What can we learn about postnatal care in Ghana if we ask the right questions? A qualitative study

Zelee Hill1*, Eunice Okyere2, Mary Wickenden1 and Charlotte Tawiah-Agyemang2

1Institute for Global Health, University College London, London, UK; 2Kintampo Health Research Center, Kintampo, Ghana

Background: There are increasing efforts to monitor progress in maternal and neonatal care, with household surveys the main mode of data collection. Postnatal care (PNC) is considered a priority indicator yet few countries report on it, and the need to improve the construct validity associated with PNC questions is recognized.

Objectives: To determine women’s knowledge of what happens to the baby after delivery, women’s comprehension of terms and question phrasing related to PNC, and issues with recall periods.

Design: Forty qualitative interviews and four focus group discussions were conducted with mothers, and 10 interviews with health workers in rural Ghana. Data were collected on knowledge and recall of postnatal health checks and language used to describe these health checks.

Results: Mothers required specific probing using appropriate language to report postnatal checks. They only had adequate knowledge of postnatal checks, which were easily observed or required asking them a question. Respondents reported that health workers rarely communicated with mothers about what they were doing, and most women did not know the purpose of the equipment used during health checks, such as why a thermometer was being used. Knowledge of neonatal checks in the first hours after a facility delivery was low if the mother and child were separated, or if the mother was tired or weak. Many women reported that they could remember events clearly, but long recall periods affected reporting for some, especially those who had multiple checks or for those with no problems.

Conclusions: Direct questions about PNC or health checks are likely to underestimate coverage. Validity of inferences can be enhanced by using appropriate verbal probes during surveys on commonly performed checks that are clear and visible to the mother.

Keywords: postnatal care; indicators; household survey; validity; pre-testing; measurement; Ghana

Received: 13 May 2015; Revised: 10 July 2015; Accepted: 3 August 2015; Published: 7 September 2015
at home receive a home visit within 24 h of delivery. Subsequently, three home visits are recommended on day 3, between day 7–14 and at 6 weeks (6). The recommended content of PNC is shown in Table 1.

PNC is considered a priority indicator by the Accountability Commission for Health of Women and Children, and by Countdown to 2015, which tracks coverage levels for health interventions (1, 2). Both the DHS and the MIC Surveys have questions on PNC that ask about ‘checks on health’ for the mother and child. Both surveys explain checks to participants as examining/assessing and asking questions about health (10, 11). Despite this, only 32 of the 75 Countdown to 2015 countries reported on PNC in the first 2 days for the mother, and only 17 on PNC for the baby (12). In addition to the low measurement coverage, there are also validity concerns related to PNC questions. These included whether mothers know what happens after delivery, can recall events from several years ago, and understand questions on PNC (13). We found two studies that compared maternal reports on PNC content with observations (Mozambique) (3), or with records (China) (14). The China study reported that indicators on PNC contacts and content had moderate validity, and the Mozambique study reported that indicators on the coverage of blood pressure being taken after delivery had unacceptable validity based on area under the receiver-operating curve (3, 14). This suggests that there is room to improve questions on this area.

With the aim of understanding how construct validity associated with items on PNC questionnaires and surveys can be improved, we conducted qualitative work in Ghana to determine women’s knowledge of what happens to the baby after delivery, women’s comprehension of terms and question phrasing related to postnatal checks, and issues with recall periods. The PNC policy in Ghana is to promote delivery and immediate post-partum care with a skilled healthcare provider, followed by two visits in the first week of life to counsel on healthy behaviours and assess for danger signs in the mother and child (15). DHS data report coverage of PNC within 2 days of delivery as 67% (16).

**Materials and methods**

**Human subjects approval**

The study received ethical clearance from the committees of the London School of Hygiene and Tropical Medicine and Kintampo Health Research Center. Informed consent was obtained from all participants.

