An online cross-sectional survey investigating community pharmacists’ information needs for evidence-based self-medication counselling

Jennifer Maria Alexa
Leipzig University: Universitat Leipzig

Thilo Bertsche (✉ thilo.bertsche@medizin.uni-leipzig.de)
Leipzig University  https://orcid.org/0000-0002-4930-6655

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Abstract

Background

Community pharmacists play an important role in healthcare. They are the only professional point of contact for all self-medication-related matters. Little research has been done regarding the information needs of pharmacists for evidence-based self-medication counselling.

Aim

To explore pharmacists’ information needs in 5 predefined areas of information needs: individual needs, quality needs, utilization needs, implication needs, and access needs.

Setting

Community pharmacies in Germany.

Method

After ethical approval, we conducted a mixed-methods study in form of an exploratory, semi-quantitative, cross-sectional online survey. Members of 3 different chambers of pharmacists were invited to participate anonymously in the survey and without any incentives after giving informed consent.

Main outcome measure

Quantitative outcome: Frequency of relevance / importance of items within predefined information needs areas, except for access needs. Qualitative outcome: Open-text responses concerning all information needs.

Results

Data from a total of 823 participants, who completed the survey, were analyzed. General and specific information such as dosage (74.2 % [611/823]) and when to refer to a physician (64.6 % [532/823]) as well as an over-the-counter-product’s effectiveness according to medical guidelines (71.4 % [588/823]) were rated as very important. Participants reported to prefer digital information sources (50.5 % [416/823] strongly agreed), especially in the form of an easily accessible database (61.6 % [507/823] strongly agreed) that contains regularly updated, manufacturer independent, critically appraised, concise information.

Conclusion

Community pharmacists expressed distinct information needs for evidence-based self-medication counselling. Further information on essential evidence-based pharmacy knowledge may be necessary to support the correct implementation.
Impact Of Findings On Practice

- The results of our study help to understand what information needs pharmacists have in order to enable evidence-based self-medication counselling.
- The data sheds light onto pharmacist-specific preferences, needs and potential knowledge gaps that can serve as a guidance for future information services. Those findings may help to comprehend how the evidence-to-practice-gap can be reduced.

Introduction

Community pharmacies play an important and unique role in healthcare [1–3]. They are the only qualified advisory body within the healthcare system, from which patients as well as other health professionals can receive individualized, well-grounded self-medication-related advice [4, 5]. Therefore, self-medication counselling represents a key competency of pharmacists [6]. This ideally includes the patient’s preference, the pharmacists’ practical experience and the best available external evidence as is defined by the principles of evidence-based pharmacy (EbPharm). If these criteria are met, best patient outcomes with a positive impact on the entire healthcare system can be achieved [7, 8].

Previously published studies have shown, however, that external evidence in particular is only sparsely integrated into everyday counselling [9–18]. Barriers such as a lack of time, and missing information resources were identified as the main reason causing the evidence-to-practice-gap [19–23]. Very few measures have been introduced to bridge this gap so far. Examples of such measures include the creation of a pharmacist-targeted, evidence-based newsletter and a corresponding database known as the EVInews project [24] as well as educational training interventions [25–31]. It is widely agreed that the implementation of EbPharm in everyday practice can only succeed with practical support for the pharmacists in charge. [32]. Yet, to our knowledge no previous studies have investigated what information needs pharmacists have in the context of evidence-based self-medication counselling. Understanding pharmacists’ information needs is however crucial to navigate further steps towards the successful implementation of EbPharm and the reduction of the evidence-to-practice gap.

The term ‘information needs’ has been used interchangeably, but mainly to describe the types of information health professionals need for their daily work [33–36]. Information has been used to refer to the necessary input, that removes uncertainties in a decision-making process [36]. Recent investigations as conducted by van der Keylen et al. [34] have examined subordinate areas of health professionals’ information needs for evidence-based practice such as individual, quality and access needs.

Our investigation of this gap in the research strived to contribute to a better understanding of community pharmacists’ information needs and how external evidence can be better integrated for evidence-based counselling in community pharmacies. The findings aimed at providing guidance on how to tailor information sources and interventions according to their needs.

Aim
This study aimed to explore German community pharmacists’ information needs within 5 predefined areas: (1.a) general individual needs, (1.b) specific individual needs, (2) quality needs, (3) utilization needs, (4) implication needs and (5) access needs for evidence-based self-medication counselling.

**Ethics approval**

Ethical approval for this study was granted by the ethics committee of the Medical Faculty of the Leipzig University in alignment with the Declaration of Helsinki (423/22-ek) on December 6, 2022.

**Method**

**Study design**

This mixed-methods study was conducted in the form of an exploratory, semi-quantitative, cross-sectional, online survey between December 1, 2022, and January 22, 2023.

**Study sample, setting, and recruitment**

The convenience study sample consisted of community pharmacists from 3 different federal chamber of pharmacists (Saxony, Bavaria, Baden-Wuerttemberg). These chambers were chosen, because of their greatly varying pharmacy density, postgraduate education programs and location in the east, south, and south-west of Germany. The participants were invited via e-mail through each chamber of pharmacists to fill in the web-based survey. An e-mail containing the survey link was sent to all community pharmacies subscribed to each federal chamber of pharmacists’ e-mailing list. The participation was voluntary, anonymous, and no rewarding incentives were given.

SoSci Survey (Version 3.1.06) [37] was used to perform the survey, automatic data collection, and completion assessment. The survey link was accessible at www.soscisurvey.de without any restrictions. Information about the study’s purpose, investigator, estimated length, and data handling was displayed on the first page, before participants gave their written informed consent. Data processing and handling met the European data protection law standards. Since the data collection was anonymous and no cookies were used, multiple data entries were beyond our control. Participants were able to review and alter their responses by using a back-button. A reminder inquiry was sent to every chamber of pharmacists in January 2023. All chambers of pharmacists were invited consecutively to ensure a technically, flawless execution. The first invitation to was sent shortly before ethics approval to leave enough time for internal voting and coordination procedures.

**Inclusion criteria**: Pharmacists had to be licensed pharmacists, who completed the entire survey.

**Study protocol and response rate**

The study protocol and completion ratio is depicted in *Figure 1.*

*Insert Figure 1 here.*
Outcome parameters:

The results of this study are structured into 3 parts (Part A, B and C). These are not corresponding to the original survey structure, because the sociodemographic-related questions were placed at the end of the survey.

- Sociodemographic data (Part A.1), Correlation Analysis (Part A.2)
- Quantitative outcome: Frequency of relevance / importance of items within all information needs areas, except for access needs (Part B).
- Qualitative outcome: Identification of items based on open-text responses concerning access needs and additional items concerning all other areas of information needs (Part C).

Survey structure

The survey spread over 12 screen pages and was designed to semi-quantitatively analyze pharmacists’ information needs. It was subdivided into 3 sections, which were as follows:

- Section 1: Introduction containing general information about the study, informed consent, instructions, and a figure presenting the survey’s purpose.
- Section 2: Information needs in 5 predefined areas for evidence-based over-the-counter (OTC)-counselling (8 questions). The 5 categories of information needs included (#1.a) general individual needs (1 question), (#1.b) specific individual needs (1 question), (#2) quality needs (1 question), (#3) utilization needs (2 questions), (#4) implication needs (2 questions), and (#5) access needs (1 question), (Part B and C).
- Section 3: Sociodemographic data (10 questions, Part A.1).

Section 2 contained 1 open-ended question addressing access needs and 7 closed questions for all other information needs areas. Participants were invited to quantitatively determine the relevance or importance of items given within the closed-ended questions through 4-point Likert scales and add items in designated text fields. The translated questions can be found within the online supplementary material (S1).

Survey development and pretesting

The chosen areas of information needs were based on previous findings regarding other health professionals’ information needs for evidence-based practice [34]. We then developed questions that specifically addressed pharmacists and their information needs in the community pharmacy. The online survey was pretested using SoSci Survey in a two-step process with 17 pharmacists. Initially, the think-aloud method was used for 12 pretests to obtain in-depth information about comprehension, feasibility, layout preferences, and how non-response errors can be prevented. After feedback-based modifications, the standard observation method was employed for the remaining pretests. A total of 9 pre-testers belonged to the target group of community pharmacists who were involved in daily self-medication
counselling. No pre-tester was involved in survey design, conduction, nor data analysis. Data generated by the pretests was not included in the final data analysis.

