



## Behavior and attitudes of residents and general practitioners in searching for health information: From intention to practice



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### ABSTRACT

**Background:** Physicians are increasingly encouraged to practice evidence-based medicine (EBM), and their decisions require evidence based on valid research. Existing literature shows a mismatch between general practitioners' (GPs) information needs and evidence available online. The aim of this study was to explore the attitudes and behavior of residents in general medicine and GPs when seeking medical information online.

**Methods:** Five focus groups (FGs) involving residents in general medicine and GPs were conducted between October 2013 and January 2014. The overall number of participants recruited was 35. The focus group discussion guide focused on participants' experiences in searching for health information on the Internet, perceived barriers and possible solutions for improving the quality of their own search processes. Descriptive analysis was performed by three researchers.

**Results:** Participants described a wide range of research topics, covering all general medicine core competencies, and especially patient-oriented topics. They used a limited list of websites. Participants were not confident about their ability to assess the quality of the information they found. Their assessment of data quality was based on intuition, and they mainly sought concordance with their existing knowledge. The way the data were exposed was considered very important. Participants were looking for information that was directly linked to their clinical practice. Information seeking processes varied among participants. They felt they had not mastered query building for conducting searches, and were aware of the impact this shortcoming had on the quality of their search for information.

**Conclusions:** Residents in general medicine and GPs understood the importance of EBM and the need for objective and reliable information. The present study highlights the difficulties in identifying this kind of information, and suggests ideas for improvement. Available search tools should change in order to fill the gap with real-world clinical practice, for example by integrating a patient-centred approach.

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## 1. Background

Evidence-based medicine (EBM) is a combination of individual clinical expertise and best available external evidence alongside patient's values and expectations [1]. Currently, EBM is increasingly encouraged in physicians' practice, and decision-making, requiring evidence based on valid research.

General practitioners (GPs) face a wide range of patients and clinical situations during their practice. This generates a large number of questions on patient management, varying between 0.10 and 1.85 questions per patient [2]. The Internet provides a broad spectrum of possible answers to GPs' questions, and is increasingly used by physicians in their daily practice [3,4]. Nevertheless, despite the

**Abbreviations:** EBM, evidence based medicine; FG, focus group; GP, general practitioner.

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growing availability and use of online information sources, some clinical questions remain unanswered [5]. This clearly shows a mismatch between GPs' information needs and evidence available online.

Although previous studies have tried to identify the information needs of GPs, most were involving north-American physicians, making the results difficult to duplicate in other practice contexts [6]. Based on the findings of these studies, GPs' information needs mostly concern treatments, diagnosis and drug therapies. Patient-centred topics, such as education or communication skills, remain rarely cited. Some barriers for the use of Internet for information seeking have already been identified. Time constraints are commonly reported in literature [2]. The lack of skills to perform a literature search, information overload and heterogeneity in information quality are frequently cited [3,7,8].

But are these known barriers sufficient to explain the remaining gap between intention and practice in finding health information online? Most of existing data come from quantitative studies, and we strongly believe that qualitative data could help us to deeply understand how residents and GPs search for medical information online, their research topics and especially the difficulties they encounter when seeking information.

The aim of this present study was to describe and understand the attitudes and behaviors of residents in general medicine and GPs in two regions of northern France regarding online information searching. More precisely, we aimed to identify the medical topics sought, any barriers encountered in retrieving information, and the methods for overcoming such obstacles.

## 2. Methods

### 2.1. Design

We conducted a qualitative study. Data were collected through 5 focus groups (FG) interviews. We recruited residents in general medicine and GPs to join the focus groups. Dynamic interaction among the participants motivated our choice of data collection technique [9]. Data were analyzed using a qualitative descriptive approach.

### 2.2. Participant recruitment

Five FGs were conducted between October 2013 and January 2014. Purposive sampling involved recruiting residents with different levels of clinical experience in general practice settings. In France, residency in general medicine lasts 3 years and follows a 6-year undergraduate programme. For the present study, residents were recruited from the second and third year groups of general medicine residents enrolled at the School of Medicine of the University of Rouen, France. Residents were first contacted by email. Sampling was then completed via personal invitations, in order to ensure variability of participants. Physicians were recruited in two regions of northern France (Upper Normandy and the greater Paris area). They were all contacted, by phone, email or face-to-face invitations. They all accepted the invitation. We ensured that FG discussions included younger and more-experienced, male and female private-practice GPs, and locums from both rural and urban areas. We also ensured that their practices had variable levels of computerisation. Some of the physicians recruited were involved in residency teaching. All participants gave their informed consent before participating. This study was approved by the ethical committee of the Rouen University Hospital. Information on participants' profiles is detailed in Section 3.