**Setting**

The study was conducted in three districts in the Brong Ahafo region of Ghana over a 2-month period in 2010. The districts were chosen as they were part of a randomized control trial, ‘Newhints’, testing the impact of home visits by community volunteers on neonatal mortality (17, 18). The Newhints study was not linked to the study reported here but included a monthly demographic and health surveillance system, which was used to identify respondents for this study. The districts were predominantly rural, multi-ethnic, and education levels were low. The main occupation was subsistence farming, and few villages were reached by paved roads. Each district had a hospital staffed by a clinical officer and medical assistants and

---

**Table 1.** WHO recommendations on postnatal care of mother and newborn

|                         | Mother | Baby |
|-------------------------|--------|------|
| **In first 24 h if delivered in a facility** | Regular assessment of vaginal bleeding, uterine contraction, fundal height, temperature, pulse. Blood pressure shortly after birth and within 6 h. Urine void documented within 6 h | A full clinical examination around 1 h after birth and before discharge |
| **At subsequent visits, enquire** | General well-being, emotional well-being, family support, resumption of sexual intercourse, and possible dyspareunia |  |
| **At subsequent visits, assess and refer if needed** | Micturition and urinary incontinence, bowel function, healing of any perineal wound, headache, fatigue, back pain, perineal pain and perineal hygiene, breast pain, uterine tenderness and lochia, breastfeeding progress | Stopped feeding well, history of convulsions, fast breathing, severe chest in-drawing, no spontaneous movement, fever, low body temperature, jaundice in first 24 h |
| **Observe for signs or risk of domestic abuse** | | Identify low birth weight and provide special care |
| **At subsequent visits, counsel** | Danger signs and care seeking, nutrition, hygiene, family planning, safe sex, use of treated bednets for mother and baby (malaria areas), gentle exercise, rest | Danger signs and care seeking, exclusive breastfeeding, cord care, thermal care, immunization, play |

Adapted from Ref. (6).
a series of health posts. At the time of the study, 65% of births were in a health facility, and nearly all pregnant women attended antenatal care at least once (unpublished surveillance data). The Brong Ahafo region is fairly typical of rural Ghana and compared to other regions’ ranks in the middle in terms of literacy, total fertility rate, levels of facility delivery, and PNC coverage. PNC coverage ranges from 49 to 88% across Ghana’s regions, with coverage in Brong Ahafo of 72% (16).

**Development of interview guides**
The interview guides were developed by the authors. These guides were piloted, first with the interviewers, and then with three recently delivered women to ensure that the interview length and structure were appropriate.

**Interview methods, content, and sample size**
Narrative data on PNC were collected during 40 narrative interviews and four focus group discussions (FGDs) with 6–10 mothers, and 10 in-depth interviews with health workers. The aim of each method is shown in Table 2, with narratives used to allow the detailed exploration of personal experiences and FGDs to determine the language used to talk about PNC as this would be enhanced through peer discussion. The narrative interviews started by asking mothers to narrate what happened in the first 24 h after delivery in as much detail as possible; mothers were then asked about contacts with health workers in the first month of life and what happened in these contacts, followed by open questions on any ‘checks’ on themselves or the baby. Finally, structured probes were used to enquire about maternal checks related to bleeding, temperature, pulse, weight, breasts, and abdomen; and newborn checks related to temperature, breathing, cord, skin, weight, and feeding. The weight of the newborn was verified by checking the maternal record card that is given to mothers after delivery. The FGDs started by asking mothers about the meaning of the term ‘check’, this was followed by respondents’ discussing the checks women receive after delivery, and the most easy to understand way of describing these checks. Finally, the groups were asked whether mothers see what happens after delivery, and potential barriers to reporting and remembering what they saw. The health workers interviews focused on what happens to mothers and babies between delivery and discharge, what checks are done, and how these checks are explained to mothers. Health workers were also asked to define PNC.

Sample size was driven by the concept of saturation sampling, that is, we continued interviewing until no new information emerged. Saturation was determined through reading of all transcripts and through frequent reflection meetings to discuss emerging themes.

