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Cross-sectional exploratory survey among health researchers in Europe on the awareness of and barriers affecting the use of an evidence-based research approach

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ABSTRACT

Objectives This exploratory study was conducted to find out how well the concept of evidence-based research (EBR) is known among European health researchers with substantial clinical research experience, and which barriers affect the use of an EBR approach. The concept of EBR implies that researchers use evidence synthesis to justify new studies and to inform their design.

Design A cross-sectional exploratory survey study.

Setting and participants The survey was conducted among European health researchers. Respondents included 205 health researchers (physicians, nurses, dentists, allied health researchers and members of other professions involved in health research) with a doctoral degree or at least 5 years of research experience.

Primary and secondary outcome measures The primary outcome measures were the level of awareness of the concept of EBR and the presence of barriers affecting the use of an EBR approach. Secondary outcome measures include correlations between sociodemographic characteristics (eg, profession) and awareness of EBR.

Results We discovered that 84.4% of the respondents initially indicated their awareness of the concept of EBR. Nevertheless, 22.5% of them concluded that, on reading the definition, they either do not know or do not fully comprehend the concept of EBR. The main barriers affecting the use of an EBR approach were related to organisational issues, such as not being attributed resources (30.5% of the respondents), time (24.8%) or access to implement it (14.9%).

Conclusions Despite the limitations, this study clearly shows that ongoing initiatives are necessary to raise awareness about the importance of implementing the EBR approach in health research. This paper contributes to a discussion of the issues that obstruct the implementation of the EBR approach and potential solutions to overcome these issues, such as improving the knowledge and skills necessary to practice the EBR approach.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Diverse background and nationality of the team of researchers involved in a study limits biases arising from one's national context and reflects the diversity across Europe.
⇒ The questionnaire was developed on the basis of a formative qualitative study.
⇒ The current study was exploratory, based on a convenience sample with most of the respondents coming from a small number of countries where the evidence-based research standards are already relatively high and well-embedded in research practice.
⇒ Conclusions cannot be extrapolated to the general health research community.

INTRODUCTION

Evidence-based research (EBR) is described as the use of prior research in a systematic and transparent way to inform a new study so that it answers questions that matter in a valid, efficient and accessible manner.[1–3] Systematic reviews and other evidence syntheses are an integral part of EBR as they enable researchers to identify research gaps and prioritise research questions after considering all relevant previous and ongoing research as well as putting research in the context of existing evidence.[4] However, in order to implement the EBR approach and efficiently use evidence syntheses in their research, health researchers need to know the methods for the identification of existing pertinent systematic reviews and need to be up to date with methods for preparing such systematic reviews.[4] Through the utilisation of an EBR approach, researchers will be able to systematically and transparently justify a new study. This, in turn, will contribute to the design of

