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Abstract

Introduction: Verbal autopsy in maternal and neonatal deaths is commonly used in developing countries to understand the medical and social causes of death in the community. Bangladesh first undertook a community verbal autopsy program in 2010. This was implemented under the maternal and neonatal death review (MNDR) system.

Objectives: To know the process of implementation of community verbal autopsy, its acceptability and effect in maternal and neonatal health, Bangladesh.

Methods: A qualitative study was performed in two districts of Bangladesh in 2011. A review of documents, observations, focus group discussions (FGDs) and in-depth interviews (IDIs) were conducted with health care providers from different systems. Data were analysed using a thematic approach.

Results: Community verbal autopsy was developed in Bangladesh using existing available tools and guidelines. First line field supervisors from health and family planning departments conducted verbal autopsies at the deceased’s home. It has been adopted within the government health system and is able to identify medical and social causes, including delays within the community that are the major contributing factors of maternal and neonatal deaths. Verbal autopsy findings are shared at the Upazila level (sub-district) and these influence the development and implementation of local action plans. Recall bias and hard to reach areas are still challenges to be overcome in the conduction of verbal autopsies.

Conclusions: The use of community verbal autopsy to identify medical and social causes of maternal and neonatal deaths is possible in an encouraging country context. The Government health system can comfortably conduct autopsies within the community. The findings of autopsy can be an effective tool and can be used by the local health and family planning managers to take the initiative at local level to improve health status of the mother and newborn.

Key words: Verbal autopsy, maternal death, neonatal death, Bangladesh.

Introduction

Globally, total maternal deaths decreased by 45% from 523,000 in 1990 to 289,000 in 2013 whereas, developing countries account for 99% (286,000) of global maternal deaths [1]. Whilst the number of neonatal deaths declined from 4.7 million in 1990 to 2.8 million in 2013 [2], developing countries comprise 98% of total deaths [3]. Bangladesh maternal mortality survey findings shows that maternal mortality declined from 322 in 2001 to 194 in 2010, a 40% decline in 9 years, a rate of decline on average about 5.5%, which appears to be on track to achieve MDG 5 [4]. United Nations estimation in 2013 showed that MMR has declined to 170 [1]. Similarly, neonatal mortality declined by 38% between 1989 and 2009 from 52 to 37 deaths per 1000 live births in Bangladesh [5]. Bangladesh is on track to achieve MDG 5 by 2015 [6, 7]. The proposed global average maternal mortality ratio is targeted at 50 by 2035 [8]. The country is one of the ten countries with the greatest absolute declines in neonatal morality [2], whereas the Every Newborn Action Plan, calls for reducing neonatal mortality rates in all countries to fewer than 10 deaths per 1,000 live births by 2035 [2]. A reduction in maternal and neonatal mortality is delayed when no routine vital registration is available and without assigning cause of death [9]. In lack of vital registration and poor certification for cause of death, verbal autopsies can provide a vital solution [10]. Studies in India indicate that every maternal death has a story to tell and can provide evidence on useful ways of addressing challenges [11]. It is important to know...
the causes for maternal deaths, contextual factors and social determinants in order to avert them, but the causes are complex and multifactorial. There lies the importance of maternal death review (MDR); it helps in identifying the three delays. Delay one is in not seeking prompt formal health care by family members; delay two is transportation to the health facility in time and delay three, factors at play at the Health facility [12]. Nevertheless, to monitor and follow up the progress of maternal health, evidence is necessary [9]. Verbal autopsy in the community is a participatory process that involves the deceased’s family members providing important information relating to death and into identifying causes and factors behind a death [13].

Bangladesh introduced the piloting of maternal and neonatal death review in one district in 2010. This included notification of each maternal and neonatal death, including still births, conducting verbal autopsies of those deaths, and preparing remedial action plan based on findings at a local level to reduce the incidence of maternal and neonatal deaths. Community verbal autopsies, conducted with the deceased’s family, were carried out by the government health system using a structured questionnaire developed and endorsed by the Directorate General of Health Services and Family planning [14, 15]. This study has identified the process of the community verbal autopsy, its acceptability and effect in addressing the issue of maternal and neonatal health in Bangladesh.

