TANZANIA MEDICAL JOURNAL
Chamvanga et al. TMJ V 36 No. 1. May 2025

Original Research Open Access

The Use of Up-to-date Database by Healthcare Practitioners in Supporting Clinical Decision-Making at The Muhimbili University of Health and Allied Sciences, Tanzania

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Abstract

Background

Healthcare practitioners encounter massive medical information online, which complicates clinical decision-making. UpToDate, launched in 1992 at Harvard Medical School, functions as a Clinical Decision Support System (CDSS) in high-income countries to enhance healthcare delivery. Despite the initiatives undertaken by Better Evidence to support access to the database, there was limited information available regarding the usage of the database by healthcare practitioners at Muhimbili University of Health and Allied Sciences (MUHAS).

Broad Objective

The general objective was to evaluate the utilization of the UpToDate database by healthcare practitioners at MUHAS in support of clinical decision-making. Specifically, the study assessed the level of awareness, examined knowledge and skills, and identified the challenges associated with using the UpToDate database in clinical decision-making.

Methods

The study employed a descriptive research design, utilizing both quantitative and qualitative approaches. MUHAS was an area of study, with a sample size of 199, including postgraduate students, five academicians, and five librarians. Convenience and purposive sampling techniques were applied in selecting respondents. Data from the study were collected through questionnaires and interview methods. SPSS was used to analyze quantitative data, and qualitative data were analysed through thematic analysis.

Results

The findings revealed moderate awareness of the UpToDate database. Due to inadequate training, the majority had insufficient knowledge and skills in using the database. As a result, they used a simple search to retrieve information from the database. Additionally, postgraduate students faced challenges including insufficient guidance, inadequate knowledge, a cumbersome registration process, poor search skills, poor internet quality, resource allocation issues, and insufficient time for use.

Conclusions and recommendations

The UpToDate Database is crucial for accessing clinical information; however, it was underutilized by postgraduate students. Therefore, librarians should find effective ways to communicate with healthcare practitioners to acquire the necessary skills and knowledge to provide accurate medical services. The institution should prioritize the UpToDate database to simplify access to medical expertise, thereby improving patient outcomes and institutional performance.

Keywords: *UpToDate database, Healthcare practitioners, Clinical decisions, Clinical decision-making, UpToDate usage.*

Introduction

Healthcare practitioners are faced with a massive amount of information from the medical literature and the internet when searching for information to make clinical decisions. The UpToDate database was founded at Harvard Medical School in 1992 and used as a Computer Clinical Decision Support System (CDSS) in high-income countries (1). The system was used for patient assessments or recommendations and then presented to the clinician for a decision (2). It was intended to improve healthcare service delivery by enhancing medical decisions with targeted clinical knowledge, patient information, and other health information.

The introduction of the UpToDate database in Africa to support healthcare practitioners in making clinical decisions was supported by Better Evidence, a group at Ariadne Labs, a joint centre for health systems innovations at Harvard School of Public Health. It facilitates access to evidence-based clinical resources for health providers. Better Evidence offers donated institutional licenses to African medical schools as part of its training program, allowing users to access the UpToDate database within their institutions. With an institutional license, users can access UpToDate (www.uptodate.com) on the institutional local area network (LAN) and register for an individual account, which will enable them to access UpToDate outside the LAN and download content.

The development of science and technology has enabled the UpToDate database to be utilised in web applications or integrated with electronic health records (EHRs) and computerised provider systems, allowing it to be accessed through desktops, tablets, and smartphones. This has enabled the database to foster confidence and provide clarity in decision-making regarding patient treatment, answer questions quickly, enhance clinical knowledge, improve patient care diagnosis, and facilitate the development of new treatments and disease prevention strategies. The government of Tanzania, through ICT policy, has allowed the use of computers in every activity for development, thus encouraging the use of electronic systems for local consumption, especially for public service delivery, education, commerce, and other service sectors, including health (3).

In 2016, the Global Health Delivery Project at Harvard School of Medicine signed a memorandum of understanding with the Universities of Rwanda and Muhimbili to provide information via UpToDate through subscriptions (4). The Better Evidence renewed its partnership with MUHAS in May 2023 for a year’s agreement in raising awareness of evidence-based resources and other clinical digital tools.

