A qualitative study of factors influencing antimicrobial prescribing by non-consultant hospital doctors

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Received 21 March 2006; returned 5 May 2006; revised 9 June 2006; accepted 13 July 2006

Objectives: To determine the factors that influence non-consultant hospital doctors (NCHDs) in their decision to prescribe antimicrobial agents.

Methods: A qualitative study using semi-structured interviews centred on a life grid tracking the medical career of 22 NCHDs employed by a university teaching hospital in the west of Ireland.

Results: Early in their careers NCHD prescribing is based primarily on the immediate influence of more senior colleagues. Recollection of formalized undergraduate teaching and hospital guidelines are a very minor influence. As their career progressed and they exercise greater autonomy, personal experience becomes the major influence on prescribing decisions. Hospital guidelines are a minor influence. Participants consider that undergraduate teaching needs to be more practical and taught in a way that is easier to apply to on-ward situations and that hospital prescribing guidelines need to be presented in a ‘user-friendly’ format and adherence to the guidelines needs to be promoted.

Conclusions: The key influences on antimicrobial prescribing by NCHDs are informal. New approaches are required to ensure that formal training and hospital guidelines on antimicrobial prescribing are more influential in shaping antimicrobial prescribing practice.

Keywords: antibiotic policy, antimicrobial policy, antimicrobial stewardship

Introduction

Acquired antimicrobial resistance is a major public health problem. In recent years the issue has been the subject of public debate with international agencies and national government and parliamentary groups developing policies to control the spread of acquired resistance.1–5 There is a consensus that antimicrobial use is the driving factor in the emergence of acquired antimicrobial resistance and that antimicrobial stewardship is a central element in efforts to control antimicrobial resistance.6,7 Many approaches to change practice in relation to antimicrobial use in the healthcare systems have been described, as recently reviewed.8 In addition two recent studies have described objective patient, physician and consultation characteristics associated with adherence by physicians to recommendation made by infectious disease physicians on consult.7,8 We noted however that little qualitative work has been reported that explores with doctors their perspective on factors that influence their antimicrobial prescribing. In the authors’ experience in Ireland and the United Kingdom doctors employed in post-graduate training posts [non-consultant hospital doctors (NCHDs)] perform most antimicrobial prescribing in hospitals. We wished to explore influences on antimicrobial prescribing practices by NCHDs to improve interventions intended to modify and improve practice. To this end we have used a qualitative approach to explore the influences on antimicrobial prescribing by this group of doctors in a 500 bed university teaching hospital.

Methods

This study took place in a regional 500 bed teaching hospital with Departments of Microbiology, Infectious Disease and Pharmacy
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available to provide guidance on antimicrobial use. Antimicrobial prescribing guidelines are available on the hospital intranet from computers in all wards and clinical areas. No printed version of the guidelines is prepared or disseminated. At the time of the study an active general programme of continuing medical education including case conferences and grand rounds was operating; however, there was no active promotion of adherence to the hospital antimicrobial prescribing guidelines. The hospital ethics committee approved the study. All the NCHDs (that is doctors undergoing pre- and post-registration training) working in the hospital at the time of the study (excluding those doing locum work and those employed as part of the microbiology or infectious disease teams) were invited to take part in the study (n = 242).

Participants were purposively sampled from the respondents.9 Purposive sampling refers to the deliberate selection of respondents for interview to reflect the diversity within the NCHD population with respect to gender, grade, medical speciality and place of undergraduate education. Participants were invited to interview until the point of saturation was reached, that is when no new themes were emerging.10 Participants were interviewed by a researcher (with masters degree in epidemiology) who was not medically qualified and did not have specific expertise in antimicrobial agents or antimicrobial prescribing. Only the interviewer knew the identity of participants. Interviews were conducted using a semi-structured topic guide and centred around a life grid which documented knowledge regarding antimicrobial agents, prescribing practice and influences at each point in the medical career.11,12 The topic guide for the interview and representation of the life grid are available as Supplementary data at JAC Online (http://jac.oxfordjournals.org/). The interviews were taped with participants’ permission and fully transcribed. The interviews were analysed using QSR NVivo8 Version 2.0.161 computer program for analysing qualitative data according to the principles of framework analysis.13,14

