

## PEER REVIEW HISTORY

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### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Exploring patients' understanding of antibiotic resistance, and how this may influence attitudes towards antibiotic use for acute respiratory infections: a qualitative study in Australian general practice.
<b>AUTHORS</b>	Bakhit, Mina; Del Mar, Chris; Gibson, Elizabeth; Hoffmann, Tammy

### VERSION 1 - REVIEW

<b>REVIEWER</b>	Margrethe Bordado Sköld Department of Occupational Medicine, Holbæk Hospital, Denmark
<b>REVIEW RETURNED</b>	22-Nov-2018

<b>GENERAL COMMENTS</b>	<p>Overall comment:</p> <p>This study covers a highly important subject and may contribute to finding better, more targeted and efficient campaigns to reduce overconsumption of antibiotics in the society. The frame of the study is relevant (involving GPs and people (both patients and parents ) consulting doctor for ARI). The use qualitative methods is also relevant in relation to the objective of the study, and opens up for a deeper understanding of the reasons behind patients' conceptions and attitudes.</p> <p>However, as the study report stands now there is a lack of transparency in the method section and the authors should provide a more detailed and transparent description of the process of analysis.</p> <p>Other comments:</p> <ol style="list-style-type: none"><li>1.Aim of study: The aim of the study stated in introduction is not consistent with aim in abstract - please clarify : ie. population ("people" vs "patients"?), antibiotic resistance in relation to ARI vs general understanding of antibiotic resistance?</li><li>2. line 81: abbreviation GP - not stated, does it mean General practices or General Practitioners?</li><li>3. Procedure : please clarify how you contacted and made appointments with the practices ? Where you a part of the other study as well? -how and when did you recruit? (during a normal working day in the practices?or?)</li><li>4. line 112. And when did this occur? (please state here how many participants was necessary)</li><li>5.line 122: change 5 to five</li><li>6. The process of analyzing and the choice of method does not stand clear. Why did you choose an inductive approach in your study?I would have expected a theoretical approach when taking your research question in account. Please provide information that support your choice of method.</li></ol>
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	7. As the result section should be read in relation to the methods used, it is difficult at the time to evaluate the results and the themes presented when not knowing how the researchers reached their results
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<b>REVIEWER</b>	Joanna May Kesten NIHR CLAHRC West and NIHR HPRU in Evaluation of Interventions University of Bristol United Kingdom
<b>REVIEW RETURNED</b>	04-Dec-2018