By 2022, UpToDate had reached 17,760 number of usage at MUHAS (5). Also, MUHAS library has trained users at different office areas (main campus, MNH, and Mloganzila) to increase the usage of the database in making clinical decisions. Additionally, MUHAS's partnership with

Better Evidence in 2023 agreed to train four local champions to lead communications, registrations, and training to the users, provide stable internet access to the campus, support the use of university communication channels (email, WhatsApp, social media, University website) for promotions and encouraged faculty members to integrate evidence-based tools into the curriculum.

Despite initiatives to support access to the database, there was no justification for the statistics reported by the UpToDate database on the usage of the database by MUHAS users. Hence, there was insufficient information regarding the usage of the database by healthcare practitioners, especially in clinical decision-making. There was a need to assess UpToDate database usage as an evidence-based clinical resource to identify users' awareness, knowledge, and skills, as well as the challenges associated with using the database, in order to plan more effective strategies to enhance usage.

Methods

Research Design

A descriptive research design was employed to describe the characteristics of a population regarding the use of the UpToDate database in making clinical decisions. The design enables the integration of quantitative and qualitative data collection methods, providing an in-depth view of the topic and facilitating the practical application of research findings for informed decision-making.

Study Area

This study was conducted at the Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania. The study area is the leading Health University in Tanzania, near the referral hospital, Muhimbili National Hospital (MNH)(6).

Population

The targeted study population consisted of MUHAS postgraduate students, academicians, and librarians, specifically those registered in the UpToDate database. The population was expected to utilise the UpToDate database for both educational and clinical purposes.

Sample size and Sampling techniques

The sample for this study was determined using a formula based on a known population size of 396 users from the UpToDate database at MUHAS. Applying the formula $n = \frac{N}{1+N(e)^2}$ The calculated sample size was approximately 199 users.

Specifically, this study employed convenience and purposive sampling techniques. Due to the nature of responsibilities that kept the respondents busy (teaching, learning, and clinical duties), a convenience sampling technique was used to select 189 postgraduate students from various departments who were easily accessible in classes, the ICT lab, and discussion rooms. The purposive sampling technique was employed to select key informants, comprising five academicians and five librarians from schools and library departments, to gather in-depth information for the study. The number of purposive samples selected from their immediate supervisors in the schools and librarians who train the students is intended to confirm the quantitative data collected.

Methods of data collection

The researcher distributed questionnaires to postgraduate students in medicine, pharmacy, nursing, dentistry, and public health. Questionnaires were collectively self-administered, and the distribution of questionnaires was based on the availability of the respondents in postgraduate students' classes, ICT labs, and discussion rooms.

Additionally, a researcher conducted face-to-face interviews with key informants, including academicians and librarians, at their offices, which lasted approximately 30 minutes due to the direct nature of the interview questions. The interview consisted of open-ended questions, organised by theme to gather in-depth information. The researcher probed postgraduates' awareness, knowledge, skills, and challenges faced in using the UpToDate database to inform clinical decisions on cases or during ward rounds. Additionally, during an interview, the responses were recorded on a sheet of paper.

Data quality control

A questionnaire and interview guides were tested prior to the study with 30 respondents at Kilimanjaro Christian Medical University College (KCMUCo) to assess the effectiveness of the instruments. KCMUCo was selected because it was among of health Universities using the UpToDate database and having similar courses found at MUHAS. Additionally, an expert specialising in clinical research was consulted to evaluate the instruments used, ensuring the quality of the data to be collected. Furthermore, triangulation was used by combining a

questionnaire and interview methods of data collection to ensure the reliability and validity of the findings.

Data analysis

The data collected were analysed both quantitatively and qualitatively. SPSS version 23 was used to analyse quantitative data obtained, where descriptive statistics were performed and presented in tables and figures to show the frequency and percentage of variables. Qualitative data were analysed using thematic analysis, where major themes were coded and supported with quotations from interviews.