### 2.3. Data collection

A semi-structured topic guide was built, based on existing knowledge. The results of the few available quantitative studies focused on research topics and querying processes of physicians, but rarely explored GPs' difficulties when seeking information. The subjects of the focus group discussion guide included participants' experiences in searching for health information on the Internet, perceived barriers and possible solutions for improving the quality of their own process when seeking medical knowledge. Four FG discussions were held outside the physicians' practice, at the Rouen medical school. The fifth one was held in a primary care setting. A moderator facilitated the discussions (MS or AM), briefly explaining the aim of the study, and leading the discussion. The moderator ensured that all issues were covered and that everyone participated. A researcher (QF) took notes during the discussions for further analysis, focusing on nonverbal communication and interactions between participants.

### 2.4. Analysis

Data analysis occurred concurrently with data collection. Data saturation was achieved after 5 focus groups, so data collection was stopped at this point. All FG discussions were recorded and transcribed verbatim. The transcripts have been de-identified. Confidentiality was ensured by assigning a number to each focus group participant. Only two members of the research team had direct access to the data. When using direct quotations of participants in the presentation of results, we took care to ensure the quotations used did not contain information that may be potentially identifiable. Our aim was to describe and understand the residents and GPs' behavior while searching for health information using internet-based resources. This resulted in a descriptive approach, about the content of websites and the different pathways used to reach this content. Data were processed in different steps, using first open coding. This first phase was performed independently by two researchers (MS and QF), without any predefined framework. The team members then came together to discuss the codes, which were then gathered together into key themes. Codes and emerging themes were compared for coding reliability through a process of discussion and deliberation (MS, QF and AM). N Vivo® software package (version 10) was used to support analysis of the transcripts. The analysis was entirely completed in French. Then, MS and AM translated in English the results and the categories, as well as the quotations included. The quality of the translation was analyzed by a native English speaker, together with the research team.

## 3. Results

### 3.1. Participants profile

We recruited 35 participants. Fifteen were residents and 20 were GPs. Mean age was 45 years and 17 were male. The characteristics of the participants and practices are summarized in Table 1.

### 3.2. Key points

Firstly, a variety of research topics was described. Secondly, the reasons for participants using certain websites when seeking data were identified. Finally their querying habits were described.

### 3.3. Research topics

Research topics covered all general medicine core competencies. Many queries concerned the most frequent health problems

**Table 1**  
Participants characteristics (residents and GPs, n = 35).

Variables	
Age	45 (26–62)
Male	17 (49%)
Residents (n = 15)	
- Age	27 (26–29)
- Number of 6 month clinical internship in general practice	10 (67%)
- Number of 12 month clinical internship in general practice	5 (33%)
GPs (n = 20)	
- Age of private practice GPs (n = 17)	48 (29–62)
- Age of locum GPs (n = 3)	28 (27–29)
- Male	13 (65%)
- Number of years in practice	22 (1–34)
- Internship instructors	11 (55%)
- University lecturers	10 (50%)
- Internet at GP's practice	16 (80%)

Data are presented as mean (range) or n (%).

encountered in primary care and focused on diagnosis, complementary investigations and treatment issues.

« In April, they changed the child vaccination schedule. We found ourselves groping around in the dark. We needed internet to retrieve the new schedule. » FG1, Female, Resident, 26 y

« If it's a bit complicated, I can easily look up information on care, treatment and follow up. » FG2, Male, Resident, 29 y

« If a patient has an INR at 11, what do I do? I've got the answer in real-time on internet. » FG4, Male, GP, 52 y

Other queries concerned the following competencies:

- Prevention, health education,

« I show pregnant women how to use a website on use of medications during pregnancy. » FG5, Male, GP, 43 y

« What I'm looking for on internet is documents to hand out to patients to help them with problem solving or understanding their health concerns. » FG5, Male, GP, 47 y

- Communication, patient-centred approach,

« Apparently our specialty is the first contact, but in reality it's third: "The specialist suggested such and such, doctor, what do you think about it?". It's terrible, but in fact, it's all on internet! » FG5, Male, GP, 43 y

