Author’s response to reviews

Title: Pre- and in-service training of health care workers on immunization data management in LMICs: A scoping review

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Author’s response to reviews:

The authors would like to thank the reviewers for taking the time to read this manuscript. Your positive and helpful feedback is appreciated and we have revised the manuscript making necessary adjustments as advised.

REVIEWER 1

1. Abstract:

2. *Introduction - consider revising the first several sentence to make a more clear flow/link between HCW, immunisation competency, and training.

This has been revised by adding the following sentences:

“Roles such as documentation of patient care, data management, analysing, interpreting and appropriate use of data are key to ending vaccine-preventable diseases (VPDs).”

3. *Methods - include number of data bases searched. Include comment on how analysis was done.

The manuscript has been modified accordingly.
“An electronic search of six online databases (PubMed, Web of science, Cochrane Library, Cumulative Index of Nursing and Allied Health Literature (CINAHL) and BMC Medical Education) was performed. Using appropriate MeSH terms and selection procedure, 12 articles published between January 1980 and May 2019 on pre- and in-service training of healthcare professionals, HCP curriculum, interventions geared towards standardised data collection procedures, data documentation and management of immunization data in LMICs, including curriculum reviews were considered for analysis.”

4. Introduction:

* Pg. 4 line 8 ‘most lack the necessary’ - is this true, that most HCWs lack training. I know it is qualified with ‘particularly in developing’ after, but sentence still implies most worldwide. Additionally, the reference used is on an article in Quebec Canada.

Suggestion has been taken and manuscript revised accordingly. A reference from Africa has been added.

* To this end, as the review is focusing on LMICs, consider adding an additional paragraph on the training and competencies of HCWs specifically in LMICs to build justification for your review’s focus.

Suggestion has been taken and manuscript revised accordingly.

“However, concerns about the quality and readiness of the health workforce in low- and middle-income countries (LMICs) in strengthening the health system have been raised.”

* Big jumps are made in the information presented. In second paragraph, introduced concepts of competency and need for training, then jumps to EPI and then VPD. Consider first, more
strongly introducing the topic of Immunization. And then adding 1-2 sentences on the specific competencies and trainings for this

Suggestion has been taken and manuscript revised accordingly.

“High-quality vaccine coverage and vaccine preventable disease (VPD) surveillance data are needed to monitor the performance and impact of the Expanded Programme on Immunization (EPI), which aims to reduce infant and child mortality and morbidity. However, inconsistent and inaccurate recording and reporting of these data limit the ability to accurately monitor EPI coverage and remain a source of concern particularly in LMICs. Due to poor and sub-standard measurement and errors in vaccination records, reliability and validity of reported data on immunization coverage is highly questionable. Additionally, incomplete and incorrect data entry and poor documentation of coverage, as well as double entries by HCPs has decreased the reporting quality [5, 10, 11]. Capacity building of HCPs on data collection, management, and analysis is key to ending VPDs.”

Methods:

* Study population: this heading is misleading as under here you also talk about interventions included. Change heading, or divide paragraph.

Suggestion has been taken and manuscript revised accordingly and heading changed to include “Intervention”

“Study population

All categories of health personnel qualified as healthcare providers (HCPs) involved with immunization data management, i.e. doctors, pharmacists, nurses and midwives, community HCPs as well as all categories of general health personnel qualified as HCPs were included.”

Intervention
In addition, studies on interventions that include any training or capacity building activities related to standardised data collection procedures and management of immunization data, including curriculum reviews were considered…”

* Please provide operational definitions for your population - i.e. who is considered a HCP/HCW, what is pre and in-service training?

Operational definitions have been provided.

“Pre-service training are recommended pre-qualification curriculum-based training, such as the EPI Prototype Curriculum for nursing/midwifery schools in the WHO African Region [8] and the Mid-Level Management Course for EPI managers [9] prescribed by regulatory bodies for preparing professionals/workers during their initial education and for certifying professionals for practice [10]. While in-service training is a regular process to refresh skills, competence and knowledge in key areas relevant to a focused healthcare field and is particularly essential to ending VPDs.”

* Table 1 Label: Your study doesn't follow the PICO format, consider relabelling. Also, I wouldn't consider this a search strategy per se, but details on the search terms or concepts

The title adjusted accordingly

* Table 1 and Table 2 - unclear how these fit together? Search terms are included in Table 2, but one would assume that you'd use all combinations of terms presented in Table 1 for the specific concept.

Table 1 & Table 2 have been coherently sorted, and suggestion has been taken and manuscript revised accordingly
* How were the different searches (Table 2) combined? (i.e. AND, OR, between the concepts?) - unclear how this was used to identify the studies for screening

Search strings are now combined in table 2

* Did all 3 authors do the screening? At second stage, how were discrepancies handled?

