The Added Value of An Open Narrative in Verbal Autopsies – A Mixed-Methods Evaluation from Malawi

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Research

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Abstract

Background: The World Health Organization’s standardised verbal autopsy (VA) instrument consists of closed questions, ascertaining signs and symptoms of illness preceding death, and an optional open narrative. As VA analyses increasingly use automated algorithms, the inclusion of narratives should be justified. We evaluated the role of open narratives on VA processes, data quality and respondent emotion.

Methods: A mixed-methods analysis was conducted using VA process data for deaths of children aged 0–59 months between April 2013 and November 2016 in Mchinji district, Malawi. Deaths were randomised at the point of interview to receive closed questions only or an open narrative followed by closed questions. Upon concluding the VA, interviewers self-completed questions relating to respondent emotions. Logistic regression was conducted to determine associations with visible emotions during VAs. A group discussion with the interviewers was conducted at the project end, to understand field experiences and explore future recommendations. Qualitative data were coded using deductive themes.

Results: A total of 2509 VAs were included, with 49.8% (n = 1341) allocated to open narratives. Narratives lasted a median of 7 minutes (range: 1–113 minutes). Interviewers reported improved respondent rapport and felt narratives improved data quality, although there was no difference in the proportion of deaths with an indeterminate cause (5.3% vs. 6.1%). The majority of respondents did not display visible emotions during VA (81%). Those with a narrative had higher, but not statistically significant, odds of displaying emotion (aOR: 1.20; 95% CI: 0.98, 1.47). Factors associated with visible emotions were: infant deaths compared to neonates; deaths at a health centre or en-route to hospital versus home; and higher socio-economic status. Non-parental respondents and increased time between death and interview were associated with lower odds of emotion.

Conclusion: Conducting an open narrative at the start of the VA to build rapport, something valued by the interviewers, may outweigh the additional time taken and slight increase in respondents becoming emotional. However, undue burdens associated with narratives may be further justified if the quality and utility of information from the narrative was promoted through standardised recommendations.

Background

A comprehensive civil registration and vital statistics (CRVS) system recording births and deaths provides a country with essential information to make informed decisions for country-specific priority-setting, and measure its progress towards the Sustainable Development Goals [1, 2]. In the absence of functional CRVS structures, verbal autopsies (VA) can partly fill this gap as an interim mortality data collection instrument by providing cause-specific mortality estimates [3–5]. These data can be used by governments, healthcare providers, researchers, donors and policy makers, who rely on accurate and comparable data over time to estimate burdens of diseases at population level, evaluate program implementation and complement routine administrative data [1, 6]. A recent review supported the use of
VA to identify vulnerable groups and health needs for effective resource allocation in humanitarian settings [7].

The VA process involves trained fieldworkers identifying and interviewing an appropriate respondent, usually a close relative or caregiver, for a given death [3]. Events preceding the death are recorded using a survey with a pre-determined set of closed questions, which can be supplemented by a free-text open narrative designed to elicit the story in the respondent's own words of how the death occurred [8]. Following this, a suspected cause of death is generally assigned through physician review, or through the automated application of statistical algorithms (e.g. InterVA or SmartVA) [3–5].

In 2006, up to 18 VA tools with varying combinations of closed questions and open narratives were reportedly being used in 13 countries [9]. The World Health Organization (WHO) published the first iteration of a standardised VA methodology in 2007, with subsequent updates in 2012, 2014 and 2016 [8]. The inclusion of an open narrative section remains recommended, but optional. The role of the narrative in physician-coded VAs has been likened to a medical history used by doctors to make diagnoses [10]. It can also encourage interviewer-respondent rapport, providing respondents a more natural outlet to express themselves and recount events they feel were most relevant [11]. The open narrative can also provide valuable information that standardised closed questions do not capture, such as cultural beliefs, adding context and holding authorities accountable to design interventions and services that are responsive to its people's needs [9, 12, 13]. In contrast, it could be argued that such information could be better identified using structured social autopsy tools – a supplementary survey conducted specifically to identify non-medical causes of death [7, 14].