Methods

The Directorate General of Health Services (DGHS) in collaboration with the Directorate General of Family Planning (DGFP), Ministry of Health and Family Welfare of Government of the People’s Republic of Bangladesh introduced maternal and neonatal death review (MNDR) under a Joint GoB - UN maternal neonatal health initiative. MNDR was piloted in the Thakurgaon district in 2010 with the technical support of the Centre for Injury Prevention and Research, Bangladesh (CIPRB) and UNICEF, Bangladesh [14]. In 2011 it was scaled up to four districts including Thakurgaon, Jamalpur, Narail and Moulvibazar districts of Bangladesh.

The study was performed in two districts named Thakurgaon and Jamalpur. Data was collected in two stages. The first stage of data was collected after initial piloting in Thakurgaon during January 2011. Three sub-districts (Upazilas) were randomly selected from all five Upazilas for the study.

Following that, the 2nd stage data collection was performed in September 2011, where in addition to Thakurgaon, Jamalpur district was randomly chosen. From each of the district, again three upazilas were randomly selected. The community verbal autopsy built on a coordinated and supportive policy environment at the national level. A national level technical team from the DGHS and DGFP was responsible for developing tools, guidelines and the implementation framework. Community verbal autopsy tools and guidelines were finally developed after a number of technical meetings and workshops and finally the government endorsed its use at the community level. The questionnaire was adapted to local customs and culture and was translated into Bengali. The questionnaires included sections on background, events leading to the death, signs and symptoms of illness leading to the death, pregnancy history, care seeking behavior and perception of the respondents about the cause of death. It also contained questions on different signs and symptoms at the time of complications.

Field level first line supervisor from the health department was designated as the health inspector (HI), assistant health inspector (AHI) and family planning inspector (FPI) from the family planning department were given responsibility to conduct verbal autopsies in maternal, neonatal deaths and still births within the community. Before doing verbal autopsy, deaths were notified by the grass root level health workers and reported at the MNDR focal point in Upazila health complex setting (UHC). The focal point at UHC assigned HI, AHI or FPI to conduct verbal autopsy as per their allocated geographical area distributions. The recommended time to do a verbal autopsy was set at least seven days after the death occurred and undertaken within the next 15 days of time period to minimize the recall bias. After completion of the autopsy, the health workers returned back completed the documentation for the MNDR focal point at UHC. A monitoring and supervision
mechanism was developed. Validity and quality of verbal autopsy data were randomly checked by the Upazila and district managers and provided necessary feedback for improvement and data quality.

To collect qualitative information on the conduct of VA and its acceptance, we randomly selected three Upazilas from the piloted district Thakurgaon. We undertook three focus group discussions conducted with the health care providers. These included health inspectors, assistant health inspectors and family planning inspectors, one for each of the Upazila. Six in-depth interviews were conducted with the managers of the health department and family planning department, including Upazila health and family planning officer (UHFPO) and Upazila family planning officer (UFPO). We also conducted unstructured participants observations in six verbal autopsy sessions to look at every possible relevant area [table 1].

To know the effect of community verbal autopsy, including the lessons learnt, a total number of six FGDs were performed from two districts, one from each of the selected Upazila. Focus group discussions took place at the community clinic (service centre, rural community) where two research officers collected information. Health inspectors, assistant health inspectors and family planning inspectors participated. Twelve in-depth interviews with the health managers and family planning managers took place at the UHC whereas interviews were taken from the district civil surgeon and deputy director of family planning at both district offices [table 2].

Research officers were trained on the guidelines and different prompts for the interviews. Before the final interviews, a pre-test was performed and tools were modified accordingly. Audio-recordings and notes were taken by the research officers. From the audio-recordings and hand notes, transcripts were prepared in local Bengali language and then translated into English. About 10% of the transcriptions were checked by the investigators to check the quality and to ensure every component was captured as per objectives. Data analysis was then conducted by examining the transcripts and recorder’s notes. Documents were analysed by initial examination, reading through and interpretation of the content.

This was accomplished by examining the transcripts and recorder’s notes in detail to explore their views on VA and process of conduction as per guideline. The data was then coded line by line, and then categories and themes were identified after a careful focused re-reading and reviewing the data. Thematic analysis is a form of pattern recognition in the data and categories the emerging themes for analysis [16]. Data were analysed and written up accordingly to the objectives. Example quotations were used to demonstrate these themes.

