

Role of patients' and doctors' views
on the management of
respiratory tract infections

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of respiratory tract infections**

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Role of patients' and doctors' views on the management of respiratory tract infections

Opvattingen van patiënten en dokters en het beleid bij luchtweginfecties

(met een samenvatting in het Nederlands)

Proefschrift

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Chapter 1

General introduction

Just started as a GP, I stood at the desk of our practice and was amazed by the questions one of our practice assistants was asking to a patient with a cough. Was it a barking cough or just fruity or tickling? Was the cough very embarrassing? Based on the answers given to these questions the practice assistant gave information and advice to the patient, including whether the patient should visit the GP and even whether antibiotics might be prescribed. On inquiry, I discovered that most of her colleagues followed more-or-less the same procedure. I wondered why this procedure was so different from what I had learned in theory. There was no mention of alarm symptoms, or of the natural course of a cough or of the uselessness of antibiotics in most cases. Then I wondered about which views the patient had about their respiratory tract symptoms and antibiotics, and which views did practice assistants have? Were these views different from GPs' views and if so, was that important? And did patients' and GPs' views on these topics matter anyway? Those questions were the trigger to start these studies.

Respiratory tract (RT) symptoms such as cough, sore throat and earache are common,¹ and the vast majority of these RT symptoms are caused by acute infections (e.g. acute bronchitis, acute pharyngitis, acute tonsillitis and acute rhinosinusitis) which are of viral origin and self-limiting.²⁻⁵ Most people have one or more of these symptoms each year and many of them subsequently visit their general practitioner (GP) for it. Each year in the Netherlands a GP is visited for these RT symptoms about 250 times per 1,000 patients.⁶ Obviously, this is because patients are worried by these symptoms; moreover, these complaints can lead to absence from school and work.

On a daily basis, GPs listen to these patients, often give them a physical examination, advise and/or treat them as best as possible. To support GPs' management of acute RT infections, several evidence-based guidelines and comprehensive reviews of the literature have been published.^{2-5, 7-10} In the Netherlands, the Dutch College of General Practitioners has issued guidelines on acute otitis media, acute sore throat, rhino-sinusitis, and acute cough.¹¹ Broadly speaking, these guidelines state that the diagnosis should mainly be based on history and physical examination alone and that antibiotic treatment is only warranted in a small high-risk group of patients. However, it is well known, that the implementation of evidence-based medicine is often difficult.¹²⁻¹⁵

In the Netherlands, antibiotics are prescribed in about one out of every three RT episodes,¹⁶⁻¹⁸ while in other European countries and in the USA antibiotics are prescribed in more than 50% of all RT episodes.¹⁹⁻²² A recent study of our research group among 150 GPs in the middle region of the Netherlands with prospectively recorded visits for RT episodes (n=6,000) has shown that about half of all antibiotic prescriptions were not in accordance with Dutch national guidelines; overprescribing ranged from 18% for acute otitis media to 71% for tonsillitis.¹²

A further rationalisation of antibiotic use by GPs is indicated, while overprescribing and inappropriate prescribing of antibiotics yields unnecessary costs, risk of side-effects, unnecessary utilisation of health services, encouraging patients to re-consult their GP for subsequent RT episode, and development of antimicrobial resistance,²³⁻²⁵ even in a low prescribing country as the Netherlands.²⁶

It is well established that a patient's decision to contact the GP, and the GP's management decisions taken during consultations are influenced by both the patients' and the GPs' views on certain topics and by the way in which patients and GPs communicate with each other.²⁷⁻⁴² In the aim to improve both patients' and GPs' behaviour in this field, we might first explore patients' and GPs' views regarding RT infections. Therefore, the main focus of the studies presented in this thesis was to explore patients' and GPs' views on RT symptoms and antibiotics as possible determinants (amongst others) of illness behaviour, antibiotic prescribing, and international differences in outpatient antibiotic use.

Patients' and GPs' views: non-medical determinants of illness behaviour and antibiotic prescribing

Although almost everybody suffers from RT symptoms at some time, the majority does not contact their GP for it. It is reported that 1 to 3 out of every 10 patients with an episode of RT symptoms visit a GP, the so-called "iceberg phenomenon".⁴³⁻⁴⁵ Patient-related factors are important determinants of this illness behaviour. In general, the elderly, as well as patients who perceive their health as moderate to poor and their illness more serious and more interfering with daily activities, and those who perceive more benefits from consulting a GP, are more inclined to visit their GP, as well as patients who are cued by others (e.g. family members) to do so.⁴⁶⁻⁴⁹

However, since there is a growing tendency among GPs to inform their patients when to contact them and in which cases one can 'wait and see', according the guidelines, GP characteristics might also influence consultation behaviour, e.g. GPs who more frequently

prescribe antibiotics for RT symptoms may encourage their patients to revisit them in case of a subsequent RT episode.⁵⁰⁻⁵² GPs who are better informed about indications for antibiotic use, may better educate their patients and enhance a better triage by practice assistants and, consequently, may be less frequently visited for these symptoms. Further, GPs who have implemented national guidelines on RT symptoms may have less visits for these symptoms, e.g. thanks to a better triage by practice assistants. However, recent studies investigating the views of patients and GPs in relation to healthcare seeking behaviour of the open population are lacking.

Even after the patient has decided to visit the GP, both the GP's and the patient's views and expectations play an essential role in the management of patients.³²⁻⁴¹ Howie pointed out long ago that non-medical factors were very important in the GP's decision to prescribe an antibiotic for a given patient.⁵³ Later studies corroborated these findings and showed that labelling RT episodes as infections instead of symptoms (diagnostic labelling) and overvaluing signs of inflammation resulted in higher antibiotic prescription rates and overprescribing of antibiotics.⁵⁴⁻⁵⁶

GPs often assume that prescribing antibiotics will increase the patient's satisfaction,^{33,34} which is probably only true for those patients who expect to get antibiotics.⁴⁰ Irrespective of expectations towards antibiotic treatment, there are indications that the amount of time spent and the information provided by the GP are strongly correlated with patients' satisfaction.^{13,,33,34,57} Nevertheless, the roles of patients' characteristics and GPs' characteristics and management have not yet been examined together in relation to getting antibiotics and being satisfied with visiting the GP. Furthermore, other aspects of the GP's management (besides prescribing antibiotics) such as giving advice and a physical examination have hardly been explored as possible determinants of satisfaction.

The role of other health professionals in general practice also deserves some attention with respect to the management of acute RT symptoms. In the Netherlands, practice assistants (i.e. paramedical staff qualified for nursing, administrative and receptionist tasks) play an increasing role with regard to advice and triage, similar to practice nurses and physician assistants in other countries.^{58,59} Concordance in views between GPs and practice assistants is therefore important.^{37,60} The views of practice assistants may also play a role in patients' illness behaviour (e.g. more self-medication) and GPs' prescribing behaviour. These differences in views could influence the quality of the patient's management and should therefore be explored further.

Non-medical determinants of the management of RT infections; an international perspective

The European Union includes a large number of countries situated relatively closely to each other, but differing considerably in many respects. For example, differences in health behaviour, views and expectations towards illness and healthcare are striking.⁶¹⁻⁶⁶ In the field of RT infections, the large variation in outpatient antibiotic prescribing between European countries is important because of costs and the relation between antibiotic use and bacterial resistance.^{67,68} It is unlikely that this variation can be explained by differences in the incidence of bacterial infections between European countries, or the susceptibility of populations.⁶⁷ Cultural factors, differences in the organisation of primary health care and differences in both patients' and GPs' views can be considered as possible determinants of differences in European outpatient antibiotic use.⁶⁹ Since an increasing number of patients and GPs tend to travel and work across different European countries, it is important to study differences in the management of frequently occurring acute diseases such as RT infections. Countries could learn from each other and thereby improve European primary care.

Objectives and structure of this thesis

Various facets of RT symptoms are explored in this thesis with a focus on 1) patients' and GPs' views, 2) illness behaviour, 3) antibiotic prescribing and, 4) international differences in outpatient antibiotic use in Europe.

Chapter 2 presents a pilot study which explored patients' and GPs' views on RT symptoms and antibiotics. This study aimed at the development of a questionnaire to measure different dimensions of views, including the perceived self-limiting character, the need to consult a GP, the need of antibiotics, and the effectiveness of antibiotics (all in case of RT symptoms).

Chapter 3 presents a nationwide study with regard to differences in the views of patients, practice staff and GPs on RT symptoms and antibiotics.

Chapter 4 addresses the determinants of visiting the GP for cough, sore throat and earache and *Chapter 5* presents a study on the determinants of getting antibiotics and being satisfied with the visit to the GP.

Chapter 6 presents a study on the determinants of antibiotic prescribing and the role of diagnostic labelling, and the study in *Chapter 7* explored GP determinants of prescribing second-choice antibiotics for RT symptoms.

In addition, two studies investigated possible determinants of international differences in outpatient antibiotic prescribing. The study in *Chapter 8* explored patients' views on RT

symptoms and antibiotics in Belgium, UK and the Netherlands, i.e. three countries with respectively high, moderate and low antibiotic prescription. *Chapter 9* presents a study in these three countries that describes (besides differences in patients' views on RT and antibiotics) other possible reasons for the differences in antibiotic prescribing in Europe.

Finally, *Chapter 10* presents a general discussion on the results of this thesis, implications for general practice, and recommendations for future research.

Second Dutch National Survey of General Practice

The data used in the studies presented in Chapters 3 to 7 were derived from the Second Dutch National Survey of General Practice (DNSGP-2), carried out by the Netherlands Institute for Health Services Research (NIVEL) in 2001. The patients enlisted in the participating practices had a similar profile to that of the general Dutch population with respect to age, gender and type of medical insurance. The participating GPs did not differ from the total population of Dutch GPs, except for type of practice; i.e. single-handed GPs were somewhat underrepresented in the study population. Therefore, this study was considered to provide a representative impression of morbidity in Dutch general practice at that time. In the study presented in Chapter 3, data were used from 195 GPs in 104 practices serving a population of 399,068 patients. In the studies presented in Chapters 4 to 7, because morbidity data or prescription data of 32 of these 195 GPs were incomplete, we used data from 163 GPs in 85 practices serving a population of 359,625 patients.

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Chapter 2

Patients' and doctors' views on respiratory tract symptoms

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Abstract

Objective: To explore the views of patients and doctors on respiratory tract symptoms.

Design: Survey among patients and general practitioners.

Setting: Primary health care and community.

Subjects: 51 patients attending a general practitioner, 38 patients in the community, 7 general practitioners.

Main outcome measures: Patients' and doctors' views on respiratory tract symptoms and differences between them: agreement with statements rated on a five-point scale, ranging from "strongly disagree" (1) to "strongly agree" (5).

Results: Patients less than doctors endorsed the self-limiting character of cough, sore throat and earache (mean 3.1, 3.4 and 2.9 versus 4.1, 4.1 and 3.7) and patients –much more than doctors– rated antibiotics as being necessary for cough and sore throat (mean 2.7 and 2.9 versus 1.7 and 1.7) and believed that antibiotics speed recovery (mean 3.7 versus 2.0). However, there was little difference relating to the necessity to see a doctor after some time period.

Conclusion: Patients appeared to differ from doctors in views on respiratory tract symptoms. The results stress the importance of exploring patients' views when being confronted by patients suffering from respiratory tract symptoms.

Introduction

Respiratory tract symptoms such as cough, earache and sore throat belong to the most frequently reported complaints in primary care. Although most of them are self-limiting, antibiotics are relatively frequently prescribed in these cases.^{1,2} Several authors have explained that patients' estimated expectations are an important reason for this management.³⁻⁵ Mutual misunderstanding, ignorance or disagreement about perception and beliefs on health and illness may negatively influence the patient-doctor relationship and patient compliance regarding advice and treatment.^{1,4} In studies on chronic diseases, patients' views relating to the identity of the illness, its course, possibilities to control it and its causes, have been shown to play an important role in the doctor-patient relationship.⁶ These dimensions might also be important in self-limiting diseases, such as respiratory tract symptoms. In three pilot-studies we therefore explored patients' and doctors' views relating to cough, earache and sore throat.

Methods

Firstly, a patients' questionnaire was constructed with six items addressing self-limiting properties of respiratory tract symptoms and need to see a doctor which were selected as core items towards patients' views on respiratory tract symptoms after interviews with a convenience sample of ten patients. A sample of convenience of fifty-one adult patients who visited their general practitioner for different respiratory complaints completed this questionnaire (Table 1; pilot 1).

Further exploration of the literature and discussing the results in our research group resulted in an extension of the questionnaire with items addressing benefits and side-effects of antibiotics and the aetiology of respiratory tract symptoms to cover the dimensions of the Illness Perception Questionnaire (IPQ).⁶ The IPQ has been constructed to measure patients' views on seriousness, duration and curability for patients with chronic diseases, but this latter questionnaire is in the original form not suitable for acute illnesses.

Because the questionnaire is aimed to measure patients' views in both healthy adults and patients without respiratory tract symptoms, the extension of the questionnaire for practical reasons of time constraint was completed by a convenience sample of 38 adults visiting a shopping centre who did not have actual respiratory symptoms (pilot 2).

Finally, considering differences between doctors and patients being relevant for improving patient-doctor communication, we invited seven general practitioners (all staff members of the Utrecht Department of General Practice) to complete a doctor's version of all items described above (pilot 3).

The items were rated on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Differences between patients' and doctors' views were described by comparing the means and standard deviation of each item; with the difference between these means being greater than 0.6 scale points, a relevant difference was assumed to exist.

Results

Patients, less than doctors, endorsed the fact that respiratory tract symptoms get better without treatment (Table 1). However, there was little difference between their endorsement on items relating to the necessity to see a doctor for a cough after two weeks, a sore throat after one week and an earache after two days. Patients -much more than doctors- rated antibiotics as being necessary for cough and sore throat, but there was no difference between their ratings for earache. Patients -much more than doctors- believed that antibiotics speed recovery, while they hardly differed from doctors regarding the side-effects of antibiotics. Patients also differed from doctors concerning causes of respiratory tract symptoms: patients were fairly convinced about cold and cold air, air pollution and bacteria as important causes, while doctors were less so.

Discussion

Patients appeared to differ from doctors in views on respiratory tract symptoms. Doctors considered respiratory tract symptoms to be more self-limiting and antibiotics less necessary, whereas patients believed antibiotics speed up recovery from these symptoms. Patients contrary to doctors thought non-viral causes of these respiratory tract symptoms probable. Although the items selection was not done following a vigorous process of scale validation, the items were sensitive for describing differences between doctors and patients. Because the samples were small, the results should be treated with caution. However, the results do stress the importance of exploring patients' views when being confronted by patients suffering from respiratory tract symptoms. The doctor should always explore what the patient is worrying about and what management is expected -not just during the consultation, but also when educating the patient or on giving advice by telephone. Because patients' views play a role in the doctor-patient relationship -and therefore in the management of respiratory tract symptoms- more insight in these differences and the association between patients' views and illness behaviour might be fruitful.

Table 1. Patients' and doctors' views on respiratory tract symptoms (mean and SD)*

Item	Patients mean (SD)	General Practitioners mean (SD)
	Pilot 1 (n=51)	Pilot 3 (n=7)
<i>Self-limiting properties</i>		
Cough almost always gets better without treatment within two weeks	3.1 (1.2)	4.1 (0.4)
Sore throat almost always gets better without treatment within one week	3.4 (1.4)	4.1 (0.4)
Earache almost always gets better without treatment within two days	2.9 (1.4)	3.7 (1.0)
<i>Need to see a doctor</i>		
If a cough lasts longer than two weeks, it is advisable to see a doctor	3.4 (1.4)	3.6 (0.5)
If sore throat lasts longer than one week, it is advisable to see a doctor	2.9 (1.4)	3.2 (1.0)
If earache lasts longer than two days, it is advisable to see a doctor	2.8 (1.2)	n.i.q.**
	Pilot 2 (n=38)	
<i>Antibiotics</i>		
You need treatment with antibiotics if you are coughing up green sputum	2.7 (1.4)	1.7 (0.5)
You need treatment with antibiotics if you have a sore throat with a raised temperature	2.9 (1.1)	1.7 (0.8)
A child with earache who feels really unwell should be treated with antibiotics	3.3 (1.0)	3.4 (1.0)
Antibiotics speed up recovery from cough, sore throat and earache	3.7 (1.2)	2.0 (0.8)
Antibiotics have few side-effects	2.4 (1.1)	2.4 (1.3)
Frequent antibiotics can cause health problems for the whole community	3.8 (1.1)	4.4 (0.5)
<i>Aetiology</i>		
Cold and cold air are important causes of conditions such as cough, sore throat and earache	3.0 (1.4)	1.9 (0.7)
Air pollution is an important cause of conditions such as cough, sore throat and earache	3.9 (1.1)	2.9 (0.9)
Bacteria are an important cause of conditions such as cough, sore throat and earache	4.3 (1.1)	2.1 (1.4)

* answer categories ranging from 1 (strongly disagree) to 5 (strongly agree)

** not in GP's questionnaire because of professional consensus

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Chapter 3

Views on respiratory tract symptoms and antibiotics of Dutch general practitioners, practice staff and patients

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Abstract

Objectives: To explore views on respiratory tract symptoms (cough, sore throat and earache) and antibiotics of GPs, practice staff, and patients.

Methods: In a nationwide study, 181 GPs, 204 practice staff members and 1250 patients from 90 practices participated by answering 14 items relating to views on respiratory tract symptoms and antibiotics in a written questionnaire. Differences in means were compared.

Results: Patients more than GPs endorsed the seriousness of respiratory tract symptoms, the need to consult a GP, the need to prescribe antibiotics, and the ability of antibiotics to speed up recovery. GPs were more convinced than patients of the self-limiting character of respiratory tract symptoms and of the fact that antibiotics have side effects. Practice staff took a middle ground in most of these views.

Conclusions: Differences between GPs, practice staff and patients must be taken into account when exploring patients' complaints and advising on treatment. Education and knowledge programmes for practice staff might be advocated.

Introduction

Respiratory tract symptoms such as cough, sore throat and earache are the most common reasons why patients consult a general practitioner (GP).¹ Most of these symptoms are caused by viral infections, are self-limiting, and require only symptomatic over-the-counter medication to relieve the symptoms, while antibiotics shorten the duration of these symptoms only modestly, if at all.²⁻⁵ Nevertheless, patients often seek medical advice, resulting in antibiotic prescription. Antimicrobial agents are used too often, even in the Netherlands,⁶⁻⁹ where antibiotic prescribing is low compared with other countries.^{10,11} Negative consequences of this over-consumption are unnecessary costs, risk of side effects, unnecessary utilisation of health services, and development of antimicrobial resistance.^{8, 12-14}

In general, patients' views differ from those of GPs.¹⁵⁻¹⁹ In case of respiratory tract symptoms, GPs tend to believe more than patients that these symptoms are self-limiting and not serious,¹⁷ while patients are not aware of the viral aetiology and overestimate effectiveness of antibiotics.²⁰ Patients' views and especially GPs' perception of patients' views towards medication seem to have a major influence on GPs' management of respiratory tract symptoms, especially regarding prescribing antibiotics.²¹⁻²⁵ Cockburn and Pitt showed in an Australian study that patients who expected to receive medication were nearly three times more likely to actually receive medication, and GPs who perceived that patients expected to receive medication prescribed ten times more than those who did not perceive.²⁶

Patients' views on seriousness, time-line, curability, and controllability have been shown to play a role in patients' coping behaviour relating to their illness, and therefore, in the doctor-patient relationship in patients with chronic diseases.²⁷⁻³⁰ Probably, this is also the case in self-limiting illnesses; mutual misunderstanding and ignorance or disagreement about views on health and illness may negatively influence patient-doctor relationship, patient compliance regarding advice and treatment, and patient satisfaction.^{21,31,32} Therefore, exploration of these dimensions of patient's views is needed for optimal patient education and treatment of patients with self-limiting illnesses as respiratory tract symptoms as well as chronic diseases.

Mutual misunderstanding and disagreement may also exist between patients and nurses or practice staff (paramedical qualified for nursing, administrative and receptionist tasks). In the Netherlands, practice staff have a growing task in intake and triage in general practice, similar to practice nurses and physician assistants in other countries.^{33,34} Therefore, accordance in views between GPs and practice staff is important. Views of practice staff might influence self-medication and the threshold to consult a GP on the one hand, and patients' satisfaction and

compliance on the other hand. However, there are no studies done so far to explore practice staff views on this topic.

