BMJ Open

Understanding antibiotics dispensed without medical prescription behaviour: a qualitative study on Spanish pharmacists

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-015674
Article Type:	Research
Date Submitted by the Author:	05-Jan-2017
Complete List of Authors:	Vazquez-Lago, Juan; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine Gonzalez-Gonzalez, Cristian; Universidade de Santiago de Compostela, Department of Preventive Medicine and Public Health - Faculty of Medicine Lopez-Vazquez, Paula; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine Taracido, Margarita; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine; Centro de Investigacion Biomedica en Red de Epidemiologia y Salud Publica Lopez, Ana; Universidade de Santiago de Compostela, Department of Clinical Psychology and Psychobiology - Faculty of Psicology Figueiras, Adolfo; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine; Centro de Investigacion Biomedica en Red de Epidemiologia y Salud Publica
Primary Subject Heading:	Qualitative research
Secondary Subject Heading:	Health services research, Pharmacology and therapeutics, Public health
Keywords:	Organisational development < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Public health < INFECTIOUS DISEASES, PRIMARY CARE, QUALITATIVE RESEARCH

Understanding antibiotics dispensed without medical prescription behaviour: a qualitative study on Spanish pharmacists.

Authors:

Juan M Vazquez-Lago (M.D.) (M.S.),[1] Cristian Gonzalez-Gonzalez (M.S.),[1] Paula Lopez-Vazquez (Ph.D.), [1] Margarita Taracido (Ph.D.),[1,3] Ana López (Ph.D.),[2] Adolfo Figueiras (Ph.D.).[1,3]

Author affiliations:

1. Department of Preventive Medicine and Public Health, University of Santiago de Compostela, Santiago de Compostela, A Coruña (Corunna), Spain.
2. Department of Clinical Psychology and Psychobiology, University of Santiago de Compostela. Santiago de Compostela, A Coruña, Spain.
3. Consortium for Biomedical Research in Epidemiology & Public Health (*CIBER en Epidemiología y Salud Pública - CIBERESP*), Spain.

Name and address for correspondence and reprint requests:

Juan M. Vázquez-Lago

Department of Preventive Medicine and Public Health,

Clinic Hospital of Santiago de Compostela,

c/Choupana s/n.

15.706 Santiago de Compostela (A Coruña), SPAIN

Phone number: (+34) 646261229 / (+34) 981956116 / (+34) 881540306

Fax number: (+34) 981950406

E-mail: juan.manuel.vazquez.lago@sergas.es

Word count:

Abstract: 294

Text: 3270

ABSTRACT

Objective: To investigate community pharmacists' knowledge, attitudes, perceptions and habits with respect to antibiotic dispensing without medical prescription in Spain.

Methods: A qualitative research using focus groups method (FG) in Galicia (north-west Spain). FG sessions were conducted using a moderator. A topic guide was developed to lead the discussions, which were audio-recorded to facilitate data interpretation, and transcription. Proceedings were transcribed and interpreted by an independent researcher.

Setting: Community pharmacies in Galicia, region Norwest of Spain.

Participants: Thirty pharmacists agreed to participate in the study, and a total of 5 FG sessions were conducted with 2-11 pharmacists. We sought to ensure a high degree of heterogeneity in the composition of the groups to improve our study's external validity. Pharmacists' participation was made subject to no gender or age restrictions, and an effort was made to form FGs with pharmacists who were both owners and non-owners, provided in all cases that they were OCP-registered community pharmacists. For the purpose of conducting FG discussions, the basic methodological principle of allowing groups to attain their "own structural identity" was applied.

Main outcome measurements: Community pharmacists' habits and knowledge with regard to antibiotics, and identify the attitudes and/or factors that influence their being dispensed without medical prescription.

Results: Pharmacists attributed the problem of antibiotics dispensed without medical prescription and its relationship with antibiotic resistance to the following attitudes: external responsibility (doctors, dentists and the national health system); complacency; indifference; and lack of continuing education.

Conclusions: Despite being a problem, antibiotic dispensing without a medical prescription is still a common practice in community pharmacies in Galicia, Spain. This practice is attributed to complacency, indifference and lack of continuing education. The

problem of resistance was ascribed to external responsibility, including that of patients, physicians, dentists and the national health system.

Keywords: Community pharmacy; Antibiotic dispensed; Public health; Infectious diseases, qualitative research.

Strengths and limitations:

1.- Results could also be compromised due to the intrinsic characteristics of the pharmaceutical system in Spain.

2.- Focus group technique seeks the interaction of all the members of the group and ensures identifies all dimensions of the problem investigated while simultaneously increasing the subjective validity of each identified idea.

3.- Proceedings were transcribed and interpreted by an independent researcher. Any points of disagreement were discussed and resolved by consensus.

4.- Possible lack of transferability of findings to health systems in other countries.

INTRODUCTION

Antibiotic resistance poses a major threat to clinical eficacy and an important problem for global public health. Resistance is an inescapable consequence of antibiotic use [1] but increases drastically with misuse and abuse. [2,3] It is thus imperative to improve antibiotic use,[4] particularly in outpatient settings where 90% of consumption occurs.[5]

One of the chief loopholes requiring attention is the dispensing of antibiotics without a prescription, a major problem in some countries.[6] Whereas outpatient use of antibiotics is restricted to prescription-based consumption in northern Europe, the USA and Canada, access to antibiotics dispensed without medical prescription is nevertheless commonplace in the rest of the world.[6,7,8] In Spain, dispensing antibiotics legally is done only through prescriptions and the National Health System (NHS) covers the expenses of almost the entire population.[9] Population density in Galicia is 92.6 inhab/km^2, similar to the European average. Population density decreases as one moves inland from Atlantic fringe. Consequently, distances to a given population's designated health centre tend to increase. In this way, community pharmacists are the first point of contact for patients as part of the health care team. Even so, up to one third of all outpatient antibiotics dispensed are not prescribed by physicians.[2,10] Despite the fact that the EU encourages Member States to restrict the use of systemic antibiotics and recommends that such drugs be exclusively consumed under medical prescription, the dispensing of antibiotics without prescription is still a common practice.[11]

Accordingly, this study sought to conduct a qualitative analysis of community pharmacists' knowledge, attitudes, perceptions and habits vis-à-vis antibiotic dispensing in Galicia, Spain.

METHODS

Study design

We used the focus group (FG) method to ascertain pharmacists' attitudes, knowledge and views concerning the dispensing and use of antibiotics in Galicia, Spain. The focus-group (FG) method was used to explore community pharmacists' habits and knowledge with regard to antibiotics, and identify the attitudes and/or factors that influence their being dispensed. We decided to use the focus-group technique because the interaction of group members tends to ensure that all the dimensions of the problem assessed are brought to

light, information is simultaneously obtained on the subjective validity of various members of the group, and in addition, it is a fast technique for generating such information.[12] A theoretical model based on a previous systematic review was constructed for the purpose of drawing up an agenda, which was to be followed during the group sessions to facilitate the identification of attitudes and/or factors.

The program for conducting meetings in the various FGs was designed with a dual purpose, namely, to address: (i) the dispensing of antibiotics without a prescription; and (ii) individual points of view regarding antibiotic-dispensing practices among pharmacists. Basing our study on a previous one undertaken on a population of physicians [13] and adapting it to the specific characteristics of pharmacists, we defined the script in attempt to cover the following factors/attitudes: complacency; indifference; external responsibilities and lack of continuing education. For the purposes of clarity and ease of comprehension, the four attitudes were defined in table 1.

Study population and settings

In Spain, many drugs, including antibiotics, may only be dispensed under medical prescription. The dispensing of drugs takes place in community pharmacies, which must be owned by a registered pharmacist.

The study population comprised community pharmacists in Galicia. Galicia is a region in north-west Spain, with a population of around 2,779,000; almost 100% of these people have access to health care delivery and 31% are pensioners. Population density in Galicia is 92.6 inhab/km^2, similar to the European average. Population density decreases as one moves inland from Atlantic fringe. Consequently, distances to a given population's designated health centre tend to increase. It's in this way that pharmacists become the first patient contact with the health system to consult their health problems.

Holding of focal group sessions

With the aid of the Official Colleges of Pharmacists (OCP), project information was distributed to all community pharmacists with a goal of encouraging participation in the FGs. FG sessions were designed to be held with pre-established number of participants between 5 to 10 pharmacists in attendance in Galicia.

We sought to ensure a high degree of heterogeneity in the composition of the groups to improve our study's external validity. Pharmacists' participation was made subject to no

gender or age restrictions, and an effort was made to form FGs with pharmacists who were both owners and non-owners, provided in all cases that they were OCP-registered community pharmacists. Sessions were chaired by a moderator who was a specialist in the field, following a script to ensure comparability among groups.

For the purpose of conducting FG discussions, the basic methodological principle of allowing groups to attain their "own structural identity" was applied.[14] This afforded an opportunity to discuss individual experiences and then start the group discussion. Only in the latter stages of the FG sessions did the moderator introduce discussion topics (following the guide) which had not been discussed.

FG sessions took place at OCP meeting rooms. All FG sessions were recorded and lasted for 45-70 minutes. The sessions ended when the information being provided by the participants yielded no new ideas. To prevent any possible interpretation biases, the proceedings were transcribed by an independent researcher (MTT).

Ethical considerations

This study was approved by the Galician Clinical Research Ethics Committee. All the pharmacists were informed that the FG sessions were to be recorded and transcribed, and that no-one attending would be personally identified in the study results.

Analysis

Analysis of the transcripts was an iterative process undertaken by two independent researchers (CGG and JVL). The researchers carefully read the transcriptions to structure the data properly. This allowed for greater in-depth study and familiarisation with the data, and decreased the likelihood of researcher bias. Thematic and discursive analysis was used to examine the data, identifying different ideas and sentences that were obtained from the different FGs and organisation of topics, with text excerpts serving as units of analysis. The next step was the association between the groups' ideas and the pre-established variables. The researchers then compared thematic analyses and analysed emerging issues. Any points of disagreement were discussed and resolved by consensus. A computerised format was not necessary used to process the results because was not involved a large number of interviews.

RESULTS

Five FGs were formed. A total of 30 pharmacists -56.7% women, 43.3% men- participated in the FGs. Our qualitative approach indicated that the influence of the following 4 variables was considered relevant when it came to dispensing antibiotics over the counter.

External responsibility

According to the conclusions of all the groups, one of the most influential variables at play when a pharmacist dispensed an antibiotic without a prescription was external responsibility, something that was seen to rest with two types of health professionals, namely, physicians and dentists.

"*I think that doctors also give them* [antibiotics] *out very easily.*" (FG5, W1). The external responsibility of physicians was viewed by 100% of the FGs as being one of the most influential variables behind the inappropriate dispensing of antibiotics (Table 2). Likewise, another important variable was dentists' responsibility. All the FGs agreed that the latter were in the habit of issuing a large number of prescriptions by telephone, i.e., "*Patients come in saying, I just talked to my dentist and he told me to take an antibiotic for 5 days, and that I must pass by his surgery.*" (FG3; M2). The groups also saw dentists as a source of unnecessary antibiotic prescriptions, i.e., "*When dentists are going to remove a tooth, they'll prescribe amoxicillin-clavulanate just like they prescribe ibuprofen.*" (FG1; M1) (Table 2).

The NHS was rated as being one of the main culprits. Pharmacists said that poor access (space-time) to physicians was an influential factor when antibiotics were dispensed without medical prescription, i.e., "*Another problem is all the time it takes to see a doctor: accessibility is always faster at a pharmacy.*" (FG2; M2) (Table 2).

Another important variable was the number of prescriptions prescribed in private insurance versus the NHS, with most FGs reporting i.e., "*Ten times more antibiotics are given in private insurance than in the NHS*" (FG2; M1).

Lack of continuing education

Lack of continuing education was considered a relevant factor by 80% of the FGs (4/5) in any case where a pharmacist dispensed antibiotics without a prescription (Table 2). As shown above, lack of continuing education can be viewed from different standpoints, e.g., "*In specific diseases, there is a range of antibiotics and you start with the oldest.*" (FG3; W3).

Age might be a confounding factor when analysing this variable, in that, "*Older pharmacists give out antibiotics much more readily.*"(FG2, M1), and, "*Young people give out fewer antibiotics.*" (FG3; W3).

Lack of knowledge could also may be associated with the occurrence of antimicrobial resistance. *"I think that issue of resistance has recently begun, not so long ago…"* (FG1, W2).

Complacency

In the five FGs (100%), complacency was seen as an important variable (Table 2), i.e., "*Many people give them to retain patients.*" (FG4; W1). A contributory factor was the different treatment accorded to regular and non-regular customers, i.e., "*Sometimes, I give them to regular patients*." (FG1; M1).

In essence, complacency is yielding to pressure when a given patient wants an antibiotic: "*When you know the customer, you try to convince him, but in the end, if he keeps on insisting, you give it to him*." (FG2; W1); and, "*If they come to get amoxicilin and then start insisting, you give it to them*." (FG5; W1). Indeed, 60% of the FGs regarded patient pressure as an important factor when it came to dispensing antibiotics without a prescription. From the viewpoint of pharmacists, the current percentage ranges from 5% to 20%.

Indifference

Participants in two FGs laid emphasis on the lack of communication between community pharmacists and other health-care professionals, chiefly physicians. The lack of communication was indirectly associated with indifference, i.e., "*I give you amoxicillin-clavulanate… but you go to your doctor and bring me the prescription. That way I feel I'm blameless.*" (FG5; W2). Approaches such as this show mutual consent and indifference among professionals, along with inappropriate attitudes to prescribing and dispensing antibiotics.

In a third FG, the following statements were made: "*The two professions are hardly involved with each other, there are no close ties, so that we criticise our mistakes but don't value our successes*"; and, "*Sometimes I dispense an inappropriate antibiotic because I don't have the time to contact the patient's physician.*" (FG2; W1) (Table 1). Although a lack of communication was identified, no suggestions for improvement were made.

Indifference is other possible way to contribute to develop microbial resistances. *"It is difficult to understand (patients) why resistance is generated, I mean, surely you speak to a person of resistance and it sounds; Now, trying to explain how the resistance is generated, you know, I mean, an effective way to make them understand that, if the antibiotic is taken after and are not going to take effect"* (FG1, W2).

There was a very important variable among pharmacists, namely, "*In addition to being health-care professionals, we are also businessmen.*" (FG2; M2). Businessman status is an extremely important factor when analysing the community-pharmacist profession in Spain. This statement reflects it: "*Take it home. If you get better, don't take it, just bring it back to me! ...and most people bring it back.*" (FG2; W1), a variable that could be defined as "delayed dispensing". Delayed prescriptions are those that are written but are only used if the symptoms do not improve.[15] Delayed dispensing of antibiotics can thus be defined as the dispensing of antibiotics for a patient, on the condition that they are not to be used immediately but only in the event that the symptoms fail to improve.

DISCUSSION

This is the first qualitative study to be conducted in Spain that explores pharmacists' knowledge of and attitudes to antibiotic use and its relationship with microbial resistance. Our study shows that antibiotics dispensed without medical prescription was attributed to complacency, indifference and lack of continuing education. The problem of resistance was ascribed to lack of continuing education, indifference and external responsibility, including patients, physicians, dentists and the NHS.

We chose a qualitative design to perform this study because it helped us to better understand the processes and realities of the problems currently confronting public health.[16] We were interested in a full, detailed description as well as concept analysis and theory generation. Since there was a theory that we could corroborate and it was hoped that a theory might arise from systematically collected data, grounded theory offered the most appropriate method.[17] The use of the focus group in the sphere of health is indicated and validated where the aim is to investigate what participants think and why they think like this, enabling data to be generated which could not be attained by other techniques. [18, 19]

Antibiotics dispensed without medical prescription is a problem in Spain. The statements made by the different FGs corroborate what previous studies have concluded, namely, that antibiotic dispensing without a prescription is a phenomenon that exists in Spain.[20,21] This conclusion was reached by all the FGs, notwithstanding the fact that there were small variations among them in terms of pharmacists' opinions regarding the attitudes responsible for this practice. Evidence has been put forward to show that the dispensing of antibiotics without medical prescription rises to 30% in Spain.[11] Our study reveal that, from the viewpoint of pharmacists, the current percentage ranges from 5% to 20%, although they thought that this percentage may have been underestimated.

Our findings have been reinforced by studies conducted elsewhere. As in our case, in these other settings a prescription is required to obtain an antibiotic, and a high percentage of self-medication and antibiotics dispensed without medical prescription at community pharmacies was likewise detected.[22] Nevertheless, the estimates of the pharmacists who participated in our FGs were lower than those of other studies conducted in the same environment. The latter studies put the percentage of antibiotics dispensed without prescription at 65.9%.[23] These results were only to be expected, however, since the pharmacists that we questioned about inappropriate dispensing were the very ones responsible for doing this.

Analysis of *lack of continuing education* showed a difference between professionals of different ages. This situation may possibly be due to: (1) increased training of new professionals in the antibiotics field, since it has been in the last ten years when the problem of resistance has had major social, scientific and clinical repercussions; (2) the fact that younger people are usually not pharmacy owners, which means that sales levels have no direct impact on their salaries and that any request to dispense antibiotics without a prescription will therefore be met with a firm refusal; and, (3) the fear factor, possibly linked to the major fear felt by young pharmacists on dispensing antibiotics, even though none of the FGs mentioned this variable.

