Author's response to reviews

Title: Overuse of antibiotics for the common cold - attitudes and behaviors among doctors in rural areas of Shandong Province, China

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Author's response to reviews: see over
BMC Medical Education reviewers’ reports on:
Overuse of antibiotics for the common cold – attitudes and behaviors among doctors in rural areas of Shandong Province, China

Reviewer: Marcia R Weaver

Version:1 Date:27 September 2014

Reviewer’s report:

Major compulsory revisions
The authors have clearly demonstrated the gap between knowledge of appropriate prescribing practices and actual practice. I would like to recommend four revisions to strengthen the manuscript.

1. Provide more quantitative details on the sample selection so that readers will have a better understanding of the context. Please see specific comments about the sample below.

Response: We have revised the methods considerably to include additional details on the sampling procedure, incorporating the suggestions made below. We have also included a figure to show the sampling.

2. Some patients have multiple diagnoses such as a common cold and a sinus infection or ear infection. Did the researchers collect data on all diagnoses or just the common cold? If it’s the former, the researchers should report two categories of results: a) patients with a common cold and no bacterial infection, and b) patients with a cold and bacterial infection. Category “a” would be the source of concern. If the authors did not collect data on all diagnoses, they should add a Limitations section and report this important limitation of their research. They should also recommend that future researchers collect data on all diagnoses.

Response: Thank you for recognising this. We included prescriptions that contained only the diagnosis of common cold. We have now made this clear in the methods section, subsection ‘ii) Collection of prescriptions’:
For this paper, all prescriptions that included only the single diagnosis of common cold (“Gan Mao”) were analyzed in this study; prescriptions with more than one diagnosis were excluded. No attempt at external validation of diagnosis was made, although it is likely that if the doctor found a more severe disease then they would have written this on the prescription instead.

3. It would be interesting to look at the relationship between the doctors’ knowledge of prescribing practices and their actual prescriptions. The prescription data does not appear to include the name of the prescribing doctor.
Again, the authors should report this limitation and recommend that future researchers collect these data.

Response: We agree that it would be interesting to investigate relationships between prescriber knowledge and prescriber practice. However, the prescription data did not include prescriber
names so such analysis was not possible. We have added a sentence in the methods section, subsection ‘ii) Collection of prescriptions’ to emphasise this:
The information of the prescriptions includes the name, age, gender, diagnosis, the types of drug used and medical cost. The name of the prescriber was not collected for individual prescriptions.

4. Concerning the ethics statement, what about informed consent of patients? The prescription data were not anonymous.

Response: We agree that the prescription data was not anonymous. However, we did not conduct any analysis of patient data. We have added two sentences in the methods section, subsection ‘Ethics statement’:
The managers of each health institution gave consent for access to prescription data. Individual patient data were not analysed.

Specific comments about the sample

a. How many counties are in Shandong province? i.e. Please report” 3 of X counties were purposively selected.”

How many administrative units were in each selected county? i.e. Please report “9 of X administrative units in the selected counties.”
How many villages were in each selected administrative unit? i.e. Please report “18 of X villages in the selected administrative units.”

Response: We have revised the methods section, subsection ‘study sites’, to include additional details on the sampling, and summarised this in figure 1. A total of 3 county hospitals, 9 township health centers and 18 village clinics were selected as study sites using a multistage sampling based on the vertical administrative structure in rural China (see figure 1). First, three counties were purposely selected out of a total of 91 counties in Shandong Province, based on geographic location and feasibility of the study. These three counties had around 2.47 million inhabitants in 2012. Second, three administrative units were randomly selected in each county. Each administrative unit consists of a town and its surrounding villages. Third, two villages were randomly selected from within each administrative unit. The only county hospital in each county was included in the study, alongside the only township health centers in each participating administrative unit, and the village clinic within each village.

b. The text says that 18 villages were selected as study sites, but I counted 39 facilities total: 3 hospitals, 18 township health centers, and 18 village clinics.

Please state the total number of facilities included in the sample.

Response: 27 facilities were included in the sample: 18 village clinics (one from each participating village), six township health centers (two from each of the three participating administrative units), and three county hospitals (one from each of the three participating counties). We have revised the ‘study sites’ subsection of the methods as described above, and included figure 1 to clarify this.
c. Provide quantitative details on the sample of facilities, as above.

How many hospitals were there in the 3 selected counties? i.e. Please report “3 of X hospitals in the selected counties.”
How many township health centers were there in the 9 selected administrative units? i.e. Please report “18 of X township hospitals in the selected administrative units.”
How many village clinics were there in the 18 selected villages?, i.e Please report “18 of X village clinics in the selected villages.”

Response: We have revised the ‘study sites’ subsection of the methods as described above, and included figure 1 to clarify this.

d. How many worked in each type of facility? What was the response rate for the doctors? i.e. How many were asked to complete the questionnaire, and how many completed it?

