

Attitudes of community pharmacists to antibiotic dispensing and microbial resistance: a qualitative study in Portugal

Fátima Roque · Sara Soares · Luiza Breitenfeld ·
Ana López-Durán · Adolfo Figueiras ·
Maria Teresa Herdeiro

Received: 15 May 2012 / Accepted: 22 January 2013 / Published online: 9 February 2013
© Springer Science+Business Media Dordrecht 2013

Abstract *Background* The inappropriate use of antibiotics is considered a main cause of microbial resistance. This is an important public health problem. Community pharmacists have an important role in the management of drugs for outpatients. *Objective* Our study sought to explore pharmacists' knowledge, attitudes, perceptions and dispensing habits insofar as to antibiotics and microbial resistance. *Setting* The study was developed with community pharmacists in the North of Portugal. *Methods* Qualitative research in the form of focus groups (FG). Focus groups were conducted with 4–7 pharmacists, using a moderator. A topic guide was developed to lead the discussions, which were audio-recorded and transcribed. The study was carried out between December 2010 and March 2011 in the five districts of the Northern Health Region of Portugal (ARS-N). Pharmacists from different regions of each district were invited to participate in the study by an investigator responsible for the study. Participants were informed about the study and that sessions were

audio-recorded to facilitate data interpretation. They signed an informed consent form before taking part in the focus groups. The Ethical Committee of ARS-N was informed of this study. *Main outcome measure* Pharmacists' knowledge and perceptions on antibiotic use and microbial resistance, attitudes related to antibiotic dispensing habits, and pharmacists' suggestions to improve antibiotic use. *Results* A total of 6 focus groups were conducted with community pharmacists (n = 32). Attitudes related to the problem of resistance were attributed external responsibility, to patients, to physicians, to other pharmacies, and to veterinary consumption. Some attitudes were identified that could lead to antibiotic dispensing without a prescription. These attitudes are complacency, precaution and external complacency. *Conclusions* Portuguese pharmacists perceive that antibiotic use and bacterial resistance could be improved, showing a behavioural intention to improve antibiotic dispensing habits.

F. Roque · S. Soares · M. T. Herdeiro
Center for Cell Biology, University of Aveiro
(CBC/UA), Aveiro, Portugal

F. Roque (✉)
Research Unit for Inland Development,
Polytechnic Institute of Guarda (UDI/IPG),
Av. Rainha D. Amélia S/N., 6300-749 Guarda,
Portugal
e-mail: froque@ipg.pt

F. Roque
University of Beira Interior (UBI), Covilhã, Portugal

L. Breitenfeld
Health Sciences Research Centre, University of Beira Interior
(CICS/UBI), Covilhã, Portugal

A. López-Durán
Department of Clinical Psychology, University of Santiago
de Compostela, Santiago de Compostela, Spain

A. Figueiras
Consortium for Biomedical Research in Epidemiology & Public
Health (CIBER en Epidemiología y Salud Pública-CIBERESP),
University of Santiago de Compostela, Santiago de Compostela,
Spain

M. T. Herdeiro
Center for Health Technology & Information Systems Research
(CINTESIS/FMUP), University of Porto, Porto, Portugal

M. T. Herdeiro
Health Technology Research Center (CITS/CESPU), Vila Nova
de Famalicão, Portugal

Keywords Antibiotic dispensing · Antimicrobial drug resistance · Community pharmacists · Pharmacist attitudes · Portugal · Qualitative study

Impact of findings on practice

- A tailored interventions should be developed to improve the quality of pharmacists' practices related to antibiotic dispensing.
- Portuguese pharmacists are aware of the risks of resistance, when dispensing antibiotics.

Introduction

In recent decades, antibiotic resistance has become one of the main public health problems worldwide. Resistance is directly associated with increased use of antimicrobial drugs, thereby leading to a major clinical and public health problem [1–8]. As antibiotics become less effective due to the increased number of organisms that develop antibiotic resistance, the threat to disease management increases [2, 4]. The problem of antibiotic resistance leads to consequences such as increased health-treatment costs and a rise in new adverse reaction to antibiotics [9, 10].

Some factors have been indicated as the main causes of antibiotic resistance, and inappropriate use of antibiotics [2, 5, 11–14] is regarded as one of these. This incorrect use can be ascribed to both health professionals and consumers. Excessive use of antibiotics is attributed to inappropriate prescription by physicians and self-medication (particularly the use of leftover antibiotics from previous courses of treatment and acquisition from pharmacies without a prescription). These are three, potentially modifiable factors that would enable resistance to be reduced.

