

# An assessment of factors influencing the prescribing of antibiotics in Acute Respiratory Illness: A questionnaire study

Hoffman, D, MBChB, DOH, MCLinPharm  
Botha, J, BPharm, PhD  
Department of Pharmacology,  
Nelson R Mandela School of Medicine,  
Durban, South Africa  
Kleinschmidt, I, BSc, MSc, PhD  
Medical Research Council of South Africa

Correspondence: Dr D Hoffman, PO Box 1585, Amanzimtoti, 4125  
Tel: (031) 903-5040/1 (work), Cell: 082 466 6777, Fax:(031) 903-5913, Email: deonhof@mweb.co.za  
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## Abstract

**Introduction:** Non-clinical factors are major determinants in the decision to prescribe medication. This study was prompted by the impression that Primary Care Physicians in South Africa are constantly under pressure to prescribe antibiotics. The objective was to assess patients' views and expectations, regarding their need for antibiotic therapy, and compare this with the doctor's perception of this expectation.

**Study Design:** Questionnaire study involving patients and general practitioners.

**Population:** General practitioners and their patients in a sub-set of the Durban Metropole, Kwa-Zulu Natal, South Africa.

**Outcomes Measured:** The patient's views and expectations regarding the need for antibiotics, the doctor's perceptions of these expectations and the relationship between all these factors and the actual prescribing of antibiotics.

**Results:** Factors most strongly associated with prescribing were the patient's opinion that antibiotics were required, his/her expectation of receiving them and the doctor's perception of this expectation. Patients aware of the dangers, to the community, of over-prescribing, expected antibiotics 64% of the time as opposed to 90% of the patients who were unaware of the dangers.

**Conclusion:** Several non-clinical factors, such as patient expectation and doctors' perception of this expectation, were associated with antibiotic prescribing. However prescribing was also strongly related to the doctor's view that an antibiotic was indicated. The expectation of receiving an antibiotic prescription, but not the actual receipt of such a prescription, was less among patients who were aware of the possible dangers to the community of antibiotic over-use.

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## INTRODUCTION

Non-clinical factors are major determinants in the decision to prescribe medication.<sup>1-3</sup> This is also true for antibiotics.<sup>4</sup> Upper respiratory tract symptoms are very common in primary care and the inappropriate prescribing

of antibiotics for respiratory tract infections, by primary health care physicians, is an ongoing concern.<sup>4-8</sup> Private patients in South Africa are often left to self-medicate because their number of visits to the doctor is restricted by their Medical Aids. When the decision is made to see the doctor,

it is often regarded as being only for the collection of an antibiotic. Previous researchers have found that, for some patients, the decision to consult a doctor is equivalent to the decision to take a prescribed medicine.<sup>2</sup> This may also be true in the South African setting when patients believe that they have

exhausted all other possibilities. Due to cost, many patients are also opting out of Medical Aid cover. As a result, when they do visit the doctor (paying for their consultation) the doctor might feel pressurised to do anything possible to prevent a revisit.<sup>6,7</sup>

The present study was prompted by the impression that primary care physicians in South Africa are constantly under pressure to prescribe antibiotics. Accordingly this study assessed patients', and parents', views and expectations regarding the need for antibiotic therapy and compared this with the doctor's perception of this expectation. The influence of these perceptions on prescribing was then assessed. This is the first such study in South Africa and differs from most of those previously published in that it captures the patients' opinion prior to, rather than after, seeing the doctor.

## METHODS

After obtaining the necessary approval from the Ethics Committee of the Nelson R Mandela School of Medicine, the survey was carried out in the first half of 2001 in a suburb of the Durban Metropole in KwaZulu-Natal. Participating doctors provided their services in a first world setting, to patients of all race groups. The standard of education of the patients was high in this middle class community, consisting of households where both parents are generally regarded as the breadwinner. In this study, an observer did not take measurements, and the variables of interest were purely the opinion of the patient and clinician gathered independently of one another. At the time of the consultation, the clinician was blinded to the possibility of the patient completing the questionnaire, minimising any prejudice on his/her part.