Response: All eligible doctors working on the day in which the questionnaire was distributed completed the survey at each facility. This is the equivalent of a 100% response rate. There is a very ‘collective approach’ within society in China, so it is not at all unusual that such a high proportion of doctors would choose to participate in a voluntary study, and this does not imply any coercion or incentive was involved. We have revised the first paragraph of ‘characteristics of the doctors’ subsection of the Results to read:
All eligible doctors working on the day in which the questionnaire was distributed at each facility completed the survey, resulting in a total of 188 completed questionnaires from the different health institutions in the three counties.

e. What is a “pragmatic random sample”? Is it a convenience sample?

Response: The word ‘pragmatic’ here was used to imply feasibility; the sampling technique was a ‘systematic random sampling’. We have revised the wording in subsection ‘ii) collection of prescriptions’ of the methods to clarify this:
At the county hospitals, where there was a far higher number of prescriptions than at other institutions, a systematic random sampling methodology was used to generate a maximum of 200 sample prescriptions from each of the departments.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests.
The present study is part of the ongoing “Sino-Swedish Bilateral Cooperation on Management of Antibiotic Resistance” with the aim of understanding the situation and developing feasible interventions to address different aspects of the problems of antibiotic resistance in China and Sweden. This sentence is meaningless.

Response: As this study is part of a larger collaboration we feel it is important to mention this in the background. We have revised the background to ensure the context of the current paper is clearer:

The present study is part of the ongoing “Sino-Swedish Bilateral Cooperation on Management of Antibiotic Resistance” with the aim of understanding the problems of antibiotic resistance in China and Sweden and developing interventions to address different aspects of the problems. The purpose of this paper is to analyze attitudes and behaviors of doctors at different levels of the rural health care system in relation to antibiotics use, with a focus on patients with the common cold, using three counties in Shandong province.

Methods: This section needs Major Compulsory Revisions.

1#The study sample is not defined clearly. What is the inclusion and exclusion criterion for study sample? Whether or not did some doctors refuse to participate in study? Were some non-clinical doctors recruited in this study? If so, how will it affect the study result?

Response: We have tried to clarify the study sampling methodology by including an additional figure (figure 1), and revising the methods section, subsection ‘study sites’, to include further details on the sampling.

A total of 3 county hospitals, 9 township health centers and 18 village clinics were selected as study sites using a multistage sampling based on the vertical administrative structure in rural China (see figure 1). First, three counties were purposely selected out of a total of 91 counties in Shandong Province, based on geographic location and feasibility of the study. These three counties had around 2.47 million inhabitants in 2012. Second, three administrative units were randomly selected in each county. Each administrative unit consists of a town and its surrounding villages. Third, two villages were randomly selected from within each administrative unit. The only county hospital in each county was included in the study, alongside the only township health centers in each participating administrative unit, and the village clinic within each village.

We have also revised the methods section, subsection ‘i) survey of doctors’, to emphasise that only clinical doctors with a legal right to prescribe were eligible to participate:

The study was limited to clinical doctors who working with patients and who had a right to prescribe antibiotics. All such doctors working at the selected township health
centers and village clinics, and at the county hospitals in the departments of internal medicine, surgery, pediatrics and obstetrics & gynecology departments were invited to participate.

All eligible doctors working on the day in which the questionnaire was distributed completed the survey at each facility. We have revised the first paragraph of ‘characteristics of the doctors’ subsection of the Results to read:

All eligible doctors working on the day in which the questionnaire was distributed at each facility completed the survey, resulting in a total of 188 completed questionnaires from the different health institutions in the three counties.

2#The development of questionnaire is not scientific and the reliability is doubtful. The authors reported that “The survey was developed based on a review of the relevant literature”. The development of questionnaire is too simple, and there are lack of pilot study and evaluation on the reliability and validity of questionnaire. In addition, the measurement of this study is not presented in detail. The result of the great discrepancy in knowledge and prescribing behaviour may partly due to the absence of reliability and validity of questionnaire.

Response: Thank you for highlighting the need to expand on the methods of survey development and piloting. We have re-named the ‘data sources’ subsection of the methods to ‘data collection’, and provided further detail in the ‘i) survey of doctors’ subsection:

A questionnaire concerning knowledge and attitudes of antibiotic prescribing, particularly in the context of patients with the common cold, was developed jointly between the collaborators in Sweden and China, based on a review of the relevant literature. It was developed in Chinese and translated into English for the collaborators to discuss. The survey contained closed-ended questions with pre-set alternatives. It was tested for language understanding and face validity, and piloted with doctors from the county hospitals and township health centers. The questionnaire was self-completed and paper-based.

The types of question asked in the current survey are not the types of questions normally subjected to reliability testing, thus we focused on the pilot testing and a careful evaluation of face validity. It is commonly known that knowledge and practice do not correspond perfectly, partly because reported practice tends to involve a participant considering ‘ideal situations’ whereas actual practice has many other influences that cannot be captured in a questionnaire. We feel that the absence of further reliability testing of the questionnaire is not likely to account for a large part of the wide discrepancy noticed between knowledge and practice.

3#The sampling method for prescription selection is not defined clearly. What was the sampling method? Why did not chose prescription randomly in township health center and village clinics? And how did authors calculate the sample size? And what is the specific random sampling method used for prescriptions selection in county hospital?