Given that self-medication is now a reality in Europe, especially in countries to the south and in the east [15, 16], possible forms of intervention should include pharmacists [17]. In Portugal, antibiotics may only be dispensed by community pharmacies under medical prescription, which means that actions to improve antibiotic use and combat self-medication must necessarily include community pharmacists.

Aim of the study

This study sought to explore pharmacists' knowledge, attitudes, perceptions and dispensing habits with respect to antibiotics and microbial resistance, with the aim of collecting information so as to design a questionnaire for use in further studies.

Methods

Study design

Qualitative research, in the form of focus groups (FGs), was designed to explore the knowledge and attitudes of pharmacists with regard to antibiotic resistance, dispensing and consumer demand. Focus groups are a type of group interview which enables researchers to collect qualitative data [18, 19]. This informal discussion about a particular topic, led by a moderator, with participants who share similar characteristics or common interests [18–20] and following a guide with a series of questions, helps to keep the discussion flowing and enables all the group members to participate, by not allowing one person to overshadow another [18–20]. This methodology is important as an exploratory research technique for obtaining data on a specific research subject [20]. We decided to use focus groups because they allow for interaction with all the group members and discussion based on personal experience and subjective points of view, so ensuring that all dimensions of the problem are debated [18, 21].

A topic guide was constructed, based on a review of the literature and a previous study with physicians [21], to facilitate identification of pharmacists' attitudes to antibiotics, bacterial resistance and dispensing habits ("Appendix"). Information in this guide was grouped into the following three categories: (1) knowledge and perception of antibiotic use and resistance; (2) antibiotic dispensing process; and (3) suggestions for improving antibiotic use.

Study population and sample selection

The study was conducted in a NUTS II (*Nomenclatura das Unidades Territoriais para Fins Estatísticos*/Nomenclature of Territorial Units for Statistics) area of Portugal defined by the Northern Regional Health Administration (*Administração Regional de Saúde do Norte/ARS-N*), which includes five geographical districts. To obtain information on all geographic areas, focus-group sessions were carried out in the five districts, from December 2010 to March 2011.

Pharmacists working in community pharmacies in the ARS-N defined area and drawn from different regions of each district were invited by the study's principal investigator (MTH) to participate in focus-group sessions. Participation of all pharmacists was on a volunteer basis, without any incentives.

Procedures

Focus groups were conducted with 4–7 pharmacists, using a pharmacist investigator (FR) as a moderator, who

followed the purpose-designed topic guide but allowed the discussion to flow for 60–90 min until there were no more new ideas. Participants were informed about the study and as to the fact that sessions were being sound-recorded to facilitate data interpretation. They were told that all content was confidential and that, in general, the data would be handled and processed without any of the participants being identified. Pharmacists signed an informed consent form before taking part in the focus groups, and the ARS-N was informed of the study. To avoid any possible interpretation biases, the audio-taped FGs were transcribed by a different investigator (SS), who was not a pharmacist and who coded the FG sessions with serial numbers (FG1, FG2, FG3, FG4, FG5 and FG6). The method used by the researcher for literal transcription was to listen to the tape and take notes. Four weeks after the last hearing of the tape, the same researcher played the tape once again, and the transcription was deemed to be concluded.

Analysis

Transcriptions were analysed by two researchers who identified and took note of the different ideas from each group. The information retained was discussed by the researchers and was classified into different pre-defined categories, in order to process the results. We chose not to use computerised analysing software because this is useful for analyses involving a larger number of interviews, which was not the case here.

Results

A total of six FGs were conducted with 32 pharmacists, 28 women and 4 men, in the five districts of Portugal's Northern Health Region. In one district (with biggest geographical dispersion), two FG sessions were held, with the aim of obtaining a total sample of over 30 pharmacists, in the line to literature [18, 22, 23], and other similar studies [21].

Knowledge and perception of antibiotic use and microbial resistance

All groups identified resistance to antibiotics as an important public health problem, even in primary care, but considered it to be a greater problem in hospital settings. Resistance to antibiotics in the case of urinary infections (all FGs), otitis (FG3) and otitis (FG3) was identified. All pharmacists mentioned that patients exerted great pressure on health professionals, such as physicians and pharmacists, to obtain antibiotics (FG1, FG4, FG5): "... patients think that antibiotics solve all their problems ..." and "... many people use

