

Explaining family physicians' beliefs about antibiotic prescriptionElham Shokouhi¹, Fereshteh Zamani-Alavijeh², Marzieh Araban³

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Type of article: Original

Abstract

Background: Antibiotics are among those drugs prescribed abundantly in hospitals due to their high efficiency. However, excessive, non-logical and unnecessary use of antibiotics regardless of physicians' recommendations is considered as a challenge.

Objectives: The aim of this study was to explain family physicians' beliefs about antibiotic prescription in Ahvaz.

Methods: This study is part of a content-analysis qualitative research conducted in Ahvaz in 2016. Study subjects were selected according to purposive sampling and data collection continued to data saturation. Required data were collected using semi-structured in-depth interviews with participation of eight subjects. Data analysis was conducted along with conducting interviews using constant comparison analysis, and it continued to the last interview. Strength and accuracy of data were investigated by experts and participants.

Results: From data analysis, four major categories were extracted that were composed of 20 subcategories. They were 1) expected outcomes of antibiotics (perceived pros and cons); 2) perceived pressure to follow others' opinions; 3) the level of access to antibiotics; and 4) individual's perception for prescription.

Conclusion: Findings of this study showed that various factors affect physicians' decisions to prescribe antibiotics and it is emphasized to consider these factors.

Keywords: Antibiotics; Prescriptions; Qualitative Research; Physicians

1. Introduction

The main goal of medical sciences is to promote, restore and maintain people's health (1). As a strategic product and one of the basic needs of the public around the world, drugs are of special importance in this field (2). The process of treating diseases is a chain, one of the main links of which is medication (3). Although the healing capacity of a series of drugs is undeniable, lack of knowledge about their correct use can be a serious threat to human life (4). In recent years, the use of a series of herbal products has become very popular, especially for infectious diseases (5). Over the past half century, antibiotics have played a major role in reducing mortality and promoting people's health around the world (6). Antibiotics are among those drugs prescribed abundantly in hospitals due to their high efficiency (7). Most antibiotics are prescribed in US hospitals to treat acute respiratory infections, including sore throat, otitis media, colds, sinus inflammation and bronchitis (8, 9). However, several conducted studies explain the unnecessary use of antibiotics, which is, in turn, considered as a challenge (7). Today, the use of antibiotics has increased significantly and in developing countries, including Thailand, India, South Africa and China, it is increasing day by day (8). A systematic review conducted in 2016 has shown that buying over-the-counter antibiotics is common in many low-income countries (10). Over 235 million doses of assorted antibiotics are

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Received: April 05, 2017, Accepted: June 14, 2017, Published: October 2017

iThenticate screening: April 30, 2017, English editing: October 02, 2017, Quality control: October 12, 2017

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consumed by people around the world annually (11). Overuse, intractable, unreasonable and unnecessary use of antibiotics are the major factors affecting antibiotic resistance (12). Antibiotic resistance is the ability of a microorganism to survive and resist against antimicrobial drugs (13). According to the conducted studies, every Iranian takes 339 units of drugs per year, which is higher than the global standards (14). In addition, statistics in Iran show that antibiotics are the bestseller drugs in Iran and annually, about 120-180 billion Tomans is spent for these drugs (11). Currently, antibiotic resistance is considered a serious and increasing problem and as a major global threat for human health (15, 16). Studies conducted on antibiotic resistance have estimated that more than 70% of bacterial pathogens are resistant to at least one antibiotic. Considering about 50,000 deaths are due to antibiotic resistance in the US and Europe in 2015 and forecasting 10 million casualties each year by 2050 due to this, the benefits of continuing the use of antibiotics may decrease rapidly (17). Long-term complications, hospitalization, increased treatment expenditures, and increased risk of death are among some negative impacts of antibiotic resistance on the outcomes of treatment (9). In fact, patients infected by bacteria resistant to mild antibiotics require treatment with more expensive antibiotics (18). A study conducted in the US has shown that of five patients referring the emergency wards, one patient refers due to the complications of antibiotic overuse (19). Antibiotic administration occurs in the framework of a wide multi-functional social network that are interacting with each other, and among these factors are physicians, nurses, pharmacists, patients and healthcare providers (20). In recent studies in Great Britain, of 1000 general physicians, 28% reported antibiotic prescription several times a week. In addition, physicians stated that they have been unsure of the necessity of prescribing antibiotics (21). Therefore, an urgent need to change drug prescription behavior is felt (22). According to studies conducted in the US, increased antibiotic prescription has imposed over 7 billion dollars of extra expenditures to the healthcare system of the country (23). Although no certain evidence exists on the fact that factors like patients' expectations, the frequency of using healthcare services, age, gender, and clinical manifestations increase the probability of improper administration of antibiotics (24), today, a series of factors are recognized related to excessive prescription of antibiotics and situations resulting in improper prescription of antibiotics especially among family physicians (25). According to the World Health Organization, family physicians are considered the center of global attempts to improve the quality of services, reduce costs, promote efficiency and establish equity in healthcare systems (26). A family physician plan was developed in Iran with the aim of reducing spaces and using all available facilities and promoting social justice (27). A study conducted in Shiraz to investigate the weaknesses and strengths of the family physician plan showed that low income, medium quality of training workshops, overcrowding and inappropriate expectations of clients, uncertainty about leave and high workload have been the major results related to service providers (26). Although the prescription rate of antibiotics has been reported to be different among physicians, few studies have investigated the relation between physicians' characteristics and antibiotic prescription and factors affecting their prescription (24). Few studies conducted in this field have been mainly quantitative and since the depth of phenomenon could not be investigated using quantitative studies and considering that no studies have yet been conducted on explaining physicians' belief about antibiotic prescription using a qualitative approach, this study was conducted to explain family physicians' beliefs about antibiotic prescription in Ahvaz, using methods that provide deeper access to information.

