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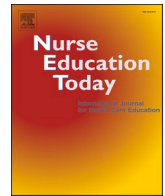
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Review

Challenges and possible solutions for accessing scholarly literature among medical and nursing professionals and students in low-and-middle income countries: A systematic review

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ABSTRACT

Background: Access to high quality research literature is essential for educating nursing and healthcare students to promote evidence-based practice. Within Low- and Middle-Income countries (LMICs) access is limited due to financial and structural constraints within countries and institutions. Reduced access to research literature limits the achievement of the Sustainable Development Goals through its impact on the education of healthcare staff and on the development of contextually appropriate evidence for practice.

Objective: To identify the challenges and possible solutions for accessing scholarly literature among medical and nursing professionals and students in low-and-middle income countries.

Design: Systematic review.

Data sources: Searches were conducted in MEDLINE, CINAHL PLUS, ERIC, ASSIA, EMBASE, and Google Scholar.

Review methods: Five bibliography databases were searched using relevant search terms, from January 2002 to July 2022. Additional searches were carried out in Google Scholar. Titles, abstracts, and full texts were independently screened by at least two authors, based on predefined eligibility criteria. Pertinent data were extracted from included studies, and critical appraisal was undertaken. Data were analysed and presented in a narrative approach.

Results: Five papers met the inclusion criteria and were included. Three aspects of challenges at different levels emerged: infrastructure and institutional level factors, individual factors, and lack of contextually appropriate evidence. Three solutions were identified: capacity development opportunities, improving Internet access, and increasing awareness of free resources.

Conclusion: This review provides an overview of common barriers medical and nursing professionals and students encounter whilst accessing scholarly literature in LMICs and identifies some possible solutions to address them. The findings can be used to guide institutions, as well as national and international decision makers to elicit policy which can promote the uptake of research in LMICs. Further research should focus on how these solutions could be harnessed to address the problems identified in this review.

1. Introduction

Accessibility to scholarly or scientific literature (in this paper we use scholarly literature to represent journal publications and academic books) is vital to healthcare professionals and the training of medical and nursing students because of the emphasis on evidence-based practice (EBP). Evidence-based practice is particularly important in the

development of high-quality healthcare to meet the United Nations' sustainable development goals (UN, 2015). However, much of the evidence currently available is generated in high-income countries in the northern hemisphere, where the socio-cultural, political, and economic context of healthcare differs considerably from that in which healthcare in Low- and Middle- Income Countries (LMICs) occurs. The development of culturally appropriate evidence is therefore essential (Fosci et al.,

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2019b), and access to current scholarship is key to the development and publication of this evidence (Beveridge et al., 2003). The focus of this paper emanated from discussions between the authors, who are based in the UK and in Ghana, on the challenges of accessing evidence for teaching healthcare students in Ghana.

Evidence-based practice involves the utilisation of best research evidence to inform clinical practice to promote the quality of healthcare and improve patient outcomes (Melnyk et al., 2010; Harvey and Kitson, 2015). To foster a culture of EBP, both medical and nursing professionals and trainees require access to timely, relevant, and high-quality scholarly information. For example, a recent scoping review that examined the factors that affect the implementation of evidence-based nursing in China identified limited access to up-to-date and high-quality scholarly resources as a significant issue that hindered the implementation of EBP (Cheng et al., 2017). Although access to scientific literature can improve the utilisation of EBP, it is challenging for many institutions in LMICs to access scientific evidence partly because of the limited financial resources they often operate with; inability to pay journal subscription fees; lack of access to free databases; and inadequate skills (Annan, 2004; Singh et al., 2011; Paci et al., 2021). For instance, the fee-based subscription publishing model, which makes scientific literature available to individuals and institutions who have the monetary ability to pay is often out of reach for many readers and institutions in LMICs (Heller et al., 2013).

One avenue to overcome the challenges with the fee-based subscription publishing model and make scholarly literature widely available to institutions in LMICs is through the Health InterNetwork Access to Research Initiative (HINARI, <https://partnership.who.int/hinari>). HINARI was created through a partnership by the World Health Organisation (WHO) with publishing organisations to improve online access (by making them free or subsidised) to scientific resources for health professionals, clinical researchers, and academics in developing countries (Aronson, 2004). A study that examined HINARI usage patterns and trends in Nigerian Universities between 2010 and 2014 found that although its usage was encouraging, it declined sharply in 2014 (Ajuwon and Titiloye, 2016). To date, evidence around HINARI usage within and across countries is limited to a large extent.