Table 1. Qualitative methods used in January 2011 at Thakurgaon district

<table>
<thead>
<tr>
<th>Method used</th>
<th>Participants</th>
<th>Numbers</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus group discussion</td>
<td>Health Inspector</td>
<td>3</td>
<td>One in each upazila</td>
</tr>
<tr>
<td></td>
<td>Assistant Health Inspector</td>
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<td></td>
<td>Family Planning Inspector</td>
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<tr>
<td>In-depth interview</td>
<td>Upazila Health and Family Planning Officer (UHFPO)</td>
<td>3</td>
<td>One in each upazila</td>
</tr>
<tr>
<td></td>
<td>Upazila Family Planning Officer (UFPO)</td>
<td>3</td>
<td>One in each upazila</td>
</tr>
<tr>
<td>Observation</td>
<td>Verbal autopsy</td>
<td>6</td>
<td>Two in each upazila</td>
</tr>
</tbody>
</table>

Table 2. Qualitative methods used in September 2011 at Thakurgaon and Jamalpur districts

<table>
<thead>
<tr>
<th>Method used</th>
<th>Participants</th>
<th>Thakurgaon</th>
<th>Jamalpur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus group discussion</td>
<td>Health Inspector</td>
<td>3 [One from each upazila]</td>
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<td></td>
<td>Assistant Health Inspector</td>
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<td>Upazila Health and Family Planning Officer (UHFPO)</td>
<td>3</td>
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<td></td>
<td>Upazila family Planning Officer (UFPO)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Civil Surgeon (CS)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Deputy Director of Family Planning (DDFP)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Ethical clearance

The ethical clearance for the study was obtained from the CIPRB Ethical Committee. A consent form was developed and utilized during interviews and participants observation. Informed consent was taken from respondents. Anonymity of each interviews and direct observation sessions was strictly maintained. The participants of the study were informed that the collected data would be used for this research only.

Results

Conduction of verbal autopsy: Observation views

Six direct observations of verbal autopsy at the community level showed that the time of day for doing a verbal autopsy varies. Usually, a health worker undertook the session between 10am to 4pm. It was observed that during noon time or during the evening a male person acted as the principal respondent or associated respondent. Many male persons in rural communities return home during their lunch time.

In the majority of cases, we identified that health workers were looked on as favourably as the local doctor and they were found to be well known to the household. Family members cordially welcomed the health workers to the home in all cases.

The health workers visit the family of the deceased person and describe the reason behind their coming to the house and seek proper permission from the family members before the interview. The consent form is read to the family members by the health workers before the interview and the villagers then agree to provide data and sign the written consent form or put their thumb or finger print mark on the document. In most cases the autopsy is conducted in a sitting position. Families bring chairs, benches or cushions for the health worker to sit in a comfortable place. In a number of cases where the family members had to sit in the floor out of respect the interviewers did the same.

We have found that interviews were conducted with the family members who were present at or before the time of death, and in neonatal death cases the mother was the respondent in all cases. However, in maternal death, we have found the husband, mother in law, sister in law or father in law to be the respondents. The health workers selected the principal responder, decided by the family, who was very familiar with the details about the death. The rest of the family becomes associate responders.

During the observation, privacy and confidentiality were maintained in all cases. The interview took place in a convenient place so that family members were able to interact. However, in most of the VA cases, there were found to be always a few people waiting outside the room to observe what was happening.

We explored mixed time duration for each of the verbal autopsies, ranging from 20 minutes to 45 minutes depending upon how the health workers talked to them. However, in no cases did we find the health workers hurrying the respondent into quick answers. However, health workers found it useful to use a clue or prompt in many questions when he deceased’s family faced difficulty in understanding terminology. It was observed that the health workers used local dialect for interactions and asking questions.

During the entire verbal autopsy session, observation findings showed that there was nowhere resistance or a reluctant to provide information. Also there was no refusal to participate in the verbal autopsy sessions. However, in a few cases we found the deceased family members were working at the time of doing a verbal autopsy and these cases took a little more time than usual.

