

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Knowledge and beliefs about dietary inorganic nitrate among UK-based nutrition professionals: Development and application of the KINDS online Questionnaire
AUTHORS	Shannon, Oliver; Grisotto, Giorgia; Babateen, Abrar; McGrattan, Andrea; Brandt, Kirsten; Mathers, John; Siervo, Mario

VERSION 1 – REVIEW

REVIEWER	Nathan S Bryan Baylor College of Medicine Houston, TX USA
REVIEW RETURNED	04-May-2019

GENERAL COMMENTS	This is a very important study on the awareness of dietary nitrate among nutrition professionals. Despite the more than decades of scientific and clinical data showing the positive effects of dietary nitrate in humans, there is still very little knowledge and awareness, especially in consumers. this study shows that even in education health professionals, there is a lot to be learned and more education may be the key.
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REVIEWER	Lauren Blekkenhorst Edith Cowan University Australia
REVIEW RETURNED	07-May-2019

GENERAL COMMENTS	Knowledge and beliefs about dietary inorganic nitrate among UK-based nutrition professionals: Development and application of the KINDS online Questionnaire Manuscript ID: bmjopen-2019-030719 Summary This paper reports the findings from an online questionnaire exploring the knowledge and beliefs of dietary nitrate among UK-based nutrition professional. The study is novel and relevant to nutrition professionals and academics teaching in the field of nutrition and dietetics. The manuscript is clear, concise and very well written. I have no major issues. Please find minor comments below. Abstract Page 2 Lines 53-54: What percentage were 'unsure about effects on other physiological parameters (e.g. cognitive function, kidney function, or cancer risk)? Lines 56-58: Can you report a percentage here to show that knowledge was generally good? Line 59: Can you report a percentage here to show that awareness was poor?
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	<p>Page 3 Lines 8-11: Is 'knowledge of nitrate' the calculated 'nitrate knowledge index'? There is no mention in the abstract about the nitrate knowledge index and how this was calculated. Is there any numerical value for 'greater' and 'better' that you can provide?</p> <p>Introduction</p> <p>Page 4 Lines 8-9: Nitrate is mainly found in leafy green vegetables and some root vegetables. Rhubarb has a median value of only 201 mg/kg fresh weight. See below reference for a list of vegetables and their nitrate levels. Blekkenhorst LC, Prince RL, Ward NC, Croft KD, Lewis JR, Devine A, et al. Development of a reference database for assessing dietary nitrate in vegetables. <i>Mol Nutr Food Res</i>. 2017;61(8):1-13.</p> <p>Methods</p> <p>Page 8 Lines 8-9: Is this meant to be 'kruskal-wallis'?</p> <p>Results</p> <p>Page 9 Lines 3-6: Can you report percentages here to show how many were unsure about other physiological effects?</p> <p>Page 10 Lines 2-31: Is it possible to report numerical values (% or n) to support these results? For example, 'More highly educated individuals (n=X) were more likely to agree...'</p> <p>Discussion</p> <p>Page 11 Lines 26-31: The evidence in healthy individuals is strong. The evidence in 'at risk' is less clear. This should be highlighted. Please see below reference. Blekkenhorst LC, Bondonno NP, Liu AH, Ward NC, Prince RL, Lewis JR, et al. Nitrate, the oral microbiome, and cardiovascular health: a systematic literature review of human and animal studies. <i>Am J Clin Nutr</i>. 2018;107(4):504-22.</p> <p>Figures • Figure 2: It would be helpful to the reader if the number was reported for each category</p>
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REVIEWER	Lachlan Mitchell University College Dublin, Ireland.
REVIEW RETURNED	25-Jun-2019