2. Material and Methods

This qualitative study was conducted via a content analysis approach to explain family physicians' beliefs about antibiotic prescription in Ahvaz in 2016. Content analysis is one of the methods used in qualitative studies that deals with extracting required contents in the form of regular and organized titles to access the research question (28). Therefore, using the mentioned approach, this study investigated experiences and perceptions of subjects under study in the real world on the mentioned phenomena. First, necessary licenses were obtained from the Research and Health Deputy of Ahvaz University of Medical Sciences. The study subjects were selected using purposive sampling among people working as family physicians in health centers who were willing to express their experiences and perceptions in addition to having the experience of prescribing antibiotics. Data collection from eight physicians continued until data saturation. Interviews were conducted in physicians' offices when there were no patient or client. Data collection was conducted using semi-structured in-depth interviews that started after primary talks as an icebreaker and to attract their trust with questions like "Please define the experience and process of prescribing antibiotics by yourself." Then, based on their answers and for better understanding and encouraging them to explain more, some questions were used, including "Could you give us an example?", "What do you mean by saying that?", "Would you explain more?", "Have you ever had such a patient?" etc. Each interview lasted about 14-30 minutes. Each interview was typed after 48 hours and then data analysis was conducted using constant comparison method concurrent with conducting interviews and it continued to the end of the last interview, such that first, initial codes were extracted from the word document of interviews while specifying that each initial code be related to what line

of interview. Then, by putting the initial codes with the same content together, they were classified into a subcategory. Finally, by putting similar subcategories together in one category, the main categories of the study were extracted. Lincoln and Guba's Evaluative Criteria (28) were used for evaluation, funding and scientific strength of data. Member check method was used to verify whether the specified codes include all intended contents of interviewees. In addition, external check method was used to agree upon conducted coding and classification, and the views of four faculty members of Ahvaz Jundishapur University of Medical Sciences who were well-versed in qualitative research, were used. For ethical considerations, this proposal was presented to the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences and it was approved to IR.AJUMS.REC.1394.398 code. The participants were assured in terms of confidentiality of data, audio files of interviewees, and not mentioning their names and details in the study. Interviews were conducted in physicians' offices when there were no clients. Oral and informed consent was obtained from all subjects to participate in the study and to record the interviews.

3. Results

This study was conducted to explain family physicians' beliefs about antibiotic prescription in Ahvaz in 2016, where eight physicians participated. Six participants were female and two were male. Mean age and work experience of participants were 37.8 and 10.1 years respectively. Three participants were employed as full-time employees, two as a cadre, one as an hourly employee, one as a contract employee and one participant was working as an apprentice. Of eight participants, one subject had an MPH license in addition to a general physician's degree. After content analysis of interviews, 61 initial codes and 4 major categories were extracted after several classifications: 1. Expected outcomes of antibiotics (perceived pros and cons); 2. Perceived pressure to follow others' opinions; 3. The level of access to antibiotics; and 4. Impression of effective measures for right prescription and correct use of antibiotics; which are shown in Table 1.

