## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

## ARTICLE DETAILS

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| **TITLE (PROVISIONAL)** | Protocol for a scoping review to identify and map the global health personnel considered skilled attendants at birth in low-and-middle income countries between 2000 – 2015 |
| **AUTHORS** | Hobbs, Amy; Moller, Ann-Beth; Carvajal-Vélez, Liliana; Amouzou, Agbessi; Chou, D; Say, Lale |

## VERSION 1 - REVIEW

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| **REVIEWER** | Micah D J Peters<br>The Joanna Briggs Institute, Faculty of Health and Medical Sciences, The University of Adelaide, Australia |
| **REVIEW RETURNED** | 12-May-2017 |

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| **GENERAL COMMENTS** | Thank you for the opportunity to review this scoping review protocol. Please see my feedback below.<br>The protocol proposes to identify, map, and evaluate the health personnel considered SAB in low-to-middle-income-countries (LMIC). This appears to be a reasonable objective for a scoping review and one with clear relevance based on the information presented by the authors in relation to differences between contexts and relevant global standards/statements.<br>It is unclear why an upper date limit of 2015 has been chosen. In order to include the most up to date evidence, it would seem important to seek to include sources of evidence up until the nearest practical date.<br>It is unclear how the authors will deal with sources of evidence published in languages other than English. The absence of language restrictions is touted as a strength, but I would like to see more details regarding how this will be operationalized.<br>The authors state that this protocol has followed the PRISMA reporting guidelines for protocols (PRISMA-P), but as a scoping review protocol it may be difficult to do this without modification as scoping reviews tend not to e.g. Item 15 (re data synthesis), Item 16: Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies) – (which has not been provided in this protocol).<br>The authors state that they will adhere to the PRISMA reporting guidelines in the conduct of the resulting scoping review, however these reporting guidelines are not especially suitable for the reporting of the conduct of scoping reviews (i.e. items regarding risk of bias reporting etc.) without adaptation. There is a checklist for reporting the conduct of scoping reviews in development (the PRISMA-ScR).<br>In terms of the inclusion criteria, might the specified inclusion of “health personnel” lead to potentially missing evidence that does not clearly explain the role of individuals involved in newborn care as being specifically health personnel (e.g. Doulas)? This is only an |

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| | issue if there are relevant/within scope individuals providing care that might be missed if they are not understood to be/identifiable as health personnel?<br>I wonder about replacing terminology around e.g. “Evaluation of the health personnel…” to details regarding the education, training, accreditation/certification etc. received. This is because scoping reviews do not tend to evaluate as in measure (i.e. scoping reviews will identify what education and training health personnel receive but will not be suited to evaluating the training e.g. in comparison to other training in relation to e.g. leaning outcomes, patient outcomes).<br>The explanation of study designs to be included is a little confusing. As worded it appears that e.g. RCTs and qualitative studies etc. have been grouped under observational study designs. This appears to simply be an issue of the structure of this section. I wonder also whether grey literature evidence sources may also be useful to include – e.g. reports from organisations and position statements etc.<br>It is unclear whether systematic reviews and other review types will be eligible for inclusion. Also unclear whether editorials and other text/opinion pieces will be eligible (e.g. papers simply describing the state of skilled birth attendants in a LMIC).<br>I am unsure why studies must “evaluate education, training etc.” if the scoping review is simply seeking to comprehensively identify differences between how e.g. education is delivered to heath personnel in this area, basic descriptions of the characteristics of education programs will be sufficient – the results of evaluations will be beyond the scope of the questions that will drive this review. Because of this, any source of evidence that contains details regarding the elements of education / training received; accreditation or certification; legislation, skills / competency; and/or continuing education requirements will likely contain useful data regardless of whether they have e.g. evaluated the impact/effectiveness of such programs.<br>Unclear why Randomized controlled trials investigating a new cadre of health personnel through interventional training programmes that have not been rolled out as part of a country-level health system will be excluded. What about different study designs or sources of evidence reporting the same thing? Unsure why only RCTs of this kind will be excluded. Also unclear why these details preclude the relevance of information from such sources. Further detail could be helpful here.<br>Some further detail regarding why studies that are a re-analysis of data from DHS or MICS will also be excluded could be provided. From the limited information on this point, it could appear that citation 22 has already mapped the data that this scoping review proposes to do. This could be clarified.<br>EPISTOMONIKOS, EPPI, and Campbell may also be useful to search.<br>Some repetition could be removed e.g. inclusion of all languages.<br>Unclear how agreement regarding identified abstracts will be quantified. Does this mean an agreement score will be provided?<br>Data extraction appears to indicate that binary answers (yes/no) will be used to account for a number of items to be extracted. This may mean missing important details regarding e.g. regulatory bodies/legislation. Are there other details regarding this data that could be extracted also?<br>Apart from providing an indicator of the quality of studies, there doesn’t seem to be a strong rationale for conducting the optional quality assessment. It would be ideal to see a clearer objective regarding why this will occur (i.e. what objective does it serve) and |