GENERAL COMMENTS	<p>Thank you to the authors for submitting this manuscript examining nutrition knowledge and beliefs of nutrition practitioners in the UK. The manuscript highlights areas of strong and lesser knowledge, and differences in knowledge and beliefs based on level of education.</p> <p>I have some concerns which must be addressed before I can recommend publication. My major concern is an insufficient justification for why this study should be conducted. The introduction is structured more towards dietary nitrate, and very little towards knowledge. Why is it important to assess the knowledge of nitrate? Would the knowledge of nitrate be reflected in the practice of nutrition professionals? Would it reflect what is being taught in tertiary education by nutrition professionals? Or otherwise?</p> <p>For this reason, I also question why no analysis was done with regards to area of practice/employment. For example, do nutrition</p>
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	<p>professionals working as clinical dietitians have a high knowledge of nitrates? May this then reflect what recommendations they are giving to patients/clients? Likewise, do those working as university lecturer have a good knowledge, and would this then reflect what is being delivered to undergraduate students (whom you have identified as having lesser knowledge)?</p> <p>More specific comments are as follows: Results, page 8, lines 35-41: do these demographics reflect the population of nutrition professionals in the UK? If not, this may be considered a limitation worth mentioning in the limitations section. Page 10, lines 42-45: I cannot see Figure 2 referred to anywhere in the text. The end of this paragraph seems like an appropriate place to do so.</p> <p>Discussion, page 11, line 3: Is qualification levels the same as education levels? I would suggest staying consistent with the aims stated in the introduction. Page 11, lines 49-57: I don't think the evidence presented by the authors "clearly illustrates" the substantial risks. Could it be that participants simply guessed that nitrate had a positive effect here, rather than truly believing nitrate had these effects? Given there is no follow-up assessment (such as interviews), I would suggest toning down this statement. To strengthen this assertion, presenting evidence in the introduction that knowledge influences practice would be helpful. Page 12, lines 22-24: "Secondly, it would help nutrition professionals..." Is this therefore good reason to look into area of practice with regards to nitrate knowledge?</p> <p>Please find an alternative to "state of the art" throughout the manuscript, as this phrase is incorrectly used throughout. I suggest "state of the evidence", or "state of the research".</p> <p>There are minor grammatical/spelling errors which must be addressed, such as page 6, line 15 "clarify"; page 16, reference 19 "oerformance".</p>
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VERSION 1 – AUTHOR RESPONSE

REVIEWER 1:

General comments:

This is a very important study on the awareness of dietary nitrate among nutrition professionals. Despite the more than decades of scientific and clinical data showing the positive effects of dietary nitrate in humans, there is still very little knowledge and awareness, especially in consumers. This study shows that even in education health professionals, there is a lot to be learned and more education may be the key.

Author response:

Thank you very much for your comment. We agree that current knowledge and awareness of dietary nitrate is poor, and hope that our study can help take steps towards addressing this issue. We understand no amendments have been requested here.

REVIWER 2:

General comments:

This paper reports the findings from an online questionnaire exploring the knowledge and beliefs of dietary nitrate among UK-based nutrition professional. The study is novel and relevant to nutrition professionals and academics teaching in the field of nutrition and dietetics. The manuscript is clear, concise and very well written. I have no major issues. Please find minor comments below.

Author response:

Thank you very much for your comments. We have responded to your specific points below.

Reviewer comment 1:

Page 2. Lines 53-54: What percentage were 'unsure about effects on other physiological parameters (e.g. cognitive function, kidney function, or cancer risk)'?

Author response:

Thank you for this comment. We have now specified the relevant percentage of participants who were unsure about these parameters.

Reviewer comment 2:

Lines 56-58: Can you report a percentage here to show that knowledge was generally good?

Author response:

Thank you for your comment. We have now included percentage values to support these statements. Given word restrictions for the abstract, we have had to provide a range of correct responses here, rather than writing the percentage of correct responses for each individual dietary source of nitrate (e.g. spinach, lettuce etc) and individual factors influencing the nitrate content of different foods (e.g. soil conditions, cooking etc). We also note some minor rewording in the abstract to accommodate the broader changes requested to this section. We hope this is clear in the manuscript.

Reviewer comment 3:

Line 59: Can you report a percentage here to show that awareness was poor?

Author response:

Thank you for your comment, we have adjusted this sentence to show that 65% and 64% of participants were unsure of the average population intake and ADI for nitrate.