a study that holds greater scientific significance[5] and societal relevance.[5] Moreover, additional ethical issues arise, which relate to the involvement of patients in ill designed and unnecessary studies that may lead to avoidable side effects.[5 6] The promotion of the evidence-based approach in healthcare research requires skills related to evidence-based practice (EBP) and research, which are acquired mostly via education and other training opportunities,[7] including training both at the university level[8–11] and during clinical work.[12–14] However, a clear distinction has to be made between EBP and EBR. While EBP is devoted to the care of patients and is a process of making decisions about healthcare based on the synthesis of the best available, current, valid and relevant evidence, the EBR approach is devoted to synthesising prior research findings (evidence) to identify research gaps, plan and design new studies. The process of EBP involves several steps, such as asking relevant clinical questions, identifying and appraising relevant evidence and integrating it with clinical expertise and the values and preferences of patients, and, finally, evaluating the outcomes. The process of EBR also requires a systematic review and synthesising of related previous studies to identify research gaps and obtaining end-users' perspectives in a systematic way to make sure that the proposed research question is fully justified. Both sources of information should be used in the design of any new study and placing its results in the context of existing evidence. Evidence synthesis, although serving different purposes, is a crucial element of both EBP and EBR. Many tools and checklists were designed to help use existing knowledge systematically and transparently, such as Preferred Reporting Items for Systematic Reviews and Meta-Analyses,[15] by describing the rationale for the review in the context of existing scientific and clinical knowledge. Although the rationale of EBR is important beyond a doubt, many scholarly studies are showing a poor adherence to the EBR approach in practice,[16 17] both in terms of justification of the need for new studies which leads to the situation when researchers are examining questions already answered in previous studies[18–21] and putting the results in the context of already existing evidence.[19 22 23] Moreover, even if the authors are using previous studies to justify the new research, it often concerns a small unrepresentative[24] and subjectively selected set of earlier similar publications[25 26] as well as studies which are supportive and statistically significant[27] or a selection of studies indicating the authors' strategic considerations. We have not been able to identify any quantitative study addressing the poor adherence to the EBR approach and the factors influencing the use and implementation of an EBR approach among health researchers. Therefore, the research gap which we would like to address in our study is related to the adherence to the steps of the EBR approach, including the practice of identifying and preparing systematic reviews and their use in the design of a new study to ensure that this new study will not become so-called research waste. In addition, we include potential barriers in undertaking new research in line with the EBR approach assuring that new studies are current, valid and relevant. The study aims to (a) determine to what extent health researchers in Europe are aware of the concept of EBR, including the correlation between the respondents' profession and awareness of the EBR concept and (b) identify and describe barriers affecting the use of an EBR approach in their research work. The study was carried out in the framework of a project COST Action CA17117 'Towards an International Network for Evidence-based Research in Clinical Health Research' (EVBRES).[28] A COST Action is an interdisciplinary research network, funded by the European Cooperation in Science and Technology, that brings researchers and innovators together to investigate a topic of their choice. The current quantitative study was preceded by a qualitative study (focus group interviews) conducted during the EVBRES training school in Tartu, Estonia, held from 30 September to 2 October 2019. Both studies covered one of the research aims of the EVBRES COST Action.

MATERIALS AND METHODS

On the first page of the online questionnaire, the research protocol (online supplemental appendix A) and the contact information to the research team were provided. Once the required information was read, the respondents consented to their participation in the study. In addition, the online questionnaire provided all the information regarding data processing, and the respondents were asked at the end of the survey if they agreed to the processing of the provided data.

Without consenting to participate and the processing of the data, the questionnaire was excluded from the analysis. Participation in the study was voluntary and we did not offer any incentives.

This study was conducted in compliance with recognised international standards, including the International Conference on Harmonisation, the Council for International Organizations of Medical Sciences and the principles of the Declaration of Helsinki.[29–31]

Study design and study population

This was a cross-sectional study, and its protocol is available at the Open Science Framework (https://osf.io/m279f/) and provided in online supplemental appendix A. The Strengthening the Reporting of Observational Studies in Epidemiology guidelines were followed in reporting (online supplemental appendix B).[32] The study population included European health researchers with a doctoral degree in a health-related discipline, or who were currently engaged in research activities with a minimum of 5 years of experience in research (as declared by the respondents, not verified). The enrolment period for respondents was between 11 January 2023 and 15 March 2023.

To define the sample size, it was necessary to estimate the percentage of researchers, who were currently aware

of the EBR concept and implement it. Since these data were not available in the existing literature, they were deduced as follows. The study by Engelking *et al*,[33] who presented a descriptive cross-sectional analysis of 622 randomised controlled trials (RCTs) published between 2014 and 2016, showed that only 20% of respondents explicitly mentioned that they conducted a systematic review as a justification for a new study. It was, therefore, assumed that this percentage represented the number of researchers who know and use the processes laid down in the concept of EBR. Considering a confidence level of 95%, a margin of error of 5%, and the addition of 10% of incomplete questionnaires a sample size of 271 respondents was requested. We used the following equation:

$n=z^2\times p\times(1-p)/E^2\times(1-f)$

where n stands for sample size, z for the 95% confidence level (1.96), p for the expected proportion (20% or 0.20), E for the margin of error (5% or 0.05) and f for the fraction of incomplete questionnaires (10%).