Emerging themes were shared and debated by a multidisciplinary team comprising social scientists, microbiologists, a pharmacist and a general practitioner. This process has been found to heighten reflectivity, that is to say it makes researchers more aware of how their own values and prejudices can influence the data analysis processes.15 To enhance the validity of our analysis we consciously looked for statements (deviant data) that contradicted our emerging analysis.16

Results

A total of 71 NCHDs (29%) responded to the invitation indicating that they were willing to participate in the study. A total of 22 participants were invited to interview. There were 14 male and 8 female participants with 7 interns (pre-registration house officers), 4 senior house officers, 5 registrars and 7 specialist registrars. Six participants were working in surgical disciplines and 16 in medical specialities or anaesthesia.

The most significant influence on prescribing practices was the opinion of more senior colleagues in the team to which the NCHD was assigned. This was especially important in the earlier years of ones medical career when doctors (particularly pre-registration house officers) have limited autonomy (Table 1, quotation 1). The majority of participants felt that the system of hierarchical instruction was beneficial in that it afforded them the support they required with their early prescribing decisions (Table 1, quotation 2). Most participants preferred it if their seniors gave instructions that were clearly based on firm evidence and were concerned if instructions were based on habit or individual preferences (Table 1, quotations 3 and 4).

It was evident that the level of explanation of the rationale for prescribing decisions provided to younger colleagues varied between medical and surgical specialties and between different consultant-led teams within a single specialty (Table 1, quotations 3 and 4). Similarly, teams varied in their reliance on evidence-based practices for antimicrobial prescribing. Individual teams had patterns of prescribing and standard ways of doing things with which new team members had to become familiar. Conforming to individual team practices emerged as an important influence on participants’ antimicrobial prescribing decisions (Table 1, quotations 5 and 6).

Moving through the medical career, personal experience became a more dominant influence in antimicrobial prescribing decisions (Table 1, quotations 7 and 8).

Decisions made at the stage of registrar or senior registrar tended to emphasize the doctors’ individual assessment of the patient and application of their individual tacit knowledge base. The influence of senior colleagues was still present at this stage although a lot more autonomy was afforded to the participants. In many cases at this career stage the doctor had greater input into decision making because of more confidence in their ability to argue for alternative approaches (Table 1, quotation 9). Participants generally felt that while undergraduate training in medical microbiology provided information on the scientific aetiology of infections, they considered that it left interns insufficiently trained to make autonomous antimicrobial prescribing decisions (Table 1, quotations 10 and 11). A number of changes that could be made to the syllabus in order to make undergraduate teaching more relevant were suggested (Table 1, quotation 12). It was also suggested that continuing educational and career development activities in the field of antimicrobial agents be made available to doctors following qualification, in order to keep informed on appropriate usage and updated on local antimicrobial resistance patterns (Table 1, quotations 13 and 14). It was felt that the microbiology department in the hospital was responsible for the dissemination of this information.

With respect to hospital guidelines on the prescription of antimicrobial agents participants recognized the value of such guidelines; however, in most cases they were not aware that such guidelines were currently available in the hospital (Table 1, quotations 15 and 16). Participants who were familiar with the intranet hospital guidelines suggested how these could be modified to ensure that they were more widely consulted (Table 1, quotation 17).

The views of five participants who completed their undergraduate education and pre-registration training in universities and hospitals in low-income countries appeared to differ from those who had graduated in Ireland. These participants (three from Sudan, one from Nigeria and one from Pakistan) described a greater emphasis on infectious disease at the undergraduate level and greater autonomy over prescribing decisions early in their career. More autonomy in prescribing decisions was connected with resource issues including less on-hand supervision and limited availability of certain antimicrobial agents (Table 1, quotations 18 and 19). Even when antimicrobial agents were available, participants seemed to feel more restrained in their prescribing, placing greater emphasis on the cost of the drug and...
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Table 1. Quotations from interviews with non-consultant hospital doctors relating to antimicrobial prescribing