Reviewer comment 4:

Page 3. Lines 8-11: Is 'knowledge of nitrate' the calculated 'nitrate knowledge index'? There is no mention in the abstract about the nitrate knowledge index and how this was calculated. Is there any numerical value for 'greater' and 'better' that you can provide?

Author response:

Thank you for your comment, we have now added median and IQR values here, and provided a brief description of the nature of the knowledge index.

Reviewer comment 5:

Introduction. Page 4. Lines 8-9: Nitrate is mainly found in leafy green vegetables and some root vegetables. Rhubarb has a median value of only 201 mg/kg fresh weight. See below reference for a list of vegetables and their nitrate levels.

Bleckenhorst LC, Prince RL, Ward NC, Croft KD, Lewis JR, Devine A, et al. Development of a reference database for assessing dietary nitrate in vegetables. *Mol Nutr Food Res*. 2017;61(8):1-13.

Author response:

Thank you very much for this useful information. We have now removed rhubarb from this opening sentence and included the reference by Blekkenhorst in support of the statement, alongside the older reference from Hord and colleagues.

Reviewer comment 6:

Methods. Page 8. Lines 8-9: Is this meant to be 'kruskal-wallis'?

Author response:

Thank you very much for highlighting this typographical error, this has now been amended in the text.

Reviewer comment 7:

Results. Page 9. Lines 3-6: Can you report percentages here to show how many were unsure about other physiological effects?

Author response:

Thank you for your comment, we have now included percentage values for how many participants were unsure about other physiological effects of inorganic nitrate consumption.

Reviewer comment 8:

Page 10. Lines 2-31: Is it possible to report numerical values (% or n) to support these results? For example, 'More highly educated individuals (n=X) were more likely to agree...'

Author response:

Thank you very much for this suggestion to help improve the clarity of this section. We have now adjusted this section to include relevant percentage values to support these results.

Reviewer comment 9:

Discussion. Page 11. Lines 26-31: The evidence in healthy individuals is strong. The evidence in 'at risk' is less clear. This should be highlighted. Please see below reference.

Blekkenhorst LC, Bondonno NP, Liu AH, Ward NC, Prince RL, Lewis JR, et al. Nitrate, the oral microbiome, and cardiovascular health: a systematic literature review of human and animal studies. *Am J Clin Nutr.* 2018;107(4):504-22.

Author response:

Thank you very much for your comment. We have now clarified that these effects are more clearly manifest in healthy versus clinical populations, and have included the useful reference by Blekkenhorst and colleagues in support of this notion.

Reviewer comment 10:

Figures. Figure 2: It would be helpful to the reader if the number was reported for each category.

Author response:

Thank you for your comment, we have now provided this information in the figure.

REVIEWER 3

General comments 1:

Thank you to the authors for submitting this manuscript examining nutrition knowledge and beliefs of nutrition practitioners in the UK. The manuscript highlights areas of strong and lesser knowledge, and differences in knowledge and beliefs based on level of education.

I have some concerns which must be addressed before I can recommend publication. My major concern is an insufficient justification for why this study should be conducted. The introduction is structured more towards dietary nitrate, and very little towards knowledge. Why is it important to assess the knowledge of nitrate? Would the knowledge of nitrate be reflected in the practice of nutrition professionals? Would it reflect what is being taught in tertiary education by nutrition professionals? Or otherwise? For this reason, I also question why no analysis was done with regards to area of practice/employment. For example, do nutrition professionals working as clinical dietitians have a high knowledge of nitrates? May this then reflect what recommendations they are giving to patients/clients? Likewise, do those working as university lecturer have a good knowledge, and would this then reflect what is being delivered to undergraduate students (whom you have identified as having lesser knowledge)?

Author response:

Thank you very much for your comments. We have now included further information in the introduction justifying why it is important to assess the knowledge of nitrate. We agree it would be insightful to compared knowledge of inorganic nitrate between individuals in different areas of practice or employment. However, we were unable to conduct this analysis given many individuals identified as working across several different fields such that we could not make comparisons between distinct groups. For example, some questionnaire respondents reported working simultaneously in roles as diverse as research scientist, sports nutritionist, clinical dietician, and university lecturer. We have acknowledged this as a key limitation in the discussion section of the manuscript.