Studies conducted in other settings using the same methodology have reached similar conclusions regarding the variables influencing the time taken to dispense an antibiotic, as being the external responsibility of physicians and patients; however, they also attach great importance to other variables, such as economic interest. [24] Economic interest is strongly linked to variables such as patient loyalty, e.g., in our environment, the dispensing of non-prescription antibiotics was found to increase in cases where patients were

known.[22] A study conducted in our setting concluded that there was an association between the pharmacist' age, the fact of owning a pharmacy, the patient's age and sex, and the workload in terms of higher or lower drug-dispensing levels. While these results cannot be directly extrapolated to our study because they would have to be restricted to antibiotic dispensing, they nonetheless show the variables which have an influence when a drug is dispensed, and these have proved relevant in our study. [25] The fact that here in Spain some community pharmacists are also business owners is a factor that has not been taken into account in studies conducted on this population. This variable emerged directly in one focus group and indirectly in others.

The *difficulty of spatiotemporal access* to physicians was another variable that emerged in the FGs. There is evidence in the literature to confirm that the proximity of a pharmacy decreases the demand for primary care. [26] Lack of communication with other health professionals, particularly physicians, due different variables such as the attitudes and perceptions of different professionals, is something that has already been studied in our setting. [27] Our study reinforces the idea of the need to improve pharmacist training programmes and the relationships among health professionals.

Complacency is a factor that has been studied by other research groups. The ease with which an antibiotic is dispensed to a patient is a variable that other studies have confirmed.[28] Our results are comparable with those yielded by other professionals in the same setting. Conclusions reached about physicians show that the determinant factors of antibiotic prescribing are fear, complacency, lack of continuing education and external responsibility.[12] Factors such as lack of continuing education and external responsibility show great influence in both studies, when it comes to prescribing and dispensing antibiotics. Both studies report the external responsibility of other professionals as being one of the main sources of malpractice, i.e., the notion of other professionals being perceived as the main culprits. Indeed, external responsibility is a common variable among health professionals, especially those who state that they have no time to give explanations, and this is the reason for their malpractice. [29]

Our results are also comparable to those of a recent qualitative study undertaken in Portugal. This latter paper concludes that attitudes related to the problem of resistance were attributed to the external responsibility of patients, physicians, other pharmacies and veterinary use.[30] In our study, external responsibility was attributed to physicians, dentists and the NHS. These results are extremely interesting because these attitudes,

which were identified in two different countries, could open the way to designing specific interventions at a Euro-regional Galicia-Northern Portugal level.

Strengths and weaknesses

One limitation is the low number and the source of the participants (community pharmacists from a specific area of Spain, who are not necessarily representative of all community pharmacists working in Spain), something that restricts the study's generalisation to other areas or countries. The generalisation of the results could also be compromised due to the intrinsic characteristics of the pharmaceutical system in Spain, governed by laws that may differ with respect to other countries. However, the study conducted in Portugal yielded similar results.[29] Another possible study limitation is that one of the FGs failed to attain the pre-established minimum number of participants. Nevertheless, the conclusions drawn from this FG did not differ significantly from those of the other groups. Among the study's advantages is the fact that interaction among FG members generated ideas about antibiotics and resistances, which would otherwise have been difficult to obtain.[16] There are several previous studies which corroborate our findings both in our and other settings, thereby increasing the reproducibility and validity of our study.[12,21,25,28]

CONCLUSIONS

Once attitudes/knowledge associated with inappropriate dispensing have been identified, interventions can be designed to focus on these shortcomings, so as to improve antibiotic use and contribute to minimising resistance.[31] Pharmacotherapy-based interventions on community pharmacists must be undertaken to prevent errors due to lack of knowledge. This also implies the need to bear in mind the specific functions of pharmacists as health professionals. Not only are publicity campaigns to reduce antibiotic use necessary, but they need to be more direct if they are to have a major impact on health professionals and the general population alike.

LIST OF ABREVIATIONS

1.- FG: focus groups
2.- M: Man
3.- NHS: National Health System
4.- OCP: Official Colleges of Pharmacists
5.- W:Woman

Contributorship statement:

All authors have contributed:

- to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work,
- drafting the work or revising it critically for important intellectual content;
- to final approval of the version to be published;
- and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Authors specific contribution:

1.- Vazquez-Lago JM: Conception and desing of the study. Desing and conduct focus groups. Contribution to peer review of the transcription data. Analysis and interpretation data. Write the different versions of the manuscript. Review final approval of the work.

2.- Gonzalez-Gonzalez C: Desing and conduct focus groups. Analysis and interpretation data. Review final approval of the work.

3.- Lopez-Vazquez P: Analysis and interpretation data. Contribution to peer review of the transcription data.

4.- Taracido M: Transcription of audio data.

5.- Lopez A: Conception and desing of the study. Desing the focus groups. Contribution to peer review of the transcription data.

6.- Figueiras A: Drafting the work and revising it critically for important intellectual content. Final approval of the version to be published.

Competing interest:

All Authors of this paper declares no conflicts of interest.

Funding:

There has been no public or private funding for the conduct and publication of this study.

Data sharing statement:

All published and unpublished study data are a set of everything you need and want to check or reproduce our research in a different field than ours.

REFERENCES

1 Baquero F, Baquero-Artigao G, Cantón R, García-Rey C. Antibiotic consumption and resistance selection in Streptococcus pneumoniae. J Antimicrob Chemother. 2002 ;50 Suppl S2:27-37.

2 Goossens H, Ferech M, Vander Stichele R, Elseviers M; ESAC Project Group. Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. Lancet. 2005 12-18; 365: 579-87.

3 Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. BMJ. 2010; 340:c2096. doi: 10.1136/bmj.c2096.

4 Spellberg B, Powers JH, Brass EP, Miller LG, Edwards E Jr. Trends in antimicrobial drug development: implications for the future. Clin Infect Dis 2004; 38: 1279–86.

5 Safrany N, Monnet DL. Antibiotics obtained without a prescription in Europe. Lancet Infect Dis. 2012; 12: 182-3.

6 Alliance for the Prudent Use of Antibiotics. Executive summary: select findings, conclusions, and policy recommendations. Clin Infect Dis 2005; 41 (suppl 4): 224–27.

7 Okeke IN, Laxminarayan R, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part I: recent trends and current status. Okeke IN, Klugman KP, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part II: strategies for containment. Lancet Infect Dis 2005; 5: 568–80.

8 Okeke IN, Klugman KP, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part II: strategies for containment. Lancet Infect Dis 2005; 5: 568–80.

9 Real Decreto Legislativo 1/2015, de 24 de julio, por el que se aprueba el texto refundido de la Ley de garantías y uso racional de los medicamentos y productos sanitarios.

10 Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. Lancet Infect Dis. 2011; 11: 692-701.

11 Campos J, Ferech M, Lázaro E, de Abajo F, Oteo J, Stephens P, Goossens H. Surveillance of outpatient antibiotic consumption in Spain according to sales data and reimbursement data. J Antimicrob Chemother. 2007; 60: 698-701.

12 Garcia Calvente MM, Mateo Rodriguez I. El grupo focal como técnica de investigación cualitativa en salud: diseño y puesta en práctica. Aten Primaria 2000; 25: 181-6.

13 Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60.

14 Bohnsack R. Group discussion and focus groups, in: A Companion to Qualitative Research, U. Flick, E. von Kardoff, and I. Steinke, Eds., pp. 24–221, Sage, London, UK, 2004.

15 Arroll B, Kenealy T, Goodyear-Smith F, Kerse N. Delayed prescriptions. BMJ. 2003; 327: 1361-2.

16 March Cerdá JC, Prieto Rodríguez MA, Hernán García M, Solas Gaspar O. Técnicas cualitativas para la investigación en salud pública y gestión de servicios de salud: algo más que otro tipo de técnicas. Gac Sanit. 1999; 13: 312-9.

17 Corbin J, Strauss A. Basics of Qualitative Research. Techniques and procedures for developing grounded theory. Sage, London, UK, 2008.

18 Kitzinger J. The methodology of focus groups: the importance of interaction between research participants. Austral. J. Public Health 1994; 16(1): 103-119.

19 Aigneren, M. La técnica de recolección de información mediante los grupos focales. CEO 2006;1-19.

20 Zapata-Cachafeiro M, González-González C, Vázquez-Lago JM, López-Vázquez P, López-Durán A, Smyth E, Figueiras A. Determinants of antibiotic dispensing without a medical prescription: a cross-sectional study in the north of Spain. J Antimicrob Chemother. 2014; 69: 3156-60.

21 Llor C, Cots JM. The sale of antibiotics without prescription in pharmacies in Catalonia, Spain. Clin Infect Dis. 2009; 48: 1345-9.

22 Sabry NA, Farid SF, Dawoud DM. Antibiotic dispensing in Egyptian community pharmacies: an observational study. Res Social Adm Pharm. 2013 May 9. doi:pii: S1551-7411(13)00049-1.

23 Caamaño Isorna F, Tomé-Otero M, Takkouche B, Figueiras A. Factors related with prescription requirement to dispense in Spain. Pharmacoepidemiol Drug Saf. 2004; 13: 405-9.

24 Kotwani A, Wattal C, Joshi PC, Holloway K. Irrational use of antibiotics and role of the pharmacist: an insight from a qualitative study in New Delhi, India .J Clin Pharm Ther. 2012; 37: 308-12.

25 Caamaño-Isorna F, Montes A, Takkouche B, Gestal-Otero JJ. Do pharmacists' opinions affect their decision to dispense or recommend a visit to a doctor? Pharmacoepidemiol Drug Saf. 2005; 14: 659-64.

26 Carrasco-Argüello A, Iglesias-Rey M, Pardo-Seco J, Caamaño-Isorna F. Proximity to the pharmacy and health care demand in primary care. Aten Primaria. 2013; 45: 172-3.

27 Rubio-Valera M, Jové AM, Hughes CM, Guillen-Solà M, Rovira M, Fernández A. Factors affecting collaboration between general practitioners and community pharmacists: a qualitative study. BMC Health Serv Res. 2012; 12:188.

28 Barbero-González A, Pastor-Sánchez R, del Arco-Ortiz de Zárate J, Eyaralar-Riera T, Espejo-Guerrero J. Demand for dispensing of medicines without medical prescription. Aten Primaria. 2006; 37: 78-87.

29 Lopez-Vazquez P, Vazquez-Lago JM, Figueiras A. Misprescription of antibiotics in primary care: a critical systematic review of its determinants. J Eval Clin Pract. 2012; 18: 473-84.

30 Roque F, Soares S, Breitenfeld L, López-Durán A, Figueiras A, Herdeiro MT. Attitudes of community pharmacists to antibiotic dispensing and microbial resistance: a qualitative study in Portugal. Int J Clin Pharm. 2013; 35: 417-24

31 Arnold SR, Straus SE. Intervenciones para mejorar las prácticas de prescripción de antibióticos en la atención ambulatoria (Revisión Cochrane traducida). Biblioteca Cochrane Plus, 2006; 3. Oxford: Update Software Ltd, http://www.updatesoftware. com (accessed on 20 April 2014).

Table 1. Definition of studied attitudes.

External responsibility: the responsibility of another professional or the NHS for the sale of antibiotics without a medical prescription.
Complacency: the ease with which antibiotics are dispensed to customers. This is associated with better customer loyalty. Part of such complacency is due to patient pressure, which comes in the form of different reasons given by a patient in order to obtain antibiotics without a prescription.
Indifference: a lack of interest in terms of the patient's illness, dispensing procedures or helping resolve patient doubts.
Lack of knowledge upgrade: lack of knowledge of pharmacists.
Lack of knowledge can be seen from three different perspectives: 1) from a legal standpoint (ignorance of the legal consequences of dispensing antibiotics without a prescription); 2) from a public health standpoint (ignorance of the consequences of dispensing antibiotics without a prescription, whether for the individual (individual point of view) or for the community (ecological point of view), in terms of resistance, etc.); or , 3) from a pharmacological standpoint (pharmacists' ignorance of the pharmacotherapeutic issues of antibiotics).

Table 2. Results of the focus groups

			FG I	FG II	FG III	FG IV	FG V
Factors influencing dispensing of non-prescription antibiotics	External Responsibility	Dentist	X	X	X	X	X
		Doctor	X	X	X	X	X
		NHS		X	X	X	X
	Complacency		X	X	X	X	X
	Lack of knowledge upgrade		X	X	X		X
	Indifference					X	X
Percentage of non-prescription antibiotics			15	5	5	20	10

FG = focus group
NHS = National Health System

DASH OF FOCUS GROUPS

Qualitative approach to the attitudes and knowledge of community pharmacists that condition inadequate prescription of antibiotics

CONTENT STRUCTURE OF PHARMACEUTICAL GROUPS

What do you think about the last campaigns on proper use of ATB carried out from the Ministry of Health?

Do you consider that there are still pharmacists who do not use ATB without prescription?

And 5 years ago? Was done? *Mention references that support this.*

What do you think could be the causes?
If you do not go out mention:

- *Difficulty of access to medical / health services*
- *By patient pressure. Sometimes aggressive attitudes, others because they can not stop going to work, because they are going to travel ...*
- *For customer loyalty.*
- *To advance time, "you already know what you are going to prescribe"*
- *And the pharmaceutical industry, has something to do?*
- *Any other reason?*

The use of ATB is now improving, the latest studies show that in Spain the consumption figures stabilize. What do you think may be the causes?

What do you think may be the% of pharmacies dispensed without prescription ATB?

BMJ Open

Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study on Spanish pharmacists

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-015674.R1
Article Type:	Research
Date Submitted by the Author:	13-May-2017
Complete List of Authors:	Vazquez-Lago, Juan; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine Gonzalez-Gonzalez, Cristian; Universidade de Santiago de Compostela, Department of Preventive Medicine and Public Health - Faculty of Medicine Zapata-Cachafeiro, Maruxa; Universidade de Santiago de Compostela, Department of Preventive Medicine and Public Health - Faculty of Medicine Lopez-Vazquez, Paula; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine Taracido, Margarita; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine; Centro de Investigacion Biomedica en Red de Epidemiologia y Salud Publica Lopez, Ana; Universidade de Santiago de Compostela, Department of Clinical Psychology and Psychobiology - Faculty of Psicology Figueiras, Adolfo; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine; Centro de Investigacion Biomedica en Red de Epidemiologia y Salud Publica
Primary Subject Heading:	Qualitative research
Secondary Subject Heading:	Health services research, Pharmacology and therapeutics, Public health
Keywords:	Organisational development < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Public health < INFECTIOUS DISEASES, PRIMARY CARE, QUALITATIVE RESEARCH

Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study on Spanish pharmacists.

Authors:

Juan M Vazquez-Lago (M.D.) (M.S.),[1] Cristian Gonzalez-Gonzalez (M.S.),[1] Maruxa Zapata-Cachafeiro (M.S.),[1] Paula Lopez-Vazquez (Ph.D.), [1] Margarita Taracido (Ph.D.),[1,3] Ana López (Ph.D.),[2] Adolfo Figueiras (Ph.D.).[1,3]

Author affiliations:

1. Department of Preventive Medicine and Public Health, University of Santiago de Compostela, Santiago de Compostela, A Coruña (Corunna), Spain.
2. Department of Clinical Psychology and Psychobiology, University of Santiago de Compostela. Santiago de Compostela, A Coruña, Spain.
3. Consortium for Biomedical Research in Epidemiology & Public Health (*CIBER en Epidemiología y Salud Pública - CIBERESP*), Spain.

Name and address for correspondence and reprint requests:

Juan M. Vázquez-Lago
Department of Preventive Medicine and Public Health,
Clinic Hospital of Santiago de Compostela,
c/Choupana s/n.
15.706 Santiago de Compostela (A Coruña), SPAIN
Phone number: (+34) 646261229 / (+34) 981956116 / (+34) 881540306
Fax number: (+34) 981950406
E-mail: juan.manuel.vazquez.lago@sergas.es

Word count:

Abstract: 299

Text: 4504

ABSTRACT

Objective: To investigate community pharmacists' knowledge, attitudes, perceptions and habits with respect to antibiotic dispensing without medical prescription in Spain.

Methods: A qualitative research using focus groups method (FG) in Galicia (north-west Spain). FG sessions were conducted using a moderator. A topic guide was developed to lead the discussions, which were audio-recorded to facilitate data interpretation, and transcription. Proceedings were transcribed and interpreted by an independent researcher used the Grounded Theory approach.

Setting: Community pharmacies in Galicia, region Norwest of Spain.

Participants: Thirty pharmacists agreed to participate in the study, and a total of 5 FG sessions were conducted with 2-11 pharmacists. We sought to ensure a high degree of heterogeneity in the composition of the groups to improve our study's external validity. Pharmacists' participation was made subject to no gender or age restrictions, and an effort was made to form FGs with pharmacists who were both owners and non-owners, provided in all cases that they were OCP-registered community pharmacists. For the purpose of conducting FG discussions, the basic methodological principle of allowing groups to attain their "own structural identity" was applied.

Main outcome measurements: Community pharmacists' habits and knowledge with regard to antibiotics, and identify the attitudes and/or factors that influence their being dispensed without medical prescription.