Two authors Eunice Turawa and Edward Nicol conducted screening of title and abstracts. Discrepancies were resolved through discussion and contribution from the 3rd author (George Bonsu)

* Pg. 5 line 44 and throughout - introduced HCPs, but switch between HCW and HCPs. Please be consistent throughout

This has been adjusted throughout the document.

Results:

* Diagram: Please thoroughly review diagram. Figures do not add up, labels might be off (i.e. is article with irrelevant title supped to be 'duplicates

  o N=2706, but if add up from each database, n=2705
o 1582 after removing duplicates, with then 1124 with irrelevant title is 458, not 814.

Many thanks for pointing this out, we have reviewed the diagram and corrected the errors.

o Did you do irrelevant title screening, and then another title and abstract screening

Yes screening for irrelevant title and abstract screening were done.

* Unclear what 'intervention' in Figure 1. Article throughout says reporting on pre and in-service training, so unclear what 'intervention' studies would be

See Table 3 for the two in-service interventions (Vasan et al. (2017) [27] and Rowe et al. (2018) [28]).

* Pg. 9, line 49. What is meant by 'evidence mapping'

This section has been adjusted accordingly.

* Pg. 9 line 53 - in both methods and results the authors talk about 'research questions' of the study, however these are never put forward. Please clearly state the questions this review seeks to answer

This section has been adjusted to study objectives.
* Pg. 9 line 55 - ‘all 13 studies’ but in the diagram there are 12 studies included.

This was a typographical error and has been adjusted accordingly

* Your studies list include policy makers etc, are these considered part of your inclusion population, seeing as your population in methods is 'health care provider’?

Policy makers are not part of our study population, however, they were listed as part of the characteristics of the 12 articles selected for review. (See Table 3)

Minor

- First sentence in Abstract, big leap between noting HCW and then uncertainty of skills on immunization handling data. Consider introducing additional line that notes HCW role of immunization interventions including data handling, before commenting on concerns and linking that to training.

This section has been adjusted accordingly.

- Pg. 4 line 5 - Sustainable Development Goals, usually capitalized I believe

Noted and adjusted accordingly.

- Developing, LMICs etc. Switches at times between two terms. ie. Pg. 4 line 12.
This section has been adjusted accordingly.

- Pg. 5 line 26 - "we conducted an exploratory research and systematically…" is awkward. Either remove 'an' or add 'project/activity etc' after research

  Noted and adjusted accordingly.

- Pg. 12 line 15 - the reference [29] punctuation is off.

  Noted and adjusted accordingly.

- Pg 13, line 2 - missing closed bracket after 'post-test' I believe.

  Inserted, thanks

- Pg. 14, line 27 - 'not relevant' consider revising to 'less relevant' or 'not responsive', as I am sure there is still some relevance of outdated resources?

  Thanks for pointing this out, this has been revised

Reviewer #2’s comments
This is an important topic to reflect on. However your recommendations should pay special attention to the following concepts:

1) Page 9, line 55, you mention 13 articles whilst I believe you quote 12 all through.

Thanks for pointing this out, the error has been corrected

2) The key issue around the poor data management also stem from poor standardization of registers, even concepts such as Target population, immunization schedules, missed opportunities have been newly introduced in the WHO EPI prototype curriculum (updated in 2015), which need progressive implementation and uptake, given that the articles reviewed are those of the period 1980-2019.

Suggestion noted and manuscript revised accordingly to include the following:

“Other issues around poor data management also stem from errors in processing data, limited use of already generated data, poor standardization of immunization data collection tools and processes such as registers, as well as ill-defined target population. These will require progressive implementation and uptake.”

3) Authors should also reflect on the use of mobile technologies to improve EPI data management, there should be good evidence on the that from the 8 out of 12 in-service training studies that would give some indication of the future of EPI data management and use.

Suggestion noted and manuscript revised accordingly to include the following:

“Furthermore, there is a need for periodic review of the immunization-training curriculum in health training institutions, capacity development and retraining of tutors on the current trends in immunization data management such as the use of mobile technologies. The web district health
information system (DHIS2) and tool such as the WHO Immunization Information System (WIISE) are useful tools in improving immunization data management and use, however, these also requires skilled workforce”

4) Authors also need to make mention of the new global health priorities given the renewed commitments to Primary Health Care (post Astana 2018) and how EPI remains as a core investment to improve childhood outcomes.

Suggestion has been taken and manuscript revised accordingly to include the following:

“Immunization is one of the most cost-effective ways to save lives, improve health and ensure long-term prosperity. Achievement of the aim of the Astana Declaration on primary health care to meet all people’s health needs across the life course through comprehensive preventive and promotive care will require strong immunization programmes with well trained and motivated workforce.”