

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Nutrition Competencies for Medicine: An Integrative Review and Critical Synthesis
AUTHORS	Lepre, Breanna; Mansfield, Kylie; Ray, Sumantra; Beck, Eleanor

VERSION 1 – REVIEW

REVIEWER	Watinee Kunpeuk International Health Policy Program, Thailand
REVIEW RETURNED	22-Aug-2020

GENERAL COMMENTS	<p>Previous studies suggested that nutrition education and competencies were less prioritized in medical education and this study can be valuable to be part and fill this knowledge gap. Knowledge from this synthesis will provide insights of framework and skills required for a provision on effective and efficient nutrition care. This study also aimed to explore nutrition competencies which were not only the clinical field but also disease prevention and domains related to human capacity building. However, further clarifications are required to explore insights of methodology used and the framework analysis.</p> <p>For the introduction, a clarification is needed why an integrative literature review is more appropriate than other types of review such as systematic review or scoping review for this research question. Moreover, rationale of using Miller's pyramid, the Knowledge to Action cycle and the Dreyfus model needs to be informed compared to other frameworks used for this research field.</p> <p>Apart from the main objective mentioned in the introduction, specific objectives need to be clarified in the methodology part as I think your main objective is quite broad. More information on the date of conducting literature search is needed. The inclusion and exclusion criteria were not clearly presented so I think this part needs to be reorganized. The inclusion criteria about participants were not clear whether the studies targeting on all levels of medical students or health professionals were included.</p> <p>"In medical competency frameworks, the aim was to review nutrition competencies to inform the development of a nutrition competency framework for the broad medical workforce in the first instance." in line 33-36 could be mentioned in the specific objectives.</p> <p>I am not sure both peer-review articles and grey literature were included in this study or not and please clarify more about this point. Also, explanation on the criteria about types of study designs (quantitative or qualitative studies or mixed methods studies, studies on primary or secondary data synthesis) is needed.</p> <p>For the results, more clarification on PRISMA flow diagram about the number of articles included is needed. The additional records were four and full-text articles were 56 so the pooled articles at this stage should be 60 for the analysis. However, in the chart the number of</p>
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	<p>studies in qualitative analysis was 11 so it needs more clarification. Furthermore, the number of full-text articles excluded was 45 but when I summed the number of articles excluded with reasons (7+18+15+1+1) and it resulted in 42 articles. Therefore, please correct this number if there were any typos. The characteristics of included should be presented in the main text or in Appendix. Search terms in all databases should be presented in the Appendix as well. A table describing full-text articles excluded with reasons (n=45) should be presented in Appendix with detailed reasons of exclusion.</p> <p>I would like to see a concise framework on nutrition competency conceptual in Fig.2. Now it seems there were too much texts and I cannot see the links and directions of all components. Therefore, reorganizing and highlighting only key elements will be of great value.</p> <p>Results on quality appraisal should have more details especially what you have found for unclear points and why some could not pass a Q5 criterion. More details of findings can be either mentioned in the discussion part.</p> <p>It seems the included studies were from developed countries. Therefore, implications of these findings particularly in low- and middle-income countries could be highlighted in the discussion part. Regarding line 31-35, regular and repeated assessment in medical education competencies are mentioned and therefore further suggestions about tools for this assessment should be a bit highlighted.</p> <p>What about limitations of the framework used for analysis? What about other frameworks that can be combined for further studies? What about the role of medical institutions to enhance nutrition competencies?</p> <p>The latest reference type I checked from the BMJ Open could be the number with superscript in the main text, please work with the editor team again for the update.</p>
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REVIEWER	Dr. Elizabeth M. Joseph-Shehu National Open University of Nigeria
REVIEW RETURNED	14-Oct-2020

GENERAL COMMENTS	A well written article, but there is a need to include the study limitation
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REVIEWER	Sarah Downer Center for Health Law & Policy Innovation at Harvard Law School, Harvard University
REVIEW RETURNED	21-Nov-2020