Instrument

Developing the content of the questionnaire

To develop the content of the questionnaire for the quantitative study (survey), that is, to identify the barriers affecting the use of an EBR approach, we used the results of a qualitative study conducted during the aforementioned EVBRES training school in Tartu, Estonia, as a formative phase.[34] Four focus groups were conducted by pairs of trained moderators according to the common interview guide. During these focus groups, the experiences and views of the study participants from various national and scientific contexts were explored. A total of 23 participants of the training school took part in the focus groups. They had various professional backgrounds, including biostatisticians, dentists, dieticians, midwives, pharmacists, physicians, physiotherapists and psychologists. The gathered material enabled the identification of 16 different barriers affecting the use of EBR approach in the professional activities of the study participants.

The barriers that were cited most frequently in the focus groups were added to the questionnaire of this study in the final two questions. The details of the qualitative study and outcomes of the focus groups can be consulted in an analytical report of the focus groups study which is available on the Open Science Framework (https://osf.io/p46bj).

The final content of the questionnaire

The questionnaire consisted of 25 questions, including 3 regarding consent and eligibility, 8 regarding sociodemographic characteristics, 12 regarding awareness of the concept of EBR and its elements, and 2 regarding possible barriers affecting the use of an EBR approach (online supplemental appendix A). The concept of EBR is explained through several steps, which were translated into 12 questions, each corresponding to a specific step in the EBR process. All 16 barriers affecting the use of EBR approach identified in the qualitative study were listed and the respondents could select multiple factors they encounter in using EBR approach. In a follow-up question, the same barriers could be ranked from the most to the least important by moving their position. The questionnaire used close-ended multiple-choice questions and one open-ended question at the end. Respondents were informed that the completion of the questionnaire would not exceed 10 min.

To explain the concept of EBR, this description (based on the literature[4]) was provided in the questionnaire: 'The two aims of EBR are as follows: Aim 1: To justify the need of a new research with adequate systematic review of existing evidence/data for all new studies, what is the researcher's responsibility: To prioritise research questions after systematic consideration of all relevant earlier and ongoing researches; To know how to conduct an efficient search for relevant systematic reviews and ongoing studies if no relevant ones are available; To keep researchers up to date with systematic reviews, and aware of the options for preparing or updating the review needed; To be able to assess the risk of bias in systematic reviews; To be able to prepare and supervise students in using, applying and conducting systematic reviews. Aim 2: Efficient production, updating and accessibility of systematic reviews, the aim beyond the researcher's responsibility: To participate in research and development activities to (a) assure improvement in the preparation, and update of systematic reviews; (b) facilitate development of automation of systematic reviews' preparation and (c) facilitate development of tools for more efficient conducting of systematic reviews.'

The digital questionnaire was created in QuestionPro, which is a survey application meeting the expected data security requirements. The respondents did not need to instal applications other than the browser used to access the questionnaire.

We validated the content of the questionnaire by sending it to two internationally recognised experts in EBR, who also both serve as authors of this manuscript. Based on their feedback, the other authors adjusted the content of the questionnaire. The feedback was mainly focused on the questions related to the construct of the EBR concept.

We then piloted the functionality of the questionnaire in our team before finalising and distributing the questionnaire.

Data collection and storage

We applied the snowball technique to recruit respondents. A request for participation was sent via the professional networks of the authors (emails, LinkedIn, ResearchGate and Facebook) and forwarded to various European scientific and professional societies in the domain of healthcare (such as the WHO, Cochrane, participants of the EVBRES COST Action. Moreover, the link to the survey was disseminated on the EVBRES' X-account (formerly known as Twitter). The collected information was stored on the application's high-security server for at

least 7 years. The data were exported to a Microsoft Excel sheet before it was used to perform statistical analyses. The requirements of the General Data Protection Regulation (GDPR) of the European Union were followed when designing the study. For instance, no personal information was collected and processed. Automatically registered IP addresses were deleted for the export from QuestionPro and, thus, not processed in the analysis.

Data analysis

Non-European respondents and respondents who only partially completed the questionnaire were not included in the analysis. A descriptive analysis of the quantitative data was conducted with data presented as frequencies (absolute and percentage). We analysed categorical variables (eg, health profession and geographical origin) using Pearson's χ^2 with continuity correction as appropriate. Prior to conducting the test, we ensured that data were in counts or frequencies format and that the assumptions of independence and adequate expected frequencies (not fewer than five instances) were met. We also considered the sensitivity of the test to sample size, interpreting the results in the context of their practical significance. All statistical analyses were done using SPSS V.22.0 (IBM). All questions in the questionnaire, except for those with open-ended responses, were quantitative.

