodes de mesure différentes par enquête auprès des ménages : un module d'enquête recueillant auprès des personnes interrogées des informations sur l'éventuel décès d'une ou plusieurs sœurs ; une collecte auprès des ménages des données relatives aux décès récents, y compris la date (ou la période) de cet événement ; et une procédure d'autopsie verbale destinée à identifier les décès maternels.

Méthodes L'étude s'est servie des données d'une enquête par sondage auprès des ménages de très grande ampleur, représentative à l'échelle nationale et réalisée au Bengladesh en 2001. Au total, 104 323 ménages ont été sélectionnés pour participer à l'enquête et un entretien fructueux a pu être mené avec 99 202 d'entre eux (95,1 % des ménages sélectionnés, 98,8 % des ménages contactés).

Résultats Les démarches reposant sur la recherche des antécédents familiaux et sur le recensement des décès auprès des ménages ont abouti à des estimations très proches de la mortalité toutes causes confondues et de celle liée à la grossesse ; l'autopsie verbale a fourni une estimation de la mortalité maternelle inférieure d'environ 15 % à la mortalité liée à la grossesse. Malgré la très grande taille de l'échantillon, les intervalles de confiance encadrant les estimations de la mortalité restaient similaires pour les trois méthodes et dépassaient ± 15 %.

Conclusion Les résultats de cette étude laissent à penser qu'en améliorant la formation des enquêteurs, la démarche utilisant les antécédents familiaux, comme celle reposant sur le recensement des décès auprès des ménages, pourraient offrir des méthodes acceptables pour mesurer la mortalité liée à la grossesse. Néanmoins, la largeur des intervalles de confiance encadrant les estimations indique que les enquêtes par sondage courantes sont incapables de fournir les informations nécessaires au suivi des progrès en direction de l'ODM. D'autres approches, telles que l'introduction de questions concernant les décès au seins des foyers dans les questionnaires de recensement de la population, devraient être envisagées.

Resumen

¿Cómo debemos medir la mortalidad materna en el mundo en desarrollo? Comparación de los sistemas basados en las defunciones en hogares y los basados en las historias de hermanas

Objetivo La reducción de la razón de mortalidad materna (RMM) es uno de seis Objetivos de Desarrollo del Milenio (ODM) relacionados con la salud. Sin embargo, no hay consenso alguno sobre la manera de medir la RMM en los muchos países que carecen de registros de defunción completos y de sistemas que permitan determinar con precisión las causas de defunción. En este estudio comparamos las estimaciones de las defunciones asociadas a embarazos y la mortalidad materna en un país en desarrollo obtenidas a partir de tres encuestas de hogares diferentes: un módulo con el que se acopió información sobre las defunciones de las hermanas de los encuestados; la recopilación de información sobre las defunciones recientes en los hogares con una definición de las defunciones maternas basada en el momento de la defunción; y un instrumento de autopsia verbal para identificar las defunciones maternas.

Métodos Utilizamos datos de una encuesta muy amplia de muestras de hogares representativa del ámbito nacional realizada en Bangladesh en 2001. Se seleccionaron para participar en el estudio 104 323 hogares, y se entrevistó con éxito a miembros de 99 202 hogares (95,1% de los seleccionados, y 98,8% de los contactados).

Resultados Los dos sistemas, -hogares o hermanas- arrojaron estimaciones muy parecidas de la mortalidad por todas las causas y la mortalidad asociada a embarazos; con las autopsias verbales se obtuvo una estimación de las defunciones maternas un 15% inferior a las muertes asociadas al embarazo. Incluso con un tamaño de muestra muy grande, sin embargo, los intervalos de confianza en torno a las tasas de mortalidad estimadas fueron semejantes en todos los casos y superaron el margen de ±15%.

Conclusión Nuestros resultados parecen indicar que, a condición de mejorar la formación de los encuestadores, tanto el método basado en las hermanas como el basado en los hogares son opciones viables para medir la mortalidad asociada al embarazo. Sin embargo, los amplios intervalos de confianza observados en torno a las estimaciones indican que las encuestas basadas en muestras sistemáticas no pueden proporcionar la información necesaria para vigilar los progresos hacia la meta del ODM. Hay que estudiar otras estrategias, como la inclusión de preguntas sobre las defunciones en hogares en los censos de población.

ملخص

كيف يتوجَّب علينا أن نقيس معدلات وفيات الأمهات في العالم النامي؟ مقارنة بين أسلوب تقدير الوفيات من السكان وأسلوب أخذ القصة من الأخوة والأخوات

الهدف: يُعد إنقاص معدلات وفيات الأمهات أحد المرامي الإنمائية الألفية الستة المرتبطة بالصحة؛ إلا أن الآراء لم تـتفق على كيفية قياس معدلات وفيات الأمهات في الكثير من البلدان التي تفتقد لنظام متكامل لتسجيل الوفيات وللتعرُّف الدقيق على أسباب الوفيات. وفي هذه الدراسة، قارنّا تقديرات الوفيات المرتبطة بالحمل ووفيات الأمهات في أحد البلدان النامية، مستمدين المعلومات من أساليب متعددة لقياس التحريات السكانية؛ وهي نموذج جمع المعلومات حول الوفيات من أخوات الذين استجابوا للدراسة؛ وتجميع المعلومات حول وفيات السكان الحديثة العهد مع تعريف لوقت حدوث الوفاة لدى الأمهات، والصفة التشريحية اللفظية كأداة للتعرُّف على أسباب وفيات الأمهات.

الطريقة: استخدمنا المعطيات التي نتجت عن التحري الذي أجري في بنغلاديش عام 2001، وشمل عيِّنة سكانية كبيرة تمثل الصعيد الوطني. واخترنا 104 323 من السكان للمشاركة، أجريت المقابلات مع 99 202 منهم بنجاح (95.1% من السكان المختارين، و98.8% من السكان الذين تم الاتصال بهم).

الموجودات: لقد حصلنا من أساليب التعرُّف على الوفيات من الأخوات ومن السكان على تقديرات شديدة التشابه لحمل الوفيات وللوفيات المرتبطة بالحمل. أما الصفة التشريحية فقد أدت إلى تقديرات لأسباب وفيات الأمهات أخفض بمقدار 15% من الوفيات المرتبطة بالحمل؛ وذلك رغم كبر حجم العيِّنة، إلا أن فاصلة الثقة المحيطة بمعدلات وفيات الأمهات كانت متشابهة في جميع الأساليب وزادت عن ± 15%.

الاستنتاج: تشير المعطيات التي حصلنا عليها في هذه الدراسة إلى أن طرق التعرُّف على معدلات الوفيات من السكان أو من الأخوات إذا كانت نتيجة لتدريب محسَّن لجميع القائمين على جمع المعطيات، هي طرق قابلة للاستعمال بنجاح لقياس معدلات الوفيات المرتبطة بالحمل لدى الأمهات. إلا أن سعة فاصلة الثقة المحيطة بالتقديرات تشير إلى أن التحريات على العينات الروتينية لا يمكنها تقديم المعلومات الضرورية لرصد التقدُّم المحرز نحو بلوغ المرامي الإنمائية للألفية. أما الأساليب الأخرى مثل إدراج الأسئلة حول وفيات السكان في تعداد السكان فينبغي أن تؤخذ بالحسبان.

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