East West University

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Project Report

"Verbal Autopsy in Bangladesh"

Submitted by

Mehedi Hassan

ID: 2013-1-53-017

Supervisor

Dr. Anup Kumar Paul

Assistant Professor

Department of Electronics and Communications Engineering

Declaration

I hereby declare that we have completed project on the topic entitled "**Verbal Autopsy in Bangladesh**" as well as prepared as research report to the department of Electronics and Communications Engineering, East West University in partial fulfillment of the requirement for the degree of B.Sc. in Electronics and Telecommunications Engineering, under the course "Research/Internship (ETE 498)". I further assert that this report in question is based on our original exertion having never been produced fully and/or partially anywhere for any requirement.

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Mehedi Hassan

ID: 2013-1-53-017

Electronics and Communication Engineering

Acceptance

This research report presented to the Department of Electronics and Communications Engineering, East West University is submitted in partial fulfillment of the requirement for the degree of B. Sc. In Electronics and Telecommunications Engineering, under complete supervision of the undersigned.

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Dr. Anup Kumar Paul

Assistant Professor

Department of Electronics and Communications Engineering

Acknowledgement

First and foremost with all our heartiest devotion I am grateful to almighty Allah for blessing us with such opportunity of learning and ability to successfully complete the task. A special thanks with honor to our supervisor Dr. Anup Kumar Paul, who was kind enough to allocate his valuable time to provide us with his humble guidance, motivating thought and encouragement.

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Mehedi Hassan

ID: 2013-1-53-017

Electronics and Communication Engineering

Abstract

Verbal autopsy (VA) is a method of determining individuals' causes of death and cause-specific mortality fractions in populations without a complete vital registration system. In such areas the majority of deaths occur outside hospitals and are not recorded. Verbal autopsy is very helpful to determine probable causes of death for the area where, there is no formal medical attention given. It is a method of gathering health information about a deceased individual to determine his or her cause of death. Verbal autopsies symptoms data reported by a family member or paid helper who regularly looks after a patient along with the cause of death are collected from a medical facility, and the cause-of-death distribution is estimated in the population where only symptom data are available. This paper develops a new database about verbal autopsy in Bangladesh to clarify cause of death using information acquired through VA. My database shares some symptom information about some people to estimate the reasons of death.

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Chapter 1

Introduction

1.1 Verbal Autopsy

A verbal autopsy (VA) is a method of gathering health information about a deceased individual to determine his or her cause of death. Health information and a description of events prior to death are acquired from conversations or interviews with a person or persons familiar with the deceased and analyzed by health professional or computer algorithms to assign a probable cause of death.[1]

Verbal autopsy is used in settings where most deaths are undocumented. Estimates suggest a majority of the 60 million annual global deaths occur without medical attention or official medical certification of the cause of death. The VA method attempts to establish causes of death for previously undocumented subjects, allowing scientists to analyze disease patterns and direct public health policy decisions.

Noteworthy uses of the verbal autopsy method include the Million Death Study in India, China's national program to document causes of death in rural areas, and the Global Burden of Disease Study 2010.[1][2][3]

1.2 Uses and users of VA data

VA is used in three main ways:

1 First, it has been primarily used as a research tool in the context of longitudinal population studies, intervention research or epidemiological studies.

2 Second, it has become a source of cause of death statistics to meet the demand for population level cause-specific mortality data to be used in policy, planning, priority setting and benchmarking.

3 Third, VA data are gaining acceptance as a source of cause of death statistics to be used for monitoring progress and evaluating what works and what does not. Because vital registration coverage has not significantly improved in developing countries, VA methods have been mainly applied in the following data collection systems: clinical trials and large-scale epidemiological studies; demographic surveillance systems; national sample surveillance systems; and household surveys. [4]

Over the past decade, due to the growing demand for solid estimates of vital events and determinants of health, the primary objective of health and demographic surveillance system (HDSS) sites evolved to encompass: 1) the production of population-based health information to support evidence-based health policies and 2) the monitoring and evaluation of health interventions in settings where routine health information and vital registration systems are incomplete. Well-run HDSS sites are a good source of data for health studies that require longitudinal follow-up. However, HDSS sites do not provide representative data for national estimates of cause-specific mortality. When information about a large geographical area is needed, mortality surveys can be used to identify deaths. These surveys have the advantage of covering a much wider geographical area than the HDSS sites and therefore allow comparisons to be made among different regions of a country.

Potential users of data generated through VA include communities, health care planners and managers, researchers, global decision-makers and donors. While there is a degree of overlap, these users have different perspectives on the uses of mortality data, which have an impact on the desirable characteristics of VA instruments. Researchers, epidemiologists and global-level decision-makers want VA data to inform burden of disease estimation and program evaluation, implying that cause of death estimates must meet high accuracy standards and be comparable over time and across countries.[5] National and sub-national decision-makers and health system managers require cause of death data for planning, budgeting and resource allocation and for monitoring and reporting to donors, implying that VA data needs to be actionable and program relevant.

There have been a few instances where VA has been administered on a large scale as an explicit part of the development of national statistics. [6] Users of VA have identified the need for simpler data collection instruments coupled with convenient IT-based solutions (e.g. mobile phones or hand-held devices). These large scale users of VA have a perspective different from that of researchers, giving priority to the VA instrument's simplicity, feasibility and adaptability to local contexts, cost-effectiveness and program relevance. [5]A simplified VA instrument coupled with automated methods to ascertain causes of death can be a steppingstone to increase the coverage of operational and representative civil and vital registration systems.

1.3 Importance and Advantages of VA

Demographers, domestic and non-domestic policymakers, public health officials, and medical personnel need information about the global distribution of deaths by cause in order to set research goals, budgetary priorities and improving policies. The quality of death registration data available in developing country is very poor and most of the countries contain no information about this. Only 12% countries out of 192 have high quality death registration data and 38% have no mortality data at all [7]. More than two third of deaths worldwide occur without any medical certification. Bangladesh is one of the developing country. Here, most of the death occurs without any medical certification. Even, on most cases, the members of deceased family don't know the exact reason of death and they don't try to know. By using verbal autopsy method, we can gather health information about a deceased person to determine the estimate cause of his or her death. In 1991, a study into the global burden was commissioned by The World Bank and a new study is currently under way. Verbal autopsy

analyses is an initiative to assess the availability of recent mortality data, and the completeness of regional death registration.

Verbal autopsy studies are now widely used in the developing countries of the world to estimate cause-specific mortality rates without vital registration or medical death certification, sample registrations, risk factors, and the effects of public health interventions. Verbal autopsy is a technique "growing in importance"[8]for estimating the cause-of death distribution in populations without vital registration or other medical death certification. It involves collecting information about symptoms (including signs and other indicators) from the caretakers of each of a randomly selected set of deceased in some population of interest, and inferring the cause of death. Inferences in these data are extrapolated either by physicians from their prior experiences or by statistical analysis of a second data set from a nearby hospital where information on symptoms from caretakers as well as validated causes of death are available.

Verbal autopsy studies are now widely used throughout the developing world to estimate cause-specific mortality, and are increasingly being used for disease surveillance and sample registration [9]. Verbal autopsy is used on an ongoing basis and on a large scale in India and China, and in 36 demographic surveillance sites around the world [10]. The technique has also proven useful in studying risk factors for specific diseases, infectious disease outbreaks, and the effects of public health interventions [11].

Until now, the most commonly used method has been physician review of symptoms with no additional validation sample. This approach can be expensive as it involves approximately three physicians, each taking 20–30 minutes to review symptoms and classify each death. To reduce the total time necessary, more physicians can be hired and work in parallel. Because judgments by these doctors are highly sensitive to their priors (when a Kansas doctor hears "fever and vomiting," malaria would not be her first thought), physicians need to come from local areas. This can pose difficult logistical problems because physicians in these areas are typically in very short supply, as well as serious ethical dilemmas since doctors are needed in the field for treating patients. Physician review also poses scientific problems since, although scholars have worked hard at increasing inter-physician reliability for individual studies, the cross-study reliability of this technique has remained low. Attempts to formalize physician reviews via expert-created deterministic algorithms are reliable by design, but appear to have lower levels of validity, in part because many diseases are not modeled explicitly and too many decisions need to be made.