The emotional strain of a VA has been recently detailed in qualitative studies from Ghana,[15] Papua New Guinea,[16] and Nepal,[17] and fieldworkers from South Africa reported a higher likelihood of respondents becoming emotional during the open narrative compared to closed question sections of the interview [18]. Furthermore, the potential for adverse effects of VA-induced distress on data quality, and the diagnostic influence this might have for assigning cause of death is important to understand [12, 19, 20].

This paper explores the role of the open narrative in the VA process, including its effects on interview procedures, data quality and respondent emotion. As the narrative potentially poses an additional burden on both respondents and interviewers, and VAs are increasingly analysed using automated algorithms that do not use these free-text responses, their inclusion in the VA process should be justified.

**Methods**

We conducted a mixed-methods analysis of VA process data for deaths of children aged 0–59 months collected prospectively from April 2013 to November 2016, as part of the VacSurv Study in Mchinji District, Malawi [21]. Mchinji is a rural agricultural district in the central region of Malawi, with a population of approximately 600,000, under-5 mortality rate of 63 per 1000 livebirths and crude birth rate of 32.2 at the time of data collection [22].
Mortality Surveillance

Full details of the population surveillance system used by the VacSurv Study have been previously described [21, 23]. Briefly, deaths in children aged 0–59 months, including stillbirths, were registered retrospectively from October 2011 to February 2012, and prospectively from March 2012 to June 2016. Births and deaths were reported by 1060 volunteer village informants who cumulatively covered the whole of Mchinji District, supervised by 50 enumerators and eight senior monitoring and evaluation officers (MEOs). Data were submitted using paper forms to the central office monthly where it was entered into a Microsoft Access database. Major errors in identification data (e.g. incompatible dates of birth and death) were sent back to the field for verification. All deaths in children under-5 years were extracted from the cleaned data, and pre-printed forms with a unique barcode containing the participant’s study ID were generated.

Verbal Autopsies

Deaths were prospectively randomised at the point of interview to either: 1) closed questions only; or 2) open narrative followed by closed questions. Randomisation was programmed into the electronic data capture form (Open Data Kit software),[24] and the MEOs were informed of the allocation after the respondent had consented to the interview. The respondent was blinded to the randomisation procedure, but MEOs were unblinded to the purpose of randomisation. The open narrative was unstructured and MEOs could choose how they recorded the details, such as audio-recording and subsequent transcription, notes or direct transcription of the story during the interview. The closed questions were WHO’s 2012 VA instrument,[25] translated into Chichewa.

Data Collection

The VAs were conducted at respondents’ homes by nine different MEOs, each with five or more years’ experience in conducting VAs. They underwent a one-week training where they collectively translated the WHO VA questionnaire, reviewed the study protocol including data collection using smartphones and strategies to conduct the interviews sensitively, and conducted supervised mock interviews.[12]

At the end of each VA, MEOs self-completed post-interview questions. MEOs were asked to document the respondents present, emotions during the interview and whether the interview needed to be paused as a result. Total VA interview duration was automatically captured on the smartphone, and MEOs noted the start and end time of the open narrative on the paper form.

Closed questions were collected using ODK Collect on Android smartphones and narratives were submitted as written transcripts on the pre-printed forms. These were entered into a Microsoft Access database, and data were linked using the participants’ study ID, then cleaned and processed.

Quantitative Analysis

Child characteristics and VA process data were described with proportions, means and standard deviations (SD) for normally distributed continuous data or medians and interquartile ranges (IQR) for
asymmetrically distributed data. The types of emotion, ability to assign a cause of death, and duration of VA were compared between those with and without an open narrative, using t- and chi2 tests.

Cause of death was assigned using InterVA-4 (www.interva.net) based on closed question responses only; respondents had the option of answering with ‘yes’, ‘no’ or ‘don’t know’. InterVA uses a Bayesian model to calculate the likelihood of different causes of death based on positive (‘yes’) closed question responses only. The number of ‘yes’ answers and subsequently the ability to assign probable cause of death were used as a proxy measure of data quality from respondents. Emotion and interview duration were chosen as proxy indicators of burden for respondents and interviewers. Stillbirths were excluded from the analysis as we used a locally modified VA tool for these deaths.