<b>GENERAL COMMENTS</b>	<p>Dear Editors,</p> <p>Thank you for the opportunity to read this manuscript reporting findings from a qualitative study exploring patients' understanding of antibiotic resistance. This is the first qualitative study to explore knowledge of antibiotic resistant organisms spreading between people in close contact and the decay of antibiotic resistance over time, which raises interesting implications for public health campaigns.</p> <p>Overall, I am concerned that throughout the manuscript the authors appear to over emphasise patients' autonomy to decide whether they use antibiotics as though the decision to receive a prescription lies solely with them. I suggest you consider whether this is an accurate reflection of the consultation process. E.g. Box - "influence on decision-making about antibiotic use" and conclusion "encourage more appropriate use of antibiotics". Also, the objectives and rationale (line 65-66) of the study are a little misleading because an assessment of how patients' understanding of antibiotic resistance influences attitudes towards antibiotic use is not addressed by the study. Rather the authors present these issues separately.</p> <p>Revisions are suggested below for each section of the manuscript:</p> <p><b>Title</b> As above, the research presented in the manuscript focuses on understanding of antibiotic resistance rather than "its influence on attitudes towards antibiotic use." Please consider rewording to reflect this.</p> <p><b>Abstract</b> Please be consistent in the use of 'patients or parents of child patients' throughout the abstract by inserting this phrase into the objectives and conclusions. Please consider whether the precursor to more appropriate use of antibiotics is fewer consultations for self-limiting viruses which do not require antibiotics.</p> <p><b>Introduction</b> Para 1, line 48. As this is not a specialist journal, please include a definition of antibiotic resistance to enable unfamiliar readers to place the findings of poor participant understanding of antibiotic resistance in context. Line 52. Please insert (AOM) after acute otitis media as this acronym is used on line 88. Line 60. Please insert references to the literature on research that has explored the "public's understanding of antibiotic resistance, consequences of it" etc. E.g. references 10, 15, 18-22. Line 65. Please consider inserting 'self-limiting' after 'minor' illnesses here and throughout the manuscript.</p> <p><b>Methods</b></p>
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	<p>Given the potential for the cluster randomised controlled trial to influence participants' knowledge of antibiotic resistance, it's unclear why recruitment for this study took place in intervention practices.</p> <p>The recruitment process is currently unclear. How did the researchers identify patients consulting with one of three ARIs? Did they approach all patients in the waiting room and ask about them to report their symptoms? The process is described as convenience in the abstract yet roughly half the participants were adult patients and half were parents – was this intentional / purposeful?</p> <p>Were people offered an opportunity to participate at a convenient time after the consultation as well as at the time. If not, why not? The importance of speaking to people immediately following a consultation is unclear.</p> <p>Adult patients and parents of young children are quite distinct. Please comment on the rationale for recruiting both.</p> <p>Line 93. Please change 'provided' to 'summarised' as the box does not present a topic guide in full.</p> <p>Box. 'Usual' behaviours about management of ARIs is not reported in the findings. Please state this and provide a reason.</p> <p>Line 103. Was the explanation of the study only provided verbally or also in written format? This description appears to suggest that people were given very little time to consider participating which has ethical implications.</p> <p>The decision to stop data collection and the analysis process is clearly described. However, although the analysis is described as inductive, the themes closely match the topic guide summary. Please consider whether the analysis was partly deductive in nature.</p> <p>Was a comparison of the themes between parents and adult patients performed? Currently there is little explicit mention of parent perceptions.</p> <p>Table 1.</p> <p>How was the presenting condition determined – self report or clinician diagnosis? Please clarify. Also do you know if the participants were prescribed antibiotics during the consultation? If so, please include this in the table.</p> <p>Results</p> <p>Line 149 – for clarity and context it would be helpful to include the explanation given to parents of antibiotic resistance.</p> <p>Some of the quotes do not stand alone currently: line 158 – what does “down the track definitely” mean? line 160 – does ‘it’ refer to antibiotic resistance, if so please insert this in square brackets.</p> <p>Line 208. “Chance” of what?</p> <p>Line 221. I disagree that the quote included indicates no change or concern as suggested. The quote appears to highlight caution about using antibiotics. Please consider replacing this quote with a more relevant one or reconsidering the interpretation.</p> <p>Discussion</p> <p>Line 304. Do you have a reference to support this statement?</p> <p>Line 306-307. Sentence beginning “The effect” appears to be incomplete.</p> <p>Limitations</p> <p>The interviews were exceptionally short. Please comment on the impact of this on the depth of information gathered.</p> <p>Consider highlighting most participants were female as a limitation.</p> <p>Line 333. Please delete the word “what”.</p> <p>Conclusion</p>
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	Consider whether the precursor to more appropriate use of antibiotics is fewer consultations for self-limiting viruses which do not require antibiotics. See earlier comment about including findings about usual behaviours to manage ARI's, this information could also highlight key strategies for addressing antibiotic resistance.
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## VERSION 1 – AUTHOR RESPONSE

Reviewer 1 comments		
1. This study covers a highly important subject and may contribute to finding better, more targeted and efficient campaigns to reduce overconsumption of antibiotics in the society. The frame of the study is relevant (involving GPs and people (both patients and parents ) consulting doctor for ARI). The use qualitative methods is also relevant in relation to the objective of the study, and opens up for a deeper understanding of the reasons behind patients' conceptions and attitudes.	Thank you.	
2. However, as the study report stands now there is a lack of transparency in the method section and the authors should provide a more detailed and transparent description of the process of analysis.	We have improved the reporting of our Methods section, (see below)	
3. Aim of study: The aim of the study stated in introduction is not consistent with aim in abstract - please clarify : ie. population ("people" vs "patients"?), antibiotic resistance in relation to ARI vs general understanding of antibiotic resistance?	We have clarified the aim of the study in the introduction to be consistent with the abstract	Line 71, 76
4. line 81: abbreviation GP - not stated, does it mean General practices or General Practitioners?	Thanks for your comment. We have clarified this abbreviation.	Line 84
5. Procedure: please clarify how you contacted and made appointments with the practices ? Where you a part of the other study as well? - how and when did you recruit? (during a normal working day in the practices? or?)	Additional clarifications have been added to the Methods section.	Line 89-91
6. line 112. And when did this occur? (please state here how many participants was necessary)	We continued to recruit patients until data saturation had occurred, which was at 32.	Line 124
7. line 122: change 5 to five	changed	Line 134
8. The process of analyzing and the choice of method does not stand clear. Why did you choose an inductive approach in your study? I would have expected a theoretical approach when taking your research question in account. Please provide information that support your choice of method.	We have used a generally accepted qualitative method (for example, described here, Thomas DR. A general inductive approach for analyzing qualitative evaluation data. Am J Evaluation 2006; 27: 237-246.) There is little unusual or controversial about the approach we used. As we asked quite	