GENERAL COMMENTS	<p>This is a timely article about a topic of growing interest in the international medical community (and certainly in the U.S.), where I am based.</p> <p>Overall, the authors do a good job of identifying the 5 common themes across the nutrition competency frameworks they analyze, and I find the conclusion recommending vertical integration of nutrition into existing competency frameworks compelling. However, I think the authors miss the opportunity to highlight in the discussion the lack of consensus on competencies evident in Table 3. Only 5 of 25 competencies are mentioned in more than half of the articles examined, and 16 of the competencies are mentioned only in 1-3 of the articles. The abstract promises a discussion of the urgency of</p>
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	<p>finding consensus on these competencies that doesn't quite materialize enough in the article - a little more discussion on this point would be welcome, especially because it is likely a barrier to integration.</p> <p>I understand the author's decision to exclude frameworks that included elements of nutrition (but are not nutrition-specific) from the review, but a few textual examples of how nutrition elements are incorporated into those competency frameworks would be helpful; is it clear from reviewing a few of those that the nutrition elements are few and far between, or optional, and does that have implications for the kind of integration of nutrition competencies into existing frameworks that the authors ultimately recommend?</p> <p>I found the references to content from Deen's article (2006) and the one about using the OSCE to increase nutrition knowledge (2001); given how relatively old these articles are, it would be good to highlight that though the ideas in them are still sound, more may be needed to encourage the development and adoption of nutrition-related competencies in medical education. There is a decent survey of US policy levers to increase medical nutrition education in the 2019 report, <i>Doctoring Our Diet: Policy Tools to Include Nutrition in US Medical Training</i>, available here: https://www.chlpi.org/wp-content/uploads/2013/12/Doctoring-Our-Diet_-September-2019-V2.pdf. The levers include having medical school accrediting entities require nutrition education, conditioning medical school funding from the government on the inclusion of nutrition education in the curriculum, incorporating nutrition content into medical board exams, and passing legislation that requires nutrition training in continuing medical education modules. While perhaps these levers are unique to the US, they are good examples of what is perhaps needed to bring a diverse set of clinicians together to create consensus-based competencies that are actually adopted. I think the article would be strengthened by mentioning some of these potential pathways.</p> <p>Some smaller points: Perhaps mention the number of patients who are hospitalized with malnutrition in the intro as indicating a need for medical training to both avoid and respond to that reality. I really like the reference to the Patient Protection and Affordable Care Act and wonder if there is equivalent or health-related legislation to mention in any of other countries where studies come from (even one example would strengthen the intro)? Also, the specific section from the ACA that I would cite to in the law (which directly support the authors' point), are 4001(d)(3), 4004(c)-(d), 4103(b), and 4206.</p> <p>Thank you for the opportunity to review.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Watinee Kunpeuk

Institution and Country: International Health Policy Program, Thailand

Comments to the Author:

Previous studies suggested that nutrition education and competencies were less prioritized in medical education and this study can be valuable to be part and fill this knowledge gap. Knowledge from this synthesis will provide insights of framework and skills required for a provision on effective and efficient nutrition care. This study also aimed to explore nutrition competencies which were not only the clinical field but also disease prevention and domains related to human capacity building. However, further clarifications are required to explore insights of methodology used and the framework analysis.

For the introduction, a clarification is needed why an integrative literature review is more appropriate than other types of review such as systematic review or scoping review for this research question.

Thank you for your comment. We determined an integrative design was appropriate for this research question as it allows for a combination of various study designs and data sources to be included and can be used to generate new frameworks and perspectives on a topic. We still utilised formal search methods to ensure the study can be replicated. We have included justification information in methods (Line 117-118).

Moreover, rationale of using Miller's pyramid, the Knowledge to Action cycle and the Dreyfus model needs to be informed compared to other frameworks used for this research field.

Thank you for your comment, we have included justification (Line 122 onwards). While we recognise there may be other frameworks, Miller's pyramid, the Knowledge to Action cycle and the Dreyfus model encompass the complexity of clinical competence, have been previously used as a theoretical framework on which to underpin educational practice in the field of medicine and provide a blueprint by which to organise nutrition competencies identified in this review. The previous work is referenced in methods (Refs 31-34).

Apart from the main objective mentioned in the introduction, specific objectives need to be clarified in the methodology part as I think your main objective is quite broad. More information on the date of conducting literature search is needed. The inclusion and exclusion criteria were not clearly presented so I think this part needs to be reorganized. The inclusion criteria about participants were not clear whether the studies targeting on all levels of medical students or health professionals were included. I am not sure both peer-review articles and grey literature were included in this study or not and please clarify more about this point. Also, explanation on the criteria about types of study designs (quantitative or qualitative studies or mixed methods studies, studies on primary or secondary data synthesis) is needed.

Thank you for your comment. We have edited the methodology to include the study objective as follows: CINAHL, Medline, Embase, Scopus, Web of Science and Global Health were searched through April 2020 to identify published nutrition competency frameworks for medical education. The search strategy for each database is provided in Supplementary Materials 1 (Line 135-136). We have edited the methodology to further specify inclusion and exclusion criteria (Line 142-151).

