Can we improve adherence to guidelines for the treatment of lower urinary tract infection? A simple, multifaceted intervention in out-of-hours services

Leentje Willems¹, Pieter Denckens¹, Hilde Philips¹, Rodrigo Henriquez¹,² and Roy Remmen¹*

¹General Practice, Department of Primary and Interdisciplinary Care, Faculty of Medicine and Health Sciences, University of Antwerp, Universiteitsplein 1, 2610 Wilrijk Antwerp, Belgium; ²Faculty of Medicine, Universidad Técnica Particular de Loja, San Cayeto Alto, Av. Marcelino Champagnat y Paris, Loja, Ecuador

*Corresponding author. Tel: +00-32-3-265-25-29; Fax: +00-32-3-265-25-26; E-mail: roy.remmen@ua.ac.be

Received 14 January 2012; returned 25 June 2012; revised 20 July 2012; accepted 24 July 2012

Objectives: To improve antimicrobial prescribing behaviour of general practitioners in large-scale out-of-hours services for uncomplicated lower urinary tract infection (LUTI) in females aged 20–80 years, which is regarded as one of the most prevalent bacterial infections in primary care.

Methods: A quasi-experimental design was used in two regional large-scale out-of-hours services. A simple, multifaceted intervention was offered in a 16 week period in one region (the intervention region). During the two washout periods, at 5 and 17 months, we observed diagnoses and prescriptions. The main outcome measure was the share of appropriate and inappropriate prescriptions.

Results: The proportion of patients with LUTI ranged from 1.0% to 2.1%. The relative proportion of appropriate prescriptions in the intervention region increased from 26.9% to 69.4%, but decreased afterwards to 40.8%.

Conclusions: A simple, multifaceted intervention for treatment of LUTI during out-of-hours care may improve the quality of antimicrobial prescribing, although the improvement may not be sustained in the longer term.

Keywords: cystitis, antimicrobial therapy, general practice, family medicine, clinical trials, multicentre study

Introduction

Antimicrobial resistance is an increasing concern across the world. The quality of antimicrobial prescribing by general practitioners (GPs) differs across countries, with inappropriate prescribing being widespread.¹,² For uncomplicated lower urinary tract infection (LUTI), for instance, nitrofurans may be prescribed preferentially because of their narrow antibacterial spectrum, low cost and good clinical activity.³ Appropriate prescribing can have a positive impact on regional bacterial resistance.⁴

Guidelines can help GPs optimize their antimicrobial prescribing. However, implementation of guidelines is difficult in everyday practice,⁵ and although various strategies have been piloted to improve adherence to guidelines, many interventions seem to be of little benefit in terms of improving the performance of the practitioners.⁶ In Flanders, for instance, an intervention at the level of peer review groups was not able to show any improvement to adherence to guidelines,⁷ although in the Netherlands intensive strategies showed better outcomes for treatment of uncomplicated LUTI.⁸ From the available body of evidence, it is suggested that to accomplish change, intensive and expensive programmes are needed that target various levels in the prescribing chain. The successful elements of multifaceted interventions remain unknown.⁹

Out-of-hours primary care has been organized in large-scale organizations in many countries throughout the world.¹⁰ This offers the opportunity to test new avenues to improve adherence to guidelines by using advances in information technology to reach many GPs in one collaborative setting.¹¹ Here, we report our attempts to improve the antimicrobial prescribing behaviour of GPs in large-scale out-of-hours services for one specific diagnostic entity, namely LUTI. This is regarded as the most prominent bacterial infection in primary care, comprising 1%–3% of the total workload of GPs. In addition, simple diagnosis and treatment is available.¹²,¹³ We used a multifaceted, cheap and simple intervention, and we used routine data of two out-of-hours services.

In Belgium, the national guideline for LUTI recommends the use of nitrofurantoin (100 mg three times a day for 3 days) or trimethoprim (300 mg each day for 3 days) and resistance is low.¹⁴ Diagnosis can be established on patient history and by using the nitrite test method if necessary.¹² In this guideline, prescribing of
other potentially active drugs, including quinolones, is explicitly not recommended. In this study we refer to these other non-recommended agents as inappropriate therapy.