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| | how the results will be used. Further, RoB cannot be assessed for qualitative studies. Depending upon the authors' decision to include other sources of evidence (e.g. text/opinion, reviews) other approaches to quality appraisal may be necessary. |

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| **REVIEWER** | Alison Morgan<br>Nossal Institute for Global Health,<br>University of Melbourne,<br>Australia |
| **REVIEW RETURNED** | 16-May-2017 |

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| **GENERAL COMMENTS** | Thanks, this scoping review provides a clear roadmap for the review of global skilled attendance at birth (SAB). An excellent contribution, well written and well justified.<br>I have two suggested changes for inclusion in the data analysis section.<br>1. At present the authors state they will review SAB against the signal functions for basic and comprehensive emergency obstetric care. This risks the review being focused on preservice training only i.e. what competencies are required to be defined as a skilled birth attendant. One of the overlooked areas is the maintenance of professional skills. It would be helpful to include in the review any mechanisms for ascertaining retention of skills. Is there a minimum number of normal or complicated deliveries/year to be able to keep your status as a skilled attendant, etc etc. You may need to develop some matrix regarding BEmONC/CEmONC for both initial competency acquisition, but with the addition of ongoing skill maintenance.<br>2. The second change is to recognise that SAB also includes caring for the baby as well as the other and should at the very least include newborn resuscitation skills within the signal functions, particularly given the relevance of this review in settings where sole practicing skilled birth attendants are common. |

## VERSION 1 – AUTHOR RESPONSE

Reviewer 1

Reviewer's comments:

1. It is unclear why an upper date limit of 2015 has been chosen. In order to include the most up to date evidence, it would seem important to seek to include sources of evidence up until the nearest practical date.

The rational for including articles from 2000-2015 is given the alignment with the conclusion of the Millennium Development Goals 2000 – 2015 and subsequent start of the Sustainable Development Goals (SDGs) 2015 – 2030 and beyond. An assessment of the global health personal considered skilled attendants at birth from 2000 – 2015 will support the revision to the definition of a skilled attendant in order to align with global measurement frameworks during the SDG era. We initiated an online open consultation on the draft revisions to the joint statement on the definition of a skilled attendant via the following web link: www.who.int/reproductivehealth/skilled-birth-attendant/en/ (the consultation will close 7 July 2017). This scoping review will inform country specific definitions of health personnel considered skilled attendants. We believe our rational is highlighted in the following paragraph in the introduction section

of our manuscript:

[Page 5, Lines 128-133] The aim of this scoping review is to identify and map the training, education, skill set, and/or competency of the various cadres of health personnel that provided pregnancy and childbirth care in LMIC during 2000 – 2015. To our knowledge, no other review has been conducted on this topic previously in the published literature. This information will support the refinement of the definition of what constitutes a SAB in order to harmonize and improve the measurement around the global monitoring of SAB coverage and progress of the SDG targets set for 2030 [6].

2. It is unclear how the authors will deal with sources of evidence published in languages other than English. The absence of language restrictions is touted as a strength, but I would like to see more details regarding how this will be operationalized.