For the results, more clarification on PRISMA flow diagram about the number of articles included is needed. The additional records were four and full-text articles were 56 so the pooled articles at this stage should be 60 for the analysis. However, in the chart the number of studies in qualitative analysis was 11 so it needs more clarification. Furthermore, the number of full-text articles excluded was 45 but when I summed the number of articles excluded with reasons (7+18+15+1+1) and it resulted in 42 articles. Therefore, please correct this number if there were any typos.

Thank you. This was a typographical error and has now been rectified (Please see Figure 1).

The characteristics of included should be presented in the main text or in Appendix.

Characteristics of included publications are provided in the main text (Line 205).

Search terms in all databases should be presented in the Appendix as well. A table describing full-text articles excluded with reasons (n=45) should be presented in Appendix with detailed reasons of exclusion.

Thank you for your suggestion. We have included search terms for all data bases in Supplementary Material 1 and a table with full text articles excluded with reasons in Supplementary Material 2.

I would like to see a concise framework on nutrition competency conceptual in Fig.2. Now it seems there were too much texts and I cannot see the links and directions of all components. Therefore, reorganizing and highlighting only key elements will be of great value.

Thank you for this comment, we agree and have reorganised the competency framework to highlight key elements. Please see Figure 2.

Results on quality appraisal should have more details especially what you have found for unclear points and why some could not pass a Q5 criterion. More details of findings can be either mentioned in the discussion part.

Details on quality appraisal can be found in results (Line 213), including results on Q5 criterion (Line 218).

It seems the included studies were from developed countries. Therefore, implications of these findings particularly in low- and middle-income countries could be highlighted in the discussion part.

We acknowledge that the majority (6/7) of articles were published in developed countries. We have now included the implications of these findings in strengths and limitations of the study (Line 411).

Regarding line 31-35, regular and repeated assessment in medical education competencies are mentioned and therefore further suggestions about tools for this assessment should be a bit highlighted.

We have re-organised the discussion to include suggestions about tools for this assessment, such as the OSCE. Please see Line 379 onwards.

What about limitations of the framework used for analysis? What about other frameworks that can be combined for further studies?

We acknowledge that while relevant, other frameworks may exist and could be used to consider the results from this review. As noted above, we chose this framework based on its previous use in health education, competency research. We have acknowledged this, and potential limitations of the frameworks used for analysis in the strengths and limitations (Line 411).

What about the role of medical institutions to enhance nutrition competencies?

While we recognise that commitment of medical institutions to nutrition education may enhance the integration of nutrition competencies, this review was not related to regulatory frameworks. The aim of this review was to synthesise published (peer-reviewed) nutrition competencies to provide a proposed nutrition framework for further review. There is a lack of consensus around the benchmark on nutrition knowledge for medicine and this review provides a conceptual framework based on peer-reviewed literature. We have additional manuscripts in preparation which reference grey literature, namely,

what the medical profession formally expects the profession to know about nutrition. This is also significant work, and it is not possible to combine in a single manuscript.

Reviewer: 2

Reviewer Name: Dr. Elizabeth M. Joseph-Shehu Institution and Country: National Open University of Nigeria

Comments to the Author

A well written article, but there is a need to include the study limitation

Thank you for your comment, we have now included strengths and limitations of this study in the main text. Please see Line 411.

Reviewer: 3

Reviewer Name: Sarah Downer

Institution and Country: Center for Health Law & Policy Innovation at Harvard Law School, Harvard University

Comments to the Author

This is a timely article about a topic of growing interest in the international medical community (and certainly in the U.S.), where I am based.

Overall, the authors do a good job of identifying the 5 common themes across the nutrition competency frameworks they analyze, and I find the conclusion recommending vertical integration of nutrition into existing competency frameworks compelling. However, I think the authors miss the opportunity to highlight in the discussion the lack of consensus on competencies evident in Table 3. Only 5 of 25 competencies are mentioned in more than half of the articles examined, and 16 of the competencies are mentioned only in 1-3 of the articles. The abstract promises a discussion of the urgency of finding consensus on these competencies that doesn't quite materialize enough in the article - a little more discussion on this point would be welcome, especially because it is likely a barrier to integration.

Thank you for your comments, we agree that there is a lack of consensus on nutrition competencies for medical education and attempt to fill this gap by providing a critical synthesis of published nutrition competencies for medicine. We have now highlighted this lack of consensus as a barrier to the integration of nutrition in medicine in the discussion (Line 398-399). This work is part of a broad thesis which includes works on development of competency standards generally, this manuscript, research on regulatory frameworks (the way that competencies could be prioritised), qualitative research with stakeholders (including doctors and end-users [clients/patients]) and ultimately a Delphi survey to assist in providing a consensus point. We have made reference to the need for regulation to "enforce" nutrition in medical education in the discussion.