Inferences from verbal autopsy data would thus seem ripe for adding to the growing list of areas where radically empirical approaches imbued with the power of modern statistics dominate human judgments by local experts [12]. Unfortunately, the parametric statistical modeling that has been used in this area (known in the field as "data derived techniques") has suffered from low levels of agreement with verified causes of death and is complicated for large numbers of causes. In practice, the choice of model has varied with almost every application. We attempt to rectify this situation.

In this article, we describe the current verbal autopsy approaches and the not always fully appreciated assumptions underlying them. We show that a key problem researchers have in satisfying most of the assumptions in real applications can be traced to the constraint existing methods impose by requiring the analysis of only one cause of death at a time. We generalize current methods to allow many causes of death to be analyzed simultaneously. This simple

generalization turns out to have some considerable advantages for practice, such as making it unnecessary to conduct expensive physician reviews, specify parametric statistical models that predict the cause of death, or build elaborate expert algorithms. Although the missing (cause of death) information guarantees that verbal autopsy estimates always have an important element of uncertainty, the new approach offered here greatly reduces the unverified assumptions necessary to draw valid inferences. As a companion to this article, we are making available easy-to-use, free and open source software that implements all our procedures.

The structure of the inferential problem we study can also be found in application areas fairly distant from our verbal autopsy applications. Some version of the methods we discuss may be of use in these areas as well. For example, a goal of paleo demography is to estimate the age distribution in a large sample of skeletons from measurements of their physical features by using a small independent reference group where validated ages are available and skeletal features are also measured [13]. Our methods seem to have already proven useful for estimating the proportion of text documents in each of a set of given categories, using a smaller reference set of text documents hand coded into the same categories[13]. Also the methods introduced here imply that individual level classifiers can greatly reduce the assumptions necessary for accurate generalization to test sets with different distributional characteristics.

1.4 Verbal Autopsy in Bangladesh

> Verbal autopsy used at community level is an accepted method to identify cause of death and factors contributing to death. Maternal deaths occurring in four districts in Bangladesh over a period of 24 months were identified and community health workers were trained to conduct a verbal autopsy. Of 571 maternal deaths identified almost half (273, 47.8%) occurred at facility level, 97 (17.0%) died on route to a healthcare facility and 201 (35.2%) maternal deaths occurred at home. The majority of maternal deaths occurred in the postpartum period (78.8%) in the first 6 hours after giving birth (41.6% of all postpartum deaths). Women who had accessed care at a healthcare facility were less likely to die in the first 6 hours when compared with women who died at home (relative risk 0.70; 95% confidence interval 0.56–0.88) 70.4% (402) of deaths were classified as direct maternal deaths, 12.4% (71) as indirect and 13.8% (79) as unspecified. The most common cause of death was hemorrhage (38%), followed by eclampsia (20%) and sepsis (8.1%). Almost three out of four women who died had sought care for complications during the index pregnancy. Most mothers who died in Bangladesh had accessed care. It is now crucial that the quality of care received at health facility level is improved. This includes a refocus on strengthening healthcare providers' knowledge and skills to recognize and manage complications and provide emergency obstetric care. The enabling environment must be in place as well as ensuring a fully functional referral pathway between healthcare facilities.

In the last decade, Bangladesh has made remarkable progress towards Millennium Development Goal 5 (MDG5) with a 40% reduction in the maternal mortality ratio (MMR) from 320 to 194 maternal deaths per 100 000 live births.[14] Although Bangladesh seems on track to reach MDG5 in 2015, an inadequate health system response and poor healthcare-seeking behavior of women and their families are often suggested as the major challenges that still need to be addressed to further reduce the MMR in Bangladesh.[15] The

identification of factors contributing to maternal deaths, including both sociodemographic and biomedical factors, can assist in the development of focused interventions to address these challenges.

Poor access to good-quality care is considered to be one of the main reasons for the relatively low percentage of deliveries conducted by skilled birth attendants (SBA) in Bangladesh.[15] Access to facility-based skilled birth attendance and emergency obstetric care may be hampered by three delays first described by Thaddeus and Maine.[16] These include delays related to decision making at community level, delays in reaching the hospital as well as delays in receiving professional care once woman has arrived at the hospital.

Verbal autopsy (VA) is a method that can be used to gather information at community level on factors contributing to a maternal death and to try and establish cause(s) of death.[17] This participatory process based on information provided by family and household members of the deceased mother provides useful information that, coupled with other surveillance methods can be used to develop a needs-based approach to addressing social as well as health system factors contributing to maternal deaths. The process of conducting VA is not new to Bangladesh. [18] The VA tools for the assessment of newborn deaths are currently included in the Demographic and Health Survey.[19] Nevertheless, the process of using VA to review maternal deaths on a larger scale and integrated within the existing healthcare system has not been scaled up in Bangladesh. We introduced VA as a methodology to be used as part of the existing health system structure across four districts in Bangladesh for all maternal deaths identified over a two-year period.

1.5 Objective of this Thesis

- To provide up-to-date information for assessing the situation of children and women in
  Bangladesh;

- To generate data for the critical assessment of the progress made in various areas, and to put additional efforts in those areas that require more attention;

- To furnish data needed for monitoring progress toward goals established in the Millennium Declaration and other internationally agreed upon goals, as a basis for future action;

- To collect disaggregated data for the identification of disparities, to allow for evidence based policy-making aimed at social inclusion of the most vulnerable;

- To contribute to the generation of baseline data for the post-2015 agenda;

- To validate data from other sources and the results of focused interventions.

Chapter 2

Methodology

2.1 Collecting Information

2.1.1 Training of field interviewers to write a 'Verbal autopsy' report

Male non-medical graduates with at least 15 years of formal education were selected. A ten days training was given on verbal autopsy interview techniques and writing verbal autopsy reports.

There are four steps in training;
1). Introduction to anatomy, signs and symptoms of various diseases,
2). mock interviews,
3). hands-on-training on writing verbal autopsy reports and
4). feedback session.

2.1.1.1 Step 1

This consisted of a basic three day introduction to anatomy, collecting data on history of past illness (refer Appendix), using symptoms/signs checklist of various diseases (refer Appendix) and to interview the surviving spouse/close associates or relatives of the deceased, the other members of the community such as neighbors to get data on train of events or circumstances preceding the death. Reports are to include complaints, symptoms, signs, and duration of illness and treatment details of the illness prior to death. The following data are to be ascertained (for all deaths due to medical causes) from the respondent to write the verbal autopsy narrative report:

• Onset of illness prior to death: sudden or gradual
• Major symptom(s) and associated symptom(s) – in chronological order
• If a symptom was present it was used as a filter to define what questions to be asked. For example, the filter symptom for heart attack was chest pain and the associated symptoms were breathlessness, sweating, vomiting and pain in the retrosternal area radiating to hand, shoulder, back etc. Cough for more than 4 weeks was a filter for lung cancer and tuberculosis. For each symptom, the duration should be recorded. Details of additional symptoms are built into the narrative in chronological order, by prompting, if necessary.
• Progress of the illness
• Any treatment received: Yes/No
• If yes, type of treatment received

• Details of hospitalization prior to death:

- ❍Name of the hospital (e.g. tuberculosis hospital, cancer hospital, coronary care unit etc),
- ❍Duration of hospitalization,
- ❍Whether discharged from the hospital against medical advice or not.
- ❍Status at the time of discharge from the hospital: alive/ dead

• History of similar episodes and treatment(s) given
• abstract information related to the illness prior to death from the investigation reports done for any illness close to the time of death (within 6 months prior to the death) / hospital discharge summary etc. If available
• If a death certificate is available, copy the cause of death given on the death certificate (In the Dhaka study death certificates were available for only 20% of total deaths).
• While recording history of adults with long standing illness, the description should include details that occurred in the month preceding the death, with other information recorded in the past history section (Appendix).
• For deaths that occur during pregnancy, delivery, or within six weeks of delivery: use Appendix

If the respondent is able to give the major symptoms and circumstances leading to death, then additional probing questions are asked about the associated symptoms using the symptoms/signs checklist (Appendix) If the respondent is not able to give sufficient information on the symptoms of the illness prior to death or have difficulty in remembering any major symptom, then get necessary information to rule out nonmedical causes of death. When the interviewer is sure that the death was not due to unnatural cause, the following procedure is used to collect necessary data on the symptom.