« I've had problems several times, because I didn't do a PSA test. The patients then saw an urologist, and came back saying: "You have to do the test". Faced with this situation, I've shown them the guidelines on cancer prevention, which concludes that PSA is not a screening test. » FG3, Male, GP, 60 y

« When it's not clear cut, and there is disagreement, we go straight to internet. » FG3, Male, GP, 60 y

- Comprehensive approach, complexity,

« Official guidelines (like the French National Authority for Health: HAS) are too strict, and not practical enough. I think they're sometimes hard to apply in real situations. » FG 4, Female, GP, 45 y

« I'd try to mix information of internet with my own experience and what the patient wants. » FG 4, Male, GP, 52 y

- Coordination of care

« When I refer to my dermatologist I attach a picture and I ask: "What do you think? Do you need to see him/her quickly?" » FG3, Male, GP, 60 y

« My referent radiologist sends me images by internet, which I can directly upload to the patient's file. » FG3, Male, GP, 56 y

- Professionalism

« I also use internet for training purposes, including CME... » FG1, Male, Resident, 28 y

« When I started out, I frequently used ENT images, especially of the eardrum, as it was difficult to identify otitis media. » FG2, Female, Resident, 26 y

« I'm used to going on the ministry of health website, because there are documents on health care organization. » FG4, Male, GP, 58 y

« [With internet], you don't feel so alone, especially if you have support from groups which share their work and papers. » FG5, Male, GP, 43 y

Information seeking objectives seemed to be different for residents and physicians: enabling physicians to update their knowledge, whereas for residents it was a form of self-reassurance.

« I sometimes feel the need to confirm, in the fear of... I always want to be sure that I have the correct information, the correct guideline. » FG 1, Female, Resident, 28 y

« What I'm looking for online, it's documents that will help me to enrich my knowledge, when I need to learn about a specific topic. » FG 5, Male, GP, 47 y

#### 3.4. Categories and concepts relating to Internet resource selection

Participants were more confident using the websites they already knew.

« In fact, I use a website I know well and which I trust. » FG 5, Male, GP, 47 y

In practice, they used a limited list of websites, the content and characteristics of which were familiar to them, thus enabling faster query building.

« I usually use several websites that I already know. » FG 4, Female, GP, 34 y

For example, residents mainly used French medical school sites. Beyond this short list, participants had a blurred vision of available information sources. Their knowledge of website characteristics was vague and confused, especially concerning health information databases.

Reliability was considered as relevant, but not fundamental criteria for choice. Their assessment of reliability was mostly based on intuition.

« We're smart enough, and have enough experience and training to make the difference. » FG 4, Male, GP, 52 y

As GPs, they felt incompetent or illegitimate for this task.

« Do we as GPs, have time to check if a website is trustworthy or not? Do we have the skills to check the validity of a website? » FG 5, Female, GP, 57 y

« Whether I can trust a paper or not? I don't have the expertise... » FG4, Female, GP, 45 y

However, several evaluation criteria were identified. People who had introduced them to the site, or who were involved in the site content, were taken into account. More credit was granted to institutions, like national health agencies, hospitals or universities.

« I've got more faith in a university or a hospital website. » FG 4, Male, GP, 58 y

The presentation and appearance of websites played a role in the participants' choices. The participants, and physicians more than residents, sought concordance with their existing knowledge.

« I refer to what I already know. If it's completely out of sync with what I already know, I tend to move on. » FG3, Male, GP, 56 y

This search for concordance involved both content and form, such as use of medical vocabulary.

« I think published papers are written in a certain way, which inspires trust. » FG4, Male, GP, 30 y

It rarely allowed for questioning of participants' knowledge and skills. The participants cited few objective criteria: an industry-free funding model, updating of data, assessment of the level of evidence, and referencing of data.

Participants stressed the importance of data presentation. They considered there was too much available data, and stressed the need for concise answers.

« I feel like I'm drowning in a sea of information. I'm afraid of not finding what I'm looking for. » FG 4, Male, GP, 30 y

They called for a data ranking system based on medical disciplines, age of data and relevance thereof. Participants regularly cited the English language and some websites charging for access as obstacles to seeking information online.

Participants sought information that was directly linked to their clinical practice. Through integration of an EBM care model, data seeking had to help the physicians deliver comprehensive care, into a patient-centred approach. Patient-centredness is a multifaceted concept involving several dimensions, such as clinical-patient relationship, patient as a unique person, patient information and patient empowerment [10].