Ethical issues

Furthermore, research clearance was obtained from the University of Dar es Salaam through the Research Information Management System (RIMS), which was then used to secure permission for data collection from the Directorate of Research and Publication at MUHAS. During the study, all participants were informed about its aim and nature both in writing and verbally. Additionally, participants were informed about the potential risks and benefits of their involvement, and participation was entirely voluntary. Participants were also assured of confidentiality, and the questionnaire did not contain any identifying information about them. Only the questionnaire number was used to identify participants, ensuring that the information provided was confidential. All cited sources have been acknowledged based on the researcher's knowledge of referencing.

Results

Demographic profile of respondents

The number of males (60.8%) was greater than that of females (39.2%) among the respondents, with the majority of respondents being from the School of Clinical Medicine (63%), as shown in Table 1.

Table 1: Demographic profile of the respondents (n=199)

	Variable	Frequency (n)	Percentage (%)
	Gender		
Quantitative sample	Female	74	37.2
	Male	115	57.8
Qualitative sample	Female	4	2
	Male	6	3
	Role (N=10)		

Qualitative sample	Lecturer/Librarian	3	30
	Assistant Lecturer/Librarian	4	40
	Tutorial Assistant/Assistant Librarian Trainee	3	30
	Schools (N=189)		
Quantitative Sample	Nursing	39	20.6
	Public Health	2	1.1
	Dentistry	1	0.5
	Pharmacy	8	4.2
	Clinical Medicine	119	63
	Diagnostic Medicine	20	10.6

Quantitative results

Awareness of the UpToDate database

The study findings revealed that out of 189 Postgraduate respondents, 77.3% were aware of the UpToDate database within the last 0-5 years, while 3.7% were aware of the database more than 10 years ago. Figure 1 identifies the point at which the respondents became aware of the database.

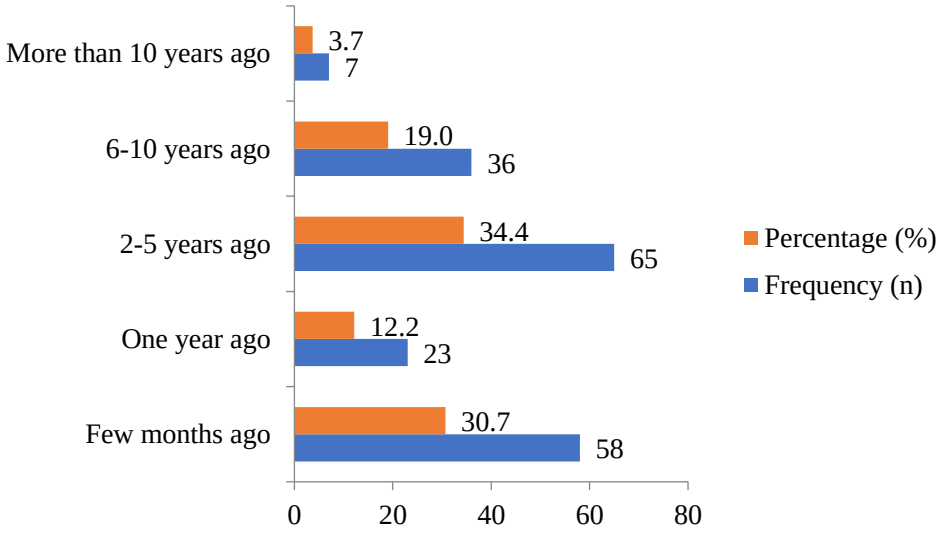

Figure 1. Awareness of UpToDate database (N=189)

Methods used to raise awareness of the UpToDate database

The study's findings revealed that the awareness of the UpToDate database among postgraduate students was raised through their fellow students, residents, or faculty (43.3%),

rather than through research support services (RSS) (1.2%) or their workplaces (1.2%). Figure 2 illustrates various methods used to disseminate awareness to users.

Frequency of usage on the UpToDate database

The study's findings indicate that 51.9% of postgraduate students utilised the database fewer than five times per week, while 48.1% used it five times or more per week. Figure 3 shows the findings.

Devices used to access the UpToDate database

The study revealed that 46% of postgraduate students use laptops, while 34% of respondents use smartphones, and a smaller percentage (20%) use desktop computers. Figure 4 identifies the devices used by postgraduate students to access the database for clinical decisions.