- ❍ read out the filter symptom/sign of each module in the symptom/sign checklist
- ❍ check responses to each, and note down positive responses
- ❍where there is a positive response, additional details on that symptom and associated symptoms, if any, should be obtained.

Thus, the methodology of collecting data in the open format using 'symptoms/signs checklist' is an interactive process, with the respondent taking the lead in providing the information, and the interviewer prompting where necessary for more details. The Field Interviewer gathers as much information as possible on the underlying cause of death from the respondent. It is imperative to get a logical and complete history of symptoms, signs, events, investigations and treatment, so that the medical reviewer gets sufficient information to assign a probable specific underlying cause of death.

2.1.1.2 Step 2

In the following two days, mock interviews were organized to illustrate techniques of probing a respondent to get the required information on cause of death as well as how to write the verbal autopsy report in local language (Bangla) in Appendix as stated by the respondent.

2.1.1.3 Step 3

The third component of training included three days of hands on verbal autopsy training in the field. To limit distress over the terminal event, the field visit was carried out at least six months after death. Name of the deceased, father's name (if the deceased was a male) or spouse name(if the deceased was a female), age, gender, informant's name and address of the deceased at the time of death were given to field interviewers to locate the house of the deceased. The Field Interviewers carry Appendix (symptoms/signs checklist) in Additional file 1 to the field. They were blind to the cause of death stated on the death certificate. The Field Interviewer located the house if the deceased based on the data given to him. He introduced himself to the respondent and began the interview. Each one completed twenty reports which were reviewed and feedback was provided two days after completion of field work to maximize quality of writing the verbal autopsy report.

2.1.1.4 Step 4

The final component of training was feedback session for2 days. This session involved teaching them how to include essential information in report writing. The feedback session mainly focused discussion on reports which did not have a specified underlying cause of death and reports with minimal information to arrive at the probable underlying cause of death; for example, a report may say that a person had a stroke ten days ago but did not specify the type of onset (sudden or gradual, whether the person was conscious or unconscious, had difficulty in speaking or not, which parts of the body may have been affected etc.) Or a report may say that the deceased had fever for ten days and died. It did not give details about the fever and other associated symptoms if any.

2.2 Feedback sessions and re-interview

Feedback sessions were organized regularly throughout the study period to improve the quality of the verbal autopsy reports and 5% of the field visit reports were validated by re-interview one week after completion of the main interview, and blind to its results. This re-interviewing was done by one or other of two special interviewers because knowledge that a resurvey might well take place would ensure reliably motivated fieldwork at the initial survey, and also to check whether there were any systematic defects in the technique of any of the field workers: none were found. The underlying cause of death arrived based on re-interview data was not substantially different from the one arrived based on main interview data.

2.3 Arriving at underlying cause of death

All verbal autopsy reports were centrally reviewed by two physicians independently in order to arrive at "probable underlying cause of death". Each made a diagnosis based on signs, symptoms and sequence of events prior to death given in the verbal autopsy report, which were then coded according to the 9th International Classification of Diseases, injuries and Causes of Death [20]. The same 2 physicians reviewed all the sampled verbal autopsy reports. The discrepancies in the underlying causes of death were noted in 5% of verbal autopsy reports. These were discussed and resolved. The disagreement between 2 physicians in arriving at underlying cause of death was noted before classifying causes of death into

broad groups. For example, 'Pneumonia' and 'Lower respiratory infection' were grouped under 'Infection'. According to one physician the underlying cause of death was pneumonia and for another physician it was lower respiratory infection.

2.4 Avoiding Bias

[21]Indicates how to avoid bias from a statistical perspective. Here, we turn these results and our extensions of them into specific, practical suggestions for choosing survey questions. We do this first via specific advice about designing questions (Section 2.1.1.1), then in a section that demonstrates the near irrelevance of sensitivity and specificity, which most previous analyses have focused on (Section 2.6.1), and finally via a specific method that automates the process of weeding out questions that violate our key assumption (Section 2.6.2 to Section 2.6.6).

2.5 Verbal Autopsy about Causes of childhood deaths in BD:

The 1993-94 BDHS employed a nationally representative, two-stage sample which was selected from the integrated multipurpose master sample (IMPS), created and based on 1991 census data by the Bangladesh Bureau of Statistics. The sampling methodology has been described elsewhere (9). Since one objective of BDHS was to provide separate estimates for each of the five divisions of the country as well as for urban and rural areas, it was necessary to increase the sampling rate in certain areas. Thus, the sample is not self-weighting and appropriate weighting factors were applied during the analyses.

2.5.1 Data collection and management procedures:

Identification of deaths from the 1993-94 BDHS data file; recruitment and training of field and data staff; field interviews; and entering the data on a microcomputer. Deaths of under-S-year-old children in the 5 years before the 1993-94 BDHS were identified from the BDHS data file and the required information about the deceased children and their households was extracted. This information included the name of the child, the name of the child's mother, the child's sex, month and year of birth, age at death, and household geographical identifiers. Ten interviewing teams, each comprising one male supervisor, two female interviewers, and one logistical assistant, were deployed for collection of data. Three quality control teams, each comprising one male and one female quality control officer, were employed to monitor the work of the interviewing teams. The field teams were trained for 2 weeks on the study questionnaire before they were finally employed. An interviewing manual was prepared to guide the data collection work. Training methods included classroom lectures and field practices. In addition, the trainees were taken to a children's hospital to examine first-hand the signs and symptoms of the diseases covered in the study questionnaire. Interviews were conducted in Bengali by Bangladeshi interviewers trained to use the instrument and in the use of the local vocabulary. Efforts were made to interview the mothers whenever possible. If the mother was not available, an adult relative who had the closest contact with the child during the terminal illness was interviewed.

2.5.2 Description of the instrument:

The verbal autopsy (VA) questionnaire was divided into five parts: (1) a sheet to record from the BDHS database the deceased child's name and address, mother's name, date of birth, date of death, and sex; (2) a section with questions and filters to correctly identify the household of the deceased child or, if the household was not found, to record the reason for not finding it; (3) an open-ended section to record the mother's unprompted description of the illness that led to the child's death; (4) a pre-coded section of prompted responses about specific symptoms and signs relating to the illness; and (5) a final section to record the direct, underlying and contributing causes of death from the death certificate, if it was available. The approach adopted in the pre-coded section of the verbal autopsy questionnaire was to start with a highly sensitive question about a given cause of death (for instance, for diarrhea, "During the 2 weeks before [child's name] died, did he/she have frequent loose or liquid stools?"), which should not exclude any positives. This was followed by a series of more specific questions, intended to eliminate false positives (for example, for diarrhea, "Did the loose or liquid stools continue until death?" which is taken as a necessary condition for a confirmed diagnosis of diarrhea). Some of the specificity filters were simple yes/no questions, like the one cited above on loose or liquid stools continuing todeath, whereas others required a numerical answer, such as questions about the maximum number of diarrheas tools.

2.5.3 Data entry

Data were entered into a microcomputer using the SOSDATA double entry program, which has built-in checks against erroneous entry of data. FORTRAN and SPSS/PC programs were used for consistency checks involving the evaluation of complex expressions.

2.5.4 Analyses plan

Attributed causes of death have been presented by age groups, sex, time period (before 1992 or 1992 and later), place of residence (rural vs. urban), mother's education, and the local administrative division of the deceased. Time period is of interest for two reasons: to determine whether there is any evidence of recall lapse for the deaths that happened >3 years before the interviews, and if the data are consistent over this period, whether there is any change in the cause of death structure.

2.6 Verbal Autopsy for Maternal Death

To study the determinants of death and health-seeking behavior of mothers who died, the government of Bangladesh implemented a population-based Maternal and Perinatal Death Review system in four rural districts of Bangladesh (Thakurgaon, Jamalpur, Moulvibazar and Narail) with a total population of 6.7 million. These four districts are located in four the seven divisions of Bangladesh and are the target districts of the joint Government-UN Maternal Newborn Health Initiative, which focuses on saving maternal and newborn lives through improved district level planning, investment in infrastructure and strengthening of human resources. In addition, these four districts are target districts for the Making it Happen

Program, which aims to improve the availability and quality of skilled care attendance and emergency obstetric care.