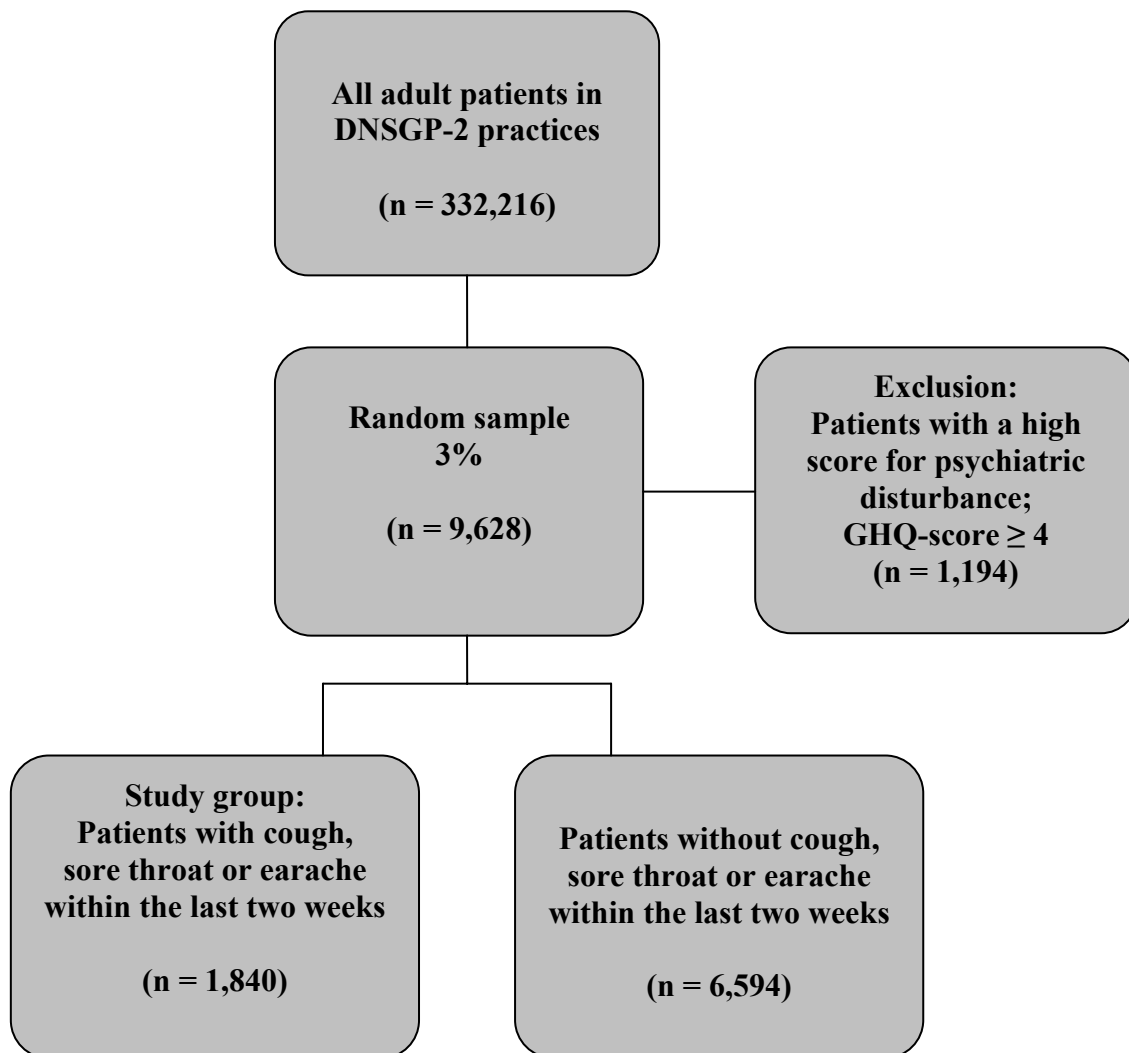
This study aimed to explore views on respiratory tract symptoms (cough, sore throat and earache) and antibiotics of GPs, practice staff, and patients in a nation-wide study.

Methods

GPs, practice staff, and patients

The data used in this study originate from the Second Dutch National Survey of General Practice (DNSGP-2), which has been carried out by the Netherlands Institute for Health Services Research (NIVEL) in 2001.³⁵ All GPs (n=195) and practice staff members (n=210) from 104 practices were invited to complete a questionnaire. In addition a random sample of all adult patients in DNSGP-2 practices was selected. Those adults who recently (i.e. within the last two weeks) suffered from cough, sore throat or earache (see flow chart) were invited to complete a questionnaire as well. Patients with a high score for psychiatric disturbance (GHQ-12-score of 4 items or more) were excluded because of participation in a study on mental illnesses.³⁶

Flow chart. Selection of the study group of 1,840 adults invited to complete the questionnaire from a random sample of 3% of all patients of the DNSGP-2 practices



Questionnaire

The questionnaire completed by GPs, practice staff and patients contained 14 items used in earlier studies (see appendix A) about views on respiratory tract symptoms and antibiotics, based on dimensions shown to be relevant in coping with chronic diseases.^{17,37} These items referred to six views: perceived seriousness (three items), self-limiting properties (three items), need to consult a GP (three items), need to prescribe antibiotics (three items), effectiveness of antibiotics (one item), all in case of respiratory tract symptoms, and side effects of antibiotics (one item). The answers were rated on a Likert-type five-points-scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Data processing and analysis

Firstly, for each participant, means were calculated for those views containing three items combined with the intercorrelation between items (Cronbach's alpha). Next, means scores were calculated for GPs, practice staff and patients. These means were compared for all six views with a high score meaning a high endorsement and a low score a low endorsement of that view. Differences were tested by a Kruskal-Wallis-test (significance level: $p < .05$).³⁸ Data analysis was performed with the Statistical Package for Social Sciences for Windows (SPSS 12.0.1).

Results

Completed questionnaires were returned by 181 GPs (response 93%; Table 1) and 204 practice staff members (response 97%). There were no differences between responding and non-responding GPs and practice staff regarding age, gender, and years of practice (table 1). A complete questionnaire was returned by 1250 out of all 1840 adult patients recently suffering from cough, sore throat or earache (68%). There were no differences between responders and non-responders regarding age, gender, type of insurance, chronic respiratory co-morbidity and diabetes mellitus or cardiovascular disease as co-morbidity, however non-responding patients were more likely to smoke than responders (43 vs. 34 %; difference 9%; 95%CI 5%-14%).

Table 1. Demographic characteristics of general practitioners (GPs), practice staff and patients (study groups and responders)

	GPs		Practice staff		Patients	
	<i>study group</i> (<i>n=195</i>)	<i>responders</i> (<i>n=181</i>)	<i>study group</i> (<i>n=210</i>)	<i>responders</i> (<i>n=204</i>)	<i>study group</i> (<i>n=1840</i>)	<i>responders</i> (<i>n=1250</i>)
Age (mean and SD)	46.7 (6.6)	47.1 (6.4)	37.9 (9.9)	37.9 (10.0)	47.3 (17.8)	47.1 (17.2)
Gender (% female)	27	26	100	100	58	58
Practising years (mean; SD)	17.7 (8.7)	18.2 (8.7)	10.6 (7.3)	10.6 (7.4)		
Smokers (%)					37	34
Health insurance (%)					67	66
Chronic respiratory co-morbidity (%)					13	13
DM and/or cardio- vascular disease (%)					11	10

Patients differed from GPs in all views (table 2). Patients considered respiratory tract symptoms more serious and less self-limiting and they thought there was more need for antibiotics in case of respiratory tract symptoms. They were more convinced about the effectiveness of antibiotics than GPs and estimated side effects of antibiotics as less important.

Practice staff differed in almost all views from both patients and GPs. They adopted a middle ground between patients and GPs in views concerning seriousness, self-limiting character of respiratory tract symptoms, need to prescribe antibiotics, and effectiveness of antibiotics. Surprisingly, practice staff reported an even greater need to consult a GP than both patients and GPs. Practice staff were as concerned about side effects of antibiotics as GPs.

Table 2. Views of general practitioners (GPs), practice staff, and patients about respiratory tract symptoms and antibiotics (AB) (Cronbach's α ; mean and SD)^a

	GPs (n=181)		Practice staff (n=204)		Patients (n=1250)	
	mean (SD)	α	mean (SD)	α	mean (SD)	α
<i>Views on respiratory tract symptoms and AB</i>						
Seriousness ^b	2.0 (0.8)	.85	3.0 (1.0)	.93	3.2 (1.0)	.78
Self-limiting character ^b	4.3 (0.6)	.59	3.9 (0.8)	.64	3.3 (0.7)	.62
Need to consult a GP ^b	3.6 (0.8)	.52	4.2 (0.7)	.48	3.8 (0.6)	.63
Need to prescribe AB ^b	1.7 (0.7)	.86	2.5 (1.0)	.89	3.1 (1.0)	.82
Effectiveness of AB ^b	1.9 (0.9)		2.4 (1.2)		3.6 (0.9)	
Side effects of AB ^c	3.8 (1.0)		3.8 (1.0)		3.1 (1.0)	

^a The answers were ranged as follows: 1: totally disagree to 5: totally agree.

^b Difference between GPs and practice staff, GPs and patients, and practice staff and patients (Kruskal-Wallis-test; $p < .01$).

^c Difference between GPs and patients, and practice staff and patients (Kruskal-Wallis-test; $p < .01$), but *not* between GPs and practice staff ($p = .25$).

Discussion

Conclusion

In this nation-wide study in the Netherlands, patients endorsed more than GPs the seriousness of respiratory tract symptoms, the need to consult a GP for these symptoms, the need to prescribe antibiotics for them, and the ability of antibiotics to speed up recovery. GPs were more convinced than patients of the self-limiting character of respiratory tract symptoms and of the fact that antibiotics have side effects. Practice staff took a middle ground in most of these views.

Strength and limitations of the study

The participation of GPs, practice staff, and patients was high as compared to other surveys. There were no differences between participants and non-participants, except that, for patients, less participants than non-participants smoked. Because smoking behaviour was not correlated with patients' views, we assume that this difference did not bias our results.

We included only patients who had recently cough, sore throat or earache, because these are the patients who are found in GP practices and, as a result, the practice implications would be better

grounded. Patients with a high risk of psychiatric disturbance were excluded. There are indications that these patients perceive symptoms more serious and perceive greater need to consult a GP than patients with a low risk.³⁹ So, the differences between patients on the one hand, and GPs and practice staff on the other hand, we assessed in our study might be slightly underestimated.

Comparison with the existing literature

In an earlier study among small groups of patients and GPs, we showed corresponding differences in views between GPs and patients relating (acute) respiratory tract symptoms and antibiotics.¹⁷ Our findings agree with those of Varonen and Saino, who also reported that patients had less confidence in natural course of sinusitis than physicians.¹⁸ Our findings are also in line with studies in which nurses in- and outside hospitals have been found to be in a middle position between physicians' and patients' views on health and illness.^{16,40}

Patients' views in this study are similar with those measured in Dutch respondents in an international study carried out among patients in the Netherlands, UK and Belgium, countries with a low, moderate, and high outpatient antibiotic use.⁴¹ In that study we found that Belgian responders perceived a higher need to consult a GP in case of respiratory tract symptoms, and perceived these symptoms as more serious and less self-limiting than responders in UK and the Netherlands. However, they did not differ in views on effectiveness and side effects of antibiotics. Therefore we think that our findings are also relevant for other settings outside the Netherlands.

Practice implications

Differences in views between patients with recent experience with respiratory tract symptoms and GPs underline the importance to explore patients' views about respiratory tract symptoms and antibiotics in individual cases to avoid misperception, to make explanation more effective and to improve shared decision making⁴²⁻⁴⁴ and so decreasing over-prescribing of antibiotics.³²

Practice staff was adopting a middle ground between GPs and patients in most dimensions, and almost all of their views differed significantly from GPs. Intake and triage by paramedic personnel (practice staff, practice nurses, physician assistants) is increasingly important in general practice.^{33,34} More agreement between GPs' and practice staff views is, therefore, desirable in order to ensure uniform disease management within practices. Quality assurance programs should target consensus and mutual understanding between the different

health professionals in primary care concerning assessment of respiratory symptoms and indications for antibiotic treatment.

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APPENDIX A**Overview of items used in the questionnaire according to views on respiratory tract symptoms and antibiotics***

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
<i>Perceived seriousness</i>					
A cough, together with a raised temperature suggests a serious infection					
A sore throat, together with a raised temperature suggests a serious infection					
A child with a raised temperature and earache suggests a serious infection					
<i>Perceived self-limiting character</i>					
Cough almost always gets better without treatment within two weeks					
Sore throat almost always gets better without treatment within one week					
Earache almost always gets better without treatment within two days					
<i>Need to consult a GP</i>					
If a cough lasts longer than two weeks, it is advisable to see a doctor					
If sore throat lasts longer than one week, it is advisable to see a doctor					
If earache lasts longer than two days, it is advisable to see a doctor					
<i>Need of antibiotics</i>					
You need treatment with antibiotics if you have both a Cough and a raised temperature					
You need treatment with antibiotics if you have both a sore throat and a raised temperature					
A child needs treatment with antibiotics if it has both earache and a raised temperature					
<i>Effectiveness of antibiotics</i>					
Antibiotics speed recovery from symptoms as cough, sore throat and earache					
<i>Side effects of antibiotics</i>					
Antibiotics have many side effects					

* items were included in the questionnaire in a random order

Chapter 4

Cough, sore throat or earache:

who visits the general practitioner ?

van Duijn HJ, Kuyvenhoven MM, Schellevis FG, Verheij TJM

Submitted

Abstract

Objectives: To explore determinants of visiting a general practitioner (GP) for cough, sore throat or earache.

Design: Health interview survey (Second Dutch National Survey of General Practice; DNSGP-2) with an additional questionnaire.

Subjects: A total of 7,057 adult patients of 163 GPs in 85 practices in the Netherlands.

Method: Characteristics of patients and GPs as well as morbidity data were derived from the DNSGP-2. Patients' symptoms and illness behaviour were measured by a health interview survey and an additional written questionnaire. Data were analysed by means of (multilevel) logistic regression.

Main outcome measures: Suffering from cough sore throat and/or earache in the past two weeks and visiting the GP for these symptoms.

Results: Of the 7,057 patients, 1,083 (22%) reported cough, sore throat or earache in the two weeks preceding the interview, and, of these, 250 visited their GP. Those aged 65 and over, those with respiratory co-morbidity, who suffered from symptoms for more than two weeks, who were cued by others to visit a GP, who perceived their symptoms as more serious, and who less endorsed the self-limiting character of RT symptoms, more frequently visited their GP.

Conclusions: This study showed that the main (non)medical determinants of visiting the GP for RT symptoms have not been changed in the last decade, despite the implementation of national guidelines for RT infections and the fall in incidence of RT symptoms.

Introduction

Respiratory tract (RT) symptoms such as cough, sore throat and earache are one of the most important reasons to visit a general practitioner (GP). Although this occurs in the Netherlands about 200 times a year per 1,000 patients,¹ most patients do not consult a GP for these symptoms. It has been estimated that about 1 to 3 of every 10 patients with an episode of RT symptoms consults a GP,^{1,2} the so-called “iceberg phenomenon”.^{3,4}

Because the vast majority of RT symptoms as cough, sore throat or earache are self-limiting and require only symptomatic treatment to relieve symptoms, patients require medical help only when they have an elevated risk for complications, or in case of alarm symptoms (e.g. shortness of breath, coughing up blood, great difficulty to swallow) or are seriously ill.⁵⁻⁷ In order to educate people about rational illness behaviour we need to know who visits the GP for RT symptoms.

It is well known that specific groups of patients (e.g. the elderly, patients who perceive their health as moderate to poor, who perceive their illness as serious and interfering with daily activities, who perceive more benefits of consulting a GP, and who are cued by others to visit their GP) are more inclined to visit their GP.⁸⁻¹⁰ However, in the last 15 years national guidelines for RT infections have been published and GPs are nowadays generally supposed to inform their patients when to contact them and under which circumstances one can ‘wait and see’. Moreover, consultation rates for RT episodes have fallen in the last decade.¹¹⁻¹²

Both of these developments may have changed the determinants to visit a GP. In addition, the characteristics of patients and GPs in combination as possible determinants of illness behaviour have not yet been studied. Therefore this study aimed to explore current GP-related and patient-related determinants of visiting a GP for cough, sore throat and earache.

Methods

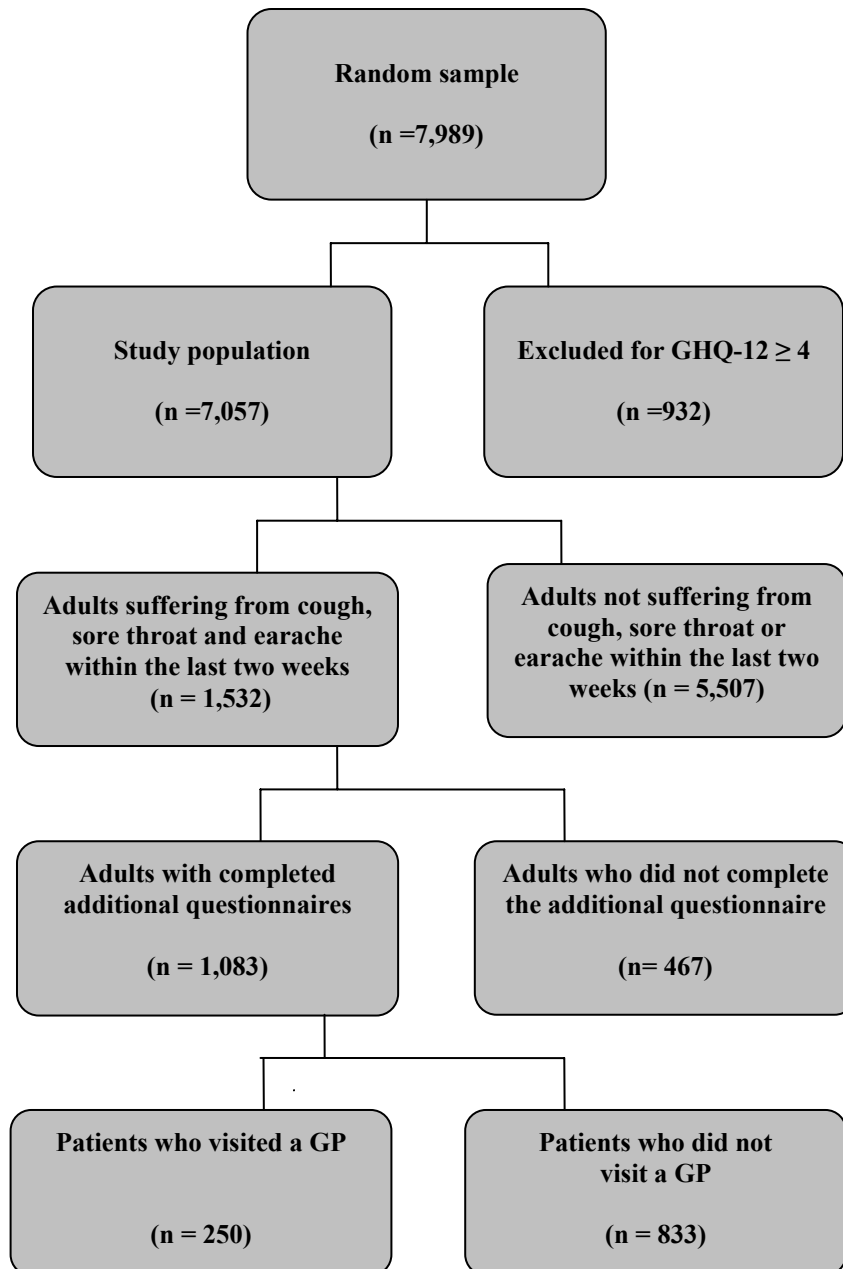
The Second Dutch National Survey of General Practice

The data used in this study were derived from the Second Dutch National Survey of General Practice (DNSGP-2), carried out by the Netherlands Institute for Health Services Research (NIVEL) in 2001 which included data from 163 GPs in 85 practices serving a population of 359,625 patients.¹³ The patients enlisted in the participating practices were comparable to the general Dutch population with respect to age, gender and type of health insurance. The participating GPs did not differ from the total population of Dutch GPs, except for type of practice; single-handed GPs were somewhat underrepresented in the study population. In all, the DNSGP-2 is supposed to validly represent GPs, patients, morbidity, and prescription in Dutch primary care in which the GP has a gatekeeper role.

Patient characteristics and illness behaviour

A random sample of 7,989 adults drawn from the practice population (age range 18 to 96 years) participated in a health interview survey with items addressing *personal characteristics*: gender (male/female), age (years), level of education (primary school or less/more than primary school), smoking behaviour (no/yes), type of insurance (publicly/privately insured), self-reported health (moderate to poor/(very) good), chronic respiratory co-morbidity (asthma, COPD and/or emphysema; no/yes), other co-morbidity (diabetes mellitus, cardiovascular diseases and/or hypertension; no/yes) and suffering from cough, sore throat or earache in the past two weeks preceding the interview (no/yes). Patients with a high score for psychiatric disturbance (GHQ-12-score of 4 items or more; n=932) were excluded because of their participation in a study on mental illnesses within the DNSGP-2.¹⁴ Thus the present analysis included 7,057 patients (Figure 1).

Figure 1. Flow chart of patients suffering from recent cough, sore throat or earache and visiting their GP



Adults who recently suffered from cough, sore throat or earache completed an additional questionnaire for *symptom characteristics*: duration >2 weeks (no/yes), presence of fever (no/yes), perceived seriousness (five-point scale: 1=very low to 5=very high), whether they were cued by others to visit a GP (no/yes), and if they used over-the-counter medication (no/yes). In addition to these items, they rated their *views on RT symptoms and antibiotics*, relating to seriousness, self-limiting character, need to consult a GP if symptoms lasted for a longer period, need of antibiotics in case of fever, need of antibiotics in case of green phlegm, effectiveness of antibiotics (all in case of RT symptoms), and side-effects of antibiotics on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).¹⁵ Finally, they were also asked whether they had visited their GP for their recent RT symptoms.

GP characteristics

All GPs completed a questionnaire containing items related to *personal characteristics*: age and gender, degree of urbanisation (rural/urban), single-handed practice (yes/no), frequency of consulting national GP guidelines in general (once a week or less/more than once a week), seeing pharmaceutical representatives in the last four weeks (yes/no), and inclination to prescribe new drugs (1=low to 5=high). As an indication of the tendency to label episodes more as an infection (e.g. acute bronchitis) rather than as a symptom (e.g. cough), we calculated per GP the proportion of the number of episodes presented to them during a one-year period labelled as infections. In addition we calculated the volume of antibiotic prescribing, i.e. the number of antibiotics prescribed for RT episodes per 1,000 patients.¹⁶ Furthermore, similar to the patients, the GPs rated their *views on RT symptoms and antibiotics*.

Outcome measures

Outcome measures were: (a) symptoms of cough, sore throat or earache in the past two weeks (no/yes) for the study population, and (b) visiting a GP for cough, sore throat or earache (no/yes) for adults with these symptoms within the past two weeks (Figure 1).

Analysis

To describe independent associations between (a) risk factors (*patients' personal characteristics*) and suffering from cough, sore throat or earache and (b) patient-related determinants (*personal and symptom characteristics and views*) and GP-related determinants (*personal characteristics and views*) on the one hand, and visiting a GP for these symptoms on

the other, multivariate logistic regression analyses were carried out ($p < 0.05$). Age, gender and those characteristics correlating with outcome measures with $p < 0.20$ were included for patients and for GPs. Data were analysed using the Statistical Package for Social Sciences for Windows (SPSS 12.0.1) after checking for interaction and collinearity ($p < 0.05$). Because cluster effects of GP practices were likely for visiting a GP, Generalized Estimating Equations (GEE by SAS system for Windows version 8) was applied for this latter analysis ($p < 0.05$).¹⁷

Results

Personal characteristics and views

Table 1 presents data on the patient characteristics of the study population ($n=7,057$). About 20% was aged 65 years and over, and more than half was female. In total, 1,532 of these 7,057 patients reported (22%) reported recent RT symptoms (Figure 1). Of these 1,532 patients an additional questionnaire was returned by 1,083 patients (71%). There were no differences between responders and non-responders regarding these characteristics and recent RT symptoms. However, non-responding patients were more likely to smoke than responders (44 and 34 %, respectively; $d=10\%$; 95%CI 5%-16%).

Table 1. Data on all patients (n=7,057), patients with recent symptoms (cough, sore throat or earache) (n=1,083), patients who visited their GP for these symptoms (n=250) and patients who did not (n=833)

	All patients (n=7,057)	Patients with recent symptoms (n=1,083)	Patient with recent symptoms who visited their GP (n=250)	Patient with recent symptoms who did not visit their GP (n=833)
Age (% aged 65 years and over)	20.6	17.7	28.0	14.6
Gender (% female)	53.8	57.6	55.6	58.2
Level of education (% low education)	34.3	32.2	43.2	28.9
Smoking behaviour (% smokers)	29.5	33.5	30.0	34.3
Type of insurance (% publicly insured)	65.5	66.8	70.4	65.7
Chronic respiratory co-morbidity (%)	7.4	13.4	27.6	9.1
Other co-morbidity (%)*	19.7	19.5	26.0	17.5
Self-reported health (% moderate to poor)	14.7	28.1	13.2	32.6
Duration of the reported symptoms > 2 weeks (% yes)		38.4	77.6	26.0
Presence of fever during the reported symptoms (% yes)		11.9	18.8	9.8
Cued by others to visit a GP (% yes)		11.7	40.8	3.0
Perceived seriousness of the symptoms (mean (SD))**		2.1 (1.1)	2.8 (1.1)	1.8 (0.9)
Over-the-counter medication (% yes)		50.8	43.6	52.9
Views on respiratory tract symptoms and antibiotics (mean (SD))***				
<i>Seriousness</i>		3.2 (0.9)	3.5 (1.0)	3.2 (0.9)
<i>Self-limiting character</i>		3.3 (0.7)	3.1 (0.8)	3.4 (0.7)
<i>Need to consult a GP</i>		3.8 (0.6)	4.0 (0.5)	3.8 (0.6)
<i>Need of antibiotics in case of fever</i>		3.1 (1.0)	3.4 (1.1)	3.0 (1.0)
<i>Need of antibiotics in case of green phlegm</i>		3.1 (1.3)	3.4 (1.3)	3.0 (1.3)
<i>Need of antibiotics in case of with spots in the throat</i>		3.7 (1.1)	3.9 (1.1)	3.7 (1.1)
<i>Effectiveness of antibiotics</i>		3.6 (0.9)	3.6 (0.9)	3.5 (0.9)
<i>Side effects of antibiotics</i>		3.1 (1.0)	3.0 (1.0)	3.2 (1.0)

* Cardiovascular disease, diabetes mellitus and/or hypertension

** Scale ranged as follows: 1 (very low) to 5 (very high)

***Scale ranged as follows: 1 (strongly disagree) to 5 (strongly agree)

Table 2. Data on the 163 general practitioners

Age (mean and SD)	47.1 (6.4)
Gender (% female)	26.4
Degree of urbanisation (%)	
<i>Rural</i>	62.0
<i>Urban</i>	38.0
Single-handed practice (%)	24.5
Consulting national guidelines for general practitioners (%)	
<i>Once a week or less</i>	46.0
<i>More than once a week</i>	54.0
Seeing pharmaceutical representatives (% yes)	56.4
Inclination to prescribe new drugs (mean and SD)*	2.4 (0.7)
Proportion of episodes labelled as infection (mean and SD)	0.72 (0.09)
Antibiotic prescriptions/1,000 patients (mean and SD)	107.3 (45.1)
Views on RT symptoms and antibiotics**	
<i>Seriousness</i>	2.0 (0.8)
<i>Self limiting character</i>	4.3 (0.6)
<i>Need to consult a GP</i>	3.5 (0.8)
<i>Need of antibiotics in case of fever</i>	1.7 (0.7)
<i>Need of antibiotics in case of green phlegm</i>	1.7 (0.7)
<i>Need of antibiotics in case of white spots in the throat</i>	2.3 (1.1)
<i>Effectiveness of antibiotics</i>	1.9 (0.8)
<i>Side effects of antibiotics</i>	3.7 (1.0)

* Scale ranged as follows: 1 (low reticence) to 5 (high inclination)

** Scale ranged as follows: 1 (strongly disagree) to 5 (strongly agree)

Table 2 presents data on the GPs. The mean age of the GPs was 47 years, with about 25% female, 62% was practising in a rural area, and 25% worked as single-handed.

Risk factors for recent symptoms

In total 1,532 patients (22%) reported recent RT symptoms (Figure 1): 1,059 reported cough, 664 sore throat and 224 earache, i.e. many patients suffered from a combination of these symptoms. Being female (OR 1.3; 95%CI 1.1-1.4), aged younger than 65 years (OR 1.3; 95%CI 1.1-1.5), reporting health as moderate to poor (OR 1.7; 95%CI 1.5-2.0), smoking (1.5; 95% CI 1.3 -1.7), and having chronic respiratory co-morbidity (OR 2.2; 95% CI 1.8-2.6) were independent risk factors for suffering from these symptoms in the last two weeks (Table 3).

Symptom characteristics and illness behaviour

About 40% of the responding patients (n=1,083) reported symptoms lasting more than two weeks, and 12% reported fever (Table 1). They perceived their symptoms as moderately serious

(mean 2.1;SD 1.1) Over-the-counter medication was used by 50% of the patients (mainly antitussives, paracetamol and homeopathic drugs) and 12% were cued by others to visit a GP. Almost 25% of the patients visited the GP for their recent symptoms (Figure 1): 24% of the patients with cough, 19% of the patients with sore throat, and 29% of the patients with earache.

Determinants of visiting a GP

Six factors were independent determinants for a patient to visit the GP: age 65 years and over (OR 1.1 (95%CI 1.2-2.7; Table 3), having respiratory co-morbidity (OR 2.2; 95%CI 1.3-3.6), suffering from the reported symptoms for more than two weeks (OR 6.3; 95%CI 4.2-9.4), being cued by others to visit a GP (OR 16.0; 95%CI 7.8-32.8), perceiving reported symptoms as more serious (OR 1.8; 95%CI 1.5-2.2), and lower endorsement of the self-limiting character of RT symptoms (OR 0.6; 95%CI 0.5 – 0.8). GP-related determinants were not associated with patients' illness behaviour.

In the regression analyses no interaction or collinearity was found between the determinants.

Table 3. Final models for determinants of (a) suffering from cough, sore throat and earache, and (b) visiting a GP for these symptoms ((multilevel) multivariate logistic regression analysis; adjusted OR (95% CI))

	Suffering from recent cough, sore throat or earache (n=7,057)	Consulting a GP for recent cough, sore throat or earache (n= 1,083)
Female	1.3 (1.1 - 1.4) ^{ns}	1.1 (0.8 – 1.6) ^{ns}
Age 65 years and older	0.8 (0.7 - 0.9)	1.8 (1.2 – 2.7)
Reporting own health as moderate to poor	1.7 (1.5 - 2.0)	na
Smokers	1.5 (1.4 - 1.7)	na
Chronic respiratory co-morbidity	2.2 (1.8 - 2.7)	2.2 (1.3 - 3.6)
Duration of the symptoms more than two weeks	na	6.3 (4.2 - 9.4)
Cued by others to visit a GP	na	16.0 (7.8 - 32.8)
Endorsing the seriousness of the reported symptoms	na	1.8 (1.5 - 2.2)
Endorsing the self-limiting character of RT symptoms	na	0.6 (0.5 - 0.8)

na not applied in the final model

ns difference not significant

Discussion

Although many persons suffered from acute respiratory symptoms (20% in the past two weeks), only one in four contacted the GP for this problem. Apart from relevant medical factors (e.g. duration of symptoms and co-morbidity), non-medical reasons (e.g. worry about seriousness of the symptoms and especially being cued by others), played an important role in deciding to visit the GP. This study has shown that the main determinants of this kind of illness behaviour have not been changed in the last decades, despite the implementation of national guidelines for RT infections and the fall in incidence of presented RT symptoms. Surprisingly, no GP-related determinants were associated with the patients' decisions to visit their GP.

Strength and limitations of the study

Characteristics of the DNSGP-2 patient sample were comparable with the general Dutch population, and responders' characteristics did not differ from non-responders except for smoking behaviour. Thus the results of the present study can be assumed to represent morbidity in daily primary care and patients' illness behaviour in the Netherlands.¹³

Information about visiting a GP was obtained by means of patients' self-reports. Studies have shown that patients tend to report fewer visits to a physician than actually recorded in computerised medical records, especially when the recall period is extended.¹⁸ However, because in the present study the recall period was only two weeks such bias can be assumed to be small. Moreover, a scrutinised inspection of GPs' electronic records showed that for most patients who reported visiting a GP this contact was indeed registered (82%); this percentage is similar to the data of children in the first DNSGP.¹⁹

In the present study, patients with a high risk of psychiatric disturbance were excluded; these patients reported more cough, sore throat or earache in the past two weeks than the study population (30% and 22%, respectively; $d=8\%$; 95%CI of difference 4-10%). Further, because these patients may perceive such symptoms as being more serious and perceive greater need to consult a GP than patients with a low risk,²⁰ the number of GP visits measured in our study might be slightly underestimated.

Smokers were underrepresented in the patients responding to the additional questionnaire. However, since smoking behaviour was not independently associated with visiting a GP, we assume that this difference did not bias our results. Finally, because our study had a cross-sectional design and partially a retrospective design, we can only assume associations and can not report on causal relationships.

Comparison with the existing literature

Smokers and patients with chronic respiratory co-morbidity suffered more frequently from cough, sore throat and earache than non-smokers and patients without chronic respiratory co-morbidity, as is reported by others.^{21,22} Of those patients reporting a recent experience with cough, sore throat or earache visited, about 25% visited the GP. This so-called ‘iceberg phenomenon’ was also found by some others, for example, Van de Lisdonk et al. found that 14% of patients reporting a common cold visited a GP,²³ while Bruijnzeels et al. reported that 36% of children with ear problems consulted a GP.²

Our findings that being female, age over 65 years, having chronic respiratory co-morbidity, higher perceived severity, longer duration, less endorsement of the self-limiting character, and being cued by other persons were related with a visit to the GP are in line with both older and recent studies.^{8-10, 18-20, 24-26} However, the recent studies addressed patients with all kind of symptoms and not specifically patients with RT symptoms. Our findings that personal characteristics (gender and level of education) and having diabetes mellitus or a cardiovascular disease were not correlated with visiting a GP, was also in line with these earlier studies.

Although patients and GPs are known to differ in their views on RT symptoms and antibiotics,¹⁵ this study did not find any association between differences in views of patients and their respective GPs on the one hand and visiting the GP for RT symptoms on the other.

Practice implications

Most patients with recent cough, sore throat or earache do not visit a GP, but those who do will probably have a high “worry factor”; they are worried by the perceived seriousness or duration of their symptoms or are cued by others. Although the elderly are more inclined to visit a GP for RT symptoms than younger patients, they do not suffer more frequently from these symptoms. The opposite applies to smokers: i.e. smokers more frequently suffer from cough, sore throat and earache than non-smokers, but do not visit the GP more frequently for these symptoms. The elderly may be more worried about their susceptibility for a problematic course of their symptoms. Since high age is related to an elevated risk for complications, elderly will often rightfully contact their GP. This may also apply to patients with respiratory co-morbidity.

Both in young and healthy patients, in elderly and in patients with co-morbidity, i.e. an inclination to worry and low confidence about one’s health may prompt a visit to the GP.

Therefore, particularly in young and healthy patients -apart from addressing their concerns-, the need still exists to inform them about the self-limiting aspects of RT symptoms which require medical attention only in case of alarm symptoms, such as shortness of breath, coughing up blood, and great difficulty in swallowing.

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Chapter 5

Visiting for cough, sore throat or earache:
who gets antibiotics and who is satisfied?

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Submitted

Abstract

Background: Antibiotics are over-prescribed for respiratory tract (RT) symptoms, partly because general practitioners (GPs) often assume that prescribing antibiotics will increase patients' satisfaction.

Aim: To explore determinants of antibiotic treatment and determinants of patients' satisfaction with their visit to their GP for cough, sore throat or earache within the same episode.

Design: Health interview survey (Second Dutch National Survey of General Practice; DNSGP-2) with an additional questionnaire.

Subjects: All persons with recent cough, sore throat or earache from a random sample of 7,989 persons compiled from 163 GPs in 85 Dutch practices, who visited their GP for these symptoms.

Method: Patients' and GPs' characteristics and morbidity data were derived from DNSGP-2. Characteristics of the symptoms, GPs' management and patients' satisfaction were measured by an additional written questionnaire. Multilevel logistic regression analyses were carried out to assess determinants of antibiotic treatment and patients' satisfaction.

Results: In total 1,083 patients suffered from RT symptoms and 250 (23%) of these visited their GP. Of this latter group 40% (n=97) were prescribed antibiotics. More likely to get antibiotics were smokers, patients with fever, those who more strongly endorsed the need of antibiotics in case of green phlegm, those who were less concerned about side-effects of antibiotics, and those with a GP who more strongly endorsed the effectiveness of antibiotics and the need of antibiotics in case of white spots in the throat. About 75% of patients was satisfied with the GP; patients who perceived their RT symptoms to be less serious, who reported that they were carefully examined by their GP, and whose GP more strongly endorsed the effectiveness of antibiotics were more likely to be satisfied.

Conclusions: GPs and patients still need to be better informed about the limited significance of single inflammation signs (e.g. fever and green phlegm) as an indication for antibiotics. Carefully examining the patient may contribute to patient satisfaction.

Introduction

Most respiratory tract (RT) symptoms (e.g. cough, sore throat and earache) are caused by viral infections, are self-limiting, and require only symptomatic over-the-counter medication to relieve the symptoms, while antibiotics shorten the duration of these symptoms only modestly, if at all.^{1,2} Nevertheless, worldwide antibiotics are frequently prescribed and often over-prescribed, even in a relatively low prescribing country like the Netherlands.³ Negative consequences of this over-consumption are unnecessary costs, medicalisation, risk of side-effects, and development of antimicrobial resistant bacteria.⁴ To implement strategies to change antibiotic prescribing routines for RT symptoms, it is important to establish the determinants of this prescribing, both in the Netherlands and in other countries.

Several general practitioner (GP) characteristics are known to be associated with antibiotic prescribing rates for RT symptoms: i.e. years of practice, medical knowledge, overvaluing inflammation signs like purulent sputum, and the tendency to label RT episodes as infections rather than as symptoms.⁵⁻⁸ Patients' views and expectations related to RT symptoms and antibiotics are also known to influence antibiotic prescribing.⁸⁻¹¹ Finally, GPs often perceive patients to expect antibiotics for RT symptoms and often assume that prescribing these antibiotics will increase patients' satisfaction, which may be only true for those patients who expect to get antibiotics.^{10,12} For patients who do not expect antibiotics, the amount of time spent with and the information provided by the GP are strongly correlated with patients' satisfaction.^{10,12-14}

Exploration of both patients' and GP's characteristics together is important to assess their mutual role as determinants of getting antibiotics and patients' satisfaction with the visit to their GP for RT symptoms. To our knowledge the role of patients' and GPs' characteristics have not yet been examined together with respect to getting antibiotics and being satisfied within the same RT episode. Furthermore, other aspects of the GP's management besides prescribing antibiotics (e.g. giving advice and physical examination), have hardly been explored as possible determinants of satisfaction.

This study investigated the determinants of antibiotic treatment and patients' satisfaction with visiting their GP for recent cough, sore throat or earache.

Method

The Second Dutch National Survey of General Practice

The data used in this study were derived from the Second Dutch National Survey of General Practice (DNSGP-2), carried out by the Netherlands Institute for Health Services Research

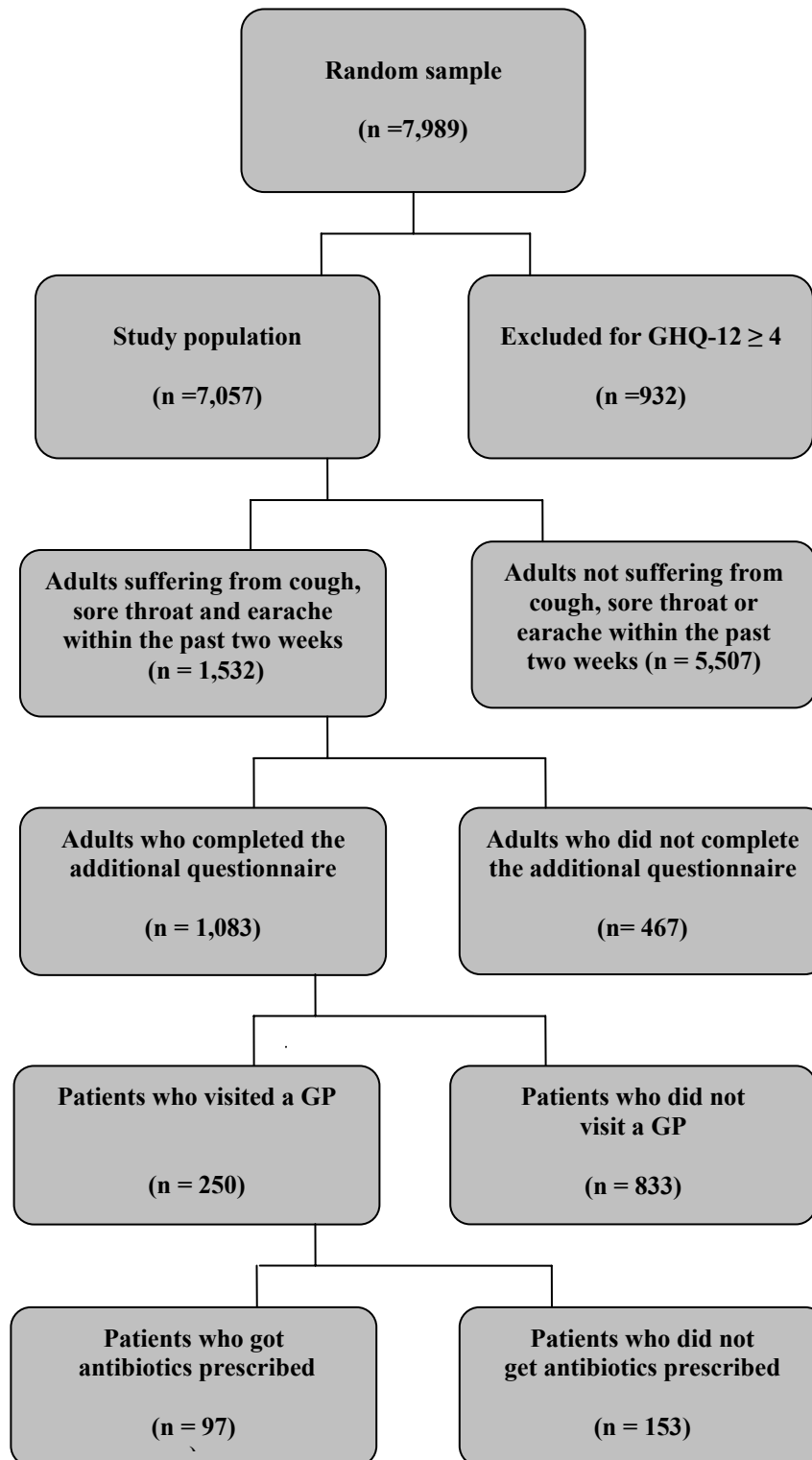
(NIVEL) in 2001.¹⁷ Data were used from 163 GPs in 85 practices serving a population of 359,625 patients. The patients enlisted in the participating practices were comparable to the general Dutch population with respect to age, gender and type of health care insurance. The participating GPs did not differ from the general population of Dutch GPs, except for type of practice: i.e. single-handed GPs were somewhat underrepresented in the study population. In all, the 2001 study provides a representative impression of morbidity and prescribing habits in Dutch general practice.

Patients, symptoms and GP's visit

A random sample of 7,989 adults (aged 18 to 96 years) drawn from the practice population participated in a health interview survey with items addressing *personal characteristics*: gender (male/female), age (years), level of education (primary school or less/more than primary school), smoking behaviour (no/yes), type of insurance (publicly/privately insured), self-reported health (moderate to poor/(very) good), chronic respiratory co-morbidity (asthma, COPD and/or emphysema; no/yes), other co-morbidity (diabetes mellitus, cardiovascular diseases and/or hypertension; no/yes), and suffering from cough, sore throat or earache in the two weeks preceding the interview (no/yes). Patients with a high score for psychiatric disturbance (GHQ-12-score of 4 or more; n=932) were excluded because of their participation in a study on mental illnesses within the DNSGP-2,¹⁸ leaving 7,057 patients (Figure 1).

In total, 1,532 patients (22%) reported recent RT symptoms (Figure 1). These patients received an additional questionnaire with items relating to *characteristics of the recent symptoms*: duration ≥ 2 weeks (no/yes), presence of fever (no/yes), perceived seriousness five-point scale; 1=very low to 5=very high), whether they were cued by others to visit a GP (no/yes), and whether they had used over-the-counter medication. They rated their endorsement on *views on RT symptoms and antibiotics*, relating to seriousness, self-limiting character, need to consult a GP if symptoms lasted for a longer period, need of antibiotics in case of fever, white spots in the throat or green phlegm, effectiveness of antibiotics (all in case of RT symptoms), and the side-effects of antibiotics on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).^{15,16} Further, they were asked whether they visited their GP for these symptoms (no/yes), and if so, they were asked for the GP's management: listening carefully (no/yes), examining carefully (no/yes), giving advice and information (no/yes), and prescribing antibiotics (no/yes). Finally, they were asked whether they were satisfied with this visit (not (quite)/yes).