All patients (older than one year), with symptoms of an acute respiratory illness, were eligible for the study. Consenting patients, or their parents, were asked by the receptionist to complete a questionnaire while waiting for the doctor. The questionnaire probed patients on several aspects of their need to consult the doctor. They were asked whether or not; they thought an

antibiotic was necessary for the ailment, whether or not they actually expected it to be prescribed and whether or not they would ask for an antibiotic. They also had to indicate whether they thought that the liberal use of antibiotics could affect the community. Information regarding exclusions was gathered in the form of questions on the questionnaire. Patients excluded from the study were those already on antibiotics, patients suffering from diabetes, asthma or emphysema and those that may have completed the questionnaire before.

Upon receiving the folded questionnaire from the patient, the receptionist sealed it with a sticker on which were printed four questions pertaining to the doctor. The sealed questionnaire was in the possession of the receptionist while the patient was in consultation. Immediately after the consultation the doctor was presented with the sealed questionnaire, answered the questions printed on the sticker, and placed the document in a sealed box. The questions put to the doctor related to expectation of, indication for, and prescription of an antibiotic. The doctor was also asked if he/she felt pressurised to prescribe an antibiotic.

Data was analysed, and frequencies were derived, using Epi Info 2000. Standard statistical methods (e.g. Kirkwood) were used to calculate standard errors and to perform significance tests. Chi-squared or Fishers Exact Test were used to detect associations between the variables and the main outcome measure, namely antibiotic prescribing. To compare the influence of the different variables on the prescribing of antibiotics, a risk ratio was calculated. Therefore, for the purposes of this study,

risk ratio refers to the "risk" of being prescribed an antibiotic although it is not regarded as a risk in the true sense of the word.

## RESULTS

Of the thirteen general practitioners approached, eleven participated in the study. Four hundred and two completed questionnaires were received from the patients. Of these 72 met the exclusion criteria, leaving 330, which were analysed. The mean age of patients participating was 29 years (range 1 to 86), and the mean number of days ill was 5 days (median 3, range 1 to 90). The parents of patients completed twenty five percent of questionnaires, the remainder being completed by patients themselves. Women comprised the majority of patients (59%), as well as parents (76%).

As shown in Table I, although nearly half (49%) of all participants did not know whether an antibiotic would help their condition, a large proportion (83%) was, nevertheless, expecting it. In fact, 81% received an antibiotic (Table II). Despite the fact that, on average, 5 days had elapsed before the patient approached the doctor for help, only 29% of patients were self-medicating. No association was found between self-medicating and the patient's desire for an antibiotic ( $p = 0.7$ ; not tabulated). A poor knowledge of the indications for antibiotics was illustrated by the fact that the majority (74%) of participants did not believe, or were unaware, that excess use of antibiotics could hold dangers for the community. Doctors felt under pressure to prescribe only 16% of the time and believed that

Table I: Frequency table of patient/parent views

Questions to patients/parents	Yes	No	Don't Know
• Are you/your child currently taking any medication?	29%	71%	-
• Do you feel that antibiotics will help this illness?	47%	4%	49%
• Do you expect the doctor to give you antibiotics?	83%	17%	-
• Will you ask the doctor for an antibiotic today?	48%	52%	-
• Does over-use of antibiotics hold dangers to the community?	27%	11%	63%

antibiotics were indicated in as many as 76% of patients seen. (Table II)

Table III indicates the associations of various factors with the prescribing of antibiotics. Patient demographics were unrelated to prescribing, as was the use of other medication. Likewise, the

duration of illness, prior to the visit, was similar in those patients who received antibiotics and those who did not ( $p = 0.43$ ; data not tabulated).

#### **Patient Expectations:**

The view that an antibiotic was required,

the expectation of an antibiotic and the intention to ask for an antibiotic were all significantly associated with actually receiving it. No association was found between prescribing of antibiotics and knowledge of the possible effects of the over-use of antibiotics in the community ( $p = 0.1$ ). However, a significant association was found between this patient knowledge of antibiotics and the expectation of a prescription ( $p < 0.001$ ; data not tabulated). Sixty four percent of those patients who were aware of the danger to the community of indiscriminate antibiotic use, expected to receive an antibiotic, as opposed to 90% of those who were either unaware of, or uninformed about, the problem. In those who did not know about the possible dangers of over-use, the risk ratio for being prescribed an antibiotic, between those who expected it and those who did not, was 1.5 (95% CI 1.03; 2.09). For patients who did know about the possible consequences of over-use of antibiotics, the corresponding risk ratio was 1.3 (95% CI 1.0; 1.8). This difference in risk ratios was not statistically significant ( $p = 0.69$ ).