2.6.1 Study sites

The four target districts are geographically and socio-economically representative of other rural districts in Bangladesh but were chosen based upon their comparatively weaker maternal and newborn health indicators: uptake of antenatal care (63.5% versus 67.7% nationally), percentage of deliveries attended by a trained provider (19.9% versus 31.4% nationally).[22]
Data collection tools

A death notification slip with information including: name, address, date and time of death and the date of reporting each maternal death was developed and approved by the government of Bangladesh.

The questionnaire used during VA was based on recommended WHO tools[23] and the existing national maternal death audit form for Bangladesh.[14] The questionnaire was shortened and adapted for use by the district healthcare workers and translated into Bengali. All questions were taken from a pre-existing national VA questionnaire. The tool was field tested in 2010 in one district and after final approval by the Directorate General of Health Services was implemented in all four study districts. The VA questionnaire includes 30 closed questions with different response categories and gathers information on: sociodemographic characteristics of the deceased, reproductive history, complications during pregnancy, antenatal care and birth-preparedness, healthcare-seeking behavior at the time of delivery, complications during delivery and the postpartum period as well as information on referral and delays (Appendix S1).

2.6.2 Training

Training material and guidelines for use of the VA questionnaire were developed by the Centre for Injury Prevention, Health Development and Research, Bangladesh with the assistance of a national expert group consisting of reproductive health specialists and program managers. Government health and family-planning managers and field supervisors in the intervention districts and upazillas were oriented during a 1-day workshop. All grass-roots level health and family-planning workers (Health Assistants [HA] and Family Welfare Assistants [FWA]) were trained for 1 day in how to identify a maternal death at household level in their area using the World Health Organization (WHO) definition of a maternal death and how to complete the death notification slip.

Field-level supervisors of HA and FWA (Health Inspectors [HI], Assistant Health Inspectors [AHI] and Family-Planning Inspectors [FPI]) received 2 days training focused on the application of the VA questionnaire and the conduct of a VA facilitated by a team of trained social scientists and medical doctors. Each supervisor conducted at least five VA under supervision to ensure competency in using the tool.

2.6.3 Data collection

2.6.3.1 Death notification

Trained HA or FWA were assigned to report any maternal death with each covering a population of 3000–4000 (Upazilla). Using a network of local community members (teachers, community health workers and traditional birth attendants [TBA]), information was received on any woman known to be pregnant who died in their area. After receiving this information, HA/FWA made a household visit to confirm that this was a maternal death defined as 'death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes' [24] and if so, completed a death notification slip. The slips were sent to an assigned local person 7–15 days after the death (Figure 2.1).

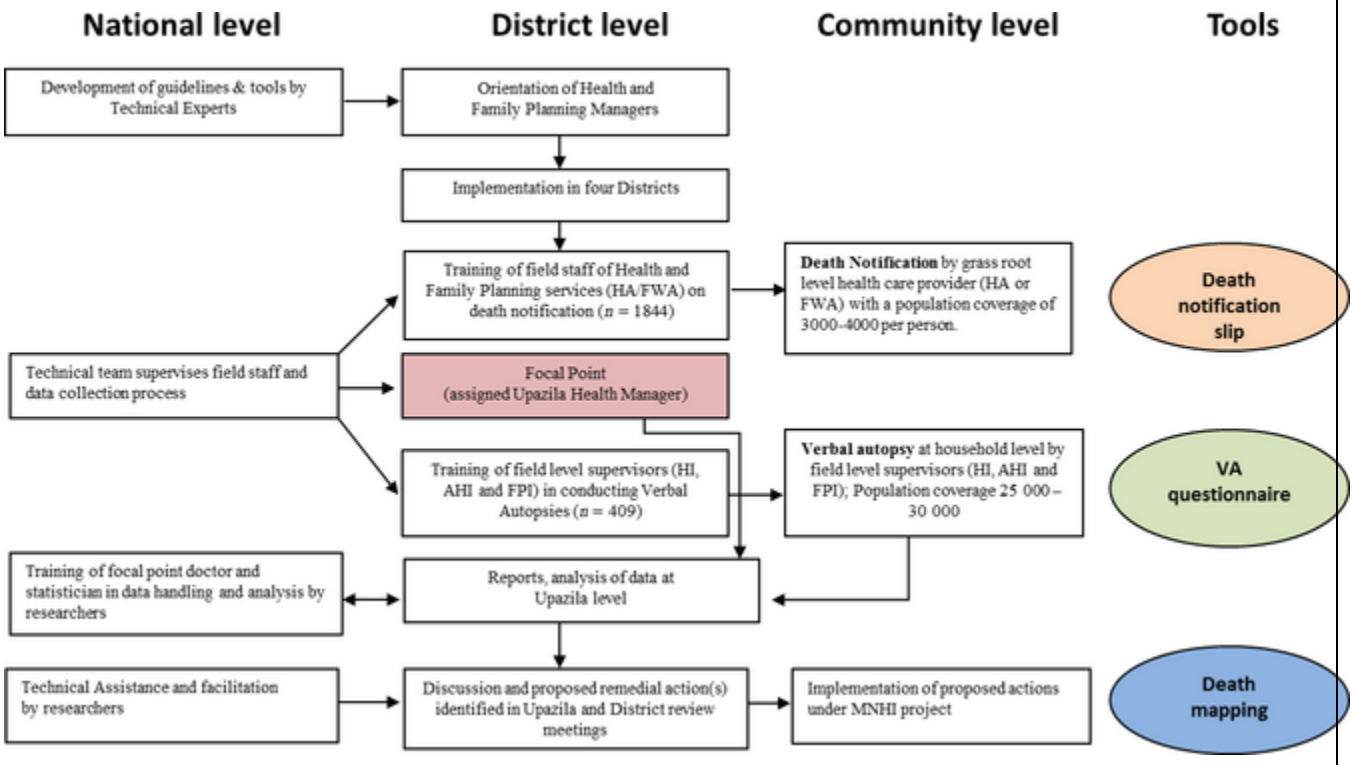

Fig 2.1: The death notification, verbal autopsy and reporting structure in BD

2.6.3.2 Verbal autopsy of collected information

Upon receipt of the death notification slip, a trained HI/AHI or FPI was assigned to conduct a VA within 15–30 days of the death by interviewing three respondents such as the mother of the woman who had died, mother-in-law, husband and/or the TBA who had provided care to the mother who had died at the household level.

2.6.3.3 Quality Assurance

All data collectors were monitored continuously using trained social scientists as research supervisors (one per upazila). The respective supervisor accompanied the health workers conducting the VA and provided instant feedback. The completed VA forms were collected and reviewed monthly at upazila level by the supervisors and central investigators. In case of any inconsistencies the family was revisited and any identified issues were clarified. Additionally, the main investigators were involved in the quality control through participation in trainings, field visits and data analysis.

2.6.3.4 Data Analysis

Data for all 571 identified maternal deaths that occurred between 1 January 2011 and 31 December 2012 in the four districts were analyzed. To assign cause of death, two obstetricians reviewed all VA independently and each assigned a cause of death. Discordant cases were discussed until consensus was reached. Cases with insufficient information to assign a cause of death were coded as 'undetermined'. The obstetricians had no background information other than that collected via VA. Data entry and descriptive analysis (frequency calculations and cross tabulations) were performed using IBM SPSS version 17.0. Pearson's chi-square test was used to calculate *P* values.

2.6.3.5 Ethics Approval

Ethical clearance was obtained from the local Ethics Committee. The protocol and tools were reviewed and approved for implementation by the relevant government department, the Directorate General of Health Services. Informed verbal consent was obtained from each respondent before each VA interview. Anonymity and confidentiality was maintained throughout the process: any staff or researcher who reviewed the VA report was 'blinded' to the name and other identifying information. Participation in the interview was voluntary and the interviewee could withdraw at any time from the interview without providing a reason or skip particular questions if these were perceived as distressing. All records and written documents were kept confidential and access remained restricted to the upazilla focal person and the research team.