Figure 1. Flow chart of visiting the GP and getting antibiotics prescribed with the visit



In total 1,083 patients (70%) completed the additional questionnaire. There were no differences between responders and non-responders regarding age, gender, level of education, type of health insurance, respiratory co-morbidity, other morbidity, and recent respiratory symptoms. However, non-responding patients were more likely to smoke than responders (44% and 34%, respectively: 95%CI of difference 5-16%). A total of 250 patients (23%) reported visiting their GP for RT symptoms, thus, this analysis included 250 patients (Figure 1).

GP characteristics

All GPs completed a questionnaire containing items related to *personal characteristics*: age and gender, degree of urbanisation (rural/urban), single-handed practice (yes/no), frequency of consulting national GP guidelines (once a week or less/more than once a week), seeing pharmaceutical representatives in the last four weeks (no/yes), and inclination to prescribe new drugs (low/high).⁸ As an indication of GP's tendency to label a RT episode more as an infection (e.g. acute bronchitis) rather than as a symptom (e.g. cough), we calculated per GP the proportion of the number of RT episodes presented to them during one year labelled as infections. In addition we calculated the volume of antibiotic prescribing, i.e. the number of antibiotic prescriptions for RT episodes per 1,000 patients. Furthermore, similar to the patients (see above) GPs rated the same *views on RT symptoms and antibiotics*.

Outcome measures and analysis

Primary outcome measures were: (a) getting antibiotics prescribed (no/yes) and (b) being satisfied with the visit to the GP (not (quite)/yes).

To describe independent associations between patient-related and GP-related determinants on the one hand, and the two outcome measures on the other, multilevel logistic regression analyses were performed ($p < 0.05$). Those patient-related and GP-related characteristics correlating with outcome measures with $p < 0.20$ were included. Generalized Estimating Equations (GEE by SAS system for Windows version 8) was applied after checking for interaction and collinearity.

Table 1. Data on the patients who visited their GP for recent symptoms (cough, sore throat or earache) (n=250), who did/did not get antibiotics (AB) and who were/were not satisfied

	All patients (n=250)	Getting AB (n=97)	Not getting AB (n=153)	Satisfied (n=188)	Not (quite) satisfied (n=59)
<i>Personal characteristics</i>					
Age (% 65 years and over)	28.0	27.8	28.1	29.8	20.3
Gender (% female)	55.6	55.7	55.6	54.8	59.3
Level of education (% low education)	43.2	46.4	41.2	44.7	39.0
Smoking behaviour (% smokers)	30.0	39.2	24.2	30.9	27.1
Type of insurance (% publicly insured)	70.4	71.1	69.9	69.1	72.9
Chronic respiratory co-morbidity (%)	27.6	33.0	24.2	28.2	25.4
Other co-morbidity (%)*	26.0	26.8	25.5	25.0	30.5
Self-reported health (% moderate to poor)	13.2	8.2	16.3	13.8	11.9
<i>Characteristics of the recent respiratory tract symptoms</i>					
Duration of the reported symptoms (% ≥ 2 weeks)	77.6	73.9	79.9	73.4	78.0
Presence of fever during the reported symptoms (% yes)	18.8	35.1	8.5	18.6	20.3
Cued by others to visit a GP (% yes)	40.8	46.4	37.3	41.5	39.0
Perceived seriousness of the symptoms (mean (SD))**	2.8 (1.1)	3.0 (1.1)	2.7 (1.0)	2.7 (1.1)	3.0 (1.1)
Over-the-counter medication (%yes)	43.6	51.5	38.6	41.5	52.5
<i>Aspects of GP's management</i>					
GP listened carefully (% yes)	76.8	79.4	75.2	78.7	72.9
GP examined carefully (% yes)	56.8	62.9	52.9	63.3	37.3
GP gave information and advice (% yes)	48.0	55.7	43.1	48.4	49.2
GP prescribed AB (%yes)	38.8	100	0	41.0	33.9
Satisfaction with GP's visit (% yes)	76.1	79.4	73.8	100	0
<i>Views on respiratory tract symptoms and AB (mean (SD))***</i>					
Seriousness	3.5 (1.0)	3.6 (1.0)	3.4 (1.0)	3.5 (1.0)	3.4 (0.9)
Self-limiting character	3.1 (0.8)	3.1 (0.8)	3.1 (0.8)	3.1 (0.8)	3.0 (0.8)
Need to consult a GP	4.0 (0.5)	4.0 (0.6)	4.0 (0.5)	4.0 (0.5)	3.8 (0.6)
Need of AB in case of fever	3.4 (1.1)	3.5 (1.0)	3.2 (1.2)	3.4 (1.1)	3.2 (1.1)
Need of AB in case of green phlegm	3.4 (1.3)	3.8 (1.1)	3.1 (1.3)	3.4 (1.3)	3.3 (1.2)
Effectiveness of AB	3.6 (0.9)	3.8 (0.9)	3.5 (0.8)	3.6 (0.9)	3.5 (0.9)
Side effects of AB	3.0 (1.0)	2.8 (1.0)	3.1 (1.0)	3.0 (1.0)	2.9 (0.9)

* Cardiovascular disease, diabetes mellitus and/or hypertension

** Scale ranged as follows: 1 (very low) to 5 (very high)

***Scale ranged as follows: 1 (strongly disagree) to 5 (strongly agree)

Results

Personal characteristics and views

Table 1 presents data on the patients. About 25% of all patients who visited a GP for recent cough, sore throat or earache was aged 65 years and over, and 56% was female (Table 1). More than 50% had a low level of education, 30% smoked and 70% were publicly insured.

Table 2 presents data on the GPs: their mean age was 47 years, 25% was female, 62% practised in a rural area, and 25% had a single-handed practice.

Table 2. Data on the 163 general practitioners

<i>Personal characteristics</i>	
Age (mean and SD)	47.1 (6.4)
Gender (% female)	26.4
Degree of urbanisation (%)	
• Rural	62.0
• Urban	38.0
Single-handed practice (%)	24.5
Consulting national guidelines for general practitioners (%)	
• Once a week or less	46.0
• More than once a week	54.0
Seeing pharmaceutical representatives (% yes)	56.4
Higher inclination to prescribe new drugs (mean and SD)*	2.4 (0.7)
Proportion of episodes labelled as infection (mean and SD)	0.72 (0.09)
AB prescriptions/1,000 patients (mean and SD)	107.3 (45.1)
<i>Views on RT symptoms and antibiotics (mean and SD)**</i>	
Seriousness	2.0 (0.8)
Self-limiting character	4.3 (0.6)
Need to consult a GP	3.5 (0.8)
Need of antibiotics in case of fever	1.7 (0.7)
Need of antibiotics in case of green phlegm	1.7 (0.7)
Effectiveness of antibiotics	1.9 (0.8)
Side effects of antibiotics	3.7 (1.0)

* Scale ranged as follows: 1 (low reticence) to 5 (high inclination)

** Scale ranged as follows: 1 (strongly disagree) to 5 (strongly agree)

Recent symptoms and GP management

About 75% of the patients who visited a GP reported RT symptoms lasting more than two weeks, 19% of the patients reported fever, and 40% were cued by others to visit their GP. Most patients perceived their recent symptoms as moderately serious (mean 2.8; SD 1.1), and 44% of all patients used over-the-counter medication (Table 1).

Most patients reported that their GP carefully listened to their complaints, over 50% reported that their GP carefully examined them, and about 50% that their GP gave information and advice (Table 1).

Table 3. Final models for determinants of getting antibiotics (AB) prescribed for cough, sore throat and earache and being satisfied with visit to the GP (multilevel logistic regression analysis; n=250 patients; adjusted OR (95% CI))

	Getting antibiotics	Being satisfied
Gender	1.5 (0.8 – 3.0) ^{ns}	1.4 (0.7 – 2.7) ^{ns}
Aged 65 years and over	0.8 (0.3 – 2.1) ^{ns}	1.5 (0.7 – 3.5) ^{ns}
Smokers	2.8 (1.3 – 6.0)	na
Presence of fever	6.7 (2.2– 19.1)	na
Endorsing the seriousness of the symptoms	na	0.7 (0.5 – 0.9)
Endorsing the need of AB in case of green phlegm	1.8 (1.3 – 2.4)	na
Concern about of side-effects of AB	0.6 (0.5 – 0.9)	na
Being carefully examined by the GP	na	4.1 (2.1 – 8.2)
GP's endorsement of the effectiveness of AB	1.5 (1.0 – 2.1)	1.9 (1.2 – 2.9)
GP's endorsement of the need of AB in case of white spots in the throat	1.6 (1.1 – 2.2)	na

na not applied in final model

ns difference not significant

Getting antibiotics and being satisfied

A total of 40% reported that their GP prescribed antibiotics and nearly 75% of those who visited the GP were satisfied with the visit.

Six factors were independently associated with getting antibiotics (Table 3): patients who smoked (OR 2.8; 95%CI 1.3 – 6.0), who had fever (OR 6.7; 95%CI 2.2 – 19.1), who more strongly endorsed the need of antibiotics in case of green phlegm (OR 1.8; 95% CI 1.3 – 2.4), and those with a GP who more strongly endorsed the effectiveness of antibiotics in case of RT

symptoms (OR 1.5; 95% CI 1.0 – 2.1) and the need of antibiotics in case of white spots in the throat (OR 1.6; 95% CI 1.1 – 2.2) were more likely to get antibiotics, while patients who were more concerned about side-effects of antibiotics were less likely to get antibiotics.

Three factors were independently associated with being satisfied with their visit to the GP: patients who perceived their recent symptoms as more serious (OR 0.7; 95% CI 0.5 – 0.9) were less likely to be satisfied with their visit to the GP, while patients who reported that they were carefully examined by the GP (OR 4.1; 95% CI 2.2 – 7.5) and whose GP more strongly endorsed the effectiveness of antibiotics (OR 1.9; 95% CI 1.2 – 2.9) were more likely to be satisfied. So, getting antibiotics prescribed was not independently associated with patients' satisfaction.

No interaction or collinearity was found between the determinants in any of the regression analyses.

Discussion

Principal findings

In the present study smoking, fever, stronger endorsement of the need of antibiotics in case of green phlegm, a lower concern of side-effects of antibiotics and a stronger endorsement of one's GP of the effectiveness of antibiotics in case of RT symptoms and the need of antibiotics in case of white spots in the throat were independently associated with getting antibiotics prescribed for cough, sore throat or earache. Patients who perceived their recent symptoms as less serious, who reported to be carefully examined by the GP, and whose GP more strongly endorsed the effectiveness of antibiotics in case of RT symptoms were more likely to be satisfied with their visit to the GP.

Strength and limitations of the study

The data of the DNSGP-2 provide a reliable and up-to-date impression of morbidity and prescribing habits in Dutch general practice.¹⁷ Patients' characteristics of the DNSGP-2 sample were comparable with those of the general Dutch population, and responders' characteristics did not differ from non-responders. Thus, the results of this survey can be assumed to represent morbidity in daily primary care in the Netherlands.

Information about visiting a GP was obtained from patients' self-reports. Studies have shown that patients tended to report less physician utilisation than was recorded in computerised patient records, especially when the recall period is extended.¹⁹ However, because the present study explored the preceding two weeks, recall bias can be assumed to be small. Moreover, a

scrutinised inspection of the electronic records showed that for 82% of our patients who reported visiting their GP this contact was indeed registered.

Finally, because the present study had a cross-sectional and (partly) a retrospective design, we can only assume correlations and no conclusions about causal relationships can be drawn.

Comparison with the existing literature

In the present study 39% of those visiting a GP reported getting antibiotics; this percentage is comparable with other Dutch studies.^{5,20} Our finding that fever was independently associated with getting antibiotics is also in accordance with other studies.^{5,21} Patients' perceived need of antibiotics in case of green phlegm was independently associated with getting antibiotics. This finding corroborates similar findings in other studies that have shown that patients' perceived need of antibiotics is a strong predictor of GPs' antibiotic prescribing.^{10,11}

In contrast to the findings in a recent Dutch study,²⁰ in our study years since registration as GP and medical knowledge on RT infections were no independent determinants. Differences in study population and primary outcome measure (getting an antibiotic prescription in a recent RT episode compared to prescription rate over a longer period) might account for these differences. On the other hand, our finding that patients whose GPs more strongly endorsed the effectiveness and the need of antibiotics got more antibiotics, might indicate a relationship between medical knowledge and prescribing antibiotics, as endorsement of these views is associated with the domain of medical cognitions and knowledge.

Careful examination was the only aspect of GPs' management that was independently associated with patient's satisfaction with the visit to the GP. Until now, no other studies did examine the relation between history taking and physical examination and patients' satisfaction. Getting antibiotics was not related with patients' satisfaction. This is partly in line with other studies.^{10,12,14,15,22}

Although patients and GPs are known to differ in their views on RT symptoms and antibiotics,¹⁶ the present study surprisingly found no association between the differences in views between patients and their respective GPs on the one hand and getting antibiotics or being satisfied with the visit to the GP for RT symptoms at the other. Apparently, other factors play a more important role in patients' satisfaction: patients want to be taken seriously and want to get rid of their symptoms.

Implications for future research and clinical practice

Fever appeared to be the most important independent determinant for getting antibiotics prescribed, despite that fever itself is not necessarily an indication to prescribe antibiotics. GPs still need to be reminded of the limited evidence that single signs of inflammation (e.g. fever and white spots in the throat) are an indication to prescribe antibiotics, and should prescribe non-antibiotic drugs to relieve the symptoms.^{1,2} The same applies for smoking. GPs appear to use smoking as an indication for antibiotic therapy. However, although there are indications that smokers have an elevated risk for complications in RT infections,²³ no studies have yet confirmed that antibiotics are indicated in smokers.

As others did before us, we also saw a relation between patients' endorsement of the need of antibiotics and getting them prescribed. Because we also found that patients' satisfaction was not related to antibiotic prescribing, it seems important, that GP's explore patients' expectations and understand that patients seem to be ready to accept to a wait and see policy in many cases.

Finally, careful physical examination of patients may attribute more to the patient's satisfaction during the consultation.

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Chapter 6

Diagnostic labelling and prescribing of antibiotics for respiratory tract episodes

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Submitted

Abstract

Background: Diagnostic labelling (i.e. the tendency to label respiratory tract (RT) episodes more as infections rather than as symptoms) probably contributes to a higher volume of antibiotic prescriptions, but the number of presented RT episodes (the incidence) might be an intermediate factor in this relationship. Although the incidence of presented RT episodes has decreased in the last decade, recent studies on the determinants of the volume of antibiotic prescriptions are lacking.

Aim: To assess the association between diagnostic labelling, the number of presented RT episodes and other possible GP-related determinants on the one hand, and the volume of antibiotic prescribing on the other.

Design of study: The Second Dutch National Survey of General Practice (DNSGP-2).

Setting: A total of 163 GPs from 85 Dutch practices, serving a population of 359,625 patients.

Methods: The number of RT episodes and antibiotic prescriptions during a one-year period were extracted from the electronic medical records. GP characteristics were measured by means of a written questionnaire. Data were analysed by multiple linear regression analysis.

Results: A total of 275.9 RT episodes/1,000 patients were registered. GPs labelled about 70% of all RT episodes as infections, and antibiotics were prescribed in 39% of all RT episodes. A higher incidence of RT episodes, a stronger inclination to label episodes as infections, a stronger endorsement of the need of antibiotics in case of white spots in the throat, and practicing in a rural area were independent determinants of the prescribed volume of antibiotics for RT episodes, whereas diagnostic labelling was not correlated with the number of presented episodes.

Conclusion: In the aim for more rational antibiotic prescribing more attention should be paid to the relation between diagnosis and antibiotic treatment.

Introduction

Most antibiotics are prescribed in primary care with respiratory tract (RT) infections being the main indication.¹ However, there is insufficient evidence to warrant its use for these infections; moreover, most of them are self-limiting.² Even in a low prescribing country such as the Netherlands there is an over-prescribing of antibiotics; about 50% of the antibiotic prescriptions for RT episodes are not in accordance with Dutch national guidelines.³⁻⁵ Considering costs, side-effects and the growing resistance to pathogens, it is important to rationalise antibiotic prescribing as much as possible.⁶ More insight into the determinants of prescribing antibiotics is therefore necessary to optimise medical education and feedback procedures.⁷

Howie was one of the first to show that antibiotic prescribing for RT episodes in general practice was influenced by the patient-doctor relationship and physician characteristics (e.g. fear of possible sequelae to streptococcal infection).⁸ Later studies corroborated these findings, showing that labelling RT episodes as infections instead of symptoms (diagnostic labelling) or overvaluing signs of inflammation pertained to higher antibiotic prescription rates and overprescribing of antibiotics,^{4,5,9-12} while the number of RT episodes per 1,000 patients presented to the GP might be an intermediate factor in this relationship.¹² After all, labelling RT episodes as infections might be a trigger to revisit the GP on a subsequent occasion.

Other GP characteristics (e.g. the number of years of practice, number of patients, and perceived workload) are also associated with antibiotic prescribing for RT episodes.^{11,14,15} However, it remains unknown whether the association between diagnostic labelling and the volume of prescribed antibiotics is a direct relationship, or whether diagnostic labelling is associated with the number of presented RT episodes and consequently with the volume of prescribed antibiotics. Furthermore, recent studies that include the incidence of RT episodes as possible determinants of antibiotic prescribing are lacking. Therefore the present study explored the association between diagnostic labelling, the number of presented RT episodes and other possible determinants on the one hand, and the volume of antibiotic prescribing on the other.

Methods

GPs, practices and patients

The data used in the present study were derived from the Second Dutch National Survey of General Practice (DNSGP-2), which was carried out by the Netherlands Institute for Health Services Research (NIVEL) in 2001.¹⁶ Data were used from 163 GPs from 85 practices serving a population of 359,625 patients. The patients enlisted in the participating practices were similar

to the profile of the Dutch general population with respect to age, gender and type of health care insurance. There were no differences between the total population of Dutch GPs and the study group except for the type of practice: i.e. single-handed GPs were underrepresented in the study population. Thus, the 2001 study provided a valid representation of the morbidity and prescribing habits in Dutch general practice.

Table 1. Respiratory tract episodes divided into localisation and type (with the corresponding ICPC codes)

<u>Labelled as symptom:</u>	<u>Labelled as diagnosis:</u>
<i>Throat:</i>	<i>Throat:</i>
R21 throat symptom/complaint	R72 strep throat
R22 tonsils symptom/complaint	R76 acute tonsillitis
<i>Ear:</i>	<i>Ear:</i>
H01 ear pain / earache	H71 acute otitis media/myringitis
<i>Nose and sinuses:</i>	<i>Nose and sinuses:</i>
R07 sneezing/nasal congestion	R74 acute upper respiratory infection
R09 sinus symptom/ complaint	R75 sinusitis acute/chronic
<i>Lower respiratory tract (acute):</i>	<i>Lower respiratory tract (acute):</i>
R05 cough	R77 acute laryngitis/tracheitis
	R78 acute bronchitis/bronchiolitis
	R81 pneumonia
	<i>Lower respiratory tract (chronic):</i>
	R91 chronic bronchitis/bronchiectasies
	R95 chronic obstructive pulmonary disease
	R96 asthma

Morbidity and prescribing

In the DNSGP-2 study, data on morbidity and antibiotic prescribing were derived from the electronic medical records during a one-year period. Morbidity as presented to the GP was registered using the International Classification of Primary Care version 1 (ICPC-1), and contact diagnoses for the same health problem were clustered into episodes. Prescriptions were registered in a separate file using the Anatomical Therapeutic Chemical classification system (ATC).¹⁷ RT episodes were identified by their ICPC codes RT episodes and split up into two categories: symptoms [such as throat symptoms (R21) or cough (R05)], and infections [such as tonsillitis (R76) or pneumonia (R81)] (Table 1). The proportion of episodes labelled as

infections was used to define diagnostic labelling, i.e. the inclination to label RT episodes as infections rather than as symptoms.

In 22 of the 85 practices, because the prescriptions could not be linked to a specific GP within the practice, the average practice prescription rates were allocated to all GPs of that practice.

Questionnaire

At the beginning of the DNSGP-2 the information collected about the GPs and their practices included age (years), gender (male/female), years since registration as GP (years), number of enlisted patients and type of practice (single-handed yes/no). Additional information collected (by means of a questionnaire) was: frequency of consulting national GP guidelines (once a week or less/more than once a week), seeing pharmaceutical representatives in the four weeks preceding completion of the questionnaire (no/yes), inclination to prescribe new drugs ranging from 1 (low) to 5 (high) and views on RT infections and antibiotics rated on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).¹⁸ GPs' medical knowledge on RT infections and antibiotics was tested (using a 10-question questionnaire) and scored from 0 (very low) to 10 (very high) by the researchers.

Outcome measure and analysis

The outcome measure was the prescribed volume of antibiotics (the number of antibiotic prescriptions per 1,000 patients per GP per year) for RT episodes.

To explore whether a relation between diagnostic labelling and antibiotic prescribing is not a direct relation but rather a relation with the number of RT episodes as intermediate, the (partial) correlations between diagnostic labelling, the number of RT episodes and the volume of antibiotic prescribing were calculated (Pearson's r ; $p < 0.05$). To calculate the association between diagnostic labelling, the number of presented RT episodes and other GP characteristics on the one hand and the volume of antibiotic prescribing for RT episodes on the other, a multiple linear regression analysis was performed after checking for interactions and collinearity ($p < 0.05$). All determinants that had a bivariate correlation with the outcome measures at $p < 0.20$, were included in the multiple linear regression analysis with a stepwise procedure, followed by an enter procedure. The strength of the associations between the determinants and the volume of antibiotics was described by standardised beta coefficients with 95% confidential intervals (95%CI).

All data were analysed using the Statistical Package for Social Sciences for Windows (SPSS 12.0.1).