Results: Pharmacists attributed the problem of antibiotics dispensed without medical prescription and its relationship with antibiotic resistance to the following attitudes: external responsibility (doctors, dentists and the national health system); complacency; indifference; and lack of continuing education.

Conclusions: Despite being a problem, antibiotic dispensing without a medical prescription is still a common practice in community pharmacies in Galicia, Spain. This practice is attributed to complacency, indifference and lack of continuing education. The

problem of resistance was ascribed to external responsibility, including that of patients, physicians, dentists and the national health system.

Keywords: Community pharmacy; Antibiotic dispensed; Public health; Infectious diseases, qualitative research.

Strengths and limitations:

1.- The generalization of the results could also be compromised due to the intrinsic characteristics of the pharmaceutical system in Spain. E.g. In the system of pharmaceutical provision in Spain, antibiotics necessarily require a prior prescription by the physician, all drugs must always be dispensed in pharmacies, and cannot be purchased in other types of establishments.

2.- Focus group technique seeks the interaction of all the members of the group and ensures identifies all dimensions of the problem investigated while simultaneously increasing the subjective validity of each identified idea.

3.- Proceedings were transcribed and interpreted by an independent researcher. Any points of disagreement were discussed and resolved by consensus.

4.- Possible lack of transferability of findings to health systems in other countries.

INTRODUCTION

Antibiotic resistance poses a major threat to clinical efficacy and an important problem for global public health. Resistance is an inescapable consequence of antibiotic use [1] but increases drastically with misuse and abuse. [2,3] It is thus imperative to improve antibiotic use, [4] particularly in outpatient settings where 90% of consumption occurs. [5]

One of the chief loopholes requiring attention is the dispensing of antibiotics without a prescription, a major problem in some countries.[6] Whereas outpatient use of antibiotics is restricted to prescription-based consumption in northern Europe, the USA and Canada, access to antibiotics dispensed without medical prescription is nevertheless commonplace in the rest of the world.[6,7,8] In Spain, dispensing antibiotics legally is done only through prescriptions and the National Health System (NHS) covers the expenses of almost the entire population.[9] Due to population density characteristics at our territory, community pharmacists are the first point of contact for patients as part of the health care team. Therefore, up to one third of all outpatient antibiotics dispensed are not prescribed by physicians.[3,10] Despite the fact that the EU encourages Member States to restrict the use of systemic antibiotics and recommends that such drugs be exclusively consumed under medical prescription, the dispensing of antibiotics without prescription is still a common practice.[11]

Accordingly, this study sought to conduct a qualitative analysis of community pharmacists' knowledge, attitudes, perceptions and habits vis-à-vis antibiotic dispensing in Galicia, Spain.

METHODS

Study design

We used the focus group (FG) method to ascertain pharmacists' attitudes, knowledge and views concerning the dispensing and use of antibiotics in Galicia, Spain. The focus-group (FG) method was used to explore community pharmacists' habits and knowledge with regard to antibiotics, and identify the attitudes and/or factors that influence their being dispensed. We decided to use the focus-group technique because the interaction of group members tends to ensure that all the dimensions of the problem assessed are brought to light, information is simultaneously obtained on the subjective validity of various members of the group, and in addition, it is a fast technique for generating such

information.[12] A theoretical model based on a previous systematic review was constructed for the purpose of drawing up an agenda and a dash of FG, [13] which was to be followed during the group sessions to facilitate the identification of attitudes and/or factors.

The program for conducting meetings in the various FGs was designed with a dual purpose, namely, to address: (i) the dispensing of antibiotics without a prescription; and (ii) individual points of view regarding antibiotic-dispensing practices among pharmacists. Basing our study on a previous one undertaken on a population of physicians [14] and adapting it to the specific characteristics of pharmacists, we defined the script in attempt to cover the following factors/attitudes: complacency; indifference; external responsibilities and lack of continuing education. For the purposes of clarity and ease of comprehension, the four attitudes were defined in table 1.

Table 1. Definition of studied attitudes.

External responsibility: the responsibility of another professional or the NHS for the sale of antibiotics without a medical prescription.
Complacency: the ease with which antibiotics are dispensed to customers. This is associated with better customer loyalty. Part of such complacency is due to patient pressure, which comes in the form of different reasons given by a patient in order to obtain antibiotics without a prescription.
Indifference: a lack of interest in terms of the patient's illness, dispensing procedures or helping resolve patients doubts.
Lack of continuing education: Lack of knowledge of pharmacist due to a bad continuing education and bad knowledge upgrade. Lack of continuing education can be seen from three different perspectives: 1) from a legal standpoint (ignorance of the legal consequences of dispensing antibiotics without prescription); 2) from a public health standpoint (ignorance of the consequences of dispensing antibiotics without a prescription, whether for the individual –individual point of view- or the community –ecological point of view- in terms of resistances…); or 3) from a pharmacological standpoint (pharmacists' ignorance of the pharmacotherapeutic issues of antibiotics).

Study population and settings

In Spain, many drugs, including antibiotics, may only be dispensed under medical prescription. The dispensing of drugs takes place in community pharmacies, which must be owned by a registered pharmacist.

The study population comprised community pharmacists in Galicia. Galicia is a region in north-west Spain, with a population of around 2,779,000; almost 100% of these people have access to health care delivery and 31% are pensioners. Population density in Galicia is 92.6 inhab/km^2, similar to the European average. Population density decreases as one

moves inland from Atlantic fringe. Consequently, distances to a given population's designated health centre tend to increase. It's in this way that pharmacists become the first patient contact with the health system to consult their health problems.

Holding of focal group sessions

In order to work in a community pharmacy in Spain, it is compulsory to be collegiate at Official Colleges of Pharmacists (OCP). Using the "snowball method", the OCP send project information in the normal manner to all community pharmacists. Community pharmacists who were interested in FGs participation, had to send a mail to researcher team. FGs sessions were designed to be held with pre-established number of participants between 5 to 10 pharmacists in attendance in Galicia.

We sought to ensure a high degree of heterogeneity in the composition of the groups to improve our study's external validity. Pharmacists' participation was made subject to no gender or age restrictions, and an effort was made to form FGs with pharmacists who were both owners and non-owners, provided in all cases that they were OCP-registered community pharmacists. Sessions were chaired by a moderator who was a specialist in the field, following a script to ensure comparability among groups.

For the purpose of conducting FG discussions, the basic methodological principle of allowing groups to attain their "own structural identity" was applied.[15] This afforded an opportunity to discuss individual experiences and then start the group discussion. Only in the latter stages of the FG sessions did the moderator introduce discussion topics (following the guide) which had not been discussed.

FG were conducted by principal research (JVL). This researcher has specific training for development research with qualitative methodology. FG sessions took place at OCP meeting rooms. Only the investigator/moderator and the participants were present in the development of the FG. All FG sessions were audio-recorded and lasted for 45-70 minutes. The investigator/moderator also collected field notes in relation to the attitudes/factors/knowledges explored. The sessions ended when the information being provided by the participants yielded no new ideas. To prevent any possible interpretation biases, the proceedings were transcribed by an independent researcher (MTT).

Ethical considerations

This study was approved by the Galician Clinical Research Ethics Committee. All the pharmacists were informed that the FG sessions were to be recorded and transcribed, and that no-one attending would be personally identified in the study results.

Analysis

We used the Grounded Theory Approach. [16] Analysis of the transcripts was an iterative process undertaken by two independent researchers (CGG and JVL). The researchers carefully read the transcriptions to structure the data properly. This allowed for greater in-depth study and familiarisation with the data, and decreased the likelihood of researcher bias. Thematic and discursive analysis was used to examine the data, identifying different ideas and sentences that were obtained from the different FGs and organisation of topics, with text excerpts serving as units of analysis. The next step was the association between the groups' ideas and the pre-established variables. The researchers then compared thematic analyses and analysed emerging issues. Any points of disagreement were discussed and resolved by consensus. Not was used an informatics software during analysis process because a large number of focus groups were not performed.

RESULTS

Five FGs were formed. 30 pharmacists -56.7% women, 43.3% men- contacted the research team and all of them were invited to participate in focal groups. Other characteristics of the FG can be seen in Table 2.

Table 2. Characteristics of focus group composition.

Focus group (n)	Sex Number (%)		Age Range	Practice Status Owner Number (%)
	Women (W)	Men (M)		
I (9)	7 (77,8)	2 (22,2)	27-32 years	0 (0)
II (7)	2 (28,6)	5 (71,4)	42-58 years	3 (42,9)
III (7)	4 (57,1)	3 (42,9)	38-50 years	2 (28,6)
IV (5)	2 (40.0)	3 (60.0)	45-60 years	1 (20)
V (2)	2 (100)	0 (0)	42-43 years	0 (0)

Our qualitative approach indicated that the influence of the following 4 variables was considered relevant when it came to dispensing antibiotics over the counter. (View table 3).

Table 3. Factors that influence antibiotic dispensing.

Indifference	due lack of communication with patient's physicians due to lack of patient follow-up due it is prioritized to sell the antibiotic
External responsibility	of patient (inappropriate use) of physicians (prescriptions without indication) of health care system (private insurances) of other professionals (mainly dentists)
Complacency	pressure exerted by customers to have the symptoms speedily resolved to prevent regular customers consulting another pharmacy
Lack of continuing education	dispensing habit

External responsibility

According to the conclusions of all the groups, one of the most influential variables at play when a pharmacist dispensed an antibiotic without a prescription was external responsibility, something that was seen to rest with two types of health professionals, namely, physicians and dentists.

"*I think that doctors also give them* [antibiotics] *out very easily.*" (FG5, W1). The external responsibility of physicians was viewed by 100% of the FGs as being one of the most influential variables behind the inappropriate dispensing of antibiotics.

Likewise, another important variable was dentists' responsibility. All the FGs agreed that the latter were in the habit of issuing a large number of prescriptions by telephone, i.e., "*Patients come in saying, I just talked to my dentist and he told me to take an antibiotic for 5 days, and that I must pass by his surgery.*" (FG3; M2). The groups also saw dentists as a source of unnecessary antibiotic prescriptions, i.e., "*When dentists are going to remove a tooth, they'll prescribe amoxicillin-clavulanate just like they prescribe ibuprofen.*" (FG1; M1).

The NHS was rated as being one of the main culprits. Pharmacists said that poor access (space-time) to physicians was an influential factor when antibiotics were dispensed without medical prescription, i.e., "*Another problem is all the time it takes to see a doctor: accessibility is always faster at a pharmacy.*" (FG2; M2).

Another important variable was the number of prescriptions prescribed in private insurance versus the NHS, with most FGs reporting i.e., "*Ten times more antibiotics are given in private insurance than in the NHS*" (FG2; M1).

Lack of continuing education

Lack of continuing education was considered a relevant factor by 80% of the FGs (4/5) in any case where a pharmacist dispensed antibiotics without a prescription. As shown above, lack of continuing education can be viewed from different standpoints, e.g., "In specific diseases, there is a range of antibiotics and you start with the oldest." (FG3; W3). In this case, it shows the lack of knowledge about what to start with the first-line antibiotic, that is not always the oldest.

Age is also referred to as a key variable to explain the existence of lack of continuing education, being older pharmacists which exhibit this deficit. "Older pharmacists give out antibiotics much more readily."(FG2, M1), and, "Young people give out fewer antibiotics." (FG3; W3).

Another aspect mentioned and related to lack of continuing education is the consideration of the problem of resistance as a recent phenomenon. "I think that issue of resistance has recently begun, not so long ago…" (FG1, W2).

Complacency

In the five FGs (100%), complacency was seen as an important variable, i.e., "*Many people give them to retain patients.*" (FG4; W1). A contributory factor was the different treatment accorded to regular and non-regular customers, i.e., "*Sometimes, I give them to regular patients.*" (FG1; M1).

In essence, complacency is yielding to pressure when a given patient wants an antibiotic: "*When you know the customer, you try to convince him, but in the end, if he keeps on insisting, you give it to him.*" (FG2; W1); and, "*If they come to get amoxicilin and then start insisting, you give it to them.*" (FG5; W1). Indeed, 60% of the FGs regarded patient pressure as an important factor when it came to dispensing antibiotics without a prescription. From the viewpoint of pharmacists, the current percentage ranges from 5% to 20%.

Indifference

Participants indicate the existence of indifference and mutual consent between community pharmacists and other health-care professionals, chiefly physicians, along with inappropriate attitudes to prescribing and dispensing antibiotics; noting the lack of communication as indirectly associated with indifference, i.e., "I give you amoxicillin-clavulanate… but you go to your doctor and bring me the prescription. That way I feel I'm blameless." (FG5; W2).

In a third FG, the following statements were made: "The two professions are hardly involved with each other, there are no close ties, so that we criticise our mistakes but don't value our successes"; and, "Sometimes I dispense an inappropriate antibiotic because I don't have the time to contact the patient's physician." (FG2; W1) (Table 1). In this case they identify communication difficulties as the cause of inadequate dispensation but show indifference when solving the problem.

We also appreciate the existence of Indifference when they must transmit adequate information about the problems of resistances to customers who go to the pharmacy to buy antibiotics, well, Indifference is other possible way to contribute to develop microbial resistances. "Ok, I see, but this is about that it is difficult for them (people) to understand, I mean, surely if you talk to somebody about resistance it will sound familiar to him, but trying to explain him how resistances are generated..., you know what I mean, an effective way to make them understand that if they take that, or those, antibiotic without needing it, it's not going to take effect later on" (FG1, W2).

Finally, another aspect that is framed within the Indifference is the fact that in Spain the pharmacist is also a businessman. "In addition to being health-care professionals, we are also businessmen." (FG2; M2), so it is concerned, in addition to the health of the individual, by the profitability of the business. This statement reflects it: "Take it home. If you get better, don't take it, just bring it back to me! …and most people bring it back." (FG2; W1). This sentence also refers to what we call "delayed dispensing" which is related to the delayed prescriptions. Delayed prescriptions are those that are written but are only used if the symptoms do not improve.[17] Delayed dispensing of antibiotics can thus be defined as the dispensing of antibiotics for a patient, on the condition that they are not to be used immediately but only in the event that the symptoms fail to improve.

DISCUSSION

This is the first qualitative study to be conducted in Spain that explores pharmacists' knowledge of and attitudes to antibiotic use and its relationship with microbial resistance. Our study shows that antibiotics dispensed without medical prescription was attributed to complacency, indifference and lack of continuing education. The problem of resistance was ascribed to lack of continuing education, indifference and external responsibility, including patients, physicians, dentists and the NHS.

We chose a qualitative design to perform this study because it helped us to better understand the processes and realities of the problems currently confronting public health.[18] We were interested in a full, detailed description as well as concept analysis and theory generation. Since there was a theory that we could corroborate and it was hoped that a theory might arise from systematically collected data, grounded theory offered the most appropriate method.[19] The use of the focus group in the sphere of health is indicated and validated where the aim is to investigate what participants think and why they think like this, enabling data to be generated which could not be attained by other techniques. [20,21]

Antibiotics dispensed without medical prescription is a problem in Spain. The statements made by the different FGs corroborate what previous studies have concluded, namely, that antibiotic dispensing without a prescription is a phenomenon that exists in Spain.[22,23] This conclusion was reached by all the FGs, notwithstanding the fact that there were small variations among them in terms of pharmacists' opinions regarding the attitudes responsible for this practice. Evidence has been put forward to show that the dispensing of antibiotics without medical prescription rises to 30% in Spain.[13] Our study reveal that, from the viewpoint of pharmacists, the current percentage ranges from 5% to 20%, although they thought that this percentage may have been underestimated.

Our findings have been reinforced by studies conducted elsewhere. As in our case, in these other settings a prescription is required to obtain an antibiotic, and a high percentage of self-medication and antibiotics dispensed without medical prescription at community pharmacies was likewise detected.[24] Nevertheless, the estimates of the pharmacists who participated in our FGs were lower than those of other studies conducted in the same environment. The latter studies put the percentage of antibiotics dispensed without prescription at 65.9%.[25] These results were only to be expected, however, since the pharmacists that we questioned about inappropriate dispensing were the very ones responsible for doing this.

Analysis of *lack of continuing education* showed a difference between professionals of different ages. This situation may possibly be due to: (1) increased training of new professionals in the antibiotics field, since it has been in the last ten years when the problem of resistance has had major social, scientific and clinical repercussions; (2) the fact that younger people are usually not pharmacy owners, which means that sales levels have no direct impact on their salaries and that any request to dispense antibiotics without a prescription will therefore be met with a firm refusal; and, (3) the fear factor. This factor are possibly linked to the major fear felt by young pharmacists on dispensing antibiotics, just as it was found in a study about physicians performed in our environment [14]. Even though none of the FGs mentioned this variable, so it is necessary to interpret this very cautiously.