**Participant selection**
Women for the narrative interviews were selected from a demographic surveillance system to ensure the inclusion of a range of ethnicities, education levels, delivery locations, and time since delivery. Selection also ensured that some women who had received a postnatal visit from the Newhints community volunteers (CBSVs) (see Table 3). The Newhints PNC visits included assessing the baby (including taking the baby’s temperature, counting breaths, and looking for chest in-drawing), and referring any potentially sick babies to a facility. Women who participated in the FGDs were selected by community informants and were stratified by ethnic group, they were selected to include talkative women who had delivered both in facilities and at home. Health workers were selected based on the sources of care described by the narrative women. Selected respondents were approached in their home or place of work by the interviewers who explained the study, answered questions, and took consent. No participants refused.

**Data collection**
Data were collected by three trained fieldworkers, who conducted 1–2 interviews a day that lasted between 30 and 60 min. Data were collected in the local language (Twi) and were tape-recorded. Field notes were also taken. FGDs

---

**Table 2. Sampling strategy and aim of each method**

| Method                      | Sampling strategy                                                                 | Aim                                                                 |
|-----------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------|
| 40 PNC narratives           | Mothers with children under 12 months selected from the demographic and health surveillance system to ensure a range of place of delivery, time since delivery, PNC contact with a Newhints worker and to reflect district diversity | - What PNC contacts and checks occur                                  |
|                             |                                                                                  | - Language used to talk about PNC                                    |
|                             |                                                                                  | - Knowledge and recall of PNC and what affects these                 |
|                             |                                                                                  | - How knowledge and recall differ by place of birth and time since delivery |
| Four focus groups with mothers | Mothers with children under 12 months selected by community-based fieldworkers to reflect district diversity | - Language used to talk about PNC                                    |
|                             |                                                                                  | - Recall of PNC and what affects this                               |
| 10 interviews with health workers | Selected based on sources of care described in the narratives                      | - Health workers’ perceptions on the content and timing of PNC       |

Citation: Glob Health Action 2015, 8: 28515 - http://dx.doi.org/10.3402/gha.v8.28515
had both a facilitator and a note taker, who were trained to encourage group interaction. Interviews and FGDs were translated and transcribed into English by the interviewer on the day of the interview. Care was taken to preserve all relevant Twi terms and phrases. All interviews were reviewed by the study principal investigator for quality, with daily feedback given and reflective meetings held.

Data management and analysis
Data analysis was conducted by the principal investigator, and findings were reviewed by the interviewers to check for consistency of interpretation. Analysis consisted of multiple readings of the transcripts to ensure familiarity with the data. Broad analytical categories were identified deductively based on the research questions, and data were then coded inductively based on emerging themes and indexed using Nvivo. Deductive codes included: Knowledge of health check, Interpretation of health check, Recall of health check, and Willingness to report health check. The deductive and inductive codes were then charted in excel following the framework methodology, which summarizes the key findings by respondents (rows in the framework) and by codes (columns in the framework) (19). This allowed for associations and relationships to be explored, and for data to be more easily compared and contrasted.

Results
The results focus on data from the narrative interviews as these provided the most detailed information, with supporting data from the FGD and in-depth interviews with health workers.

Neither women who participated in the narrative interviewers nor the FGDs reported that specific people, or visits, were for ‘checking health’ after delivery. The exception was women who were visited at home as part of the Newhints trial ‘He came to “check” the children because he does it for everyone in the community when they gave birth’ (29-year-old, with no education who delivered at home 4 months ago). Health workers themselves had varied definitions of PNC, ranging from a contact at a specific time, 2 weeks to 40 days, to any care provided in the first month/6 weeks. No health workers defined postnatal care as occurring specifically in the first days after birth, and checks in the delivery facility were not considered PNC.