Thank you for requesting more details about language. We are fortunate that many of the co-authors on this paper fluently speak more than one language in addition to English, including French, Spanish, Portuguese, and Turkish, among others. Resources at the World Health Organization and/or UNICEF will be utilized in order to assist in the translation of articles that are published in languages outside of the co-authors abilities. We have added a sentence to the Study Selection section in the second paragraph, as follows:

[Page 8, Lines 268-269] Identified non-English language full-text articles will be screened by native/advanced speakers to assess whether they meet our criteria for inclusion.

3. The authors state that this protocol has followed the PRISMA reporting guidelines for protocols (PRISMA-P), but as a scoping review protocol it may be difficult to do this without modification as scoping reviews tend not to e.g. Item 15 (re data synthesis), Item 16: Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies) – (which has not been provided in this protocol).The authors state that they will adhere to the PRISMA reporting guidelines in the conduct of the resulting scoping review, however these reporting guidelines are not especially suitable for the reporting of the conduct of scoping reviews (i.e. items regarding risk of bias reporting etc.) without adaptation. There is a checklist for reporting the conduct of scoping reviews in development (the PRISMA-ScR).

Thank you for bringing it to our attention that there is a PRISMA checklist under development for Scoping Reviews. If the PRISMA-ScR were currently available for use, we would have gladly followed these guidelines instead of the PRISMA-P or PRISMA. However, in the absence of the PRISMA-ScR, we have chosen to use the PRISMA checklist to adhere to standard a systematic methodology for our review. If the PRISMA-ScR becomes available prior to the completion of this study we will assess our review against these criteria.

As you correctly point out, there are several items in the PRISMA-P that are not applicable to a scoping review protocol, including checklist item 15 and 16. We have identified these in our previously attached PRISMA-P checklist that was uploaded to the BMJ Open author submission portal. In addition, item 15d in the PRISMA-P allows you to explain how you plan to conduct data synthesis if quantitative analysis is not appropriate, which we have done both in the checklist and in the data extraction and analysis section of our protocol [Page 8, Lines 299-305].

4. In terms of the inclusion criteria, might the specified inclusion of “health personnel” lead to potentially missing evidence that does not clearly explain the role of individuals involved in newborn care as being specifically health personnel (e.g. Doulas)? This is only an issue if there are relevant/within scope individuals providing care that might be missed if they are not understood to be/identifiable as health personnel?

Thank you for your valid comment. Our search strategy is very broad, as we are only looking to identify the health personnel / cadres who provide skilled care to women during childbirth. The purpose of this scoping review is to try to identify who these personnel are and whether or not they meet the criteria of a skilled birth attendant as per internationally agreed upon criteria. Doula or personnel who functions in a supportive role to the woman or acts as birth assistant (not birth attendant) during labour and delivery would not be considered a skilled attendant at birth. We have added a clarification sentence to the Exclusion Criteria section of the protocol:

[Page 7, Lines 221-222] Personnel who provide supportive care to the woman during labour or act as a birth assistant, such as doulas, will not be considered skilled attendants for inclusion in this review.

5. I wonder about replacing terminology around e.g. “Evaluation of the health personnel…” to details regarding the education, training, accreditation/certification etc. received. This is because scoping reviews do not tend to evaluate as in measure (i.e. scoping reviews will identify what education and training health personnel receive but will not be suited to evaluating the training e.g. in comparison to other training in relation to e.g. leaning outcomes, patient outcomes).

I am unsure why studies must “evaluate education, training etc.” if the scoping review is simply seeking to comprehensively identify differences between how e.g. education is delivered to heath personnel in this area, basic descriptions of the characteristics of education programs will be sufficient – the results of evaluations will be beyond the scope of the questions that will drive this review. Because of this, any source of evidence that contains details regarding the elements of education / training received; accreditation or certification; legislation, skills / competency; and/or continuing education requirements will likely contain useful data regardless of whether they have e.g. evaluated the impact/effectiveness of such programs.