2.7 Insertion of the data in to the Database

After collecting the data, we have to insert those on to the database. So that, researchers and demographers can get the data which are very important for their research. Our database is created by using html, PHP and CSS language.

Figure 2.2: Login page of the database

Figure 2.3 Query Page

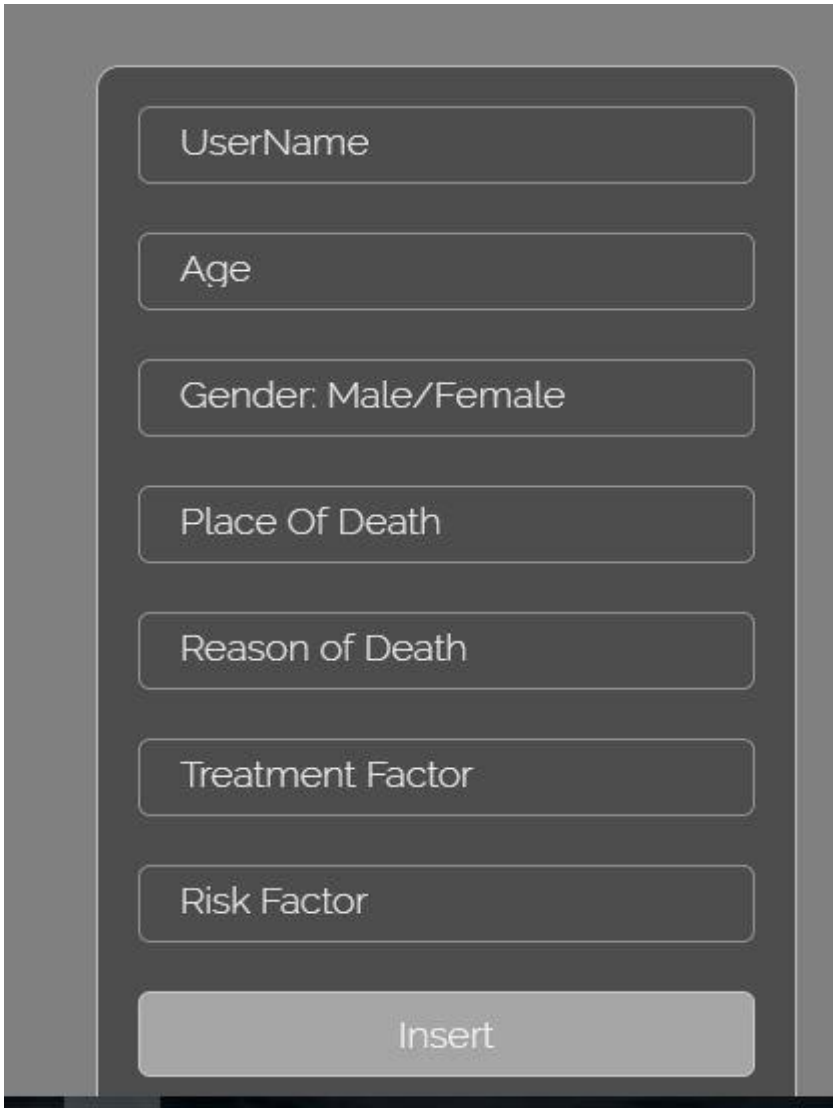

Figure 2.4 Data insertion interface of the database

Chapter 3

Results

3.1 Causes of childhood death

Table 3.1: Percentage distribution of apparent causes of death of under-5 year old children, by age group, 1988-93

		Age group		
Cause of death	Neonatal	1-11 months	12-59 months	Total (%)
Confirmed diagnoses				
Accident	0.0	4.4	20.9	8.8
Drowning	0.0	3.1	18.9	7.7
Others	0.0	1.3	2.0	1.1
Neonatal tetanus	14.9	0.0	0.0	5.4
Measles	0.0	0.0	1.9	0.7
Measles followed by	0.0	3.6	5.1	2.8
		ALRI, diarrhea		
ALRI	11.0	30.1	18.3	18.9
Watery diarrhea	1.7	6.6	4.6	4.1
Persistent diarrhea	0.0	4.6	3.5	2.6
Dysentery	0.0	0.9	2.4	1.1
ALRI and watery diarrhea	1.0	5.1	2.9	2.8
ALRI and persistent diarrhea	0.0	3.1	3.0	2.0
ALRI and dysentery	0.0	0.4	1.0	0.5
Congenital abnormality	0.9	0.0	0.0	0.3
Prematurity	0.0	0.0	0.0	0.0
Possible diagnoses Possible ALRI	6.3	8.6	4.0	6.1
Possible diarrhea	0.0	5.6	8.6	4.7

		Age group		
Cause of death	Neonatal	1-11 months	12-59 months	Total (%)
Early perinatal	47.6	0.0	0.0	17.1
Malnutrition	1.5	6.6	8.6	5.5
Not identified	14.8	18.5	13.9	15.5
No. of deaths (unweighted)	311	232	285	828

3.2 Causes of Maternal Deaths

Based on current MMR estimates of 194 per 100 000 live births Bangladesh [14] and a crude birth rate of 22.6,[19] we would have expected 588 maternal deaths to occur in the four districts during the 2-year study period. A total of 571 maternal deaths were identified in the four districts between January 2011 and December 2012. A VA was conducted after the maternal death was identified: 19.6% took place within 15 days, 43.1% within 1 month and 67.8% within 2 months of a mother's death.
Of the 571 maternal deaths identified, 273 (47.8%) died in a health facility, 97 (17.0%) died during transfer (on the way to a health facility—from the community or referred from a lower to a higher level facility) and 201 (35.2%) of maternal deaths occurred at home.

For the sake of descriptive comparisons, women who died at home and on the way to a health facility were combined into one group (n = 298). The characteristics of mothers who died are provided in Table 3.2 and are disaggregated by place of death (community, facility) and compared with the general population data available for Bangladesh. [19]

Table 3.2 Characteristics of mothers who died (all, died at community or facility level) compared with national statistics

Characteristics *n* (%)	**DHS 2011**	**Total (*n* = 571)**	**Maternal deaths at home or in transit (*n* = 298)**	**Maternal deaths at a Health facility (*n* = 273)**
Age				
Mean age at first marriage (±SD) [years]		17.8 ± 3.0	17.8 ± 3.0	17.7 ± 3.0
Mean age at first childbirth (±SD) [years]		19.9 ± 3.3	20.0 ± 3.3	19.8 ± 3.3
Mean age at death (±SD) [years]		26.6 ± 6.0	27.5 ± 6.2	25.6 ± 5.7
Mothers' education				
None	27.7%	186 (32.6%)	115 (38.6%)	71 (26.0%)
Primary education	30.0%	190 (33.3%)	93 (31.2%)	97 (35.5%)
Secondary education	42.3%	174 (30.5%)	81 (27.2%)	93 (34.1%)
Higher secondary and above		21 (3.7%)	9 (3.0%)	12 (4.4%)
Gravidity				
1		205 (35.9%)	96 (32.2%)	109 (39.9%)
2–4		289 (50.6%)	159 (53.4%)	130 (47.6%)
5 or more		77 (13.5%)	43 (14.4%)	34 (12.5%)

Characteristics *n* (%)	DHS 2011	Total (*n* = 571)	Maternal deaths at home or in transit (*n* = 298)	Maternal deaths at a Health facility (*n* = 273)
Antenatal care (ANC; index pregnancy)				
Proportion of women who received ANC	67.7%	428 (75.0%)	213 (71.5%)	215 (78.8%)
Proportion of women who received ANC four or more times	25.5%	146 (25.5%)	71 (26.0%)	75 (25.1%)
Home	16.2%	39 (10.9%)	25 (14.3%)	14 (7.7%)
Community level health facility		187 (52.4%)	93 (53.1%)	94 (51.6%)
Hospital		106 (29.7%)	45 (25.7%)	61 (33.5%)
Mode and place of delivery				
Vaginal delivery at community level		291 (64.7%)	206 (86.6%)	85 (40.1%)
Vaginal delivery at facility level		71 (15.8%)	20 (8.4%)	51 (24.1%)
Caesarean section	17.1%	88 (19.6%)	12 (5.0%)	76 (35.8%)
Attendant at delivery				
Doctor	22.2%	115 (25.6%)	22 (9.2%)	93 (43.9%)
Nurse/FWV	9.2%	64 (14.2%)	21 (8.8%)	43 (20.3%)
Relative/TBA	67.4%	271 (60.2%)	195 (81.9%)	76 (35.8%)
Care sought for complications during index pregnancy		372 (72.2%)	163 (61.0%)	209 (84.3%)
Treatment received before death		440 (77.2%)	175 (58.9%)	265 (97.1%)