For the analysis of the rankings of barriers (ranging from the most important to the least important) performed by respondents under Q26, we summarised those which were most commonly ranked the highest (top three rankings). We started with barriers ranked by the participants as the most important (first choice) and described those selected by the largest group of participants. We did the same for the second and third choices.

The responses to the open-ended questions were analysed qualitatively. We coded the responses deductively, using the thematic categories from the formative study as a coding book, and we further analysed the responses coded with similar codes.

RESULTS

Respondent characteristics

The studied sample included 205 respondents, who represented 25 countries in the WHO European Region, with most respondents from Belgium (20.0%), Finland (14.1%) and Portugal (13.7%) (online supplemental figure 1).

The professions most indicated by our respondents were physicians (23.9%), followed by nurses (15.6%), psychologists (8.8%), physiotherapists (5.9%), dentists (5.4%), dieticians and nutritionists (4.4%), speech-language therapists (2.9%), pharmacists (2.9%), occupational therapists (2%) and public health providers (2%). Other backgrounds included a variety of professions, grouped into professionals with (a) an allied health background (including a podiatrist, a professional who works in (allied) healthcare, one exercise physiologist, an e-health specialist, a pharmacologist, a psychotherapist, one public health and physiotherapist researcher, one epidemiologist and three veterinarians); (b) a social or educational science background (including two in social sciences, one in health education, one in communication and one in knowledge management); (c) a bio(medical) background (including an evolutionary biologist, two biochemists, one cancer/biomedical researcher, one molecular biologists, two bio(medical) engineers, one biologists, one toxicologists and a medical lab technician) and (d) a general background (an engineer, two scientists and an economist).

Regarding their experience in research, respondents were mostly involved in the development of systematic reviews (58.5%), while more than half of them (52.7%) had experience in conducting clinical trials (multiple answers were possible). Almost half of the respondents reported having experience in basic research (47.3%) and qualitative research (46.8%). Apart from the abovementioned types of research and having experience in clinical practice guidelines (20.5%), some of the respondents reported having experience in other types of research. Mostly, epidemiological/observational research (2.4%), applied research (2.0%) and health service research (2%) were indicated as other types of research (multiple answers were possible; online supplemental table S1 for details).

Most of the respondents declared that they were familiar with literature reviews and around a third got familiar with literature reviews during their bachelor studies (29%). Regarding the type of reviews, respondents were most familiar with systematic reviews (94%) and meta-analyses (72%) (table 1). Two-thirds of the respondents 75.2% (152) reported that they had experience with conducting systematic reviews.

Awareness of the EBR concept

Most of the respondents reported that they were aware of the concept of EBR (84.4%) and there was no statistical difference between the groups of professionals (χ^2=6.70; df=10; p=0.75).

As a part of the questionnaire, respondents were provided with a description of the aims of EBR and what they mean for the researchers. The survey asked the respondents about their awareness of the concept and aims before and after reading this description to evaluate if the perception of their awareness of the concept had changed after reading the description. Table 2 shows the results.

There is a difference between the number of respondents who indicated their awareness of the concept of EBR before and after they read our extended description of the concept (χ^2=71.6; df=2; p<0.001). After reading this description of EBR, 63% were aware of the aims of EBR, 22.5% were not aware of this approach and 14.5% indicated partial awareness of the aims of EBR. Those who indicated partial awareness were familiar with aim 1 or its elements (72%), aim 2 (12%) or elements of both

Table 1 Respondents' familiarity with literature reviews

Question (multiple answers possible)	Frequency % (n)
Are you familiar with literature reviews?	
Yes	97 (94)
No	3 (3)
Do you have experience with conducting a systematic review?	
Yes	75 (152)
No	25 (50)
When did you become familiar with literature reviews?	
During bachelor studies	29 (58)
During master studies	27 (55)
During PhD/doctoral programme	22 (44)
During professional activities and professional/continuing education	20 (40)
Other*	2 (4)
Which types of literature reviews are you familiar with?	
Systematic reviews	94 (192)
Meta-analysis	72 (147)
Scoping review	64 (131)
Umbrella review (overviews)	38 (78)
Rapid review	32 (65)
Mixed-method review	29 (60)
Integrated review	14 (28)
Realist review	7 (15)
Other*	3 (6)

*See online supplemental table S3 for more details.

aims (8%) or generally with the importance of the idea (24%) (multiple categories possible).

The survey also enquired about implementing each of the nine steps of the EBR approach in practice as described in table 3. The most frequently followed were the steps about formulating a preliminary research question before starting a research study (always, 65.4%, n=134; never, 0%), searching for relevant systematic reviews before starting a research study (always, 62.4%, n=128; never, 0.5%, n=1) and assessing if the relevant systematic reviews found before starting a research study are up to date (always, 55.8%, n=111; never, 2%, n=4). On the opposite, the following steps respondents implemented more rarely: planning a new systematic review if the quality and/or scope are not adequate before starting their own (never, 19.1%, n=38; always, 15.1%, n=30), assessing the PICOT (= Population, Intervention, Comparison, Outcome, Time frames), methods and results of the systematic reviews and/or relevant ongoing studies before starting a research study (never, 12.8%, n=25; always, 31.6%, n=62) and searching for relevant primary studies if the currency of the relevant systematic reviews is not adequate before starting their own (never, 4.4%, n=9; always, 42.4%, n=87) (table 3).

For the majority of EBR steps, there were no significant associations between professional background and a particular EBR step with exception of searching for relevant systematic reviews (χ^2=57; df=30; p=0.02) and assessing the PICOT (χ^2=56.3; df=30; p=0.003), with physiotherapists implementing those two steps more often and speech-language therapists (both steps), psychologists (first step) and pharmacists (second step) less often.

Among respondents aware of EBR (those who answered 'yes' to the question 'Before reading the description, were you familiar with the aims of Evidence-based research as proposed above?'), the frequency of barriers encountered in using the nine steps of EBR is described in table 4. Most frequently identified barriers affecting the use of an EBR approach were lacking the resources to apply EBR (43; 30.5%), being constrained in time (35; 24.8%), lacking a network to apply EBR (30; 21.3%) and lack of experience in EBR (24; 17.0%). We classified the barriers affecting the use of an EBR approach into five groups: organisational, personal, collaboration, research field and other (table 4).

Table 5 includes the answers of 141 respondents who are aware of the EBR (those who answered 'yes' to the question 'Before reading the description, were you familiar with the aims of Evidence-based research as proposed above?'). The most influential barriers (first-choice) preventing respondents from using an EBR approach were a lack of EBR knowledge (15 respondents; 23.1%) and having an insufficient research network (14 respondents; 14.6%).

The barriers most often voted as the second choice were the lack of resources to apply EBR (18; 18.2%), the lack of experience in EBR (13; 17.8%) and the lack of a network

Table 2 Awareness of the concept of EBR before and after providing description of the aims of EBR and what these aims mean for the researchers

Answer	Frequency before providing description of EBR, % (n)	Frequency after providing description of EBR, % (n)
Yes	84.4 (173)	63.0 (109)
No	15.6 (32)	22.5 (39)
Partially	0	14.5 (25)
Total N	100 (205)	100 (173)

EBR, evidence-based research.

Table 3 Frequency of implementation of EBR steps as indicated by the respondents

EBR step (item of the questionnaire) (total number of respondents)	Never % (n)	Sometimes % (n)	Usually % (n)	Always % (n)
Q16. You formulate a preliminary research question before you start your research study (N=205)	0.0 (0)	5.9 (12)	28.8 (59)	65.4 (134)
Q17. You search for relevant systematic reviews before you start a research study (N=205)	0.5 (1)	9.3 (19)	27.8 (57)	62.4 (128)
Q18. You assess the quality and scope of the relevant systematic reviews that you found before you start a research study (N=204)	2.5 (5)	18.6 (38)	38.2 (78)	40.7 (83)
Q19. You assess if the relevant systematic reviews that you found before you start a research study are up to date (N=199)	2.0 (4)	10.1 (20)	32.2 (64)	55.8 (111)
Q20. You plan a new systematic review if the quality and/or scope are not adequate before you start your own (N=199)	19.1 (38)	37.7 (75)	28.1 (56)	15.1 (30)
Q21. You search for relevant ongoing studies before you start your own./Q22. You search for relevant primary studies if the currency of the relevant systematic reviews is not adequate before you start your own (+ you select them for inclusion, you critically appraise the selected studies and you summarise the results) (N=205)*	4.4 (9)	19.5 (40)	33.7 (69)	42.4 (87)
Q23. You assess the PICOT (= Population, Intervention, Comparison, Outcome, Time frames), methods and results of the systematic reviews and/or relevant ongoing studies before you start a research study (N=196)	12.8 (25)	21.9 (43)	33.7 (66)	31.6 (62)
Q24. You use the reviews (and/or ongoing studies) to formulate the final research question AND/OR to inform about the design of a new study AND/OR to justify new research in ethical approval and funding applications AND/OR to integrate new findings with prior research findings AND/OR to prepare study report for publication AND/OR to make recommendations for future research before you start a research study (N=196).	1.5 (3)	16.3 (32)	45.9 (90)	36.2 (71)

*Q21 and Q22 were asked as one question; hence, one answer was provided for these two questions.
EBR, evidence-based research.

to apply EBR (13; 13.5%). As the third choice, insufficient research network (12; 12.5%), time constraints and lack of the resources (workforce, technology) to apply EBR (both with 11 votes; 11.1% and 11.8%) were given by the respondents. Further choices (4th–16th) are presented in online supplemental table S4.

DISCUSSION

This exploratory study was conducted to find out how well the concept of EBR is known among European health researchers with substantial clinical research experience, and which barriers affect the use of an EBR approach. Based on the study's findings, it is surprising that more health researchers responded that they knew the concept of EBR before they had read the definition than after reading it. This indicates that the concept is not fully or precisely understood or may even be confused with the EBP concept, which is more widely known, especially in the medical and allied communities. Researchers should ideally understand this concept correctly before conducting a study. A lack of knowledge about EBR leads to unnecessary risks or waste of time and funds.[3–5] At this moment, it seems that many researchers have heard of the concept of EBR but do not know exactly what it entails. EBR may not be considered to be of general importance by organisations and conducting clinical studies may then be given priority. Other barriers that affect the implementation of EBR is the lack of time, the pressure to publish work or the lack of a work network. This shows the importance of a network such as the Evidence Based Research Network (ebrnetwork.org).

Most of our respondents—health researchers—conduct a systematic review before the start of their study if necessary (86%). This is more than expected from previous studies.[14] However, health researchers included in our study conducted the steps from the EBR process differently depending on their background. Physicians and physiotherapists tend to have more experience conducting systematic research than other health researchers. The same professionals have more experience in searching for relevant systematic reviews before conducting a study. This suggests that it is possible that (1) certain health professionals may not realise the importance of consulting or conducting systematic reviews or (2) a lack of individual studies in a specific health field is the reason that systematic reviews have not been systematically conducted and,

Table 4 Barriers to the use of an EBR approach encountered by the respondents

Factors determinants (total=141)	Relative frequency, %* (absolute frequency)
Your organisation does not consider Evidence-based research important	11.35 (16)
Your country does not consider Evidence-based research important	10.34 (15)
Your colleagues consider Evidence-based research a waste of time and/or an unnecessary complication of the work to be done	14.18 (20)
You lack the knowledge about Evidence-based research	4.96 (7)
You lack experience in Evidence-based research	17.02 (24)
You lack a network to apply Evidence-based research (eg, you are part of a small research group, no colleague who can introduce you to the methods…)	21.28 (30)
You cannot decide to apply Evidence-based research as you need to follow others' expectations	9.93 (14)
You feel a publication pressure and therefore you don't apply Evidence-based research	15.60 (22)
You prefer to start your (clinical) research study than to apply Evidence-based research first	9.22 (13)
You are constrained in time and therefore you don't apply Evidence-based research	24.82 (35)
You are not sufficiently proficient in English to read the sources that you need to read to apply Evidence-based research	1.42 (2)
You are not proficient in the (other than English) language in which most of the relevant sources that are available are written in	4.26 (6)
You lack the resources (work force, technology) to apply Evidence-based research	30.50 (43)
You cannot access databases to apply Evidence-based research	14.89 (21)
The quality of the systematic reviews in your field of research is low which prevents you to apply Evidence-based research	15.60 (22)
The quantity of the systematic reviews in your field of research is low which prevents you to apply Evidence-based research	14.89 (21)
Other	3.55 (5)