Results

GPs characteristics

The GPs' mean age was 47 years and about 25% was female (Table 2). The mean period of practising since registration was 18 years, the mean number of patients was about 2,200 per GP and about 5,700 per practice. About 25% of all GPs had a single-handed practice and over 60% practised in a rural area. About 50% of the GPs consulted national guidelines more than once a week and 56% of them had seen a pharmaceutical representative in the four weeks preceding completion of the questionnaire. The inclination to prescribe new drugs had a mean score of 2.4. In general, GPs endorsed the self-limiting character of RT infections (mean 4.3) and they less endorsed the seriousness of RT infections (mean 2.0), the need for antibiotics in case of fever (mean 1.7), and the effectiveness of antibiotics (mean 1.9), while they were less concerned about side-effects of antibiotics (mean 2.3). The GPs moderately endorsed the need to be consulted in case of RT complaints (mean 3.5).

Morbidity and prescribing

In total 275.9 RT episodes/1,000 patients were registered (Table 2). About 60% of these episodes was for upper RT episodes and the remainder was for lower RT episodes (150.3 vs. 125.6 episodes/1,000 patients). GPs labelled about 70% of all RT episodes as infections and in 39% of all RT episodes antibiotics were prescribed (107.5 antibiotic prescriptions related to 259.9 RT episodes).

Table 2. Data on the 163 general practitioners participating in the study

Age in years (mean (SD))	47.1 (6.4)
Gender (% female)	26.4
Years since registration (mean (SD))	18.2 (8.7)
Number of patients (mean (SD))	2,197 (646)
Total patients per practice (mean (SD))	5,669 (2,855)
Type of practice (% single-handed)	24.5
Degree of urbanisation (% rural)	62.0
Consulting national guidelines for GPs (% > once a week)	54.0
Seeing pharmaceutical representatives (% yes)	56.4
Inclination to prescribe new drugs (mean (SD))*	3.1 (0.7)
Medical knowledge on respiratory tract symptoms and antibiotics (mean (SD))**	7.1 (1.5)
Views on RT symptoms and antibiotics (mean (SD))***	
- <i>Seriousness</i>	2.0 (0.8)
- <i>Self-limiting character</i>	4.3 (0.6)
- <i>Need to consult a general practitioner</i>	3.5 (0.8)
- <i>Need of antibiotics in case of fever</i>	1.7 (0.7)
- <i>Need of antibiotics in case of green phlegm</i>	1.7 (0.7)
- <i>Need of antibiotics in case of white spots in the throat</i>	2.3 (1.1)
- <i>Characteristics of cough</i>	2.5 (0.9)
- <i>Effectiveness of antibiotics</i>	1.9 (0.8)
- <i>Side-effects of antibiotics</i>	2.3 (1.0)
RT episodes/1,000 patients/year (mean (SD))	275.9 (67.7)
Proportion of RT episodes labelled as infections (mean (SD))	0.72 (0.09)
Antibiotic prescriptions for RT episodes per 1,000 patients/year (mean (SD))	107.5 (45.1)

* Scale ranged as follows: 1 (low inclination) to 5 (high inclination)

** Scale ranged as follows: 1 (very low) to 10 (very high)

***Scale ranged as follows: 1 (strongly disagree) to 5 (strongly agree)

RT: respiratory tract

Diagnostic labelling, presented episodes and antibiotic prescribing

There was a strong correlation between the number of RT episodes and the volume of antibiotic prescribing (r 0.69; $p < 0.01$), while the correlation between diagnostic labelling and the volume of antibiotic prescribing was moderate (r 0.30; $p < 0.01$). There was no correlation between the number of RT episodes and diagnostic labelling (r 0.11; $p = 0.17$). These inter-correlations were

supported by partial correlations, which means that the incidence was not an intermediate factor between the tendency to label RT episodes more as infections rather than as symptoms on the one hand and prescribing antibiotics on the other.

GPs with a high tendency to label RT episodes as infections prescribed about 33% more antibiotics than GPs with a medium and low tendency: mean 127.4 (SD 51.3), mean 98.6 (SD 43.0), and mean 97.5 (SD 34.3), respectively.

Determinants of prescription of antibiotics

The proportion of RT episodes labelled as infections was independently associated with the volume of antibiotic prescribing (beta 0.22; Table 3). The number of RT episodes had the strongest independent association with the volume of antibiotic prescribing (beta 0.61), while practising in a rural area and endorsing the need of antibiotics in case of white spots in the throat showed a weaker association with the volume of antibiotic prescribing (beta 0.22 and beta 0.12, respectively).

Table 3. Correlation between GPs' characteristics and volume of antibiotic prescription for respiratory tract (RT) episodes (multiple linear regression analysis; standardised beta coefficient; 95%CI; n=163 GPs)

Variables in model	Standardised beta coefficient (95% CI)
RT episodes/1,000 patients/year	.61 (.51-.72)
Degree of urbanisation (rural)	.24 (.14- .35)
Proportion of RT episodes labelled as infections	.22 (.12-.32)
Endorsement of the need of antibiotics in case of white spots in the throat	.12 (.02-.23)
<i>Explained variance (R²)</i>	<i>61%</i>

Discussion

Summary of main findings

The tendency to label an RT episode as an infection is independently correlated with the volume of antibiotic prescriptions. The number of presented RT episodes is more strongly associated with the volume of antibiotics prescribed for RT episodes. There is no correlation between diagnostic labelling and the number of presented RT episodes. Thus, we can conclude that the number of presented RT episodes is not an intermediate variable between the tendency to label episodes as infections and the volume of antibiotic prescribing.

Strengths and the limitations of this study

The 163 participating GPs were representative for the total population of GPs in the Netherlands. The GPs' characteristics were comparable with those of the total population of Dutch GPs, except for the type of practice; single-handed GPs were under-represented in the present study. However, because this factor was not significantly correlated with the volume of antibiotics prescribed for RT episodes, it is unlikely that this influenced the results. In addition, the patients involved in the DNSGP-2 study reflected the general Dutch population.¹⁶

We assume that the morbidity and antibiotic prescribing data are accurate because they were extracted from the electronic medical records of the participating practices, and the interobserver reliability of coding episodes into the ICPC codes is high.¹⁹ The registration covered a 12-month period for each practice, thereby eliminating seasonal influences. Considering the representativeness of the participating GPs and their patients -and the high validity of the data- the results of the present study can be assumed to validly represent morbidity and GPs prescribing behaviour in Dutch general practice.

For 56 of the 163 GPs the volume of antibiotics prescribed was only available on the practice level. In these cases the volume of antibiotics prescribed by each GP was estimated by means of the number of prescriptions per practice. This implies a loss of variance in outcome measures so that associations in the regression analysis might have been underestimated. Finally, because our study had a cross-sectional design, we can only assume correlations and no conclusions about causal relationships can be drawn.

Comparison with existing literature

In the present study 72% of all RT episodes were labelled as infections, compared with 41-62% in other studies that labelled their RT episodes with a diagnosis 'assuming a bacterial infection'.^{9, 10} In a recent Dutch study 63% of the RT episodes were labelled as infections, and

the antibiotic prescribing rate for all RT episodes was about 35%.²⁰ Compared with the latter study in which data were collected by hand-written prospective recording of visits we assume that our data collection from the electronic medical records are probably more accurate.

Our finding that the number of RT episodes/1,000 patients is strongly associated with the volume of prescribed antibiotics/1,000 patients for RT episodes has also been suggested by Ashworth et al.¹² Diagnostic labelling also turns out to be an independent determinant of the volume of antibiotics prescribed for acute RT episodes; this latter phenomenon has already been described by Howie in 1983,⁸ and later confirmed by others.⁹⁻¹² We have demonstrated that diagnostic labelling is directly related with the volume of antibiotic prescriptions with the number of presented RT episodes not being an intermediate factor.

It might be proposed that because the incidence of all RT infections will not vary greatly between GP practices, the variation in labelling as infections might indicate that diagnostic labelling is an arbitrary process (thus not objective), thus justifying antibiotic prescribing. GPs may use this mechanism to defend themselves against unforeseen complications or worsening, even though these sequelae will seldom occur.⁸

Implications for future research and clinical practice

The inclination to label RT episodes as infections was an independent determinant of the volume of antibiotics prescribed for RT episodes. Quality assurance programs and postgraduate courses should emphasise that prognostic criteria (e.g. chronic respiratory co-morbidity and age) as an indication to prescribe antibiotics are better supported by evidence-based insights than diagnostic labelling alone. In addition, since diagnostic labelling might be influenced by e.g. reasons related to therapeutic justification, the use of diagnostic labels in research has to be handled with some caution.

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Chapter 7

Determinants of prescribing of second-choice antibiotics for upper and lower respiratory tract episodes in Dutch general practice

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Abstract

Objectives: The aim of this study was to assess the association between general practitioners' (GPs') characteristics and the volume of second-choice antibiotics for acute respiratory tract (RT) episodes by GPs.

Methods: Morbidity and antibiotic prescription data originated from the Second Dutch National Survey of General Practice (DNSGP-2). GPs' characteristics, including professional activities and views on RT symptoms and antibiotics were measured by a written questionnaire. Multiple regression was carried out to assess associations between possible determinants and volume of second-choice antibiotic prescriptions.

Results: In ~39% of acute RT episodes antibiotics were prescribed, with one-quarter being second-choice antibiotics, relatively more frequently in lower than in upper RT episodes: 30 versus 19%. GPs who were more frequently consulted by patients with RT episodes ($\beta=0.29$; 95% CI 0.13-0.41), who labelled RT episodes more as diagnoses than as symptoms ($\beta=0.27$; 95% CI 0.15-0.42), who less frequently used national GP guidelines ($\beta=-0.17$; 95% CI -0.31 to -0.03), and who were more inclined to prescribe new drugs ($\beta=0.26$; 95% CI 0.13-0.40), prescribed more second-choice antibiotics.

Conclusions: Given the growing number of prescriptions of second-choice antibiotics, it is important to implement professional guidelines in daily practice, while training in being reluctant to prescribe new drugs and being alert to the marketing activities of pharmaceutical companies should be started in the medical curriculum.

Introduction

Over the last 10 years antibiotic prescribing rates for respiratory tract (RT) infections in Western countries have been stable or have decreased. However, there is an international trend to prescribe more co-amoxyclov and newer and more expensive antibiotics, such as new macrolides and quinolones,¹⁻⁴ although these chemotherapeutics are 'second-choice' antibiotics, which should be reserved in case of failure of or intolerance to first-choice agents. This trend is unwanted because the growing use of antibiotics such as macrolides has been accompanied by growing resistance of important pathogens.⁵

More insight into determinants of outpatient prescribing second-choice antibiotics might be helpful in designing interventions aimed at reducing inappropriate use. Therefore, this study aimed to assess the relationship between general practitioners' (GPs') characteristics and the volume of second choice antibiotics prescribed for RT infections. This study was possible because of the availability of data from a nationwide study including GPs' characteristics, morbidity and prescription data.⁶

Methods

The data used in this study originate from the Second Dutch National Survey of General Practice (DNSGP-2), carried out by The Netherlands Institute for Health Services Research (NIVEL) in 2001 and including 163 GPs in 85 practices serving a mid-time population of 359,625 patients.⁶ The mean number of GPs per practice was less than two (mean: 1.9), with 11 out of 85 practices having more than three GPs. The participating GPs did not differ from the total population of Dutch GPs, except for type of practice: single-handed GPs were somewhat under-represented in the study population.

This study was believed to give a representative impression of morbidity and prescribing habits in Dutch general practice. During 12 months, data about patients' presented morbidity were extracted from routine electronic medical records using codes according to the International Classification of Primary Care, version 1 (ICPC-1), and GPs' prescriptions were registered using the Anatomical Therapeutic Chemical classification system (ATC) used by WHO (<http://www.who.int/classifications/atcddd>). We divided RT episodes into episodes labelled by GP as symptoms, such as earache (H01) and cough (R05), and episodes labelled as infections such as acute otitis media (H71) and acute bronchitis (R78), for upper and lower RT. As an indication of the inclination to label episodes more as infections than as symptoms, we calculated the proportion of the number of episodes labelled as infections per GP.

Prescriptions were calculated by linking prescription data with episodes on patient level and aggregated on GP level. In 22 practices with two or more GPs, patients could not be linked

with a particular GP. In these cases practice prescription rates were used to estimate GP's prescription rates.

All participating GPs completed a questionnaire containing items relating to gender, years of practice, degree of urbanization of practice location (rural, urban), full-time (no/yes), number of enlisted patients (absolute number), single-handed practice (no/yes), frequency of consulting national GP guidelines (once a week or less/more than once a week), seeing pharmaceutical representatives in the last 4 weeks (no/yes), inclination to prescribe new drugs (1=low to 5=high), and views on RT infections and antibiotics rated on a five-point scale (1=strongly disagree to 5=strongly agree).⁷

The outcome measure was the volume of second-choice antibiotics for RT episodes (the number of prescriptions of co-amoxycylav, macrolides and quinolones for RT episodes per 1000 patients per year per GP). To describe the association between GPs' characteristics and the volume of second-choice antibiotics prescribed for RT episodes, multiple linear regression analysis was carried out using SPSS 12.0.1. Independent associations were assessed using a forward stepwise strategy followed by an enter strategy with checks on interaction and collinearity.

Results

The GPs' mean age was 47 years, one-quarter of them being female (Table 1). About half of the GPs consulted national guidelines more than once a week, with the remaining half consulting them less frequently. Fifty-six percent of the GPs had seen pharmaceutical representatives in the 4 weeks preceding the questionnaire. Inclination to prescribe new drugs showed a mean score of 2.4 (95% CI 2.2-2.6). In general, GPs endorsed the self-limiting character of RT infections (mean 4.3; 95% CI 4.2-4.4), while they significantly less endorsed seriousness of RT infections (mean 2.0; 95% CI 1.9-2.2), need of antibiotics in case of RT infections (mean 1.7; 95% CI 1.6-1.8), effectiveness of antibiotics (mean 1.9; 95% CI 1.7-2.0) and the importance of side-effects of antibiotics (mean 2.3; 95% CI 2.1-2.4). GPs endorsed the need to use them in case of RT infections moderately (mean 3.5; 95% CI 3.4-3.7).

Table 1. GPs' characteristics (n=163 GPs)

Age, years [mean (95% CI)]	47.1 (46.1- 48.1)
Gender (% female)	26.4
Years of practice [mean (95% CI)]	18.2 (16.8 - 19.5)
Degree of urbanisation (%)	
<i>rural</i>	62.0
<i>urban</i>	38.0
Full-time (%)	30.4
Number of enlisted patients [mean (95% CI)]	2197 (2097 - 2296)
Single-handed practice (%)	24.5
Consulting national guidelines for general practitioners (%)	
<i>once a week or less</i>	46.0
<i>more than once a week</i>	54.0
Seeing pharmaceutical representatives (% yes)	56.4
Inclination to prescribe new drugs [mean (95% CI)]*	2.4 (2.2 - 2.6)

* Scale ranged as follows: 1-low inclination to 5- high inclination

In total, 275.9 RT episodes /1000 patients were registered (Table 2). Nearly 60% of these episodes were for upper RT episodes and ~40% for lower RT episodes (150.3 vs. 125.6 episodes/1000 patients), while ~70% of all RT episodes were labelled as infections. Antibiotics were prescribed in ~39% of all RT episodes. One-quarter of these prescriptions were for second-choice antibiotics (8% co-amoxyclav, 13% macrolides en 2% quinolones), relatively more frequently in lower than in upper RT episodes (30 versus 19%) (Table 2). The number of prescriptions of second-choice antibiotics for episodes of the upper RT was 12.1/1000 patients, being 19% of all antibiotic prescriptions for these indications, and for episodes of the lower RT 13.8/1000 patients, i.e. 30% of all antibiotic prescriptions for these indications.

Table 2. Number of RT episodes per 1000 patients/GP/year, proportion of episodes labelled as infections, total and second-choice antibiotic prescriptions per 1,000 patients/GP/year, and proportion of second-choice antibiotic of all antibiotic prescriptions (n=163 GPs)

	Upper RT	Lower RT	Upper and lower RT
	<i>Mean (95% CI)</i>	<i>Mean (95% CI)</i>	<i>Mean (95% CI)</i>
Respiratory tract episodes/ 1000 patients	150.3 (143.3 - 157.4)	125.6 (120.1 - 131.0)	275.9 (265.4 - 286.4)
Proportion of episodes labelled as infections of all episodes	0.80 (0.78 - 0.81)	0.63 (0.61 - 0.65)	0.72 (0.71 - 0.74)
Total antibiotic prescriptions/ 1000 patients	61.5 (57.0 - 66.0)	45.9 (42.4 - 49.4)	107.3 (100.3 - 114.4)
Second-choice antibiotic prescriptions/ 1000 patients	12.1 (10.5 - 13.7)	13.8 (12.3 - 15.3)	26.0 (23.1 - 28.8)
Proportion of second-choice antibiotic of all antibiotic prescriptions	0.19 (0.17 - 0.21)	0.30 (0.28 - 0.33)	0.24 (0.22 - 0.26)

Four factors were independently correlated with the volume of second-choice antibiotics (total explained variance 28%): GPs who were more frequently consulted by patients with RT episodes ($\beta=0.29$; 95% CI 0.13-0.41), who labelled RT episodes more as infections ($\beta=0.27$; 95% CI 0.15-0.42), who less frequently consulted national GP guidelines ($\beta= -0.17$; 95% CI - 0.31 to -0.03), and who were more inclined to prescribe new drugs ($\beta=0.26$; 95% CI 0.13-0.40) prescribed more second-choice antibiotics for these episodes. Neither interaction nor collinearity between determinants was found in any of the regression analyses.

Discussion

About 25% of all prescribed antibiotics were second-choice antibiotics; prescribing of second-choice antibiotics was relatively more prominent in lower RT infections than in upper RT infections. Determinants of prescribing second-choice antibiotics appeared to be a higher number of RT episodes/1000 patients, labelling RT episodes more as infections, consulting less frequently national guidelines for GPs and a higher inclination to prescribe new drugs.

The data from the DNSGP-2 are thought to give a reliable and up-to-date impression of morbidity and prescription habit in Dutch general practice.⁶ We suppose the prescribing data are

highly valid, because they were extracted from electronic databases of the participating practices. GPs' characteristics of the DNSGP-2 sample were comparable to those of the total population of Dutch GPs, except for an under-representation of single-handed GPs.

Some methodological remarks have to be made. First, the proportion of antibiotic prescriptions of 56 GPs was estimated with the aid of the mean number of prescriptions per 1000 patients per practice. This implies a loss of variance in outcome measurement, so associations in the regression analysis were conservatively estimated. We did not find a difference in mean antibiotic prescribing volumes between GPs with and without estimated means, so we suppose these estimations not to yield bias. Controlling results for clustering at practice level was not indicated, because the mean number of GPs per practice was less than two, with only 11 out of 85 practices having more than three GPs. Lastly, we have to consider that our study had a cross-sectional design, so we can only assume correlations and not causal relationships.

Earlier studies have shown that the more GPs are consulted for RT episodes, and the more they label these episodes as infections, the more they prescribe antibiotics.^{8,9} In our study this seemed also to be the case for prescribing second-choice antibiotics, which was strongly correlated with the total number of antibiotic prescriptions/1000 patients (Pearson's r : 0.60; $P < 0.01$). GPs who less frequently consulted national GP guidelines prescribed more second-choice antibiotics, which supports the Dutch quality assurance policy relating to rational prescribing.

The finding that GPs who were more inclined to prescribe new drugs appeared to prescribe more second-choice antibiotics indeed is interesting, because several studies have shown an association between the inclination to prescribe new drugs and seeing pharmaceutical representatives⁹ (in this study Pearson's $r=0.47$; $P < 0.01$). It is probable that there is a mutual reinforcement between these factors: the inclination to prescribe new drugs influences seeing pharmaceutical representatives, and seeing them may enforce this inclination. This finding has also been corroborated by the qualitative study of Prosser and Walley.¹⁰ Moreover, it is noteworthy that after dividing RT episodes into episodes of the upper and lower tract, seeing pharmaceutical representatives was an independent factor in the volume of second-choice antibiotics prescribed for lower RT episodes ($\beta=0.29$; 95% CI 0.14-0.41).

Given the growing number of prescriptions of second-choice antibiotics,¹⁻⁴ it is important to implement guidelines to set a right indication to prescribe antibiotics and to reserve second-choice antibiotics in case of failure of or intolerance to first-choice antibiotics. Furthermore, developing more critical prescribing skills, e.g. training in being reluctant to prescribe new

drugs and being alert to the marketing activities of pharmaceutical companies, should be started in the medical curriculum.

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Chapter 8

Patients' views on respiratory tract symptoms and antibiotics: an international comparison

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Abstract

Objectives: To describe patients' views on respiratory tract symptoms and antibiotics in Belgium, UK and the Netherlands.

Design: International questionnaire study.

Setting: Two rural and two urban practices in each country.

Participants: 687 randomly selected patients from four practices in each country.

Main outcome measures: Patients' views on respiratory tract symptoms: agreement with statements rated on a five-point scale, ranging from 'strongly disagree' (1) to 'strongly agree' (5).

Results: The response rate was 61 % in Belgium, 38 % in UK and 62% in the Netherlands. Patients reported a wide variety in antibiotic prescription over the preceding last two years: Belgium: 62%; UK: 52% and the Netherlands: 31%. Belgian respondents had a higher inclination to consult the GP with respiratory tract symptoms (mean: 4,5 versus 3,6 and 3.8) and perceived these symptoms as more serious than UK and Dutch respondents (mean: 4.2 versus 3.4 and 3.6), but less self-limiting (mean: 2.9 versus 3.4 and 3,6). There were lesser differences in views concerning antibiotics. Belgian respondents endorsed most strongly that antibiotics have side effects. Views about the need to consult, the seriousness of symptoms, the effectiveness of antibiotics and especially the general practitioner as the best person to consult for RT symptoms correlated moderately to strongly with each other, while endorsement of the self-limiting character of these symptoms and concern with side effects of antibiotics weakly correlated with the other views.

Conclusions: These differences might partly explain differences in levels of antibiotic prescribing, although they might also reflect the countries' health care systems. Patient education should focus on the benign nature of the vast majority of respiratory tract symptoms making consultation generally unnecessary rather than on side effects of antibiotics.

Introduction

Respiratory tract symptoms as cough, earache and sore throat are the commonest reasons why patients in primary care consult their doctor. Antibiotics are frequently prescribed for these respiratory tract symptoms, but shorten the duration of these symptoms only modestly, if at all.^{1,2} The over-prescribing of antibiotics wastes money, exposes patients unnecessarily to risks of side-effects, encourages re-consulting for similar problems and causes antimicrobial resistant bacteria. Patients, however, appear to overestimate the effectiveness of antibiotic treatment.³ We have previously suggested that patients' attitudes as well as differences in health care systems deserve consideration as possible determinants of differences in European outpatient antibiotic use.^{4,5} Antibiotic resistance is an international problem and particularly in Europe, opportunities for international interventions abound. An awareness of possible similarities and differences in views between countries might be helpful in designing international interventions. We therefore compared patients' views on respiratory tract symptoms and antibiotics in the Netherlands, the UK and Belgium, representing nations with low, moderate and high antibiotic prescription levels in primary care.⁵

Methods

One hundred patients were randomly selected from the practice patient list of each of four general practices in each country. Practices were purposefully recruited to represent areas with range of social class and rural vs. urban characteristics. One practice in UK sent an initial approach to two hundred randomly selected patients with a return slip indicating whether they would like to take part and to be sent a questionnaire. The remaining patients were sent questionnaires in a one-stage approach. The questionnaire asked patients to rate their responses to statements about respiratory tract symptoms and antibiotics (Table) with response categories ranging from 1 (strongly disagree) to 5 (strongly agree). The scale items had previously been pilot tested and related to one of six domains: *need to consult a general practitioner*, *perceived seriousness*, *perceived self limiting character*, *perceived effectiveness of antibiotics to speed up recovery*, *perceived effectiveness of antibiotics to prevent deterioration*, and *side effects of antibiotics*.⁶ Results were expressed as means.

Results

In total, 678 evaluable questionnaires were returned (38% to 62% per country; Table). Inter-practice variation within countries was small. Patient report of antibiotic use during the preceding two years was highest in Belgium and lowest in the Netherlands with the UK in

between (Table). The intercorrelation between the items with the six clusters of was moderate to strong (Cronbach's α ranged from .70 to .85 for all respondents together; Table).

Belgian respondents reported a greater perceived need to consult a general practitioner with respiratory tract symptoms and considered these symptoms as more serious and less self-limiting than respondents in the UK and the Netherlands. UK respondents were slightly less convinced of the need to consult a general practitioner and of the seriousness of symptoms than Dutch respondents. The respondents in the three countries were similar in their reported perception of effectiveness of antibiotics to speed recovery and to prevent respiratory tract symptoms from deteriorating.

Belgian respondents more often endorsed concerns about adverse effects from antibiotics compared to the UK respondents, with the Dutch respondents adopting a middle ground. Lastly, Belgian respondents endorsed the statement that a general practitioner is the best person to consult with respiratory tract symptoms more than UK and Dutch respondents.

Views about the need to consult, the seriousness of symptoms, the effectiveness of antibiotics and the general practitioner as the best person to consult correlated well with each other (Pearson's r ranging from .27 to .76). Views relating to the self-limiting character of respiratory tract symptoms and the side effects of antibiotics correlated weakly with the other views. Patients' sex and age were only slightly correlated with their ratings. Interpractice variation within countries was small.

Table. Demographic characteristics (mean and SD) of respondents from the Netherlands, UK and Belgium and their views on respiratory tract symptoms and antibiotics (AB) (mean and SD; Cronbach's alpha)*

	Netherlands (n=247)		UK (n=188)		Belgium (n=243)		All (n=678)	
Response rate (%)	61.7		37.6		60.2		52.2	
Age	40.1 (11.8)		44.9 (12.1)		41.3 (13.0)		41.9 (12.4)	
Gender (% female)	64.0		55.6		65.8		62.3	
Highest level of education								
-low	10.7		17.9		7.2		11.4	
-medium	58.1		46.2		51.7		52.6	
-high	31.2		35.8		41.1		36.1	
Antibiotics past 2 years								
-prescribed (%)	31.8		54.0		62.1		48.8	
- not prescribed (abs)	5		10		12		27	
<i>In case of respiratory tract symptoms:</i>								
		α		α		α		α
Need to consult a general practitioner	3.8 (1.0)	.75	3.6 (0.7)	.66	4.5 (0.6)	.57	4.0 (0.9)	.74
• Cough and raised temperature >2 days	3.5 (1.4)		3.4 (1.0)		4.4 (1.0)		3.8 (1.3)	
• Sore throat and raised temperature >2 days	3.4 (1.4)		3.2 (1.0)		4.4 (0.9)		3.7 (1.3)	
• A child with earache >2 two days	4.5 (0.8)		4.1 (0.7)		4.8 (0.5)		4.5 (0.7)	
Perceived seriousness	3.6 (1.0)	.80	3.4 (0.7)	.74	4.2 (0.8)	.79	3.8 (0.9)	.82
• Cough and raised temperature	3.5 (1.2)		3.3 (1.0)		4.1 (1.0)		3.7 (1.1)	
• Sore throat and raised temperature	3.5 (1.1)		3.3 (0.9)		4.2 (0.9)		3.7 (1.1)	
• A child with earache and raised temperature	3.8 (1.0)		3.7 (0.8)		4.3 (0.8)		3.9 (1.0)	
Perceived self-limiting character	3.6 (0.9)	.67	3.4 (0.7)	.67	2.9 (1.0)	.67	3.3 (0.9)	.70
• Cough better without treatment < 2 weeks	3.7 (1.2)		3.5 (1.0)		2.9 (1.3)		3.4 (1.3)	
• Sore throat better without treatment < 1 week	4.0 (1.1)		3.7 (0.9)		3.2 (1.3)		3.6 (1.2)	
• Earache almost always gets better without treatment within two days	3.1 (1.2)		3.0 (0.9)		2.7 (1.2)		2.9 (1.1)	
Antibiotics speed up recovery	3.3 (1.1)	.83	2.9 (0.7)	.69	3.1 (1.1)	.84	3.1 (1.0)	.82
• Antibiotics speed recovery from coughs	3.1 (1.3)		2.7 (0.8)		2.9 (1.3)		2.9 (1.2)	
• Antibiotics speed recovery from sore throats	3.3 (1.2)		2.8 (1.0)		2.8 (1.3)		3.1 (1.2)	
• Antibiotics speed recovery from earache	3.4 (1.2)		3.1 (1.3)		2.9 (1.3)		3.3 (1.1)	
AB stop deteriorating symptoms	2.9 (1.2)	.86	2.8 (0.8)	.77	2.8 (1.2)	.88	2.8 (1.1)	.85
• Antibiotics stop cough deteriorating	2.6 (1.4)		2.6 (0.9)		2.6 (1.3)		2.6 (1.2)	
• Antibiotics stop sore throats deteriorating	2.8 (1.3)		2.8 (1.0)		2.8 (1.3)		2.8 (1.2)	
• Antibiotics stop earache deteriorating	3.1 (1.3)		3.1 (1.3)		2.9 (1.3)		3.0 (1.2)	
Side effects of antibiotics**	4.0 (1.0)	.66	3.8 (0.9)	.74	4.3 (1.0)	.77	4.0 (1.0)	.74
• Frequent use can cause problems for your health	4.1 (1.0)		3.9 (0.9)		4.5 (0.9)		4.2 (1.0)	
• Frequent use can cause problems for the community	3.7 (1.3)		3.6 (1.1)		4.2 (1.2)		3.9 (1.2)	
A GP is the best person to go	3.6 (1.1)		3.4 (1.0)		4.2 (0.9)		3.8 (1.1)	
Bacteria are an important cause	4.2 (1.0)		3.8 (0.8)		4.1 (0.9)		4.0 (0.9)	

* The answers were ranged as follows: 1: totally disagree to 5: totally agree

** This view is based on two items, so the Pearson correlation coefficient was used in stead of Cronbach's alpha

Discussion

Because we sampled from a small number of practices in each country, our results should be treated cautiously. Belgian respondents perceived a higher need to consult a general practitioner with respiratory tract symptoms and viewed these as more serious and less self-limiting compared to UK and Dutch respondents. This is congruent with respondents' higher reported use of antibiotics, as well as higher national figures for antibiotic prescription in Belgium compared with the UK and the Netherlands and this congruence suggests validity of our data.⁴ There were smaller differences between the UK and Dutch respondents' views as might be expected, given the differences in national antibiotic use.

Countries' health care delivery characteristics, such as having personal patients lists, and the degree of participation of GP's in peer review groups addressing prescribing behaviour, having national guidelines on management and patient education, and physician availability also may contribute to the international variance in views as well as in antibiotic use.⁵ Given the intercorrelation between the clusters of views, patient-directed interventions might fruitfully highlight the benign nature of the vast majority of respiratory tract symptoms, which makes consulting the general practitioner generally unnecessary.

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Chapter 9

Variation in outpatient antibiotic use in three European countries: exploration of possible determinants

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Abstract

Objective: To explore some factors that are probably determinants of differences in outpatient antibiotic use between Belgium, UK and the Netherlands, countries with a high, moderate, and low outpatient antibiotic use.

Methods: The outcome measure was the volume of outpatient antibiotic use, expressed as DDD per 1,000 persons per day. As possible determinants we explored implementation of a quality assurance policy program for GPs on respiratory tract infections, financial dependence on patients, and demographics.

Results: In addition to patients' views about respiratory tract infections and antibiotics, demographics and health care system characteristics seemed to be associated with differences in outpatient antibiotic use in the three countries.

Conclusion: Direct dependence on patients for income might be a risk factor for a higher level of prescribing antibiotics, while a higher degree of peer influence might be a possible moderating factor in prescribing.

Introduction

Most antibiotics in primary care are for respiratory tract infections, while the vast majority of these infections are self-limiting.¹ This over-prescribing of antibiotics wastes money, unnecessarily exposes patients to risk of side effects, encourages re-consulting for similar problems and causes antimicrobial resistance. Several studies have reported a large international variation in outpatient antibiotic use in Europe.^{2,3} The international trend to prescribe more broad-spectrum, newer and more expensive chemotherapeutics^{4,5} and the growing antibiotic resistance problems emphasize the need of implementing guidelines advocating a restrictive antibiotic policy. An awareness of possible determinants of international differences in antibiotic prescribing could help in designing interventions.⁶

Earlier we have shown that patients' views on about respiratory symptoms and antibiotics are moderately associated with variation in antibiotic use (Belgium, UK and the Netherlands, countries with a high, moderate, and low outpatient antibiotic use).⁷ Differences in total pharmaceutical expenditure per capita are not a plausible explanation either (in 1997: Belgium 318\$, United Kingdom 243\$, and the Netherlands 212\$).⁸ This study explores the relationship between primary care characteristics and demographics on the one hand and outpatient antibiotic use on the other hand in these three countries in 2001.

Methods

For primary care characteristics we selected the degree of implementation of a *quality assurance policy* program for GPs on respiratory tract infections, including national guidelines for managing acute respiratory tract infections in primary care and participating in structured pharmacotherapy peer review groups.⁹ Furthermore we explored whether GPs were directly *financially dependent on patients* (e.g. paid by fee for service rather than salaried). These indicators (in 2001) were identified by literature review and authors' expertise on primary care characteristics in their respective countries. The percentage of persons 60 years and over was selected as possible *demographic* determinant, because medical consumption of the elderly is known to be relatively high. This latter indicator was extracted from WHO data.¹⁰

The *outcome measure* was the volume of outpatient antibiotic use, expressed as DDD per 1,000 persons per day in Belgium, UK, and the Netherlands. We obtained these data for 2001 from European Surveillance of Antimicrobial Consumption (ESAC).¹¹

Results

In Belgium, the UK and the Netherlands the outpatient antibiotic use in 2001 was respectively 24, 14 and 10 DDD per 1,000 persons per day (Table 1). The percentage of persons aged 60 and over was highest in Belgium and lowest in the Netherlands, with the UK in-between. In 2001 the Netherlands had more national guidelines for managing respiratory tract infections in primary care (acute otitis media, sore throat, and sinusitis) than the UK (none) and Belgium (sore throat). And, the degree of participation in structured pharmacotherapy peer review groups was estimated to be high among Dutch GPs, moderate among British and low among Belgian GPs. So, in 2001, the Netherlands had a more tight peer-led quality assurance structure and program in this field than Belgium and the UK. The number of general practitioners per 1,000 persons was lowest in the Netherlands, a little higher in UK, while Belgium had four times the Dutch number. Combined with the fact that Belgium had a fee for service system, while the

Table 1. Use of drugs, health care system characteristics, and demographics in 2001 of Belgium, United Kingdom (UK) and the Netherlands (NL)

	Belgium	UK	NL
<i>Use of drugs</i>			
DDD outpatient use of antibiotics per 1,000 persons per day	24	14	10
<i>Quality assurance policy</i>			
National guidelines primary care concerning acute respiratory tract infections	Sore throat '98	None	Sore throat '90 AOM '92 Sinusitis '93
Pharmacotherapy peer review groups (degree of participation)	-	±	+
<i>Financial dependence on patients</i>			
Number of GPs/1,000 persons	1.9	0.60	0.48
Fee for service	+	±	±
Practice patient list	±	+	+
<i>Demographics</i>			
% persons of 60 years and over	22.2	20.7	18.4

Netherlands and UK had a predominantly fee for capitation system with enlisted patients, direct financial dependence of GPs on patients was highest in Belgium compared with UK and the Netherlands.

Discussion

The results suggest that Dutch GPs' prescribing might have been more driven by professional standards, while Belgian GPs were more influenced by patients' demands, with the British GPs positioned in between. We hypothesise that being more directly dependent on patients for income might be a risk factor for higher outpatient antibiotic use prescribed by GPs, while a higher degree of professional influences might be a possible moderating factor.⁹

If this holds true, increasing the influence of peers, for instance by improving quality assurance policy, and decreasing the direct financial dependence of GPs on patients might lead to prescribing behaviour in accordance with professional guidelines i.e. a reduction in antibiotic prescribing. This conclusion is in accordance with Canadian findings that fee for service physicians were more likely to prescribe antibiotics at rates above the median than their salaried counterparts.¹²

This study has limitations. First, we only explored three countries, because we studied patients' views in these three countries.⁷ So this study is an endeavour to analyse cross-cultural differences in prescribing from an interdisciplinary point of view. The relative importance of these factors cannot be shown, because the strength of the association with the outcome variable is unknown. These results show the need for a more extensive international study relating to the role of peers and dependence on patients in prescribing antibiotics.

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Chapter 10

General discussion

Patients frequently suffer from respiratory tract (RT) symptoms such as cough, sore throat and earache, mostly caused by acute infections.¹ Because these infections generally resolve spontaneously and antibiotics seldom speed up the recovery,²⁻¹¹ most people do not need to visit a general practitioner (GP) for RT symptoms and, if they do, antibiotics are seldom required. However, many patients do visit their GP for these symptoms and GPs do prescribe more antibiotics than is justified according to evidence-based medicine.^{12,13} In addition, the differences in prescribing behaviour between countries are substantial.^{14,15}

Non-medical factors, such as the GP's perceived pressure from the patients, are important in the decision whether or not to prescribe antibiotics. Patients' expectations are mainly based on their views regarding the natural course of RT infections, the effectiveness of antibiotics in reducing symptoms or preventing deterioration, and on the side-effects of antibiotics. A better insight in patients' and GPs' views on RT symptoms and antibiotics might be fruitful to set up and target implementation strategies and quality assurance programmes to improve antimicrobial management in general practice.

Therefore, the main focus of the studies presented in this thesis was to explore patients' and GPs' views on RT symptoms and antibiotics as possible determinants (amongst others) of illness behaviour, antibiotic prescribing, and differences in outpatient antibiotic prescribing between countries.

Role of patients' views and patient characteristics in visiting the GP and getting antibiotics prescribed

In studies on chronic diseases, patients' views regarding the identity of the illness, its course, possibilities to control it and its causes, are known to play an important role in illness behaviour and the doctor-patient relationship.¹⁶⁻¹⁸ The work presented in this thesis has shown that these views also play a role in self-limiting illnesses such as RT episodes; i.e. patients who perceive their symptoms as more serious and less endorse the view that RT symptoms are self-limiting, are more likely to visit their GP for these symptoms. Obviously, anxiety and worry play an important role in deciding to visit the GP.

In addition, other determinants of visiting a GP for RT symptoms are: being aged 65 years and over, having chronic respiratory co-morbidity, duration of symptoms more than two weeks, and being cued by others (lay referral system). The elderly may be more worried about their susceptibility for a problematic course of their symptoms. Since higher age is related to an elevated risk for complications, the elderly will often rightfully contact their doctor. This may also be the case for patients with respiratory co-morbidity. For young and healthy patients,

however, for the vast majority of RT symptoms there is no reason to worry. Most of these patients only need to be informed about the self-limiting character of RT symptoms, which require medical attention only in case of alarm symptoms such as shortness of breath, coughing up blood, great difficulty in swallowing, and being very ill.¹⁹ In addition to this, some subgroups of patients suffering from RT symptoms may indeed have a higher risk for a complicated course of RT symptoms; therefore, more studies on such subgroups are needed.

Next, it should be emphasised that, in case a patient does visit the GP for RT symptoms, it is important that the GP explores patient's worry, views and expectations. Asking the patients whether they are worried, why they are worried, and whether somebody prompts them to visit the GP can reassure the patients that their GP takes them seriously. Moreover, such discussions about the patient's views and expectations during the visit may help to avoid misinterpretation and to enhance shared decision making.²⁰⁻²²

Smokers with RT symptoms tend to fall into a different category: although they are more likely to suffer from RT symptoms,²³ they visit their GP less frequently for such symptoms. Apparently, smokers consider their symptoms as "normal" side-effects of smoking and tend to avoid visiting their GP also because don't want a 'lecture'. There is some evidence that smokers more frequently have a complicated course of RT symptoms, so from that viewpoint it might be necessary to visit their GP.²⁴ Moreover, smokers are known to be more prone to develop COPD.²⁵ If smokers with RT symptoms do not visit their GP e.g. persistent cough, they may not be diagnosed as a COPD patient and may thereby be deprived of appropriate therapy and assistance with lifestyle changes. Therefore, public campaigns targeted at smokers with persistent cough could enhance smokers' inclination to visit their GP.

The patient's view on the need for antibiotics in case of inflammation signs (e.g. green phlegm) and less concern for the side-effect of antibiotics -both widespread views among patients-,²⁶ proved to be independently associated with getting antibiotics prescribed when a patient visits the GP. These views probably support patients' expectations and, indirectly, their GP's decision to prescribe antibiotics. Therefore, patient education should focus on the self-limiting character of most RT symptoms, and on the minimal significance of a single sign of inflammation; this information can be made available by the GPs and public media campaigns.

Role of GP's views and GP characteristics in the management of RT episodes

The GP's endorsement of the view that antibiotics are needed in case of inflammation signs (such as white spots in the throat) is important: the more the GP endorses this view the more antibiotics he or she prescribes for RT episodes/1,000 patients/year, and a patient whose GP

endorses this view is more likely to get antibiotics when visiting the GP for an RT episode. Moreover, GPs are more likely to prescribe antibiotics for RT symptoms when they endorse the view that antibiotics are effective for RT symptoms, when the patient has fever, and also the patient is a smoker. However, none of the Dutch national guidelines for RT symptoms stipulate a single inflammation sign (e.g. fever or white spots in the throat) as a reason to prescribe antibiotics, except for coughing adults with fever aged 75 years and over.¹⁹ Further, smokers more often have antibiotics prescribed than non-smokers. Although there are indications that smokers more frequently have a complicated course of the illness, it has not been established that antibiotics prevent deteriorating RT infections in smokers. Therefore, GPs have to be aware that neither a single inflammation sign nor smoking by itself are sufficient reason to prescribe antibiotics in case of RT symptoms.²⁴

The tendency to label RT episodes as infections [e.g. ICPC code R78 (acute bronchitis)] instead of as symptoms [e.g. ICPC code R05 (cough)], is an independent determinant of the volume of antibiotics prescribed for RT episodes. This phenomenon has also been reported by others.²⁷⁻³⁰ Because the incidence of the different RT infections presumably does not vary considerably between GP practices, the variation in labelling RT episodes as infections might indicate that diagnostic labelling is an arbitrary process that is not governed by objective rules, but is influenced by reasons of therapeutic justification. Some argue that GPs should label RT episodes more as symptoms and only label these episodes as infections in case a bacterial infection that needs antibiotic treatment is suspected. However, not all bacterial infections need antibiotic treatment. Therefore, GPs should label RT episodes as infections when any type of infection is suspected. At the same time they should realise that only a minor proportion of all RT infections do warrant antimicrobial therapy.

The vocational and postgraduate training of GPs needs to emphasise the correct indications for prescribing antibiotics in case of RT symptoms. Structured peer review groups combined with (postgraduate) education of GPs are suitable methods to implement such recommendations.³¹

The inclination of GPs to prescribe new drugs is associated with the volume of second-choice antibiotics, such as co-amoxyclav, chinolones and macrolides. Since the tendency to prescribe new drugs is strongly correlated with receiving visits from pharmaceutical representatives (Pearson's r 0.47; $p < 0.01$), a mutual reinforcement probably exists between these factors: the inclination to prescribe new drugs influences seeing pharmaceutical representatives, and seeing them may enforce this inclination.³² Therefore, GPs should avoid visits from pharmaceutical representatives in the practice setting and should restrict themselves

to discussing new developments in pharmacotherapy in, e.g., pharmacotherapy peer review groups together with pharmacists.³¹ Pharmaceutical representatives could play a role in such review groups if the pharmaceutical industry is prepared to modify its rather subjective input.

GPs might be less concerned about patient dissatisfaction if they do not prescribe antibiotics. This study corroborates the results of earlier studies which showed that GPs overestimate the influence of prescribing on patient satisfaction.^{31,33-35} Because patients are worried about their RT symptoms, they want to be taken seriously, e.g. they want their ears, throat and lungs examined by otoscope, penlight or stethoscope. Because patients need appropriate information and reassurance about their symptoms, they are keen to be examined, informed and reassured when they visit their GP for RT symptoms. Although examining patients may also attribute to the patients' satisfaction, physical examination might be a trigger to revisit the GP on subsequent occasion. Therefore, the GP should explain to patients that for these symptoms, next time the patient could 'wait and see' instead of visiting the GP.