**Data analysis**

All analyses were performed using Microsoft Office Excel (version 2016, Microsoft Corporation, Redmond, Washington, U.S.A.) and IBM® SPSS® Statistics version 29.0 (IBM Corporation, Armonk, New York, U.S.A.). The quantitative data analysis included descriptive statistics and a Spearman's rank order correlation to investigate the relationship between sociodemographic traits and familiarity with EbPharm-related topics *(Part A.2)*. Furthermore, the comparability of the participant’s sociodemographic characteristics between the 3 chambers of pharmacists was tested using a two-sided Kruskall-Wallis test and a Chi-square test. The threshold for statistical significance was set at \( p < 0.05 \).

Data generated by this survey comprised qualitative data and ordinal or nominal scaled data. Text responses to open-ended questions were thematically and manually clustered in a two-step process into variables based on a deductive, hierarchical approach. The variables’ frequencies were determined afterwards. In uncertain cases, the respective variable was discussed between the two study authors and clustered based on consensus afterwards or excluded from the analysis.

We estimated that 100 participants would provide a representative basis for our data analysis in each chamber of pharmacists. Data from participants, who provided non-analyzable data or did not finish the survey were excluded.

**Results**

*(Part A.1) Participants’ characteristics*

The participant’s characteristics are provided in *Table 1*. A total of 823 participants fulfilled the inclusion criteria. The median age was 45 years (IQR: 35.0 – 54.0). Most participants were female (83.1 % [684/823]), had more than 10 years of work experience (68.3 % [562/823]), and were involved in self-medication counselling in community pharmacies (97.8 % [805/823]).

*Insert Table 1 here.*

A Kruskall-Wallis test showed significant sociodemographic differences between the participants of the 3 different chambers of pharmacists concerning age, academic degree (\( p<0.001 \) each) and professional experience (\( p= 0.047 \)) to be statistically significant. The median age of all participants from the chamber of pharmacists of Saxony (S) was 36 years (IQR: 31.0 – 47.5), Bavaria (B) 46 (IQR: 36.0 – 55.0) and Baden-Wuerttemberg (BW) 46 (IQR: 35.0 – 55.0). Within the chamber of pharmacists of S, 15.1 % (14/93) held an additional diploma in pharmacy (Dipl.-Pharm.) and 9.7 % (9/93) a doctoral degree. A total of 1.1 % (5/461) from the chamber of pharmacists of B had a diploma title and 4.6 % (21/461) a doctoral degree. Similarly, 0.7 % (2/269) within in the chamber of pharmacists of BW held a Diploma degree and 6.7 % (18/269) a doctoral degree. In all 3 chambers of pharmacists, more than half of all participants had
more than 11 years of professional experience ([S] 55.9 % {52/93}, [B] 70.3 % {324/461}, [BW] 69.1 % {186/269}). No statistically significant differences regarding educational training and gender were identified.

(Part A.2) **Correlation analysis**

The results of the correlation analysis are shown in Table 3 within the online supplementary material S3. Increasing professional experience was associated with a decrease in familiarity with all 5 EbPharm-related topics (weak, negative correlation with values ranging from $r_s=-0.080$ to $r_s=-0.205$ and $p \leq 0.022$ respectively) and the topics finding external evidence ($r_s=-0.122$, $p<0.001$) as well as the interpretation of study results ($r_s=-0.123$, $p<0.001$).

**Quantitative outcome:**

(Part B) **Quantitative assessment of pharmacists’ information needs for evidence-based counselling (#1 – #4)**

The Figures 2 to 5 illustrate the quantitative survey results.

*Insert Fig. 2, Figure 3, Figure 4 and Figure 5 here.*

As can be seen from Figure 2 more than half of all participating pharmacists rated general information about dosage (74.2 % {611/823}) and drug-interactions (62.6 % {515/823}) to be very important for counselling. A great proportion of those surveyed indicated that information concerning effectiveness according to medical guidelines (71.4 % {588/823}) and tested indications (67.3 % {554/823}) are very relevant (Figure 3).

