Patients’ perceptions of conflicting information on chronic medications: a prospective survey in Switzerland

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ABSTRACT

Objective The number of patients with chronic diseases and subsequent visits to various healthcare professionals has been rising over the past decades, exposing patients to potential risks of receiving conflicting medication information. This study aims to investigate the prevalence of conflicting information on medications perceived by chronic patients in Switzerland and to understand its impact on patients’ medication self-management and navigation in the healthcare system.

Participants This cross-sectional study included adult patients taking at least one prescribed medication for at least 6 months, who had visited at least two physicians in the past 3 months.

Main outcome measures Data on patients’ perceptions of conflicting information were collected in person through a 17-item questionnaire available on paper and electronically with four domains: (1) whether the patient had perceived any conflicting information, (2) categories of conflicting information, (3) impact and (4) sources involved in the conflicting information.

Results Of the 405 included patients, 47% perceived conflicting information related to one or more medication topics including indication, schedule, dosage, risk, severity or duration of side effects. Patients who perceived conflicting information were prescribed more drugs than those perceiving no conflicting information (p<0.01). Consequently, 65% of the participants modified their navigation of the healthcare system and 34% reported medication non-adherence. General practitioners (82%), specialist physicians (74%) and pharmacists (49%) were the healthcare professionals most often involved in conflicting information. Experience with the medication, its package insert and significant others were more frequently involved in conflicting information than internet or social media.

Conclusion Nearly half the patients in our study perceived conflicting information in the outpatient healthcare system, which can decrease medication effectiveness and pose safety issues. This issue is widely overlooked and unaddressed. Consistency of information among healthcare providers in partnership with patients should be reinforced through guidelines and new models of interprofessional care.

INTRODUCTION

Age is associated with increased prevalence of multiple chronic diseases.1 Multimorbid chronic disease outpatients often visit several healthcare professionals such as physicians, nurses and pharmacists, who provide complementary expertise which increases the risk of receiving conflicting medication information2 or perceiving conflicting information about their medication.3 Various healthcare professionals use different information sources and communication styles.4 5 Fragmentation of care induced by a lack of coordination among various healthcare professionals can lead to inconsistent communication or misinformation perceived by patients.5 6 Although no consensus definition of conflicting information on medication exists, Carpenter et al defined conflicting health information as ‘two or more health-related propositions that are logically inconsistent with one another’ such that the patient could not simultaneously engage in or believe both propositions at once’.7 8

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study explored the prevalence and consequences of patients’ perceptions of conflicting information regarding their prescribed chronic disease medication in the outpatient healthcare setting.

⇒ The survey was created specifically for the purpose of this study, approved by an expert committee and pretested by 11 patients before data collection. The authors intend to validate this questionnaire in the future so that the same instrument could be used in other studies and settings.

⇒ The survey was described as a questionnaire focusing on medication-related information, without mentioning the term ‘conflicting information’ during the recruitment process to avoid selection bias.

⇒ Patient perceptions of conflicting information may not reflect receipt of actual conflicting information. Nevertheless, patients’ perceptions, as the main driver of their medication decision making and trajectory in the healthcare system, belong to patient-reported experience; they are of importance for the healthcare system.
Information on medication originates from scientific evidence and recommendations issued by experts such as healthcare professionals or the pharmaceutical industry. Previously published studies reported physicians being patients’ preferred source for medication information. Lay sources such as the internet, television or social media have also been highlighted as being common sources of medication information for chronic disease patients. Perception of information is a subjective process not only influenced by sources of information but also by patients’ experiences as well as sociodemographic factors such as age, level of education and clinical factors such as type and length of the disease. Indeed, perception of conflicting information can originate from factual contradictions but can also be triggered by other circumstances such as a patient’s own interpretative process or because of a suboptimal communication from healthcare providers. Conflicting information has been described as a barrier to properly understanding health conditions and medications, and has lead patients to seek information from non-professional sources such as the internet. Conflicting information can lead to misunderstanding, exposing patients to a lower quality of care, decrease trust in the healthcare system, decrease medication adherence and efficacy, increase healthcare costs, and negatively impact clinical follow-up.