In our study, GP-related determinants do not play an important role in the patient's decision to visit the GP for RT symptoms. Another Dutch study suggested that since the publication of national guidelines RT incidence rates have decreased.³⁶ One of the possible explanations of these different outcomes might be a difference in methods: our study had a transversal design (including a single RT episode), while the other Dutch study had a longitudinal design (comparing RT incidences in 1987 and 2001). Efforts to implement national guidelines for diagnosis and management in the last decade may indeed have influenced patients' illness behaviour. Nevertheless, public campaigns aimed at the public related to these national guidelines are probably still needed. If patients are aware that visiting a GP and getting antibiotics in case of RT episodes is generally not necessary in most cases (as is also stated in these guidelines), this could influence illness behaviour of patients with RT symptoms.

Differences in views between patients, GPs and practice assistants

Our study showed that patients more than GPs endorse the seriousness of RT symptoms, the need to consult a GP for these symptoms, the need to prescribe antibiotics for RT symptoms and the ability of antibiotics to speed up recovery. Patients less than GPs endorsed the self-limiting character of RT symptoms. These differences emphasise the importance of exploring patients' views when they visit their GP; GPs have to be aware that the patient's views on RT symptoms and antibiotics are probably different from their own. Perhaps the GP should specifically ask why the patient visited the GP, and whether or not the patient assumes that antibiotics are needed. Although GPs have been instructed to do this, it seems to be difficult to implement this

strategy in daily routine.³⁷ That is unfortunate, because this might serve to avoid misperceptions, make explanations more effective, allow consensus to be reached and avoid inappropriate prescribing of antibiotics.²⁰⁻²²

The role of the practice assistants in the intake and triage procedures in Dutch general practice has increased in importance. Generally, they are the first persons to speak with patients suffering from RT symptoms and they may decide whether to give advice or arrange a consultation with the GP. Practice assistants tend to take a position between patients and GPs in most of the views related to RT symptoms and antibiotic prescribing. Therefore, more consensus is needed between practice assistants' and GPs' views in order to enhance more uniform disease management among practices. To achieve this, quality assurance programs related to the management of RT symptoms according to national guidelines.¹⁹ Moreover, encouraging the assistant to use the Telephone Guide of the Dutch College of GPs (developed for intake and triage procedures) might enable a more rational use of GP antibiotic management, as has been extensively introduced in Dutch GP centres for out-of-hours services.^{38,39} Furthermore, all healthcare workers in general practice could be invited to join the pharmacotherapy peer review groups to discuss topics that are relevant to their areas of expertise.

Prescribing antibiotics; an international perspective

Because of the striking international differences in the volume of outpatient antibiotic prescribing, we explored possible determinants for this difference by comparing Belgium, UK and the Netherlands. Differences in outpatient antibiotic use can only partially be explained by differences in patients' views. For example, Belgian respondents perceive a higher need to consult a GP for RT symptoms and view these as more serious and less self-limiting compared with their British or Dutch counterparts.

Investigation of other possible determinants of European differences in outpatient antibiotic use (such as demographics, quality assurance policy, and financial dependence on patients) indicate that Dutch GPs' prescribing habits are more influenced by professional standards, whereas Belgian GPs are more influenced by patients' demands, with the British GPs positioned in between. Thus, being more directly dependent on patients for income might be a risk factor for higher outpatient antibiotic use prescribed by GPs,⁴⁰ while a higher degree of professional influence might be a moderating factor.

Therefore, increasing the influence of peers (e.g. by improving quality assurance policy) and decreasing the direct financial dependence of GPs on patients might result in prescribing behaviour being more in accordance with professional guidelines, i.e. a reduction in antibiotic prescribing. Consequently, introducing patient lists for GPs, with emphasis on fee for capitation instead of fee for service in primary care, and financial government support to implement national guidelines for GPs in primary care and to establish and maintain (pharmacotherapeutical) peer review groups might enhance a rational antimicrobial management. From this viewpoint current trends in the Netherlands to introduce market principles into health care, to discuss the need for patient lists, and to reduce government expenditure on quality assurance programs are, to put it mildly, unwise.

Practice implications and directions for future research

Implications for daily practice

- Because patients who visit their GP for RT symptoms are probably worried about their symptoms, the GP should explore the patients' concerns, especially if they have been cued by others. Moreover, the GP should explore the patients' views on the need of antibiotics by simply asking whether he or she expects antibiotics and, if so, why they consider antibiotics to be necessary.
- GPs might be made aware that patients' satisfaction with the visit does not depend on prescribing antibiotics but first of all on taking them seriously, e.g. not only by taking a medical history but also by using a stethoscope, penlight or otoscope to make an examination in case of ear, throat and cough symptoms and by giving appropriate information and explaining the disease symptoms, course and management.
- To ensure uniform management of RT symptoms in general practice consensus on views concerning RT symptoms and antibiotic prescribing between GPs and other healthcare professionals is desirable. This can be reached by discussing these topics in practice meetings. Implementing the use of protocols like the Telephone Guide of the Dutch College of General Practitioners (NHG) may improve intake and triage procedures in general practice. The participation of all health professionals in general practice in peer review groups should be considered.
- In order to avoid needless information on new drugs, GPs should stop to see pharmaceutical representatives. Latest information could be acquired from, e.g. postgraduate training programs that not are organised by the pharmaceutical industry, and discuss pharmacotherapy in peer review groups.

Implications on (inter)national level

- To improve the patient's knowledge about RT episodes, public media campaigns might focus on the self-limiting character of most RT symptoms, the minimal therapeutic importance of inflammation sign like green phlegm and white spots in the throat, and of the meaning of alarm symptoms such as shortness of breath, coughing up blood and great difficulty in swallowing. Public campaigns should also target smokers who have a persistent cough to encourage them to visit the GP to get individual information and advice.
- Vocational and postgraduate training of GPs, based on the national guidelines, needs to convey the appropriate indications to prescribe antibiotics in case of RT symptoms. Special attention should be paid to indications for antibiotic treatment and selection of first-choice drugs.
- Quality assurance programs should be introduced that focus on educating practice assistants, in collaboration with organisations of both GPs and practice assistants. Such programs should also promote consensus and mutual understanding between all healthcare professionals in general practice.
- The pharmaceutical industry could reconsider their policy to support GPs by ceasing to send pharmaceutical representatives to the GP's practice and by participating in objective peer-led education.
- To promote prescribing behaviour in accordance with professional guidelines (i.e. to reduce antibiotic prescribing) direct financial dependence of GPs on patients should be avoided.
- Patient lists for GPs combined with fee for capitation instead of fee for service might increase independence of patients and thus may lead to a more rational antibiotic prescribing.
- To establish national quality assurance programs for RT infections, to implement national guidelines and to promote pharmacotherapy peer review groups, healthcare assurance companies and government have to cooperate with national GP associations in a joint effort.
- From the viewpoint of the European unification and the ever-increasing number of patients who travel locally and abroad, national guidelines and policies on diagnostics and management in primary care could be standardised on European level as much as possible.

Directions for future research

- Because it is not entirely clear which groups of patients are prone to a complicated course of an RT infection, longitudinal studies on subgroups are needed to explore the relative risks, with particular focus on the elderly and smokers.
- Since diagnostic labelling is an arbitrary process (probably influenced by reasons of therapeutic justification) diagnostic labelling (e.g. according to the ICPC) in research has to be handled with some caution.
- A more extensive study is needed to assess the determinants of differences in European antibiotic prescribing and their relative importance. This study should include factors of both peer dependence and patient dependence in addition to personal and clinical factors.

On the end of this thesis I have looked back to see whether I have got answers on the questions that triggered me to start these studies. I have discovered that practice assistants in general differ from GPs in views about RT symptoms and antibiotics. Thus I probably differ with my practice assistants in these views too. This matters, because implementation of evidence-based guidelines in general practice has to be supported by all staff members in practice. Therefore consensus in views on RT symptoms and antibiotics between all health workers in my practice is needed.

I have also discovered that patients differ from GPs in these views and so I probably differ from my patients in these views in most cases. That matters because patients might have unvoiced agendas and expectations when they visit me. I need to explore their worries and expectations even more than I have already tried to do. I have to be conscious that their spouses and relatives have cued them to visit me. It is sensible to explore these reasons for encounter to supply more effective patient information.

Next, I have learned that I should use my stethoscope and otoscope more frequently to take my patients seriously, perhaps even when this use is medically not necessary. Finally, I am strengthened in my refusal to see pharmaceutical representatives.

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Summary

Chapter 1: General introduction

Respiratory tract (RT) symptoms such as cough, sore throat and earache are common, and the vast majority of these RT symptoms are caused by acute infections which are of viral origin and self-limiting. Most people have one or more of these symptoms each year and many of them subsequently visit their general practitioner (GP) for it. Despite the self-limiting character of most RT symptoms, each year in the Netherlands a GP is visited for these RT symptoms about 250 times per 1,000 patients and antibiotics are prescribed in about one out of every three RT episodes. A further rationalisation of antibiotic use by GPs is indicated, while overprescribing and inappropriate prescribing of antibiotics yields unnecessary costs, risk of side-effects, unnecessary utilisation of health services, encouraging patients to re-consult their GP for subsequent RT episodes, and development of antimicrobial resistance.

It is well established that a patient's decision to contact the GP, and the GP's management decisions taken during consultations are influenced by both the patients' and the GPs' views on certain topics and by the way in which patients and GPs communicate with each other. A better insight in patients' and GPs' views might be fruitful to target implementation strategies and quality assurance programmes to improve antimicrobial management in general practice. Thus, the main focus of the studies presented in this thesis was to explore patients' and GPs' views on RT symptoms and antibiotics as possible determinants (amongst others) of illness behaviour, antibiotic prescribing, and international differences in outpatient antibiotic use.

Chapter 2: Patients' and doctors' views on respiratory tract symptoms

In this chapter a pilot study is presented which explored patients' and GPs' views on RT symptoms and antibiotics. This study aimed at the development of a questionnaire to measure different dimensions of views, including the perceived self-limiting character, the need to consult a GP, the need of antibiotics, and the effectiveness of antibiotics (all in case of RT symptoms). Questionnaires of 51 patients attending a general practitioner, 38 patients in the community and 7 general practitioners were analysed. Patients less than doctors endorsed the self-limiting character of cough, sore throat and earache and patients -much more than doctors- rated antibiotics as being necessary for cough and sore throat and believed that antibiotics speed recovery. However, there was little difference relating to the necessity to see a doctor after some time period.

Chapter 3: Views on respiratory tract symptoms and antibiotics of Dutch general practitioners, practice staff and patients

A more elaborate study regarding differences in the views of patients, practice staff and GPs on RT symptoms and antibiotics is described in chapter 2. In this study -embedded in the Second Dutch National Survey of General Practice (DNSGP-2)- 181 GPs, 204 practice staff members and 1250 patients from 90 practices participated by answering items relating to views on RT symptoms and antibiotics in a written questionnaire. Patients more than GPs endorsed the seriousness of RT symptoms, the need to consult a GP, the need to prescribe antibiotics, and the ability of antibiotics to speed up recovery. GPs were more than patients convinced of the self-limiting character of RT symptoms and of the fact that antibiotics have side effects. Practice staff took a middle ground in most of these views. This means that differences between GPs, practice staff and patients must be taken into account when exploring patients' complaints and advising on treatment. Education and knowledge programmes for practice staff might be advocated.

Chapter 4: Cough, sore throat and earache: who visits the general practitioner?

The study presented in chapter 4 addressed the determinants of visiting the GP for recent cough, sore throat and earache. Characteristics of 7,057 patients and 163 GPs in 85 practices as well as morbidity data were derived from the DNSGP-2. Patients' symptoms and illness behaviour were measured by a health interview survey and an additional written questionnaire. Of the 7,057 patients, 1,083 (22%) reported cough, sore throat or earache in the two weeks preceding the interview, and, of these, 250 visited their GP. Those aged 65 and over, those with respiratory co-morbidity, who suffered from symptoms for more than two weeks, who were cued by others to visit a GP, who perceived their symptoms as more serious, and who less endorsed the self-limiting character of RT symptoms, more frequently visited their GP. This study showed that the main (medical and non-medical) determinants of visiting the GP for RT symptoms have not been changed in the last decade, despite the implementation of national guidelines for RT infections and the fall in incidence of presented RT symptoms. No GP-related determinants were associated with the patients' decisions to visit their GP.

Chapter 5: Cough, sore throat and earache: who gets antibiotics and who is satisfied?

The objective of this study was to explore determinants of antibiotic treatment and determinants of patients' satisfaction with their visit to the GP for cough, sore throat or earache. Characteristics and morbidity data of the 250 patients who visited their GP for cough, sore throat or earache, as described in chapter 4, and characteristics of their GPs were derived from DNSGP-2.

Characteristics of the symptoms, GPs' management and patients' satisfaction were measured by an additional written questionnaire. In total 97 patients (40%) were prescribed antibiotics. More likely to get antibiotics were smokers, patients with fever, those who more strongly endorsed the need of antibiotics in case of green phlegm, those who were less concerned about side-effects of antibiotics, and those with a GP who more strongly endorsed the effectiveness of antibiotics and the need of antibiotics in case of white spots in the throat. About 75% was satisfied with the GP; patients who perceived their RT symptoms to be less serious, who reported that they were carefully examined by their GP, and whose GP more strongly endorsed the effectiveness of antibiotics were more likely to be satisfied. Thus, GPs and patients still need to be better informed about the limited significance of single inflammation signs (e.g. fever and green phlegm) as an indication for antibiotics, while carefully examining the patient may contribute to patient satisfaction.

Chapter 6: Diagnostic labelling and prescribing of antibiotics for respiratory tract episodes

In this chapter a study is described that aimed to assess the association between diagnostic labelling (i.e. GP's inclination to label episodes as infections rather than as symptoms), the number of presented RT episodes and other possible GP-related determinants on the one hand, and the volume of antibiotic prescribing on the other. Morbidity and antibiotic prescription data of 163 GPs from 85 Dutch practices, serving a population of 359,625 patients originated from the DNSGP-2. GPs' characteristics, including professional activities and views on RT symptoms and antibiotics were measured by a written questionnaire. A total of 275.9 RT episodes/1,000 patients were registered. GPs labelled about 70% of all RT episodes as infections, and antibiotics were prescribed in 39% of all RT episodes. A higher incidence of RT episodes, a stronger inclination to label episodes as infections, a stronger endorsement of the need of antibiotics in case of white spots in the throat, and practicing in a rural area were independent determinants of the prescribed volume of antibiotics for RT episodes, whereas diagnostic labelling was not correlated with the number of presented episodes. In the aim for more rational antibiotic prescribing more attention should be paid to evidence-based indications, because signs of inflammation are probably being overvalued.

Chapter 7: Determinants of prescribing of second-choice antibiotics for upper and lower respiratory tract episodes in Dutch general practice

In order to assess the association between GPs' characteristics and the volume of second-choice antibiotics for RT episodes, data of the 163 GPs described in chapter 6 were further analysed. In

about 39% of RT episodes antibiotics were prescribed, with one-quarter being second-choice antibiotics, relatively more frequently in lower than in upper RT episodes: 30 versus 19%. GPs who were more frequently consulted by patients with RT episodes, who labelled RT episodes more as diagnoses than as symptoms, who less frequently used national GP guidelines, and who were more inclined to prescribe new drugs, prescribed more second-choice antibiotics. Given the growing number of prescriptions of second-choice antibiotics, it is important to implement professional guidelines in daily practice, while training in being reluctant to prescribe new drugs and being alert on marketing activities of pharmaceutical companies should be started in the medical curriculum.

Chapter 8: Patients' views on respiratory tract symptoms and antibiotics; an international comparison

The study in chapter 8 explored patients' views on RT symptoms and antibiotics in Belgium, UK and the Netherlands, i.e. three countries with respectively high, moderate and low antibiotic prescription. Views on RT symptoms of 687 randomly selected patients from four practices in each country were measured. Belgian respondents had a higher inclination to consult the GP with RT symptoms and perceived these symptoms as more serious than UK and Dutch respondents, but less self-limiting. There were lesser differences in views concerning antibiotics. Belgian respondents endorsed most strongly that antibiotics have side effects. These differences might partly explain differences in levels of antibiotic prescribing, although they might also reflect the countries' health care systems. Patient education should focus on the benign nature of the vast majority of RT symptoms making consultation generally unnecessary rather than on side effects of antibiotics.

Chapter 9: Variation in outpatient antibiotic use in three European countries: exploration of possible determinants

This chapter presents a study in the same three countries (Belgium, UK and the Netherlands) that describes -besides differences in patients' views on RT and antibiotics- other possible reasons for the differences in antibiotic prescribing in Europe. In addition to patients' views about RT infections and antibiotics, demographics and health care system characteristics were associated with differences in outpatient antibiotic use in the three countries. Thus direct dependence on patients for income might be a risk factor for a higher level of prescribing antibiotics, while a higher degree of peer influence might be a possible moderating factor in prescribing.

Chapter 10: General discussion

The main results were discussed in the last chapter. The work presented in this thesis has shown that patients' views play a role in RT episodes. Therefore, it is important that the GP explores patient's views to avoid misinterpretation and to enhance shared decision making. Next to this, patients' views probably support their GP's decision to prescribe antibiotics. This thesis also showed that GP's views are important in the management of RT episodes; GPs have to be aware that neither a single inflammation sign nor smoking by itself are sufficient reason to prescribe antibiotics in case of RT symptoms.

Our finding that the tendency to label RT episodes as infections is a determinant of the volume of antibiotics prescribed for RT episodes might indicate that diagnostic labelling is influenced by reasons of therapeutic justification. GPs should label RT episodes as infections when any type of infection is suspected, realising that only a minor proportion of all RT infections do warrant antimicrobial therapy. The inclination of GPs to prescribe new drugs is associated with the volume of second-choice antibiotics. Since this tendency is strongly correlated with seeing pharmaceutical representatives, GPs should avoid visits from pharmaceutical representatives in the practice. GPs might be less concerned about patient dissatisfaction if they do not prescribe antibiotics; satisfaction is probably more influenced by taking patients seriously.

Our studies revealed that practice assistants tend to take a position between patients and GPs in most of the views related to RT symptoms and antibiotic prescribing. Therefore, more consensus is needed between practice assistants' and GPs' views in order to enhance more uniform disease management among practices. To achieve this, quality assurance programs might help to increase consensus and mutual understanding between GPs and practice assistants.

Finally, our studies showed that international differences in outpatient antibiotic use can only partially be explained by differences in patients' views. Exploration of other possible determinants indicate that being more directly dependent on patients for income might be a risk factor for higher outpatient antibiotic use, while a higher degree of professional influence might be a moderating factor. On the end of this chapter practice implications and directions for future research are given.

Samenvatting

Hoofdstuk 1: Algemene introductie

Luchtwegklachten als hoesten, keelpijn en oorpijn komen veelvuldig voor. De overgrote meerderheid van deze klachten wordt veroorzaakt door acute infecties van virale aard die vanzelf overgaan. De meeste mensen hebben jaarlijks een of meerdere malen dergelijke klachten en velen bezoeken hiervoor dan hun huisarts. Ondanks het feit dat luchtwegklachten meestal vanzelf overgaan, wordt de huisarts jaarlijks ongeveer 250 keer per 1.000 patiënten bezocht voor luchtwegklachten, terwijl antibiotica worden voorgeschreven in een op de drie episoden met luchtwegklachten. Het is nodig dat huisartsen antibiotica meer rationeel gaan voorschrijven, omdat overprescriptie en onjuist voorschrijven van antibiotica zorgen voor onnodige kosten, risico's op bijwerkingen, onnodig gebruik van de gezondheidszorg, het aanmoedigen van patiënten om hun huisarts tijdens een volgende episode met luchtwegklachten weer te raadplegen en het ontwikkelen van resistentie tegen antimicrobiële middelen.

Vast staat dat de beslissing van een patiënt om contact te leggen met de huisarts en de beslissingen van de huisarts tijdens het consult worden beïnvloed door opvattingen van zowel patiënten als huisartsen en door de wijze waarop patiënten en huisartsen met elkaar communiceren. Een beter inzicht in de opvattingen van patiënten en huisartsen zou kunnen leiden tot een verbetering van implementatiestrategieën en kwaliteitsprogramma's met het oog op het beleid bij luchtweginfecties. Daarom was de kern van de onderzoeken die in dit proefschrift worden gepresenteerd het exploreren van opvattingen van patiënten en huisartsen over luchtwegklachten en antibiotica als mogelijke determinanten van ziektegedrag, voorschrijven van antibiotica en internationale verschillen in antibioticagebruik buiten het ziekenhuis.

Hoofdstuk 2: Opvattingen over luchtwegklachten van patiënten en dokters

In dit hoofdstuk wordt een pilot gepresenteerd waarbij opvattingen over LWK en antibiotica van patiënten en dokters worden geëxploreerd. Deze studie had tot doel een vragenlijst te ontwikkelen waarmee verschillende dimensies van opvattingen konden worden gemeten: zoals de veronderstelling dat luchtwegklachten vanzelf overgaan, de noodzaak om bij deze klachten de dokter te raadplegen, de noodzaak antibiotica voor deze klachten voor te schrijven en de veronderstelde effectiviteit van antibiotica. Vragenlijsten van 51 patiënten die een huisarts bezochten, 38 patiënten uit de bevolking en 7 huisartsen werden geanalyseerd. Patiënten onderschreven de opvatting dat klachten als hoesten, keelpijn en oorpijn vanzelf overgaan minder dan dokters en patiënten vonden veel meer dan dokters dat antibiotica voor hoesten en keelpijn noodzakelijk zijn en dat antibiotica genezing hiervan versnellen. Er waren echter

weinig verschillen met betrekking tot de veronderstelde noodzaak een dokter na een bepaalde tijdspanne te raadplegen.