Characteristics *n* (%)	DHS 2011	Total (*n* = 571)	Maternal deaths at home or in transit (*n* = 298)	Maternal deaths at a Health facility (*n* = 273)
Place of treatment for complication before death				
Home		29.8 (76)	41.4 (46)	20.8 (30)
Community facilities		12.5 (32)	17.1 (19)	9.0 (13)
Health Centre or Hospital (UHC, DH, MCWCs)		53.3 (136)	37.8 (42)	65.3 (94)
Providers of treatment for complication				
Trained community providers		6.0 (15)	11.0 (12)	2.1 (3)
Nurse, Family Welfare Visitor (FWV)		13.1 (33)	11.9 (13)	14.0 (20)
General or specialist doctors		65.9 (166)	54.1 (59)	74.8 (107)
Before delivery (antenatal death)		121 (21.2%)	60 (20.1%)	61 (22.3%)
After delivery (postnatal death)		450 (78.8%)	238 (79.9%)	2127.7%)

3.2.1 Age, parity and education

Women who died at a health facility were younger (25.6 ± 5.7 years) than those who died in the community (27.5 ± 6.2 years) ($P = 0.001$). The majority of maternal deaths occurred in women who were multiparous (64.1%). About a third of mothers who died were prim gravidae. Literacy levels among all women who died were low. One-third of the deceased women was illiterate (32.6%) one-third (33.3%) had only primary education and one-third (34%) of mothers attended secondary school and above. Mothers who died at home were less educated than those who died in a health facility ($P = 0.001$).

3.2.2 Antenatal care

Of all mothers who died, 75% had attended for antenatal care on at least one occasion and 25.5% of women received four or more antenatal check-ups. Mothers who died at a health facility were more likely to have received antenatal care (78.8%) compared with those who died at home (71.5%) ($P = 0.02$). Just over half (52.4%) of mothers had received antenatal care at community-level facilities such as community clinics or union level facilities through trained health workers or community skilled birth attendants.

3.2.3Time of death

A total of 450 maternal deaths occurred in the postpartum period (78.8%) and of these more than half (250; 55.6%) occurred in the first day after childbirth (Figure 3.1). Of these, 187 died in the first 6 hours after giving birth (74.8%). Women who had accessed care at the health facility were less likely to die in the first 6 hours after giving birth (72/212; 34.0%) compared with women who died in the community or were in transit but had not yet reached the health facility (115/238; 48.3%) (Relative risk; 95% confidence interval: 0.70; 0.56–0.88).

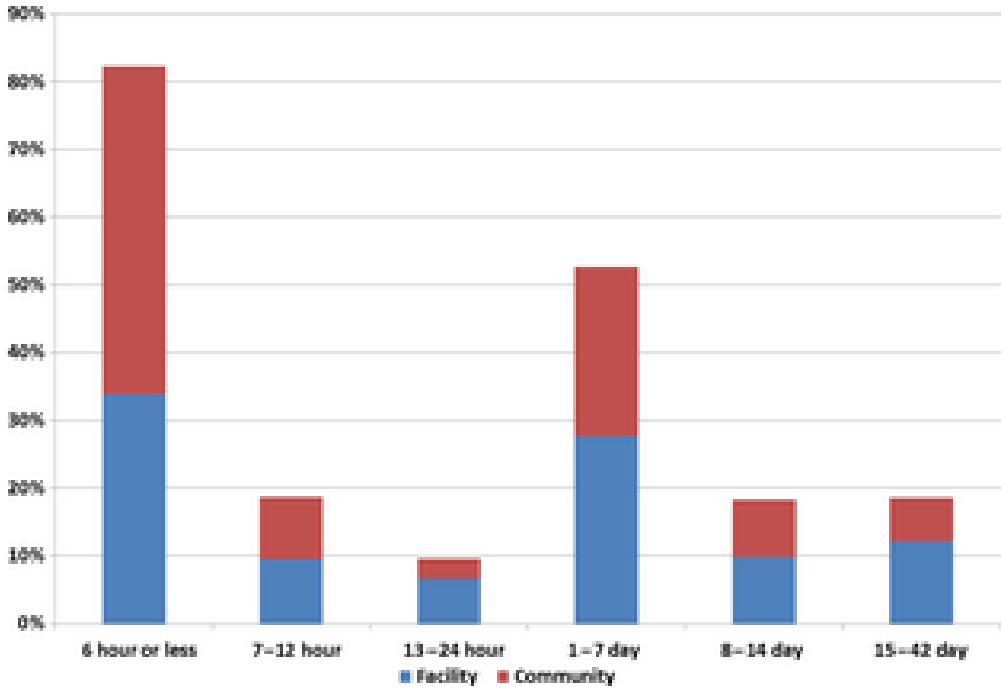

Figure 3.1 Maternal deaths in facilities and the community by time after delivery

3.2.4 Delivery characteristics

Of the mothers who died postpartum, 80.4% delivered vaginally (including assisted vaginal deliveries) and 19.6% were delivered by caesarean section (CS). The majority of CS were done in private hospitals (60.2%) whereas 39.8% took place in public facilities including: Upazila Health Complexes (2.3%), District Hospitals (10.2%) or Medical Colleges (27.3%).

A total of 39.8% of all deliveries were supervised by an SBA; including doctors (25.6%) and nurses (14.2%). The rate of SBA was lower among the women who died at home (18%) compared with those who died in a health facility (64.2%) ($P = 0.001$).

3.2.5 Care seeking for complications

Of all respondents ($n = 515$), 72.2% reported that health care had been sought for complications that arose during the index pregnancy. This was higher for maternal deaths that had occurred in health facilities (84.3%) than for deaths that occurred at home (61%). In total 97.1% of the women who died at a health facility received some form of care before death occurred. The majority of women who died at home reported having received medical treatment before death occurred (58.9%). Mothers who died at home received care mostly at home (38%) or at community-level health facilities (21%). General and specialist doctors had attended the majority of mothers who died in facilities (65%) and a significant number who died at home (45%).

3.2.6 Cause of death

After VA review, 70.4% (402) of cases were classified as direct maternal deaths, 12.4% (71) as indirect and 13.8% (79) as unspecified (Table 3.3). The most frequently identified cause of death was hemorrhage (38%) followed by pre-eclampsia/eclampsia (20%) and sepsis (8.1%). Deaths caused by hemorrhage occurred more frequently at home (43%) than at facility level (32.6%). Pre-eclampsia/eclampsia ranked second as cause of death with a higher proportion of facility deaths attributed to eclampsia than community deaths (22.7% versus 17.4%).

Table 3.3. Main cause of maternal death attributed using verbal autopsy for deaths occurring at home or at a health facility and compared with 2010 data for Bangladesh (n = 571)

Type and cause of maternal death	MMHS 2010 (%)	Total *n* (%)	Maternal death at home *n* = 298 (% of total)	Maternal death at a health facility *n* = 273 (% of total)
Direct maternal death				
Hemorrhage	31	217 (38.0%)	128 (43.0%)	89 (32.6%)
Pre-eclampsia-eclampsia	20	114 (20.0%)	52 (17.4%)	62 (22.7%)
Obstructed labor	7	19 (3.3%)	8 (2.7%)	11 (4.0%)
Termination of pregnancy	1	25 (4.4%)	15 (5.0%)	10 (3.7%)
Sepsis	0	46 (8.1%)	20 (6.7%)	26 (9.5%)
Indirect maternal death	35	71 (12.4%)	39 (13.1%)	32 (11.7%)
Unspecified	9	79 (13.8%)	36 (12.1%)	43 (15.8%)

When examining the time interval between delivery and death by cause of death, hemorrhage was responsible for the majority of deaths in the first 24 hours; whereas, the number of deaths as a result of sepsis increased over time during the postpartum period. For maternal deaths attributed to pre-eclampsia/eclampsia two peaks are observed: one in the immediate postpartum period and one 8–14 days after delivery (Figure 3.2).