Response: The sampling methodology was strongly influenced by what it was feasible to do in the setting, and what we felt would provide useful information. We included all prescriptions from village clinics and township health centers, in order to include what we felt to be a sufficient number of prescriptions for our analysis. As there were a far greater number of prescriptions written by doctors at the county hospitals, we decided to only include a random
sample of these, for reasons of feasibility. As we did not intend to do any statistical testing on the prescription data we did not conduct any sample size calculations. We have revised the wording in subsection ‘ii) collection of prescriptions’ of the methods to include a further description:

At the county hospitals, where there was a far higher number of prescriptions than at other institutions, a systematic random sampling methodology was used to generate a maximum of 200 sample prescriptions from each of the departments.

Was “common cold” defined according to the international classification of disease?

Response: We have already mentioned in the limitations section that it was not possible to validate the diagnosis on the prescriptions. We have revised subsection ‘ii) collection of prescriptions’ in the methods to state:

For this paper, all prescriptions that included only the single diagnosis of common cold (“Gan Mao”) were analyzed in this study; prescriptions with more than one diagnosis were excluded. No attempt at external validation of diagnosis was made, although it is likely that if the doctor found a more severe disease then they would have written this on the prescription instead.

Results: This section needs Major Compulsory Revisions.
The presentation of study result is too complicated. Some result can be shown in Table to simplify the result section.

Response: We have now included an additional table, table 2, which shows the main results from the survey, categorised according to county and healthcare facility type. In the main text we refer to total responses.

Discussion: This section needs Major Compulsory Revisions.
The discussion section does not discuss but only reiterates the results. Here is where you compare and contrast your findings with other published research, explaining the findings, identifying how your results have provided NEW information and added to our understanding. For example, the author should explain: why were there gaps between knowledge and practice? Why were doctors in township health centers less likely to have attended training? Why were prescriptions from village clinics more likely to contain a prescription for an antibiotic?

Response: Thank you for your comment. We have removed instances of repetition of results from the discussion, and further expanded parts of the discussion:

(paragraph 1) Although almost all doctors stated they would not use antibiotics for a patient with a common cold in our questionnaire, we found that at least one antibiotic was present on over half of all prescriptions for patients with a common cold from the institutions these doctors work at. Gaps between reported knowledge and actual practice within antibiotic prescribing are commonly encountered. This high prescription rate of antibiotics in the context of viral upper respiratory tract infections is in line with the results of a recent systematic review suggesting that almost half of all outpatient appointments in China result in a prescription for an antibiotic [6], and with a similar mean number of antibiotics used. At the time of the current study doctors were able to make profits from individual drug
prescriptions, including antibiotics, and this may have stimulated over-prescribing of antibiotics.

And:

(paragraph 2) A high proportion of doctors in our study have attended training on antibiotics since qualifying, and for the vast majority this training has occurred within recent years. It is unclear why doctors from township health centers were less likely to have attended such training than village doctors or doctors from county hospitals. It may be that doctors from township health centers have received less encouragement or have fewer opportunities to attend training than doctors from other levels of health facility.

In addition, the author said “only half felt that the national essential drug system affected their use of antibiotics” in “Discussion second paragraph”. However, this finding was not present in the result.

Response: Thank you, this has been now been removed entirely.

Level of interest: An article of limited interest

Quality of written English: Not suitable for publication unless extensively edited

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests: I declare that I have no competing interests.
Reviewer: Tahir Khan

Version: 1 Date: 29 August 2014

Reviewer’s report:

Major Revision:
First of all I appreciate authors effort for this study. However there are some concerns arisen after reviewing this paper.

1- Study tool: it is not stated anywhere in the text that either tool was valid, what was the construct of the tool and was it valid? I appreciate if authors can apply some statistical test to see the reliability of the tool.

Response: Thank you, we have expanded on the methods of survey development and piloting, providing further detail in the ‘i) survey of doctors’ subsection:
A questionnaire concerning knowledge and attitudes of antibiotic prescribing, particularly in the context of patients with the common cold, was developed jointly between the collaborators in Sweden and China, based on a review of the relevant literature. It was developed in Chinese and translated into English for the collaborators to discuss. The survey contained closed-ended questions with pre-set alternatives. It was tested for language understanding and face validity, and piloted with doctors from the county hospitals and township health centers. The questionnaire was self-completed and paper-based.

The types of question asked in the current survey are not the types of questions normally subjected to reliability testing, thus we focused on the pilot testing and a careful evaluation of face validity.

2- Results: Data is presented only as N %, authors should apply some advance statistical to see the association among the variable that might have association with the study question.

Response: We have already presented several chi-squared tests in the results, looking at relationships between survey answers and type of institution that the doctors worked at, and whether they had attended training on antibiotic use. We agree that it would have been interesting to conduct a more in-depth analysis, if we had been able to correlate the survey responses with prescription data at the level of the individual doctor, but this was not possible.

3- Some minor typos are there, that can be rectified in consultation with a native speaker.

Response: Thank you, we have revised these.

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I have no competing interests