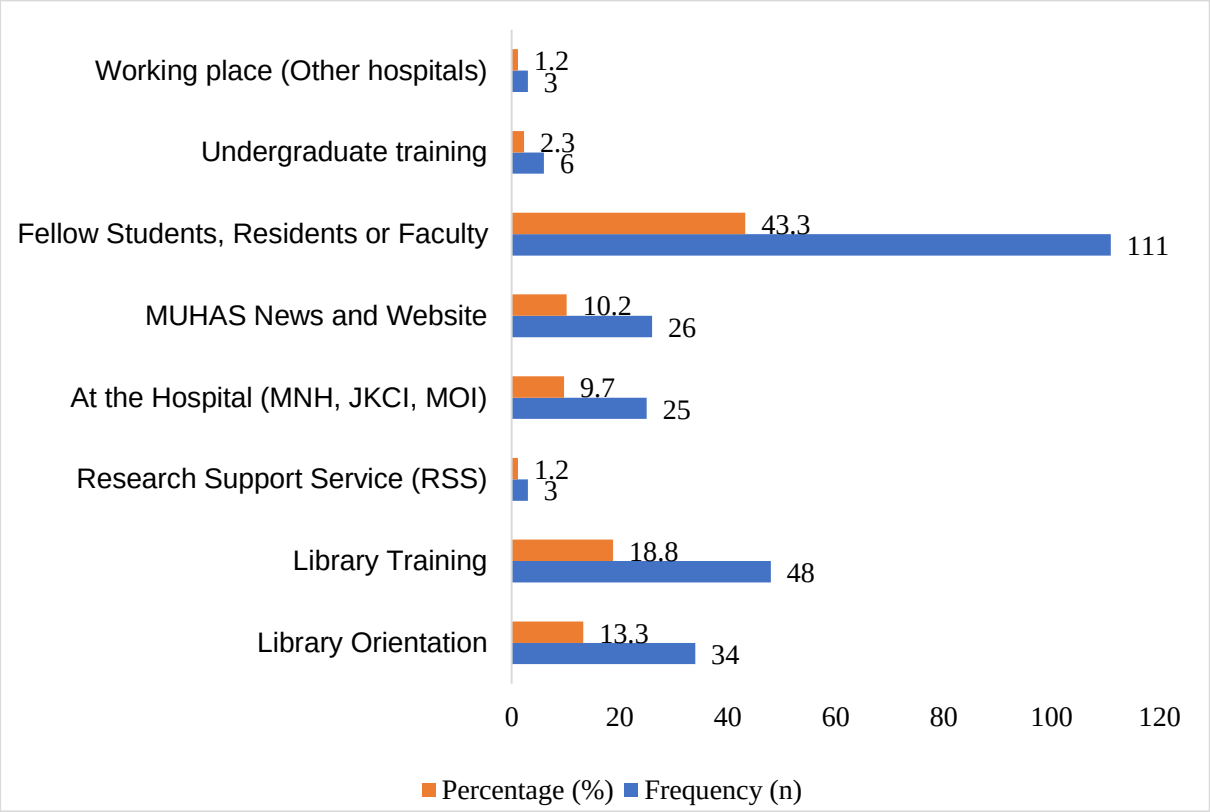

Figure 2. Ways used to raise awareness of the UpToDate database (N=189)

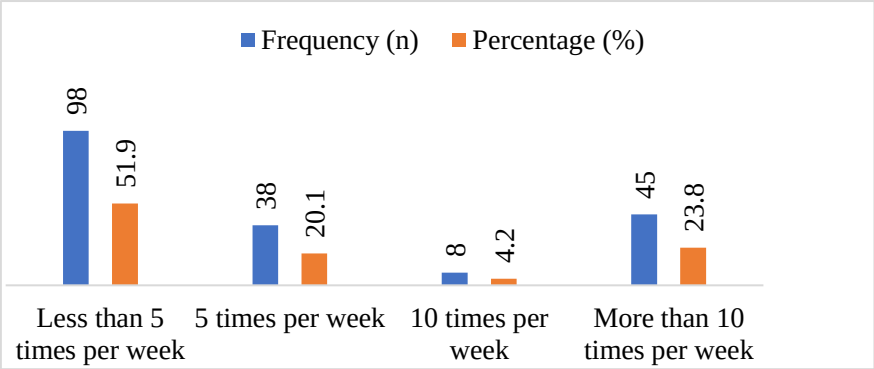

Figure 3. Usage of the UpToDate database by postgraduate students per week (N=189)