Studies conducted in other settings using the same methodology have reached similar conclusions regarding the variables influencing the time taken to dispense an antibiotic, as being the external responsibility of physicians and patients; however, they also attach great importance to other variables, such as economic interest. [26] Economic interest is strongly linked to variables such as patient loyalty, e.g., in our environment, the dispensing of non-prescription antibiotics was found to increase in cases where patients were known.[23] A study conducted in our setting concluded that there was an association between the pharmacist' age, the fact of owning a pharmacy, the patient's age and sex, and the workload in terms of higher or lower drug-dispensing levels. While these results cannot be directly extrapolated to our study because they would have to be restricted to antibiotic dispensing, they nonetheless show the variables which have an influence when a drug is dispensed, and these have proved relevant in our study. [27] The fact that here in Spain some community pharmacists are also business owners is a factor that has not been taken into account in studies conducted on this population. This variable emerged directly in one focus group and indirectly in others.

The *difficulty of spatiotemporal access* to physicians was another variable that emerged in the FGs. There is evidence in the literature to confirm that the proximity of a pharmacy decreases the demand for primary care. [28] Lack of communication with other health professionals, particularly physicians, due different variables such as the attitudes and perceptions of different professionals, is something that has already been studied in our setting. [29] Our study reinforces the idea of the need to improve pharmacist training programmes and the relationships among health professionals.

Complacency is a factor that has been studied by other research groups. The ease with which an antibiotic is dispensed to a patient is a variable that other studies have confirmed.[30] Our results are comparable with those yielded by other professionals in the same setting. Conclusions reached about physicians show that the determinant factors of antibiotic prescribing are fear, complacency, lack of continuing education and external responsibility.[13] Factors such as lack of continuing education and external responsibility show great influence in both studies, when it comes to prescribing and dispensing antibiotics. Both studies report the external responsibility of other professionals as being one of the main sources of malpractice, i.e., the notion of other professionals being perceived as the main culprits. Indeed, external responsibility is a common variable among health professionals, especially those who state that they have no time to give explanations, and this is the reason for their malpractice. [13]

Our results are also comparable to those of a recent qualitative study undertaken in Portugal. This latter paper concludes that attitudes related to the problem of resistance were attributed to the external responsibility of patients, physicians, other pharmacies and veterinary use.[31] In our study, external responsibility was attributed to physicians, dentists and the NHS. These results are extremely interesting because these attitudes, which were identified in two different countries, could open the way to designing specific interventions at a Euro-regional Galicia-Northern Portugal level.

Strengths and weaknesses

One limitation is the low number and the source of the participants (community pharmacists from a specific area of Spain, who are not necessarily representative of all community pharmacists working in Spain), something that restricts the study's generalisation to other areas or countries. The generalisation of the results could also be compromised due to the intrinsic characteristics of the pharmaceutical system in Spain, governed by laws that may differ with respect to other countries. However, the study conducted in Portugal yielded similar results.[31] Anyway, qualitative methods can seek to obtain a range of views, generalisability of findings is not usually an expected attribute of this type of research. Similarly, the nature of qualitative data is that it is jointly constructed by the researcher and participants and cannot be viewed as objective accounts.[16,20] Another possible study limitation is that one of the FGs failed to attain the pre-established minimum number of participants. Nevertheless, the conclusions drawn from this FG did not differ significantly from those of the other groups. Among the study's advantages is the

fact that interaction among FG members generated ideas about antibiotics and resistances, which would otherwise have been difficult to obtain. [16] There are several previous studies which corroborate our findings both in our and other settings, thereby increasing the reproducibility and validity of our study.[13,22,26,29]

CONCLUSIONS

Once attitudes/knowledge associated with inappropriate dispensing have been identified, interventions can be designed to focus on these shortcomings, so as to improve antibiotic use and contribute to minimising resistance.[32] Pharmacotherapy-based interventions on community pharmacists must be undertaken to prevent errors due to lack of knowledge. This also implies the need to bear in mind the specific functions of pharmacists as health professionals. Not only are publicity campaigns to reduce antibiotic use necessary, but they need to be more direct if they are to have a major impact on health professionals and the general population alike.

LIST OF ABREVIATIONS

1.- FG: focus groups
2.- M: Man
3.- NHS: National Health System
4.- OCP: Official Colleges of Pharmacists
5.- W:Woman

Contributorship statement:

All authors meet the ICMJE criteria and all authors have contributed:

- to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work,
- drafting the work or revising it critically for important intellectual content;
- to final approval of the version to be published;
- and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Authors specific contribution:

- Vazquez-Lago JM: Conception and design of the study. Design and conduct focus groups. Contribution to peer review of the transcription data. Analysis and interpretation data. Write the different versions of the manuscript. Review final approval of the work.

- Gonzalez C: Design and conduct focus groups. Analysis and interpretation data. Review final approval of the work.
- Zapata-Cachafeiro M: Write the different versions of the manuscript. Review final approval of the work.
- Lopez-Vazquez P: Analysis and interpretation data. Contribution to peer review of the transcription data.
- Taracido M: Transcription of audio data.
- Lopez A: Conception and design of the study. Design the focus groups. Contribution to peer review of the transcription data.
- Figueiras A: Drafting the work and revising it critically for important intellectual content. Final approval of the version to be published.

Competing interest:

All Authors of this paper declares no conflicts of interest.

Funding:

There has been no public or private funding for the conduct and publication of this study.

Data sharing statement:

All published and unpublished study data are a set of everything you need and want to check or reproduce our research in a different field than ours.

REFERENCES

1 Baquero F, Baquero-Artigao G, Cantón R, García-Rey C. Antibiotic consumption and resistance selection in Streptococcus pneumoniae. J Antimicrob Chemother. 2002 ;50 Suppl S2:27-37.

2 Goossens H, Ferech M, Vander Stichele R, Elseviers M; ESAC Project Group. Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. Lancet. 2005 12-18; 365: 579-87.

3 Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. BMJ. 2010; 340:c2096. doi: 10.1136/bmj.c2096.

4 Spellberg B, Powers JH, Brass EP, Miller LG, Edwards E Jr. Trends in antimicrobial drug development: implications for the future. Clin Infect Dis 2004; 38: 1279–86.

5 Safrany N, Monnet DL. Antibiotics obtained without a prescription in Europe. Lancet Infect Dis. 2012; 12: 182-3.

6 Alliance for the Prudent Use of Antibiotics. Executive summary: select findings, conclusions, and policy recommendations. Clin Infect Dis 2005; 41 (suppl 4): 224–27.

7 Okeke IN, Laxminarayan R, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part I: recent trends and current status. Okeke IN, Klugman KP, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part II: strategies for containment. Lancet Infect Dis 2005; 5: 568–80.

8 Okeke IN, Klugman KP, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part II: strategies for containment. Lancet Infect Dis 2005; 5: 568–80.

9 Real Decreto Legislativo 1/2015, de 24 de julio, por el que se aprueba el texto refundido de la Ley de garantías y uso racional de los medicamentos y productos sanitarios.

10 Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. Lancet Infect Dis. 2011; 11: 692-701.

11 Campos J, Ferech M, Lázaro E, de Abajo F, Oteo J, Stephens P, Goossens H. Surveillance of outpatient antibiotic consumption in Spain according to sales data and reimbursement data. J Antimicrob Chemother. 2007; 60: 698-701.

12 Garcia Calvente MM, Mateo Rodriguez I. El grupo focal como técnica de investigación cualitativa en salud: diseño y puesta en práctica. Aten Primaria 2000; 25: 181-6.

13 Lopez-Vazquez P, Vazquez-Lago JM, Figueiras A. Misprescription of antibiotics in primary care: a critical systematic review of its determinants. J Eval Clin Pract. 2012; 18: 473-84.

14 Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60.

15 Bohnsack R. Group discussion and focus groups, in: A Companion to Qualitative Research, U. Flick, E. von Kardoff, and I. Steinke, Eds., pp. 24–221, Sage, London, UK, 2004.

16 Corbin, J. & Strauss, A. (1990). Grounded theory method: Procedures, canons, and evaluative criteria. Qualitative Sociology, 13, 3-21.

17 Arroll B, Kenealy T, Goodyear-Smith F, Kerse N. Delayed prescriptions. BMJ. 2003; 327: 1361-2.

18 March Cerdá JC, Prieto Rodríguez MA, Hernán García M, Solas Gaspar O. Técnicas cualitativas para la investigación en salud pública y gestión de servicios de salud: algo más que otro tipo de técnicas. Gac Sanit. 1999; 13: 312-9.

19 Corbin J, Strauss A. Basics of Qualitative Research. Techniques and procedures for developing grounded theory. Sage, London, UK, 2008.

20 Kitzinger J. The methodology of focus groups: the importance of interaction between research participants. Austral. J. Public Health 1994; 16(1): 103-119.

21 Aigneren, M. La técnica de recolección de información mediante los grupos focales. CEO 2006;1-19.

22 Zapata-Cachafeiro M, González-González C, Vázquez-Lago JM, López-Vázquez P, López-Durán A, Smyth E, Figueiras A. Determinants of antibiotic dispensing without a medical prescription: a cross-sectional study in the north of Spain. J Antimicrob Chemother. 2014; 69: 3156-60.

23 Llor C, Cots JM. The sale of antibiotics without prescription in pharmacies in Catalonia, Spain. Clin Infect Dis. 2009; 48: 1345-9.

24 Sabry NA, Farid SF, Dawoud DM. Antibiotic dispensing in Egyptian community pharmacies: an observational study. Res Social Adm Pharm. 2013 May 9. doi:pii: S1551-7411(13)00049-1.

25 Caamaño Isorna F, Tomé-Otero M, Takkouche B, Figueiras A. Factors related with prescription requirement to dispense in Spain. Pharmacoepidemiol Drug Saf. 2004; 13: 405-9.

26 Kotwani A, Wattal C, Joshi PC, Holloway K. Irrational use of antibiotics and role of the pharmacist: an insight from a qualitative study in New Delhi, India .J Clin Pharm Ther. 2012; 37: 308-12.

27 Caamaño-Isorna F, Montes A, Takkouche B, Gestal-Otero JJ. Do pharmacists' opinions affect their decision to dispense or recommend a visit to a doctor? Pharmacoepidemiol Drug Saf. 2005; 14: 659-64.

28 Carrasco-Argüello A, Iglesias-Rey M, Pardo-Seco J, Caamaño-Isorna F. Proximity to the pharmacy and health care demand in primary care. Aten Primaria. 2013; 45: 172-3.

29 Rubio-Valera M, Jové AM, Hughes CM, Guillen-Solà M, Rovira M, Fernández A. Factors affecting collaboration between general practitioners and community pharmacists: a qualitative study. BMC Health Serv Res. 2012; 12:188.

30 Barbero-González A, Pastor-Sánchez R, del Arco-Ortiz de Zárate J, Eyaralar-Riera T, Espejo-Guerrero J. Demand for dispensing of medicines without medical prescription. Aten Primaria. 2006; 37: 78-87.

31 Roque F, Soares S, Breitenfeld L, López-Durán A, Figueiras A, Herdeiro MT. Attitudes of community pharmacists to antibiotic dispensing and microbial resistance: a qualitative study in Portugal. Int J Clin Pharm. 2013; 35: 417-24

32 Arnold SR, Straus SE. Intervenciones para mejorar las prácticas de prescripción de antibióticos en la atención ambulatoria (Revisión Cochrane traducida). Biblioteca Cochrane Plus, 2006; 3. Oxford: Update Software Ltd, http://www.updatesoftware. com (accessed on 20 April 2014).

DASH OF FOCUS GROUPS

Qualitative approach to the attitudes and knowledge of community pharmacists that condition inadequate prescription of antibiotics

CONTENT STRUCTURE OF PHARMACEUTICAL GROUPS

What do you think about the last campaigns on proper use of ATB carried out from the Ministry of Health?

Do you consider that there are still pharmacists who do not use ATB without prescription?

And 5 years ago? Was done? *Mention references that support this.*

What do you think could be the causes?
If you do not go out mention:

- *Difficulty of access to medical / health services*
- *By patient pressure. Sometimes aggressive attitudes, others because they can not stop going to work, because they are going to travel ...*
- *For customer loyalty.*
- *To advance time, "you already know what you are going to prescribe"*
- *And the pharmaceutical industry, has something to do?*
- *Any other reason?*

The use of ATB is now improving, the latest studies show that in Spain the consumption figures stabilize. What do you think may be the causes?

What do you think may be the% of pharmacies dispensed without prescription ATB?

Manuscript: Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study on Spanish pharmacists.

Juan M Vazquez-Lago (M.D.) (M.S.), Cristian Gonzalez-Gonzalez (M.S.), Maruxa Zapata-Cachafeiro (M.S.), Paula Lopez-Vazquez (Ph.D.), Margarita Taracido (Ph.D.), Ana López (Ph.D.), Adolfo Figueiras (Ph.D.)

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		Page 1
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	Juan M. Vazquez-Lago Page 1
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 1
3. Occupation	What was their occupation at the time of the study?	Doctor in Medicine. Specialist in preventive medicine and public health. PhD student Page 1
4. Gender	Was the researcher male or female?	Male Page 1
5. Experience and training	What experience or training did the researcher have?	The researcher published an article with similar methodology (Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of

		antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60.).The researcher studied masters in public health where the qualitative methodology forms part of the teaching program. Conducted continuous training courses in qualitative methodology. Page 5 and 16
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	Page 5-6 .
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Page 5
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Page 4-5-6

Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 7
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 5-6
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 6
12. Sample size	How many participants were in the study?	Page 7
13. Non-participation	How many people refused to participate or dropped out? Reasons?	Page 7 and 13
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 6 .
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Page 6
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Page 6-7
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Page 5
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	Page 7
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 6

20. Field notes	Were field notes made during and/or after the interview or focus group?	Page 6
21. Duration	What was the duration of the inter views or focus group?	Page 6
22. Data saturation	Was data saturation discussed?	Page 6
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	N/A
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	N/A
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	Page 5
27. Software	What software, if applicable, was used to manage the data?	Page 7
28. Participant checking	Did participants provide feedback on the findings?	Page 6
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Page 7 to 10
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes, there was. From page 10 to 14
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes. they were. From page 7 to 10
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Discussion of major and minor themes From page 10 to 14

BMJ Open

Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study of Spanish pharmacists.

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-015674.R2
Article Type:	Research
Date Submitted by the Author:	07-Jun-2017
Complete List of Authors:	Vazquez-Lago, Juan; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine Gonzalez-Gonzalez, Cristian; Universidade de Santiago de Compostela, Department of Preventive Medicine and Public Health - Faculty of Medicine Zapata-Cachafeiro, Maruxa; Universidade de Santiago de Compostela, Department of Preventive Medicine and Public Health - Faculty of Medicine Lopez-Vazquez, Paula; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine Taracido, Margarita; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine; Centro de Investigacion Biomedica en Red de Epidemiologia y Salud Publica Lopez, Ana; Universidade de Santiago de Compostela, Department of Clinical Psychology and Psychobiology - Faculty of Psicology Figueiras, Adolfo; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine; Centro de Investigacion Biomedica en Red de Epidemiologia y Salud Publica
Primary Subject Heading:	Qualitative research
Secondary Subject Heading:	Health services research, Pharmacology and therapeutics, Public health
Keywords:	Organisational development < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Public health < INFECTIOUS DISEASES, PRIMARY CARE, QUALITATIVE RESEARCH

Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study of Spanish pharmacists.

Authors:

Juan M Vazquez-Lago (M.D.) (M.S.),[1] Cristian Gonzalez-Gonzalez (M.S.),[1] Maruxa Zapata-Cachafeiro (M.S.),[1] Paula Lopez-Vazquez (Ph.D.), [1] Margarita Taracido (Ph.D.),[1,3] Ana López (Ph.D.),[2] Adolfo Figueiras (Ph.D.).[1,3]

Author affiliations:

1. Department of Preventive Medicine and Public Health, University of Santiago de Compostela, Santiago de Compostela, A Coruña (Corunna), Spain.
2. Department of Clinical Psychology and Psychobiology, University of Santiago de Compostela. Santiago de Compostela, A Coruña, Spain.
3. Consortium for Biomedical Research in Epidemiology & Public Health (*CIBER en Epidemiología y Salud Pública - CIBERESP*), Spain.

Name and address for correspondence and reprint requests:

Juan M. Vázquez-Lago
Department of Preventive Medicine and Public Health,
Clinic Hospital of Santiago de Compostela,
c/Choupana s/n.
15.706 Santiago de Compostela (A Coruña), SPAIN
Phone number: (+34) 646261229 / (+34) 981956116 / (+34) 881540306
Fax number: (+34) 981950406
E-mail: juan.manuel.vazquez.lago@sergas.es

Word count:

Abstract: 300

Text: 4437

ABSTRACT

Objective: To investigate community pharmacists' knowledge, attitudes, perceptions and habits with regard to antibiotic dispensing without medical prescription in Spain.

Methods: A qualitative research using focus-group method (FG) in Galicia (north-west Spain). FG sessions were conducted in the presence of a moderator. A topic script was developed to lead the discussions, which were audio-recorded to facilitate data interpretation and transcription. Proceedings were transcribed by an independent researcher and interpreted by two researchers working independently. We used the Grounded Theory approach.

Setting: Community pharmacies in Galicia, region Norwest of Spain.

Participants: Thirty pharmacists agreed to participate in the study, and a total of 5 FG sessions were conducted with 2-11 pharmacists. We sought to ensure a high degree of heterogeneity in the composition of the groups to improve our study's external validity. Pharmacists' participation had no gender or age restrictions, and an effort was made to form FGs with pharmacists who were both owners and non-owners, provided in all cases that they were OCP-registered community pharmacists. For the purpose of conducting FG discussions, the basic methodological principle of allowing groups to attain their "own structural identity" was applied.

Main outcome measurements: Community pharmacists' habits and knowledge with regard to antibiotics, and identification of the attitudes and/or factors that influence antibiotic dispensing without medical prescription.

Results: Pharmacists attributed the problem of antibiotics dispensed without medical prescription and its relationship to antibiotic resistance to the following attitudes: external responsibility (doctors, dentists and the NHS); acquiescence; indifference; and lack of continuing education.

Conclusions: Despite being a problem, antibiotic dispensing without a medical prescription is still a common practice in community pharmacies in Galicia, Spain. This practice is attributed to acquiescence, indifference and lack of continuing education. The

problem of resistance was ascribed to external responsibility, including that of patients, physicians, dentists and the NHS.

Keywords: Community pharmacy; Antibiotic dispensing; Public health; Infectious diseases, qualitative research.

Strengths and limitations:

1.- The generalization of the results could also be compromised due to the intrinsic characteristics of the pharmaceutical system in Spain. In the system of pharmaceutical provision in Spain, antibiotics necessarily require a prior prescription by the physician, and all drugs must always be dispensed by pharmacies and cannot be purchased in other types of establishments.

2.- The focus-group technique seeks the interaction of all the members of the group and ensures the identification of all the dimensions of the problem investigated while simultaneously increasing the subjective validity of each identified idea.

3.- Proceedings were transcribed and interpreted by an independent researcher. Any points of disagreement were discussed and resolved by consensus.

4.- Possible lack of generalization of findings to health systems in other countries.

INTRODUCTION

Antibiotic resistance poses a major threat to clinical efficacy and is an important problem for global public health. Resistance is an inescapable consequence of antibiotic use [1] but it increases drastically with misuse and abuse. [2,3] It is thus imperative to improve antibiotic use, [4] particularly in outpatient settings where 90% of the consumption occurs. [5]

One of the chief loopholes requiring attention is the dispensing of antibiotics without a prescription, a major problem in some countries.[6] Whereas outpatient use of antibiotics is restricted to prescription-based consumption in northern Europe, the USA and Canada, access to antibiotics dispensed without medical prescription is nevertheless commonplace in the rest of the world.[6,7,8] In Spain, dispensing antibiotics legally is done only through prescriptions, and the National Health System (NHS) covers the expenses of almost the entire population.[9] Due to population density characteristics in our territory, community pharmacists are the first point of contact for patients, as part of the health care team. Therefore, up to one third of all outpatient antibiotics dispensed are not prescribed by physicians.[3,10] Despite the fact that the EU encourages Member States to restrict the use of systemic antibiotics and recommends that such drugs be exclusively consumed under medical prescription, the dispensing of antibiotics without prescription is still a common practice.[11]

Accordingly, this study sought to conduct a qualitative analysis of community pharmacists' knowledge, attitudes, perceptions and habits with regard to antibiotic dispensing in Galicia, Spain.

METHODS

Study design

We used the focus-group (FG) method to ascertain pharmacists' attitudes, knowledge and views concerning the dispensing and use of antibiotics in Galicia, Spain. The focus-group (FG) method was used to explore community pharmacists' habits and knowledge with regard to antibiotics, and to identify the attitudes and/or factors that influence their being dispensed. We decided to use the focus-group technique because the interaction of group members tends to ensure that all the dimensions of the problem assessed are brought to light, information is simultaneously obtained on the subjective validity of various

members of the group, and in addition, it is a rapid technique for generating such information.[12] A theoretical model based on a previous systematic review was constructed for the purpose of drawing up an agenda and a script for FG, [13] which was to be followed during the group sessions to facilitate the identification of attitudes and/or factors.

The program for conducting meetings in the various FGs was designed with a dual purpose, namely, to address: (i) the dispensing of antibiotics without a prescription; and (ii) individual points of view regarding antibiotic-dispensing practices among pharmacists. Basing our study on a previous one undertaken in a population of physicians [14] and adapting it to the specific characteristics of pharmacists, we defined the script in attempt to cover the following factors/attitudes: acquiescence; indifference; external responsibilities and lack of continuing education. For the purposes of clarity and ease of comprehension, the four attitudes are defined in Table 1.

Table 1. Definition of studied attitudes.

External responsibility: the responsibility of another professional or the NHS for the sale of antibiotics without a medical prescription
Acquiescence: the ease with which antibiotics are dispensed to customers. This is associated with better customer loyalty. Part of such complacency is due to patient pressure, which comes in the form of different reasons given by a patient in order to obtain antibiotics without a prescription.
Indifference: a lack of interest in terms of the patient's illness, dispensing procedures or helping resolve patients doubts.
Lack of continuing education: Lack of knowledge of pharmacist due to a bad continuing education and bad knowledge upgrade from the point of view of quantity and quality. Lack of continuing education can be seen from three different perspectives: 1) from a legal standpoint (ignorance of the legal consequences of dispensing antibiotics without prescription); 2) from a public health standpoint (ignorance of the consequences of dispensing antibiotics without a prescription, whether for the individual – individual point of view- or the community –ecological point of view- in terms of resistances, etc); or 3) from a pharmacological standpoint (pharmacists' ignorance of the pharmacotherapeutic issues of antibiotics).

Study population and settings

In Spain, many drugs, including antibiotics, may only be dispensed under medical prescription. The dispensing of drugs takes place in community pharmacies, which must be owned by a registered pharmacist.

The study population comprised community pharmacists in Galicia. Galicia is a region in north-west Spain, with a population of around 2,779,000; almost 100% of these people have access to health care delivery and 31% are pensioners. Population density in Galicia is 92.6 inhab/km^2, similar to the European average. Population density decreases as one moves inland from the Atlantic fringe. Consequently, distances to a given population's

designated health centre tend to increase. This is how pharmacists become patients' first contact with the health system to consult their health problems.

Holding of focal group sessions

In order to work in a community pharmacy in Spain, it is compulsory to be a member of the Official Colleges of Pharmacists (OCP). Using the "snowball method", the OCP sent project information in the usual way to all community pharmacists. Community pharmacists who were interested in FG participation had to send a reply to the research team. FG sessions were designed to be held with a pre-established number of participants, between 5 and 10 pharmacists in attendance in Galicia.

We sought to ensure a high degree of heterogeneity in the composition of the groups to improve our study's external validity. Pharmacists' participation had no gender or age restrictions, and an effort was made to form FGs with pharmacists who were both owners and non-owners, provided in all cases that they were OCP-registered community pharmacists. Sessions were chaired by a moderator who was a specialist in the field, following a script to ensure comparability among groups.

For the purpose of conducting FG-discussions, the basic methodological principle of allowing groups to attain their "own structural identity" was applied.[15] This afforded an opportunity to discuss individual experiences and then start the group discussion. Only in the latter stages of the FG-sessions did the moderator introduce discussion topics (following the script) which had not been mentioned.

FGs were conducted by the principal researcher (JVL). This researcher is specifically trained to develop research using qualitative methodology. FG-sessions took place in OCP meeting rooms. Only the investigator/moderator and the participants were present during the FG-sessions. All FG-sessions were audio-recorded and lasted 45-70 minutes. The investigator/moderator also took field notes in relation to the attitudes/factors/knowledge explored. The sessions ended when the information being provided by the participants yielded no new ideas. To prevent any possible interpretation biases, the proceedings were transcribed by an independent researcher (MTT).

Ethical considerations

This study was approved by the Galician Clinical Research Ethics Committee. All the pharmacists were informed of the purpose of the study, of what their involvement

entailed, of the objectives, as well as of the fact that the FG sessions would be recorded and transcribed, and that no participant would be personally identified in the study results. All of them agreed to participate by signing informed consent.

Analysis

We used the Grounded Theory Approach. [16] Analysis of the transcripts was an iterative process undertaken by two researchers working independently (CGG and JVL). The researchers carefully read the transcriptions to structure the data adequately. This allowed for greater in-depth study and familiarisation with the data, and decreased the likelihood of researcher bias. Thematic and discursive analysis was used to examine the data, identifying different ideas and sentences that were obtained from the different FGs and organising the topics, with text excerpts serving as units of analysis. The next step was to establish the association between the groups' ideas and the pre-established variables. The researchers then compared the thematic analyses and analysed emerging issues. Any points of disagreement were discussed and resolved by consensus. No computer software was used to analyze the process because the number of FGs was performed was not large.

RESULTS

Five FGs were formed. Thirty pharmacists -56.7% women, 43.3% men- contacted the research team and all of them were invited to participate in the FGs. Other characteristics of the FG can be seen in Table 2.

Table 2. Characteristics of focus group composition.

Focus group (n)	Sex Number (%)		Age Range	Practice Status Owner Number (%)
	Women (W)	Men (M)		
I (9)	7 (77,8)	2 (22,2)	27-32 years	0 (0)
II (7)	2 (28,6)	5 (71,4)	42-58 years	3 (42,9)
III (7)	4 (57,1)	3 (42,9)	38-50 years	2 (28,6)
IV (5)	2 (40.0)	3 (60.0)	45-60 years	1 (20)
V (2)	2 (100)	0 (0)	42-43 years	0 (0)

Our qualitative approach indicated that the influence of the following 4 variables was considered relevant when it came to dispensing antibiotics over the counter (see Table 3).

Table 3. Factors that influence antibiotic dispensing.

Indifference	due lack of communication with patient's physicians
	due to lack of patient follow-up
	due it is prioritized to sell the antibiotic
External responsibility	of patient (inappropriate use)
	of physicians (prescriptions without indication)
	of health care system (private insurances)
	of other professionals (mainly dentists)
Acquiescence	pressure exerted by customers to have the symptoms speedily resolved to prevent regular customers consulting another pharmacy
Lack of continuing education	dispensing habit

External responsibility

According to the conclusions of all the groups, one of the most influential variables at play when a pharmacist dispenses an antibiotic without a prescription was external responsibility, an aspect that was considered to lie with two types of health professionals, namely, physicians and dentists.

"*I think that doctors also give them* [antibiotics] *out very easily.*" (FG5, W1). The external responsibility of physicians was viewed by 100% of the FGs as being one of the most influential variables underlying the inappropriate dispensing of antibiotics.

Likewise, another important variable was dentists' responsibility. All the FGs agreed that the latter were in the habit of issuing a large number of prescriptions by telephone, i.e., "*Patients come in saying, I just talked to my dentist and he told me to take an antibiotic for 5 days, and that I must go to his surgery.*" (FG3; M2). The groups also saw dentists as a source of unnecessary antibiotic prescriptions, i.e., "*When dentists are going to remove a tooth, they'll prescribe amoxicillin-clavulanate, just like they prescribe ibuprofen.*" (FG1; M1).

The NHS was rated as being one of the main culprits. Pharmacists said that poor access (space-time) to physicians was an influential factor when antibiotics were dispensed without medical prescription, i.e., "*Another problem is all the time it takes to see a doctor: access is always faster at a pharmacy.*" (FG2; M2).

Another important variable was the number of prescriptions prescribed in private insurance versus the NHS, with most FGs reporting i.e., "*Ten times more antibiotics are given in private insurance than in the NHS*" (FG2; M1).

Lack of continuing education

Lack of continuing education was considered a relevant factor by 80% of the FGs (4/5) in any case where a pharmacist dispensed antibiotics without a prescription. As shown above, lack of continuing education can be viewed from different standpoints, e.g., *"In specific diseases, there is a range of antibiotics, and you start with the oldest." (FG3; W3).* In this case, it shows the lack of knowledge about starting with the first-line antibiotic, which is not always the oldest.

Age is also referred to as a key variable to explain the existence of lack of continuing education, with older pharmacists being those who exhibit this deficit. *"Older pharmacists give out antibiotics much more readily."(FG2, M1),* and, *"Young people give out fewer antibiotics." (FG3; W3).*

Another aspect mentioned and related to lack of continuing education is the consideration of the problem of resistance as a recent phenomenon. *"I think that the issue of resistance has begun recently, not so long ago..." (FG1, W2).*

Acquiescence

In the five FGs (100%), acquiescence was seen as an important variable, i.e., "*Many people give antibiotics to retain patients.*" (FG4; W1). A contributory factor was the different treatment accorded to regular and non-regular customers, i.e., "*Sometimes, I give them to regular patients*." (FG1; M1).

In essence, acquiescence is yielding to pressure when a certain patient wants an antibiotic: "*When you know the customer, you try to convince him, but in the end, if he keeps on insisting, you give it to him*." (FG2; W1); and, "*If they come to get amoxicillin and then start insisting, you give it to them*." (FG5; W1). Indeed, 60% of the FGs regarded patient pressure as an important factor when it came to dispensing antibiotics without a prescription. From the pharmacists' viewpoint, the current percentage ranges from 5% to 20%.

Indifference

Participants indicate the existence of indifference and mutual consent between community pharmacists and other health-care professionals, chiefly physicians, along with inappropriate attitudes to prescribing and dispensing antibiotics, noting the lack of communication as indirectly associated with indifference, i.e., *"I will give you amoxicillin-clavulanate... but you go to your doctor and bring me the prescription. That way, I feel I'm blameless." (FG5; W2).*

In a third FG, the following statements were made: *"The two professions are hardly involved with each other, there are no close ties, so that we criticise our mistakes but don't value our successes";* and, *"Sometimes I dispense an inappropriate antibiotic because I don't have the time to contact the patient's physician." (FG2; W1)* (Table 1). In this case, they identify communication difficulties as the cause of inadequate dispensation but show indifference about solving the problem.

We also observed the existence of Indifference about transmitting adequate information about the problems of resistances to customers who go to the pharmacy to buy antibiotics, as Indifference is another possible way to contribute to developing microbial resistances. *"Ok, I see, but this is about their (people's) difficulty to understand, I mean, surely, if you talk to somebody about resistance, it will sound familiar to them, but trying to explain to them how resistances are generated..., you know what I mean, an effective way to make them understand that, if they take this or that antibiotic without needing it, it's not going to have any effect later on" (FG1, W2).*

Finally, another aspect that is framed within Indifference is the fact that, in Spain, the pharmacist is also a businessman. *"In addition to being health-care professionals, we are also businessmen." (FG2; M2),* so, in addition to the individual's health, they are concerned about the profitability of the business. This statement reflects this attitude: *"Take it with you. If you get better, don't take it, just bring it back to me! ...and most people bring it back." (FG2; W1).* This sentence also refers to what we call "delayed dispensing" which is related to delayed prescriptions. Delayed prescriptions are those that are written but are only used if the symptoms do not improve.[17] Delayed dispensing of antibiotics can thus be defined as the dispensing of antibiotics for a patient, on the condition that they are not to be used immediately but only in the event that the symptoms fail to improve.

DISCUSSION

This is the first qualitative study to be conducted in Spain that explores pharmacists' knowledge of and attitudes toward antibiotic use and its relationship with microbial resistance. Our study shows that antibiotics dispensed without medical prescription was attributed to acquiescence, indifference and lack of continuing education. The problem of resistance was ascribed to lack of continuing education, indifference and external responsibility, including patients, physicians, dentists and the NHS.

We chose a qualitative design to perform this study because it helped us to better understand the processes and realities of the problems currently confronting public health.[18] We were interested in a full, detailed description as well as conceptual analysis and theory generation. As there was a theory that we could corroborate and it was hoped that a theory might arise from systematically collected data, the grounded theory offered the most appropriate method.[19] The use of the FG in the sphere of health is indicated and validated in works where the aim is to investigate what participants think and why, enabling data to be generated which could not be attained by other techniques. [20,21]

Antibiotics dispensed without medical prescription is a problem in Spain. The statements made in the different FGs corroborate the conclusions of previous studies, namely, that antibiotic dispensing without a prescription is a phenomenon that exists in Spain.[22,23] This conclusion was reached by all the FGs, notwithstanding the fact that there were small variations among them in terms of pharmacists' opinions regarding the attitudes responsible for this practice. Evidence has been provided to show that the dispensing of antibiotics without medical prescription reaches 30% in Spain.[13] Our study reveals that, from the pharmacists' viewpoint, the current percentage ranges from 5% to 20%, although they thought that this percentage may have been underestimated.

Our findings are reinforced by studies conducted elsewhere. As in our case, in these other settings, a prescription is required to obtain an antibiotic, and a high percentage of self-medication and antibiotics dispensed without medical prescription at community pharmacies was likewise detected.[24] Nevertheless, the estimates of the pharmacists who participated in our FGs were lower than those of other studies conducted in the same environment. The latter studies placed the percentage of antibiotics dispensed without prescription at 65.9%.[25] These results were only to be expected, however, as the pharmacists that we questioned about inappropriate dispensing were the very ones responsible for doing this.

Analysis of *lack of continuing education* showed a difference between professionals of different ages. This situation may be due to: (1) increased training of new professionals in the antibiotics field, as it is in the last ten years when the problem of resistance has had major social, scientific and clinical repercussions; (2) the fact that younger people are usually not pharmacy owners, which means that sales levels have no direct impact on their salaries and that any request to dispense antibiotics without a prescription will therefore

be met with a firm refusal; and, (3) the fear factor. This factor is possibly linked to the major fear felt by young pharmacists about dispensing antibiotics, as found in a study of physicians performed in our area [14]. However, none of the FGs mentioned this variable, so it is necessary to interpret it very cautiously.

Studies conducted in other settings using the same methodology have reached similar conclusions regarding the variables influencing the time taken to dispense an antibiotic, and the external responsibility of physicians and patients. However, they also attach great importance to other variables, such as economic interest. [26] Economic interest is strongly linked to variables such as patient loyalty, e.g., in our environment, the dispensing of non-prescription antibiotics was found to increase in cases where patients were known.[23] A study conducted in our setting concluded that there was an association between the pharmacist' age, the fact of owning a pharmacy, the patient's age and sex, and the workload in terms of higher or lower drug-dispensing levels. While these results cannot be directly extrapolated to our study because they would have to be restricted to antibiotic dispensing, they nonetheless show the variables that have an impact when a drug is dispensed, and these have proved to be relevant in our study. [27] The fact that, in Spain, some community pharmacists are also business owners is a factor that has not been taken into account in studies conducted in this population. This variable emerged directly in one FG and indirectly in others.

The *difficulty of spatiotemporal access* to physicians was another variable that emerged in the FGs. There is evidence in the literature to confirm that the proximity of a pharmacy decreases the demand for primary care. [28] Lack of communication with other health professionals, particularly physicians, due to different variables such as the attitudes and perceptions of different professionals is an aspect that has already been studied in our setting. [29] Our study reinforces the idea of the need to improve pharmacist training programmes and the relationships among health professionals.

Acquiescence is a factor that has been studied by other research groups. The ease with which an antibiotic is dispensed to a patient is a variable that other studies have confirmed.[30] Our results are comparable with those yielded by other professionals in the same setting. Conclusions reached about physicians show that the determinant factors of antibiotic prescribing are fear, acquiescence, lack of continuing education and external responsibility.[13] Factors such as lack of continuing education and external responsibility show great influence in both studies, when it comes to prescribing and dispensing

antibiotics [13,30]. Both studies report the external responsibility of other professionals as being one of the main sources of malpractice, i.e., the notion of other professionals being perceived as the main culprits. Indeed, external responsibility is a common variable among health professionals, especially those who state that they have no time to give explanations, and this is the reason for their malpractice. [13,30]

Our results are also comparable to those of a recent qualitative study undertaken in Portugal. This paper concludes that attitudes related to the problem of resistance were attributed to the external responsibility of patients, physicians, other pharmacists and veterinarians.[31] In our study, external responsibility was attributed to physicians, dentists and the NHS. These results are extremely interesting because these attitudes, which were identified in two different countries, could clear the way to designing specific interventions at a Euro-regional Galicia-Northern Portugal level.

Strengths and weaknesses

One limitation is the low number and the source of the participants (community pharmacists from a specific area of Spain, who are not necessarily representative of all community pharmacists working in Spain), an aspect that restricts the study's generalization to other areas or countries. The generalization of the results could also be compromised due to the intrinsic characteristics of the pharmaceutical system in Spain, governed by laws that may differ with respect to other countries. However, the study conducted in Portugal yielded similar results.[31] In any case, qualitative methods can seek to obtain a range of views, and generalizability of findings is not usually an expected attribute of this type of research. Similarly, the nature of qualitative data is that it is jointly constructed by the researcher and the participants and cannot be viewed as objective accounts.[16,20] Another possible study limitation is that one of the FGs failed to attain the pre-established minimum number of participants. Nevertheless, the conclusions drawn from this FG did not differ significantly from those of the other groups. Among the study's advantages is the fact that interaction among FG members generated ideas about antibiotics and resistances, which would otherwise have been difficult to obtain. [16] There are several previous studies that corroborate our findings both in our own and in other settings, thereby increasing the reproducibility and validity of our study.[13,22,26,29]

CONCLUSIONS

Once attitudes/knowledge associated with inappropriate dispensing have been identified, interventions can be designed to focus on these shortcomings, so as to improve antibiotic use and contribute to minimising resistance.[32] Pharmacotherapy-based interventions with community pharmacists must be undertaken to prevent errors due to lack of knowledge. This also implies the need to bear in mind the specific functions of pharmacists as health professionals. Not only are publicity campaigns to reduce antibiotic use necessary, but they need to be more direct if they are to have a major impact on health professionals and the general population alike.

LIST OF ABREVIATIONS

1.- FG: focus groups
2.- M: Man
3.- NHS: National Health System
4.- OCP: Official Colleges of Pharmacists
5.- W:Woman

Contributorship statement:

All authors meet the ICMJE criteria and all authors have contributed:

- to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work,

- drafting the work or revising it critically for important intellectual content;

- to final approval of the version to be published;

- and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Author's specific contribution:

1.- Vazquez-Lago JM: Conception and design of the study. Design and conduct focus groups. Contribution to peer review of the transcription data. Analysis and interpretation data. Write the different versions of the manuscript. Review final approval of the work.

2.- Gonzalez-Gonzalez C: Design and conduct focus groups. Analysis and interpretation data. Review final approval of the work.

3.- Zapata-Cachafeiro M: Write the different versions of the manuscript. Review final approval of the work.

4.- Lopez-Vazquez P: Analysis and interpretation data. Contribution to peer review of the transcription data.

5.- Taracido M: Transcription of audio data.

6.- Lopez A: Conception and design of the study. Design the focus groups. Contribution to peer review of the transcription data.

7.- Figueiras A: Drafting the work and revising it critically for important intellectual content. Final approval of the version to be published.

Competing interest:

All Authors of this paper declare no conflicts of interest.

Funding:

There has been no public or private funding for the performance and publication of this study.

Data sharing statement:

All published and unpublished study data are a set of all you need, should you want to confirm or reproduce our research in a different field than ours.

REFERENCES

1 Baquero F, Baquero-Artigao G, Cantón R, García-Rey C. Antibiotic consumption and resistance selection in Streptococcus pneumoniae. J Antimicrob Chemother. 2002 ;50 Suppl S2:27-37.

2 Goossens H, Ferech M, Vander Stichele R, Elseviers M; ESAC Project Group. Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. Lancet. 2005 12-18; 365: 579-87.

3 Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. BMJ. 2010; 340:c2096. doi: 10.1136/bmj.c2096.

4 Spellberg B, Powers JH, Brass EP, Miller LG, Edwards E Jr. Trends in antimicrobial drug development: implications for the future. Clin Infect Dis 2004; 38: 1279–86.

5 Safrany N, Monnet DL. Antibiotics obtained without a prescription in Europe. Lancet Infect Dis. 2012; 12: 182-3.

6 Alliance for the Prudent Use of Antibiotics. Executive summary: select findings, conclusions, and policy recommendations. Clin Infect Dis 2005; 41 (suppl 4): 224–27.

7 Okeke IN, Laxminarayan R, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part I: recent trends and current status. Okeke IN, Klugman KP, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part II: strategies for containment. Lancet Infect Dis 2005; 5: 568–80.

8 Okeke IN, Klugman KP, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part II: strategies for containment. Lancet Infect Dis 2005; 5: 568–80.

9 Real Decreto Legislativo 1/2015, de 24 de julio, por el que se aprueba el texto refundido de la Ley de garantías y uso racional de los medicamentos y productos sanitarios.

10 Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. Lancet Infect Dis. 2011; 11: 692-701.

11 Campos J, Ferech M, Lázaro E, de Abajo F, Oteo J, Stephens P, Goossens H. Surveillance of outpatient antibiotic consumption in Spain according to sales data and reimbursement data. J Antimicrob Chemother. 2007; 60: 698-701.

12 Garcia Calvente MM, Mateo Rodriguez I. El grupo focal como técnica de investigación cualitativa en salud: diseño y puesta en práctica. Aten Primaria 2000; 25: 181-6.

13 Lopez-Vazquez P, Vazquez-Lago JM, Figueiras A. Misprescription of antibiotics in primary care: a critical systematic review of its determinants. J Eval Clin Pract. 2012; 18: 473-84.

14 Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60.

15 Bohnsack R. Group discussion and focus groups, in: A Companion to Qualitative Research, U. Flick, E. von Kardoff, and I. Steinke, Eds., pp. 24–221, Sage, London, UK, 2004.

16 Corbin, J. & Strauss, A. (1990). Grounded theory method: Procedures, canons, and evaluative criteria. Qualitative Sociology, 13, 3-21.

17 Arroll B, Kenealy T, Goodyear-Smith F, Kerse N. Delayed prescriptions. BMJ. 2003; 327: 1361-2.

18 March Cerdá JC, Prieto Rodríguez MA, Hernán García M, Solas Gaspar O. Técnicas cualitativas para la investigación en salud pública y gestión de servicios de salud: algo más que otro tipo de técnicas. Gac Sanit. 1999; 13: 312-9.

19 Corbin J, Strauss A. Basics of Qualitative Research. Techniques and procedures for developing grounded theory. Sage, London, UK, 2008.

20 Kitzinger J. The methodology of focus groups: the importance of interaction between research participants. Austral. J. Public Health 1994; 16(1): 103-119.

21 Aigneren, M. La técnica de recolección de información mediante los grupos focales. CEO 2006;1-19.

22 Zapata-Cachafeiro M, González-González C, Vázquez-Lago JM, López-Vázquez P, López-Durán A, Smyth E, Figueiras A. Determinants of antibiotic dispensing without a medical prescription: a cross-sectional study in the north of Spain. J Antimicrob Chemother. 2014; 69: 3156-60.

23 Llor C, Cots JM. The sale of antibiotics without prescription in pharmacies in Catalonia, Spain. Clin Infect Dis. 2009; 48: 1345-9.

24 Sabry NA, Farid SF, Dawoud DM. Antibiotic dispensing in Egyptian community pharmacies: an observational study. Res Social Adm Pharm. 2013 May 9. doi:pii: S1551-7411(13)00049-1.

25 Caamaño Isorna F, Tomé-Otero M, Takkouche B, Figueiras A. Factors related with prescription requirement to dispense in Spain. Pharmacoepidemiol Drug Saf. 2004; 13: 405-9.

26 Kotwani A, Wattal C, Joshi PC, Holloway K. Irrational use of antibiotics and role of the pharmacist: an insight from a qualitative study in New Delhi, India .J Clin Pharm Ther. 2012; 37: 308-12.

27 Caamaño-Isorna F, Montes A, Takkouche B, Gestal-Otero JJ. Do pharmacists' opinions affect their decision to dispense or recommend a visit to a doctor? Pharmacoepidemiol Drug Saf. 2005; 14: 659-64.

28 Carrasco-Argüello A, Iglesias-Rey M, Pardo-Seco J, Caamaño-Isorna F. Proximity to the pharmacy and health care demand in primary care. Aten Primaria. 2013; 45: 172-3.

29 Rubio-Valera M, Jové AM, Hughes CM, Guillen-Solà M, Rovira M, Fernández A. Factors affecting collaboration between general practitioners and community pharmacists: a qualitative study. BMC Health Serv Res. 2012; 12:188.

30 Barbero-González A, Pastor-Sánchez R, del Arco-Ortiz de Zárate J, Eyaralar-Riera T, Espejo-Guerrero J. Demand for dispensing of medicines without medical prescription. Aten Primaria. 2006; 37: 78-87.

31 Roque F, Soares S, Breitenfeld L, López-Durán A, Figueiras A, Herdeiro MT. Attitudes of community pharmacists to antibiotic dispensing and microbial resistance: a qualitative study in Portugal. Int J Clin Pharm. 2013; 35: 417-24

32 Arnold SR, Straus SE. Intervenciones para mejorar las prácticas de prescripción de antibióticos en la atención ambulatoria (Revisión Cochrane traducida). Biblioteca Cochrane Plus, 2006; 3. Oxford: Update Software Ltd, http://www.updatesoftware. com (accessed on 20 April 2014).

SCRIPT OF FOCUS GROUPS

Qualitative approach to the attitudes and knowledge of community pharmacists that condition inadequate prescription of antibiotics

CONTENT STRUCTURE OF PHARMACEUTICAL GROUPS

What do you think about the last campaigns on proper use of ATB carried out from the Ministry of Health?

Do you consider that there are still pharmacists who do not use ATB without prescription?

And 5 years ago? Was done? *Mention references that support this.*

What do you think could be the causes?
If you do not go out mention:

- *Difficulty of access to medical / health services*
- *By patient pressure. Sometimes aggressive attitudes, others because they can not stop going to work, because they are going to travel ...*
- *For customer loyalty.*
- *To advance time, "you already know what you are going to prescribe"*
- *And the pharmaceutical industry, has something to do?*
- *Any other reason?*

The use of ATB is now improving, the latest studies show that in Spain the consumption figures stabilize. What do you think may be the causes?

What do you think may be the% of pharmacies dispensed without prescription ATB?

Manuscript: Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study of Spanish pharmacists.

Juan M Vazquez-Lago (M.D.) (M.S.), Cristian Gonzalez-Gonzalez (M.S.), Maruxa Zapata-Cachafeiro (M.S.), Paula Lopez-Vazquez (Ph.D.), Margarita Taracido (Ph.D.), Ana López (Ph.D.), Adolfo Figueiras (Ph.D.)

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	Juan M. Vazquez-Lago Page 6. *"FG were conducted by principal research (JVL)"*
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 1. *"Juan M Vazquez-Lago (M.D.) (M.S.)"*
3. Occupation	What was their occupation at the time of the study?	Doctor in Medicine. Specialist in preventive medicine and public health. MD and PhD student Page 1. *"Department of Preventive Medicine and Public Health, Clinic Hospital of Santiago de Compostela"*
4. Gender	Was the researcher male or female?	Male Page 1
5. Experience and training	What experience or training did the researcher have?	The researcher published an article

		with similar methodology (Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60.).The researcher studied masters in public health where the qualitative methodology forms part of the teaching program. Conducted continuous training courses in qualitative methodology. Page 6. "*This researcher has specific training for development research with qualitative methodology"* and page 15. *"Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60."*
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	Page 5. *"In order to work in a community pharmacy in Spain, it is compulsory to be collegiate at Official Colleges of*

		Pharmacists (OCP). Using the "snowball method", the OCP send project information in the normal manner to all community pharmacists. Community pharmacists who were interested in FGs participation, had to send a mail to researcher team." Page 6. *"FG sessions took place at OCP meeting rooms."*
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Page 6. *"All pharmacists were informed of the purpose of the study, of what implied their implication, of the objectives, as well as that the FG sessions were to be recorded and transcribed, and that no-one attending would be personally identified in the study results. All agreed to participate by signing informed consent."*
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Page 4-5-6-7

Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 6
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 5-6
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 5
12. Sample size	How many participants were in the study?	Page 7
13. Non-participation	How many people refused to participate or dropped out? Reasons?	Page 7 and 12
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 6 .
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Page 6
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Page 6-7
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Page 5
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	Page 7
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 6

20. Field notes	Were field notes made during and/or after the inter view or focus group?	Page 6
21. Duration	What was the duration of the inter views or focus group?	Page 6
22. Data saturation	Was data saturation discussed?	Page 6
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	N/A
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	N/A
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	Page 5
27. Software	What software, if applicable, was used to manage the data?	Page 7
28. Participant checking	Did participants provide feedback on the findings?	Page 6
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Page 6-7-8-9
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes, there was. From page 7 to 12
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes. they were. From page 7 to 12
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Discussion of major and minor themes From page 7 to 22

BMJ Open

Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study of Spanish pharmacists.

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-015674.R3
Article Type:	Research
Date Submitted by the Author:	15-Jun-2017
Complete List of Authors:	Vazquez-Lago, Juan; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine Gonzalez-Gonzalez, Cristian; Universidade de Santiago de Compostela, Department of Preventive Medicine and Public Health - Faculty of Medicine Zapata-Cachafeiro, Maruxa; Universidade de Santiago de Compostela, Department of Preventive Medicine and Public Health - Faculty of Medicine Lopez-Vazquez, Paula; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine Taracido, Margarita; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine; Centro de Investigacion Biomedica en Red de Epidemiologia y Salud Publica Lopez, Ana; Universidade de Santiago de Compostela, Department of Clinical Psychology and Psychobiology - Faculty of Psicology Figueiras, Adolfo; Universidade de Santiago de Compostela, Departament of Preventive Medicine and Public Health - Faculty of Medicine; Centro de Investigacion Biomedica en Red de Epidemiologia y Salud Publica
Primary Subject Heading:	Qualitative research
Secondary Subject Heading:	Health services research, Pharmacology and therapeutics, Public health
Keywords:	Organisational development < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Public health < INFECTIOUS DISEASES, PRIMARY CARE, QUALITATIVE RESEARCH

Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study of Spanish pharmacists.

Authors:

Juan M Vazquez-Lago (M.D.) (M.S.),[1] Cristian Gonzalez-Gonzalez (M.S.),[1] Maruxa Zapata-Cachafeiro (M.S.),[1] Paula Lopez-Vazquez (Ph.D.), [1] Margarita Taracido (Ph.D.),[1,3] Ana López (Ph.D.),[2] Adolfo Figueiras (Ph.D.).[1,3]

Author affiliations:

1. Department of Preventive Medicine and Public Health, University of Santiago de Compostela, Santiago de Compostela, A Coruña (Corunna), Spain.
2. Department of Clinical Psychology and Psychobiology, University of Santiago de Compostela. Santiago de Compostela, A Coruña, Spain.
3. Consortium for Biomedical Research in Epidemiology & Public Health (*CIBER en Epidemiología y Salud Pública - CIBERESP*), Spain.