The primary analysis was a per-protocol analysis, excluding interviews in which MEOs documented that a narrative was conducted when allocated to not include one, and vice versa. We compared respondent emotion during the interview between those with and without a narrative. A multivariable logistic regression was conducted, adjusted for potential confounders defined a priori as: main respondent, child’s age and sex, location of death and socio-economic tercile. All analyses were conducted with Stata 15.0.

Qualitative Data Collection and Analysis

At study completion, a group discussion was held with the MEOs who conducted VAs during the project to gather their feedback on the utility of the open narrative and recommendations for VA procedures going-forward. This group discussion was led by the technical advisor (CK) in a private room within the office using a structured topic guide (Web-Appendix 1). The discussion was conducted in English, audio-recorded and transcribed verbatim. The data was then coded using the following deductive themes, based on the aim of the study: the interview process and procedures; perceived data quality; and emotions in VAs. The final analysis was shared with the MEOs, after triangulation with the quantitative analysis to check for interpretation.

Ethics

Verbal informed consent was obtained for all VA interviews, and written consent for the group discussion participants. The study was approved by the National Health Sciences Research Ethics Committee in Malawi [#837], London School of Hygiene and Tropical Medicine, UK [#6047] and Centers for Disease Control and Prevention, USA [#6268].

Results

A total of 3623 under-5 deaths were reported during the study period, and 2509 were included in the analysis (Fig. 1). Overall, 50.2% (n = 1352) were allocated to no narrative and 49.8% (n = 1341) to have an open narrative, with 95% and 94% of VAs conducted per-protocol in each arm. Balance in the randomisation was achieved for respondent type, socio-economic status, child sex and time since the death. However more open narrative interviews were conducted for neonates (44.5% versus 39.9%, p-
value = 0.042) and location of death differed between the two groups (Web-Appendix 2). Of the deaths, 41.9% were neonates, 52.9% were male and 31.8% occurred at home (Web-Appendix 2). Primary respondents were mainly mothers (77.0%, n = 1931), followed by grandparents (10.6%, n = 266) and fathers (8.0%, n = 200). The mean time between death and verbal autopsy was 22.5 weeks (range: 1–52 weeks). We present the quantitative and qualitative results together under the following themes: VA processes, data quality and emotions.

**VA Processes and Procedures**

Open narratives took a median of 7 minutes (range: 1–113 minutes) and closed questions took 17.5 minutes (range: 6–164 minutes). Overall, interviews which included narratives took longer to complete, with 32.3% taking longer than 30 minutes compared to only 5.2% of those without a narrative ($p$-value < 0.001), with the accompanying closed questions correspondingly taking longer on average to complete (Table 1).

|                  | No Narrative N = 1265 | Narrative N = 1242 | $p$-value |
|------------------|-----------------------|--------------------|-----------|
| Total VA duration (Minutes) |                      |                    |           |
| < 10             | 259 (20.5%)           | 33 (2.7%)          |           |
| 11–20            | 663 (52.4%)           | 381 (30.7)         |           |
| 21–30            | 252 (19.9%)           | 422 (34.0%)        |           |
| > 30             | 66 (5.2%)             | 401 (32.3%)        |           |
| Missing          | 25 (2.0%)             | 5 (0.4%)           | < 0.001   |
| Closed question duration (Minutes) |                  |                    |           |
| Min – Max        | 6–134                 | 6–164              |           |
| Median (IQR)     | 15.0 (9.7)            | 19.8 (9.9)         | < 0.001   |
| Narrative duration (Minutes) |                |                    |           |
| Min – Max        | 1–113                 |                    |           |
| Median (IQR)     | 7.0 (5.0)             |                    |           |

From the group discussion, MEOs reported narratives generally taking between 3 and 15 minutes. A key factor in the duration of these was the respondent and whether they were capable and willing to respond.
Respondents who were keen to relay their story were reported to do so without prompting, including in interviews randomised to not include a narrative. Conversely respondents who were hard to engage in interviews with a narrative were also reported.