Knowledge that a check had occurred
Women were rarely told what checks were being done, and communication between health staff and mothers was minimal. The major themes around factors influencing maternal knowledge of checks are shown in Table 4. Women who were interviewed knew checks had occurred when they observed equipment such as a thermometer or sphygmomanometer being used, or when someone asked them a question, for example, about bleeding, pain, or breastfeeding. For newborn checks, knowledge was influenced by where the baby was after delivery and the state of the mother. These determined whether the mother was able to observe checks.

Separation of mother and baby in home deliveries was rare, but around half of the interviewed women who delivered in the facility reported that the baby was taken out of sight to be ‘seen to’ or bathed. The baby was often taken to the maternity ward where the mother joined them when they were strong enough to walk. This meant that knowledge of whether checks, such as birth weight, were done was rare. Half of the women who had a birth weight in their maternal record reported that birth weight had not been taken.

Women who were interviewed also made assumptions about things they observed. For example, unwrapping the baby, or touching the cord, was assumed to be a cord check, and women also assumed that some checks were universally done. For example, around half of the women who reported bleeding, and most who reported a cord check, did so on the assumption that it was done rather than necessarily knowing at the time. None of the women who delivered at home reported that being sick or tired

| Table 3. Narrative respondent characteristics |
|---------------------------------------------|
| Characteristic                          | Number |
| Age (years)                              |        |
| < 25                                      | 10     |
| 25–35                                     | 23     |
| > 35                                      | 7      |
| Education                                |        |
| None                                      | 17     |
| Primary                                  | 15     |
| Secondary or above                       | 8      |
| Place of delivery                        |        |
| Facility                                  | 21     |
| Home                                     | 19     |
| Occupation                               |        |
| None                                      | 3      |
| Farmer                                   | 24     |
| Seamstress                                | 5      |
| Hairdresser                               | 4      |
| Trader                                    | 3      |
| Other                                     | 1      |
| Parity                                    |        |
| 1                                         | 10     |
| 2–5                                       | 25     |
| > 5                                       | 5      |
| Time since delivery                      |        |
| < 6 months                                | 17     |
| 6–12 months                               | 23     |
| Received NEWHINTS PNC visit              |        |
| Yes                                       | 9      |
| No                                        | 31     |
affected their knowledge of whether checks were done, but around half of those who delivered in facilities said they were unsure what happened to them or the baby in the first hours after delivery because they were tired or weak or were being attended to.

**Interpretation of the check**

Although women who were interviewed were able to observe the use of equipment, most women did not know what the thermometer, stethoscope, or blood pressure cuff were for specifically, except that it was ‘seeing their health’, ‘seeing if they had any sickness’, ‘looking at their strength’, or ‘see how their body is doing’. A few women had misconceptions about what the instruments were for.

Interviewer: ... did they ‘checkie’ his breathing? Respondent: They ‘checkie’ it ... Interviewer: What did they do that makes you think they ‘checkie’ his breathing? Respondent: Is it not what they put at his armpit? (30-year-old Banda with primary education who delivered in a district hospital 3 months ago)

Interviewer: Did someone ‘check’ to see if your body was hot or cold? Respondent: You mean if someone put her hand on my forehead? Interviewer: I mean did someone put something under your armpit to see if your body is hot or cold? Respondent: Ah, yes. The ‘nurse’ put something under my armpit and left it there ... Interviewer: Do you know what that thing is for? Respondent: I never knew what it was for until today ... I never knew it was to check body hotness or coldness. (21-year-old with Primary education who delivered in a Health Center 9 months ago)

Over half of the women who were interviewed that reported having their temperature taken had to have the thermometer described before they gave an answer, with similar findings related to having the blood pressure cuff described. Knowledge of checks was higher amongst educated women (secondary school and above), who knew terms such as ‘BP’ and ‘temperature’. A key issue related to this lack of knowledge was a lack of communication between the mothers and the health staff. This finding was confirmed by all respondent groups:

Interviewer: So what did they say they were doing when they put it [thermometer] there? Respondent: The nurse didn’t tell me ... I didn’t know what she was doing. Interviewer: So why didn’t you ask her? Respondent: Eh. I can’t ask because they are doing their work. Some of the nurses don’t have patience so if you go and ask her some questions ... she would insult you ... If they are doing something you have to keep quiet and look at them. They don’t tell you anything when they come. (27-year-old with Secondary school education who delivered in a district hospital 11 months ago)

Our workload is too much unless we do a check and there is an abnormality ... if that happens we tell her what the problem is. (Midwife in district hospital)

Other issues with interpretation were: reporting delivery activities such as pressing on the abdomen during delivery as a check, and difficulty differentiating between a check and being given advice or performing an activity, as illustrated by this mother:

Interviewer: Did someone check how the baby was feeding? Respondent: Yes. Mr. X told me to give the breast milk to him often. (32-year-old with primary education who delivered at home 11 months ago)
Checks were done by a variety of people including traditional birth attendants for those who delivered at home, healers, and family members. Traditional birth attendants usually returned to the house after delivery ‘to see how you and baby are faring and whether the baby is crying . . . At times they come 3 or 4 times . . . ’ (37-year-old focus group respondent who delivered in a facility 4 months ago). Interpretation of a health worker was problematic as women did not clearly discriminate between them, considering hospital/facility workers, community health volunteers, Newhints fieldworkers, and healers all as health workers.

Interviewer: Apart from the weighing people, did you see any health worker?
Respondent: Yes. We took the baby to a woman who gave us medicine to bath the baby . . . She does local medicines. (36-year-old with no education who delivered in a health centre 4 months ago)

**Remembering the check**

Several of the women who were interviewed that delivered more than 6 months ago said that they had problems remembering because they had delivered long ago, this was especially true if they had multiple checks:

Look at me I have almost forgotten everything. I use to remember all this initially but because it is getting longer I started forgetting everything. (42-year-old who delivered at home 6 months ago)

They did so many things on the baby but because it is almost a year now, I have forgotten most of the things they did for the baby. (32-year-old who delivered at home 11 months ago)

Women in one focus group reported that they would forget things if everything had gone well, but if there had been some problems they would remember everything that happened however long ago it happened.

Several women who were interviewed had difficulty estimating exact time periods, such as minutes or hours, but women who delivered in facilities talked with confidence about the time they arrived in the facility and when they left – often linked to the Muslims prayer times. Salient points in time for the women were: before and after the placenta was delivered, before or after they were moved from the labour to the maternity/lying in ward (occurs only in the big district hospitals and some private maternity homes), and before and after discharge.

**Willingness and ability to answer questions about checks**

The idea of a health check ‘Checkie’ was well understood by women as ‘seeing if there is any sickness in the body . . . See how your health is . . . check to see if you are strong’, and they gave examples of tests on blood, urine, and ‘toilet’ (faeces). Three words were commonly used to talk about health checks: ‘checkie’, ‘firii me’ (diagnose), and ‘hwee me’ (look at me). All FGDs reached consensus that these words can be used interchangeably, but did not agree on which is the most used or best word.

Questions phrasing was key in eliciting responses from narrative mothers, and specific probing was often required. For example, when asked if they had received any health checks in the month after delivery only eight women responded positively, but on probing 21 additional women reported a check. For some women, probes had to be very specific in terms of mentioning the check and the provider or describing the check.

Interviewer: Did somebody take your body hotness?
Respondent: No.
Interviewer: But do you know how they take body hotness?
Respondent: No
Interviewer: So if they took it how would you know?
Respondent: Laughing.
Interviewer: Ok did they put anything in your armpit?
Respondent: Yes. They did it when I delivered and when I went on the 10th day they did it. (27-year-old with Secondary school education who delivered in a district hospital 11 months ago)

In addition to being linked to the level of probing, the ability to answer questions was also linked to the terminology used. This was especially for questions around blood pressure, which were best understood when terms such as ‘tied your hand’, ‘saw if your blood was high’, and ‘saw if your breathing was up’ were used.