Conduction of verbal autopsy at the community: Health workers view

Verbal autopsy is undertaken in the community when a maternal, neonatal death or still birth occurred. Assigned field level health and family planning worker assigned by the primary health care centre to conduct the verbal autopsy by visiting the deceased household family. Health workers found community verbal autopsy interesting and an informative method of collecting details on death information. Moreover, through verbal autopsy questionnaires we able to identify social factors related to death. Field level health workers perform the autopsy within their daily regular field activities. Health workers discussed the findings amongst themselves during monthly meeting about causes of deaths and were able to plan for local action plan to share in the Upazila review meeting.
One of the HI told during FGD:
“It is a social event. We meet the family members (the deceased’s kin) and they welcome us cordially and offer up the required details and information related to the death.”

The FGD with another AHI mentioned that:
“This is a way to collect maternal and neonatal deaths related information; through this we are able to understand both medical causes and social errors behind death.”

Another FPI spoke:
“Verbal autopsy is a new experience to us. We never did this before; a systemic way to ask different questions related to death helps us to know details on causes of death.

During FGD, HI from one of the upazila told:
“Verbal autopsy in maternal and neonatal deaths provides scope to validate already notified death at community.”

Another AHI stated that:
“In our country why maternal and neonatal death rate is high…why they die…finding out the causes of their death. We are doing this to find out the causes and probable solution to prevent maternal and neonatal deaths.”

Acceptability of verbal autopsy

The field level health workers undertook verbal autopsies as part of their regular activities. They were aware of their responsibilities to perform verbal autopsy in the community. Likewise, without hesitation the community also provided information relating to death.

During FGD one of the health worker mentioned:
“Initially at the beginning of doing verbal autopsy it felt a little difficulty to ask a number of questions with the deceased family members, however, later on when we frequently carried out verbal autopsy, the instrument come to easier to me and now we can comfortably interact with the family members.”

In another FGD, one of the participant mentioned:
“Maternal and neonatal deaths are occurring at our own working areas; it’s our responsibility to know details on the death issue so that we could find out the solutions.”

One of the FPI spoke:
“Regular verbal autopsy is so helpful to me, I can interact with my field level family planning staff on the causes of death and they can further work on that to prevent future deaths.”

Upazila health and family planning officer (UHFPO) of one of the Upazila stated
“Our field level staff is committed to perform verbal autopsies within the community, they have ability to follow the questionnaire and easily interact with the local people. Our workers have very good access in the village which helps a lot in attaining the information.”

Upazila family planning officer (UFPO) of one of the Upazila told:
“Conduction of a verbal autopsy takes time to do and our field staff are now conducting autopsies within their regular field activities which doesn’t burden them. The workers accept the task in a cordial manner.”

Acceptability of verbal autopsy in exploring medical and social causes of a death

Verbal autopsy in maternal and neonatal deaths is able to identify causes behind a death in the community. The autopsy related questionnaire is easily understandable by the villagers making it easy for them to respond and provide death related details information. The autopsy also explores the social factors and barriers related to a death, including delays related to decision making and transferring of the patient to the facility.

During FGD, one of the HI mentioned:
“The autopsy has a set of questionnaires on what happened during the occurrence of complications and treatment seeking history. It helps us to know the causes of a death.”

During another FGD, participants stated that:
“Verbal autopsy in maternal and neonatal death explores social causes for we ask the family on different delays during decision making and transferring the patient.”

One of the FPI said during IDI:
“All questions in verbal autopsy tool are related to the signs and symptoms of the patient. The deceased’s family members easily remember those rather than stating causes of death.”

One of the UFPO of an upazila said:
“We are discussing at the Upazila review meeting each death. We analyse the findings and assign causes of death of mother and newborn at local level.
One of the UHFPO of one Upazila stated:
“The reasons behind a death can be understandable from the verbal autopsy and health and family planning department can understand predominant causes of deaths in specific areas.”

**Utilization of community verbal autopsy findings**

The findings from the verbal autopsies are very useful for the health workers and managers at the local and district level for planning, taking initiative based on the deaths patterns and implementation of the action plan on ground. The findings also help to prepare recommendation at the local level to share at national level for policy dialogue and take appropriate further steps.

