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Article

Evidence Based Pharmaceutical Care in Community Pharmacies: A Survey of 595 French Pharmacists

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Abstract: We assessed the use of Evidence-Based Practice (EBP) among pharmacists working in community pharmacies in France, and the factors linked to this practice. During 3 months in 2018 an online survey was sent to over 7,000 active pharmacists, and posted on pharmacist social media sites. The 40-item questionnaire described four clinical cases reflecting typical situations (conventional medicine and Complementary and Alternative Medicine) encountered daily by community pharmacists. Multiple-choice responses were proposed and scored according to whether they reflected EBP. A high total score indicated behavior in line with EBP. Univariate and multivariate analyses were used to evaluate factors that might explain adherence to EPB (pharmacy's characteristics, the pharmacist's status, mode of continuing education and sources of information). 595 pharmacists completed the questionnaire. The majority relied on pharmaceutical industry and other biased and/or non-evidence-based sources, particularly concerning information on homeopathic products. The consultation of independent reviews, health agency recommendations, and peer-reviewed scientific journals, was associated with evidence-based decisions. In contrast, reliance on pharmaceutical industry documents, personal experience and informal handbooks was linked to lower EBP scores. The level of EBP use by French community pharmacists needs to be improved to ensure that good quality scientifically-based advice is given to customers

Keywords: Evidence based practice; Pharmaceutical care; Community pharmacy; France; Over-the-counter medication; sources of information

1. Introduction

Nowadays, community pharmacists (CP) are considered to be healthcare providers [1]. In Europe, pharmaceutical care is defined as "the pharmacist's contribution to the care of individuals in order to optimize medicines use and improve health outcomes" [2,3]. Changes in the role of pharmacies in the community underlie this description of the pharmacist's function. Day-to-day pharmacy practice is no longer restricted to the dispensation of medicines. Professional pharmacy services currently include vaccinations, triage services, medication reviews and pharmaceutical planning [4]. Over time, for many patients the CP has become their first contact with the healthcare system. In France, less restricted access to medicines has made this possible. Indeed, the offer of over-the-counter (OTC) medications has expanded and now includes the dispensing of drugs previously available only on prescription. The CP is also perceived as a privileged interlocutor for complementary and alternative medicines (CAMs) (with around 100 hours of initial training in CAMs), making a bridge between conventional medicines and natural health products [5]. Finally, changes in French legislation over the past 10 years have changed the CP from a simple retailer to a

pharmaceutical services provider [1], not only for patients but also for other healthcare professionals, including physicians. The CP has become a co-decision-maker, especially when working in an integrated-care environment.

“With greater power comes greater responsibility” [6]: could be the statement describing this change in function that ranges from the management of minor ailments to the provision of pharmaceutical care for patients with chronic conditions [7]. Responsible practice implies that it is Evidence-Based Practice (EBP) [8]. The adoption by CPs of an approach based on EBP has been studied in terms of perceptions [9–12], evaluation of professional practices [13–15], the evaluation of interventions during initial training [16,17] or in everyday practice [18,19].

The studies that have evaluated EBP in the community pharmacy setting have mainly focused on OTC drugs. In contrast, the primary objective of the present study was to assess attitudes and the application of EBP, whatever the nature of the health product (OTC medication, CAMs or prescription-only medicines).

2. Materials and Methods

A cross-sectional study was carried out among CPs and 6th (final) year pharmacy students practicing in a community pharmacy or studying in France. In France final-year pharmacy students taking the CP speciality undertake an internship of 6 months in a community pharmacy. Pharmacy technicians and students at earlier stages in their pharmacy studies were not included. The 40-item online questionnaire (Supplementary Material S1) was sent between 1st April and 1st June 2018 using a public email database containing more than 7,000 different contacts of CPs. The questionnaire was also posted on five Facebook groups (restricted to CPs and pharmacy students).

The primary objective of this study concerned the multiple-choice part of the questionnaire that presented four fictional cases typical of those encountered in the daily practice of community pharmacists. The topics were the replacement of influenza vaccination by a homeopathic product, a dietary supplement (red yeast rice) as a substitute for statins, the use of the herbal preparation St. John's Wort for moderate depression, and the choice of a nonsteroidal anti-inflammatory drug (NSAID) (supplementary material S1). For each case, the respondents had to choose one of the four proposed responses that best corresponded to their current professional practice.