Another effort to improve access to scholarly literature in recent years is through open-access publication. Open-access publishing removes monetary and legal restrictions and makes scholarly literature widely available to readers via the internet (Heller et al., 2013). Open-access ensures the findings of research are readily available to many and can promote the scientific impact of research in a timely manner.

With the growing popularity of open access publishing, coupled with initiatives such as HINARI, and the widespread use of the internet throughout LMICs, it is expected that access to scholarly literature would have improved. However, it appears this is not the case because there is limited evidence regarding the access and utilisation of scholarly literature in LMICs.

In this current work, we undertake a systematic review to examine the current evidence around challenges and experiences of accessing scholarly literature among medical and nursing professionals and students in LMICs. The review questions are as follows:

1. What are the challenges that medical and nursing professionals and students face in accessing scholarly literature in LMICs?
2. What are the facilitators or innovations being employed to improve access to scholarly literature in LMICs from the perspectives of medical and nursing professionals and students?

2. Methods

The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement (Page et al., 2021).

2.1. Search and screening

The adapted Population, Phenomenon of Interest, Context (PICO) framework was employed to develop the search strategy (Stern et al., 2014). Keywords were searched and combined with “AND” in five databases: MEDLINE, CINAHL PLUS, ERIC, ASSIA, and EMBASE (Table 1). A bibliography of included papers was screened to identify more eligible papers.

We conducted the search in July 2022. The search was limited to papers published from 2002 onwards to account for the widespread availability of internet access in LMICs, and we did not set any restrictions on study types. Covidence was used to manage search results. Three researchers (MZ, LD, RS) screened titles, abstracts, and full texts of articles independently. Papers that did not meet the inclusion criteria were excluded. Any disagreements were resolved through group discussion meetings.

The inclusion and exclusion criteria, which guided the screening process are shown in Table 2.

2.2. Critical appraisal

The Joanna Briggs Institute (JBI) critical appraisal tools and Quality assessment with diverse studies (QuADS) checklist were used to assess the quality of included studies (Porritt et al., 2014). Appropriate checklists were used based on study designs. QuADS checklist was applied to appraise the mixed method study (Harrison et al., 2021). Quality appraisal was conducted by one reviewer (MZ) and another reviewer (RS) double-checked this for accuracy.

2.3. Data extraction and analysis

The data extraction form was designed by three reviewers (MZ, LD, RS) in advance and subsequently piloted with one of the included papers. Relevant data were extracted from included studies (Table 3). A narrative approach was employed to synthesise data (Earthy and Cronin, 2008).

3. Results

3.1. Search outcomes

The initial database search identified a total of 3326 papers. After removing duplicates, 2679 papers were left for titles and abstracts screening. After applying the inclusion and exclusion criteria (Table 2) during titles and abstracts screening, 2634 papers were excluded, leaving 45 papers to be screened for eligibility. After reading the full texts of the 45 papers against the inclusion and exclusion criteria, only four papers met the inclusion criteria. Additional search in Google scholar resulted in one additional paper. In total, we included five papers in this review (Fig. 1).

Table 1
Search terms.

Population (P)	academ* OR profession* OR professor* OR lectur* OR teach* OR trainer* OR healthcare educat* OR practice* nurse* OR practice* doctor* OR healthcare staff OR student* OR learn* OR trainee*
Phenomenon of Interest (I)	resourc* OR access to resourc* OR evidenc* OR access to evidenc*
Context (Co)	“developing countr*” OR “developing nation*” OR “low middle income countr*” OR LMIC OR “poor countr*” OR HINARI OR Africa OR Southeast Asia OR China OR India
Outcome	knowledge OR challenge* OR barrier* OR facilitator* OR solution* OR innovat*

Table 2
Inclusion and exclusion criteria.