One of health worker (AHI) mentioned in FGD:
“Death findings are shared among us in the monthly meeting at Upazila health complex and we know area specific death patterns.”

During FGD in Jamalpur, one of the FPI told:
“In our family planning department, we sit once in a week, all of FPI meet in the family planning office. Verbal autopsies findings are shared and discussed among us and we inform our UFPO if anything we found to need further steps.”

One of the UHFPO of one Upazila in Thakurgaon spoke:
“We use the verbal autopsy data for planning, we instruct our field staff accordingly when we know clearly why maternal, neonatal deaths are occurring in the areas. A number of health camps, awareness meeting with pregnant mothers, referral of complicated cases from community to the facility now practicing in those areas where deaths are higher, specially maternal deaths”

One of the UFPO from Jamalpur district mentioned during the interview:
“We maintained confidentiality at highest level, we never blame to anyone. Rather we try to find out what are the errors behind the death to prevent future deaths.”

Whereas, DDFP of Jamalpur district mentioned:
“District review meeting on MNDR provides scope to know details of the cause of deaths in the district. I can instruct family planning department to intervene for better counselling, birth planning, antenatal care and post natal care for mother and newborn accordingly.

“Evidence based intervention are taken using the verbal autopsy in the district, it’s much easier for the health department to work on area specific death reduction based on causes and contributing factors of deaths different areas within the district. NGOs participation support us to implement initiatives” - The civil surgeon from Thakurgaon reported.

**Strengths**

Community verbal autopsy has been performed within the existing health system by the health and family planning department. Field level staff conducted verbal autopsies in coordination with each other. The health workers felt conducting verbal autopsy is one of the key responsibilities to address causes of deaths for they had comfortable access to households to collect data from the deceased family members. Villages found health workers to be as their own people in the community. Verbal autopsy information was kept confidential by the health workers; they submitted the data to the focal point at the Upazila health complex as soon as they collected it, and at all times a non-blaming approach was maintained. Findings were also used by the Upazila and district managers for the improvement of maternal and newborn health of the district.

During conduction of FGD in Jamalpur, one the health worker mentioned;
“We work in a team with our department and family planning department. We have an assigned specific area to do verbal autopsy, we follow it, and so there is not too much extra, overburdened work.”

Another FPI in Thakurgaon mentioned:
“Respondents love to let us know the facts that happened and the complications that occurred. The community didn’t hesitate to interact.”

One of the UHFPO of Jamalpur spoke during interview:
“We share and discuss on causes of deaths in our medical team at the upazila health complex, it help us to take proper initiatives at the community. We can also share in the monthly health and family planning coordination meeting to the field staff so that they can also intervene in the community during field visits."

DDFP of Thakurgaon district said:
“Verbal autopsy helps for planning and implementation local action plan, it’s so useful for dis-
strict improvement of maternal and newborn health status.”

**Challenges**

Although verbal autopsy at the community level is conducted successfully to explore the causes of death, a number of challenges remain. The villagers sometimes requested aid from the government health system after they got the opportunity to discuss their issues with the government health workers. Although it is a non-blaming approach, the community had a tendency to blame the health system if the mother or newborn was treated in the facility. Most blamed the doctors and nurses. A verbal autopsy might take more time than usual which results in difficulties in concentration and recall by the respondent. It was also found that the mother found it extremely difficult to provide information in front of the father in law or mother in law, or even in front of husband on death issues. There was also the issue of recall bias in some cases when the verbal autopsy was conducted after a month. In a few cases, respondents didn’t mention any maternal or neonatal complications that caused difficulty in identifying why the mother or newborn died. There was also difficulty in accessing hard to reach areas for the health workers. This was especially challenging during the rainy season. The health workers also found that the verbal autopsies were not always conducted on a regular basis. As they only happened when a death occurred they had to careful about and familiar with the questionnaire to be used for family members.

One of HI mentioned during FGD:

“Time is a factor. Usual a verbal autopsy takes 30-45 minutes, however, in some cases it takes more than 45 minutes and the respondent finds it difficult to concentrate for that period of time.”

“We found the mother sometimes felt shaky to talk about the detailed information in front of her father in law or mother in law, and sometimes even in front of her husband. The reason might be there are family members social barriers behind the death they did not want to surface.” - Reported a FPI.