pharmacy as a first resort to solve their health problems, and when they think that an antibiotic is necessary, they often ask the pharmacy for it and insist that we supply it...". Some pharmacists (FG3; FG4; FG5) commented, "... they insist on obtaining an antibiotic... but when we explain the consequences of using an unnecessary antibiotic, some patients understand and don't insist anymore. But if we just said no, without providing an explanation relating to their health... they would insist and think that we didn't believe them". Another participant stated, "... I did not sell an antibiotic without a prescription and the patient then came back to show me the box he purchased at another pharmacy ...". In FG4, one pharmacist said, "... one mother told me, very angrily, that I made her spend the entire afternoon with her son in the hospital... and the physician prescribed the antibiotic she wanted ...". The most common situations giving rise to this demand for antibiotics are respiratory infections and more specific infections, such as tooth and urinary infections. Topical ophthalmic use was observed (FG4) to be an important problem that warranted discussion by professionals and the scientific community, "... patients with recurrent conjunctivitis insist on buying ointments containing antibiotics and they never go to the doctor ... this is an important problem, and nobody worries about this...consequences of this must be investigated ..."

Factors associated with development of resistance to antibiotics

Pharmacists identified the following four factors as being the main causes of resistance: (1) self-medication with leftovers from previous treatment, and/or acquisition of antibiotics at certain pharmacies without a prescription; (2) patients' non-compliance with the prescribed dosages; (3) excess/inadequate antibiotic prescription by physicians; and (4) excessive use of antibiotics in animals used for human consumption, without respecting withdrawal periods. An important cause was reported (FG5) to be the fact that physicians often prescribed inadequate dosages, while another group (FG3) mentioned the absence of the dosage in the prescription as a problem, "The prescription does not always include the dosage ... and we can only advise the patient on the standard dosage... we do not know the severity of the infection ... and the correct dosage depends on the severity ...".

One group (FG4) identified drug interactions with alcohol as an important cause and went to state that, when they informed patients that alcohol might interfere with the antibiotic activity, some chose to stop the treatment, "... alcohol consumption is also a problem... interactions between alcohol and antibiotics could increase resistances ... we advise patients for alcoholic risks, and many times they refuse stop drinking ..." Excessive prescription of the

newer generation of antibiotics was reported by another group (FG5) as being the main reason for the emergence of multiresistance.

One important factor mentioned by FG2 was the fact that the presence of antibiotics in domestic waste continues to occur because not all patients make a practice of returning surplus or expired medicines to the pharmacy. This situation contributes greatly towards resistance in the environment, which affects everyone.

All pharmacists attributed the problem of resistance to external causes, including patients, physicians, other pharmacies and veterinary consumption.

Antibiotic dispensing process

In all groups, pharmacists said that they were under pressure to dispense antibiotics without a prescription, and they all identified a number of factors which they perceived as contributing to this demand (Table 1). The main reasons identified by pharmacists for patients demanding antibiotics without a prescription and pressuring pharmacists into selling these could be broken down into two categories: one was linked to patients' lack of knowledge about antibiotics, inasmuch as they believed that antibiotics were the cure for everything and that previously taken antibiotics could be used for similar situations without the need for medical diagnosis; and the other was linked to patients' socio-economic situation, inasmuch as pharmacists in some FGs mentioned that patients demanded antibiotics without a prescription because they could not afford fees or private medical consultations, and could not miss work to see a doctor (Table 1).

When dispensing habits were discussed, pharmacists were under the impression that some pharmacies sold antibiotics without a prescription, yet they felt that this situation was becoming less widespread because the new generation of pharmacists was more sensitive to the issue and the population was generally more receptive to pharmacists' information. There were some specific situations, however, which pharmacists recognised as contributing towards antibiotics being dispensed without a prescription, both by others and themselves (Table 2). They identified some clinical situations in which they acknowledged having occasionally dispensed antibiotics without a prescription; this mainly occurred in cases where they knew the patient personally, and where the patient often brought the prescription to them at a later point in time.

Two focus groups (FG1, FG6) admitted that attitudes towards known patients tended to be different because pharmacists knew the individual patient's history and could expect the prescription to be handed in later. In FG3, this situation was recognised in the case of recurrent tonsillitis.

Table 1 Factors that lead to patient demand for antibiotics without a prescription

<i>Factors</i>	Reported by
Patients recognise and request specific antibiotics that were effective in a previous situation	FG1; FG2; FG3; FG6
Belief that an "antibiotic is the cure for everything"	FG1; FG4; FG5
Difficult access to health care	FG1; FG3; FG4
Patients cannot miss work (docked from salary)	FG1; FG3
Patients have no money to pay fees or private medical consultations	FG1; FG2; FG4
Antibiotics for travelling	FG4; FG5; FG6

FG focus group

Table 2 Factors that pharmacists recognised could lead them to dispense an antibiotic without a prescription