The interviews with women who had been visited by a Newhints community volunteer indicated that there was often a strong social bond between them. A few women who were visited by the volunteer reported checks that were very unlikely given the equipment that the volunteers are provided with as part of the programme. No other issues with women being unwilling to give honest reports emerged.

**Discussion**

We found that mothers required specific probing using appropriate language to report postnatal checks. They only had adequate knowledge of checks that were easily observed or required asking them a question. Health workers rarely communicated with mothers about what they were doing, and most women did not know what equipment such as a thermometer was for. Knowledge of neonatal checks in the first hours after a facility delivery was low if the mother and child were separated, or if the
mother was tired or weak. Many women reported that they could remember events clearly, but long recall periods affected reporting for some, especially those who had multiple checks or for those with no problems.

Qualitative data from Bangladesh and Malawi support our findings that specific prompts need to be used when asking questions about PNC contacts (20). The recent addition to PNC questions of an introductory statement explaining checks as ‘examining’, ‘assessing’, and ‘asking questions about health’ in the DHS and the MIC Surveys (10, 11) are likely to improve valid reporting. We suggest that validity may be further improved by providing examples of checks that are commonly performed, that can be easily described, and which are clear and visible to the mother. Checks that fulfil these criteria are also candidates for signal functions, a short list of postnatal checks used in surveys to reflect the content of PNC, and five signal functions have been recommended partly informed by this study (13).

The lack of knowledge about the purpose of equipment was surprising, especially as in the most recent DHS in Ghana 97% of women reported having a blood pressure check during antenatal care (16), but in our study a theme emerged around having to have the blood pressure cuff described. Possible explanations are that the DHS translated blood pressure using descriptive terms such as ‘wrapped your hand’, which we found mothers understood. Alternatively, our finding on the need to describe equipment may not be generalizable beyond our study sample. The low knowledge of checks could be linked to health workers rarely communicating with mothers about what they were doing. Our findings support the suggestion that coverage measurement could be improved by increasing the salience of intervention delivery (21), for example, by service providers providing explanations of the interventions being delivered.

Many women reported that they could remember events clearly, but long recall periods affected reporting for a few, especially for those women who had multiple checks or where the checks did not find any problems. Findings from other studies also suggest that mothers can recall details of their delivery and care after many years (20, 22, 23).

Unlike antenatal care, PNC is not yet a well-recognized or branded concept. This is reflected in the fact that the DHS and the MIC Surveys can ask directly about antenatal care, but need to describe PNC. Recent changes in WHO guidelines (6, 9) make it likely that over the next few years home visits in the postnatal period will become more common. Our study shows that such visits quickly gain recognition as visits to check the baby, and questions on PNC may become easier to ask, and better understood, over time. This potential change in mothers’ abilities to report on PNC could affect the ability to monitor change over time.

Pre-testing has long been the standard method of improving survey questions in low-income countries and is recommended to limit error and bias (24). Pre-testing usually consists of interviewers piloting the questionnaire on a small number of respondents. Problems are identified through observing interviews, feedback from fieldworkers, and through tallying responses. For example, fieldworkers may report that when asked a certain question, respondents looked puzzled or hesitated. This method of pre-testing can mean that some problems remain unnoticed, as answers can sound reasonable but may still have been poorly understood, recalled, and reported (25). Qualitative methods, such as cognitive interviewing (26), are increasingly being used in low-income countries (27–30), but these methods focus on testing questions rather than developing them based on respondents’ descriptions of constructs and their experiences (26). We feel that using qualitative methods to develop, rather than test questions, improves validity as it allows concepts and terminologies to emerge from the respondents’ perspective and provides a better understanding of potential biases.