<table>
<thead>
<tr>
<th>Instructions from seniors</th>
<th>Team preferences and prescribing practices</th>
<th>Developing individual experience and autonomy</th>
<th>On education and training</th>
<th>On guidelines</th>
<th>Non-consultant hospital doctor prescribing-international context</th>
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<tbody>
<tr>
<td>1. ‘I did what I was told, like all interns do’ (Male Specialist Registrar, Anaesthesia)</td>
<td>5. ‘When I was an SHO, you move around every six months and what you would have used, or what the consultant liked in one hospital, wouldn’t necessarily go in another hospital at all, you know? So to a certain extent you had to fit in a little bit with individual consultant preferences’ (Female Specialist Registrar, Haematology/Medical Oncology)</td>
<td>7. ‘I would love to say (knowledge about antimicrobial prescribing was) from college, from my studying; but you don’t remember stuff that you study, you remember stuff that happens to you from experience’ (Female SHO, Neurology)</td>
<td>10. ‘What you learned in lectures was not real; because lectures is more theory—how the antibiotic works, the mechanisms really. The lectures is (sic) not practice’ (Female SHO, Neurology)</td>
<td>15. ‘It’s just that I don’t know that there are any local guidelines, there may be’ (Male Specialist Registrar, Endocrinology)</td>
<td>18. ‘The intern would not definitely decide here (Ireland) because he has SHO and he has registrar to supervise him, but there (Nigeria) you may have to make the decision—the decision may have to be yours’ (Male Registrar, Ear, Nose and Throat)</td>
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<td>2. ‘It’s a good system because he (Senior colleague) probably knows better than you; he may have a good reason’ (Male Registrar, Ear, Nose and Throat)</td>
<td>6. ‘There were quite a lot of differences in what was acceptable and what wasn’t acceptable (in different teams?). It was a bit bizarre to be honest, because obviously patients were coming in with the same clinical indications’ (Female Specialist Registrar, Haematology &amp; Medical Oncology)</td>
<td>8. ‘Your experience increases after a year…. You’ve seen certain clinical scenarios before, it’s more straightforward. If a patient was on x and y antibiotics and from their clinical picture over the last day or two they weren’t working, you will know a fair amount more than you would’ve at intern level…. your knowledge basically builds up and your experience builds up—you’ll have seen a lot of it before, and that would, in theory, I would think or hope would improve your decisions’ (Male Registrar, Geriatrics)</td>
<td>11. ‘There isn’t much application of the theoretical microbiology you study into the clinical or into ward teaching’ (Male Specialist Registrar, Paediatrics)</td>
<td>16. ‘Well one thing that few hospitals have and I think would be a good idea if they did have, are widely available guidelines from the consultant microbiologists in terms of what are the particular antibiotics that they recommend’ (Male SHO, Surgery)</td>
<td>19. ‘(Prescribing is) guided mainly by the availability of the drugs themselves; the cost of them. Because I did my internship in different parts; so I did part in the capital of my country (Sudan) where most of the drugs are available and people can afford them. But I did part of my internship in another part of the country where some of the antibiotics are not available or affordable by most of the people there’ (Male Registrar, Obstetrics and Gynaecology)</td>
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<td>3. ‘Most of the time there’s no rationale. In practice senior colleagues are getting it from more seniors and in so the practice is going into the different generations; rather than being evidence-based’ (Male Specialist Registrar, Gastroenterology)</td>
<td>14. ‘More teaching of interns would be a good idea… if there was more of a sort of feedback on their own prescribing; it would be a better learning experience’ (Male SHO, Surgery)</td>
<td>9. ‘Whereas at the start you just did what you were told without question because you had so little experience, but now if you don’t feel it’s indicated you can question it a bit more and say “do we really need that”…. You just have a bit more confidence in your judgement’ (Female Intern, Surgery)</td>
<td>12. ‘(We) should have dedicated ward rounds for the course (medical microbiology)—that we would go and see someone of interest from a microbiology point of view’ (Male Intern, Neurology)</td>
<td>17. ‘What’s wrong with the guidelines is there’s too much talk in it, if it had less talk and it was more like a flow chart or something; something to just look up or whatever… more user friendly’ (Female SHO, Neurology)</td>
<td>20. ‘It’s a good system because he (Senior colleague) probably knows better than you; he may have a good reason’ (Male Registrar, Ear, Nose and Throat)</td>
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<td>4. ‘I had very good consultants in ICU who had evidence it seemed, to back up everything. I was very fortunate’ (Female Specialist Registrar, Accident and Emergency)</td>
<td>13. ‘More teaching of interns would be a good idea’ (Female Intern, Surgery)</td>
<td>3. ‘Most of the time there’s no rationale. In practice senior colleagues are getting it from more seniors and in so the practice is going into the different generations; rather than being evidence-based’ (Male Specialist Registrar, Gastroenterology)</td>
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The individual circumstances of the patient than their counterparts who had graduated in Ireland.