To give the respondents confidence and to encourage them to complete and return the questionnaire, for one case (n° 2 – St John's Wort) all the answers proposed corresponded to good EBP. This was also to show that the questionnaire was not intended to judge CAM if its use was backed-up by scientific evidence. The pharmacists' choices of response to this case were not analyzed. The questionnaire also collected socio-demographic data about the respondents, the sources of information they usually consulted concerning allopathic medicines and CAM, and any continuing education they pursued (supplementary material S1).

A pilot version of the questionnaire had been tested by 11 community pharmacists, physicians, university lecturers and hospital pharmacists, and 30 pharmacy students.

The primary outcome was the total score from the multiple-choice responses to the clinical cases. For each case, 4 points were attributed for the response closest to EBP, 3 points if the respondent knew the best EBP response but felt they could not say that to the patient, 2 points if the respondent did not know the appropriate EBP answer, and 1 point if the response was counter to EBP. Thus, the minimum total score was 3 and the maximum score 12. The ranking attributed to responses had been justified by a review of the literature that included the Cochrane Database of Systematic Reviews, the French “La Revue Prescrire” (a French independent publication on professional practice & drugs, produced by a network of volunteer experts) and the recommendations of the French health authorities and/or professional associations if necessary (Supplementary material S2) [20–31]. Based on the distribution of multiple-choice scores a threshold was determined such that respondents could be categorised into two groups, EBP positive (higher score) and EBP negative (lower score).

The second part of the questionnaire collected data on the type of pharmacy where the CP worked and the pharmacist's status, whether they attended any continuing education and the sources of information they usually consulted.

Analysis: We present qualitative variables using number and frequency, and mean and standard deviation for continuous variables. To compare mode of continuing education according to pharmacist's status, we used the Chi2 test. Univariate tests were conducted to evaluate the association between responses and the profile of the participants and the pharmacies where they worked. A multivariate analysis with logistic regression was conducted using variables selected from the univariate analyses (having a $p \leq 0.20$) that might explain the adherence of participants to EBP (EPB +, or EBP -). The final model was selected after a manual step-down selection procedure. An a priori alpha of less than 0.05 was considered as significant. Stata 15 software for OSX was use for data analyses

The statistical analysis and content of this article are consistent with STROBE international recommendations to report cross-sectional studies (if applicable).

3. Results

Out of the 599 pharmacists and 6th year pharmacy students who returned the survey, four questionnaires were incomplete. Finally, 595 completed questionnaires were included in the database for statistical analysis. The mean age of the respondents was 38 ± 11.7 years and they came from all 13 metropolitan regions of France, as well as the overseas territories (Table 1). Given the use of Facebook groups for which the number of pharmacists who accessed the site but did not respond to the questionnaire was not known, the response rate could not be calculated.

Table 1. Characteristics of respondents and the pharmacies in which they work.

Characteristic	Number (total =595)
entry 1	data
entry 2	data
Male, n (%)	196 (32.9%)
Mean age, yrs (SD)	38.2 (11.7)
Age band, n (%)	
< 30 yrs	193 (32.4%)
30-39 yrs	167 (28.1%)
40-49 yrs	105 (17.6%)
≥ 50 yrs	130 (21.8%)
Pharmacist's status, n (%)	
Pharmacy owner CP	330 (55.5%)
Salaried CP	176 (29.6%)
Temporary CP	30 (5.0%)
Junior CP	59 (9.9%)
Pharmacy location, n (%)	
City centre	128 (21.5%)
Satellite town	73 (12.3%)
Social-housing estate	38 (6.4%)
Rural area	216 (36.3%)
Sub-urban area	140 (23.5%)
Regions of France with most responders, n (%)	
Provence and Cote d'Azur	88 (14.8%)
Auvergne Rhone Alpes (SE France)	76 (12.8%)
Aquitaine (SW France)	67 (11.3%)
Loire valley (central France)	59 (9.9%)
South of France	54 (9.1%)

Table 2 shows the distribution of pharmacists' responses to the cases presented in the questionnaire (except case 2 which was not scored as all responses were good EBP) and Figure 1

shows the distribution of the total score, supporting the categorization of responders into 2 groups with a threshold between 7 and 8 (EPB negative: score ≤ 7 and EBP positive: score ≥ 8).

Table 2. Responses to the 3 clinical cases used to evaluate the use of EBP.

Case	Type of response	N=595	Points
1	Homeopathy instead of influenza vaccination, n (%)		
	EBP response with action	479 (80.5%)	4
	EBP response without action	35 (5.9%)	3
	Did not know	8 (1.3%)	2
3	Red yeast rice as a substitute for statins, n (%)		
	EBP response with action	278 (46.7%)	4
	EBP response without action	26 (4.4%)	3
	Did not know	25 (4.2%)	2
4	Choice of NSAID, n (%)		
	EBP response	149 (25.0%)	4
	Did not know	196 (32.9%)	2
	Not EBP	250 (42.0%)	1

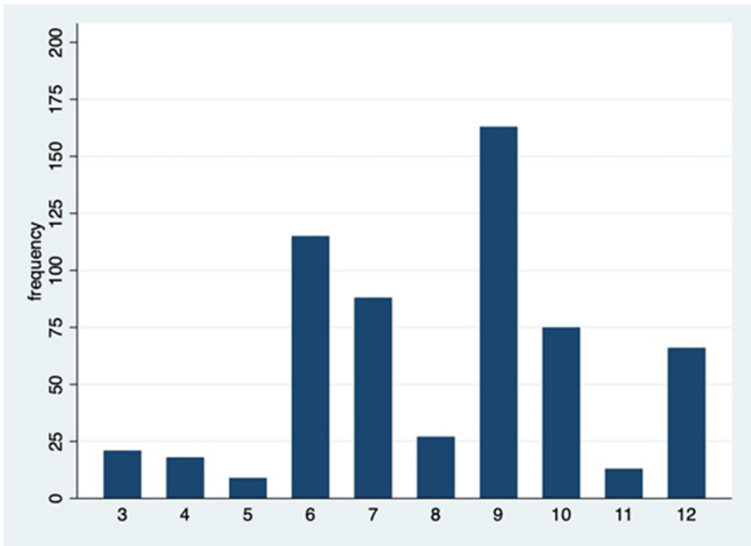


Figure 1. Distribution of the total multiple-choice score (n=595).

French pharmacists use a variety of continuing education methods (both self-instruction or following organized courses) to increase their knowledge and keep up-to date with developments concerning both conventional medications, devices etc. and CAMs (Table 3).

Table 3. Mode of continuing education according to pharmacist’s status. (Several answers were possible).

	Junior CP (n=59)	Salaried CP (n=176)	Temporary CP (n=30)	Owner CP (n=330)	P	All (n=595)
Professional Journals	46 (78.0%)	138 (78.4%)	23 (76.7%)	182 (55.2%)	<0.01	389 (65.4%)
Pharmaceutical industry information	41 (69.5%)	140 (79.5%)	17 (56.7%)	188 (57.0%)	<0.01	386 (64.9%)
Conferences	21 (35.6%)	99 (56.3%)	10 (33.3%)	223 (67.6%)	<0.01	353 (59.3%)

University courses	28 (47.5%)	75 (42.6%)	19 (63.3%)	105 (31.8%)	<0.01	227 (38.2%)
Personal contacts	26 (44.1%)	42 (23.9%)	10 (33.3%)	80 (24.2%)	<0.01	158 (26.6%)
Reading “ <i>La revue Prescrire</i> ”*	15 (25.4%)	34 (19.3%)	6 (20.0%)	63 (19.1%)	0.73	118 (19.8%)

“La Revue Prescrire” (or “Prescrire”) is a monthly publication of mainly reviews in French that address developments in disease management, medications, and medical techniques and technologies. Prescrire contains no advertising, and is financed by subscriptions. Prescrire mainly publishes reviews prepared by its own staff. It is run by a not-for-profit organization and is independent of the pharmaceutical industry

After qualifying as a pharmacist in France (Pharm D: 6 years of pharmaceutical studies plus an internship) the most frequent post-graduate courses taken by CPs were orthopedics (mandatory diploma to counsel for medical devices in orthopedics) 48.6% (289/595); homeopathy (these diploma courses were recently withdrawn in public sector schools of pharmacy) 8% (48/595); and home care (diploma in helping dependent patients remain in their homes) 7% (42/595). Many participants had not completed any post-graduate diploma course.

Concerning the topics broached in the cases presented in the questionnaire (homeopathic product instead of influenza vaccination, dietary supplements to replace statins, and CAM instead of nonsteroidal anti-inflammatory drugs (NSAIDs)) the most commonly consulted sources of information are shown in Table 4.

Table 4. Sources of information usually used.

A. Sources of information (used more than 50% of the time) on homeopathic and herbal medicines *	N=595
Handbooks for both pharmacists and the general public	291 (48.9%)
Summary of Product Characteristics	251 (42.2%)
Training by pharmaceutical sales representatives	238 (40.0%)
Discussions with colleagues	216 (36.3%)
Professional magazines for pharmacists (e.g., <i>Le Moniteur des pharmacies</i> , <i>Le quotidien du pharmacien</i>)	210 (35.3%)
Personal experience	188 (31.6%)
French Language Pharmacy Learned Society publications	137 (23.0%)
Health agency recommendations (ANSM, HAS, etc.)	130 (21.8%)
<i>La revue Prescrire</i>	73 (12.3%)
Clinical trials found in reliable databases (Pubmed, Cochrane, Uptodate)	51 (8.6%)
B. Sources of information (used more than 50% of the time) on the best choice of NSAID **	
Summary of Product Characteristics	528 (88.7%)
Health agency recommendations (ANSM, HAS, etc.)	265 (44.5%)
French Language Pharmacy Learned Society publications	231 (38.8%)
Professional magazines for pharmacists (e.g., <i>Le Moniteur des pharmacies</i> , <i>Le quotidien du pharmacien</i>)	222 (37.3%)
Discussions with colleagues	178 (29.9%)
<i>La revue Prescrire</i>	113 (19.0%)
Handbooks for both pharmacists and the general public	101 (17.0%)
Personal experience	98 (16.5%)
Clinical trials found in reliable databases (Pubmed, Cochrane, Uptodate)	39 (6.6%)
Training by pharmaceutical sales representatives	25 (4.2%)

*Cases 1, 2 and 3; ** Case 4.

The logistic regression selected the variables that were positively or negatively associated with the group using EBP (EBP positive) or the group ignoring EBP ((EBP negative). An odds ratio (OR) >1 was positively correlated with the proper use of the EBP and an OR < 1 was negatively correlated

with the good use of the EBP. The factors positively correlated with use of EBP were: being a final year student or junior CP (compared to being a pharmacy owner ($p < 0.01$), frequent use of health agency recommendations for guidance ($p < 0.01$) as well as reading "Prescrire" ($p = 0.010$), compared to not consulting them. The factors negatively correlated with the proper use of EBP were: the frequent use of information provided by pharmaceutical laboratory sales representatives ($p = 0.012$), relying on personal experience ($p = 0.016$), and/or having a diploma in homeopathy ($p = 0.024$) (Table 5).

Table 5. Univariate and Multivariate logistic regression.

	Univariate OR 95% CI]	Multivariate OR [95%]
Health agency recommendations*	1.33 [1.15-1.53] $p < 0.01$	1.25 [1.06-1.47] $p < 0.01$
Personal Experience*	0.85 [0.73-0.99] $p = 0.041$	0.82 [0.69-0.96] $p = 0.016$
Reading "La revue Prescrire"	1.29 [1.13-1.47] $p < 0.01$	1.21 [1.05-1.39] $p = 0.010$
Consulting the peer-reviewed reports of clinical trials *	1.29 [1.07-1.56] $p < 0.01$	/
Consulting reviews in magazines for pharmacists*	1.23 [1.10-1.38] $p < 0.01$	/
Attending training by pharmaceutical sales representatives**	0.85 [0.74-0.98] $p = 0.023$	0.83 [0.71-0.96] $p = 0.012$
Number of pharmacists in the dispensary	1.19 [1.03-1.38] $p = 0.016$	/
Having a diploma in homeopathy	0.49 [0.27-0.89] $p = 0.020$	0.47 [0.25-0.90] $p = 0.024$
Being Male	1.40 [0.99-1.99] $p = 0.060$	1.53 [1.04-2.25] $p = 0.030$
Pharmacist status		
Owner CP	ref	ref
Salaried CP	1.34 [0.93-1.94] $p = 0.120$	1.38 [0.91-2.09] $p = 0.131$
Temporary CP	1.82 [0.82-4.00] $p = 0.139$	1.62 [0.71-3.74] $p = 0.255$
Junior CP	3.21 [1.67-6.17] $p < 0.01$	3.07 [1.55-6.08] $p < 0.01$

* in clinical case n°4 involving NSAIDs ** for homeopathic and herbal medicine.

4. Discussion

The choice of responses to a questionnaire that presented different clinical cases gave us some insights into the knowledge and use of EBP by community pharmacists and associated factors such as their status in the pharmacy, the sources of information they usually use and whether they pursued any continuing education. Most previous surveys focusing on EBP in community pharmacies used qualitative methods, questionnaires with multiple open text answers, or ordered and Likert scales [10–12,14].

More than 80% of questionnaire respondents checked influenza vaccine as the first-line measure for influenza prevention. However, 12% affirmed that they would advise replacing influenza vaccine by the homeopathic product "Influenzinum" (a homeopathic product in the form of granules containing a dilution of the current year's influenza vaccine), and considered it as an effective option, despite any scientific proof. These answers need to be considered in the context of French attitudes towards influenza vaccine and homeopathy at the time the questionnaire was distributed (2018). The authorisation for community pharmacists to perform influenza vaccinations was introduced in 2018. Likewise, homeopathy has been reimbursed by the French national health

insurance scheme for decades. However, its place in drug therapy and its reimbursement by the French social security has been criticized for several years by both the pharmaceutical and medical professions. This controversy finally led most French universities to discontinue their university diploma courses in homeopathy. Moreover, the study shows that pharmacists who hold a university diploma in homeopathy are more inclined to make decisions that are not supported by EBP. Thus, the impact of homeopathy courses does not seem to be confined to the sole practice of homeopathy itself. Perhaps, the fact of undergoing training in homeopathy reflects adherence to a mode of reasoning based on beliefs (or theories) without taking into account scientific evidence.

The survey showed that some pharmacists are directed to non-EBP information sources in courses run by the pharmaceutical industry, rely on their personal experience and consult informal non-peer reviewed handbooks (often provided by sales representatives and available in the dispensary). Indeed, Hanna et al. [11] suggested that decisions taken regarding OTC medications and CAMs are mostly the result of personal experience (individual, familial or patient feedback). Furthermore, it is interesting to note that the product's safety seems more important than the product's efficacy for some pharmacists [11,13–15]. In view of the results of qualitative studies on OTC sales conducted by Hanna [11] and Rutter [13], when in doubt and faced with commercial pressure, some pharmacists choose to secure the sale rather than giving EBP advice. However, in the present study, for some pharmacists, an alternative stance was seen in all three cases. This consisted of giving the patient the non-EBP product while at the same time recognizing their action was not EBP.

The case concerning red yeast rice is interesting because it concerns a CAM product containing a phytotherapeutic molecule identical to lovastatin (monacolin K). This active agent in red yeast rice has been assessed according to EBP criteria, however the few randomised studies are relatively small in size [32]. The monacolin K concentration varies according to how the red rice is prepared and can sometimes contain traces of toxic substances [33]. The survey showed that nearly half of the respondents would deliver red yeast rice to reduce cardiovascular risk in patients who experienced adverse muscular side effects with a statin and had to discontinue it. While it seems that the pharmacist is making a therapeutic choice based on patient safety, the answers to this clinical case raise questions as to how pharmacists are trained to evaluate the benefit/risk balance.

The survey revealed that the majority of pharmacists still use information sources that are subject to bias. Indeed, the majority of sources used by community pharmacists for documentation on CAM are subject to bias (training from the pharmaceutical industry, personal experience and informal CAM handbooks). This is possibly because high quality randomized trials of CAM are difficult to fund and often have negative results making them difficult to publish (publication bias). These broad figures (except on CAM) are comparable to those from Mamiya et al., [34] in another international setting: concerning tools for continuing self-development, 34.8% of respondents answered "at home using books purchased by themselves and web searches", 24.2% "study meeting of medical associations such as Japanese Society of Hospital Pharmacists or Japan Pharmaceutical Association" and 10.8% respondents answered "pharmaceutical companies (wholesalers) study meetings. It should be noted that some pharmacists are not at ease reading English language information, and this might make it more difficult to access reports of high-quality studies published in international journals. Furthermore, it appears that some respondents rely on information from the regulatory authorities, but are often not up-to-date with changes, because they rely on the package inserts only. The results of the multivariate analysis confirm the importance of the source of information used in the choices made, with the use of sources less subject to bias, such as the French review "Prescrire" (the only independent source of information on Drugs in French language, funded entirely by its subscribers), being associated with science-based decisions. The reliance on personal experience and pharmaceutical industry-related training was correlated with decisions not supported by scientific evidence. The results also suggest that making science-based decisions is more frequent among junior pharmacists who use multiple and varied sources of information, unlike more senior pharmacists with more years of experience, but possibly less inclined or with less time to explore news sources. This might also be explained by recent changes in the pharmacy curriculum.

Initial training now incorporates teaching modules aimed at developing an EPB culture among pharmacy students. This is particularly the case for teaching modules concerning the critical reading of articles or those in clinical pharmacy. The study was transversal, so conclusions regarding either a change in attitude according to generation (age), or to a phenomenon of erosion during professional exercise cannot be advanced.

As a specification of Evidence based-medicine, evidence-Based Practice in Pharmacy relates to the promotion of “judicious, appropriate and safe use of medicines” [35]. One of the key issues is education. One of the most important determinants of adult learning is its relevance to clinical practice [36]. Teaching healthcare professionals to discern the most relevant and independent information source so that they can use it in their practice is essential. It also appears necessary to integrate lessons based not only on EBP but also on applying the principals of EBP to clinical practice in all continuing education courses. It seems unrealistic to expect French community pharmacists to routinely search and critically appraise clinical trial reports in the international literature, particularly due to the language barrier. This is why the regular consultation of up-to-date simplified review articles in independent publications such as “Prescrire” should be encouraged.

There are several potential biases and limitations to our study, particularly concerning the representativeness of the sample. The large number of respondents provides a broad overview of the practices of community pharmacists practicing in France, the respondent profile being comparable to the French pharmacist population in terms of sex ratio. and age. Data collection was carried out via an online questionnaire that had been tested by several community pharmacists, university hospital practitioners and pharmacy students to ensure its coherence, feasibility, and quality. Our sample is slightly younger than that of French pharmacists as a whole, which can be explained by our decision to include student pharmacists in their end-of-study internship in the 6th year. The percentage of pharmacy owners is comparable to national figures. For logistical reasons, we did not contact all French regions, but Table 1 shows that each targeted region has a weighting in the sample close to its weighting in the national demography of community pharmacists. The questionnaire could be completed in the pharmacist’s free time, allowing the respondent to focus on the benefit/risk evaluation. It did not take into consideration the external constraints that usually accompany such decision making (restricted time, patient/customer or managerial pressure etc). The self-declarative format of the questionnaire may have induced a bias towards respondents giving what they considered to be the desired responses rather than ones reflecting the pharmacist’s actual everyday practise.

Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

5. Conclusions

The data collected from 595 pharmacists allowed us to make an overview of Evidence-Based Practice among French community pharmacists and to highlight some factors influencing their choices. Junior community pharmacists tend to be more willing to apply EBP compared to their more senior colleagues. The sources of information mainly consulted by the pharmacist were also linked to their respect of EBP. These results should be confirmed in a larger study. However, in the meantime one could hypothesize that teaching pharmacy students simple methods to access non-biased sources of information can lead to better EBP. This should also be a challenge for practising pharmacists, who need to keep their knowledge and skills up to date instead of working “from their own experience”.

The EBP approach is still at its beginning among French community pharmacists. Even if our methodology is open to improvement (we don't have a gold-standard for evaluating this EBP approach among pharmacists), our study highlights some encouraging signs: around 40% of pharmacists surveyed have adopted an EBP-compatible approach, a figure indeed overestimated given the over-representation of young pharmacists in our sample. However, more interesting is the qualification of this positioning: in particular, a greater consideration of evidence in decision-making

on the part of young pharmacists, combined with greater use of scientifically valid sources of information (recommendations for practice such as those in the "*Prescrire*" journal). In fact, the two key issues to continuing the EBP trend in community pharmacy practice are to include EBP in the initial and continuing training of pharmacists, and to help them access independent, synopsis and practice-oriented sources of information.

Supplementary Materials: The following supporting information can be downloaded at the website of this paper posted on Preprints.org., Questionnaire S1: Community pharmacists and their daily therapeutic choices; Table S2: Evidence Based Practice Scoring of Multiple-choice answers.

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