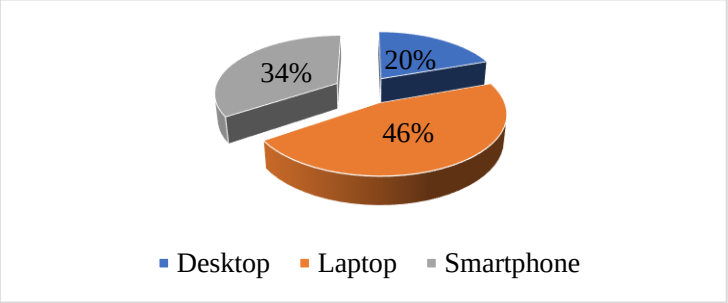

Figure 4. Devices used by postgraduate students in accessing the UpToDate database (N=189)

Knowledge and skills of the UpToDate database

UpToDate database training

The study aimed to determine whether respondents had acquired knowledge through training provided by the Muhimbili University of Health and Allied Sciences (MUHAS). The study findings revealed that most of the respondents (84%) had not attended any UpToDate training, while 16% had participated in the training. Table 4.2 below shows the results.

Skills in using the UpToDate database

The UpToDate database lacks various features and direct search techniques; however, the methods and skills are practically applied to obtain relevant information within the database. The study findings showed that respondents (24.6%) used a simple search to find information on the UpToDate database, while the use of truncation (1.9%) was used in low numbers. Table 4.2 describes the findings.

Challenges to the Use of UpToDate Database

The respondents were asked to identify the challenges they encountered when using the UpToDate database. They cited insufficient guidance on using the UpToDate database (18.9%), followed by inadequate knowledge (18.8%), cumbersome process of registration (18%), poor searching skills (16.2%), poor quality of internet (15.8%) and insufficient time on using the database (12.3%). Table 2 shows the distributions.

Table 2: UpToDate training, searching skills used, and challenges faced by postgraduate students when searching information on the UpToDate database (N=189)

Variable	Frequency (n)	Percentage (%)
UpToDate training		
Attended	158	84
Not attended	31	16
Searching Skills Used		
Simple search	152	24.6
Advanced search	62	10
Boolean operators	27	4.4
Truncation	12	1.9
Keyword(s) Search	102	16.5
Citation searching	58	9.4
Using Medical Subject Heading (MeSH)	79	12.7
Downloading the full article	84	13.6
Using filters	24	3.9
By using field tags	19	3
Challenges of Using UpToDate Database		
Insufficient guidance	119	18.9
Inadequate knowledge	118	18.8
The cumbersome process of registration	113	18
Poor searching skills	102	16.2
Poor quality of the internet	99	15.8
Insufficient time on using the database	77	12.3

Qualitative results

Although the quantitative results showed some challenges in using the database, the new themes that emerged from the interviews were;

Unfamiliarity with the library environment and services among postgraduate students failing to access library services and request assistance in times of need.

> *"Most Postgraduates are not familiar with the library environment. They visit the library during training, creating or verifying an UpToDate account or signing their clearance form." (Interviewee #2)*

Limited access to the UpToDate database is granted after the user's initial registration; therefore, usage is limited to a period of three months. This requires account activation in an institutional network, hence discouraging usage.

> *"In creating an account, a user has to fill in all requested information with red stars…and it requires a user to log in to their account on the MUHAS network after 90 days to activate the account". (Interviewee #1)*

The use of lecture notes, memory, and colleagues to make clinical decisions rather than using UpToDate for evidence-based information. This was mentioned by the supervisors in the interview.