Table 1. Main categories and sub categories

Main category	Sub-categories		
Individual perception of prescription (Perceived pros and cons)	Expected effects of antibiotics	Eliminating bacterial infection and timely treatment	
		Reducing the severity of the disease and mortality rate related to it	
		Preventing the recurrence of infection	
		Preventing the spread of infections	
		Reducing complications of infection	
	Expected side effects of antibiotics	Understanding (perceiving) the ability to prevent side effects	Preventable antibiotic side effects Un-preventable antibiotic side effects
		Understanding (perceiving) the ability to side effect treatment	Permanent side effects Ability to treat and relieve complications
		Understanding the risk of severe complications in certain groups	
Perceived pressure to follow others' opinion	Perceived pressure to follow patients' preferences and opinion		
	Perceived pressure to follow patients' Companions' preferences and opinion		
	Perceived pressure to follow coworkers' preferences and opinion		
The level of availability of antibiotics	Estimated cost of preparation and use of antibiotics, and the financial burden resulted from it on the patient		
	Easy access to antibiotic		
Impression of effective measures for right prescription and correct use of antibiotics	Culture making	Informing the community about the complications and the prohibition of illicit and improper request of antibiotics	
		Culture making on the right use of each drug	
	Training and retraining	Training and education of doctors about right antibiotics prescription	
		Training and educating physicians on how to train and persuade patients	
Supervising antibiotic prescription			

3.1. Expected outcomes of antibiotics (perceived pros and cons)

Participants' expectations of the results of antibiotic prescription were extracted from two subcategories of expected effects and side effects of drugs that are explained as follows.

3.1.1. Expected outcomes of drugs

In this case, a general physician with a work experience of three years, working at one of the health centers of East Society of Ahvaz (Participant 5) states, "We administer antibiotics for bacterial infections to prevent development of the disease and treat it as soon as possible, to reduce the course of illness or to shorten it." In addition, a general physician with a work experience of six years working at one of the health centers of East Society of Ahvaz (Participant 3) stated, "Antibiotics are among those drugs used for treating infectious diseases and they cause the eradication and treatment of many infectious and deadly diseases."

3.1.2. Expected side effects of drugs

Participants believed that every drug has its own side effects and complications are not related to administration with or without indications." In this case, a general physician with a work experience of thirteen years, working at one of the health centers of West Society of Ahvaz (Participant 4) states, "No drugs have been produced without any side effects. However, physicians should weigh up different options and see whether benefits of the drug outweigh its side effects." In this regard, a general physician with a work experience of one year, working at one of the health centers of West Society of Ahvaz (Participant 7) who took his mandatory course at this center states, "Every drug or chemical that enters the body has some side effects since it is not an organic material, and these side effects may be minor or major."

3.2. Perceived pressure to follow others' opinions

Perceived pressure to follow others' opinions was extracted from three subcategories of perceived pressure to follow patients' preferences and opinions, perceived pressure to follow patients' companions' preferences and opinions and perceived pressure to follow coworkers' preferences and opinion.

3.2.1. Perceived pressure to follow patients' preferences and opinions

Participants considered patients' comments to be interfering with drug prescription. Regarding this subcategory, a general physician with MPH license and a work experience of 23 years, working at one of the health centers of East Society of Ahvaz (Participant 6) stated, "Patients and their companions usually comment on prescribed medications. I sometimes resist against some people and refuse to prescribe what they want. However, in some cases, they insist and I need much time to convince them. So, I occasionally make a compromise and prescribe antibiotics for them."

3.2.2. Perceived pressure to follow patients' companions' preferences and opinions

Regarding the interference of patients' companions, a general physician with a work experience of less than five years, working at one of the healthcare networks (Participant 1) stated, "Considering the lack of cultural development, interventions of patients' companions sometimes have a direct effect on prescribing drugs."

3.2.3. Perceived pressure to follow coworkers' preferences and opinion

In this case, a general physician with a work experience of thirteen years, working at one of the health centers of West Society of Ahvaz (Participant 4) stated, "In Iran, even a pharmacy technician and worse than that the pharmacists allow themselves to prescribe drugs, while in western countries no pharmacist is allowed to prescribe drugs."

3.3. The level of availability of antibiotics

The level of availability of antibiotics was extracted from two subcategories of estimated cost of preparation and use of antibiotics and the financial burden resulted from it on the patient, as well as easy access to antibiotics, that are explained as follows.

3.3.1. Estimated cost of preparation and use of antibiotics and the financial burden resulted from it on the patient

Findings of analyzing interviews showed that factors including the price of drugs and patients' financial situation can affect prescribing or not prescribing a particular type of antibiotic. In this case, a general physician with a work experience of one year working at one of the health centers of West Society of Ahvaz (Participant 7) stated, "Financial situation of the patient is effective when you can prescribe that type of antibiotic with the same efficiency and lower price." In addition, a general physician with a work experience of less than five years working at one of the healthcare networks (Participant 1) stated, "No significant burden is imposed upon the patients in terms of the drugs being expensive or cheap".

3.3.2. Easy access to antibiotics

In this case, a general physician with a work experience of twenty years working at one of the health centers of West Society of Ahvaz (Participant 8) stated, "There is no special option that can affect my prescription, except the patient's idea. However, access to the drug can also be effective." Another participant, who was a general physician

with a work experience of eleven years, working at one of the health centers of East Society of Ahvaz (Participant 2) stated, "The availability of drugs in the pharmaceutical market of the country, access to medicines, costs etc. affect prescribing or not prescribing drugs".

3.4. Impression of effective measures for right prescription and correct use of antibiotics

According to the participants, conducting a series of measures by the government and related organizations as well as measures by the physicians themselves could affect proper prescriptions by the physicians and correct use of drugs by the patients. Therefore, effective measures for proper and correct prescription and usage of drugs were extracted from three subcategories of culture making, training and retraining, as well as supervising antibiotic prescription, that are explained as follows.

3.4.1. Culture making

Culture making refers to establishing measures by the government that develop people's information and knowledge related to correct use of drugs and to make patients trust the prescriptions provided by physicians for their healing. Considering this subcategory, a general physician with a work experience of less than five years, working at one of the healthcare networks (Participant 1) stated, "The major pillar is culture making, whether via mass media or cultural courses. However, physicians' attempt and effort is also important in uncontrolled antibiotic administration".

3.4.2. Training and retraining

Participants believed that personal training (instructions provided by physicians for patients) or group training (training provided for groups) as well as holding retraining courses for physicians, are among some effective measures. In this case, a general physician with a work experience of one year, working at one of the health centers of West Society of Ahvaz (Participant 7) stated, "Training can be 100% effective, both public training and training provided by physicians." Another participant, who was a general physician with a work experience of eleven years, working at one of the health centers of East Society of Ahvaz (Participant 2) stated, "Training patients is the major principle to prevent arbitrary use or insisting on its prescription. Retraining physicians is also important".

3.4.3. Supervising antibiotic prescription

Prescribing medicines by non-specialists such as pharmacy technicians, pharmacy managers etc. and absence of controlling laws for physicians' prescriptions by the government are among some reasons why participants considered supervising prescriptions as a way of controlling drug prescription. Related to this subcategory, a general physician with a work experience of thirteen years working at one of the health centers of West Society of Ahvaz (Participant 4) stated, "Antibiotics are easily and illicitly administered, even by the pharmacies and unfortunately there is no acceptable law in this regard that can be controlled, at least, as far as I know." In addition, another participant, who was a general physician with a work experience of three years, working at one of the health centers of East Society of Ahvaz (Participant 5) stated, "Unfortunately, in our country, Iran, pharmacies sell many over-the-counter drugs without prescriptions. Of these drugs are antibiotics like azithromycin that can be bought from every pharmacy. I have frequently gone to the pharmacy without introducing myself and bought co-amoxiclav. They sell it easily without doubting whether a physician has prescribed it for you or you are a physician yourself. The pharmacies should be supervised to prevent them from selling antibiotics to people without prescriptions."

4. Discussion

In this study, reviewing perceptions and experiences of family physicians in Ahvaz in terms of prescribing antibiotics, findings were extracted from four main groups of "expected outcomes of antibiotics (perceived pros and cons)", "perceived pressure to follow others' opinions", "the level of access to antibiotics", and "impression of effective measures for right prescription and correct use of antibiotics". Participants' expectations of the results of antibiotic prescription were extracted from two subcategories of "expected effects of drugs" and "expected side effects of drugs". Participants of this study pointed to some factors including: eliminating bacterial infection and timely treatment, reducing the severity of the disease and the mortality rate resulted from it, preventing recurrence of the disease, preventing the spread of disease, and reducing complications of diseases as expected effects of drugs. Participants believed that the effect that some antibiotics have on the patient's complete recovery is effective in prescribing them. In addition, participants considered the following factors as expected side effects of drugs; preventable complications, non-avoidable complications, permanent complications, and the ability to treat and resolve complications. In terms of antibiotics having side effects, participants stated that when antibiotic side effects outweigh their benefits for treatment, they avoid prescribing them. According to the participants, considering the effects and possible complications of antibiotics are very effective in prescribing or not prescribing a particular antibiotic drug. Perceived pressure to follow others' opinions as the second major category was extracted from three subcategories of perceived pressure to follow patients' opinion, perceived pressure to follow patients' companions' opinion and perceived pressure to follow coworkers' opinion. In fact, participants mentioned interfering with