Hoofdstuk 3: Opvattingen over luchtwegklachten en antibiotica van Nederlandse huisartsen, praktijkassistentes en patiënten

Een uitgebreider onderzoek naar verschillen in opvattingen van patiënten, praktijkassistentes en huisartsen over luchtwegklachten en antibiotica wordt beschreven in hoofdstuk 2. Aan dit onderzoek -ingebod in de Tweede Nationale Studie naar ziekten en verrichtingen in de huisartsenpraktijk (NS2)- namen 181 huisartsen, 204 praktijkassistentes en 1250 patiënten van 90 praktijken deel door in een schriftelijke vragenlijst antwoord te geven op items met betrekking tot opvattingen over luchtwegklachten en antibiotica. Patiënten onderschreven de ernst van luchtwegklachten, de noodzaak een huisarts te raadplegen, de noodzaak antibiotica voor te schrijven en het vermogen van antibiotica om genezing te versnellen meer dan huisartsen. Praktijkassistentes namen bij de meeste van deze opvattingen een middenpositie in. Dit betekent dat rekening moet worden gehouden met verschillen in opvattingen tussen huisartsen, praktijkassistentes en patiënten wanneer de klachten van patiënten geëxploreerd worden en wanneer wordt geadviseerd over de behandeling. Nascholing voor praktijkassistentes zou bevorderd moeten worden.

Hoofdstuk 4: Hoesten, keelpijn en oorpijn: wie bezoekt de huisarts?

Het onderzoek dat wordt gepresenteerd in hoofdstuk 4 richtte zich op de determinanten van het bezoeken van de huisarts voor recente klachten van hoesten, keelpijn en oorpijn. Zowel kenmerken van 7057 patiënten en 163 huisartsen uit 85 praktijken als morbiditeitgegevens waren afkomstig van de NS2. Klachten en ziektegedrag van patiënten werden gemeten door middel van een mondeling gezondheidsinterview en een toegevoegde schriftelijke vragenlijst. Van de 7057 patiënten rapporteerden 1083 (22%) klachten van hoesten, keelpijn of oorpijn in de twee weken voorafgaand aan het interview en hiervan bezochten 250 patiënten hun huisarts. Patiënten van 65 jaar of ouder, met respiratoire co-morbiditeit, die langer dan twee weken klachten hadden, die waren aangespoord door anderen om de huisarts te bezoeken, die hun klachten als ernstiger ervoeren en die minder veronderstelden dat luchtwegklachten vanzelf overgaan, bezochten vaker hun huisarts. Dit onderzoek toonde aan dat de belangrijkste (medische en niet medische) determinanten van het bezoek aan de huisarts voor luchtwegklachten niet zijn veranderd in de laatste tien jaar, ondanks de implementatie van NHG-standaarden voor luchtwegklachten en de daling in incidentie van gepresenteerde

luchtwegklachten. Er waren geen huisartsgerelateerde determinanten geassocieerd met de beslissing van patiënten om hun dokter te bezoeken.

Hoofdstuk 5: Hoesten, keelpijn en oorpijn: wie krijgt antibiotica en wie is tevreden?

Het onderwerp van dit onderzoek was het exploreren van determinanten van antibioticabehandeling en determinanten van de tevredenheid van patiënten over het consult bij de huisarts voor hoesten, keelpijn of oorpijn. Kenmerken en morbiditeitgegevens van 250 patiënten die het spreekuur van hun huisarts bezochten voor hoesten, keelpijn of oorpijn, zoals beschreven in hoofdstuk 4, en kenmerken van hun huisartsen waren afkomstig van de NS2. Kenmerken van de klachten, het beleid van de huisartsen en de tevredenheid van de patiënten werden gemeten door middel van een schriftelijke vragenlijst. In totaal kregen 97 patiënten (40%) antibiotica voorgeschreven. Patiënten met koorts, patiënten die rookten, patiënten die de noodzaak van antibiotica in geval van groen slijm meer onderschreven, patiënten die minder bezorgd waren over bijwerkingen van antibiotica en de patiënten met een huisarts die de effectiviteit van antibiotica en de noodzaak van antibiotica in het geval van witte stippen in de keel meer onderschreven, kregen vaker antibiotica voorgeschreven. Ongeveer 75% was tevreden over de huisarts. Patiënten die hun klachten als minder ernstig ervoeren, die aangaven zorgvuldig door hun huisarts te zijn onderzocht en patiënten met een huisarts die meer overtuigd was van de effectiviteit van antibiotica, waren vaker tevreden. Het is derhalve nog steeds nodig huisartsen en patiënten beter te informeren over de beperkte betekenis van op zichzelf staande tekenen van een ontsteking (zoals koorts en groen slijm) als een indicatie voor het voorschrijven van antibiotica, terwijl zorgvuldig onderzoek van de patiënt bij kan dragen tot tevredenheid van de patiënt.

Hoofdstuk 6: Diagnostisch labelen en het voorschrijven van antibiotica voor luchtwegepisoden

In dit hoofdstuk wordt een onderzoek beschreven dat ten doel had om de associatie vast te stellen tussen diagnostisch labelen (d.w.z. de neiging van de huisarts om episodes meer als infecties dan als klachten te labelen), het aantal gepresenteerde luchtwegklachten en andere mogelijke huisartsgerelateerde determinanten enerzijds en het volume voorgeschreven antibiotica anderzijds. Gegevens over morbiditeit en antibioticaprescriptie van 163 huisartsen uit 85 Nederlandse praktijken, waarbij 359.625 patiënten waren ingeschreven, waren afkomstig van de NS2. Huisartskenmerken, waaronder beroepsmatige activiteiten en opvattingen over luchtwegklachten en antibiotica, werden gemeten door middel van een schriftelijke vragenlijst.

In totaal werden 275,9 luchtweegepisoden/1.000 patiënten geregistreerd. Huisartsen labelden ongeveer 70% van alle luchtweegepisoden als infecties en antibiotica werden in 39% van alle luchtweegepisoden voorgeschreven. Een hogere incidentie van luchtweegepisoden, een grotere neiging om deze episoden te labelen als infecties, het meer onderschrijven van de noodzaak van antibiotica in het geval van witte stippen in de keel en het praktiseren in een landelijk gebied waren onafhankelijke determinanten van het volume van voorgeschreven antibiotica, terwijl diagnostisch labelen niet was gecorreleerd met het aantal gepresenteerde episoden. Ten einde het voorschrijven van antibiotica meer te rationaliseren, zou meer aandacht moeten worden geschonken aan wetenschappelijk onderbouwde indicaties, omdat tekenen van ontsteking waarschijnlijk overgewaardeerd worden.

Hoofdstuk 7: Determinanten van het voorschrijven van tweedekeus antibiotica voor bovenste en onderste luchtweegepisoden in de Nederlandse huisartspraktijk

Ten einde de associatie vast te stellen tussen huisartskenmerken en het volume tweedekeus antibiotica voor luchtweegepisoden werden de gegevens van de 163 huisartsen beschreven in hoofdstuk 6 verder geanalyseerd. In ongeveer 39% van de luchtweegepisoden werd antibiotica voorgeschreven, waarvan een kwart tweedekeus antibiotica, relatief frequenter voor lagere dan voor bovenste luchtweegepisoden: 30% versus 19%. Huisartsen die vaker werden geconsulteerd door patiënten met luchtweegepisoden, die luchtweegepisoden vaker als infecties dan als klachten labelden, die minder vaak NHG-standaarden raadpleegden en die meer geneigd waren tot het voorschrijven van nieuwe medicijnen, schreven meer tweedekeus antibiotica voor. Gezien het toenemende aantal voorschriften van tweedekeus antibiotica is het belangrijk professionele richtlijnen in de praktijk van alledag te implementeren, terwijl training in terughoudendheid om nieuwe medicijnen voor te schrijven en waakzaamheid met betrekking tot marketingactiviteiten van de farmaceutische industrie al plaats zou moeten vinden in het medische curriculum.

Hoofdstuk 8: Opvattingen van patiënten over luchtwegklachten en antibiotica; een internationale vergelijking

Het onderzoek in hoofdstuk 8 exploreerde opvattingen van patiënten over luchtwegklachten en antibiotica in België, Groot-Brittannië en Nederland (landen waarin respectievelijk veel, gemiddeld en weinig antibiotica worden voorgeschreven). De opvattingen werden gemeten van 687 aselect geselecteerde patiënten van vier praktijken in elk land. Belgische respondenten toonden een grotere neiging om de huisarts te consulteren voor luchtwegklachten, ervoeren deze klachten als ernstiger dan Britse en Nederlandse respondenten en waren er minder van overtuigd

dat deze klachten vanzelf overgaan. Er waren minder verschillen in opvattingen over antibiotica. Belgische respondenten onderstreepten het meest dat antibiotica bijwerkingen hebben. Deze verschillen verklaren mogelijk deels de verschillen in voorschrijfniveau, hoewel zij mogelijk eveneens de nationale gezondheidszorgsystemen weerspiegelen. Voorlichting van patiënten zou zich meer moeten richten op het goedaardige karakter van de overgrote meerderheid van luchtwegklachten, wat consultatie in het algemeen overbodig maakt, dan op bijwerkingen van antibiotica.

Hoofdstuk 9: Variatie in antibioticagebruik buiten het ziekenhuis in drie Europese landen: exploratie van mogelijke determinanten

Dit hoofdstuk presenteert een onderzoek in dezelfde drie landen (België, Groot-Brittannië en Nederland) waarbij -naast verschillen in opvattingen over luchtwegklachten en antibiotica- andere mogelijke oorzaken voor de verschillen in het voorschrijven van antibiotica in Europa beschreven worden. Naast opvattingen van patiënten over luchtwegklachten en antibiotica waren ook demografische- en gezondheidszorgkenmerken geassocieerd met verschillen in antibioticagebruik buiten het ziekenhuis in de drie landen. Directe afhankelijkheid van patiënten met betrekking tot het inkomen zou daarom een risicofactor kunnen zijn voor een hoger voorschrijfniveau van antibiotica, terwijl een grotere mate van invloed door collega huisartsen een matigende factor in het voorschrijven zou kunnen zijn.

Hoofdstuk 10: Algemene discussie

De belangrijkste resultaten worden besproken in het laatste hoofdstuk. Het werk dat in dit proefschrift wordt gepresenteerd heeft aangetoond dat opvattingen van patiënten een rol spelen bij luchtwegepisoden. Derhalve is het belangrijk dat de huisarts opvattingen van de patiënt exploreert ten einde misinterpretatie te voorkomen en om te bevorderen dat gekomen wordt tot een gezamenlijke besluitvorming ('shared decision making'). Daarnaast ondersteunen opvattingen van patiënten waarschijnlijk het besluit van de huisarts om antibiotica voor te schrijven. Dit proefschrift toont ook aan dat opvattingen van huisartsen van belang zijn voor het beleid bij luchtwegepisoden; huisartsen moeten zich bewust zijn van het feit dat noch op zich zelf staande tekenen van een ontsteking noch roken op zich zelf voldoende reden zijn om antibiotica voor te schrijven voor luchtwegklachten.

Onze bevinding dat de neiging om luchtwegklachten als infecties te labelen een determinant is van het volume van antibiotica dat voorgeschreven wordt voor luchtwegepisoden, wijst er wellicht op dat diagnostisch labelen gebruikt wordt om de therapie te

rechtvaardigen. Huisartsen zouden luchtwegepisoden moeten labelen als een infectie, indien welk soort infectie dan ook wordt vermoed, zich realiserende dat slechts in kleine minderheid van alle luchtweginfecties antibiotica aanbevolen worden. De neiging van huisartsen om nieuwe medicijnen voor te schrijven is geassocieerd met het volume van tweedekeus antibiotica. Aangezien deze neiging sterk is gecorreleerd met het ontvangen van artsenbezoekers, zouden huisartsen bezoeken van deze artsenbezoekers aan de praktijk moeten vermijden. Huisartsen zouden minder bezorgd moeten zijn over ontevredenheid van patiënten als zij geen antibiotica voorschrijven; tevredenheid is waarschijnlijk meer gebaat door het serieus nemen van patiënten.

Onze onderzoeken toonden aan dat praktijkassistenten opvattingen over luchtwegklachten en antibiotica hebben die meestal liggen tussen die van huisartsen en patiënten. Ten einde een meer eenduidig beleid binnen de praktijken te voeren is derhalve meer overeenstemming nodig in opvattingen van praktijkassistenten en huisartsen. Om dit te bereiken zouden kwaliteitsbevorderingprogramma's gericht op het vergroten van overeenstemming en wederzijds begrip tussen huisarts en praktijkassistente kunnen helpen.

Tenslotte toonden onze onderzoeken aan dat internationale verschillen in antibioticagebruik buiten ziekenhuizen slechts gedeeltelijk kunnen worden verklaard door verschillen in opvattingen van patiënten. Exploratie van andere mogelijke determinanten wees er op dat een grotere afhankelijkheid van patiënten met betrekking tot het inkomen een risicofactor zou kunnen zijn voor een groter antibioticagebruik, terwijl een grotere mate van professionele invloed een matigende factor zou kunnen zijn. Aan het einde van dit hoofdstuk worden implicaties voor de praktijk en aanwijzingen voor verder onderzoek gegeven.

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Tijdens mijn basisopleiding tot arts in Leiden maakte ik onder leiding van prof.dr.J.D.Mulder al enkele malen kennis met het doen van wetenschappelijk onderzoek op het gebied van de huisartsgeneeskunde. Ik had sindsdien altijd het plan om ooit eens te starten met een promotieonderzoek. Op een feestavond na het NHG-congres in december 1998 zat ik aan tafel met prof.dr.Th.J.M.Verheij, mijn latere promotor. Ik kende Theo nog uit de tijd dat hij huisarts was in Noordwijk en ik vertelde hem over mijn wens onderzoek te doen naar opvattingen van patiënten bij hoesten. Hij nodigde mij uit voor een gesprek op het Julius Centrum in Utrecht met uiteindelijk als gevolg het starten van het promotietraject. Sindsdien heeft hij mij enthousiast gehouden voor het onderwerp. Telkens wist hij de grote lijn aan te geven, waarbij hij mij bij herhaling uitdaagde de relevantie van de onderwerpen aan te geven: “wat voor nieuws heb je de wereld te bieden?”. Daarnaast heeft hij mij de gelegenheid geboden internationale ervaring op te doen tijdens congressen van de WONCA (World Organization of Family Doctors) en de GRIN (General Practice Respiratory Infections Network). Ik heb dit bijzonder gewaardeerd. Theo, bedankt.

Bijzonder veel dank ben ik verschuldigd aan mijn co-promotor dr.M.M.Kuyvenhoven, die mij al die jaren intensief -en tot het allerlaatste moment!- heeft begeleid als een zorgzame socioloog. Bijna elke twee weken reisde ik met het openbaar vervoer naar Utrecht om met Marijke te overleggen over mijn ‘huiswerk’. Aan het eind van (bijna) elk van de 132 besprekingen had ik het gevoel dat we weer een stukje verder waren gekomen. Zij leerde mij dat een artikel was als een standbeeld, waaraan steeds gepolijst en gebeeldhouwd moest worden om een goed resultaat te krijgen. Hoewel dat mijn geduld bij tijd en wijle ernstig op de proef stelde, moest ik telkens toegeven dat elke nieuwere versie van een artikel een verbetering was. Marijke, ik zal de bijeenkomsten met jou missen.

Veel tijd heb ik niet op het Julius Centrum doorgebracht. In dit ICT-tijdperk kan het meeste immers thuis gebeuren op je eigen PC en e-mailverkeer maakt communiceren op afstand makkelijk. Toch heb ik genoeg tijd gehad om naast Theo en Marijke ook enkele andere personen op het Julius Centrum te leren waarderen. Allereerst natuurlijk Peter Zuithof: Peter,

wat moest ik op het gebied van statistiek zonder jou beginnen! Je hebt mij leren werken met SPSS en SAS, zodat ik thuis statistische bewerken kon uitvoeren en als het te moeilijk voor mij werd, dan was jij er! Ook aan mijn directe ‘voorgangers’ op het gebied van onderzoek naar luchtwegklachten en antibiotica, Ineke Welschen en Annemiek Akkermans, bewaar ik goede herinneringen. Ineke en Annemiek, de congressen waren door jullie aanwezigheid altijd extra leuk en ik heb regelmatig gebruik gemaakt van jullie ervaringen en publicaties. Verder heb ik veel te danken aan Marlies Blijleven en Marianne Knape, die als secretaresses van respectievelijk Marijke en Theo altijd punctueel en opgeruimd allerlei zaken voor mij hebben kunnen regelen. Tenslotte mag ik Ted van Essen niet vergeten. Hij was op de dinsdagmiddagen mijn ‘kamergenoot’ die mij altijd weer hartelijk ontving en -als goede huisarts- geïnteresseerd bleef.

Voor een groot deel van mijn onderzoek werd gebruik gemaakt van data van de Tweede Nationale Studie van het Nivel, waarvan François Schellevis als projectleider onze contactpersoon was. François, bedankt voor je medewerking aan het onderzoek, je interesse en je waardevolle commentaar op de artikelen.

Vier Nederlandse huisartspraktijken waren betrokken bij het internationale deel van het onderzoek. Ik dank dan ook de huisartsen J.A.Pool (Katwijk), G.H.Smit (Hoogvliet), C.van Gijn (Utrecht) en M.Numans (Utrecht) voor hun belangeloze medewerking.

Bijzonder interessant waren verder de (internationale) contacten met leden van de GRIN. Tijdens de internationale congressen kwam ik ze telkens weer tegen: vakbroeders en -zusters die allen bijzonder geïnteresseerd waren in luchtwegklachten en antibioticagebruik in de eerste lijn. Met Chris Butler uit Wales en Samuel Coenen uit Antwerpen werd gezamenlijk onderzoek gedaan, resulterend in een deel van mijn proefschrift. Chris en Samuel, vooral de talloze enthousiaste e-mailcontacten met jullie zal ik niet licht vergeten.

Dan dichterbij huis. Opbeurend was de afgelopen jaren de warme belangstelling van mijn collegae van de Katwijkse Huisartsenkring voor het wel en wee van de voortgang van het onderzoek. Dat deed mij altijd weer goed. Verder heb ik in het bijzonder veel steun gehad aan mijn buurman-huisarts Irvine Velberg. Irvine, bedankt voor je waarnemingen die het voor mij mogelijk maakte dit proefschrift te voltooien. Ik ben blij dat je samen met ‘mijn’ praktijkondersteuner Carolien Oudwater mijn paranimf wil zijn.

Carolien, bedankt voor je steun en aandacht al die jaren. Je hebt het hele traject meegemaakt en vol belangstelling gevolgd. Nu maar eens een cursus?

Ook de praktijkassistentes hebben het mij mogelijk gemaakt dit onderzoek te doen. Zij hielden op dinsdagochtend in ieder geval extra rekening met mij, zodat ik niet al te gestresst naar Utrecht kon vertrekken. Daarnaast hebben zij veel administratieve werkzaamheden t.b.v. het onderzoek verricht, zoals het noteren van de binnengekomen vragenlijsten.

Pa en ma, jullie hebben me gestimuleerd naar het gymnasium te gaan en om daarna geneeskunde te gaan studeren, hoewel studeren onze familie niet in het bloed zit. Ik ben daar nog steeds dankbaar voor en heb geen spijt gehad van de keus die ik hierdoor gemaakt heb. Huisarts is een prachtig vak! Ik ben blij dat ik van jullie geleerd heb waar het om gaat in het leven: goed je best doen en geven om anderen.

Tenslotte het thuisfront. Nee, pappa moet naar Utrecht. Nee, pappa is bezig achter de computer. Nee, pappa is nu moe. Nee, pappa kan vandaag niet naar het voetballen, want er moet een stuk af. Toch bleven Michiel, Anne en Lucas begrijpend en vaak zelfs trots op mij, waarschijnlijk vooral omdat ik dan toch maar weer de vastgelopen PC ging bekijken en hielp bij het “nu echt heel erg moeilijke” huiswerk. Ze hebben in het begin van het onderzoek met veel lol duizenden vragenlijsten gevouwen en in een enveloppe gedaan. Dan zijn het toch leuke kinderen! Sander (nu acht jaar) begreep het allemaal nog niet, maar hij wist altijd wel op een subtiele manier mijn aandacht te trekken (en te krijgen...!).

Last but not least Marianne. Hoewel promoveren op het lijstje met “nog te doen voor mijn vijftigste” bovenaan prijkte op mijn veertigste verjaardag, ben ik destijds vooral dankzij jouw aanmoediging op Theo Verheij afgestapt. Gedurende al die jaren bleef je mij steunen en aanmoedigen om het project tot een goed einde te brengen. Nooit gezeur over de tijd die ik aan het onderzoek besteedde, omdat je wellicht wist dat ik toch nooit stil zitten kan. Ben ik niet bezig als huisarts of onderzoeker, dan wel als fractievoorzitter van het Katwijkse CDA of lid van een of ander bestuur ... Je zult wel nooit een man krijgen die de hele avond rustig in de huiskamer zit. Bedankt voor het aanhoren van al mijn enthousiaste maar meestal erg lange verhalen over het onderwerp. De totstandkoming van dit proefschrift is een feest voor ons beiden!

About the author

Huug van Duijn was born on February 9th, 1959 in Katwijk, the Netherlands. In 1977, after graduating from the Christelijk Lyceum Dr.W.A.Visser 't Hooft (gymnasium β) in Leiden, he attended the Medical School at the University of Leiden.

As a student he was involved in several research projects of the Department of General Practice at the University of Leiden, e.g. a study on the process of decision-making in the establishment of the general practitioners' "Package of Basic Tasks and Duties" in 1983 by Riet de Jonge.

After obtaining his medical degree in December 1984, he worked as a free-lance physician at the Social Fund of Construction Industry. In July 1984 he started a one-year period of vocational training at the Department of General Practice at the University of Leiden, including a training period at the general practice of Ed Priester in Rijnsburg.

In the second half of 1985 he acted as stand-in for several general practitioners, e.g. for Willem Meewisse in Katwijk. After a year as employee, he entered into a partnership with general practitioner Wil Bergman in January 1987, also in Katwijk. This partnership lasted till August 1995 and since then he has worked single-handed as a general practitioner in Katwijk.

Since 2000 he has been attached to the Julius Center for Health Sciences and Primary Care, at the University Medical Center Utrecht, where he completed this thesis.

He has been married since 1986 to Marianne van Delft and they have four children: Michiel (18), Anne (16), Lucas (14), and Sander (8).