#### **Doctor Perceptions:**

With regard to the doctor, both a belief that an antibiotic was indicated and a perception of patient expectation were associated with prescribing ( $p < 0.0001$ ). The risk ratio for prescribing an antibiotic when the doctor considered it to be indicated, compared to him considering it not to be indicated, was 97.8. However, the corresponding ratio when he thought it was expected by the patient, compared to thinking it was not expected, was 2.4. The risk of being prescribed an antibiotic when the patient actually expected one, compared to the patient not expecting one, was 2.8.

There was no significant association between prescribing of antibiotics and the doctor feeling pressurised to do so ( $p = 0.95$ ). Doctors perceived their patients to expect antibiotics in 60% of consultations. They were correct 90% of the time. In the 40% of patients perceived not to expect an antibiotic, doctors were correct only 26% of the time ( $p < 0.001$ ; not tabulated). The fact that some patients were already self-medicating at the time of the consulta-

Table II: Frequency table of doctor views

Questions to doctors	Yes	No
• Was an antibiotic expected by the patient?	60%	40%
• Was an antibiotic indicated for his condition?	76%	24%
• Was an antibiotic prescribed to the patient?	81%	19%
• Did you feel pressurised to prescribe an antibiotic?	16%	84%

Table III: Proportion of patients being prescribed antibiotics and the association of this outcome measure with patient/parent and doctor variables.

Variable	Antibiotic Prescribed (%)	P-value of Difference
<i>Demographics:</i>		
Respondent: patient parent	83 75	0.18
Sex of patient: female male	79 85	0.31
Sex of parent: female male	64 73	0.85
<i>Other:</i>		
Patients currently on medication	80	
Patients currently not on medication	81	0.89
<i>Patient/Parent Expectations:</i>		
Believes antibiotic will help: Yes No	85 50	< 0.0001
Expecting an antibiotic: Yes No	86 60	< 0.0001
Intends asking for antibiotic: Yes No	89 73	< 0.0006
Aware of antibiotic effect on community: Yes No	75 87	0.10
<i>Doctor Perceptions:</i>		
Thought patient expected antibiotic: Yes No	88 60	< 0.0001
Antibiotic was indicated: Yes No	99 21	< 0.0001
Felt pressurised to prescribe antibiotics: Yes No	73 82	0.95

tion was unrelated to the doctor's perception of the patient's desire for an antibiotic ( $p = 0.69$ ; not tabulated).

## DISCUSSION

The over-prescribing of antibiotics (and other medication) is a worldwide concern and is cited as a major contributor to the escalating cost of health care. Reasons reported by previous researchers were time limits, a sign of sympathising with the patient, medico-legal concerns, and increasing patient satisfaction with the visit.<sup>6,7</sup>

In the present study a large proportion of patients expected (83%) and received (81%) antibiotics. The factors most strongly associated with prescribing were the patient's expectation, the doctor's perception of that expectation, and the indication for antibiotics. The doctors' perception of patient expectation and patient expectation itself were similar in their association with prescribing, whereas the former has had a greater influence in other published studies.<sup>2,5,6,8,9,12,13</sup> Doctors, in the present study, were underestimating the patients' desire for an antibiotic, as 74% of the patients judged not to expect an antibiotic actually wanted it. However, when doctors believed that patients were anticipating an antibiotic they were correct most of the time. This perception did not translate into feeling under pressure to prescribe (16%), probably due to their belief that antibiotics were generally indicated (76%). The study did not assess whether or not these indications were valid. Participating doctors were fully aware of the reasons for the research and the high percentage of indication for antibiotics may be partially explained by an effort on the part of the physician to validate his/her habit of over-prescribing. Macfarlane *et al.* reported similar results for expectancy (72%) and prescribing (75%) of antibiotics, while doctors were prescribing due to pressure in 17% of cases. Antibiotics were generally considered to be indicated in 78% of patients.<sup>5</sup>