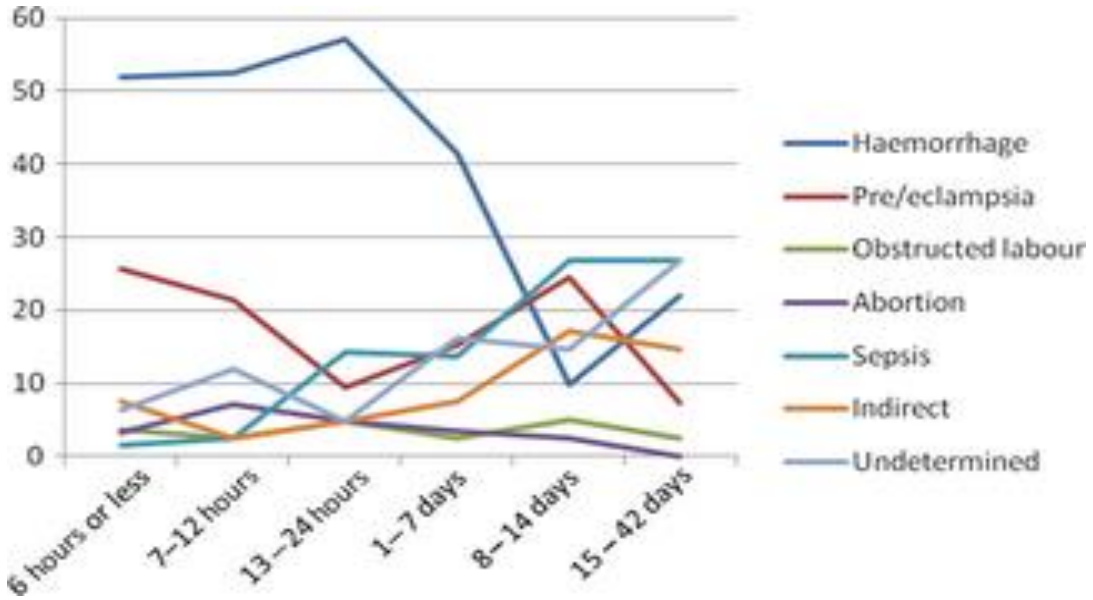

Figure 3.2 Cause of maternal deaths by time after delivery

3.2.7 Factors contributing to maternal death: associated delays

During the verbal autopsy, respondents (family members, TBA) were asked about the time it took to take a decision to seek care, the time it took to reach a health facility and how long they waited at the health facility before the woman had received treatment. Information was available for 318 maternal deaths. Respondents reported that the decision to seek care (Type 1 delay) had been taken quickly—within 3 hours in 62.5% of all cases (Table 3). The time it took to reach a healthcare facility after deciding to do so (Type 2 delay) was reported to be <2 hours in the majority of cases (77.2%). Overall, 83.2% of respondents reported that women had received treatment within the first hour after arriving at a health facility (Type 3 delay).

Table 3.4 Analysis of the 'Three delays' reported for maternal deaths that occurred in four districts in Bangladesh (*n* = 318)

Type of delay reported	Maternal deaths Total *n* (%)	Maternal deaths at home or in transit *n* (%)	Maternal deaths at health facility *n* (%)
Reported time to decide to seek care (Type 1 delay)	318	110	208
Within 1 hour	100 (31.4%)	34 (30.9%)	66 (31.7%)
1–3 hours	99 (31.1%)	42 (38.2%)	57 (27.4%)
4–6 hours	47 (14.8%)	15 (13.6%)	32 (15.4%)
More than 6 hours	72 (22.6%)	19 (17.3%)	53 (25.5%)
Reported time to reach the health facility (Type 2 delay)	289	81	208
Within 1 hour	73 (25.3%)	27.2% (22)	51 (24.5%)
1 to 2 hours	150 (51.9%)	54.3% (44)	106 (51.0%)
More than 2 hours	66 (22.8%)	18.5%(15)	51 (24.5%)
Reported time to receive treatment (Type 3 delay)	280	77	203
Within 1 hour	233 (83.2%)	88.3% (68)	165 (81.3%)
1–2 hours	36 (12.9%)	9.1% (7)	29 (14.3%)
More than 2 hours	11 (3.9%)	2.6% (2)	9 (4.4%)

3.3 Discussion

In this paper we present the findings for 571 identified maternal deaths that occurred over a period of 2 years in four districts in Bangladesh. All deaths were subjected to a VA to assess socio-medical characteristics, care-seeking behavior, cause of death and contributing factors. The majority of identified maternal deaths occurred in the postpartum period (78.8%). Although coverage with skilled birth attendance was low (39.8%) in this setting compared with 2013 international coverage rates of 70% overall and 59% for the South East Asia Region,[25] only a third (35.2%) of maternal deaths occurred at home. The majority of women had accessed care at a health facility (47.8%) or was on the way to a nearby health facility (17.0%) when they died. This suggests that the quality of care rather than access to care played an important role.

In Bangladesh as a whole and in the four study districts, the majority of deliveries are still conducted by unskilled birth attendants such as relatives or untrained TBAs. [19] In contrast, three-quarters of mothers in this study had received antenatal care on at least one occasion and a similar proportion were reported to have sought care for a life-threatening obstetric complication. Hence, although women do not use health facilities for delivery, they do access these services when complications arise. Our study revealed that most mothers who had a complication actually sought care and either died at facility level or in transit. This is contrary to earlier findings from Bangladesh where most maternal deaths were reported to have occurred at home.[15] In rural areas with presumably less availability and/or access (transport) to care, more women die at home, which is similar to the findings of studies conducted in India, Tanzania and Zimbabwe.[26-28] However, a recent study from Gujarat, India also reported that the majority of maternal deaths now occur in hospital. [29]

In this study, for the 17% of mothers who died on the way to/from a facility, we were unable to differentiate between deaths occurring on the way from home to a health facility or in transit from one health facility to another. Findings from a study conducted in India revealed that of 18% of mothers who died 'in transit', 11.5% died while being referred between health facilities [30] Such figures indicate that managing emergencies at lower level health facilities remains a challenge in many settings. Anecdotal evidence suggests that in several settings sick patients tend to be referred immediately to a higher level healthcare facility to avoid potential blame in case of death. We previously demonstrated that the key emergency obstetric care signal functions are simply not available at primary and often secondary healthcare levels.[31] There is a need to ensure that healthcare providers at primary care level can at least provide skilled birth attendance and basic emergency obstetric and newborn care.

The majority of mothers who died had accessed care. Delays in both accessing and receiving care have previously been reported as major contributing factors to maternal death.[32-34] However, no major delays were reported in this study. The family and community-based carers of the mothers who died in the four districts in Bangladesh included in this study reported that women had accessed care and received treatment within a relatively short time. This study did not allow assessment of the content and quality of emergency obstetric care or delivery care provided. This would require further research. Inability of providers to recognize a 'sick woman', inadequate treatment or failure to refer to a higher-level healthcare facility in a timely and appropriate manner have, however, also been observed in other settings. [35-36]

Most maternal deaths in this study occurred postpartum and the majority of mothers died within 24 hours after delivery. World literature on cause of death reveals similar findings with postpartum hemorrhage as the leading cause (30.8% in Asia, 33.9% in Africa) followed by sepsis (11.6% in Asia, 9.1% in Africa) and hypertensive disorders (9.1% in both Africa and Asia).[37]

The fact that the majority of mothers who delivered at a facility also died at a facility points towards the need for an emphasis on the quality of care provided rather than an emphasis on access to care. At community-level and primary-level health facilities, even if the full complement of emergency obstetric and newborn care is not available, it is essential that healthcare providers are able to at least stabilize the patient before referring her to a higher level. This does not necessarily require sophisticated equipment and/or drugs. Unfortunately, the basic knowledge and skills to manage and correctly refer such cases is often lacking and healthcare providers working at lower level healthcare facilities are not mandated to at least commence emergency care and ensure careful and effective referral. Training of healthcare providers in the immediate management of obstetric complications is much needed and has been shown to have a positive impact on knowledge and skills. [38-41]