Previously published articles highlighted that between 25% and 80% of patients received or perceived conflicting diagnoses or medication information. These frequencies vary largely between populations studied. In the USA, the prevalence of posthospital medication discrepancies encountered by elderly patients was estimated to be 14%. An international self-completed survey estimated the prevalence of conflicting information about medication use during pregnancy at 23%. In rheumatic diseases, conflicting medication information on medication was estimated to be 25%, 80% for arthritis patients and 51% in vasculitis patients. Most investigations were conducted in the USA or Asia, where healthcare systems are organised differently than in Europe. To our knowledge, only one study has been conducted in Europe so far.

This study aims to: (1) investigate the prevalence of conflicting medication information perceived by patients with chronic diseases in Switzerland, (2) characterise conflicting medication information and (3) understand its impact on patient medication self-management and navigation in the healthcare system.

METHODS

Study design and procedures

This is a cross-sectional study. Outpatients were recruited at an academic community pharmacy located at the entrance of the University Hospitals of Geneva, Switzerland, and in three partner community pharmacies from March to December 2019. Inpatients were recruited in three medical units at the University Hospitals of Geneva, in June 2019. Patient inclusion criteria were: (A) taking at least one prescribed medication for a chronic disease for at least 6 months, (B) having visited at least two physicians during the past 3 months and (C) being able to communicate in French, English, Portuguese or Spanish (in which the researcher was able to communicate). Outpatients were recruited at the pharmacy, after filling the prescription or while waiting in line. Regarding inpatients, the researcher described the study to all eligible patients. All eligible and interested outpatients and inpatients signed a consent form clarifying that the collected data were coded and neither their physician, nor their pharmacist or nurse would have access to the individual answers provided.

To ensure representativeness, patients were recruited between 9:00 and 18:00 during weekdays (Monday–Friday). No incentive was offered to participants. To avoid selection bias, the survey was presented to patients as a survey about medications without mentioning ‘conflicting information’. The definition of conflicting information used in this study was Carpenter’s definition: ‘Two or more health related propositions that are logically inconsistent with one another’.

Patient and public involvement

An expert patient was involved at several stages of this study including the design of the protocol and conduct of the study. Preliminary results were presented on a regular basis and feedback was obtained from the patient throughout the entire study.

Measures

A 17-item survey was created in French and made available by the researcher in person both on paper and on an electronic tablet. Participants were able to complete the survey alone or with the help of the researcher (BS). The survey was available in French with the possibility to have questions translated verbally into Portuguese, English and Spanish, by the researcher (BS) if needed. The survey included two contextual items (whether the participant is a patient or a caregiver, and the reasons for visiting the pharmacy), five patients’ sociodemographic items (age, gender, preferred language, level of education, nationality and if applicable, resident permit) and six health-related items (types and duration of long-term diseases, number and names of all medications taken, healthcare professionals consulted regularly, perceived quality of health). The quality of life item is the ‘general health’ item of the validated French SF (Short Form)-36 health survey.

Four questions assessed conflicting medication information. The first question collected data on patients’ perceptions of conflicting information regarding their prescribed medications in the past 12 months in eight domains: indication, dosage, schedule, how to take the medication, duration of treatment, risk of side effects, side effect severity and duration of side effects. Patients rated each category through a 5-item scale: never,
sometimes, often had perceived conflicting information, no information received and ‘I do not know’. Internal consistency was assessed postsurvey, for the eight items of this question through Cronbach’s alpha coefficient. The second item collected data on perceived consequences of conflicting information on medication adherence such as stopping the medication, reducing dosage or switching to complementary medicine (n=6 response options, see online supplemental material 1) and navigation in the healthcare system such as visiting another healthcare professional, or taking a second appointment with the same physician (n=4 response options, see online supplemental material 1). The third and fourth questions investigated 19 sources of conflicting medication information, including 8 professional sources (eg, general physician, specialist physician or pharmacist) and 11 lay sources, including (patients’ own experience, close family, the internet or social media). For questions 2–4 in this section, participants were able to select ‘other’ as answer. The survey was reviewed by an expert committee composed of four healthcare professionals (two physicians, a pharmacist and a nurse) and an expert patient for face validity and content validity. Then, it was pilot-tested with 11 patients to ensure clarity and understanding of the questions. The used version is available as online supplemental material 1.

Sample size calculation

Our sample size calculation was based on the following equation: $n = \frac{\left(p(1-p)\right)z^2}{d^2}$ (with $p=$the expected proportion; $z=1.96$ for a confidence level of 95%; $d=$margin of error of 5%). Based on the available literature, our expected proportion of patients who perceived conflicting information was estimated to be 24% (IQR 23%–45%). For a prevalence of exposure to conflicting information of 24% and 50%, 289 and 385 patients needed to be included in the survey, respectively. Therefore, we conservatively targeted a sample size of 400 patients to ensure a sufficient study power.

Statistical analysis

Chronic diseases were categorised according to International Classification of Diseases-11 code and medication were coded using the Anatomical Therapeutic Chemical Classification system.

In patients having received information, perceived conflicting information was dichotomised as ‘present’ (code 1) if at least one category among the eight conflicting information types was rated as ‘sometimes’ or ‘often’. Conflicting information was scored as ‘absent’ (code 0) if all eight domains were rated as ‘never’. Absence of answer and responses of ‘I don’t know’ were labelled as missing data. $\chi^2$ tests were performed to investigate the association between two categorical variables such as perceiving conflicting information on at least one medication topic and (1) sociodemographic variables (gender, age, level of education, preferred language and nationality), (2) self-assessed quality of life and (3) medical variables (recent contact with a prescriber, type and duration of disease and number of medications taken).

A multivariate logistic regression model was used to investigate the association between the presence of at least one conflicting information and the following variables: gender, age, level of education, language, nationality, daily number of medication, occurrence of a recent contact with a physician and presence of the following diseases: circulatory system; endocrine, nutritional or metabolic diseases; mental behavioural or neurodevelopmental disorders; diseases of the musculoskeletal system; diseases of the respiratory system and other miscellaneous symptoms. The model also included the interaction between gender and age. Variables for the multivariate analysis were selected according to the results of the bivariate analysis. Determinants with a $p<0.05$ in the bivariate analysis were included in a multivariable logistic regression model. The final model was selected using a bidirectional stepwise procedure based on the Akaike information criterion (function stepAIC of the R package MASS with all the parameters set by default). All the analyses were performed using R software, V.3.6.3 (The R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Among the 1854 approached patients, 1361 (73%) accepted to participate of which 31 were inpatients. Main reasons for refusal were lack of time and lack of interest in the study. Among the 1361 individuals who accepted participation, 956 (70%) did not fill in the inclusion criteria. Hence, 405 participants were included in this study, where 190 participants (47%) perceived at least one conflicting information (figure 1). Alpha’s Cronbach coefficient for the eight items on conflicting information perceived in the last 12 months showed an acceptable internal consistency, with $\alpha=0.76$.

Two hundred and thirty-seven (59%) participants completed the electronic version of the survey, while all other completed the paper version. Sixteen participants
(4%) completed the survey without the presence of the researcher and returned it afterwards. Among included participants (table 1), 65% were over 51 years old, 57% were women and 74% were of Swiss nationality. General practitioners (GPs) were the healthcare professional mostly seen by participants (88%), followed by medical specialists such as gynaecologists (21%), psychiatrists/psychologists (17%) or cardiologists (13%) (table 2). For 52% of the participants, their first chronic disease was diagnosed over 5 years ago. The three main chronic diseases reported were related to the circulatory system (37%), endocrine, nutritional or metabolic disease (29%) and mental, behavioural or neurodevelopmental disorders (15%). Moreover, 44% of participants were prescribed ≥4 chronic treatments. Participants’ perception of their own health was described as ‘good to excellent’ by 79%.

| Table 1 | Sociodemographic data |
|---------|-----------------------|
| Variable | N° of patients n (%) |
| Age (years) (n=403; missing data=2) | |
| 18–30 | 36 (9%) |
| 31–40 | 47 (12%) |
| 41–50 | 57 (14%) |
| 51–60 | 94 (23%) |
| 61–70 | 92 (23%) |
| 71–80 | 61 (15%) |
| >80 | 16 (4%) |
| Gender (n=401; missing data/other=4) | |
| Female | 230 (57%) |
| Participant (n=404; missing data=1) | |
| Patient | 387 (96%) |
| Caregiver | 17 (4%) |
| Nationality (n=401; missing data=4) | |
| Swiss | 299 (74%) |
| European | 92 (23%) |
| Non-European | 10 (3%) |
| Highest education level (n=399; missing data=6) | |
| Obligatory schooling (elementary and middle schools) | 73 (18%) |
| Apprenticeship (professional training) | 88 (22%) |
| High school | 24 (6%) |
| Professional college | 100 (25%) |
| University | 114 (28%) |
| Preferred language (n=405) | |
| French | 323 (80%) |
| Others: Portuguese, English, Spanish, Italian, German | 82 (20%) |

| Table 2 | Clinical data |
|---------|----------------|
| Variable | N° of patients n (%) |
| Main chronic diseases (ICD-11 code, WHO) (Patients may suffer from different diseases) (missing data=17) | |
| Circulatory system diseases | 151 (37%) |
| Endocrine, nutritional or metabolic diseases | 119 (29%) |
| Mental, behavioural or neurodevelopmental disorders | 62 (15%) |
| Musculoskeletal system or connective tissue diseases | 38 (9%) |
| Respiratory system diseases | 31 (8%) |
| Symptoms, signs or clinical findings, not elsewhere classified* (eg, anxiety, chronic pain, fibromyalgia, tachycardia) | 44 (11%) |
| Years since diagnosis of first chronic disease (n=397; missing data=8) | |
| Less than 1 | 38 (9%) |
| 1–5 | 150 (37%) |
| More than 5 | 209 (52%) |
| Visit the pharmacy after: planned or emergency appointment, or hospitalisation discharge (recent contact with physician (n=404; missing data=1) | |
| Yes | 194 (48%) |
| No of different medication taken per patient daily or weekly (n=397; missing data=8) | |
| < 4 | 222 (56%) |
| four or more | 175 (44%) |
| No of patients with chronic or long-term prescribed medication (ATC code) (n=379; missing data=26) | |
| (C) Cardiovascular system | 170 (42%) |
| (A) Alimentary tract and metabolism | 161 (40%) |
| (N) Nervous system | 140 (35%) |
| (B) Blood and blood forming organs | 112 (28%) |
| (R) Respiratory system | 46 (11%) |
| (M) Musculoskeletal system | 34 (8%) |
| (H) Systemic hormonal preparations, excluding reproductive hormones and insulins | 33 (8%) |
| (L) Antineoplastic and immunomodulating agents | 26 (6%) |
| (G) Urogenital system and reproductive hormones | 22 (5%) |
| (J) Anti-infectives for systemic use | 14 (3%) |
| (S) Sensory organs | 11 (3%) |
| (D) Dermatological drugs | 8 (2%) |
| (V) Others, unspecified | 25 (5%) |
| Healthcare professionals seen regularly (at least once per year) (n=390; missing data=15) | |
| General practitioner | 357 (88%) |
Forty-seven per cent of the participants sometimes or often perceived conflicting information related to their medication treatment in the previous 12 months (see figure 2). Participants reported perceiving conflicting information on one (14%), two (10%), three (10%) and four or more (13%) different topics. Conflicting information on side effects (22%) and duration of treatment (18%) was reported most commonly.

Figure 2 Prevalence of perceived conflicting information according to the eight measured categories of information (n=190 patients).

Among those who perceived conflicting medication information, 65% modified their navigation through the healthcare system by either taking a new appointment with the same physician (45%), seeking other medical advice (30%), avoiding consultation with the same physician (7%) or switching to complementary medication (3%). Moreover, 34% of participants reported being non-adherent to their medications after receiving conflicting information (see table 3). There was no statistically significant association between modifying navigation through the healthcare system and endorsing...
a non-adherent behaviour to medication ($\chi^2$ test (1, N=190)=0.26, p=0.61).

In the bivariate analysis, quality of health was significantly lower for those who took more than three medications (p<0.0001) and for those who perceived conflicting information (p<0.0001). Participants with a cardiovascular disease (37%) such as essential hypertension or coronary atherosclerosis perceived less conflicting information in comparison to participants with no cardiovascular disease (63%) (p=0.001). Participants' gender, language, nationality, and duration of chronic diseases were not significantly different between those who did and did not perceive conflicting information.

In the multivariate analysis (table 4), being prescribed more than three medications was associated with a significantly higher risk of perceiving conflicting information (p=0.014), and participants with a cardiovascular disease and who were older than 50 years had a significantly lower risk of perceiving conflicting information (p=0.001). There was a trend towards perceiving more conflicting information in participants with a higher level of education.

Healthcare professionals were most often perceived by participants as sources of conflicting information in comparison to the Internet and social media. GPs (82%), specialist physicians (74%) and pharmacists (50%) were the healthcare professionals commonly perceived as sources of conflicting medication information. GPs were more frequently sources of conflicting information in participants with a long-standing chronic disease (p=0.018), as well as in participants who were taking more than three medications (p=0.013). Among lay sources of conflicting information were individuals' own experience with the medication (58%) and significant others (33%). Younger participants (18–50 years) mentioned the Internet and social media more frequently as sources of conflicting information than older patients ≥51 years (internet, p<0.001; social media, p=0.003).

**DISCUSSION**

Among community pharmacy patients and inpatients with chronic diseases, nearly half (47%) perceived at least one conflicting information regarding their chronic medications during the past 12 months. Taking more medications and younger age were associated with increased likelihood of perceiving conflicting information. Conflicting medication information had some negative consequences by either triggering a modification in the patient’s navigation though the healthcare system or decreasing medication adherence. Conflicting information was reported across all medication topics, although the most commonly related to side effects information which is a topic known to trigger many negative emotions in patients, including fear. The level of information patients need to cope and manage side effects varies widely across individuals.

The high prevalence of patients perceiving conflicting information is consistent with the findings from previously published studies. While other studies evaluated conflicting information encountered by patients suffering from specific chronic diseases such as arthritis or atrial fibrillation, our study describes the perception of conflicting information of patients with various long-term diseases and treatments, most of them included in the primary care context, that is, community pharmacies.

According to our results, perceived conflicting information originates from various healthcare professional sources, mainly from GPs, specialist physicians and pharmacists. Findings from other studies also described physicians as main sources for confliction information, while pharmacists were noted not as major sources of conflicting information. Interestingly, our results show that, although pharmacists are mentioned as a source of conflicting information, only 6% of included patients listed their pharmacists among the healthcare professionals they consulted regularly. Pharmacists are not always seen as a healthcare professional by patients although patients consult their pharmacist over two times more often than their physician as described in Switzerland in 2018.

Information provided by healthcare professionals also came into conflict with patients’ own experience and knowledge about medication, medication package inserts or information from close friends and family. Medication package inserts are usually seen as an important source but also rather difficult to understand, which is accentuated if the level of health literacy of chronic patients is low.

Such complexity can explain why medication package insert is sometimes perceived as a source for conflicting information. Friends and family can play many roles in a patients care including providing information and participating in the decision-making process, not included in the discussion with the healthcare professional, family and friends can become a source of conflicting information. Unexpectedly, the Internet and social media were not commonly cited as sources of conflicting
information. This result was surprising given that these sources are widely used by chronic patients and have been described as potential sources for conflicting information. However, since not all patients discuss information found online with healthcare professionals, this aspect might be under evaluated. This can also be because our survey was completed in person rather than online as it was done in other studies.

As previously published, being prescribed multiple medications increases the need for medication information, thus increasing the risk of conflicting information. Hence, particular attention should be provided to polypharmacy patients. Interestingly, our study also showed that cardiovascular disease seems to be linked to less perceived conflicting medication information compared with the other chronic diseases. Cardiovascular diseases are well known to healthcare providers, and strong consensual national and international guidelines for treatment have been established (eg, European and US guidelines). Furthermore, guidelines in hypertension have also highlighted the need for interprofessional collaboration to support medication adherence.