	Inclusion criteria	Exclusion criteria
Population (P)	Nursing or medical clinicians or academics or healthcare students	Patients or nonmedical or non-nursing students
Phenomenon of Interest (I)	Access to academic resources/evidence (academic papers, textbooks)	Resources that are not academic papers or textbooks
Context (Co)	Low- and middle-income countries	High-income countries
Outcome (O)	Challenges OR barriers OR facilitators OR solutions OR innovations to access resources	Not challenges OR barriers OR facilitators OR solutions OR innovations to access resources
Study type	Primary studies	Reviews
Year	2002 Jan-2022 July	Before 2002

3.2. Overview of included studies

The quality of included studies was mixed, with three rated high quality, and two rated medium quality. Three studies were appraised using JBI critical appraisal tool (Gifford et al., 2018; Young et al., 2016;

Lam et al., 2004), and the other two studies were appraised using the QuADS checklist (Baro et al., 2011; Smith et al., 2007), which was designed specifically for mixed-methods studies (Harrison et al., 2021). The included studies were published from 2004 to 2018 and undertaken across various countries (Table 3). Two were from China, one was from South Africa and another from Nigeria. The remaining one was an international study involving five African countries which were Cameroon, Nigeria, Tanzania, Uganda, and Gambia.

The settings where studies were conducted were hospital (Gifford et al., 2018), university (Young et al., 2016; Lam et al., 2004; Baro et al., 2011), and a combination of hospital and a research institution (Smith et al., 2007). Among the two conducted in hospitals, nurses and doctors were involved. In the three conducted in universities, two targeted undergraduate students (Lam et al., 2004, Baro et al., 2011), and one targeted undergraduate educators (Young et al., 2016).

