Author’s response to reviews

Title: Why Patients Want to Take or Refuse to Take Antibiotics: An Inventory of Motives

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Response to Reviewers

Kamalesh Sarkar (Reviewer 1)

Comment: Research topic appears to be interesting. But methodology seems to be not sound as it is based on self-reported behaviour only without any scope of cross-verification. When infection is there, suitable antibiotic needs to be taken to get rid of infection as well as to prevent person to person spread. If there is any individual justification of not taking antibiotic in an appropriate situation - can't be accepted/justified. This appears to be the most important unsuitability for publishing this kind of paper.

Response: The study was about reported motives to take or not to take antibiotics. Participants were asked to indicate why at some times in the past they have taken antibiotics and why at other times in the past they have decided not to take antibiotics. In other words, participants were asked to remember past, specific behaviors and to analyze the reasons of these behaviors. As we wished to examine the motivational structure of these behaviors, asking participants to report their motives was the only way to have access to them.

As indicated in the limitations section, although motives were assessed through self-reports, responses were clearly structured. For example, six interpretable motives to take antibiotics were found, which means that the data were coherent. If participants had not been able to analyze their motives or if they had consciously decided to misreport their motives, responses would not have structured themselves into six coherent factors. In other words, there was a checking device built up in the methodology used.
We agree, however, with the reviewer that cross-verification is needed. The limitations section has been completed. It reads: “The study has at least two limitations. First, motives were assessed through self-reports. Participants’ responses were, however, clearly structured: If they had consciously decided to misreport their motives, responses would have been given in a more or less random way and, as a result, no clear factor structure could have been found. Now that the complete structure of motives is known, it will be possible, in future studies, conducted in collaboration with physicians, to contact people who have recently been prescribed antibiotics, to ask them whether they have taken these antibiotics, and, using a shortened six-item (or four-item) version of the questionnaire, to assess the reasons why they have taken them (or not taken them or discontinued the treatment).”

Catherine Smith (Reviewer 2):

Comment # 1: This study aimed to identify the reasons why people take or refuse to take antibiotics that have been prescribed. The researchers conducted a survey of 418 adults who were asked to rate statements relating to antibiotic use (or non-use) on a 15-point scale. They then used factor analysis to identify the main motives reported.

Background

The acronym "BRICS" should be defined.

Response: The sentence has been completed (see Background section, first sentence). It now reads: “Antibiotics consumption is on the rise in most countries, especially in countries forming the BRICS (Brazil, Russia, India, China and South-Africa) group [1].”

Comment # 2: The statement that "Although use of antibiotics in developing parts of the world should be encouraged, the current level of consumption in developed countries raises concerns for public health” is not referenced and not entirely correct. Inappropriate/overuse of antibiotics is a worldwide problem, not just a problem in more developed countries. It can be made worse in developing countries for example by availability over the counter (see for example https://aricjournal.biomedcentral.com/articles/10.1186/s13756-017-0208-x).

Response: This part of the manuscript has been rewritten (see Background section, first paragraph). It now reads: “Antibiotics consumption is on the rise in most countries, especially in countries forming the BRICS (Brazil, Russia, India, China and South-Africa) group [1]. Inappropriate use of antibiotics is a worldwide issue that concerns developed countries as well as
developing countries. This issue can, nevertheless, arise differently from one part of the world to another, depending on the level of economic development and local cultures [2]. Irresponsible antibiotic use may have detrimental effects—increasing antibiotic resistance (the public health level), and causing side effects (the patient level), either directly through gastrointestinal side effects and allergic reactions or indirectly by changing the nature of the gut flora [3,4].”

Comment # 3: Statement "Prescription by a physician is certainly not the only reason to take antibiotics: Patients consume many over-the-counter pharmacological substances, and antibiotics are just one of them" - this implies that antibiotics are available over the counter - please clarify if this is the case in the study area.

Response: This part of the Background section (second paragraph) has been completed. It now reads: “Prescription by a physician is certainly not the only reason to take antibiotics: Patients consume many over-the-counter pharmacological substances, and antibiotics are just one of them. In France, antibiotics are available only on a physician’s prescription, but they may be borrowed from family members or they can be bought on the Internet. The reasons for antibiotic use by patients have, until now, not been examined in a systematic way.”

Comment # 4: Methods -- Development of questionnaire - who was in the focus group? Were they experts/members of the public etc? Was there a reason for using a 15-point scale used (is this a standard measure)?

Response: The sentence has been completed (see Material section). It now reads: “This list was shown to a focus group of four adults who were members of the public. They reformulated 48 items judged as ambiguous and suggested 22 additional items based on their personal views.”

We used a 15-point response scale in order to provide enough flexibility to respondents who would like to nuance their ratings. This scale has been used in previous studies examining people’s motives to undergo surgery [19] or to use skin bleaching agents [18].

Comment # 5: Data analysis - there should be a section in the methods describing how the analysis will be conducted - i.e., calculation of mean scores; using exploratory factor analysis; regression analysis etc. This is a major issue with the paper in its current format.

Response: A Data Analyses section has been added. It reads:
Data Analyses

Mean scores of the reason-to-take items and of the reason-not-to-take items were computed. Two separate exploratory factor analyses were conducted, one on each set of items. They showed that 24 reason-to-take items and 34 reason-not-to-take items did not load (correlation < .30) on any factor or loaded on more than one factor. They were removed from the analyses, and a second set of factor analyses was conducted. Six interpretable factors (68% of the variance) with eigen-values ranging from 1.11 to 14.43 were observed in the reason-to-take condition, and four interpretable factors (66%) with eigen-values ranging from 1.45 to 14.88 were observed in the reason-not-to-take condition. VARIMAX rotations were performed. Ten mean factor scores were computed. A series of forward stepwise regression analyses was conducted with the demographic characteristics as the independent variables and the ten scores as the dependent variables.