I understand the author's decision to exclude frameworks that included elements of nutrition (but are not nutrition-specific) from the review, but a few textual examples of how nutrition elements are incorporated into those competency frameworks would be helpful; is it clear from reviewing a few of those that the nutrition elements are few and far between, or optional, and does that have implications for the kind of integration of nutrition competencies into existing frameworks that the authors ultimately recommend?

As above re the requirements for regulatory frameworks. Thank you for your comment. We have included an example of the types of frameworks excluded which may include elements of nutrition but are not nutrition-specific (Line 145-146). As a discussion point, we recognise that examining how

nutrition is integrated into existing frameworks may have implications for the integration of nutrition competencies, however, the aim of this review was to synthesise published (peer-reviewed) nutrition competencies to provide a proposed nutrition framework for further review. Key themes identified in this review highlight that although these competencies are nutrition-specific, the underlying cross-cutting competencies (e.g., working as a team, health promotion and disease prevention) provide opportunity for the vertical and horizontal integration of nutrition competencies into existing frameworks or curricula (Figure 2).

I found the references to content from Deen's article (2006) and the one about using the OSCE to increase nutrition knowledge (2001); given how relatively old these articles are, it would be good to highlight that though the ideas in them are still sound, more may be needed to encourage the development and adoption of nutrition-related competencies in medical education. There is a decent survey of US policy levers to increase medical nutrition education in the 2019 report, *Doctoring Our Diet: Policy Tools to Include Nutrition in US Medical Training*, available here: https://www.chlpi.org/wp-content/uploads/2013/12/Doctoring-Our-Diet_-September-2019-V2.pdf. The levers include having medical school accrediting entities require nutrition education, conditioning medical school funding from the government on the inclusion of nutrition education in the curriculum, incorporating nutrition content into medical board exams, and passing legislation that requires nutrition training in continuing medical education modules. While perhaps these levers are unique to the US, they are good examples of what is perhaps needed to bring a diverse set of clinicians together to create consensus-based competencies that are actually adopted. I think the article would be strengthened by mentioning some of these potential pathways.

Thank you for this suggestion, we agree that external incentive may be required and have referenced suggested levers from the 2019 report 'Doctoring our diet' in the discussion (Line 402 onwards). We think that the levers mentioned are global. Local incorporation by individual universities is positive but will not solve the problem without formal requirements by regulatory bodies (which may vary from country to country).

Some smaller points: Perhaps mention the number of patients who are hospitalized with malnutrition in the intro as indicating a need for medical training to both avoid and respond to that reality. I really like the reference to the Patient Protection and Affordable Care Act and wonder if there is equivalent or health-related legislation to mention in any of other countries where studies come from (even one example would strengthen the intro)? Also, the specific section from the ACA that I would cite to in the law (which directly support the authors' point), are 4001(d)(3), 4004(c)-(d), 4103(b), and 4206.

Thank you. We have referenced public health legislation from other countries (Australia and New Zealand) and the WHO (Line 76 onwards). We referenced the double burden of malnutrition (Line 60-64) and the prevalence of malnutrition in hospitalised patients (Line 89-91).

Thank you for your review and consideration of this manuscript.

VERSION 2 – REVIEW

REVIEWER	Watinee Kunpeuk International Health Policy program, Thailand
REVIEW RETURNED	07-Jan-2021
GENERAL COMMENTS	For the critical appraisal (line 185), I have noticed that only the primary researcher conducted this process alone. In this case, I am afraid it was subjected to bias as only the author's perspective dominated all the results. If not, please provide more information

	how many people involved in this step. For Figure 2, it may need to be redesigned to reduce words and to be more attractive.
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VERSION 2 – AUTHOR RESPONSE

Reviewer: 1

Miss Watinee Kunpeuk, International Health Policy Program

Comments to the Author:

For the critical appraisal (line 185), I have noticed that only the primary researcher conducted this process alone. In this case, I am afraid it was subjected to bias as only the author's perspective dominated all the results. If not, please provide more information how many people involved in this step.

Thank you for your comment, we have acknowledged this as a limitation in the manuscript.

For Figure 2, it may need to be redesigned to reduce words and to be more attractive.

Thank you for your suggestion. We have re-submitted Figure 2 as BOTH a table with the original wording, and as the figure with reduced words. Our preference is to include the table version as given these are competencies, we believe the wording is necessary to ensure the correct interpretation of the data. If the Editor agrees, the figure can be deleted.