3.3. Characteristics of included studies

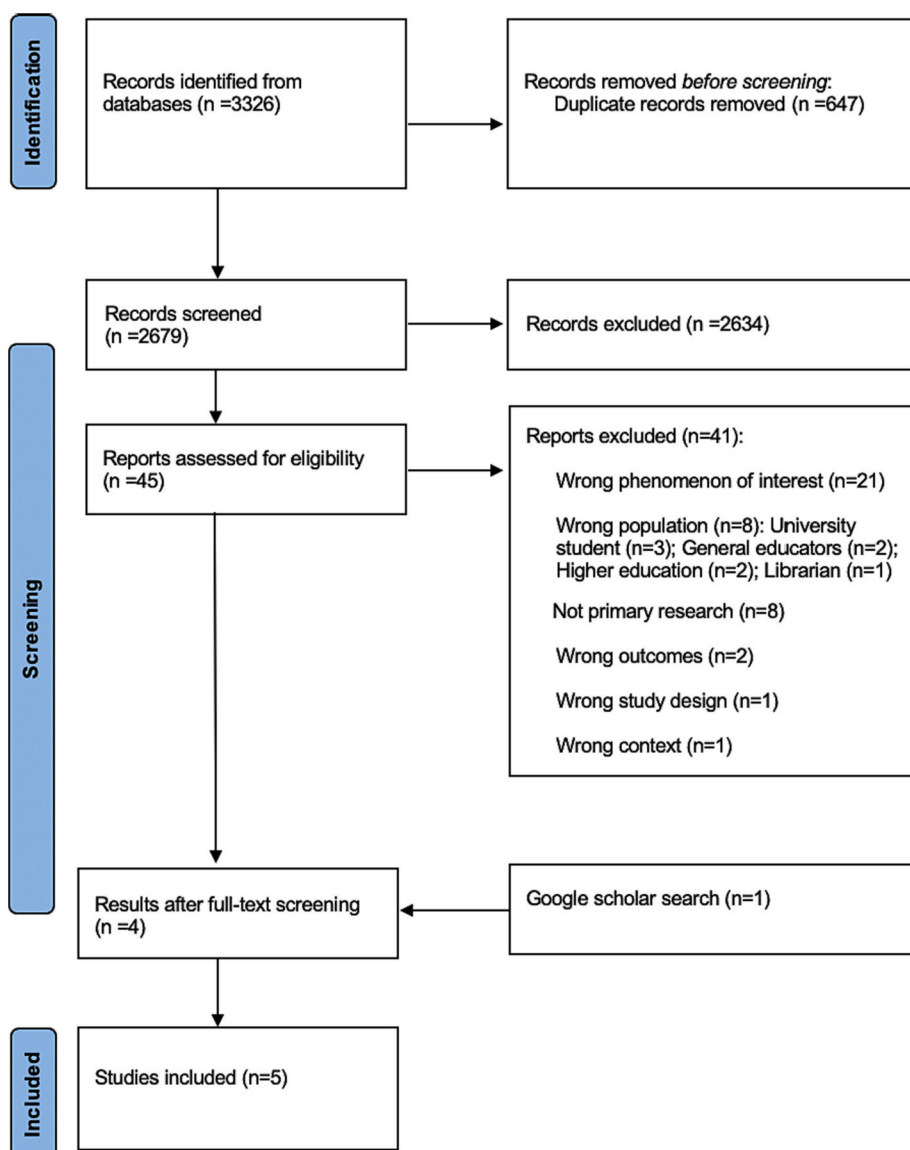


Fig. 1. PRISMA flowchart.

Table 3
Characteristics of included studies.

Study details	Country	Context	Design	Population	Aims	Challenges/barriers	Facilitators/Innovations/Solutions	Impacts on education/clinical practice	Quality
Gifford et al. (2018)	China	Hospital	A descriptive qualitative design	Staff nurses, head nurses, directors ($N = 13$)	Aim: To explore barriers and facilitators to evidence-based practice (EBP) in Hunan province.	<ol style="list-style-type: none"> 1. The lack of readable and understandable evidence because of language 2. The lack of knowledge and skills about finding, accessing, and appraising research evidence 3. The lack of training to learn how to do research 4. Sources of knowledge: colleagues (peers, head nurses, and doctors), educational seminars and conferences, original nursing education, social media applications (apps) and the internet web service "Baidu." WeChat, a mobile text and voice messaging service developed in China 	N/A	Professional education on skills of searching for evidence should be given to Chinese nurses and nursing students	High
Young et al. (2016)	South Africa	University	A cross-sectional survey	Undergraduate educators ($N = 42$)	Aim: To assess educators' confidence to practice and teach Evidence-based healthcare (EBHC), their attitude to EBHC, and barriers to practicing and teaching EBHC.	<ol style="list-style-type: none"> 1. Searching for evidence is too time-consuming, and most educators believed that their questions could be addressed by referring to a textbook or consultant 2. Limited access to the Internet and resources 3. Lack of knowledge and skills 	<ol style="list-style-type: none"> 1. Capacity development opportunities to enhance the ability to search literature 2. Improving departmental Internet access and exploring WIFI access to help access databases and resources 	Barriers to teaching EBHC were centred around lack of time, lack of support, and lack of evidence in some clinical areas and the need for more training in teaching EBHC.	High
Lam et al. (2004)	China (Hong Kong)	University	A longitudinal focus group-based qualitative study	Year 4 medical undergraduates ($N = 39$)	Aim: To identify and explore common barriers to the adoption of evidence-based medicine (EBM) practice in the undergraduate setting.	<ol style="list-style-type: none"> 1. Lack of time: Looking for evidence to answer clinical questions if too time-consuming. Rather than search for research evidence, students felt they preferred to approach their teachers directly with questions 2. Lack of incentive to look for research evidence because medical school progress and assessment are primarily based on textbook knowledge, not EBM. 3. Using InfoRetriever software to access evidence often had limited evidence that students needed and took too much time to search 4. Lack of local evidence 	N/A	Strategies to help promote EBM: <ol style="list-style-type: none"> 1. Encouraging faculty members to act as role models in practicing EBM 2. Introducing EBM-based assessments 3. Developing localized medical evidence databases to enhance accessibility and applicability 	High
Baro et al. (2011)	Nigeria	University	A descriptive survey and interview study	Undergraduate students ($N = 135$)	To investigate whether undergraduate students are information literate, and to determine whether they are aware of and use different information resources including electronic ones, and to assess their ability to evaluate information before use.	<ol style="list-style-type: none"> 1. Lacked searching skills or lacked awareness of some information resources in the library: They have difficulty in using the medical library to locate information resources (57 %) 2. Lack of funds for the libraries to subscribe to foreign medical journals: They have difficulty accessing foreign medical journals through the Internet (50.4 %) 	<ol style="list-style-type: none"> 1. Librarians at the medical library to educate students on how to use the information resources 2. Librarians and faculty collaborate to teach how to search the Internet effectively, such as medical databases provided 	This paper may help inform discussion about students' competencies for locating, selecting, evaluating, and using information essential for lifelong learning.	Medium

(continued on next page)

Table 3 (continued)

Study details	Country	Context	Design	Population	Aims	Challenges/barriers	Facilitators/Innovations/Solutions	Impacts on education/clinical practice	Quality
Smith et al. (2007)	Five African countries: Cameroon, Nigeria, Tanzania, Uganda, Gambia	Four hospitals and one external-funded research institution	A descriptive study using survey and interviews	Postgraduate doctors and research scientists (N = 333)	Aim: To describe awareness, reported use and factors influencing use of online medical literature via free access initiatives.	<p>3. They are not aware of and do not use electronic databases to retrieve information to meet their information needs (74.8 %)</p> <p>4. They experienced difficulty in locating good citable information materials from the Internet (51.1 %)</p> <p>5. Lack of time and money</p> <p>1. Lacked free access to "full-text"</p> <p>2. Difficulties logging in to websites that require a password, including HINARI</p> <p>3. Problems with hardware, Internet connections and computing facilities, such as electricity interruptions, Internet connections, and inadequate computing facilities</p>	<p>1. Institutions to inform information about the websites it is subscribed to, and raise awareness about the free online resources available to them</p> <p>2. Provision of passwords could be better managed and teaching hospitals could do more to publicise the various electronic resources available to students and staff</p>	Internet use is common, but awareness of free-access initiatives is limited. HINARI and other initiatives could be more effective with strong institutional endorsement and management to promote and ensure access.	Medium

3.4. Description of phenomenon of interest

The phenomenon of interest varied in different studies. One explored barriers and facilitators to EBP (Gifford et al., 2018). One assessed attitude and confidence to practice and teach Evidence-based healthcare (EBHC) (Young et al., 2016). One identified and explored common barriers to the adoption of EBM (Lam et al., 2004). One investigated undergraduates' information literacy and determined whether they were aware of and used different information resources and assessed their ability to evaluate information before use (Baro et al., 2011). One described awareness, reported use, and factors influencing the use of online medical literature via free access initiatives (Smith et al., 2007). In order to synthesise the studies in a narrative fashion, we organised the reported findings (data) of included studies in a table (see Table 3) by grouping them into categories - challenges (or barriers), and possible solutions (or facilitators or innovations). We interrogated the data to examine the similarities and differences within and across included studies in relation to challenges and possible solutions for accessing resources. As we interrogated the data, sub-categories were identified within the main categories. Where possible, appropriate segments of text from the source papers were used as illustrative quotes to reflect or provide further detail of the account of each category or sub-category.

3.5. Challenges or barriers to accessing resources

3.5.1. Infrastructure and institutional factors

Three studies mentioned external barriers to accessing evidence (Baro et al., 2011; Young et al., 2016; Smith et al., 2007), such as the Internet, funding, and the specific system issue.

The lack of widely available and reliable Internet access and Wifi was one of the barriers to accessing resources (Young et al., 2016). In Smith et al. (2007), nearly all participants mentioned poor internet connections and computing facilities, which was an obstacle to accessing online information.

"There are also cases where logging in to some databases like HINARI takes long, after waiting for so long you get a message that the connection has failed" (Smith et al., 2007, p.5).

The lack of "free full texts" was also a barrier mentioned. In Smith et al. (2007), one participant reported disappointment when using PubMed because only abstracts were displayed and full texts were charged. Participants complained that they rarely had access to free full texts, even within the so-called free initiative, HINARI.

"HINARI has a common password for this institution, but users are discouraged because they say at times some cost must be incurred if full text is requested" (Smith et al., 2007, p.4).

High-subscription-fees to get articles from priced journals, such as Cochrane Library, was also reported in this study. A similar situation was found in the study conducted in Nigeria where libraries lacked the money to subscribe to foreign journals, which meant that most students struggled to get access to foreign literature (Baro et al., 2011).

There was also a specific system issue when accessing free evidence. For example, HINARI requires a common password to log in to the website. This password is accessed from the librarian in the institution. However, some users stated that they preferred for databases that do not require a username and password, such as PubMed, rather than databases like HINARI, which they were sometimes not able to access because they needed to meet librarians to get the password. Moreover, on the librarian side, as a gatekeeper of passwords, they thought an institutional password was not convenient for users. Several post-graduate doctors thought it would be easier if passwords were just required outside of university boundaries (Smith et al., 2007).