	focussed questions, and did not have prior hypotheses or assumptions, it was chosen as an appropriate method to summarise and generate main themes from the raw data.	
9. As the result section should be read in relation to the methods used, it is difficult at the time to evaluate the results and the themes presented when not knowing how the researchers reached their results	See above responses for changes made to the methods section. We are unclear if there are specific sections of the results that the reviewer believes need altering.	
Reviewer 2 comments		
Thank you for the opportunity to read this manuscript reporting findings from a qualitative study exploring patients' understanding of antibiotic resistance. This is the first qualitative study to explore knowledge of antibiotic resistant organisms spreading between people in close contact and the decay of antibiotic resistance over time, which raises interesting implications for public health campaigns.	Thank you	
Overall, I am concerned that throughout the manuscript the authors appear to over emphasise patients' autonomy to <i>decide</i> whether they use antibiotics as though the decision to receive a prescription lies solely with them. I suggest you consider whether this is an accurate reflection of the consultation process. E.g. Box - "influence on decision-making about antibiotic use" and conclusion "encourage more appropriate use of antibiotics". Also, the objectives and rationale (line 65-66) of the study are a little misleading because an assessment of how patients' understanding of antibiotic resistance influences attitudes towards antibiotic use is not addressed by the study. Rather the authors present these issues separately.	<p>We disagree that there is emphasis that the decision to receive a prescription solely lies with patients and advocate for this decision to occur collaboratively between patients and GPs (in a process known as shared decision making – for elaboration, see for example Bakhit, M., et al. (2018). "Shared decision making and antibiotic benefit-harm conversations: an observational study of consultations between general practitioners and patients with acute respiratory infections." 19(1): 165.  <a href="https://doi.org/10.1186/s12875-018-0854-y">https://doi.org/10.1186/s12875-018-0854-y</a> )</p> <p>To remove confusion about this, we have revised the rationale in the introduction.</p> <p>We have also modified the objectives and title.</p>	Abstract, last para of Introduction and first para of Methods
10. Title: As above, the research presented in the manuscript focuses on understanding of antibiotic resistance rather than "its influence on attitudes towards antibiotic use." Please consider rewording to reflect this.	<p>We have changed the Title to</p> <p>Exploring patients' understanding of antibiotic resistance, and how this may influence attitudes towards antibiotic use for acute respiratory infections: a qualitative study</p> <p>We remain keen to demonstrate the importance of these changes in attitudes on the potential to influence antibiotic prescribing – bearing in mind the large body of evidence suggesting that patient demand for antibiotics if a strong influence on the clinician's decision to prescribe them.</p>	
11. Abstract: Please be consistent in the use of 'patients or parents of child patients' throughout the abstract by inserting this phrase into the objectives and conclusions.	We have made the suggested change	Line 17, 34, 71
12. Please consider whether the precursor to more appropriate use of antibiotics is fewer	We are not convinced that a focus on viral vs bacterial is the answer to reducing antibiotic	