Name and address for correspondence and reprint requests:

Juan M. Vázquez-Lago
Department of Preventive Medicine and Public Health,
Clinic Hospital of Santiago de Compostela,
c/Choupana s/n.
15.706 Santiago de Compostela (A Coruña), SPAIN
Phone number: (+34) 646261229 / (+34) 981956116 / (+34) 881540306
Fax number: (+34) 981950406
E-mail: juan.manuel.vazquez.lago@sergas.es

Word count:

Abstract: 300

Text: 4437

ABSTRACT

Objective: To investigate community pharmacists' knowledge, attitudes, perceptions and habits with regard to antibiotic dispensing without medical prescription in Spain.

Methods: A qualitative research using focus-group method (FG) in Galicia (north-west Spain). FG sessions were conducted in the presence of a moderator. A topic script was developed to lead the discussions, which were audio-recorded to facilitate data interpretation and transcription. Proceedings were transcribed by an independent researcher and interpreted by two researchers working independently. We used the Grounded Theory approach.

Setting: Community pharmacies in Galicia, region Norwest of Spain.

Participants: Thirty pharmacists agreed to participate in the study, and a total of 5 FG sessions were conducted with 2-11 pharmacists. We sought to ensure a high degree of heterogeneity in the composition of the groups to improve our study's external validity. Pharmacists' participation had no gender or age restrictions, and an effort was made to form FGs with pharmacists who were both owners and non-owners, provided in all cases that they were OCP-registered community pharmacists. For the purpose of conducting FG discussions, the basic methodological principle of allowing groups to attain their "own structural identity" was applied.

Main outcome measurements: Community pharmacists' habits and knowledge with regard to antibiotics, and identification of the attitudes and/or factors that influence antibiotic dispensing without medical prescription.

Results: Pharmacists attributed the problem of antibiotics dispensed without medical prescription and its relationship to antibiotic resistance to the following attitudes: external responsibility (doctors, dentists and the NHS); acquiescence; indifference; and lack of continuing education.

Conclusions: Despite being a problem, antibiotic dispensing without a medical prescription is still a common practice in community pharmacies in Galicia, Spain. This practice is attributed to acquiescence, indifference and lack of continuing education. The

problem of resistance was ascribed to external responsibility, including that of patients, physicians, dentists and the NHS.

Keywords: Community pharmacy; Antibiotic dispensing; Public health; Infectious diseases, qualitative research.

Strengths and limitations:

1.- The generalization of the results could also be compromised due to the intrinsic characteristics of the pharmaceutical system in Spain. In the system of pharmaceutical provision in Spain, antibiotics necessarily require a prior prescription by the physician, and all drugs must always be dispensed by pharmacies and cannot be purchased in other types of establishments.

2.- The focus-group technique seeks the interaction of all the members of the group and ensures the identification of all the dimensions of the problem investigated while simultaneously increasing the subjective validity of each identified idea.

3.- Proceedings were transcribed and interpreted by an independent researcher. Any points of disagreement were discussed and resolved by consensus.

4.- Possible lack of generalization of findings to health systems in other countries.

INTRODUCTION

Antibiotic resistance poses a major threat to clinical efficacy and is an important problem for global public health. Resistance is an inescapable consequence of antibiotic use [1] but it increases drastically with misuse and abuse. [2,3] It is thus imperative to improve antibiotic use, [4] particularly in outpatient settings where 90% of the consumption occurs. [5]

One of the chief loopholes requiring attention is the dispensing of antibiotics without a prescription, a major problem in some countries.[6] Whereas outpatient use of antibiotics is restricted to prescription-based consumption in northern Europe, the USA and Canada, access to antibiotics dispensed without medical prescription is nevertheless commonplace in the rest of the world.[6,7,8] In Spain, dispensing antibiotics legally is done only through prescriptions, and the National Health System (NHS) covers the expenses of almost the entire population.[9] Due to population density characteristics in our territory, community pharmacists are the first point of contact for patients, as part of the health care team. Therefore, up to one third of all outpatient antibiotics dispensed are not prescribed by physicians.[3,10] Despite the fact that the EU encourages Member States to restrict the use of systemic antibiotics and recommends that such drugs be exclusively consumed under medical prescription, the dispensing of antibiotics without prescription is still a common practice.[11]

Accordingly, this study sought to conduct a qualitative analysis of community pharmacists' knowledge, attitudes, perceptions and habits with regard to antibiotic dispensing in Galicia, Spain.

METHODS

Study design

We used the focus-group (FG) method to ascertain pharmacists' attitudes, knowledge and views concerning the dispensing and use of antibiotics in Galicia, Spain. The focus-group (FG) method was used to explore community pharmacists' habits and knowledge with regard to antibiotics, and to identify the attitudes and/or factors that influence their being dispensed. We decided to use the focus-group technique because the interaction of group members tends to ensure that all the dimensions of the problem assessed are brought to light, information is simultaneously obtained on the subjective validity of various members of the group, and in addition, it is a rapid technique for generating such

information.[12] A theoretical model based on a previous systematic review was constructed for the purpose of drawing up an agenda and a script for FG, [13] which was to be followed during the group sessions to facilitate the identification of attitudes and/or factors.

The program for conducting meetings in the various FGs was designed with a dual purpose, namely, to address: (i) the dispensing of antibiotics without a prescription; and (ii) individual points of view regarding antibiotic-dispensing practices among pharmacists. Basing our study on a previous one undertaken in a population of physicians [14] and adapting it to the specific characteristics of pharmacists, we defined the script in attempt to cover the following factors/attitudes: acquiescence; indifference; external responsibilities and lack of continuing education. For the purposes of clarity and ease of comprehension, the four attitudes are defined in Table 1.

Table 1. Definition of studied attitudes.

External responsibility: the responsibility of another professional or the NHS for the sale of antibiotics without a medical prescription
Acquiescence: the ease with which antibiotics are dispensed to customers. This is associated with better customer loyalty. Part of such complacency is due to patient pressure, which comes in the form of different reasons given by a patient in order to obtain antibiotics without a prescription.
Indifference: a lack of interest in terms of the patient's illness, dispensing procedures or helping resolve patients doubts.
Lack of continuing education: Lack of knowledge of pharmacist due to a bad continuing education and bad knowledge upgrade from the point of view of quantity and quality. Lack of continuing education can be seen from three different perspectives: 1) from a legal standpoint (ignorance of the legal consequences of dispensing antibiotics without prescription); 2) from a public health standpoint (ignorance of the consequences of dispensing antibiotics without a prescription, whether for the individual – individual point of view- or the community –ecological point of view- in terms of resistances, etc); or 3) from a pharmacological standpoint (pharmacists' ignorance of the pharmacotherapeutic issues of antibiotics).

Study population and settings

In Spain, many drugs, including antibiotics, may only be dispensed under medical prescription. The dispensing of drugs takes place in community pharmacies, which must be owned by a registered pharmacist.

The study population comprised community pharmacists in Galicia. Galicia is a region in north-west Spain, with a population of around 2,779,000; almost 100% of these people have access to health care delivery and 31% are pensioners. Population density in Galicia is 92.6 inhab/km^2, similar to the European average. Population density decreases as one moves inland from the Atlantic fringe. Consequently, distances to a given population's designated health centre tend to increase. This is how pharmacists become patients' first contact with the health system to consult their health problems.

Holding of focal group sessions

In order to work in a community pharmacy in Spain, it is compulsory to be a member of the Official Colleges of Pharmacists (OCP). Using the "snowball method", the OCP sent project information in the usual way to all community pharmacists. Community pharmacists who were interested in FG participation had to send a reply to the research team. FG sessions were designed to be held with a pre-established number of participants, between 5 and 10 pharmacists in attendance in Galicia.

We sought to ensure a high degree of heterogeneity in the composition of the groups to improve our study's external validity. Pharmacists' participation had no gender or age restrictions, and an effort was made to form FGs with pharmacists who were both owners and non-owners, provided in all cases that they were OCP-registered community pharmacists. Sessions were chaired by a moderator who was a specialist in the field, following a script to ensure comparability among groups.

For the purpose of conducting FG-discussions, the basic methodological principle of allowing groups to attain their "own structural identity" was applied.[15] This afforded an opportunity to discuss individual experiences and then start the group discussion. Only in the latter stages of the FG-sessions did the moderator introduce discussion topics (following the script) which had not been mentioned.

FGs were conducted by the principal researcher (JVL). This researcher is specifically trained to develop research using qualitative methodology. FG-sessions took place in OCP meeting rooms. Only the investigator/moderator and the participants were present during the FG-sessions. All FG-sessions were audio-recorded and lasted 45-70 minutes. The investigator/moderator also took field notes in relation to the attitudes/factors/knowledge explored. The sessions ended when the information being provided by the participants yielded no new ideas. To prevent any possible interpretation biases, the proceedings were transcribed by an independent researcher (MTT).

Ethical considerations

This study was approved by the Galician Clinical Research Ethics Committee. All the pharmacists were informed of the purpose of the study, of what their involvement entailed, of the objectives, as well as of the fact that the FG sessions would be recorded and

transcribed, and that no participant would be personally identified in the study results. All of them agreed to participate by signing informed consent.

Analysis

We used the Grounded Theory Approach. [16] Analysis of the transcripts was an iterative process undertaken by two researchers working independently (CGG and JVL). The researchers carefully read the transcriptions to structure the data adequately. This allowed for greater in-depth study and familiarisation with the data, and decreased the likelihood of researcher bias. Thematic and discursive analysis was used to examine the data, identifying different ideas and sentences that were obtained from the different FGs and organising the topics, with text excerpts serving as units of analysis. The next step was to establish the association between the groups' ideas and the pre-established variables. The researchers then compared the thematic analyses and analysed emerging issues. Any points of disagreement were discussed and resolved by consensus. No computer software was used to analyze the process because the number of FGs was performed was not large.

RESULTS

Five FGs were formed. Thirty pharmacists -56.7% women, 43.3% men- contacted the research team and all of them were invited to participate in the FGs. Other characteristics of the FG can be seen in Table 2.

Table 2. Characteristics of focus group composition.

Focus group (n)	Sex Number (%)		Age Range	Practice Status Owner Number (%)
	Women (W)	Men (M)		
I (9)	7 (77,8)	2 (22,2)	27-32 years	0 (0)
II (7)	2 (28,6)	5 (71,4)	42-58 years	3 (42,9)
III (7)	4 (57,1)	3 (42,9)	38-50 years	2 (28,6)
IV (5)	2 (40.0)	3 (60.0)	45-60 years	1 (20)
V (2)	2 (100)	0 (0)	42-43 years	0 (0)

Our qualitative approach indicated that the influence of the following 4 variables was considered relevant when it came to dispensing antibiotics over the counter (see Table 3).

Table 3. Factors that influence antibiotic dispensing.

Indifference	due lack of communication with patient's physicians
	due to lack of patient follow-up
	due it is prioritized to sell the antibiotic
External responsibility	of patient (inappropriate use)
	of physicians (prescriptions without indication)
	of health care system (private insurances)
	of other professionals (mainly dentists)
Acquiescence	pressure exerted by customers to have the symptoms speedily resolved to prevent regular customers consulting another pharmacy
Lack of continuing education	dispensing habit

External responsibility

According to the conclusions of all the groups, one of the most influential variables at play when a pharmacist dispenses an antibiotic without a prescription was external responsibility, an aspect that was considered to lie with two types of health professionals, namely, physicians and dentists.

"*I think that doctors also give them* [antibiotics] *out very easily.*" (FG5, W1). The external responsibility of physicians was viewed by 100% of the FGs as being one of the most influential variables underlying the inappropriate dispensing of antibiotics.
Likewise, another important variable was dentists' responsibility. All the FGs agreed that the latter were in the habit of issuing a large number of prescriptions by telephone, i.e., "*Patients come in saying, I just talked to my dentist and he told me to take an antibiotic for 5 days, and that I must go to his surgery.*" (FG3; M2). The groups also saw dentists as a source of unnecessary antibiotic prescriptions, i.e., "*When dentists are going to remove a tooth, they'll prescribe amoxicillin-clavulanate, just like they prescribe ibuprofen.*" (FG1; M1).

The NHS was rated as being one of the main culprits. Pharmacists said that poor access (space-time) to physicians was an influential factor when antibiotics were dispensed without medical prescription, i.e., "*Another problem is all the time it takes to see a doctor: access is always faster at a pharmacy.*" (FG2; M2).

Another important variable was the number of prescriptions prescribed in private insurance versus the NHS, with most FGs reporting i.e., "*Ten times more antibiotics are given in private insurance than in the NHS*" (FG2; M1).

Lack of continuing education

Lack of continuing education was considered a relevant factor by 80% of the FGs (4/5) in any case where a pharmacist dispensed antibiotics without a prescription. As shown above, lack of continuing education can be viewed from different standpoints, e.g., *"In specific diseases, there is a range of antibiotics, and you start with the oldest." (FG3; W3).* In this case, it shows the lack of knowledge about starting with the first-line antibiotic, which is not always the oldest.

Age is also referred to as a key variable to explain the existence of lack of continuing education, with older pharmacists being those who exhibit this deficit. *"Older pharmacists give out antibiotics much more readily."(FG2, M1),* and, *"Young people give out fewer antibiotics." (FG3; W3).*

Another aspect mentioned and related to lack of continuing education is the consideration of the problem of resistance as a recent phenomenon. *"I think that the issue of resistance has begun recently, not so long ago..." (FG1, W2).*

Acquiescence

In the five FGs (100%), acquiescence was seen as an important variable, i.e., "*Many people give antibiotics to retain patients.*" (FG4; W1). A contributory factor was the different treatment accorded to regular and non-regular customers, i.e., "*Sometimes, I give them to regular patients*." (FG1; M1).

In essence, acquiescence is yielding to pressure when a certain patient wants an antibiotic: "*When you know the customer, you try to convince him, but in the end, if he keeps on insisting, you give it to him*." (FG2; W1); and, "*If they come to get amoxicillin and then start insisting, you give it to them*." (FG5; W1). Indeed, 60% of the FGs regarded patient pressure as an important factor when it came to dispensing antibiotics without a prescription. From the pharmacists' viewpoint, the current percentage ranges from 5% to 20%.

Indifference

Participants indicate the existence of indifference and mutual consent between community pharmacists and other health-care professionals, chiefly physicians, along with inappropriate attitudes to prescribing and dispensing antibiotics, noting the lack of communication as indirectly associated with indifference, i.e., *"I will give you amoxicillin-clavulanate... but you go to your doctor and bring me the prescription. That way, I feel I'm blameless." (FG5; W2).*

In a third FG, the following statements were made: *"The two professions are hardly involved with each other, there are no close ties, so that we criticise our mistakes but don't value our successes";* and, *"Sometimes I dispense an inappropriate antibiotic because I don't have the time to contact the patient's physician." (FG2; W1)* (Table 1). In this case, they identify communication difficulties as the cause of inadequate dispensation but show indifference about solving the problem.

We also observed the existence of Indifference about transmitting adequate information about the problems of resistances to customers who go to the pharmacy to buy antibiotics, as Indifference is another possible way to contribute to developing microbial resistances. *"Ok, I see, but this is about their (people's) difficulty to understand, I mean, surely, if you talk to somebody about resistance, it will sound familiar to them, but trying to explain to them how resistances are generated..., you know what I mean, an effective way to make them understand that, if they take this or that antibiotic without needing it, it's not going to have any effect later on" (FG1, W2).*

Finally, another aspect that is framed within Indifference is the fact that, in Spain, the pharmacist is also a businessman. *"In addition to being health-care professionals, we are also businessmen." (FG2; M2),* so, in addition to the individual's health, they are concerned about the profitability of the business. This statement reflects this attitude: *"Take it with you. If you get better, don't take it, just bring it back to me! ...and most people bring it back." (FG2; W1).* This sentence also refers to what we call "delayed dispensing" which is related to delayed prescriptions. Delayed prescriptions are those that are written but are only used if the symptoms do not improve.[17] Delayed dispensing of antibiotics can thus be defined as the dispensing of antibiotics for a patient, on the condition that they are not to be used immediately but only in the event that the symptoms fail to improve.

DISCUSSION

This is the first qualitative study to be conducted in Spain that explores pharmacists' knowledge of and attitudes toward antibiotic use and its relationship with microbial resistance. Our study shows that antibiotics dispensed without medical prescription was attributed to acquiescence, indifference and lack of continuing education. The problem of resistance was ascribed to lack of continuing education, indifference and external responsibility, including patients, physicians, dentists and the NHS.