prescribing drugs as one of the most effective factors pointed out by almost all participants and these interferences are mostly from the patients, companions and coworkers' side. Participants believed that today, considering easier access of the people to medical websites and books relative to the past, and rising levels of people's information on health and medical issues, commenting on prescribing medications by the people has increased. In this regard, in a study conducted in 2013 by Charani et al. related to explaining factors affecting antimicrobial prescriptions in London hospitals, they stated that having the culture of "not interfering" with prescription of antimicrobial drugs by peers could prevent unnecessary prescriptions by physicians (20). This finding complied with the results of the present study, since participants of this study considered interfering with prescription of medication by the patients and their companions and sometimes their coworkers as one of the factors affecting their prescriptions. The study by Amani et al. in 2012 in Ardabil, showed that 31.7% of family members asked for their intended drugs when referring to physicians. In addition, 41.3% of families asked the physicians to prescribe antibiotics (29). However, the study by Amani et al. was a quantitative study, the results of which could not be compared with the findings of the present qualitative study. The third major category under the title of the level of access to antibiotics was extracted from two subcategories of estimated cost of preparation and use of antibiotics and the financial burden resulted from it on the patient as well as easy access to antibiotics.

According to the participants, factors like the price of medications, patients' financial situation, and access to a particular drug or antibiotic by the patient can affect their prescriptions. The qualitative study by Soleymani et al. in 2012 in Kashan, demonstrated that the cost of medications is one of the factors affecting self-medication (30), and this view complies with the results of the present study. In the study by Gholipoor et al. in 2015 in Tabriz, the availability of medication and the high cost of visiting physicians are considered as two major factors affecting self-medication (31). Since this was a quantitative study, its results could not be compared with the findings of the present study. Impression of effective measures for right prescription and correct use of antibiotics is the fourth main category extracted from three subcategories of culture making, training and retraining as well as supervising antibiotic prescription. Participants pointed to some items including: informing society about complications and preventing the request for antibiotic prescription, forming a culture about correct usage of drugs, training and retraining physicians on the way of prescribing antibiotics and training and retraining physicians on the way of training and convincing patients, and considering them as effective measures for correct prescription and usage of medications. Almost all participants considered training people and retraining physicians as important factors, and believed that continuous and regular training courses for drug usage by people affect avoiding unnecessary drug usage and avoiding the purchase of medication without physicians' prescription, and holding retraining courses for physicians also has a significant effect on correcting drug prescription. Results of the study by Alouthman et al. in 2016 in Saudi Arabia, showed that physicians believed that educational interventions are among useful and effective solutions to improve the pattern of prescriptions (7). The mentioned quantitative study investigated the physicians' knowledge and attitude towards prescribing antibiotics. Therefore, it could not be compared with the present qualitative study. However, findings of similar quantitative studies show the effectiveness of educational interventions in this field. Participants believed that some pharmacies illicitly provide some medications without being prescribed by physicians and the absence of controlling laws and supervising the sales of pharmacies have resulted in easy access of people to various types of antibiotics. Results of the study by Alipoor et al. in 2013 that was conducted to investigate the relation between characteristics of students and their arbitrary use of antibiotics in Qum, indicated that 50.2% of students have bought their required antibiotics without them having been recommended by a physician (6). It is worth mentioning that the mentioned study is quantitative, and classification of its results is different from the results of the present study, which is a qualitative study. The review study of Ershadpur et al. in 2013 indicates delivery of medication without prescription by pharmacists (4). However, classification of findings of the mentioned study does not comply with the present qualitative study. However, it appears that supervising the sales of pharmacies and approving laws that prohibit the sale of medicines without prescription by the pharmacies are some essential issues. Regarding the limitation of the study, since all interviews were conducted at physicians' offices, and at any moment, it was possible that a patient or another client could enter the office, interviewees were excused to allocate over 30 minutes for interviews.

5. Conclusions

According to the findings of this study, assorted factors affect physicians' prescriptions. Therapeutic effects of the drug, possible side effects of the drug, patients, companions or coworkers' comments on drug prescription, financial burden of providing medication by patients, access to medications, cultural and educational issues as well as the sales of pharmacies not being supervised are among the most important factors that considering them is severely emphasized.

Acknowledgments:

The authors sincerely appreciate all subjects who participated in this research, the Research Deputy of Ahvaz Jundishapur University of Medical Sciences, and Social Determinants of Health Research Center for their financial support of this study to the code of SDH-9414.

Conflict of Interest:

There is no conflict of interest to be declared.

Authors' contributions:

All authors contributed to this project and article equally. All authors read and approved the final manuscript.

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