<i>Factors</i>	Reported by
Lack of packages for a complete treatment	All
Prescription over the telephone	All
Known patient/clinical history, such as recurrent tonsillitis (patients bring prescriptions later)	FG1; FG3; FG6
For specific infections, such as tooth and urinary infections (they know that doctors will prescribe)	FG3

FG focus group

Although one of the factors most cited as increasing resistance was patient non-compliance, all pharmacists claimed that, when dispensing antibiotics, they were in the habit of urging patients to comply with the treatment regimens. None however expressed any intention of monitoring patients. Pharmacists acquired their perception of non-compliance with antibiotic treatment in cases where patients came to the pharmacy requesting antibiotics to continue a course of treatment initiated with leftovers from a previous prescription, or patients returned packages of antibiotics to the pharmacy on the expiration date.

At some sessions (FG4; FG5) pharmacists relayed the importance of the practice of warning patients about the interactions between antibiotics and other drugs.

Insofar as generic drugs were concerned, pharmacists considered that neither these, nor the selection of active substance, nor dispensing habits had any influence on the increase in the consumption of antibiotics. Some pharmacists (FG3; FG4) noted, however, that the lower prices of generics could have the advantage of influencing treatment compliance.

Suggestions for improving antibiotic use

Lastly, we recorded suggestions for improving antibiotic use (Table 3). Pharmacists felt that community microbial-resistance studies were called for and that discussing these issues with all the stakeholders involved was vital for improving antibiotic use. Participants reported that there was little communication between physicians and pharmacists, and between primary care and hospital settings.

Discussion

This is the first qualitative study to be conducted in Portugal with the aim of exploring pharmacists' knowledge of and perceptions about antibiotic use and microbial resistance. The results obtained enable pharmacists' attitudes relating both to the perception and attribution of the problem and to dispensing habits, to be identified. The problem of resistance was ascribed to external causes, including patients, physicians, other pharmacies and veterinary consumption. Self-medication with leftovers and non-compliance with the recommended treatment were attributed to patients. These causes have been pinpointed by various authors [3]. A further factor mentioned by pharmacists was the fact that some patients dispose of antibiotics along with their domestic waste. Although no studies have been conducted to evaluate the impact of antibiotics contained in household waste, the presence of wastewaters with antibiotics was evaluated by a Portuguese study [24] in which the authors analysed the presence of tetracyclines in four samples of hospital wastewater effluent and their eventual status in municipal wastewater

treatment plants (WWTPs). Minoxiline and tetracycline were found in 41.7 % of the samples; epitetracycline and doxycycline were found in 25 and 8.3 % of the samples, respectively. Their WWTP removal rate ranged from 89.5 to 100 % [24].

Pharmacists are of the opinion that the main factor associated with resistance is the great number of prescriptions, along with the prescribing of new-generation drugs, an external factor attributed to physicians. It is interesting to compare these pharmacists' views to physicians' attitudes studied in Spain, where the latter attributed the problem of resistance to pharmacist sales without a prescription [21]. Comparison of our results to those obtained from the Spanish study would seem to show that an important attitude common to all health professionals is that of attributing responsibility for resistance-related problems to others. In a recent review [25] of attitudes to antibiotic misprescription, the authors identified the responsibilities of others as a factor underlying misprescription, and went on to say that this factor motivates the belief that other professionals are responsible for generating antibiotic resistance. This similarity between pharmacists and physicians could explain the findings obtained in previous studies, namely, that self-medication and prescription are practices affected by the same cultural dimensions [26], thereby suggesting that in countries with a higher incidence of self-medication with antibiotics, the prescription rate is also high [16]. Inappropriate use of antibiotics in a population can substantially increase with change of location [27], which shows that attitudes to and habits of prescribing and dispensing medicine have an important role in antibiotic use. A recent study [2] revealed discrepancies in physicians', pharmacists' and nurses' respective levels of awareness as to frequently encountered resistance and the strategies available for limiting this phenomenon. In another study [28], pharmacists were more concerned about antibiotic resistance than were physicians, but the physicians' and pharmacists' knowledge of and beliefs about the effects of antibiotics were nevertheless very similar.