3.5.2. Individual level factors

Four studies mentioned individual level factors that hindered access to resources (Lam et al., 2004; Baro et al., 2011; Young et al., 2016; Gifford et al., 2018). The factors were lack of time, lack of knowledge

and skills, lack of incentives, and lack of awareness to use scholarly resources.

In Young et al. (2016), more than 50 % of participants, who were undergraduate educators, thought searching for literature was too time-consuming, and they preferred to get answers from textbooks or consultants. This barrier was also mentioned by Lam et al. (2004). Undergraduate medical students preferred to ask their teachers for answers to clinical questions, rather than searching for literature because it was time-consuming. Although they recognised the usefulness of personal digital assistant (PDA), which increased their intention to search for clinical evidence, they found it often took five to ten minutes to locate the evidence they sought with the PDA or the InfoRetriever software. Students became reluctant to spend additional time exploring the software and the evidence they needed when they encountered delays in searching for evidence (Lam et al., 2004).

Not being capable to conduct a search or understand evidence was also a barrier. In Gifford et al. (2018), Chinese clinical nurses were not able to find and understand research evidence because of the lack of knowledge and skills. Although tertiary hospitals sometimes provided training, most attendees were head nurses (Gifford et al., 2018). Baro et al. (2011) also found that undergraduate students did not use electronic resources because they thought they lacked the skills necessary to understand and use the resources. Furthermore, 57 % of participants found it difficult to use the library to locate information resources.

Lacking motivation can hinder students to search for evidence themselves. Lam et al. (2004) found that undergraduate medical students lacked the motivation to search for literature because of the specific learning environment in Hong Kong. Students were seldom asked to provide evidence to support their clinical decisions. Furthermore, they felt that they were expected to approach their teachers directly with clinical questions because it was a more efficient use of time. The top priority of students was to pass medical school progress, which was primarily based on textbook knowledge. Therefore, there was a lack of incentive to search for research evidence.

Lacking awareness of where to search for resources was another barrier to accessing evidence. In Baro et al. (2011), 74.8 % of participants were not aware that they could use digital databases, such as MEDLINE and HINARI, to retrieve the information they needed. Gifford et al. (2018) found that nurses' primary knowledge source was not a formal academic search. Instead, they relied more on peers, educational seminars, their original education, or social media applications.

3.5.3. Lack of contextually appropriate evidence

Two studies mentioned the lack of readable evidence (Gifford et al., 2018; Lam et al., 2004). In Gifford et al. (2018), Chinese nurses could not read research journal articles because they were not published in Chinese, therefore, there was a lack of readable and understandable academic evidence. Additionally, the nurses did not believe that research evidence was applicable to their setting because the research were not conducted in China. Similarly, In Lam et al. (2004), most evidence contained in the InfoRetriever, the software used by medical students, was based on the studies conducted in other contexts so they were not easily applicable to Hong Kong.

"The majority of strong evidence, such as evidence from meta-analysis, often does not contain any data collected in Hong Kong. Most of the studies are either conducted in Europe or North America. It might not be applicable to Hong Kong. Therefore, it is questionable to practice based on best evidence" (Lam et al., 2004, p.994, Table 3).

3.6. Possible solutions, facilitators or innovations to accessing resources

Facilitators to accessing scholarly resources were rarely addressed or discussed in the papers included in this review. However, there was some indication of facilitators identified in a few.

3.6.1. Capacity development opportunities

Two papers (Baro et al., 2011; Young et al., 2016) highlighted that building capacity among medical and nursing educators and students could be a possible solution to addressing challenges with accessing scholarly literature. Given the challenge of lack of capacity to interpret and understand scholarly literature, including knowledge of biostatistics, searching skills, how to read papers, educators proposed that capacity development training could be a solution (Young et al., 2016). It was also reiterated that that librarians have a responsibility to educate medical students on how to use the information resources appropriately (Young et al., 2016). In Young et al. (2016), some students also suggested that teaching faculty and librarians could collaborate to teach students how to use the library and digital library to search for literature effectively, or librarians could teach them how to use medical databases provided, such as MEDLINE and HINARI.

