



Patients' opinions on metoprolol, as expressed on the Internet - an exploratory, qualitative study

DOI: 10.7365/JHPOR.2018.1.6

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Keywords:

quality use of medicines; Internet; qualitative study;
Poland; patient safety

Abstract

Background

Use of the Internet in health communication provides an opportunity for more effective discussions, consequently Internet forums are potential sources of drug-related information for the patients. However, we must consider the possibility of misinformation that exists in the virtual environment. We explore patients' perceptions and attitudes towards metoprolol as stated on the Internet. We equated patients' opinions published on the Internet with written information available in Poland for patients and physicians.

Methods

This is an exploratory, qualitative study. Data was analyzed thematically. Themes were identified inductively from the data as described by experts in the field of qualitative studies. To obtain data from a variety of individuals, they were collected from three websites that were publicly available and patient-directed.

Results

Five themes were identified: weight gain, impact on sleep and mood, interactions between alcohol and drugs, using metoprolol during gestation, and a connection between sexual dysfunction and pharmacotherapy. Patients described their concerns as associated directly with the pharmacotherapy. Patients declared that their physician had no time to explain drug-related problems during the examination. In the Consumer Medicine Information (leaflets), all the information that could prove beneficial for solving a patient's confusion, misinterpretations and concerns, can be found.

Conclusions

Internet forums are not reliable sources of medicine-related information. Most opinions included in this study presented as poor quality and should be considered potentially risky for the patients and might be unsafe in the field of public health issues. Further study should be based on quantitative methods or triangulation concept.

Introduction

The problem of health communication between patients and healthcare professionals is one of the most challenging in the modern health care system.^[1] Health communication is important from the perspective of an individual patient but also has an impact on public health issues.^[2]

A physician's skill in providing the patient with information about health-related matters is essential to improve patient adherence and may have a tremendous impact on healthy behaviors and outcomes.^[3] The patient's preferences and concerns have an important effect on adherence and persistence.^[4] Moreover, patients have the right to receive detailed and contemporary information about their medications. One way of providing such information is through documents such as Consumer Medication Information (CMI, e.g. leaflets inserted in the package with the drug) or Product Information addressed to medical professionals (e.g. pharmacists or physicians).^[5,6] Using the above mentioned documents is crucial for improving the communication between patients and medical professionals.^[7]

Use of the Internet and social media in health communication provide an opportunity for more effective discussions. However, we must consider the possibility of misinformation regarding health issues that exists in the virtual environment.^[8] The digital revolution has had a significant impact on how healthcare professionals connect with patients.^[9] In recent years, we have observed rapid changes concerning the use of the Internet and social media in the fields of medicine and pharmacy. Consequently, it is essential to improve the level of contemporary knowledge and to provide a better understanding of these tools and their impact on health communication.^[10]

Herein, we present current conditions within the healthcare system that have led to many factors that aggravate the process of communication between the physician and patient, including a lack of time, levels of stress, burnout, or demanding administrative procedures.^[11] Due to this, patients often search for critical information associated with their health status via social media or on an Internet forum. Currently, Internet forums are recognized as a place for exchanging information about medicines between patients.^[12] Finally, this problem is not widely described in the literature and needs more attention.

Because little is known about patients' experiences and opinions on medicinal products as published on Internet forums by Polish patients, we used qualitative methods to explore discussions of medication-related problems that occurred on such forums. Metoprolol remains one of the most frequently used drug in cardiovascular medicine with a variety of indications, from hypertension to arrhythmias. It is worth mentioning that metoprolol is also cost-effective option and is placed on official list containing drugs which are reimbursed from public sources. Indeed, according to the current recommendations, metoprolol has a meaningful role in the secondary prevention after acute coronary syndromes (ACS).^[13] Thus, the aim of this qualitative work is to explore patients' perceptions and attitudes towards metoprolol, the cardioselective

β 1-receptor blocker medication as stated on the Internet. Moreover, we equated patients' opinions published on the Internet with written information available in Poland for patients and physicians.

Methods

This exploratory study used a qualitative approach.^[14] that has been widely used in studies of social pharmacy and the quality use of medications.^[15] We decided to collect patients' opinions on metoprolol as published on Internet forums to provide depth and wide-ranging insights about concerns associated with pharmacotherapy. Patients' opinions were collected until no new ideas were generated - to reach theoretical saturation.

Selection of websites and data collection

To obtain data from a variety of individuals, we collected data from three websites that were publicly available and patient-directed. We did not conduct our study on Internet forums dedicated towards healthcare professionals. We selected the most information-rich websites and those which had the highest ranking position in Google, the most popular search engine used in Poland. We chose two forums dedicated to healthcare issues and one regarding general matters. Data was collected from the three selected websites in two ways: initially, using a selection via Google Internet Research Engine (limited to Polish language) and secondly, based on the search engine published on the forum websites to detect data relevant to the study subject. All of the included posts were authored by unique users. Posts were published from 2008 to 2016. This process continued until theoretical saturation was achieved. Moreover, the analytical process was conducted independently by two researchers (DS, PM).

Theoretical background

The provided analysis focused on issues related to drug safety. Thus, users' opinions were analyzed in light of safety concerns.

Data analysis

The obtained data was thematically analyzed with the constant comparison approach and the topic scheme was developed inductively based on the collected data.^[16] Topics were identified inductively from the data as described by experts within the field of qualitative studies. The inductive analysis was based on finding patterns rather than defining hypotheses before ending the collection process of patients' opinions and creating codes during the course of collection.^[17] Each opinion was coded accordingly and structured hierarchically into sub-themes and themes in-

dependently by a member of the project team (DŚ/PM). The identified themes were discussed amongst the study authors to establish the theme and resolve all initial differences in the identification or allocation of major and minor issues.

Due to the fact that no information is provided about patient gender, and to simplify the analysis, the masculine form was permanently used to describe people of each gender. The findings are described below, along with background for the themes identified. Any similarities or differences observed between patients' opinions are reported in relevant sections.

Finally, we compared patients' opinions to the information obtained from the Consumer Medicines Information (leaflets) and the Product Information (PI) approved by the Office for Registration of Medicinal Products, Medical Devices and Biocidal Products.

The translation process

Before the translation of patients' opinions into English, we prepared a verification of grammatical and stylistic style, in order not to change the meaning of the texts. The translation was performed by a bilingual American Native Speaker (L1 English, L2 Polish) with expertise in the relevant topic, and checked for correctness, including grammar, punctuation, spelling and style by a supervisor of this paper.

Ethical considerations

Because Internet forum posts are considered publicly available data, ethical commission consent is not required. This study was not considered as human subject research. Due to concerns about the patients' privacy, we took additional steps to protect the anonymity of the forum users. First of all, we have not disclosed the names of the three websites we used. Secondly, we present direct quotes without any usernames or nicknames. Moreover, we tried to present only passages from a single post or to combine two or more similar posts. To protect intellectual property of the pharmaceutical industry, we cite the patients' opinions in a way that the brand name of the drug cannot be identified.

Results

Five major themes emerged from the obtained data, which included patients' opinions on weight gain, impact on sleep and mood, interactions between alcohol and drugs, the possibility of using metoprolol during gestation and the relationship between sexual dysfunction and pharmacotherapy. In the following opinions, patients

described their concerns as associated directly with the pharmacotherapy. However, the patients' opinions also focused on assessments of the medical care received or the physician's attitude and empathy. In many cases, patients declared that their physician had no time to explain and/or discuss medication-related problems during their examination.

Theme 1 - Weight-related problems

Patients' concerns about weight gain are not directly related solely to metoprolol. In those who expressed such opinions, this point is associated with every β -blocker used long-term. This theory is mostly provided by patients with a medical history of taking more than one β -blocker or taking many drugs (polypharmacy). Appearance was an important issue mentioned by many patients. Since we had no information about the patient's gender, we concluded based on the form of the verb used (in Polish, masculine and feminine forms of the verb have different orthography) that women are more sensitive to these issues. Moreover, we noticed that patient consequently related taking the drug and dieting. Furthermore, in their opinion, even healthy diet may not be sufficient enough to stop weight gain. Patients did not highlight the connections between nutrition and health status nor did they indicate diet as an important factor related to the progression of cardiovascular diseases.

Theme 2 - Neurological and psychiatric problems

Most of the patients indicated mild neurological symptoms, e.g. dizziness, weakness, sleeping disorders, or tinnitus. According to the obtained information, any problems allowed for normal functioning and did not require consultation with physicians. However, there was a consensus of opinions that the mentioned disorders affected the health-related quality of life. Most of the patients could not describe their symptoms thoroughly; they also had problems expressing their feelings and emotions. Additionally, in some situations patients declared that they took another medicinal product (OTC or Rx) to relieve their neurological symptoms. A common situation described by the patients was to take a sedative and/or sleep-inducing drug to improve sleep quality. Nevertheless, only a few patients indicated that taking such a drug might be associated with addiction and/or actually aggravate their clinical condition. The majority of patients were not aware that the addition of another drug to their therapy may lead to drug interactions. Only a few patients mentioned that they consulted with a physician about their problems associated with taking metoprolol. In the patients' opinions, physicians underestimated their problems and did not react properly to their concerns. Several opinions also suggest jeering at problems by physicians and depreciating the patients' condition.

Theme 3 - Interactions between alcohol and metoprolol

A majority of patients underestimated the possibility of interactions occurring between alcohol and medicinal products. Moreover, many patients shared their own experiences to convince others that drinking alcohol during pharmacotherapy is safe. Some opinions even suggested that medical professionals (physicians or pharmacists) agreed with the patients that the possibility of interactions between the drug and alcohol is very low. Patients also mentioned that the consequences of drinking alcohol and taking metoprolol depend only upon personal perspective and inclinations. In some cases, patients made generalizations; they highlighted that interactions between alcohol and any drugs are irrelevant from a clinical point of view. Participants perceived that there was no information about potential interactions in the Consumer Medicine Information (e.g. drug leaflets). In the patients' opinions, the lack of information in the leaflets was synonymous with no risk for health and life in the mentioned branch of pharmacotherapy. Some of the patients declared that they do not take any medications when drinking alcohol. However, they stressed that this situation may be harmful to their health status and lead to exacerbation of heart disease.

Theme 4 - Metoprolol and gestation

Many patients were familiar with the dangers associated with taking medicinal products during gestation. However, for some of the opinions, the danger associated with such a situation was not seen as a straightforward process. They stressed the importance of providing information from medical professionals (physicians and pharmacists) before becoming pregnant rather than during the first trimester. Moreover, the opinions suggested that consultation with a physician is a necessary part of planning for pregnancy if patients are taking medications for chronic diseases, e.g. hypertension or heart failure. Some patients stated that medicinal products should not be used during pregnancy. One of these opinions suggested that such information was obtained from a cardiologist. Most of the concerns raised were associated with a wide range of emotions, e.g. fear or uncertainty. Patients indicated that they read the Product Information (PI) or Consumer Medicines Information (e.g. leaflet) or searched for information on the Internet. The medication-related questions focused on the drug's impact on the fetus rather than the condition of the mother. In certain cases, the opinions focused on specific drug-related effects on the fetus, such as the drug causing bradycardia.

Theme 5 - Metoprolol and sexual dysfunction

Every opinion associated with sexual dysfunction was focused on male disorders. Male patients associated their

erection problems solely with taking the medication. One patient noted that their problem might have a multifactorial background and its association with progression of the primary disease. Moreover, after changing the pharmacotherapy management scheme, sexual conditions improved. Many patients indicated that their physicians were empathic and aware that sexual dysfunction is an important factor on quality of life. In some cases, patients noticed the connection between taking a drug and erection dysfunction had an impact on adherence and persistence. Patients also identified barriers and constraints in actual clinical settings that might limit the communication between patients and physicians in case an intimate problem emerges. Further, one patient mentioned that in a community pharmacy in Poland, there is no place to communicate and discuss with the pharmacist in private.

Comparison of patient identified medication-related problems with the *Consumer Medicine Information and Product Information* available in Poland

Consumer medicine information (CMI) leaflets are available for every prescription drug in Poland. Patients can find there every necessary information associated with pharmacotherapy, with a particular focus on side effects and interactions between medicinal products. Moreover, they are written in a friendly and accessible way. We were able to find all the necessary information in the leaflets that could prove beneficial in solving a patient's confusion, misinterpretations and concerns. The most useful information is provided in the Side Effects section. Accordingly, in this section we found the following information: common metoprolol side effects may include dizziness, feeling of tiredness, nightmares or trouble sleeping; which might be crucial information for patients with neurological or psychiatric concerns. Unusual weight gain is classified in a less common category. Disturbances of libido are listed as very rare. However, it should be highlighted that the lists of possible side effects are long and their reading might be difficult and exhaustive for patients. Information regarding alcohol and how its' use can have an impact on the prevalence of certain side effects of metoprolol was included in the Interactions section. The information obtained from the section entitled Pregnancy and Breastfeeding Warnings was the most detailed and comprehensive. Patients could find the conclusion that if there is a suspicion that the woman taking the medication is pregnant or planning to become pregnant, she should immediately consult with a physician or pharmacist before taking this medication. Moreover, according to CMI, metoprolol should be taken during pregnancy only if clearly needed. The possible impact on the fetus is also strictly highlighted (including information about the decrease in heart rate of the fetus

and neonate). Breastfeeding information contained in the leaflet is not clearly defined; it mentioned that the active ingredient is transferred into breast milk but that this situation is assessed as clinically irrelevant.

Products Information (PI) is addressed to professionals, particularly physicians and pharmacists. Data included in this document requires a medical or pharmaceutical education at a higher level. In the PI, we also found a description of clinical studies and advanced knowledge in the field of pharmacodynamics. However, the PI represents a highly practical approach and is intended mainly for medical practitioners and pharmacists who work in the community pharmacy setting. Professionals can use the PI to find answers to the medicine-related problems described in this paper. For example, in section Pregnancy and Breastfeeding, this document focuses on clinical management, e.g. discontinuation of treatment before the planned delivery, procedures in case of emergency childbirth and/or observation of the newborn exposed to the effects of metoprolol. This information is crucial and highly necessary from the practical perspective.

Discussion

This study highlights many significant insights from patients' opinions and their concerns on the issue of medicine-related problems associated with taking metoprolol. Metoprolol is a well-recognized and well-established active pharmaceutical ingredient used to treat several cardiovascular diseases (e.g. hypertension) and to prevent myocardial infarction. All patient concerns constituted potential obstacles to effective treatment and could affect adherence. Some opinions may also have an impact on public health issues, e.g. interactions between medicinal products and alcohol, or opinions suggesting patients not take the drug during pregnancy. Individuals identified many barriers within the healthcare system regarding effective communication between patients and medical professionals, as well as the successful management of non-adherence problems. It is important to consider the implications of these findings for the development of effective multidisciplinary strategies aimed at improving medical communication within the healthcare system in Poland. It should be emphasized that information which can dispel many of the patient's concerns is included in the leaflets of medicinal products. The text of Consumer Medicines Information (CMI, e.g. patients' leaflets) is easy to read and well written, however, sometimes finding the necessary detailed information can be difficult and exhaustive for the patient, particularly for the elderly generation. Aslani et al. suggested that written information should be concluded with additional oral advice.^[18] However, this approach is not widespread in Poland.

Many well-designed studies confirm that effectively written Consumer Medicines Information plays a key role in safe and effective medicine taking, but the structure of the currently available materials do not meet patients' needs.^[19,20,21] Moreover, many patient identified medical-related problems are summarized in the Side Effects section. According to experts, this section is poorly written and thus critically assessed by patients.^[22] These facts confirm our observations.

Undoubtedly, Internet forums are influential sources of consumer information.^[23] Many patients viewed the Internet as a valuable tool for finding health information in order to support their knowledge or enhance the communication process with physicians or pharmacists.^[24] However, this research area is not well investigated in the field of health communication. Undoubtedly, the use of health information sources found on the Internet is increasing in popularity. In addition, Polish patients stated that the Internet can be a important tool to help find health-related topics and improve the level of health literacy.^[25] One recent study provides deeper insights into patients' concerns about diet and weight loss as published on Internet forums.^[26] Moreover, another study indicates that patient experiences of searching for information on the Internet in the field of healthcare varied widely (e.g. seeking for eczema related topics).^[27] Despite this, there is a limited number of research studies that focus on Internet forums and medicine-related topics. Most of them indicated that information related to medicinal products in Internet forums or published via social media could be a risk for the patients and constitute a threat to public health policy. Internet users, but also medical professionals must be aware that online forums are not reliable sources of information.^[28,29,30] This paper supports the conclusion that patients' opinions about medicine-related problems published on the Internet are of poor quality and have little to no scientific background. These findings differ from the work by Cole et al., who argued that most of the information published on the Internet in the field of healthcare is of a reasonably good quality.^[31]

In light of this study, it should be noted that the findings may be transferable to other settings and impact approaches to improve communication between medical professionals and patients. This work provides a theoretical basis for clinicians, other healthcare professionals or researchers to pay more attention to medicine-related information published on the Internet. The study showed the enormous potential of Consumer Medicines Information (CMI), which may be used as a way to dispel the patient's doubts. Quantitative methods should be used to investigate how many patients use Internet forums as a medicine-related source of information. Triangulation concept should be considered as highly expected.