Among the attitudes to dispensing habits encountered by this study, those specifically relating to the dispensing of antibiotics without a prescription were attributed to external responsibility, complacency and precaution. External responsibility was variously ascribed to the health system, to physicians and to patients. When attitudes specifically relating to dispensing quality and information given to patients were considered, a positive attitude was observed with regard to informing patients, while engaged in dispensing, about the need for therapeutic compliance. However, there was an attitude of indifference, both to achieving patient compliance once the customer had left the pharmacy and to identifying possible interactions

Table 3 Recommendations proposed by the different Focus Groups for improving antibiotic use

Factors	Reported by
Periodic determination of resistance in the community	FG1; FG3
Regulatory measures to avoid prescription of new molecules	FG5
Disclosure of new antibiotic resistance and hospital studies to primary health care professionals	FG1
More interaction between pharmacists and physicians in pharmacotherapy decisions, and between primary care and hospitals	FG1;FG3; FG5
More control of antibiotic dispensing without a prescription	FG3; FG2
More information and awareness about the impact of antibiotics for animals	FG1; FG5
Educational intervention for health professionals and for the population	All

FG focus group

between antibiotics and other drugs in the same patient. One Portuguese-based study [29] into university students' attitudes to antibiotic use showed that their perceptions about antibiotic compliance was incorrect, which in turn may mean that the information conveyed by pharmacists and physicians had not been properly understood by these patients. This could be attributed to the above-mentioned indifference of pharmacists who did not carry out any type of follow-up of patients during their antibiotic treatment.

As reported in earlier studies [30], pharmacists tend to differentiate between well-known and unknown customers, mainly in recurrent situations, such as tonsillitis, and in clinical situations (dental and urinary infections) where, pharmacists argue, physicians will definitely prescribe antibiotics. The prescribing of antibiotics in these clinical situations has been widely discussed in the literature [31–33], and has revealed the need for educational interventions for physicians and pharmacists aimed at improving antibiotic use.

In recent decades, the professional activity of the community pharmacist has changed dramatically, as has the role of the community pharmacy. A considerable number of patients see pharmacists as first-line health professionals for solving their problems, and they exert great pressure on such pharmacists to obtain antibiotics without a prescription. In line with other European studies [9, 34], all FGs mentioned that illegal antibiotic dispensing without a prescription is still a reality. In our study, however, pharmacists felt that this was not as commonplace as it had been 5 years previously. A factor which has contributed towards this improvement in the quality of pharmaceutical care is the increase in the number of licensed pharmacists and the improved training of pharmaceutical technicians.

Pharmacists acknowledged that the relationship with physicians is very complex and that cooperation between these professions, in primary care, is very low. This is an issue reported by some authors [35]. Some pharmacists feel that a better relationship between health professionals, with periodic discussions about patient-related problems, coupled with the intervention of pharmacists in pharmacotherapy decision-making, could improve antibiotic use. Cooperation in primary care between physicians and pharmacists has yielded successful outcomes in the management of some diseases [35–39]. The important role of the pharmacist is cited by Coenen [40] as being one of the factors responsible for better use of antibiotics in the Netherlands than in Belgium, since in Belgium pharmacotherapy is not discussed on a regular basis in local groups involving pharmacists as it is in the Netherlands. Additionally, consumption in Belgium is nearly three times that of the Netherlands [41].

Our study has some limitations, which include specific limitations relating to the use of a qualitative study and the

fact that the pharmacists' discussion could be biased in view of their tendency to provide legally acceptable answers. Moreover, the low number of participants plus the fact that the focus group sessions were solely in the Northern Region of Portugal, mean that the study's conclusions cannot be freely generalised to other countries.

Conclusions

Some of the pharmacists interviewed were aware of their important role in fighting antibiotic resistance. This exploratory study enabled us to identify pharmacists' attitudes to the problem of antibiotic resistance and dispensing practices, and led pharmacists to reflect on their behaviour during the dispensing process. It was suggested that information on community-based resistance measures and enhanced interaction between physicians and pharmacists could improve antibiotic use.

The results obtained from this study are important for designing a questionnaire to assess pharmacists' attitudes and subsequently developing tailored interventions to improve the quality of pharmacists' antibiotic-dispensing practices.

Acknowledgments The authors wish to express their sincere thanks to Michael Benedict for reviewing and revising the English of this manuscript.

Funding This work was supported by Foundation for Science and Technology (*Fundação para a Ciência e Tecnologia*) grants [PTDC/SAU-ESA/105530/2008] and [PEst-OE/EGE/UI4056/2011] from the Portuguese Ministry of Science & Education, and Health Research Fund (*Fondo de Investigación Sanitaria*) grants [PI081239 and PI09/90609] from the Spanish Ministry of Health.

Conflicts of interest The authors declare that they have no conflicts of interest.

Appendix

Moderator's guide for focus groups

- “What are your opinions about the latest campaigns on the correct use of antibiotics? (latest years, type of campaign—pamphlets in pharmacies, television advertisements).”
- “Are there pharmacists that dispense antibiotics without a prescription? What about 5 years ago? Were there any?”
- “What are the causes of antibiotics being dispensed without a prescription? In case of no answer being forthcoming, specify: