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Internet use for information seeking in clinical practice: A cross-sectional survey among French general practitioners

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ABSTRACT

Background: Medical information needs regarding patient care are particularly large for general practitioners (GPs). The Internet seems to be a relevant but underused tool to seek medical information.

Objective: We aimed to describe the characteristics of the French GPs using the Internet for information seeking, to identify the barriers to its use and the factors that could facilitate it.

Method: We conducted a cross-sectional survey among GPs currently practicing in France, using an online questionnaire, in July 2009. We analysed the answers of 721 respondents.

Results: Most of the respondents used the Internet to seek information. They were significantly younger, worked in group practice, had Internet training and had Internet access at the practice. The main barriers were related to the physician (lack of knowledge or specific skills), to the practice conditions (lack of time, concerns about relationship with patient, financial non-recognition) and to the information (information overload, quality concerns, low relevance, language barrier). Practitioners wanted more reliable and more relevant documents for daily practice. Websites with already selected resources could increase the GPs use of the Internet for medical information seeking.

Conclusion: The reported obstacles were largely common with those previously described in other countries, except the language barrier and the financial non-recognition. Even if the generalization of our results to all French GPs should be cautious, the study provided better insights into the obstacles to the Internet use to seek clinical information in family practice and the factors that could facilitate it.

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1. Introduction

1.1. Clinical information needs in family practice

Physicians are not “all-knowing”. Biomedical knowledge doubles about every 20 years [1]. To practice a high quality

medicine, physicians have to constantly update their knowledge and find the information they need to integrate the best evidence in their clinical decisions [2]. The average number of clinical questions facing the general practitioner (GP) is between 0.07 and 1.85 per consultation [3]. In the broad scope of family practice, problems encountered and questions arising are particularly wide-ranging. Clinical information

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needs are larger for GPs than for colleagues in other specialties [4].

1.2. Internet use for clinical information search: a relevant and underused tool

The Web has the characteristics of an ideal source of medical knowledge [5] and the Internet seems to be a relevant tool for information regarding patient care. It is hoped it could help doctors by providing them with the helpful information as they see a patient [6,7]. Physicians can use the Internet to solve clinical problems, to support decision-making and to overcome memory limits [8]. The use of online retrieval information systems can help physicians to better answer their clinical questions [9]. Despite an increasing access to Internet, GPs still seem to prefer printed resources, Continuing Medical Education (CME) or contact with their colleagues to answer the questions arising in their clinical practice [3,10,11]. GPs usually believe information in medical journals to be more reliable than information published on the Web [12].

1.3. Many obstacles and some facilitating factors

Time constraints are commonly reported in literature. GPs only seek answers to between 30% and 57% of their clinical questions [3] and they spend, on average, less than 2 min seeking answers [13]. Many obstacles are related to information seeking [14]. The skills to perform a literature search are often limited or lacking and most of the GPs are unfamiliar with using online tools. Information overload is a barrier to using the Internet in daily practice [4]. Web-based information is heterogeneous in quality, and not always fit to a direct use for practice [15]. Age, gender, and practice type or location can impact Internet use, but are not always taken into account in literature. Immediacy of access to information is an important and helpful aspect [16]. Computer availability when consulting was a predictive factor to Internet access at work [17]. Training needs are frequently reported in literature [18] and could facilitate the practitioners' use of the Internet. Learning about how to use the Internet and experiencing its benefits could increase its use by GPs [19]. Websites or portals with relevant information or selected links could guide clinicians in the Web-based resources [12].

1.4. Aims of the study

The aims of our study were to describe the characteristics of the French GPs using the Internet for clinical information search to identify the barriers to this Internet use and the factors that could facilitate it.

2. Method

We conducted a cross-sectional survey among French GPs, using an online self-administered questionnaire. The study protocol was approved by the Ethics Committee of the French Society of General Medicine.

2.1. Questionnaire design

We designed a questionnaire that contained 20 questions, based on the factors identified in the published literature. Questions were spread on three screens corresponding to three parts: (i) demographic characteristics: gender, age, department, practice location ("urban", "semi-rural", "rural" area), group/solo practice, average number of patients seen per week (" <80 ", "80–120", "120+") and Electronic Health Record (EHR) use; (ii) sources of medical information used in clinical practice (including "books and printed journals", "CME, congress and seminar", "Web/Internet", "printed guidelines", "electronic documents (offline)", "colleagues", "informal documents" and "medical representative") and physician's preference (on a scale from 1 "most preferred" to 8 "least preferred"); (iii) Internet access in consultation room, competencies to use the Internet for information seeking (from "good" to "insufficient"), Internet training, obstacles and facilitating factors (using multiple choice questions). Although we did not identify language barrier in our literature review, we wanted to evaluate it as a potential obstacle. Eight questions were mandatory (gender, age, practice location, information sources used, resources rank according to the preference, Internet obstacles and facilitating factors) and all questions except one were closed. The last question was open: "What do you think about the Internet use for information regarding patient care?". The creation of the online questionnaire and technical infrastructure for conducting the survey was provided by "It's Sauquet.com" (Paris, France).

2.2. Survey design

Data were collected during two weeks, in July 2009. We used three different channels to invite GPs to answer the online questionnaire. An email was sent to the mailing list of the French Society of General Medicine and was followed by an email reminder one week later. An announcement was published in the Egora physician newsletters (edited by Global Media Health, a French medical editor) and posted in the discussion forum of the National College of Teachers in General practice. The exact number of physicians invited (email, newsletter, forum) to participate the study was unknown. The physician participation was voluntary and uncompensated. Accepting to participate in the study by responding to the questionnaire implied consent.

2.3. Sample

The GPs surveyed in the study were not randomised: the respondents constituted a convenience sample. We used a simple inclusion criterion: to be a general practitioner currently practicing in France. The GPs practicing in another country, physicians from other specialties, retired physicians, trainees or students were not included. We secured that only practicing GPs from France were included by mentioning it explicitly in the invitation email and by requiring the department of exercise.

Table 1 – Characteristics of Internet users (n = 610) and non-users (n = 111), and statistical significance of differences between them (Chi-2 tests, 2-tailed).

Characteristics	Total	Users No. (%)	Non-users No. (%)	p
Gender (N = 721)				NS
Male	551	462 (83.8)	89 (16.1)	
Female	170	148 (87.1)	22 (12.9)	
Age in years (N = 721)				0.031
<50	260	230 (88.5)	30 (11.5)	
50+	461	380 (82.4)	81 (17.6)	
Practice location (N = 716)				NS
Urban	353	300 (85.0)	53 (15.0)	
Semi-rural	222	190 (85.6)	32 (14.4)	
Rural	141	115 (81.6)	26 (18.4)	
Practice type (N = 715)				0.002
Solo	287	229 (79.8)	58 (20.2)	
Group	428	377 (88.1)	51 (11.9)	
Average number of patients seen per week (N = 718)				NS
<80	131	116 (88.5)	15 (11.4)	
80–120	385	327 (84.9)	58 (15.1)	
80+	202	164 (81.2)	38 (18.8)	
Electronic health record (N = 719)				<0.001
Yes	667	573 (85.9)	94 (14.1)	
No	52	35 (67.3)	17 (32.7)	
Internet access in consultation room (N = 718)				<0.001
Yes	682	587 (86.1)	95 (13.9)	
No	36	21 (58.3)	15 (41.7)	
Competencies to using the Internet for information seeking (N = 718)				<0.001
Good	120	105 (87.5)	15 (12.5)	
Rather good	429	374 (87.2)	55 (12.8)	
Rather insufficient	152	122 (80.3)	30 (19.7)	
Insufficient	17	7 (41.2)	10 (58.8)	
Internet training (N = 720)				0.002
Yes	270	243 (90.0)	27 (10.0)	
No	450	366 (81.3)	84 (18.7)	

2.4. Statistical analysis

Answers were treated anonymously. The data from the web questionnaire were directly exported and analysed using Excel™. A descriptive analysis was conducted: we calculated frequency distribution and means for each survey item. We used Chi-square (Chi-2) analysis to compare percentages, using the online software OpenEpi [20]. We used Z test to compare the sample mean age with the total population of GPs exercising in France. We considered significance at the $p < 0.05$ level.

3. Results

During the survey period, the URL for accessing the questionnaire was opened 1 112 times and 874 GPs validated at least the first screen of the questionnaire. We analysed results from a total of 721 GPs who did validate the three screens (to limit missing data). Because of the survey method, we could neither calculate the response rate nor the number of the non-included physicians.

3.1. Characteristics of the GPs sample

The characteristics of the GPs sample are presented in Table 1. Of the respondents, 76.4% were male and the mean age was 50.5 years (SD 8.9). About half the GPs included in the study

(49.3%) practiced in urban areas and took care of between 80 and 120 patients per week (53.6%). The majority of respondents worked in group practice (59.9%) and this practice type was significantly more common among female than male (68.7% versus 57.2%, $p = 0.008$).

Of the GPs who did not complete the questionnaire, 153 validated at least the first screen. In term of demographics, they did not differ from the GPs who did complete the questionnaire, except for age (52.4 years, $p = 0.043$) and the proportion of those working in group practice (49.3% vs. 59.9%, $p = 0.019$).

Internet users for information regarding patient care differed significantly from the non-users on the following factors: age, practice type, EHR use, Internet training and self-estimated competencies (Table 1). The Internet users did not differ significantly by gender nor practice location.

3.2. Internet use for clinical information search

Almost all the respondents (95.0%) had Internet access in the consultation room (Table 1), 93.4% in private practice and 96.0% in group practice ($p = 0.116$). This access was significantly different according to gender (96.5% among male GPs vs. 90.0% among female GPs, $p < 0.001$), regardless of the practice type: private (94.5% vs. 86.5%, $p = 0.028$) or group (97.8% vs. 91.2%, $p = 0.02$) (Table 2).

A large part of the GPs (84.6%) reported they used the “Web/Internet” to seek information in clinical practice

Table 2 – Internet access in the consultation room according to gender and practice type.

Gender	Practice type	Internet access	
		No.	(%)
Male (N = 548) ^a		529	(96.5)
	Group (N = 312)	305	(97.8)
	Solo (N = 235)	223	(94.9)
Female (N = 170) ^b		153	(90.0)
	Group (N = 114)	104	(91.2)
	Solo (N = 52)	45	(86.5)

^a Practice type was missing for 1 male GP with Internet access.
^b Practice type was missing for 4 female GPs with Internet access.

Table 3 – Medical information sources used in regard to patient care and GPs' preference on a scale from 1 "most preferred" to 8 "least preferred".

Medical information source	Users		Preference Mean (SD)
	No.	(%)	
Books and printed journals	622	(86.3)	2.9 (1.8)
CME, ^a congress and seminar	617	(85.6)	2.7 (1.6)
Web/Internet	610	(84.6)	2.8 (1.8)
Printed guidelines	502	(69.6)	4.0 (1.8)
Electronic documents (offline)	462	(64.1)	4.2 (2.0)
Colleagues	361	(50.1)	4.4 (1.9)
Informal documents	254	(35.2)	5.8 (1.9)
Medical representative	155	(21.5)	7.3 (1.3)

^a Continuing Medical Education.

(Table 3). "Books and printed journals" (86.3%) and "Continuing Medical Education (CME), congress and seminar" (85.6%) were the two other most frequently used sources of information regarding patient care.

When asked to rank the different medical sources in order of preference from 1 "most preferred" to 8 "least preferred" (Table 3), the respondents were most likely to prefer "CME, congress and seminar" (mean score of 2.7). "Web/Internet" was rated 2.8 mean, followed with "books and printed journals" (2.9 mean), "printed guidelines" (4.0 mean), "electronic documents (offline)" (4.2 mean) and "colleagues" (4.4 mean).

A majority of the GPs (62.5%) reported they had no Internet training for clinical practice (Table 1), with no significant difference according to gender ($p > 0.05$). Most of the respondents (76.5%) estimated their competencies to using the Internet for information seeking as "rather good" or "good" (Table 4). Among them, 85.4% reported Internet training compared with only 71.3% who did not ($p < 0.001$).

Table 4 – Self-estimated competencies to using the Internet was significantly associated to Internet training ($p < 0.001$).

Internet training	Self-estimated competencies	
	"Good" or "rather good"	"Rather insufficient" or "insufficient"
	No. (%)	No. (%)
Yes (N = 268)	229 (85.4)	39 (14.5)
No (N = 449)	320 (71.3)	129 (28.7)

Table 5 – Barriers and obstacles to Internet use for information seeking in clinical practice (multiple answers were possible).

Barriers and obstacles	No. (%)
Too much information to scan	344 (47.7)
Lack of time	339 (47.0)
Language barrier	246 (34.1)
Low relevance for clinical practice	195 (27.0)
Lack of training or skills about the Internet	178 (24.7)
Unreliability of the information	177 (24.5)
Lack of familiarity or experience	102 (14.1)
Too slow connection	93 (12.9)
Too complicated to use	49 (6.8)
Software problems	45 (6.2)
Data security concerns	35 (4.9)
No Internet access	32 (4.4)
Costs	11 (1.5)
Other(s)	79 (11.0)

3.3. Obstacles to the Internet use for information search

Results concerning the obstacles to the use of the Internet for information regarding patient care are reported in Table 5. The most frequently reported obstacles to this Internet use were "too much information to scan" (47.7%) and the "lack of time" (47.0%), followed by the "language barrier" (34.1%).

In the last (open) question, some practitioners answered that Internet use was inappropriate during consultation and could have a negative impact on the relationship with the patient. Others mentioned as a barrier the financial non-recognition of this activity in their practice. Moreover, full-text documents not always accessible, document fees or websites with required subscription were cited as obstacles.

3.4. Factors facilitating the Internet use

Results concerning the factors that could facilitate the GPs' use of the Internet to seek medical information for practice are presented in Table 6. The surveyed GPs mainly reported factors concerning information itself. Most of them wanted evidence-based summaries (65.0%) or websites with selected

Table 6 – Facilitating factors to Internet use for information seeking in clinical practice (multiple answers were possible).

Facilitating factors	No. (%)
Website with evidence-based summaries	469 (65.0)
Website with selected documents or useful links for clinical practice	392 (54.4)
More relevant information for clinical practice	344 (47.7)
More available time	334 (46.3)
Simplification of information seeking	320 (44.4)
More reliable information	193 (26.8)
Faster Internet connection	137 (19.0)
Internet training	136 (18.9)
Internet access during consultation time	68 (9.4)
Technical assistance	45 (6.2)
Reduced costs	28 (3.9)
Other(s)	36 (5.0)

documents or useful links (54.4%). More relevant information for clinical practice was expected (47.7%). The respondents also called for “more available time” (46.3%) and a “simplification of information seeking” (44.4%).

In the open question, a practitioner mentioned that his regular use of the Internet in peer group (a CME tool) made it easier for him using Internet in daily practice. Supervision of an intern in the practice was another mentioned factor that could facilitate information seeking on the Web.

4. Discussion

4.1. Principal findings

Most of the French surveyed GPs currently use the Internet to seek medical information regarding patient care, without replacing the “traditional” resources (printed journals and CME). In comparison with non-users, users were significantly younger, worked in group practice, had Internet training and Internet access in their consultation room.

The main barriers identified could be related to the physician (lack of knowledge or specific skills), to the practice conditions (lack of time, concerns about its use during consultation and relationship with patient, the financial non-recognition) and to the information available on the Web (information overload, quality concerns or low relevance for daily practice, language barrier). Websites with already selected resources could increase the GPs use of the Internet for medical information search. Practitioners wanted more reliable and more relevant documents for daily practice.

4.2. Implications of the findings

In the current paradigm of biomedical informatics, the implications of our study go beyond simply “browsing the Web”. With the development of standardization, the data recorded in EHRs (such as medication administration or physical assessment) should help physicians access more relevant information in clinical context, by excluding documents unsuitable to the patient case. Web-based tools/portals should be designed to answer the questions arising in daily practice, such as diagnostic procedure or prescribing concerns. Software should be developed to be integrated with the clinical system and could behave similar to existing medical smartphone apps, by meeting specific and clearly defined needs, in a simple way. Above the technical considerations, the responsibility of national health authorities should not be ignored in providing reliable and independent information to the health professionals.

Although the duration of a consultation for French GPs is the longest in Europe (16 min on average) [21], surveyed GPs reported time difficulties to deal with the great amount of the retrieved information and to critically appraise them. Relevant resources should be selected and presented in a suitable format for practice. Clinicians could be helped (and save time) if some simple elements were available in or associated with the documents (level of evidence, conflict of interest, relevance for clinical practice).

The financial non-recognition as barrier and lack of time could be related to the payment system currently existing in France. For most French GPs, their income is based on a fee-for-service. The time spent to seek information is unpaid, at least not directly. Other payment systems could be considered to allow more time for an information seeking process.

Our results suggested that Internet training could facilitate its use for information seeking. Training intervention should be encouraged and could be intended, first, to the practitioners who perceive less benefit from using the Internet (older and solo practicing physicians).

Most of French GPs are not fluent in English. They cannot easily use the English resources, particularly in daily practice. When they are relevant and applicable in the French context, more documents should be translated. Better English training could be considered to overcome this language barrier. More studies and publications in French should also be encouraged.

4.3. Comparison with the literature

Our results are consistent with previous studies conducted in other countries and which reported the same obstacles [12,18,22]. Previous studies suggested training intervention could improve the use of the Internet for clinical information seeking [23,24]. According to a recent review, the effects of interventions targeting the Web-based resources were small and the effectiveness of interventions to promote ICT adoption in healthcare settings remained uncertain [25]. To be effectively adopted, information systems have to meet the needs of end-users (GPs) and take into account their concerns [26]. In our literature review, we did neither find a reference describing language barrier nor the potential impact of supervising an intern at the practice.

4.4. Limitations of the method

The study involved a convenience sample and results should not be directly generalized to the population of French GPs. The practitioners included in this study differed significantly from the French GPs concerning gender ratio [27] (76.4% vs. 69.4% were male) and practice type [28] (59.9% vs. 54.3% worked in group), but not regarding mean age [27] (50.5 vs. 49.9 years, Z value = 1.808; $p > 0.05$). Recruiting GPs by email, newsletters, Web forum and using an online questionnaire might have biased our study including practitioners more likely to use the Internet or to have a positive opinion about it. Among surveyed GPs, 95% had Internet access in the consultation room versus 73% of GP practices in France [29]. We used a self-administrated questionnaire: Covell DG [30] showed the limits of this method and reported that physicians misperceived their information needs and their use of medical resources.

4.5. Call for further research

Lack of relevant information in primary care is not specific to the Web resources. We can call for the development of medical research in this field to produce more helpful results for family practice. Further studies should better assess the impact of training interventions designed for improving the GPs' use

Summary points

What was already known on the topic?

- Medical information needs regarding patient care are particularly large for General Practitioners, and the Internet is a useful tool for information seeking.
- Time constraints, lack of skills, unfamiliarity and information overload are any obstacles to the Internet use by practitioners.
- Internet training and access at the point-of-care, relevant and quality information are other factors that could facilitate their use of the Internet.

What the study has added to our knowledge?

- The Internet use to seek medical information regarding patient care seems not have replaced the “traditional” resources, in France.
- French GP users were significantly younger and worked in group practice, but gender was not a significant factor.
- Language barrier and financial non-recognition were obstacles to the Internet use for clinical information seeking reported by French GPs and not previously described in other countries.

of the Internet. The impact on practice and the effectiveness assessment of information tools, online or directly embedded into EHRs [31], need further research.

5. Conclusions

Most of surveyed GPs used the Internet to seek information regarding patient care. Their reported obstacles were largely common with those previously found in other countries, except the language barrier and non-recognition. More relevant information and selected resources could facilitate this Internet use for daily practice. A convenience sample and declarative answers are the main limits of our study. Even if our results can not be generalized without caution to all French GPs, the study provided better insights into the obstacles to the general practitioners' use of the Internet to seek clinical information and factors that could facilitate it.

Conflict of interest

All authors declare that they have no conflicts of interest in relation to this manuscript.

Author contributions

Study concept and design: EB, MA. Analysis and interpretation of data, including statistical analysis: EB, MA, DD, GH. All authors contributed to the final version of the manuscript.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.ijmedinf.2012.02.001.

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