“My experience has been that after getting consent sometimes a respondent starts to recount before you ask, so you don’t interrupt, you just listen. But because your phone has asked you not to take an open history, you don’t take notes on that, you just go straight to the questions.” (MEO 8)

“And you can see that there were some open histories that were very short, maybe just 2 minutes [general agreement]. You just know that the respondent was not ready to give you information. It happened like that.” (MEO 2)

However, in general the MEOs agreed that the main difference in interviews with and without open narratives was the time taken. Not taken into consideration in the quantitative measures of duration was the time to identify appropriate respondents before an interview could start. This could involve multiple visits to a respondent’s household before an appropriate respondent could be located (e.g. mother or father), or needing to gain community trust to access the respondent.

“But some other times it may take even 10 minutes because these people know who you want to talk to you, but they are trying to shield them because they are not very sure at first what you’ve come to do.” (MEO 1)

When asked what they would recommend as the best VA procedure, there was a consensus that both the open narrative and closed questions were important and should be included: “The best way is the one which has the open history, that way you have the full explanation.” (MEO 7)

**Data Quality**

Based on InterVA analysis of closed questions, 94.3% of deaths had a cause of death assigned; there was no difference between those with and without an open narrative (94.7% versus 93.9%, \( p \)-value = 0.404). Comparing the number of positive responses in the closed questions found no differences with a mean of 22.4, 21.4 and 21.8 “yes” answers for neonates, infant and child VA interviews (Table 2). The addition of the open narrative was not associated with respondents expressing a desire to know or suggest a potential cause of death.
Table 2
Description of respondent emotions and VA quality indicators, between interviews with and without open narratives.

| Respondent displayed visible emotion | No Narrative n (%) | Narrative n (%) | Total n (%) | p-value |
|-------------------------------------|--------------------|----------------|-------------|---------|
| No                                  | 1042 (82.4%)       | 990 (79.7%)    | 2032 (81.0%)|         |
| Yes                                 | 223 (17.6%)        | 252 (20.3%)    | 475 (19.0%) | 0.089   |
| *Type of emotion displayed during interview |                |                |             |         |
| Crying                              | 4 (1.8%)           | 12 (4.8%)      | 18 (3.4%)  |         |
| Long silence                        | 59 (26.5%)         | 68 (27.0%)     | 127 (26.7%)|         |
| Other signs of emotion              | 160 (71.8%)        | 172 (68.2%)    | 332 (69.9%)| 0.191   |
| *Interview paused due to respondent becoming too emotional |                |                |             |         |
| No                                  | 89 (39.9%)         | 117 (46.4%)    | 206 (43.4%)|         |
| Yes – Once                          | 31 (13.9%)         | 41 (16.3%)     | 72 (15.2%) |         |
| Yes – More than once                | 103 (46.2%)        | 94 (37.3%)     | 197 (41.5%)| 0.146   |
| Respondent expressed desire to know the cause of death |                |                |             |         |
| No                                  | 1235 (97.6%)       | 1216 (97.9%)   | 2451 (97.8%)|         |
| Yes                                 | 30 (2.4%)          | 26 (2.1%)      | 56 (2.2%)  | 0.638   |

*Questions only asked for respondents who had a visible display of emotion (n = 475)

