Perceptions among Swedish hospital physicians on prescribing of antibiotics and antibiotic resistance

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ABSTRACT
Objective To explore and describe perceptions of antibiotic prescribing among Swedish hospital physicians, with special reference to whether the perceptions included awareness of antibiotic resistance (AR).

Design A phenomenographic approach was used and data were collected in face-to-face interviews.

Setting Hospitals in seven different counties in central Sweden.

Participants A strategic sample of 20 hospital physicians specialising in internal medicine, surgery or urology.

Main outcome The variation of perceptions of antibiotic prescribing.

Results Five qualitative different perceptions were found. AR was considered in two of the perceptions. Reasons for not considering AR included a dominating focus on the care of the patient combined with lack of focus on restrictive antibiotic use, or uncertainty about how to manage infectious diseases or the pressure from the healthcare organisation. Parallels between the five perceptions and the stages in the transtheoretical model of health behaviour change were seen.

Conclusions In three of the perceptions, AR was not considered when antibiotics were prescribed. Physicians who primarily express these three perceptions do not seem to be prepared to change to restrictive prescribing. Our findings can be useful in designing activities that encourage AR prevention. Organisational changes are also needed.

Increase in antibiotic resistance (AR) is a global problem that requires attention.1 The level of AR is related to the level of antibiotic use.2,3 To prevent an increase in AR development, restrictive prescribing is recommended.4 Several factors influencing the prescription of antibiotics have been proposed, for instance, awareness of AR among physicians5,6 and patients’ demands for antibiotic treatment.7 However, a decisive factor is certainly how the prescribers actually perceive antibiotic prescribing because the way people act is related to how they perceive certain phenomena. Many studies on physicians’ perceptions and attitudes to antibiotic prescribing focus on primary care practitioners; studies on hospital physicians are less frequent. However, although they are not the major antibiotic prescribers, hospital physicians are important because they often serve as role models for primary care practitioners.8 The aim of this study was to explore and describe perceptions among Swedish hospital physicians of how antibiotics are prescribed, with special reference to whether the perception included awareness of AR.

METHOD
Study design This study was conducted with a phenomenographic approach.9 Phenomenography is a qualitative method designed to identify and describe perceptions in a group of people and has been used to explore perceptions among healthcare professionals.10–14 Data in a phenomenographic study are commonly collected in face-to-face interviews. A total of 20 interviews are regarded as sufficient to identify the variation of perceptions.15 The result of a phenomenographic study is presented as categories of descriptions, which are the researchers’ abstraction of perceptions. Furthermore, an outcome space is created, which shows how the categories of description relate to each other.16

Participants A strategic sample of 20 hospital physicians was recruited. The strategy was to include hospital physicians with different experiences of antibiotic prescribing to gain a rich and varied interview material. Thus, we selected physicians from different hospitals and counties, different specialities, with various lengths of professional years, and a reasonable mix in age and sex.

The physicians were first contacted by email. The purpose of the study was described. The physicians were informed that their participation was voluntary and that they could withdraw at any time without giving a reason. Confidentiality was guaranteed. Twenty-eight physicians were asked to participate and 20 accepted. Table 1 presents information about participants.

Data collection All interviews were conducted by one of the authors (JB) in May/June 2005. The interviews lasted 25–90 min, were semistructured and followed a common interview guide. Questions were constructed to help the participants focus on actual situations when they had prescribed antibiotics. This was done by asking them to recall a specific situation experienced during routine clinical practice and to describe the situation, including how the decision to prescribe antibiotics was made. The question was repeated and a second situation was examined. At the end of the interview, participants were asked for their general opinions regarding the development of AR. All interviews were held during the physicians’ work time in a quiet room at the hospital. Nineteen interviews were tape-recorded and transcribed verbatim. In one case, thorough notes were taken during the interview because the physician did not agree to be tape-recorded. Immediately after the session, the whole interview was written.
After this a discussion was held between analyst and co-reader to establish final categories and create an outcome space.

**FINDINGS**

Five categories of description were identified, representing five qualitatively different perceptions. A basic concept expressed in all categories concerned the patient; today’s patient must be cared for and properly treated. There was also a general awareness of the existence of AR. However, this awareness was to various degrees either held in the foreground or in the background and thus had different meanings in different perceptions. Furthermore, infectious disease specialists were mentioned in all perceptions. However, the relationships to them varied.

The findings are reported as categories of descriptions, and the relationships among categories are shown in the outcome space (see figure 1). In this study, more awareness of AR when antibiotics are prescribed corresponded to a more complex perception. Categories are described in table 3; each category is illustrated by a quotation.