"I am computer literate, what I need is the advanced searching skills to enable me use these electronic resources they are talking about" (Baro et al., 2011, p.117).

3.6.2. Improved access to the Internet

A couple of studies reported that reliability of, and access to, internet connection was a barrier to accessing scholarly literature and therefore institutions investing in improving internet connection could overcome this challenge (Smith et al., 2007; Young et al., 2016).

"Pdf format is preferable to HTML in places where connectivity is good. It is better for one to at least access full text if connectivity is slow and this is only possible for HTML format, but if connectivity is fine then one can go for pdf format" (Smith et al., 2007, p.5).

Educators called for faculty development to create an enabling departmental environment in which they could have reliable and widely available internet access and WIFI, to access relevant scholarly literature (Young et al., 2016).

3.6.3. Raised awareness of free resources

One of the included papers argued that inability to use the scholarly literature could be as a result of lack of awareness of some information resources (Baro et al., 2011). In Smith et al. (2007), some postgraduate doctors thought that it was the responsibility of institutions to provide information about the websites or resources that they have subscribed to, as well as raising awareness of these resources, especially those free online resources.

4. Discussion

4.1. Principal finding

To the best of our knowledge, this is the first systematic review that provides an up-to-date synthesis of the current evidence identifying barriers and facilitators to accessing scholarly literature among medical and nursing professionals and students in LMICs. Five studies were included in this LMICs-focused review, three of the included studies were conducted in Africa while the other two were conducted in China (including one conducted in Hong Kong special administrative region).

This review identified three aspects of challenges: namely infrastructural and institutional factors, individual level factors, and the lack of locally appropriate evidence. On the infrastructural and institutional level, poor access to the internet, insufficient funding, and password-required log-in process, were identified. On the individual level, lack of time, lack of knowledge and skills, lack of incentives, and lack of awareness of databases of scholarly resources, were barriers to accessing literature. Lastly, language barrier and lack of context-applicable evidence were also identified as challenges of accessing evidence. Regarding facilitators, providing capacity development opportunities, improving access to, and reliability of, the internet, and raising awareness of free resources were mentioned despite included studies not providing a deep exploration of these factors.

4.2. Comparison with existing literature

At the individual level, factors such as lack of time, lack of incentives, lack of knowledge and skills, and lack of awareness to use professional resources were reported as barriers (Lam et al., 2004; Baro et al., 2011; Young et al., 2016; Gifford et al., 2018). The findings corroborate other studies which reported similar barriers to implementing EBP among nurses (Brown et al., 2009; Cheng et al., 2017; Wang et al., 2013) and studies which identified barriers to research production (Ogundahunsi et al., 2015; Trotter and Kell, 2014). Cheng et al. (2017) identified several barriers to implementing EBP in mainland China, which included heavy workload, lack of an effective way to translate evidence, insufficient knowledge, skills, and motivation among nurses. Contrasted with the attractive working environment, higher wages, advanced technologies and economy, more stable social and political context, and better quality of life in high-income countries, healthcare personnel and academic staff in LMICs still lack incentives and time to conduct research because of the heavy teaching, administrative and consultancy workloads (Beaudry and Mouton, 2018). Prioritising teaching over research is a common phenomenon among university leaders (Fosci et al., 2019b), which explains the finding that medical students lacked incentives to search for evidence (Lam et al., 2004).

Given that insufficient knowledge and skills in searching for evidence is another barrier to accessing scholarly literature, there is an urgent need to intensify efforts to train healthcare professionals and students in information literacy which can improve their level of knowledge and confidence in information searching. For instance, in Ghana, undergraduate students are required to take a compulsory course in information literacy (Ozor and Toner, 2022). However, Fosci et al. (2019a) still reported a lack of human resource capable of conducting research as one of the major challenges confronting Ghana despite efforts to increase the number of researchers with PhD level education.

Furthermore, the lack of sustainable funding to promote research in LMICs, including poor infrastructure and resources, are the infrastructure and institutional level barriers to accessing scholarly literature (Ghaffar et al., 2008; Van Vught, 2008). LMICs still face the challenge of limited research funding opportunities by governments partly because of the weak demand for research output to inform various policies which means governments in LMICs have not fully recognised the importance of research, and the poor alignment of research with government's needs and priorities. In Ghana, for instance, since the government has not established a dedicated funding scheme for research in the country, universities rely on the Ministry of Education to fund research, and research institutes rely on the funding from the Ministry of Environment, Science, Technology and Innovation. Overall, the country relies heavily on international donors to sustain the research system (Fosci et al., 2019a).