consultations for self-limiting viruses which do not require antibiotics.	prescribing. Rather, addressing the poor efficacy of antibiotics for ARIs in general (whatever the aetiology) seems to be the best way to reduce antibiotic use. See the argument in the Introduction (and Coxeter, P., et al. (2015). "Interventions to facilitate shared decision making to address antibiotic use for acute respiratory infections in primary care." Cochrane Database of Systematic Reviews(11): Cd010907.).	
13. Introduction: Para 1, line 48. As this is not a specialist journal, please include a definition of antibiotic resistance to enable unfamiliar readers to place the findings of poor participant understanding of antibiotic resistance in context.	We have added a definition of antibiotic resistance.	Line 49,50
14. Line 52. Please insert (AOM) after acute otitis media as this acronym is used on line 88.	We have made the required change.	Line 54
15. Line 60. Please insert references to the literature on research that has explored the "public's understanding of antibiotic resistance, consequences of it" etc. E.g. references 10, 15, 18-22.	We have cited the relevant references.	Line 62
16. Line 65. Please consider inserting 'self-limiting' after 'minor' illnesses here and throughout the manuscript.	We have made the required change.	Line 68, 254, 300, 330
17. Methods: Given the potential for the cluster randomised controlled trial to influence participants' knowledge of antibiotic resistance, it's unclear why recruitment for this study took place in intervention practices.	We highlight this as one potential study limitations (line 346-351). Moreover, we argue this posed little risk, as discussed in the section: the aid included no information about resistance decay or spread.	
18. The recruitment process is currently unclear. How did the researchers identify patients consulting with one of three ARIs? Did they approach all patients in the waiting room and ask about them to report their symptoms? The process is described as convenience in the abstract yet roughly half the participants were adult patients and half were parents – was this intentional / purposeful?	We have added additional clarifications describing the exact recruitment process. The final sample of approximately half adult patients and half as parents of child patients was not intentional.	Line 111-116
19. Were people offered an opportunity to participate at a convenient time after the consultation as well as at the time. If not, why not? The importance of speaking to people immediately following a consultation is unclear.	Patients were interviewed directly after the consultation because this i) is the time of decision making about whether to take antibiotics, ii) important for reducing recall bias, and iii) enabled face-to-face interviews to occur	Propose no change
20. Adult patients and parents of young children are quite distinct. Please comment on the rationale for recruiting both.	Both groups experience ARIs (albeit vicariously in the case of parents of sick children) and consult GPs for them. Most of the information that is provided in public health campaigns is not differentiated according to these two 'groups'. With a few exceptions, the benefit and harms of antibiotics for ARIs (and the risk and consequences of antibiotic resistance) are also not different for these groups.	Propose no change



21. Line 93. Please change 'provided' to 'summarised' as the box does not present a topic guide in full.	We have made the required change	Line 100
22. Box. 'Usual' behaviours about management of ARIs is not reported in the findings. Please state this and provide a reason.	The problematic word seems to be 'usual'. Talking to patients, we wanted to focus on the usual ARI management, rather than the special cases (complicated ARIs with other co-existing disease for example)	Propose no change
23. Line 103. Was the explanation of the study only provided verbally or also in written format? This description appears to suggest that people were given very little time to consider participating which has ethical implications.	The study explanation was done both verbally and by providing participants with a study information sheet. We have added this clarification	Line 114-116
24. The decision to stop data collection and the analysis process is clearly described. However, although the analysis is described as inductive, the themes closely match the topic guide summary. Please consider whether the analysis was partly deductive in nature.	See Point 10 above. No previous research has explored patients/public understanding of the aspects of resistance that we explored (as found in ref 12) and as such, we had no prior assumptions or hypotheses about this.	
25. Was a comparison of the themes between parents and adult patients performed? Currently there is little explicit mention of parent perceptions.	No and this was not an intention of the study.	
26. Table: How was the presenting condition determined – self report or clinician diagnosis? Please clarify. Also do you know if the participants were prescribed antibiotics during the consultation? If so, please include this in the table.	Thanks for your comment. We have added additional clarifications to the recruitment process. No, we were not able to collect this information for all participants.	Line 113-116
27. Results: Line 149 – for clarity and context it would be helpful to include the explanation given to parents of antibiotic resistance.	We have included the explanation given to parents of antibiotic resistance.	Line 162-164
28. Some of the quotes do not stand alone currently: line 158 – what does "down the track definitely" mean? line 160 – does 'it' refer to antibiotic resistance, if so please insert this in square brackets. Line 208. "Chance" of what?	We have removed "down the track definitely" from the quote as we agree that it does not provide additional information. We have inserted [antibiotic resistance] to the quote. The participant meant by chance [hope]: that antibiotic resistance decays with time. We have inserted the rest of the quote.	Line 172-173 Line 174 Line 221-222
29. Line 221. I disagree that the quote included indicates no change or concern as suggested. The quote appears to highlight caution about using antibiotics. Please consider replacing this quote with a more relevant one or reconsidering the interpretation.	We have replaced this quote with a more relevant one, indicating no change in patients' attitude towards antibiotic use.	Line 234-236
30. Discussion: Line 304. Do you have a reference to support this statement?	Yes, the reference is cited in line 314 (reference no. 12)  McCullough AR, Parekh S, Rathbone J, et al. A systematic review of the public's knowledge and beliefs about antibiotic resistance. J Antimicrob Chemother	No change (we have highlighted the relevant

	2016;71(1):27-33. doi: 10.1093/jac/dkv310 [published Online First: 2015/10/16]	t referen ce- line 314)
31. Line 306-307. Sentence beginning "The effect" appears to be incomplete.	Thanks for picking this up. We have improved the sentence clarity.	Line 320- 321
32. Limitations: The interviews were exceptionally short. Please comment on the impact of this on the depth of information gathered. Consider highlighting most participants were female as a limitation.	We have added the short duration of the interviews as a limitation. We have already highlighted that our study sample is not representative of the wider Australian population (line 344-346) and have added that this includes a gender imbalance.	Line 352- 353
33. Line 333. Please delete the word "what".	We have deleted the word "what"	Line 338
34. Conclusion: Consider whether the precursor to more appropriate use of antibiotics is fewer consultations for self-limiting viruses which do not require antibiotics. See earlier comment about including findings about usual behaviours to manage ARI's, this information could also highlight key strategies for addressing antibiotic resistance.	See response to Point 14 above.	

## VERSION 2 – REVIEW

<b>REVIEWER</b>	Margrethe Bordado Sköld Dept. of Occupational and Social Medicine, Holbæk Hospital, Denmark
<b>REVIEW RETURNED</b>	04-Jan-2019

<b>GENERAL COMMENTS</b>	Thank you for your revision of the manuscript. The method section now appear more transparent, which in turn helps the evaluation of the result and discussion section. I find the changes and the authors' responses appropriate and satisfactory. As outpointed, the study findings are new and relevant, and the report of the study now appear systematic, clear and reflective.
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<b>REVIEWER</b>	Joanna Kesten University of Bristol
<b>REVIEW RETURNED</b>	17-Jan-2019

<b>GENERAL COMMENTS</b>	Dear Authors, Thank you for your thoughtful and considered response to my comments. I have a small number of outstanding queries relating to the methods.  Point 20. Thank you for inserting the additional information about the recruitment process. Please clarify how many participant audio recordings were deleted if patients were diagnosed as having an
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	<p>illness other than an ARI. Please also reflect on the ethical implications of not using data provided by these participants. Were participants aware that this could happen prior to participation?</p> <p>Point 21. Please insert this information into the manuscript for transparency.</p> <p>Point 22. Please also insert this information into the manuscript for transparency.</p> <p>Point 24. My point here is that the findings relating to the first bullet point in the Box do not appear to be reported in the results. Please state this and provide a reason or clarify where in the text these findings are reported. Apologies for the confusion.</p> <p>Point 26. This point refers to the analysis process itself rather than any prior assumptions held by the research team. When coding the data, do you consider the process to be fully inductive or informed by the interview topic guide (the main themes closely relate to topic guide summary) and therefore at least partly inductive in nature.</p>
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## VERSION 2 – AUTHOR RESPONSE

Reviewer 1 comments		
35. Thank you for your revision of the manuscript. The method section now appear more transparent, which in turn helps the evaluation of the result and discussion section. I find the changes and the authors' responses appropriate and satisfactory. As outpointed, the study findings are new and relevant, and the report of the study now appear systematic, clear and reflective.	- Thank you.	
Reviewer 2 comments		
36. Thank you for your thoughtful and considered response to my comments. I have a small number of outstanding queries relating to the methods.	- Thank you	
37. Point 20: Thank you for inserting the additional information about the recruitment process. Please clarify how many participant audio recordings were deleted if patients were diagnosed as having an illness other than an ARI. 38. Please also reflect on the ethical implications of not using data provided by these participants. Were participants aware that this could happen prior to participation?	<ul style="list-style-type: none"> <li>- We have added additional clarifications</li> <li>- At the time of consent, patients were advised that to be eligible for the study they must be suffering from an acute respiratory infection, with the diagnosis confirmed afterwards by the treating GP.</li> </ul>	Line 126-128
39. Point 21. Please insert this information into the manuscript for transparency.	- We have inserted this information into the manuscript.	Line 123-125

40. Point 22. Please also insert this information into the manuscript for transparency.	- We have inserted this information into the manuscript.	Line 95-98
41. Point 24. My point here is that the findings relating to the first bullet point in the Box do not appear to be reported in the results. Please state this and provide a reason or clarify where in the text these findings are reported. Apologies for the confusion.	- Thank you for clarifying this and apologies for the confusion. We meant 'Usual' behaviours for using or expecting antibiotics for managing ARIs. We did not mean alternative treatments/approaches other than antibiotics. We have clarified that in the Box.	Box
42. Point 26. This point refers to the analysis process itself rather than any prior assumptions held by the research team. When coding the data, do you consider the process to be fully inductive or informed by the interview topic guide (the main themes closely relate to topic guide summary) and therefore at least partly inductive in nature.	- We have altered the manuscript to incorporate 'partially inductive' in the data analysis section of the manuscript.	Line 137-138