Comment # 6: Does the demographics/ personal experience with antibiotics questionnaire include a question about whether the participant has ever refused to take antibiotics that were prescribed? This seems important as the study aims to explore reasons for refusing antibiotics.

Response: This part of the Participants section has been completed. It now reads: "Seven hundred fifty persons were approached, and 418 (56%) agreed to participate. All the participants who agreed to take part in the study had been prescribed antibiotics in the past by their physician. Most of the time, they have decided to take them but sometimes, they have decided not to take them or to discontinue the treatment. All participants provided informed consent. Demographic characteristics are shown in Table 1".

Comment # 7: Results. Results should include a brief summary of the characteristics of the participants.

Response: This part of the results section (first paragraph) now reads: "One hundred and forty seven males and 271 females aged 18-85 years participated in the study. The mean scores of the reason-to-take items ranged from 2.21 to 9.75 (out of 15). Main results of the first exploratory factor analysis are shown in Table 2".

Comment # 8: "The first factor (21%)… " - please clarify what the % refers to.

Response: This percentage refers to the variance explained. This sentence (of the Result section) now reads: "The first factor (21% of the variance) was labelled…".
Comment # 9: Tables - column headings should define the values being reported (e.g. in table 1, the column heading "Factors" should say "(Percentage of yes or no responses)", rather than just being in the legend. Please also clarify which columns are % of yes, and which are % of no.

Response: Table 1 has been corrected.

Comment # 10 : Regression analysis - if a linear regression was used, this should be stated. It would also be easier to interpret if the results for the models were included in a table.

Response: The information requested is now provided in the Data Analyses section. It reads: "A series of forward linear stepwise regression analyses was conducted with the demographic characteristics as the independent variables and the ten scores as the dependent variables."

As suggested by the reviewer, main results from the stepwise linear regression analyses are now shown in Table 4.

We have rewritten the Results section accordingly. Now it reads:

One hundred and forty seven males and 271 females aged 18-55 years participated in the study. The mean scores of the reason-to-take items ranged from 2.21 to 9.75 (out of 15). Main results of the first exploratory factor analysis are shown in Table 2.

The first factor (21% of the variance) was labelled Appropriate prescription since it loaded on items expressing the idea that antibiotics were prescribed by a qualified physician and that this prescription looked reasonable to the participants’ eyes. The mean of the four items with the highest loadings was 8.46 (SD = 4.89), the highest value observed. The second factor—Protective device (11%)—expressed the idea that antibiotics can protect the body from bacterial invasion (M = 5.78, SD = 3.71). The third factor—Enjoyment (11%)—expressed the idea that antibiotics were considered as a quick fix allowing someone to go out and celebrate the weekend as usual (M = 4.17, SD = 3.60). The fourth factor—Others’ pressure (10%)—expressed the idea that antibiotics were taken mainly in order to reassure close relatives (M = 4.41, SD = 3.53). The fifth factor—Work imperative (8%)—expressed the idea that antibiotics were taken mainly to be able to achieve important work (M = 6.99, SD = 4.13). Finally, the sixth factor—Personal autonomy (7%)—expressed the idea that through the taking of antibiotics one can shorten one’s dependence upon others (M = 4.51, SD = 3.86).

The mean scores of the reason-to-refuse items ranged from 2.29 to 10.61. Main results of the second factor analysis are shown in Table 3. The first factor (34% of the variance) was labelled Secondary Gain since it loaded on items expressing the idea that through prolonged illness one can benefit from increased social support and one may also be able to control more easily one’s social environment (M = 3.92, SD = 4.27). The second factor—Bacterial Resistance (14%)—expressed the idea that the irresponsible use of antibiotics may facilitate the process of bacterial
resistance (M = 6.41, SD = 3.87). The third factor—Self-defense (10%)—expressed the idea that the body was able to defend itself against the infection, in particular when it was not severe (M = 8.92, SD = 3.77). Finally, the fourth factor—Lack of trust (8%)—expressed the idea that one may not always be fully confident in the prescriber’s competence (M = 5.09, SD = 3.61).

Table 1 shows the relationship between participants’ characteristics and scores on each factor of motives, and Table 4 shows the results from the stepwise regression analyses. Appropriate prescription was significantly associated with gender (β = .16) and number of children (β = -.13). Protective device was only associated with change of treatment (β = .18). Enjoyment was associated with age (β = -.14), number of therapies (β = .15), and concerns with public health issues (β = -.10). Work imperative was associated with gender (β = .13), number of antibiotic treatment in the past year (β = .09), and change of treatment (β = .13). Secondary gain was only associated with age (β = .17). Bacterial resistance was associated with personal experience of inefficacy (β = .15), conviction that antibiotics are in general useless (β = .13), and expressed concerns about resistance (β = .27). Self-defense was associated with personal experience of inefficacy (β = .13) and expressed concerns about resistance. Finally, Lack of trust was similarly associated with personal experience of inefficacy (β = .15) and expressed concerns about resistance (β = .18).

Comment # 11: Discussion. Paragraph starting "Overall, a notable proportion of people report adopting behaviours that are more beneficial to micro-organisms than to humans and other animals…” - I find it difficult to understand what your meaning is here.

Response: The sentence has been completed. It now reads: “Overall, a notable proportion of people report adopting behaviors that are more beneficial to micro-organisms than to humans and other animals; that is, behaviors that are likely to increase bacterial resistance.”