*The respondents could select multiple answers, therefore, the sum of the percentages exceeds 100.
†For details, see online supplemental table S3.
EBR, evidence-based research.

therefore, cannot be consulted (because they do not exist at all). Despite this, the barrier 'the quality and quantity of the systematic reviews in a specific field of research are low' was not highly ranked. A similar conclusion was drawn by Wieland *et al*[35] for traditional East Asian medicine therapies. In the same vein, Tume *et al*[36] found that the main reason for not conducting a systematic review in nursing sciences is the quality and accessibility of RCTs.

Conducting a systematic review prior to starting a research study leads to better identification of pressing research questions and avoids unnecessary use of research resources and time. Lack of time, however, is a barrier affecting the use of an EBR approach that is ranked (and thus experienced) by nearly all respondents and has been known as a barrier from previous studies, for instance, McLennan *et al*.[18] Conducting a systematic review is a time-consuming endeavour, Khalil *et al*[37 38] pointed out that scoping and mapping reviews are also an option to identify priority research questions. It is important that researchers, who need more time to conduct a systematic review, find other ways to review the existing evidence systematically to start their own study from a reliable overview of existing evidence about the topic of research. Additional methods include conducting rapid and umbrella reviews. Many publications[39–42] explain, either in-depth or briefly, how to conduct each type of review in a systematic and reliable manner.

As proposed by Lund *et al*,[4] consulting or—if the quality of a review is insufficient—conducting a systematic search for evidence is a core component of the EBR concept. Assessing the quality of evidence is a crucial, though often underestimated step in the process. As Murad *et al*[43] suggested, the well-known and widely applied pyramid of evidence is only a rather simplistic version and does not consider a study's internal validity. An RCT can have a high risk of bias but is, despite this increased risk of bias, highly ranked in the pyramid. The same applies to systematic reviews: without quality assessment, their position remains at the top of the pyramid, potentially without having earned it.

The main strength of this exploratory study is that it shows how well researchers are familiar with the concept of EBR and what they identify as the main barriers affecting its implementation. It also reveals how much

Table 5 Ranking of the barriers to implement EBR in individuals familiar with EBR (N=141)*

Barriers (number of respondents who ranked this barrier)	Option not chosen/missing value	First choice		Second choice		Third choice	
	N	N	%	N	%	N	%
You lack the knowledge about Evidence-based research (N=65)	76	15	23.08	6	9.23	5	7.69
You lack a network to apply Evidence-based research (eg, you are part of a small research group, no colleague who can introduce you to the methods) (N=96)	45	14	14.58	13	13.54	12	12.50
Your organisation does not consider Evidence-based research important (N=76)	65	11	14.47	7	9.21	6	7.89
You lack the resources (work force, technology) to apply Evidence-based research (N=99)	42	12	12.12	18	18.18	11	11.11
You are constrained in time and therefore you don't apply Evidence-based research (N=93)	48	11	11.83	12	12.90	11	11.83
Your colleagues consider Evidence-based research a waste of time and/or an unnecessary complication of the work to be done (N=91)	50	10	10.99	7	7.69	10	10.99
You cannot access databases to apply Evidence-based research (N=77)	64	8	10.39	6	7.79	4	5.19
You lack experience in Evidence-based research (N=73)	68	7	9.59	13	17.81	10	13.70
Your country does not consider Evidence-based research important (N=65)	71	6	9.23	5	7.69	4	6.15
The quality of the systematic reviews in your field of research is low which prevents you to apply Evidence-based research (N=71)	70	4	5.63	2	2.82	5	7.04
You feel a publication pressure and therefore you don't apply Evidence-based research (N=80)	61	4	5.00	8	10.00	7	8.75
You prefer to start your (clinical) research study than to apply Evidence-based research first (N=74)	67	3	4.05	5	6.76	7	9.46
The quantity of the systematic reviews in your field of research is low which prevents you to apply Evidence-based research (N=66)	75	2	3.03	4	6.06	5	7.58
You are not sufficiently proficient in English to read the sources that you need to read to apply Evidence-based research (N=38)	103	1	2.63	1	2.63	4	10.53
You cannot decide to apply Evidence-based research as you need to follow others' expectations (N=79)	62	2	2.53	3	3.80	5	6.33
You are not proficient in the (other than English) language in which most of the relevant sources that are available are written in (N=44)	97	0	0.00	0	0.00	3	6.82