**Different numbers of questions are asked for different age groups
|                                | No Narrative n (%) | Narrative n (%) | Total n (%) | p-value |
|--------------------------------|--------------------|----------------|-------------|---------|
| No                             | 909 (71.9%)        | 890 (71.7%)    | 1799 (71.8%)|         |
| Yes                            | 356 (28.1%)        | 352 (28.3%)    | 708 (28.2%) | 0.912   |
| Inter-VA able to assign cause of death |                    |                |             |         |
| Indeterminate                  | 77 (6.1%)          | 66 (5.3%)      | 143 (5.7%)  |         |
| Determinate                    | 1188 (93.9%)       | 1176 (94.7%)   | 2364 (94.3%)|         |
| Number of “Yes” responses to closed questions** | Mean (SD)         |                |             |         |
| Neonates                       | 22.6 (5.3)         | 22.2 (5.3)     | 22.4 (5.3)  | 0.297   |
| Infants                        | 21.5 (6.8)         | 21.3 (7.3)     | 21.4 (7.0)  | 0.658   |
| Child                          | 22.2 (8.2)         | 21.3 (8.1)     | 21.8 (8.1)  | 0.122   |

*Questions only asked for respondents who had a visible display of emotion (n = 475)

**Different numbers of questions are asked for different age groups

There was consensus from the MEOs that data collected was of better quality when they conducted an open narrative. The first reason was that they effectively asked the questions twice, once as the narrative and then a second time in the closed questions, enabling them to cross-check responses. Secondly, MEOs reported respondents being more comfortable narrating a story than responding to “yes/no” questions.

“I have that feeling that, without the open history, the quality is compromised. Because it’s like the recall system, the set-up of the brain of the respondent, is disturbed by question time and again. Unlike when he or she is free to express everything from her memory, it happens to be good quality data [...] I think that open history gives a respondent a feeling that you are really concerned, because you take a lot of time to listen to him or her.” (MEO 8)

While only 28.2% of respondents were recorded as providing a cause of death (Table 2), the MEOs noted that caregivers would often give a reason for their child’s death – especially if they had sought care. However, they also noted that cause of death was not limited to medical reasons:

“In their narrations, they will tell you the cause, ‘yes this baby was suffering from malaria, but we think this baby died because they delayed in referring us to a health centre’. Maybe in the most remote areas there was no ambulance, they were told to come to the [town] but the ambulance was not available. They
were told to look for their own transport to the [town]. So they will tell you those ones as reasons, not the actual sickness of the baby.” (MEO 4)

**Emotion**

In the majority of interviews, respondents did not display visible signs of emotion (81%), with similar proportions between those with and without an open narrative (79.7% versus 82.4%, \( p \)-value = 0.089). Of those who were recorded as showing signs of emotions, 3.4% cried, 26.7% had a long silence and 69.9% displayed other signs of emotion – over half of these interviews needed to be paused once or more (Table 2).

Table 3 shows the logistic regression for respondent emotion. While having an open narrative was associated with 20% (aOR: 1.20; 95% CI: 0.98, 1.47) higher likelihood of the respondent becoming emotional during the interview; this was not statistically significant but may be pragmatically relevant. Factors associated with lower odds of becoming emotional during the VA interview included: non-parental respondents and increased time between the death and interview (2% lower odds for each week passed). Factors associated with increased odds of visible displays of emotion include: deaths amongst infants compared to neonates (aOR: 1.42; 95% CI: 1.09, 1.85); the death occurring at a health centre (aOR: 1.36; 95% CI: 1.04, 1.77) or en-route to hospital (aOR: 1.49; 95% CI: 1.00, 2.22); and being in the middle (aOR 1.52; 95% CI: 1.17, 1.97) or highest wealth tercile (aOR: 1.49; 95% CI: 1.13, 1.95).
Table 3
Logistic regression exploring associations between respondent and child characteristics and emotions during VA.