Although the recognition that the sustainable social and economic development in LMICs relies heavily on higher education, lack of resources, including adequately trained researchers, and long-term neglect of research resulting from weak linkages between government and institutions, still impede research in LMICs. The lack of human resources, such as capable researchers, is one of the barriers to producing research output in Ghana (Fosci et al., 2019a). Although the country has put efforts to increase the number of researchers with PhD level qualification, PhD quality is compromised because of the low-quality training provided by underqualified lecturers (Fosci et al., 2019a).

Linkages between higher education, research, and government are often not developed into innovation systems in LMICs, which causes the inability to work with the research output and find research priorities on the government side (Franzen et al., 2017; Mgone et al., 2010; Adam et al., 2011).

The findings of this review indicate that boosted internet access, increased research skill training, and decreased workload among health workers may facilitate engagement with research, including accessing scholarly literature. However, these actions might not align with

government's priorities which was identified as a barrier to progressing research productivity in LMICs (Fosci et al., 2019b).

Internationalisation can help to address the resource challenges that inhibit research production (Jowi et al., 2013). Partnerships for knowledge and development within African universities and bilateral Africa-Europe collaborations in science have expanded significantly in recent years (Radwan and Sakr, 2018). However, the lack of South-South collaborations which means developing countries collaborate to strengthen their voice in global politics, economic affairs, and within African higher education, contributes to gaps in the research agenda in LMICs. This results in a lack of locally undertaken research and the lack of contextualised evidence, which still impedes internationalisation (Nwaka et al., 2010). Furthermore, due to the "brain drain" phenomenon (Docquier and Rapoport, 2012), LMICs struggle to train and retain capable researchers to address local health issues, which results in the dependence on high-income countries for solutions to local health problems and the inability to tackle local contextualised problems (Reidpath and Allotey, 2019), although it is recognised that locally undertaken health research is needed to meet global health needs (Franzen et al., 2017).

4.3. Implications for practice and future research

Given the growing importance of EBP for nursing and healthcare practitioners, and the need to support research within LMICs to create a contextually appropriate evidence base, it is vital to identify barriers or challenges researchers may encounter during accessing research literature and to clarify how to solve these problems. Hence, several recommendations are provided based on the findings of this review.

First, further research to explore facilitators or solutions to accessing scholarly literature in LMICs is urgently needed. In particular, this should explore barriers and solutions to accessing open access resources. Second, to bring in meaningful international collaboration on research for the development of contextually appropriate evidence, sustainable funding, both internal and external, are required. Third, in some cases, research institutions develop their research plans which are not harmonised with the government's development strategy. Therefore, linkages between research organisations and governments should be enhanced. Lastly, adequate time and training for nursing and healthcare practitioners are required to guarantee their motivation to search for literature and the development of searching skills, which are the prerequisite of normal uptake of research.

4.4. Strengths and limitations

The robust way that literature searching, screening, study selection, data extraction, and analysis were undertaken is a strength of this review. PRISMA was followed to improve reporting of this review. However, there were several limitations. First, only published peer-reviewed scientific studies published in English were included meaning grey literature on this topic or papers which are not published in English might have been missed. Second, some included papers did not discuss accessing scholarly literature specifically, but talked about EBP, which means they did not focus on barriers or facilitators explicitly and extensively.

5. Conclusion

This review provides an overview of common barriers medical and nursing professionals and students encounter whilst accessing scholarly literature in LMICs and identifies some possible solutions to address them. The findings can be used to guide institutions, as well as national and international decision makers to elicit policy which can promote the uptake of research in LMICs. Further research should focus on how these solutions could be harnessed to address the problems identified in this review.

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CRedit authorship contribution statement

RS, LD, JA and HKA conceptualised and developed the project. MZ took the lead on developing the initial drafts. All authors contributed to shaping the final drafts. All authors read and agreed on the final version.

Declaration of competing interest

The authors declare no conflicts of interest.

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