Thank you very much for this comment. We will amend the wording throughout the manuscript as you correctly pointed out that we are not “evaluating”; rather, we are trying to identify and map all of the different cadres in relation to competencies and certification etc. that currently exist in LMIC. We do aim to compare our findings with the internationally agreed upon criteria as per the 2004 WHO/FIGO/ICM joint statement on the definition of a skilled attendant at birth. We have changed the terminology accordingly in our title and throughout the manuscript.

6. The explanation of study designs to be included is a little confusing. As worded it appears that e.g. RCTs and qualitative studies etc. have been grouped under observational study designs. This appears to simply be an issue of the structure of this section. I wonder also whether grey literature evidence sources may also be useful to include – e.g. reports from organizations and position statements etc.

Thank you for your keen attention to detail. We agree that the explanation of study designs is confusion and apologize for this oversight. We intend to include any study design that reports on primary source data of original research. In Table 1: Inclusion criteria for identifying eligible studies, we have clarified the Study Design category to read as follows:

[Page 6, Table 1] Primary source research of any study design conducted on human subjects (observational studies including prospective or retrospective cohort, case control, and case series; quasi-experimental; experimental, randomized control trials; and qualitative study designs).

In addition, we have clarified the wording of the second paragraph in the Inclusion Criteria of the protocol:

[Page 6, Lines 179-185] All primary source study designs reporting on original human studies research will be included if it provides or compares the education and/or training received, accreditation or certification requirements, legislation, skills, and/or competencies of the skilled health personnel (paid or voluntary) who provide interventions related to the delivery of maternal and newborn health during pregnancy and childbirth (intrapartum). Secondary source data including systematic reviews and other study designs such as case reports, commentaries, editorials, letters, or other opinion pieces will be excluded.

7. It is unclear whether systematic reviews and other review types will be eligible for inclusion. Also unclear whether editorials and other text/opinion pieces will be eligible (e.g. papers simply describing the state of skilled birth attendants in a LMIC).

Thank you. Please see our response to your comment as per the above explanation for your comment #7. We have added the following clarification to the second sentence of paragraph two of the Inclusion Criteria section:

[Page 6, Lines 184-185] Secondary source data including systematic reviews and other study designs including case reports, commentaries, editorials, letters, or other opinion pieces will be excluded.

As well, we have already stated in the protocol under the Search Strategy section:

[Page 7, Lines 246-248] A manual search of the reference lists of all identified studies or systematic reviews as well as a hand search of the literature from global initiatives for additional data, including UNFPA, WHO, and United Nations Children's Fund (UNICEF), will be done.

8. Unclear why Randomized controlled trials investigating a new cadre of health personnel through interventional training programmes that have not been rolled out as part of a country-level health system will be excluded. What about different study designs or sources of evidence reporting the same thing? Unsure why only RCTs of this kind will be excluded. Also unclear why these details preclude the relevance of information from such sources. Further detail could be helpful here.

We intend to compile the training / education received at the level of the cadre itself, not the content of new or existing training programmes or interventions. We have removed the sentence “Randomized control trials investigating a new cadre of health personnel that have not be rolled out as part of the country-level health system” from the protocol and replaced with the following sentence:

[Page 7, Lines 224-226] Any study designs evaluating or comparing interventional training programmes will be excluded as the intent of our review is to map the training received by the cadre, not the content of new or existing training programs.

9. Some further detail regarding why studies that are a re-analysis of data from DHS or MICS will also be excluded could be provided. From the limited information on this point, it could appear that citation 22 has already mapped the data that this scoping review proposes to do. This could be clarified. EPISTOMONIKOS, EPPI, and Campbell may also be useful to search.

Thank you for noting this. We have conducted an analysis of DHS and MICS through previous mapping activities conducted by UNICEF and WHO as part of a desk review and harmonized database of existing SAB data (please consult for further details: https://unstats.un.org/sdgs/indicators/database/?indicator=3.1.2). We have updated the wording to include this clarification and have cited the Campbell paper that you are referring to in the last paragraph of the exclusion criteria section of the protocol:

[Page 7, Lines 228-232] A manual mapping of the cadres considered SAB within nationally representative household coverage surveys has been previously conducted by reviewing the Demographic Health Surveys (DHS) [22] and Multiple Indicator Cluster Surveys (MICS) [23] as part of a harmonized UNICEF and WHO joint database on skilled attendants at birth [24] and has been conducted previously [25]. Thus, studies that are a re-analysis of data from DHS or MICS will also be excluded.