« When I prescribe non common drugs to pregnant women, I systematically look on this website and I show them how to use it, so they can empower themselves. » FG 4, Female, GP, 34 y

« My decision will not be exclusively based on the information I may find online. The decision will be based on several things: this detailed information, the person in front of me and my relationship with this person. » FG 4, Male, GP, 52 y

Only a few of them were aware of the existence of general medicine guidelines databases, in French or foreign languages.

« A website for family physicians is missing. » FG3, Male, GP, 60 y

They were therefore ready to sacrifice some reliability on the altar of direct applicability of data.

« During the consultation, I'll accept less reliability as long as I find an answer which allows me to go forward. » FG5, Female, GP, 58 y

### 3.5. Information seeking process

The information seeking processes varied among participants, who emphasized the role of experience in building more valid queries.

« I perform the search my way. » FG4, Female, GP, 45 y

Most of their queries were built with natural language, without using controlled vocabulary. Participants were not aware of the role of key words and Boolean operators; especially among

physicians. They did not master the specific searching process of medical databases; and felt incompetent in their use.

« [Talking about Pubmed] It is really complicated, I find it hard to use [General approval]. » FG2, Female, Resident, 26 y

Google was the most frequently used search engine. Building their queries, participants integrated the type of websites to search for the information they needed, or the type of documents.

« Well, we all have our own methods (. . .): you enter the search term, and add "pdf". This accesses more relevant and scientific papers. » FG3, Male, GP, 60 y

Participants were fully aware of the impact query quality had on the validity of data. Nevertheless, querying was considered as a difficult process, and they were usually unsatisfied with their search results: useful answers, when they existed, were lost in a mass of non-relevant data. They felt they had circumvented the so-called official querying process, and felt guilty of not mastering available tools.

« I really don't feel like I'm doing it how I should. » FG1, Female, Resident, 29 y

### 3.6. Research context

Research process depended on time available.

« I don't use the same Websites and the same web search strategy when I have the time, for instance for teaching, or when I help a doctoral student with his/her thesis. In these cases, I adopt more structured pathways, i.e. using web search tools, and databases etc. » FG5, Male, GP, 43 y

Participants differentiated the fast and precise queries they performed during their working hours from the more global queries they could do at home. Patient involvement in the search process varied. Patients were usually informed of ongoing information research performed either in real time or otherwise.

« I would feel like I was betraying his/her trust, if I hid the fact I was looking up information. As if the consultation was for both of us. » FG5, Male, GP, 47 y

Patient involvement depended on the patient, the current health problem and the potential risk of acute anxiety.

« I feel that including them in the search gets them involved. » FG5, Female, Locum GP, 27 y

## 4. Discussion

### 4.1. Summary of main findings

Participants described a wide range of research topics, covering all general medicine core competencies, and especially patient-oriented topics. They used a limited list of websites. Participants were not confident about their ability to assess the quality of the information they found. Their assessment of data quality was based on intuition, and they mainly sought concordance with their existing knowledge. The way of presenting the data was considered very important. Participants were looking for information that was directly linked to their clinical practice. Information seeking processes varied among participants. They felt they had not mastered query building for conducting searches, and were aware the impact this shortcoming had on the quality of their search for information.

#### 4.2. Comparison with existing literature

Several studies have already tried to build a taxonomy of questions asked by GPs' during their clinical exercise. They agree on the key part of diagnostic- and medication-related questions [7,11]. In the study conducted by Gonzalez-Gonzalez et al., more than half the questions related to diagnostic topics, and one in four to treatment topics. Our study shows that the range of questions asked by GPs' during their consultations is much wider. They reflect all general medicine core competencies, and especially a patient-centred approach [12]. Based on our 20 years experience of developing the CISMef catalogue [13], most of search engines and databases are disease-centred. The implementation of the patients' perspective in search engines and databases may help GPs' in patient care.

In our study, participants clearly pointed out the importance of evidence-based medicine. Their answers show that participants are infused with EBM culture. However, our findings demonstrate that a large gap remains between intention and practice. First, participants mostly sought concordance with their existing knowledge. They used clinical queries to test the validity of a hypothesis by seeking only confirming evidence. Positive hypothesis testing in the Internet is a well-known topic, especially among patients [14]. Among residents and GPs', the use of online resources might be strategically thought: they knew the overarching "answer" and were using the tools for the details. It could also be explained by the lack of skills to perform a literature search and the fear of information overload. Therefore, search engine developments may be needed to provide disconfirming evidence. Participants were aware of the role of validated data in the care of patients, but felt incompetent when seeking information, despite the existence of medical informatics training programmes including Internet search for health information [15]. The situation is multi-factorial. Many obstacles to query building and solution finding have already been identified in the literature. The amount of time necessary to find information, difficulties in reformulating the original question and finding an optimal search strategy, lack of a good source of information, uncertainty as to whether all relevant information has been found, and inadequate synthesis of any pieces of evidence into a clinically useful approach are the most cited [2,7]. In 2007, a web log analysis was undertaken in a meta-search engine covering 150 health resources and a variety of guidelines. It showed that most queries were built using a single search term and no Boolean operator [16]. The format of the requested data was also cited as a relevant topic. When asking GPs for factors which facilitated Internet use for information seeking in clinical practice, most asked for evidence-based summaries [4]. Using synthesized results of systematic evidence surveillance allowed physicians to answer more questions and change clinical decisions more often [17]. The best format for this synthesized information remains unclear [18]. In an EBM model care context, another obstacle for seeking information cited by participants was assessment of the reliability of data. Participants, and especially physicians, felt incompetent for this task. Their assessment was mainly intuitive, and focused on external validation, such as the authority of the institutional journal hosting the website. This latter is the major criterion of the Health On the Net code of conduct, the world reference to certify health information websites on the Internet [19]. Internal validation focused on the content and rigor of research. It remained incidental, despite its importance in the methods of evidence-based practice [20]. This feeling of incompetence was sometimes associated with a feeling of illegitimacy, and some participants experienced the impression that some websites, and especially medical databases, were not made for them. This clearly shows a gap between an idealized academic model of searching and real world practicalities [21].

#### 4.3. Strengths and limits

This study has some limitations. Despite a large number of participants, only a few worked in single medical practices, and several were involved in residency teaching, which may affect the diversity of our sample. The responses of participants may have been affected by the fact that the two interviewers were involved in residency teaching. Nevertheless, their answers did not indicate that they were reluctant to report behaviors they considered themselves as inappropriate. Moreover, the researchers who participated in the data collection were not involved in the junior doctors' clinical assessments.

The diversity of participants, the facts that the analysis was conducted by several researchers and that the data saturation was achieved allowed us to ensure credibility. This study involved 35 residents and GPs, from different geographical areas and with various practice settings, which ensures good transferability.

#### 4.4. Perspectives

Physicians and residents in general medicine are fully aware of the importance of evidence-based medicine and the need for objective and reliable information. Our study shows their difficulties in identifying this kind of data, and suggests ideas for improvement. Our findings reflect the recent changes affecting the profession of GPs, and especially the importance of knowledge access. Available tools have to change in order to fill the gap with real-world clinical practice, for example by integrating the patient's perspective. For example, this could involve a symptom or complaint focus in search engines or databases. Scientific information could also be systematically combined with figures, illustrations and summarized information in a format that patients understand. Information synthesis should be developed. We also need to precisely identify the information needs of GPs, who work in a comprehensive and complex context of multimorbidity. We need to raise GPs awareness of "research culture". Training interventions to improve information management have positive effects on GPs' behaviors, and need to be developed [22,23]. Continuous medical education to acquire proper information searching skills on the Internet seems mandatory.

#### Competing interests

The authors declare they have no competing interests.

#### Authors' contributions

MS, AM, and SJD had the initial idea of the study. MS, QF, and AM conceived the topic guide. MS, QF, and AM collected the data and performed analysis. MS drafted the manuscript. NG, GK, AM and SJD made substantial enhancement to it. All the authors approved the final manuscript.

#### Availability of supporting data

Supporting data are available in an open access repository (LabArchives). They include all the transcribed verbatim, in French. Data are available at the following URL: <https://mynotebook.labarchives.com/share/Cismef%2520/MjAuOHw2NDQ3MS8xNi9UcmVITm9kZS8yMTU1NzkwODQ4fDUyLjg=>.

**Summary points**

What was already known on the topic

- GPs’ face a wide range of clinical situations during their practice. Nevertheless, despite the use of online information sources, some clinical questions remain unanswered.
- Time constraints, lack of skills to perform a literature search, information overload and heterogeneity in information quality are the most frequently cited barriers for the use of Internet for information seeking.

What this study added to our knowledge

- Information needs of GPs’, who work in a comprehensive and complex context of multimorbidity, have to be precisely identified.
- Available tools have to change in order to fill the gap with real-world clinical practice, by integrating a patient-centred approach.

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