| Visible emotion due to open narrative | aOR* (95% CI) | p-value |
|--------------------------------------|---------------|---------|
| **Descriptors**                      |               |         |
| Open narrative                       |               |         |
| No                                   | 1.00          |         |
| Yes                                  | 1.20 (0.98, 1.47) | 0.084  |
| Respondent                           |               |         |
| Mother                               | 1.00          |         |
| Father                               | 0.72 (0.49, 1.07) | 0.102  |
| Grandparent                          | 0.23 (0.13, 0.39) | < 0.001|
| Others                               | 0.04 (0.01, 0.28) | 0.001  |
| Child's age                          |               |         |
| Neonate                              | 1.00          |         |
| Infant                               | 1.42 (1.09, 1.85) | 0.010  |
| Child under-5                        | 1.21 (0.86, 1.69) | 0.274  |
| Child's sex                          |               |         |
| Male                                 | 1.00          |         |
| Female                               | 0.99 (0.80, 1.22) | 0.920  |
| Location of death                   |               |         |
| Home                                 | 1.00          |         |
| Health centre                        | 1.36 (1.04, 1.77) | 0.023  |
| MDH                                  | 0.96 (0.72, 1.27) | 0.753  |
| En route to hospital                 | 1.49 (1.00, 2.22) | 0.049  |
| Other                                | 0.38 (0.23, 0.64) | < 0.001|
| Socio-economic status by tercile     |               |         |
| Tercile 1 (Lowest)                   | 1.00          |         |
| Tercile 2 (Middle)                   | 1.52 (1.17, 1.97) | 0.002  |
| Tercile 3 (Highest)                  | 1.49 (1.13, 1.95) | 0.004  |
| Delay between death & VA (Weeks)     | 0.98 (0.98, 0.99) | 0.002  |

*All variables presented were included in the adjusted analysis

The emotion of respondents was not directly raised by the MEOs during the discussion; however, they noted a key challenge in conducting the VAs as being unable to help respondents or feeling hopeless...
when respondents related their stories. They raised specific examples around HIV positive respondents seeking advice or requests for referrals of malnourished children to NGO programmes.

“A challenge, in a nut shell, was not being able assist where questions were raised. You have raised questions to them. In the end they raise questions to you, that need action, for you to not be able to do anything. That was a big challenge and a let-down.” (MEO 4)

The MEOs raised the fact that the VA process is emotional from the interviewer’s perspective, as well as the respondent, with many of the MEOs also having families and young children which can relate to the narrative.

“The verbal autopsies are not easy to be carried as they involve or concern somebody who has lost life, so it’s always emotional between the interviewer and the interviewee” (MEO 2)

Discussion

Using a mixed-methods analysis of VA process data amongst children under-five in Malawi, we explored the role of open narratives on the interview process, data quality and respondents’ emotions. As expected, free-text narratives increased the duration of the VA interview but did not impact on the ability of a Bayesian algorithm to assign a cause of death - the proxy we used for data quality. The interviewers considered the open narrative useful in building rapport with respondents, agreeing with previously reported experiences, [11, 26] and believed it subsequently improved the VA data. However, respondents with an open narrative displayed visible emotions more frequently when compared to those without, even if visible respondent emotion was relatively uncommon.

Although previous studies have observed VA-induced emotional stress amongst respondents, [16–18, 27] exploring characteristics of both the respondent and deceased showed interesting associations with visible emotion. Firstly, respondents were more likely to show emotion if they were of a higher socio-economic status. One hypothesis could be that under-five deaths are more common amongst lower socio-economic households; [28] specifically in Malawi, a study reported an under-five mortality of 52/1000 livebirths in the highest wealth group, compared to 69/1000 in middle and low wealth groups [29]. The ‘unexpectedness’ of deaths amongst children has been found to be associated with increased parental grief previously [30]. Therefore, as these are rarer events in families which are less underprivileged, with fewer perceived barriers to healthcare and prevention, this may affect respondent emotion.

We observed that deaths occurring at health centres or en-route to hospital was associated with increased emotion. This may reflect respondents’ perception or experience of poor quality of care, resulting in frustrations at system failures and delays in referrals and receiving care. This was echoed by the MEOs, and prior data from this setting,[12] who described respondents attributing deaths to non-medical causes. Deficiencies in Malawian healthcare facilities’ ability to deliver quality maternal, newborn and child care, have been found,[31] and modelled estimates suggest that poor quality maternal and
newborn care result in considerable preventable mortality [32]. Caregiver frustration with healthcare provision and challenges in reaching referral facilities is therefore understandable.