Two out-of-hours organizations were selected. In the intervention region (Turnhout, Antwerp) 175,000 patients are served by 134 GPs (49 females; 81 >45 years), while in the control region (Borgerhout, Antwerp) 120,000 patients are served by 98 GPs (33 females; 68 >45 years). These services are open during weekends and public holidays. During the week individual GPs offer services to their patients.

In both services, similar software applications are used and all patient contacts are recorded using the International Classification of Primary Care (ICPC) codes. Prescriptions are integrated in the software. In Belgium, only standard boxes can be prescribed (for instance, nitrofurantoin can only be prescribed in boxes of 50 capsules of 50 mg or 100 mg). The duration of treatment and daily regimens are not coded in the patient files.

Methods

Ethics

Ethical approval was obtained from the University Hospital of Antwerp, Belgium (reference number 8/52/293).

Simple, multifaceted intervention

A simple, multifaceted intervention was offered for a 16 week period in one region (the intervention region). A first e-mail was sent to all GPs at the beginning of the project, highlighting the core recommendations of the national guideline and the aim of the project. Later on, a routine e-mail reminder was sent just before being on call. Individual GPs were informed of the best treatment for cystitis. During on-call duty, a five slide information presentation was shown to the GPs to explain regional resistance and the superiority of the best choice (near optimal for nitrofurantoin and trimethoprim or with or without sulfamethoxazole).

In addition, the doctors’ resting room had two posters and three hand-outs with key messages from the Belgian guideline. The special focus was on appropriate and inappropriate use of antimicrobials. Finally, at the end of the intervention a final e-mail with the key messages of the guideline was sent to GPs in the intervention region. During the same period, no interventions for treatment of LUTI were organized in the control region.

Time frame for the study

The project was conducted in four periods of 16 weekends. During the intervention period we implemented the multifaceted interventions and during the two washout periods, at 5 and 17 months, we observed diagnoses and prescriptions.

Analysis

Descriptive analysis and post hoc comparison between the intervention and control region was undertaken. The outcome measures were the incidence of LUTI among healthy females and the appropriate versus inappropriate use of antimicrobials according to the Belgian guideline and the local resistance patterns.

Data

In the two regions we collected data on the total number of patient consultations, their ICPC diagnoses and the number of LUTIs (ICPC code U71, uncomplicated urinary tract infection) in female patients aged 20–80 years inclusive. Prescriptions in these cases were allocated as appropriate or inappropriate. Nitrofurans or trimethoprim, with or without sulfamethoxazole, were identified as appropriate antimicrobial prescriptions. Inappropriate prescriptions included, among others, quinolones and extended-spectrum penicillins (see Table 1).

Results and discussion

Table 2 shows the number of consultations per period. The proportion of patients with LUTI ranged from 1.0% to 2.1%. Table 3 shows, per time frame, the percentages of the prescriptions of antimicrobials. The proportion of appropriate prescriptions in the intervention region increased from 26.9% to 69.4%, but decreased afterwards to 40.8%. Figure 1 graphically presents the percentages of appropriate prescriptions during four periods in the control and intervention region.

Table 1. Appropriate and inappropriate treatments of LUTI according to the Belgian guideline

<table>
<thead>
<tr>
<th>Appropriate treatment</th>
<th>Inappropriate treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrofurans</td>
<td>quinolones</td>
</tr>
<tr>
<td>Trimeprhom with or without sulfamethoxazole</td>
<td>others: i.e. amoxicillin, amoxicillin/ clavulanic acid, fosfomycin, azithromycin, cefadroxil, cefuroxime, doxycycline, itraconazole and fluconazole</td>
</tr>
</tbody>
</table>

Table 2. Number of patient consultations and number of LUTI diagnoses

<table>
<thead>
<tr>
<th>Service</th>
<th>Number of patient consultations/LUTI diagnoses</th>
<th>Period 1: before</th>
<th>Period 2: intervention</th>
<th>Period 3: 5 months</th>
<th>Period 4: 17 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>number of patient consultations</td>
<td>6436</td>
<td>5171</td>
<td>6456</td>
<td>6427</td>
</tr>
<tr>
<td></td>
<td>number of LUTI diagnoses</td>
<td>134</td>
<td>108</td>
<td>108</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>number of patient consultations/number of LUTI diagnoses (%)</td>
<td>2.1</td>
<td>2.1</td>
<td>1.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Control</td>
<td>number of patient consultations</td>
<td>2906</td>
<td>2278</td>
<td>3008</td>
<td>4719</td>
</tr>
<tr>
<td></td>
<td>number of LUTI diagnoses</td>
<td>59</td>
<td>64</td>
<td>62</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>number of patient consultations/number of LUTI diagnoses (%)</td>
<td>2.0</td>
<td>2.8</td>
<td>2.1</td>
<td>1.0</td>
</tr>
</tbody>
</table>
This is the first study addressing the large-scale out-of-hours services as a locus for quality improvement regarding antimicrobial prescribing in Belgium, a country particularly known for its high use of antimicrobials. In this study, a priori adherence to the guideline for LUTI with regard to prescribing the recommended antimicrobial agents was low (between 26.9% and 37.3%). For upper respiratory tract infections, this attitude to prescribing of antibiotics has proved difficult to change. Interventions, including a time-consuming intervention in the GPs accreditation scheme using small-group quality circles with academic detailing appeared to have little effect.

The out-of-hours services in Belgium are expanding, with about 10% of the population currently having a service available. We showed that a simple and multifaceted intervention using the large-scale facilities of the out-of-hours services can change the routine of GPs and increase adherence to the national guidelines for treatment of LUTI in these services. The use of recommended antimicrobials increased more than 2-fold, but once the intervention was stopped the practice subsequently reverted to what it was like prior to the intervention. More work is needed to identify reasons for this. Recently a need to change the culture and put quality first in Belgium general practices was identified. We may also hypothesize that huge investments by the pharmaceutical industry (like frequent visits by representatives to GPs) may counteract the recommendations in the guidelines in this country.

Limitations of the study

The category ‘no prescription’ needs attention. Two explanations can account for this category. First, early onset LUTI can sometimes be treated by watchful waiting and optimal fluid intake or interventions like the use of cranberry, especially in older females. Also, technical problems in the physicians’ offices might possibly have caused under-reporting of prescriptions. For example, when printers are unavailable, physicians tend to write prescriptions by hand, and this information is subsequently not captured in the database.
The quality of outpatient antimicrobial prescribing is subject to a number of disease-specific indicators, one of which is the number of days of intake and dosage. Because the data of this study were drawn from routine data of the out-of-hours services, we could not analyse data on the length of the treatment, as this is not regularly recorded.

Conclusions
Out-of-hours services are suitable platforms for quality improvement for antimicrobial prescribing. In this study we found that a simple, multifaceted intervention focusing on the treatment of LUTI during out-of-hours care was successful in increasing the share of appropriate antimicrobial prescriptions. Although this improvement subsequently declined, differences remain over time in comparison with the quality of prescribing in the control region. The reasons for the decline need further attention. More work is also needed to study if repetitively giving short messages can improve the prescribing patterns of GPs in a more persistent manner.

Acknowledgements
We thank all the GPs of the collaborating out-of-hours services. Special thanks to Johan Brouns, Philip Ryckebosch, Martine Van Deuren, Thierry Christiaens and Luc Seuntjens for their help.

Funding
Only internal funding from the Centre for General Practice was used. R. R. and H. P. are on the payroll of this institute. This work is part of the Masters theses of L. W. and P. D. and was performed during vocational training.

Transparency declarations
No material or other support was obtained from third parties. The collaborating out-of-hours services offered their routine data for this study.

References