Verbal autopsy is only part of a more comprehensive surveillance of maternal deaths, but this study has illustrated that strategies targeted at quality improvement at health facility level could be beneficial and would complement interventions that are more community-based and target education and birth preparedness. Although this study covered all maternal deaths occurring at community level in four districts of Bangladesh and so provided a comprehensive picture of different factors associated with maternal deaths, we are aware of its limitations. The majority of mothers died at facilities and we were not able to cross-check the information obtained through VA with patient records or a facility-based maternal death review process to verify the cause of death and examine in more detail the delays that could have occurred at facility level. Additional collection of qualitative data on delays might have provided a more comprehensive picture as delays tend to be underestimated through quantitative questioning alone. [31] Despite validation of a death as a maternal death by healthcare providers, all collected VA data are based on information provided by lay people in the community. Therefore, we cannot completely rule out misclassification of deaths and under-reporting of certain conditions as described elsewhere. [18, 42,43]

Chapter 4

Conclusion

The VA technique assumes that each disease category has a distinct set of signs and symptoms which are always present in the terminal illness of children dying from a particular cause, but are not present in the same combination in any other fatal illness. At present, this assumption is not fully valid. There is a good deal of overlap between the symptoms of ARI and malaria. Research to identify the clinical markers of malaria and ARI so that these two causes of deaths can be distinguished will be very important, particularly for the malaria prevalent areas. Similarly, based on VA studies to date, it appears that it is almost impossible to distinguish between sepsis and pneumonia in newborn babies who die during the first week of life. More research is required to use successfully the VA technique for early neonatal deaths. The VA technique also assumes that the carer of the deceased child (usually the mother) can accurately recognize and report the signs and symptoms of the terminal illness. Our findings and earlier VA studies reveal that although mothers do recognize the signs and symptoms of diseases, their recognition may be selective and culture-specific. Furthermore, the clinical and lay concepts of terms used to describe a particular sign or symptom often may not coincide. VA instruments can be further improved if they are adapted, based on specific studies of the mothers' recognition of signs and symptoms and the terms they use to describe them.

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➢ Appendix A:

Appendix I – used to write the history of past illness and verbal autopsy report for adult deaths (25 years or older) and in Appendix II – Symptoms/ signs checklist for adult deaths (≥ 25(years) is givenClick here for file[http://www.biomedcentral.com/content/supplementary/1471-2458-4-47-S1.doc]

Programming Code for Database:

For Signup:

```
<?php

require_once  'php_func/conection.php';

        if(isset($_POST['submit']))
        {
                $Username  = $_POST['username'];
                $Password = $_POST['password'];


                $sql_insert="INSERT  INTO user(username,password)
                                VALUES('$Username','$Password')";

           mysqli_query($db,  $sql_insert)  ;

           header("location:  login.php");


        }

?>

<!doctype html>
<html>
<head>
<meta charset="utf-8">
<title>Untitled  Document</title>
</head>

<body>
<form method="post"  >
Username: <input type="text"  name="username"  /><br /><br />
password: <input type="password"  name="password"  /><br /><br />


<input type="submit"  name="submit"  value="signup"  />
</form>
</body>
</html>
```

For Login:

```
<?php

require_once  'php_func/conection.php';



if(isset($_POST['submit']))
{
        $username  = $_POST['username'];
        $password = $_POST['password'];

        $sql = "SELECT  * FROM user WHERE username=  '$username'  AND password=
'$password' LIMIT  1";

        $run_user  = mysqli_query($db,  $sql);
   $check_user  = mysqli_num_rows($run_user);


                if($check_user  >0)
                {

                header("Location:  user_home.php");

        }

                else
                {
                header("Location:  index.html");
                echo "Invalid  login  information";


        }
}



?>
<!doctype html>
<html>
<head>
<meta charset="utf-8">
<title>Untitled  Document</title>
</head>

<body>
<form method="post"  >
```

```
Username: <input type="text" name="username" /><br /><br />
Password: <input type="password" name="password" /><br /><br />
<input type="submit" name="submit" value="Log In" />
<a href="signup.php"> Sign Up </a>
</form>


</body>
</html>
```

For User Home:

```
<?php

	if(isset($_POST['data_input']))
	{

		header("Location: data_input.php");


	}

	if(isset($_POST['report_display']))
	{
		header("Location: report_display.php");


	}
?>

<!DOCTYPE html>
<html >
<head>
<meta charset="UTF-8">
<title>User Home</title>

<link href='https://fonts.googleapis.com/css?family=Raleway:300,200' rel='stylesheet'
type='text/css'>
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/meyer-
reset/2.0/reset.min.css">

<link rel="stylesheet" href="css/style.css">

</head>

<body>
<form method="post">
<div style="position: absolute; top:40%; left:35%; margin:20px">
	<input style="padding:15px;border-radius: 12px;margin-right: 15px;font-size: 20px"
type="submit" name="data_input" value="Insert Data" />
```

```
<input style="padding:15px;border-radius: 12px;font-size: 20px" type="submit"
name="report_display" value="Show Report" />
</div>

</form>
</body>
</html>
```

For Data Input:

```
<?php

require_once 'php_func/conection.php';

        if(isset($_POST['submit']))
        {
                $name = $_POST['name'];
                $age = $_POST['age'];
                $sex = $_POST['sex'];
                $place_of_death = $_POST['place_of_death'];
                $reason_of_death = $_POST['reason_of_death'];
                $treatment_factor = $_POST['treatment_factor'];
                $risk_factor = $_POST['risk_factor'];

                $sql_insert="INSERT INTO
data_input(Name,Age,Sex,Place_Of_Death,Reason_of_Death,Treatment_Factor,Risk_Factor
)

VALUES('$name','$age','$sex','$place_of_death','$reason_of_death','$treatment_factor','$risk
_factor')";

            mysqli_query($db, $sql_insert) ;

            header("location: user_home.php");
        }

?>

<!DOCTYPE html>
<html >
<head>
<meta charset="UTF-8">
<title>Data Input</title>

<link href='https://fonts.googleapis.com/css?family=Raleway:300,200' rel='stylesheet'
type='text/css'>
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/meyer-
reset/2.0/reset.min.css">
<link rel="stylesheet" href="css/style.css">
```

```
</head>

<body>
<form method="post">

<div class="form"  style="top:20%">
<div class="forceColor"></div>
<div class="topbar">
<div class="spanColor"></div>
        <input type="text" class="input" id="Name" placeholder="UserName"/>
<input type="text" class="input" id="age" placeholder="Age"/>
        <input type="text" class="input" id="sex" placeholder="Gender: Male/Female"/>
        <input type="text" class="input" id="place_of_death" placeholder="Place Of
Death"/>
        <input type="text" class="input" id="reason_of_death" placeholder="Reason of
Death"/>
        <input type="text" class="input" id="Treatment_factor" placeholder="Treatment
Factor"/>
        <input type="text" class="input" id="risk_factor" placeholder="Risk Factor"/>
</div>
<button class="submit" id="submit" >Insert</button>
</div>
</form>
</body>
</html>
```

For Report Display:

```
<?php

require_once 'php_func/conection.php';


        $sql = "SELECT * FROM data_input ";

?>

<!doctype html>
<html>
<head>
<meta charset="utf-8">
<title>Untitled Document</title>
</head>

<body>

        <?php
```

```
    $result  = $db->query($sql);

    if ($result->num_rows  > 0) {
        // output  data of each row
        while($row  = $result->fetch_assoc())  {

  ?>

        Name: <?php echo $row["Name"]  ?><br /><br />
        Age: <?php echo $row["Age"]  ?><br /><br />
        Sex: <?php echo $row["Sex"]  ?><br /><br />
        Place of Death: <?php echo $row["Place_Of_Death"]  ?><br /><br />
        Reason of Death: <?php echo $row["Reason_of_Death"]  ?><br /><br />
        Treatment  Factor: <?php echo $row["Treatment_Factor"]  ?><br /><br />
        Risk Factor: <?php echo $row["Risk_Factor"]  ?><br /><br />

        <hr>

<?php } } ?>

</body>
</html>
```