Although the MEOs perceived better rapport and improved data quality from VAs with open narratives, we did not observe any differences in the number of “yes” responses and the subsequent proportion of VAs with an assigned cause of death. Earlier findings from Malawi showed limited advantage in including open narratives to assign cause of death [12], however in this case it is hard to know whether individual answers would have been different. The added diagnostic value of the free-text narratives was also examined by Rankin et al., [19] who reported that the addition of the narrative did not explain discrepancies in diagnoses between physician and InterVA analyses. This could be due to narratives capturing indicators which are included in closed questions. A key principle in research ethics is to avoid intrusions;[33] therefore, if narrative data is not intended for analysis and does not appear to have any influence on data quality, documenting these data may pose an unnecessary burden.

A key limitation of our study was our reliance on interviewer-observed signs of respondent emotion. The MEO self-completed post-VA questionnaire may have suffered from the subjective nature of emotion and possible cultural norms of private bereavement. Including questions on respondent-reported emotional distress and interviewer self-reported emotion may have provided richer information. Secondly, it is likely that protocol violations occurred, as MEOs reported respondents being unwilling or unable to fully engage in the open narrative, and conversely narrating the story of their child's death without prompt. This is not unlike the reluctance observed in VA respondents in rural Ghana who occasionally denied interviews due to grief [15]. While we planned a per-protocol analysis, we were unable to fully adjust for these violations in the quantitative analysis, and our results may therefore more closely reflect intention to treat. Finally, the group discussion with the MEOs was led by the technical advisor, possibly leading to social-desirability bias limiting their willingness to highlight concerns or deviations from the protocol.

**Conclusion**

As far as we are aware, this is the first study to report the effect of open narratives during VA interviews on respondent emotion. Evidence from this large-scale evaluation suggests that open narratives do not necessarily affect data quality, but play a role in establishing rapport, which was clearly valued by interviewers. From the interviewer perspective, conducting an open narrative at the start of the VA may therefore outweigh the additional time burden and the slight increase in respondents becoming emotional. Any undue burden associated with having an open narrative would be further justified if the quality and utility of information from the narrative can be guaranteed. We would therefore recommend guidance from leading bodies, such as the WHO VA Reference Group, for a more standardised approach to record and analyse free-text narratives with a view to reducing bias introduced by those involved during the process such as interviewers, transcribers and reviewers. We would also support longer waiting periods between death and time of interview, so long as accurate recall is not negatively impacted, and the inclusion of wider non-parental family members to reduce the emotional burdens associated with the sensitive nature of discussing death.
Abbreviations

CRVS: civil registration and vital statistics
IQR: interquartile range
MEO: monitoring and evaluation officer
ODK: Open Data Kit
SD: standard deviation
VA: verbal autopsy
WHO: World Health Organization

Declarations

Ethics approval and consent to participate

The study was approved by the National Health Sciences Research Ethics Committee in Malawi [#837], London School of Hygiene and Tropical Medicine, UK [#6047] and Centers for Disease Control and Prevention, USA [#6268]. Verbal informed consent was sought from respondents prior to starting the verbal autopsy interviews. Consent was documented in the electronic data capture form.

Consent for publication

Not applicable.

Availability of data and materials

Fully anonymised quantitative and qualitative datasets generated and analysed for the purpose of this study are available from the corresponding author, Dr. Carina King (c.king@ucl.ac.uk on reasonable request for research purposes only, following approval from the National Health Sciences Research Ethics Committee in Malawi, and study Principal Investigators.

Competing interests

The authors declare that they have no competing interests.
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Author contributions

This study was conceived by PL, EF and CK, based on data from a larger study conceived by NBZ, BJB, JB, EF and CK. The data was collected under the oversight of TP, CM, and MB. The quantitative data was analysed by PL and the qualitative data was coded and analysed by CK. The manuscript was written by PL, with significant input from CK. All authors read, commented and approved the manuscript.

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**Figures**
Figure 1

Verbal autopsy inclusion (CONSORT diagram)

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