First column lists different barriers, and the following columns show how often that barrier was ranked as the first, second, third choice by the participants. The data include both the number and percentage of respondents who chose each barrier in each rank position
*Further choices (4th–16th) are presented in online supplemental table S4.
EBR, evidence-based research.

more must be done. It should be noted, however, that this survey was distributed through a snowball sampling method, meaning that the authors mainly spread it in their network. The authors are all connected to EBR or systematic literature methodology (through the Grading of Recommendations Assessment, Development and Evaluation network, Cochrane network or others), which means that it is likely that many of the respondents are as well. This may explain why the percentage of the respondents conducting a systematic review prior to the start of their study is higher than expected, based on findings from a previous study.[19] The results of the survey show

where more work needs to be done in order to increase the knowledge and implementation of EBR, such as raising awareness at the level of journal editors before accepting publications.

The main limitations of the presented paper are its recruitment method (snowball sampling technique) and sample size, which prevent the results from being generalised. A convenience sample was used by the available channels of communication, which were mainly institutional. Health researchers, on the other hand, mainly work in institutions, so in that perspective, the sample is a representation of the investigated population but is rather not representative sample of the European health researchers. According to our power calculation, the sample size should have been 271. In total, 530 respondents opened the questionnaire, although most of them did not complete it. A total of 205 questionnaires filled out by respondents from all over the WHO European Region were included. Most respondents came from a small number of countries, including Finland, Belgium and Portugal, where the EBR standards are relatively high and well-embedded in research. The gathered data did not present a random sample from each of the European countries. The incoming data were analysed as such despite the overall lower sample size. The results obtained must, therefore, be used with caution and reflecting on the fact that they reflect, in a non-homogeneous way, different countries and practices related to national work cultures.

The survey included one question ('How many years of experience in the research do you have?') that was not shown to the respondents due to the logical setting error, and therefore, we have no data collected for that question. Despite this loss of data, analysis of the remaining questions was possible and conducted and proved valuable in understanding the study question. A final limitation was observed in the last question, where respondents ranked 10 out of 16 listed barriers affecting the use of an EBR approach. Not all factors were visible on one screen, which made the respondents rank the factors last in the list less frequently than the others. Of the first nine factors in the list, between 94% and 99.5%, factors were ranked. Of the remaining seven factors, only between 16.6% and 9.8% were classified, with many of them not ranked at all. We have consequently concluded that it would have been easier for the respondents to either display the factors in a random order differently for each respondent so that they did not start ranking the first nine ones, or to ask the respondents to rank the factors on a Likert scale (ranking between totally agree and totally disagree).

Another limitation is that the authors could not check if respondents were familiar with specific concepts, such as the different types of reviews even though they indicated so. Some researchers do not differentiate between different types of reviews. Also, two questions ('do you have experience with' and 'are you familiar with') were open to various interpretations (for instance, 'Are you familiar with literature reviews' could have raised the impression that knowing that literature reviews exist is sufficient to answer 'yes') and should have been formulated more specifically. This explorative study, despite its limitations, offers concrete working points for the EBR Network (ebrnetwork.org), consisting of the researchers who participated in EVBRES and others, as well as and other scholars who take interest in EBR. In the future, there should be a focus on the increase of the knowledge of EBR in more detail, and on lowering the barriers to implement EBR. It is essential to provide open-access, module-sized information about the concept of EBR and its steps, including the critical step of assessing the quality of evidence and conducting reviews of the literature in a systematic way.

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