Despite the fact that almost half the patients did not know whether an antibiotic would help, 83% were still expecting it. Other studies have

concluded that when patients frequently receive antibiotics, which are clinically not indicated, they are led to a false perception of their efficacy.<sup>6,9,10,11</sup> In the present study self-medication, at the time of his/her consultation, had no influence on the patient's expectation of antibiotics, the doctor's perception of that expectation nor on the actual prescribing of antibiotics. Previously published studies have generally not evaluated the influence of this variable on the prescribing of antibiotics.

There was less expectation of receiving an antibiotic among patients who were aware of the danger to the community of indiscriminate antibiotic use, compared to those who were either unaware of, or uninformed about the problem ( $p < 0.001$ ). However, the risk ratio for receiving an antibiotic prescription in these two groups was not significantly different. Therefore it appears that educating patients on the negative effects of over-prescribing will lessen their expectancy, but not necessarily the ultimate prescribing of antibiotics. Mainous *et al.* were of the opinion that patient education will lessen prescribing by doctors by decreasing the expectancy of antibiotics by the patient.<sup>11</sup>

The present study is one of the few to measure the influence of both participant and doctor perception on antibiotic prescribing. Another advantage is that it captured the participant's opinion *prior* to the actual doctor visit. It appears that Mangione-Smith *et al.*, who assessed parental and doctor opinion, have been the only other researchers to do this.<sup>8</sup> They reported a lower expectancy for antibiotics (50%) in their population group as compared to Macfarlane *et al.* (72%). They proposed possible reasons to be the higher age group of patients in the Macfarlane study (mean = 49 yrs; Mangione-Smith mean = 32-38 yrs) and the fact that Macfarlane *et al.* captured the patient's expectation after he had seen the doctor.<sup>8</sup> In the present study, despite an even lower average age (29 years) than those in both the above studies and the fact that patient opinions were captured pre-consult, patient expectation of antibiotics was even higher (83%).

The present study did not measure

patient satisfaction with the consultation, nor the influence of this on prescribing. Other studies have shown no relationship between prescription of medicines and patient satisfaction.<sup>5,6,7,13,14,15</sup> Some of these authors have shown that there is no substitute for taking time to explain treatment modalities to the patient,<sup>5,6,7,14,15</sup> while others have reported that when attempts are made to educate the physician about the disadvantages of over-prescribing much effort brings only little change.<sup>8</sup> Thus it appears that the answer may lie in discussing treatment modalities with the patient. This would firstly increase patient satisfaction with the consultation and further may reduce the prescribing of antibiotics. A study on the management of sore throats showed a 68% reduction of the use of antibiotics when patients were given the option of not using them.<sup>16</sup>

Clinicians should remain mindful of the fact that their function is to gather information from patients regarding their illnesses. The appropriate information should then be presented to the patients in an unbiased way so that an informed decision can be taken by them regarding their treatment of choice.<sup>12</sup>

### Study Limitations

It is possible that there was some clustering of responses by surgery, which would result in the standard errors being underestimated, and in significance of differences being exaggerated. However, the relative homogeneity in surgery catchments makes this unlikely. Since individual general practitioners insisted on complete anonymity of their results, it was impossible to identify to which surgery a patient belonged, and therefore it was not possible to assess whether response varied between the surgeries. The possibility also exists that there may have been some selection bias due to the fact that it was left to the receptionist to decide to whom she would present the questionnaire for completion.

### KEY POINTS FOR CLINICIANS

- The prescribing of antibiotics was associated with patients expecting

them and doctors thinking that patients may want them.

- Despite this doctors did not feel under pressure to prescribe because most of the time they believed that antibiotics were indicated.
- Self-medication was unrelated to patients' expectancy, doctors' perception of this expectancy or the prescribing of antibiotics.
- Although patients with knowledge of the possible dangers to the community of the over-use of antibiotics had less expectation of receiving antibiotics, antibiotics were not prescribed significantly less to this group. □

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