To become familiar with new information, the patient has to develop competencies in bridging information received from various healthcare professionals. Interprofessional collaborative practice is reported to increase a concerted provision of comprehensive information on medications in order to increase the efficiency and safety of healthcare. As several consecutive providers (GP, medical specialist, pharmacist, nurse) provide information on medications to patients, their roles must be harmonised to optimise delivery of consistent information. Interprofessional collaborative practices in outpatient settings imply an active and ongoing partnership between several professionals from diverse professional backgrounds and cultures, who come from different organisations or sectors, to work together to provide services for the benefit of patients. Such interprofessional practice must be reinforced and investigated to encourage safer medication use in the community.

This study has several limitations. First, the recruitment of inpatients at the university hospital was unsuccessful, with only 31 individuals participating in the study, either because patients were unavailable or did not feel well enough to participate. Therefore, our results are limited to the experiences of long-term outpatients. Second, a selection bias may be present, as survey participants are often limited to those who are most motivated to participate. To mitigate potential bias related to only having those who have strong opinions about conflicting information in the study, the term ‘conflicting information’ was never mentioned during recruitment. Moreover, to allow for the inclusion of patients with various health and computer literacy, both paper-based and electronic tablet-based surveys were used, and a researcher was available to answer questions and to verbally translate questions into Portuguese, English and Spanish when needed. Although this intervention from the researcher could influence participants’ response, less than 5% of participants needed help with this translation, hence having a negligible impact on the results. Third, since the survey was available both on paper and electronic tablet, it was impossible to have mandatory questions and our results show some missing data. We tried to limit this as much as possible by always checking the questions and providing information to the participant when necessary. Fourth, because this survey aimed at exploring conflicting information perceived by patients regarding their chronic medications, questions were created specifically for the purpose of the study and the psychometric properties of the instrument were not all evaluated. However, for the purpose of face validity and content validity, the survey was reviewed and approved by an expert committee of 4 healthcare professionals (physicians, pharmacist and nurse) and an expert patient, and was pretested by 11 patients before data collection started. Internal consistency of the eight items on the last 12-month perceived conflicting information on medications was also assessed and represented by a Cronbach’s alpha coefficient of 0.76. This questionnaire deserves full future validation so that the instrument could be used in various studies and settings to compare data and monitor the issue over time. Fifthly, the pandemics had an important impact on academic research, which explains the delay between data collection and this publication. However, the authors believe that these results remain relevant as the Swiss healthcare system has not changed much in the past 3 years and remains fragmented (eg, no shared electronic patient record) with outpatient healthcare professionals working in silos. Lastly, perceived conflicting information does not mean that the provided information was actually contradictory but, rather, was perceived as such by patients. We were interested in the patients’ perceptions because perceptions are main drivers of patients’ medication adherence and healthcare system navigation behaviours.

CONCLUSIONS

To our knowledge, this was the first study that investigated the prevalence of perceived conflicting information by chronic patients in Switzerland. This issue is prevalent in the ambulatory healthcare system and involves multiple aspects of a patient’s medication, especially side effects. Confusion originating from perceived conflicting information can influence patients’ navigation in the healthcare system by causing them to visit multiple healthcare professionals, to seek a different opinion, and importantly influence their adherence to medication. Because safety is a key healthcare concern, our study clearly shows that perceived conflicting information can affect patients’ attitude towards their adherence to medication and their care. Our results also suggest that patients seek information from multiple sources, which represents a high risk of finding heterogeneous and discordant information. It is therefore safe
to say that the Swiss healthcare system can improve the way that it delivers medication information. Increasing the quality of information also means increasing the quality of communication and trust.

Several levels of recommendations emerge from the results of this study, particularly in the field of interprofessional collaborative practice. New interprofessional models with greater collaboration among healthcare professionals and partnership with patients could better respond to chronic disease patients’ evolving medication needs. As reinforced by the Swiss Office of Public Health by its research programme on interprofessionality in healthcare, more research in this field is needed.13 47

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