Limitations

In interpreting the findings, it should be noted that due to the qualitative nature of the study, the results may not be generalizable to a broader population of patients who have taken metoprolol and other medicinal products within the β -blocker group. Additionally, the qualitative nature of this study means that no specific hypotheses were directly formulated. Rather, the investigators' use of a qualitative approach allows for a more in-depth insight into patients' opinions. Considering that this research area is not well explored, particularly from a Polish perspective, this qualitative approach in many ways was the most appropriate way to establish insights into this topic. The findings collected can be used as the basis for future quantitative investigations or even to build a triangulation model.

Furthermore, we had a limited demographic information about the patients. The Internet environment does not easily facilitate the conduction of research due to the continuous flow of information. In addition, there is no gold standard for conducting such a research. This work has a unique but exploratory character.

Conclusions

This work presents novel and unique insights into patients' perspective of medicine-related problems as published on Internet forums. Exploring patients' concerns and doubts by use of a qualitative approach provided a more in-depth understanding of their specific needs and preferences and created the possibility of further research. Internet forums are not reliable sources of medicine-related information. Most opinions included in this study presented as poor quality and should be considered potentially risky for the patients, as well as unsafe in the field of public health issues. Further study should be based on quantitative methods or triangulation concept

Table 1. Examples of quotes from the identified medicine-related problems.

Themes	Sample quotes
The weight-related problems	All beta blockers cause weight gain, unfortunately I gained weight after metoprolol, and now I'm taking propranolol and again I've gained weight, and it's so true that it's really hard to lose this extra weight.
	I noticed a small increase in body weight, Maybe women are more sensitive on this point ? (...) For over a month I've been taking bisoprolol instead of metoprolol and I've actually slimmed down a little, which confirms for me that while taking metoprolol I gained weight.
	My body weight has also increased, even though I'm a vegetarian.
The neurological and psychiatric problems	I feel good, sometimes a symptom here or there like dizziness but it's getting better .
	(...) Dizziness, weakness, ringing in my ears (...)
	I've been taking metoprolol 50mg for a few months now and I feel tired and sleepy.
	Regarding depression, I feel strange after this medication, very, somehow overwhelmed.
The interactions between the alcohol and metoprolol	I sleep poorly, but now I see it might be due to metoprolol, which is based on metoprolol, which crosses the blood-brain barrier (similarly like propranolol) and can have an effect on sleep quality.
	But the fact if alcohol could really hurt someone or if they gain weight... this is all dependent on the person and we can't foresee this.
	Generally it's like this, that 99% of the time taking medications with alcohol doesn't have any effect. Being convinced that alcohol causes interactions with most drugs is usually not true. (...) Actually, in the case of metoprolol, alcohol doesn't have a bigger effect. (..)
Metoprolol and gestation	It seems to me that, if the information sheet of the drug doesn't have any information telling you not to drink alcohol, then it means that a small amount shouldn't hurt and of course we can always consult a doctor or pharmacist if we have doubts.
	My cardiologist told me that I can get pregnant. But that I would have to stop taking all medications then.
	My doctor prescribed me metoprolol knowing that I'm pregnant... I don't know this medication but I already read that it should be automatically stopped during pregnancy and breastfeeding...and now I don't know what to do, to take it or not, I'm very afraid that it could harm my child.
Metoprolol and sexual dysfunction	The medication should not be used during pregnancy, unless it is absolutely necessary. Beta-adrenolytics can cause bradycardia in the fetus and newborn, which is important to remember when taking these drugs in the III trimester of pregnancy and the time around delivery. Beta-adrenolytics can cause bradycardia in a breastfed child. Metoprolol is transferred into the mother's milk, however the effect on the child who is breastfed is clinically insignificant, if the mother is taking the drug in therapeutic doses.
	I took this drug about half a year and the only thing I noticed is that it causes impotence.
	Regarding sex what I've noticed, is that my desire hasn't lessened, but a prolongation in "the time that it takes to get to sex", experiencing it lasts longer, which has piqued the interest of my wife (I hope you know what I'm talking about) (7 years of intimacy, and 5 years after marriage). Generally after the medication I feel like a "young GOD" my nervous reactions are more toned down, lack of excessive sweating and irritability. Unfortunately, my weight has gone up and so has my cholesterol.

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