A number of less significant influencing factors also emerged. There was evidence that participants sometimes felt under pressure to prescribe antibiotics, when they did not feel that they were necessary, from both nursing and other ward staff, and from patients and their relatives. Most participants seemed aware of and concerned about bacterial resistance to antimicrobial agents and recognized how inappropriate antibiotic prescribing contributed to this problem. However even those aware of the problems did not refer to this as a significant influence on their day-to-day prescribing practice. Participants did not describe
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Promotion by the pharmaceutical industry as significant influence on their antimicrobial prescribing decisions.

Discussion

Qualitative research is used in health services research to examine issues that are not amenable to quantification and in the context of prescribing research can be used to good effect to elucidate decision making among clinicians.\(^{7,18}\) We are not aware of previous qualitative studies that examine the issue of antimicrobial prescribing in hospitals. From the current study, antimicrobial prescribing decisions in the hospital studied appear to be based initially primarily on instruction passed down through a hierarchical system and subsequently on personal experience. Formal undergraduate education on antimicrobial agents, rationale for antimicrobial use, existing hospital guidelines and concerns about emerging resistance appear to be minor influences. Reliance on informal influences in clinical decision making documented here is consistent with previous research in hospital and primary care settings in the UK.\(^{19,20}\)

Although there was support among participants for the value of guidelines, with participants agreeing that they would be utilized if highlighted and made widely available in a user-friendly format, most were not aware of existing guidelines. Most participants agreed that it was important to keep up to date on new local antimicrobial resistance patterns and current recommendations regarding use of antimicrobial agents and considered that it was the responsibility of the microbiology department to disseminate this information. The participants identified a gap between the practical knowledge needed by interns to make appropriate antimicrobial prescribing decisions and that which they gain at undergraduate level.

The extent to which the findings of the present study can be generalized is uncertain as it was performed in a single hospital over a limited time period. One of the aims of the study was to use the qualitative data collected to inform a larger quantitative study. We are currently in the process of piloting a questionnaire, based on the findings of the study, which may be used to quantify the relative importance of each of the influences identified. By applying this questionnaire to a wider population of NCHDs we can test whether findings can be generalized to other hospitals.

Areas that emerge as meriting further study include the differences in the experience of participants who graduated and trained in low-income countries and the differences described between different disciplines.

Notwithstanding the limitations of the study the data collected highlight a number of issues that should be considered by policy makers seeking to influence antimicrobial prescribing in hospitals. The hierarchical structure within teams appears to be a critical influence in forming the antimicrobial prescribing practice of doctors early in their career. The personal experience acquired by doctors is highly valued by them and becomes embedded in the later antimicrobial prescribing practice of doctors. This suggests that winning active support of senior medical staff for prudent antimicrobial use guidelines is critical in achieving improved prescribing. Undergraduate education and availability of antimicrobial prescribing guidelines on the hospital intranet appears to have minimal impact on prescribing, and active promotion/marketing of prudent antimicrobial prescribing guidelines with personal contact may be necessary to achieve implementation.

Acknowledgements

We wish to acknowledge financial support from the Department of Health and Children and the participation and support of the medical staff at University College Hospital Galway.

Transparency declarations

None to declare.

Supplementary data

The topic guide for the interview and representation of the life grid are available as Supplementary data at JAC Online (http://jac.oxfordjournals.org/).

References