10. Some repetition could be removed e.g. inclusion of all languages.

Thank you for bringing repetition to our attention. We have deleted 'the search will be inclusive of all languages' from the Search Strategy section of the protocol. However, we feel it is still important to note that the search was conducted without language restrictions and have amended the first sentence to read:

[Page 7, Lines 236-240] The search strategy will be conducted for all relevant existing literature without language restrictions based on search terms relating to the research questions restricted to the years 2000-2015, using the following online bibliographic databases: PubMed/MEDLINE, EMBASE, CINAHL Complete, the Cochrane Database of Systematic Reviews, POLINE, and the World Health Organization (WHO) Global Health Library (GHL).

11. Unclear how agreement regarding identified abstracts will be quantified. Does this mean an agreement score will be provided?

We have added details about how the agreement will be quantified to the Study Selection section first paragraph, as follows;

[Page 8, Lines 264-265] Agreement regarding the identified abstracts will be quantified using the κ statistic [24] and disagreement resolved by an additional reviewer (DC).

12. Data extraction appears to indicate that binary answers (yes/no) will be used to account for a number of items to be extracted. This may mean missing important details regarding e.g. regulatory bodies/legislation. Are there other details regarding this data that could be extracted also?

Indeed, some fields in the data extraction form will be binary (yes/no). There will be a yes/no variable to indicate if the cadre is regulated and/or legislated to perform certain signal functions or skills. In our 'strength and limitations' section we have stated that the extraction form is not able to be finalized at the protocol stage due to the nature of the review and will remain flexible to allow for 'the emergence of other themes and/or categories'.

13. Apart from providing an indicator of the quality of studies, there doesn't seem to be a strong rationale for conducting the optional quality assessment. It would be ideal to see a clearer objective regarding why this will occur (i.e. what objective does it serve) and how the results will be used. Further, RoB cannot be assessed for qualitative studies. Depending upon the authors' decision to include other sources of evidence (e.g. text/opinion, reviews) other approaches to quality appraisal may be necessary.

Thank you for bringing this to our attention. Since this is not a requirement for a scoping review, we agree that there does not appear to be a strong rationale for conducting a quality assessment and we have removed the Quality Assessment section from the protocol.

Reviewer 2

Reviewer's comments:

1. At present the authors state they will review SAB against the signal functions for basic and comprehensive emergency obstetric care. This risks the review being focused on preservice training only i.e. what competencies are required to be defined as a skilled birth attendant. One of the overlooked areas is the maintenance of professional skills. It would be helpful to include in the review any mechanisms for ascertaining retention of skills. Is there a minimum number of normal or complicated deliveries/year to be able to keep your status as a skilled attendant, etc etc. You may need to develop some matrix regarding BEmONC/CEmONC for both initial competency acquisition, but with the addition of ongoing skill maintenance.

Thank you, we agree that we would like this review to identify both pre-services and in-service training, such as continuing education in order to maintain skills and competency. Articles that provide the continuing education of health personnel are one of our inclusion criteria. Based on your feedback we have also added 'continuing education (duration, content, frequency)' and 'number of normal or complicated deliveries performed over a defined time period' as additional items for data extraction [Page 8, Lines 284-287].

2. The second change is to recognize that SAB also includes caring for the baby as well as the other and should at the very least include newborn resuscitation skills within the signal functions, particularly given the relevance of this review in settings where sole practicing skilled birth attendants are common.

Thank you for this very relevant comment. We agree that newborn care is an important role for the skilled attendant. Basic neonatal resuscitation is a BEmONC signal function and has already been listed in our paper within the data extraction and analysis section signal function #7 [Page 8, Line 294].

We have also stated that it is difficult to finalize the data extraction sheet as this is a scoping review and we intend to allow flexibility for the emergence of new data or themes for synthesis within our review. If an article reports on specific signal functions that are relevant to essential and emergency newborn care, we intend to include these.