Specific comments:

Specific comment 1:

Results, page 8, lines 35-41: do these demographics reflect the population of nutrition professionals in the UK? If not, this may be considered a limitation worth mentioning in the limitations section.

Author response:

Thank you for your comment. We acknowledge that our sample may not be entirely reflective of the wider field of nutrition professionals in the UK in the limitations section of the discussion. Please see the following text:

'...it possible that our results may not be fully representative of the community of nutrition professionals. We attempted to reach as wide an audience as possible by circulating the questionnaire through several nutrition societies and universities but it is possible that we did not reach certain groups of nutrition professionals. Importantly, those who responded to the questionnaire may have a greater interest in nitrate than non-respondents, potentially skewing our results to suggest greater nitrate knowledge than is present in the whole field of nutrition professionals [41]'

Specific comment 2:

Page 10, lines 42-45: I cannot see Figure 2 referred to anywhere in the text. The end of this paragraph seems like an appropriate place to do so.

Author response:

Thank you for pointing out this omission in our manuscript, we have now referred to Figure 2 at the suggested point in the text.

Specific comment 3:

Discussion, page 11, line 3: Is qualification levels the same as education levels? I would suggest staying consistent with the aims stated in the introduction.

Author response:

Thank you for your suggestion, we have now adjusted 'qualification levels' to read 'education levels' for consistency throughout the manuscript.

Specific comment 4:

Page 11, lines 49-57: I don't think the evidence presented by the authors "clearly illustrates" the substantial risks. Could it be that participants simply guessed that nitrate had a positive effect here, rather than truly believing nitrate had these effects? Given there is no follow-up assessment (such as interviews), I would suggest toning down this statement. To strengthen this assertion, presenting evidence in the introduction that knowledge influences practice would be helpful.

Author response:

Thank you for your comment. We have now toned down the statement in accordance with your recommendation. The statement 'clearly illustrates the substantial risk' has been adjusted to read 'illustrates the possible risk'. As mentioned in response to your general comments above, we have also now presented further information in the introduction that knowledge and beliefs may influence the practice of nutrition professionals.

Specific comment 5:

Page 12, lines 22-24: "Secondly, it would help nutrition professionals..." Is this therefore good reason to look into area of practice with regards to nitrate knowledge?

Author response:

Thank you for your comment. As mentioned above (see General Comments 1), we agree it would have been very interesting to look into differences in nitrate knowledge depending upon the area of practice/ employment of nutrition professionals. However, unfortunately due to the overlap (i.e. participants simultaneously working in several disparate fields of nutrition) this analysis was not possible.

Specific comment 6:

Please find an alternative to "state of the art" throughout the manuscript, as this phrase is incorrectly used throughout. I suggest "state of the evidence", or "state of the research".

Author response:

Thank you very much for your comment, we have now adjusted all mentions of 'state of the art' to 'state of the knowledge'.

Specific comment 7:

There are minor grammatical/spelling errors which must be addressed, such as page 6, line 15 "clarify"; page 16, reference 19 "oerformance".

Author response:

Thank you very much for highlighting these issues. We have thoroughly re-read the manuscript and believe we have now corrected the relevant typographical errors.

VERSION 2 – REVIEW

REVIEWER	Dr Lauren Blekkenhorst Post-Doctoral Research Fellow Edith Cowan University Australia
REVIEW RETURNED	02-Aug-2019

GENERAL COMMENTS	The authors have adequately addressed my comments raised.
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REVIEWER	Lachlan Mitchell University College Dublin, Ireland.
REVIEW RETURNED	06-Aug-2019

GENERAL COMMENTS	Thank you to the authors for the work put in to improve this manuscript based on reviewer comments. I am satisfied that all previous concerns have been addressed, and I feel the manuscript is now at a standard ready for publication. Congratulations.
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