**DISCUSSION**

This is one of the first studies exploring hospital physicians’ perceptions of antibiotic prescribing. The most important contribution is that it presents a new way to describe how physicians perceive antibiotic prescribing in hospital care. The analysis focused especially on whether the perceptions included awareness of AR. Five qualitatively different perceptions were identified; in two of them, AR was considered when prescribing antibiotics, and in three, AR was not considered.

A major factor that influenced perception was whether the physician had a special interest in infectious disease management or not. We found that only in the most complex perception was there a clear expression of this interest (Aware, interested and competent). In all other perceptions, the concept was that other areas were more important and interesting. Obviously, special competence is necessary to use antibiotics with narrow-spectrum and short treatment periods (which theoretically is more beneficial from a resistance development perspective) to avoid jeopardizing the patient’s life and health.

In perception D (Aware and restrictive, but support required), the perception was that it is possible to use less aggressive antibiotic treatment strategy in most patients. This concept had developed despite lack of special interest in treatment of infectious diseases. Instead, this had developed from close collaboration with colleagues with such special interests, either physicians in the same departments or infectious disease specialists. The importance of these colleagues was emphasised, and to maintain this perception, close support from an infectious disease specialist is probably necessary.

In perception B, the barrier for restrictive antibiotic prescribing expressed by the physicians was the uncertainty of how to manage infectious diseases. Lack of such knowledge among physicians has been reported in earlier studies (see below). Thus, to encourage restrictive antibiotic prescribing, physicians must be reinforced in the management of infectious

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Table 1  Demographics of participants

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Urology (total)</th>
<th>Surgery (total)</th>
<th>Internal medicine (total)</th>
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<tbody>
<tr>
<td>31–40</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>41–50</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>51–60</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>61–70</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5 (1 woman)</td>
<td>5 (1 woman)</td>
<td>10 (2 women)</td>
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</table>

The number of female physicians is small. However, the proportion of female physicians in Sweden in 2005 was similar to the proportion in our study (internal medicine 31%, surgery 14% and urology 11% female physicians). The medical specialties were selected because of expected experience of treating patients with infections or for perioperative prophylaxis.

**Figure 1** This outcome space illustrates the logical relationship among the five identified categories of description A–E. In an outcome space a category that is more complex is placed at a higher level, above categories that are less complex. Aspects building up the categories: 1) Care of patient, 2) Guidelines 3) Restrictive prescribing, and 4) Special interest in infectious disease treatment. Aspects included in the categories: A includes 1; B and C include 1 and 2; D includes 1, 2 and 3; and E includes 1, 2, 3 and 4.
### Table 3 Description of the five identified categories

<table>
<thead>
<tr>
<th>Category of description</th>
<th>Description</th>
<th>Quotation</th>
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<tbody>
<tr>
<td>A. Prefer “effective” treatment</td>
<td>In this perception the basic notion was that the patient of today must be treated. However, infections, antibiotics and AR were of no interest in this perception. Therefore, to be sure that the patient would be cured, broad-spectrum antibiotics were selected. It was known that these antibiotics were not recommended, but in spite of this, they were chosen because they were perceived as effective. The threat of AR was perceived as a theoretical problem and was not kept in mind when antibiotics were prescribed.</td>
<td>“The same antibiotics are used in treatment as in the prophylaxis, as I told you about. This is not so good, I know, but this is the way it is. Theory is theory but this is practice. That’s why it is rather common that fluoroquinolones are also used in uncomplicated UTI. … Yes, I have seen resistant bacteria elsewhere for example Lexinor. But this is nothing I have been thinking about.” (Interview 19)</td>
</tr>
<tr>
<td>B. Too uncertain to be restrictive</td>
<td>In this category the main focus was also on the patient of today, but in addition there was a general notion that guidelines of restrictive treatment of infectious diseases should be followed. A restrictive treatment was, however, not practiced and the barrier for this was the physician’s uncertainty. The uncertainty seemed to be a consequence of low interest in antibiotics and treatment of infectious diseases. It was expressed that narrow-spectrum antibiotics were considered but often regarded as not effective enough. Accordingly, to make the physician feel certain, extra doses of antibiotics were used as well as broader-spectrum antibiotics. Some physicians reflected on the consequences of their uncertainty, whereas others did not.</td>
<td>“I think that we, because of uncertainty, may be somewhat more active. And for the same reason that we sometimes give more broad spectrum antibiotics than they do for example at the department of infectious diseases, it will be… When you do not know, you use something stronger.” (Interview 6)</td>
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<tr>
<td>C. Stuck in the healthcare system</td>
<td>This perception has similarities with B but here the barrier for a restrictive treatment was the healthcare system. It was said that hospital care today means high tempo, many patients to take care of in a short time and a constant struggle to find free beds. Consequently, hospitalised patients must be effectively treated so they can be discharged as quickly as possible. The “wait and see” philosophy was not accepted any longer, and patients could not be brought back for follow-up visits. Accordingly, it was expressed that treatment today was often more potent than necessary.</td>
<td>“Previously they were kept in the hospital to rest the intestine, today they are sent home with two antibiotics. … I think, that when we are not able to bring the patients back for a second visit, it makes us incautious and makes us use more [antibiotics] than we used before.” (Interview 5)</td>
</tr>
<tr>
<td>D. Aware and restrictive, but support required</td>
<td>In perception D the concept was, as in B and C, that the patient must be treated and guidelines for restrictive treatment should be followed. The difference was that here this was done in practice. As in perception B, infectious diseases were not of the highest interest. The strategy was to follow guidelines carefully, which here included the safe use of antibiotics with narrow spectrum in the treatment of most patients. Support from infectious disease specialists was considered necessary. Awareness of AR and the active prevention of AR had often been introduced by a colleague or an infectious disease specialist.</td>
<td>“So in all treatment with antibiotics this [antibiotic resistance] is, so to speak, kept in one’s mind. … To be frank, this is not exactly my main area of interest, and then you follow these recommendations and guidelines we get from the department of infectious diseases.” (Interview 4)</td>
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<tr>
<td>E. Aware, interested and competent</td>
<td>In this perception infectious diseases were a major interest and accordingly the treatment of patients was more diverse. It was often possible to use narrow-spectrum antibiotics and still guarantee the safety of the patient because the physician knew how to manage serious infections. In this conception the infectious disease specialists were important for updating of competence, but the treatment was most of the time managed without specialist counselling.</td>
<td>“Yes, this [infectious diseases] is a major part of our work. … If you have an infection unit [at the hospital] it may look different than here, but for us infections are a very large part of our activities, I would say.” (Interview 17)</td>
</tr>
</tbody>
</table>