We chose a qualitative design to perform this study because it helped us to better understand the processes and realities of the problems currently confronting public health.[18] We were interested in a full, detailed description as well as conceptual analysis and theory generation. As there was a theory that we could corroborate and it was hoped that a theory might arise from systematically collected data, the grounded theory offered the most appropriate method.[19] The use of the FG in the sphere of health is indicated and validated in works where the aim is to investigate what participants think and why, enabling data to be generated which could not be attained by other techniques. [20,21]

Antibiotics dispensed without medical prescription is a problem in Spain. The statements made in the different FGs corroborate the conclusions of previous studies, namely, that antibiotic dispensing without a prescription is a phenomenon that exists in Spain.[22,23] This conclusion was reached by all the FGs, notwithstanding the fact that there were small variations among them in terms of pharmacists' opinions regarding the attitudes responsible for this practice. Evidence has been provided to show that the dispensing of antibiotics without medical prescription reaches 30% in Spain.[13] Our study reveals that, from the pharmacists' viewpoint, the current percentage ranges from 5% to 20%, although they thought that this percentage may have been underestimated.

Our findings are reinforced by studies conducted elsewhere. As in our case, in these other settings, a prescription is required to obtain an antibiotic, and a high percentage of self-medication and antibiotics dispensed without medical prescription at community pharmacies was likewise detected.[24] Nevertheless, the estimates of the pharmacists who participated in our FGs were lower than those of other studies conducted in the same environment. The latter studies placed the percentage of antibiotics dispensed without prescription at 65.9%.[25] These results were only to be expected, however, as the pharmacists that we questioned about inappropriate dispensing were the very ones responsible for doing this.

Analysis of *lack of continuing education* showed a difference between professionals of different ages. This situation may be due to: (1) increased training of new professionals in the antibiotics field, as it is in the last ten years when the problem of resistance has had major social, scientific and clinical repercussions; (2) the fact that younger people are usually not pharmacy owners, which means that sales levels have no direct impact on their salaries and that any request to dispense antibiotics without a prescription will therefore

be met with a firm refusal; and, (3) the fear factor. This factor is possibly linked to the major fear felt by young pharmacists about dispensing antibiotics, as found in a study of physicians performed in our area [14]. However, none of the FGs mentioned this variable, so it is necessary to interpret it very cautiously.

Studies conducted in other settings using the same methodology have reached similar conclusions regarding the variables influencing the time taken to dispense an antibiotic, and the external responsibility of physicians and patients. However, they also attach great importance to other variables, such as economic interest. [26] Economic interest is strongly linked to variables such as patient loyalty, e.g., in our environment, the dispensing of non-prescription antibiotics was found to increase in cases where patients were known.[23] A study conducted in our setting concluded that there was an association between the pharmacist' age, the fact of owning a pharmacy, the patient's age and sex, and the workload in terms of higher or lower drug-dispensing levels. While these results cannot be directly extrapolated to our study because they would have to be restricted to antibiotic dispensing, they nonetheless show the variables that have an impact when a drug is dispensed, and these have proved to be relevant in our study. [27] The fact that, in Spain, some community pharmacists are also business owners is a factor that has not been taken into account in studies conducted in this population. This variable emerged directly in one FG and indirectly in others.

The *difficulty of spatiotemporal access* to physicians was another variable that emerged in the FGs. There is evidence in the literature to confirm that the proximity of a pharmacy decreases the demand for primary care. [28] Lack of communication with other health professionals, particularly physicians, due to different variables such as the attitudes and perceptions of different professionals is an aspect that has already been studied in our setting. [29] Our study reinforces the idea of the need to improve pharmacist training programmes and the relationships among health professionals.

Acquiescence is a factor that has been studied by other research groups. The ease with which an antibiotic is dispensed to a patient is a variable that other studies have confirmed.[30] Our results are comparable with those yielded by other professionals in the same setting. Conclusions reached about physicians show that the determinant factors of antibiotic prescribing are fear, acquiescence, lack of continuing education and external responsibility.[13] Factors such as lack of continuing education and external responsibility show great influence in both studies, when it comes to prescribing and dispensing

antibiotics [13,30]. Both studies report the external responsibility of other professionals as being one of the main sources of malpractice, i.e., the notion of other professionals being perceived as the main culprits. Indeed, external responsibility is a common variable among health professionals, especially those who state that they have no time to give explanations, and this is the reason for their malpractice. [13,30]

Our results are also comparable to those of a recent qualitative study undertaken in Portugal. This paper concludes that attitudes related to the problem of resistance were attributed to the external responsibility of patients, physicians, other pharmacists and veterinarians.[31] In our study, external responsibility was attributed to physicians, dentists and the NHS. These results are extremely interesting because these attitudes, which were identified in two different countries, could clear the way to designing specific interventions at a Euro-regional Galicia-Northern Portugal level.

Strengths and weaknesses

One limitation is the low number and the source of the participants (community pharmacists from a specific area of Spain, who are not necessarily representative of all community pharmacists working in Spain), an aspect that restricts the study's generalization to other areas or countries. The generalization of the results could also be compromised due to the intrinsic characteristics of the pharmaceutical system in Spain, governed by laws that may differ with respect to other countries. However, the study conducted in Portugal yielded similar results.[31] In any case, qualitative methods can seek to obtain a range of views, and generalizability of findings is not usually an expected attribute of this type of research. Similarly, the nature of qualitative data is that it is jointly constructed by the researcher and the participants and cannot be viewed as objective accounts.[16,20] Another possible study limitation is that one of the FGs failed to attain the pre-established minimum number of participants. Nevertheless, the conclusions drawn from this FG did not differ significantly from those of the other groups. Among the study's advantages is the fact that interaction among FG members generated ideas about antibiotics and resistances, which would otherwise have been difficult to obtain. [16] There are several previous studies that corroborate our findings both in our own and in other settings, thereby increasing the reproducibility and validity of our study.[13,22,26,29]

CONCLUSIONS

Once attitudes/knowledge associated with inappropriate dispensing have been identified, interventions can be designed to focus on these shortcomings, so as to improve antibiotic use and contribute to minimising resistance.[32] Pharmacotherapy-based interventions with community pharmacists must be undertaken to prevent errors due to lack of knowledge. This also implies the need to bear in mind the specific functions of pharmacists as health professionals. Not only are publicity campaigns to reduce antibiotic use necessary, but they need to be more direct if they are to have a major impact on health professionals and the general population alike.

LIST OF ABREVIATIONS

1.- FG: focus groups
2.- M: Man
3.- NHS: National Health System
4.- OCP: Official Colleges of Pharmacists
5.- W:Woman

478 **REFERENCES**

1 Baquero F, Baquero-Artigao G, Cantón R, García-Rey C. Antibiotic consumption and resistance selection in Streptococcus pneumoniae. J Antimicrob Chemother. 2002 ;50 Suppl S2:27-37.

2 Goossens H, Ferech M, Vander Stichele R, Elseviers M; ESAC Project Group. Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. Lancet. 2005 12-18; 365: 579-87.

3 Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. BMJ. 2010; 340:c2096. doi: 10.1136/bmj.c2096.

4 Spellberg B, Powers JH, Brass EP, Miller LG, Edwards E Jr. Trends in antimicrobial drug development: implications for the future. Clin Infect Dis 2004; 38: 1279–86.

5 Safrany N, Monnet DL. Antibiotics obtained without a prescription in Europe. Lancet Infect Dis. 2012; 12: 182-3.

6 Alliance for the Prudent Use of Antibiotics. Executive summary: select findings, conclusions, and policy recommendations. Clin Infect Dis 2005; 41 (suppl 4): 224–27.

7 Okeke IN, Laxminarayan R, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part I: recent trends and current status. Okeke IN, Klugman KP, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part II: strategies for containment. Lancet Infect Dis 2005; 5: 568–80.

8 Okeke IN, Klugman KP, Bhutta ZA, et al. Antimicrobial resistance in developing countries. Part II: strategies for containment. Lancet Infect Dis 2005; 5: 568–80.

9 Real Decreto Legislativo 1/2015, de 24 de julio, por el que se aprueba el texto refundido de la Ley de garantías y uso racional de los medicamentos y productos sanitarios.

10 Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. Lancet Infect Dis. 2011; 11: 692-701.

11 Campos J, Ferech M, Lázaro E, de Abajo F, Oteo J, Stephens P, Goossens H. Surveillance of outpatient antibiotic consumption in Spain according to sales data and reimbursement data. J Antimicrob Chemother. 2007; 60: 698-701.

12 Garcia Calvente MM, Mateo Rodriguez I. El grupo focal como técnica de investigación cualitativa en salud: diseño y puesta en práctica. Aten Primaria 2000; 25: 181-6.

13 Lopez-Vazquez P, Vazquez-Lago JM, Figueiras A. Misprescription of antibiotics in primary care: a critical systematic review of its determinants. J Eval Clin Pract. 2012; 18: 473-84.

14 Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60.

15 Bohnsack R. Group discussion and focus groups, in: A Companion to Qualitative Research, U. Flick, E. von Kardoff, and I. Steinke, Eds., pp. 24–221, Sage, London, UK, 2004.

16 Corbin, J. & Strauss, A. (1990). Grounded theory method: Procedures, canons, and evaluative criteria. Qualitative Sociology, 13, 3-21.

17 Arroll B, Kenealy T, Goodyear-Smith F, Kerse N. Delayed prescriptions. BMJ. 2003; 327: 1361-2.

18 March Cerdá JC, Prieto Rodríguez MA, Hernán García M, Solas Gaspar O. Técnicas cualitativas para la investigación en salud pública y gestión de servicios de salud: algo más que otro tipo de técnicas. Gac Sanit. 1999; 13: 312-9.

19 Corbin J, Strauss A. Basics of Qualitative Research. Techniques and procedures for developing grounded theory. Sage, London, UK, 2008.

20 Kitzinger J. The methodology of focus groups: the importance of interaction between research participants. Austral. J. Public Health 1994; 16(1): 103-119.

21 Aigneren, M. La técnica de recolección de información mediante los grupos focales. CEO 2006;1-19.

22 Zapata-Cachafeiro M, González-González C, Vázquez-Lago JM, López-Vázquez P, López-Durán A, Smyth E, Figueiras A. Determinants of antibiotic dispensing without a medical prescription: a cross-sectional study in the north of Spain. J Antimicrob Chemother. 2014; 69: 3156-60.

23 Llor C, Cots JM. The sale of antibiotics without prescription in pharmacies in Catalonia, Spain. Clin Infect Dis. 2009; 48: 1345-9.

24 Sabry NA, Farid SF, Dawoud DM. Antibiotic dispensing in Egyptian community pharmacies: an observational study. Res Social Adm Pharm. 2013 May 9. doi:pii: S1551-7411(13)00049-1.

25 Caamaño Isorna F, Tomé-Otero M, Takkouche B, Figueiras A. Factors related with prescription requirement to dispense in Spain. Pharmacoepidemiol Drug Saf. 2004; 13: 405-9.

26 Kotwani A, Wattal C, Joshi PC, Holloway K. Irrational use of antibiotics and role of the pharmacist: an insight from a qualitative study in New Delhi, India .J Clin Pharm Ther. 2012; 37: 308-12.

27 Caamaño-Isorna F, Montes A, Takkouche B, Gestal-Otero JJ. Do pharmacists' opinions affect their decision to dispense or recommend a visit to a doctor? Pharmacoepidemiol Drug Saf. 2005; 14: 659-64.

28 Carrasco-Argüello A, Iglesias-Rey M, Pardo-Seco J, Caamaño-Isorna F. Proximity to the pharmacy and health care demand in primary care. Aten Primaria. 2013; 45: 172-3.

29 Rubio-Valera M, Jové AM, Hughes CM, Guillen-Solà M, Rovira M, Fernández A. Factors affecting collaboration between general practitioners and community pharmacists: a qualitative study. BMC Health Serv Res. 2012; 12:188.

30 Barbero-González A, Pastor-Sánchez R, del Arco-Ortiz de Zárate J, Eyaralar-Riera T, Espejo-Guerrero J. Demand for dispensing of medicines without medical prescription. Aten Primaria. 2006; 37: 78-87.

31 Roque F, Soares S, Breitenfeld L, López-Durán A, Figueiras A, Herdeiro MT. Attitudes of community pharmacists to antibiotic dispensing and microbial resistance: a qualitative study in Portugal. Int J Clin Pharm. 2013; 35: 417-24

32 Arnold SR, Straus SE. Intervenciones para mejorar las prácticas de prescripción de antibióticos en la atención ambulatoria (Revisión Cochrane traducida). Biblioteca Cochrane Plus, 2006; 3. Oxford: Update Software Ltd, http://www.updatesoftware. com (accessed on 20 April 2014).

FOOTNOTES.

Contributorship statement:

All authors meet the ICMJE criteria and all authors have contributed:

- to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work,
- drafting the work or revising it critically for important intellectual content;
- to final approval of the version to be published;
- and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Author's specific contribution:

1.- Vazquez-Lago JM: Conception and design of the study. Design and conduct focus groups. Contribution to peer review of the transcription data. Analysis and interpretation data. Write the different versions of the manuscript. Review final approval of the work.

2.- Gonzalez-Gonzalez C: Design and conduct focus groups. Analysis and interpretation data. Review final approval of the work.

3.- Zapata-Cachafeiro M: Write the different versions of the manuscript. Review final approval of the work.

4.- Lopez-Vazquez P: Analysis and interpretation data. Contribution to peer review of the transcription data.

5.- Taracido M: Transcription of audio data.

6.- Lopez A: Conception and design of the study. Design the focus groups. Contribution to peer review of the transcription data.

7.- Figueiras A: Drafting the work and revising it critically for important intellectual content. Final approval of the version to be published.

Competing interest:

All Authors of this paper declare no conflicts of interest.

Funding:

There has been no public or private funding for the performance and publication of this study.

Data sharing statement:

Unpublished data from the study can be availed upon request from Juan M. Vázquez Lago.

SCRIPT OF FOCUS GROUPS

Qualitative approach to the attitudes and knowledge of community pharmacists that condition inadequate prescription of antibiotics

CONTENT STRUCTURE OF PHARMACEUTICAL GROUPS

What do you think about the last campaigns on proper use of ATB carried out from the Ministry of Health?

Do you consider that there are still pharmacists who do not use ATB without prescription?

And 5 years ago? Was done? *Mention references that support this.*

What do you think could be the causes?
If you do not go out mention:

- *Difficulty of access to medical / health services*
- *By patient pressure. Sometimes aggressive attitudes, others because they can not stop going to work, because they are going to travel ...*
- *For customer loyalty.*
- *To advance time, "you already know what you are going to prescribe"*
- *And the pharmaceutical industry, has something to do?*
- *Any other reason?*

The use of ATB is now improving, the latest studies show that in Spain the consumption figures stabilize. What do you think may be the causes?

What do you think may be the% of pharmacies dispensed without prescription ATB?

Manuscript: Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study of Spanish pharmacists.

Juan M Vazquez-Lago (M.D.) (M.S.), Cristian Gonzalez-Gonzalez (M.S.), Maruxa Zapata-Cachafeiro (M.S.), Paula Lopez-Vazquez (Ph.D.), Margarita Taracido (Ph.D.), Ana López (Ph.D.), Adolfo Figueiras (Ph.D.)

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	Juan M. Vazquez-Lago Page 6. *"FG were conducted by principal research (JVL)"*
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 1. *"Juan M Vazquez-Lago (M.D.) (M.S.)"*
3. Occupation	What was their occupation at the time of the study?	Doctor in Medicine. Specialist in preventive medicine and public health. MD and PhD student Page 1. *"Department of Preventive Medicine and Public Health, Clinic Hospital of Santiago de Compostela"*
4. Gender	Was the researcher male or female?	Male Page 1
5. Experience and training	What experience or training did the researcher have?	The researcher published an article

		with similar methodology (Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60.).The researcher studied masters in public health where the qualitative methodology forms part of the teaching program. Conducted continuous training courses in qualitative methodology. Page 6. "*This researcher has specific training for development research with qualitative methodology"* and page 15. *"Vazquez-Lago JM, Lopez-Vazquez P, López-Durán A, Taracido-Trunk M, Figueiras A. Attitudes of primary care physicians to the prescribing of antibiotics and antimicrobial resistance: a qualitative study from Spain. Fam Pract. 2012; 29: 352-60."*
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	Page 5. *"In order to work in a community pharmacy in Spain, it is compulsory to be collegiate at Official Colleges of*

		Pharmacists (OCP). Using the "snowball method", the OCP send project information in the normal manner to all community pharmacists. Community pharmacists who were interested in FGs participation, had to send a mail to researcher team." Page 6. *"FG sessions took place at OCP meeting rooms."*
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Page 6. *"All pharmacists were informed of the purpose of the study, of what implied their implication, of the objectives, as well as that the FG sessions were to be recorded and transcribed, and that no-one attending would be personally identified in the study results. All agreed to participate by signing informed consent."*
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Page 4-5-6-7

Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 6
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 5-6
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 5
12. Sample size	How many participants were in the study?	Page 7
13. Non-participation	How many people refused to participate or dropped out? Reasons?	Page 7 and 12
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 6 .
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Page 6
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Page 6-7
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Page 5
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	Page 7
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 6

20. Field notes	Were field notes made during and/or after the inter view or focus group?	Page 6
21. Duration	What was the duration of the inter views or focus group?	Page 6
22. Data saturation	Was data saturation discussed?	Page 6
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	N/A
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	N/A
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	Page 5
27. Software	What software, if applicable, was used to manage the data?	Page 7
28. Participant checking	Did participants provide feedback on the findings?	Page 6
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Page 6-7-8-9
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes, there was. From page 7 to 12
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes. they were. From page 7 to 12
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Discussion of major and minor themes From page 7 to 22