Limitations

The methods we used have limitations related to the potential for recall and social desirability bias. There are also issues around generalizability, as studies on the validity of maternal and child health indicators have found high variability in sensitivity and specificity between, and within, countries; for example, between rural and urban areas (21). This variation may be linked to differences in the epidemiological context but may also be due to cultural and education differences. Our data collection was limited in the range of participants included, and selection of respondents to reflect a wider range of experiences may be merited. The themes that emerged for this population may be affected by the low coverage of postnatal visits amongst respondents and the low education levels. This study does, however, raise a range of issues that survey designers should consider when thinking about the potential for measurement error in their settings.

Conclusions

Direct questions about PNC or health checks are likely to underestimate coverage. Recent additions to PNC questions in the DHS and the MIC Surveys are likely to improve validity. Validity may be further increased by specific questioning, and by using setting appropriate probes and examples of commonly performed health checks, that can easily be described and are clear and visible to the mother. PNC visits by community health workers appear to gain recognition and branding quickly.
If these visits increase, as is recommended by the WHO, the questions about PNC may become easier to ask and answer. Improving the level of communication between health workers and their patients would increase the validity of PNC indicators and would also improve the quality of care women receive. Collecting qualitative data to improve PNC questions was extremely useful in understanding and improving the validity of PNC indicators. We recommend that survey designers should move away from relying on standard pre-testing methodologies.

**Authors’ contributions**

ZH and CT designed the study with inputs from MW and EO. EO, CT, and ZH participated in data collection and iterative data analysis. ZH drafted the manuscript with the help of MW who conducted a literature review. All authors reviewed and revised the manuscript.

**Acknowledgements**

This study was funded by Save the Children who commissioned the work and had a member on the study advisory group. They did not play a role in the analysis of the data or the writing of this article.

**Conflict of interest and funding**

The authors declare that they have no conflict of interest and funding.

**References**

1. World Health Organization. Every woman, every child: from commitments to action. Geneva: World Health Organization; 2012.

2. World Health Organization and UNICEF. Building a future for women and children: the 2012 report. Washington, DC: World Health Organization and UNICEF; 2012.

3. Stanton CK, Rawlins B, Drake M, Dos Anjos M, Cantor D, Chonglo L, et al. Measuring coverage in MNCH: testing the validity of women’s self-report of key maternal and newborn health interventions during the peripartum period in Mozambique. PLoS One 2013; 8: e60694.

4. Hancioglu A, Arnold F. Measuring coverage in MNCH: tracking progress in health for women and children using DHS and MICS household surveys. PLoS Med 2013; 10: e1001391.

5. Lawn JE, Lee AC, Kinney M, Sibley L, Carlo WA, Paul VK, et al. Two million intrapartum-related stillbirths and neonatal deaths: where, why, and what can be done? Int J Gynaecol Obstet 2009; 107: S5–18.

6. World Health Organization. WHO recommendations on postnatal care of the mother and newborn. Geneva: World Health Organization; 2013.

7. Kerber KJ, de Graft-Johnson JE, Bhutta ZA, Okong P, Starrs A, Lawn JE. Continuum of care for maternal, newborn, and child health: from slogan to service delivery. Lancet 2007; 370: 1358–69.

8. Lawn JE, Kerber K, Enweronu-Laryea C, Massie Bateman O. Newborn survival in low resource settings – are we delivering? BJOG 2009; 116: 49–59.

9. World Health Organization and UNICEF. Home visits for the newborn child: a strategy to improve survival. Geneva: World Health Organization and UNICEF; 2009.

10. Demographic and Health Surveys. Model woman’s questionnaire. 2015. Available from: http://dhsprogram.com/pubs/pdf/DHSQ7/DHSQ7_Womans_QRE_EN_20May2015_DHSQ7.pdf

11. Multiple Indicator Cluster Surveys/MICS4. Questionnaire for individual women; 2012. Available from: http://www.childinfo.org/mics4_questionnaire.html

12. World Health Organization and UNICEF. Fulfilling the health agenda for women and children. The 2014 report. Geneva: World Health Organization; 2014.

13. Moran AC, Kerber K, Sitrin D, Guenther T, Morrissey CS, Newby H, et al. Measuring coverage in MNCH: indicators for global tracking of newborn care. PLoS Med 2013; 10: e1001415.

14. Liu L, Li M, Yang L, Ju L, Tan B, Walker N, et al. Measuring coverage in MNCH: a validation study linking population survey derived coverage to maternal, newborn, and child health care records in rural China. PLoS One 2013; 8: e60762.

15. Twum-Danso NA, Dasoberi IN, Amenga-Etego IA, Adonidzo A, Kanyoke E, Boadu RO, et al. Using quality improvement methods to test and scale up a new national policy on early post-natal care in Ghana. Health Policy Plan 2014; 29: 622–32.

16. Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF Macro. Ghana Demographic and Health Survey 2008. Accra: GSS, GHS, and ICF Macro; 2009.

17. Kirkwood BR, Manu A, ten Asbroek AH, Soremekun S, Weobong B, Gyan T, et al. Effect of the newhints home-visits intervention on neonatal mortality rate and care practices in Ghana: a cluster randomised controlled trial. Lancet 2013; 381: 2184–92.

18. Kirkwood BR, Manu A, Tawiah-Agyemang C, ten Asbroek G, Gyan T, Weobong B, et al. NEWHINTS cluster randomised trial to evaluate the impact on neonatal mortality in rural Ghana of routine home visits to provide a package of essential newborn care interventions in the third trimester of pregnancy and the first week of life: trial protocol. Trials 2010; 11: 58.

19. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol 2013; 13: 117.

20. Yoder PS, Rosato M, Mahmud R, Fort A, Rahman F, Armstrong A, et al. Women’s recall of delivery and neonatal care in Bangladesh and Malawi: a study of terms, concepts, and survey questions. Maryland: ICF Macro; 2010.

21. Bryce J, Arnold F, Blane H, Hancioglu A, Newby H, Requejo J, et al. Measuring coverage in MNCH: new findings, new strategies, and recommendations for action. PLoS Med 2013; 10: e1001423.

22. Rao MR, Levine RJ, Wasif NK, Clemens JD. Reliability of maternal recall and reporting of child births and deaths in rural Egypt. Paediat Perinat Epidemiol 2003; 17: 125–31.

23. Tomeo CA, Rich-Edwards JW, Michels KB, Berkley CS, Hunter DJ, Frazier AL, et al. Reproducibility and validity of maternal recall of pregnancy-related events. Epidemiology 1999; 10: 774–7.

24. Eisele TP, Rhoda DA, Cutts FT, Keating J, Ren R, Barros AJ, et al. Measuring coverage in MNCH: total survey error and the interpretation of intervention coverage estimates from household surveys. PLoS Med 2013; 10: e1001386.

25. Fowler FJ Jr. How unclear terms affect survey data. Public Opin Q 1992; 56: 218–31.

26. Beatty PC, Willis BG. Research synthesis: the practice of cognitive interviewing. Public Opin Q 2007; 71: 287–311.
27. Scorza P, Stevenson A, Canino G, Mushashi C, Kanyanganzi F, Munyanah M, et al. Validation of the “World Health Organization Disability Assessment Schedule for children, WHODAS-Child” in Rwanda. PLoS One 2013; 8: e57725.

28. Vreeman RC, Nyandiko WM, Ayaya SO, Walumbe EG, Inui TS. Cognitive interviewing for cross-cultural adaptation of pediatric antiretroviral therapy adherence measurement items. Int J Behav Med 2014; 21: 186–96.

29. Huang KT, Owino C, Vreeman RC, Hagembe M, Niuguna F, Strother RM, et al. Assessment of the face validity of two pain scales in Kenya: a validation study using cognitive interviewing. BMC Palliat Care 2012; 11: 5.

30. Mavhu W, Langhaug L, Manyonga B, Power R, Cowan F. What is ‘sex’ exactly? Using cognitive interviewing to improve the validity of sexual behaviour reporting among young people in rural Zimbabwe. Cult Health Sex 2008; 10: 563–72.