AR, antibiotic resistance.

Each category is illustrated by a quotation.

disease treatment; probably both education and restrictive prescribing experience are needed.

An important message to policy-makers and hospital managers is given in perception C (Stuck in the healthcare system). It was clearly stated that it is possible to use treatment methods that reduce the risk of AR, but the healthcare system develops in another direction and thus contributes to AR development. Most infections are not life-threatening, and it is often wise to wait and see how the disease develops before aggressive treatment strategies are chosen. Practicing these methods was, however, considered impossible in healthcare today. This finding is important and should not be ignored; the healthcare system must be organised in a way that supports restrictive antibiotic prescribing.

Many studies demonstrate that physicians do not practice restrictive antibiotic treatment. It has been suggested that a major
CONCLUSIONS

This study presents a new way to understand how hospital physicians perceive antibiotic prescribing. Five qualitatively different perceptions were found. AR prevention was practiced in two of the perceptions. In the other three, AR was not considered in treatment of infectious diseases. This was related to the lack of focus on AR, the feelings of uncertainty in managing infectious treatment or that healthcare system was a barrier. Specialists in infectious diseases play decisive roles in helping hospital colleagues in AR prevention. Parallels were found between identified perceptions and stages in the transtheoretical model of health behavioural change. Physicians who primarily express the three perceptions where AR was not considered do not seem to be ready to change to restrictive prescribing. Our findings can be useful in the development of activities directed at physicians who encourage AR prevention. It should be noted that, in addition to such activities, organisational changes are also needed.

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Competing interests None.

Provenance and peer review Not commissioned; externally peer reviewed.

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Table 4  The transtheoretical model

<table>
<thead>
<tr>
<th>Stage of change (Prochaska and Velicer)</th>
<th>Suggested correlation to our categories of description</th>
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<tbody>
<tr>
<td>Precontemplation</td>
<td>Not aware of the problem; not interested in taking action; tend to avoid reading, talking or thinking about their high-risk behaviours</td>
</tr>
<tr>
<td>Contemplation</td>
<td>Have intentions to change, know the pros but are much aware of the cons</td>
</tr>
<tr>
<td>Preparation</td>
<td>Have intentions to act in the near future, have taken some action and have plans for how to change</td>
</tr>
<tr>
<td>Action</td>
<td>Act to a degree to reduce risk</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Try to keep the new behaviour and avoid relapses</td>
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</tbody>
</table>

According to the model, behaviour change is a process involving five stages. Previous theories described behavioural change as an event. The right column shows our suggestion of best correlation between identified perceptions and stages of change. Note that perceptions and stages include different aspects and cannot be totally correlated.
REFERENCES