Opinions on importance of information source quality criteria varied. More than two-thirds of all participants found relevance for OTC-counselling (64.8 % {533/823}) and recency (52.9 % {435/823}) to be very important. Closer inspection of Figure 4 shows that 50.5 % (416/823) strongly agreed to prefer digital/electronic information formats, particularly databases (61.6 % {507/823}). Only a small number of participants reported to be not familiar with the interpretation of clinical studies (7.4 % {61/823}) and critical appraisal (10.1 % {83/823}). A proportion of participants, who indicated to be at least partially familiar with the 5 given topics, felt that the interpretation of clinical study results (52.3 % {392/750}) and how to find external evidence (61.2 % {180/294}) are very relevant for future information services.

**Qualitative outcome:**

(Part C) **Cluster analysis of the open-text responses**

The results from the cluster analysis of the open-text responses are shown in Table 2 within the online supplementary material S2.
(#1.a) General individual needs: A total of 5 respondents suggested that practical experience (40.0 % [2/5]), usage during pregnancy and while breastfeeding (20.0 % [1/5]) as well as abuse and misuse potential (20.0 % each [1/5]) are also important information for OTC-counselling in general.

(#1.b) Specific individual information needs: Six participants added other information that they find relevant regarding an OTC-product’s external evidence, which for example comprise: conflicts of interests in medical guidelines, time since market authorization, long-term monitoring data and independence of study results (16.7 % each [1/6]).

(#2) Quality needs: A total of 5 out of 16 participants mentioned details about study characteristics (31.3 % [5/16]) as another quality criterion for counselling-related information sources. Nearly 20 % (18.8 % each [3/16]) also disclosed independence, clarity, conciseness to be important quality traits.

(#3) Utilization needs: Out of all 56 given open-text responses: Webinars (17.9 % [10/56]), summaries (10.7 % [6/56]) as well as free of charge and easy to use databases (8.9 % [5/56]) emerged as the most frequently mentioned electronic formats. Moreover, 16.1 % (9/56) of respondents named podcasts as a potential audio information format and a smaller proportion mentioned analogue formats such as ring binders (5.4 % [3/56]) and posters (3.6 % [2/56]).

(#4) Implication needs: The search for information is a theme that emerged from the 3 given open-text responses. In this case the search for independent information sources in general, for independent studies and about the EbPharm methodology/concept (33.3 % each [1/3]) was mentioned.

(#5) Access needs: Less than half of all participants (43.0 % [354/823]) provided answers for the solely open-ended question about how the access to OTC-related external evidence for pharmacists can be improved. The establishment of a database was the most frequently mentioned response (26.8 % [95/354]). The second most often given response concerned the linking of evidence-based information/databases with the pharmacy software (13.6 % [48/354]), followed by the provision of short summaries/overviews (12.4 % [44/354]). The majority of participants’ responses mentioned information formats or measures that require an active search (295/479), whereas 479 represents the frequency of how often an identified variable was mentioned.

Discussion

Community pharmacists play an important role as health promoters in healthcare and self-medication counselling is their key competency. Very little attention has been paid to community pharmacists’ information needs for evidence-based self-medication counselling. Up to now, research has tended to focus more on investigating barriers, educational interventions and the status quo of counselling-practice [9, 12, 13, 19, 20, 41]. This study was therefore set out with the aim of gaining an insight into their information needs to help facilitate EbPharm into practice. We explored 5 predefined areas of information needs, which included general and specific individual needs, quality needs, utilization needs, implication as well as access needs. The results of our study show that the majority of participants prefer digital
information source formats for evidence-based self-medication counselling that allow an active search for information. Furthermore, they indicated that the establishment of an information tool, preferably as a database, that contains regularly updated, independent, critically appraised, concise and relevant information, would be useful. Information such as dosage, interactions, and effectiveness of an OTC-product according to medical guidelines were rated as very important. Further educational training on EbPharm basics may however be necessary to enable a correct usage of such sources and the application of the EbPharm-concept for counselling practice.

Information sources should fulfill distinct criteria

Our study found that pharmacists rated information such as dosage, drug-interactions and when to refer to a physician as very relevant for self-medication counselling in general. Furthermore, specific information on an OTC-product’s effectiveness according to medical guidelines, tested indications and types of clinical studies in which it was tested were seen as very relevant. These results seem plausible, since a well-grounded product recommendation requires a thorough assessment of its appropriateness, benefits and potential harm for the patient. They are furthermore in line with previous investigations such as by Makhlouf et al. [42] that studied counselling practice concerning minor ailments. Ideally, an informed decision is based on reliable, evidence-based information sources. However, finding such important and relevant information can prove to be a challenge. OTC-products such as medicines or supplements are authorized on the market in various ways. The manufacturers are therefore not always obliged to provide sufficient information on for instance dosage, treatment duration, limits of self-medication, potential adverse drug reactions, or even any clinical data at all. It should therefore be considered to include such information in information sources for pharmacists.

EbPharm-related knowledge is essential to conduct evidence-based consultations

Access to a growing body of literature has expanded and patients can now more easily inform themselves. It is therefore of great importance nowadays that pharmacists use high quality information sources for such matters. According to open-text responses, participants expressed the desire to use information sources that already contain manufacturer-independent, critically appraised information. Surprisingly, when asked to evaluate the importance of different quality criteria of external evidence, most participants rated relevance for counselling, recency and transparency as very important, but not the disclosure of literature references. This appears to be contradictory, as the disclosure of literature references could be also regarded as a transparency marker. Possible explanations may include the fact that EbPharm has been introduced in recent years and a great proportion of participants had more than 10 years of professional experience. A note of caution may therefore be due as the rated quality markers may not fully represent those that are needed for sources of high internal validity. Knowledge about the threefold EbPharm-concept, the handling and finding of high quality external evidence and quality traits of evidence should be intensified in the upcoming years as already suggested [15, 17, 19].

This potential knowledge gap may also explain the contradictory finding why on the one hand two thirds of all participants indicated to be at least partially familiar with the critical appraisal and interpretation of
clinical studies as well as how to find external evidence. Yet, on the other hand more than half of all participants were not familiar with the PICO-scheme and the EbPharm 5-step method. The correlation analysis also showed a weak negative relationship between the familiarity with fundamental EbPharm-related topics and professional experience as well the participants’ academic degree. A possible explanation for the negative relationship between higher academic degree and seemingly decreased EbPharm-topic familiarity may be that participants with postgraduate education were more likely to scrutinize their realistic skillset. Simultaneously, in alignment with some open text-responses there seems to be a demand for information services such as educational training on how to search for and handle external evidence. It may be important to offer more information on EbPharm basics nonetheless to help implement the concept into everyday practice and reduce uncertainties.

An easy-to-access database to reduce the evidence-to-practice-gap

Interestingly, the majority of participants reported to prefer an ideally free-of charge and easy to access databases as an information source format and strongly agreed that they would prefer digital formats in general. Other formats such as informative websites and podcasts were also mentioned, but notably formats that enable an active search for information instead of a passive information supply. This observation may be attributed to the fact that when confronted with an OTC-related inquiry, pharmacists are expected to access the required information in a timely manner.

As described by previous studies [33, 34, 43] health professionals’ information needs vary greatly given the different scope of practice and professional demands they face. To our knowledge, this is the first study that investigated the information needs of community pharmacists for evidence-based self-medication counselling. Our study sample consisted of pharmacists from different chamber of pharmacists and therefore regions in Germany, of whom 97.8 % [805/823] reported to be involved in customer counselling. With regards to external validity, the findings of our study may therefore be relevant for policy makers and the pharmacist workforce as we studied a large sample from the target group. A closer inspection of the significant differences between the 3 chamber of pharmacists revealed that these discrepancies are attributed to lower median of age in the chamber of Saxony in comparison to Bavaria and Baden-Wuerttemberg. Furthermore, the significant difference in academic degree was due to more participants holding a pharmacy diploma and less doctoral degrees in Saxony in comparison to Bavaria and Baden-Wuerttemberg. Diploma titles were previously only available in the former German Democratic Republic (GDR) and mainly universities located in the east of Germany offer such degrees until now. We therefore estimate the differences to not be relevant.

Areas of future research should investigate further areas of information needs to gain a more holistic insight. After the creation of an information tool that is tailored to pharmacists’ information needs, it should be investigated how the correct usage of external evidence of such a tool can be facilitated to reduce-the-evidence-to-practice gap.

Limitations of the survey
We examined 5 areas of pharmacists’ information needs for evidence-based OTC-counselling based on recent literature. Other areas of information needs remain to be explored. Furthermore, it was impossible to include all potentially relevant items for each question within the Likert-scaled responses. However, participants were always given the opportunity to write down new items as open-text responses that were analyzed afterwards.

The study sample included participants from 3 out of 17 different chambers of pharmacists in Germany. Despite minor regional differences, we believe that the study results are generalizable, because counselling standards and information needs should be comparable.

It was impossible to identify unique site visitors given that the survey was anonymous. We excluded incomplete surveys to reduce the probability of including double entries.

A survey validation was not carried out. However, pretests with 17 pharmacists were performed prior to the survey conduction.

Conclusion

This study revealed that pharmacists have very specific information needs. They indicated to prefer digital or electronic information source formats, especially in form of an easily accessible database that contains relevant information for evidence-based counselling. Information should fulfill distinct criteria such as being manufacturer-independent, critically appraised and concise. Efforts to provide essential EbPharm-related knowledge should be intensified to ascertain the correct implementation of evidence-based self-medication counselling.

Abbreviations

ABDA: Federal Union of German Associations of Pharmacists (Berlin, Germany)

EbPharm: evidence-based pharmacy

OTC: Over-the-counter

POM: Prescription-only-medicine

Declarations

Both authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Jennifer Maria Alexa. The first draft of the manuscript was written by Jennifer Maria Alexa and both authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Acknowledgements
We express our gratitude to Dr. Maryam Yahiaoui-Doktor for assistance with the statistical analysis. Furthermore, we thank all pre-testers and study participants for their contribution.

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**Conflicts of Interest**

The authors declare that they have no conflicts of interest.

**References**


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Tables

Table 1. Sociodemographic data of the study sample.
<table>
<thead>
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<th>Characteristics</th>
<th>Study sample (n = 823)</th>
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<td>Gender [n (%)]</td>
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<tr>
<td>Female</td>
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**Figures**
Study Protocol

Study objective

Analysis of community pharmacists’ information needs for evidence-based, self-medication counselling within the 5 predefined areas of information needs:

- Access needs
- Implication needs
- Individual needs
- Utilization needs
- Quality needs

Study design

Exploratory, semi-quantitative study, online survey containing 8 questions with combined likert-scaled as well as open text response formats.

Study Sample and Setting

Community pharmacists in Germany.

Study Procedure

An e-mail containing the online-survey link was sent to all subscribed community pharmacies of the e-mailing lists of the 3 federal chambers of pharmacists Saxony (S), Bavaria (B), and Baden-Wuerttemberg (BW) between 01.12.2022 and 22.01.2023.

Completion ratio

\[
0.72 = \frac{\text{number of users, who completed the survey}}{\text{number of users, who gave their informed consent}} = \frac{836 (n \text{ (S)} = 96, n \text{ (B)} = 469, n \text{ (BW)} = 271)}{1166 (n \text{ (S)} = 130, n \text{ (B)} = 640, n \text{ (BW)} = 396)}
\]

Enrollment

Assessed for eligibility: n = 1166
Excluded, n = 343

Analysis

n = 823
n (S) = 93
n (B) = 461
n (BW) = 269

Reasons

- no licensed pharmacists, n = 9
- missing/unclear sociodemographic data, n = 4
- did not fill in the entire survey, n = 330

Figure 1

Study Procedure and Participant flow chart, modified based on CHERRIES, CROSS and STROBE [38–40].
### Figure 2

Participants’ rating of importance of general OTC-counselling related information for pharmacists ([#1.a] general individual needs) and of quality criteria for OTC-related information sources external evidence ([#2] quality needs).
Figure 3

Participants’ rating of relevance on the provision of information regarding OTC-related external evidence ([#1.b] specific individual needs).
Figure 4

Participants’ rating of agreement on preferred information formats in general and external evidence formats ([#3] utilization needs).
Figure 5

Participants’ rating of familiarity EbPharm-related topics and rating of relevance of these for future information services ([#4] implication needs). For the rating of relevance, only responses from participants who indicated to be at least partially familiar with the topic were considered.

### Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Supplementarymaterial20230407.docx