One of the health workers spoke in the FGD:

“Sometimes we faced challenges to get right the respondent in the household when we visit the home to do a verbal autopsy. Then we have to wait until main respondent comes or have to go there another time if the respondent is absent on the day.”

On this issue, another HI said:

“A few times, we found the household locked when we visited, they went somewhere else. In those cases we needed to go again to visit the household.”

“I have seen a number of verbal autopsies in the field with my health workers. If the death notification has been delayed, our health inspector has sometimes to visit the household after many months to conduct the verbal autopsy. Then there are many challenges for respondents to remember the issues related to what health care seek actions took place during the complications of mother or newborn.” - One of the UFPO spoke during interview.

“We go the household at least after a week, usually after 10 days of a death. When the death issues are discussed the mother or father or other family members become emotional. We know death is always sensitive and at any point the family may lose their nerve. It’s challenging to interact within the emotional environment.” - One of the health workers stated during the FGD.

Another UFPO stated:

“During discussing a maternal death or neonatal verbal autopsy, I have found a few cases, where there was a scarcity of information, especially related to complications where it is difficult to understand what actually happened to the mother or newborn before the death.”

**Discussions**

In our study, we have found that the verbal autopsy at the community is conducted by the government field level health workers. Members from the deceased’s family know the health workers as the health workers are from the same community and also work there. Mostly the respondents smoothly answer the questions and happily provide their time. Health workers use a structured questionnaire for maternal, neonatal death or still birth. In all cases, they were assigned by the Upazila MNDR focal point to do VA they report back to same focal point after the completion of the autopsy and submit the VA form.

Maternal death review has been conducted in many other countries [10, 17-25]. In selected districts, India has conducted maternal and perinatal death inquiry. [26] Death review has also been undertaken to some extent in Bangladesh on ma-
ternal and neonatal death [27, 28]. Community based death review (verbal autopsy) is an excellent method to explore the medical causes and factors contributed women deaths through interview of the deceased family in the community [29]. One study mentioned that verbal autopsy can be an appropriate and cost-effective tool as it uses a retrospective interview of family members about the circumstances leading to the cause of death [30].

In our study, the government field level health workers are responsible for the conduction of the autopsy. They do this by carrying out other interviews with the deceased’s family members who were present before the death or knew the events taking place before the death occurred. The community VA is conducted at least after seven days of the death occurring in the community; usually it takes place between the 8th days to 21st day. The study on maternal death review mentioned similar approaches to our study [31]. We have found that the verbal autopsy adopted a non-blame approach and also maintained strict confidentiality and anonymity. This also followed the WHO 2004 response to maternal death review (MDSR) in 2013 [30, 32].

The findings from verbal autopsy specify circumstances that lead to death and also delays within the community. These were raised in the review meeting and used to prepare action plans to improve the health system. Similar results were found in a study conducted in Tamil Naru, India [33]. Verbal autopsy is a method of ascertaining probable causes of a death based on an interview with primary caregivers about the signs, symptoms and circumstances preceding that death [34].

Our study mentioned that sometimes it is difficult to know the causes of death from the verbal autopsy, especially data coming from community. Another study has also mentioned about reliability and validity of verbal autopsy data [35].

Major strengths were found to be having a team from the health and family planning department to conduct the verbal autopsy using government tools and strictly maintaining non-blaming approaches. One study mentioned similar findings as strength; however the study also mentioned some of the weaknesses of the approach such as blaming, the health provider’s knowledge and skill, inadequate skill resources. All these are challenges for low income countries [23]. However, some of the challenges in the community identified in this study can be readily overcome or minimized though comprehensive planning and initiatives from the Upazila and district health managers.

Verbal autopsy in maternal, neonatal deaths and still births at the community has been identified as a valuable instrument to identify causes of deaths. Interaction with the community people by the field level health workers intensifies its importance in determining the factors related to causes of deaths, including delays. Health managers at the district level use the findings to develop action plans to further improve maternal and neonatal health services. Thus, the findings and outcomes of community verbal autopsy in MNDR could contribute in the reduction of maternal and neonatal mortality in Bangladesh.

**Acknowledgements**

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