> *"We observe that postgraduate students often rely on lecturer notes, memory, and collegial discussions as critical resources in their decision-making process. While these tools are helpful for reinforcing knowledge and guiding practice, it is essential that students also engage in scientific thinking and evidence-based reasoning to ensure that their clinical decisions are both informed and adaptable to individual patient needs." (Interviewee #7).*

Discussion

The study included 199 respondents, with the number of males exceeding that of females due to sampling bias, as the research study did not use a representative sample of the targeted population. In other words, data were gathered from a group in which some members of the intended population have a higher or lower sampling probability than others. The majority of respondents were from the School of Clinical Medicine, as it offers a wider range of courses compared to other schools at MUHAS.

The findings revealed moderate awareness of the UpToDate database. The majority were aware of the database from 0-5 years ago, during their internship, working, or at the beginning

of their postgraduate studies at MUHAS. The awareness of the database was primarily gained through fellow students, residents, or faculty, as they believed their peers were effective ambassadors who could provide more effective explanations of the database, rather than attending library orientation and training sessions. Additionally, it was observed that only a few respondents were aware of the UpToDate database, likely due to the popularity of search engines (such as Google and Wikipedia) and scholarly databases, including PubMed/Medline, eMedicine, Google Scholar, Medscape, and HINARI (7). The level of awareness of the UpToDate database was influenced by time, the respondents' current educational status, and the popularity of alternative databases used. The familiarity of nurses with the UpToDate database was largely due to the hospitals' and libraries' instructions, as most nurses became familiar with the database by searching the web and utilising electronic resources (8). Regarding the awareness of academics, pharmacists, and other practitioners, it was reported that awareness was primarily a result of training, rather than institutional promotions, such as websites (9). Hence, a variety of methods should be used to spread awareness, and their effectiveness depends on the nature of the users and circumstances.

Also, the majority of postgraduate students own personal computers, including laptops and smartphones, to access the UpToDate database. The use of personal computers for accessing the database was facilitated by portability and easy accessibility through UpToDate's Android and desktop applications. Besides, few used desktop computers were available at the office during the consultation. The database was used less than five times per week due to university activities, such as lectures, module exams, test sessions, and clinic sessions. Therefore, discouraging postgraduate students from using the database resulted in them relying on their lecture notes and past materials to make clinical decisions. It was revealed that usage via the mobile UpToDate app was consistently about two to three times more common than usage via the website (www.uptodate.com). Still, both forms of usage followed approximately the same trends (10). The frequency of database usage by MUHAS postgraduate students was low compared to Makerere University College of Health Sciences in Uganda, due to a lack of attention to the use of evidence-based resources in medical practice.

Moreover, most respondents lacked knowledge and search skills, so they employed a simple search strategy to find information in the UpToDate database, aiming to save time. Failure to attend any training resulted in the reliance on basic skills for searching information in the database, despite MUHAS library promotions through orientations and postgraduate training on literature search, scientific writing, and proposal writing. In contrast to the majority of respondents in the studies (7,9) who lacked knowledge due to institutional exposure to

training, the studies (11,12) found that radiographers and paediatricians had high expertise due to their high participation and willingness to learn through Continuing Medical Education (CME). Therefore, training is crucial for healthcare practitioners to enhance their knowledge and skills. It was reported that, although medical doctors had busy schedules, they did not have enough time to practice searching skills from the database; however, most of them possessed searching skills when searching medical information from a database (13). Additionally, evidence-based medicine (EBM) courses should be investigated to enhance the effectiveness of such classes and their role in enhancing doctors' skills and improving patient care (14). Therefore, searching skills for healthcare practitioners are essential, although they may fail to practice these skills due to the nature of their responsibilities. They need the skills to enrich their services; the knowledge and skills should be taught at all levels, periodically by experts such as librarians, to enhance the experiences of healthcare providers.

MUHAS postgraduates are not active library users, as guidance is provided by librarians at checkpoints, the Research Support Service (RSS) desk, and the ICT lab in the library. These places are visible and well-known to library users for the services they provide, such as verifying identity cards at checkpoints and borrowing and returning library materials at the Special Reserve, rather than for registering the UpToDate Database. Furthermore, the use of UpToDate via the mobile app was consistently higher than via the website, largely due to the successful registration of students in creating an UpToDate account (10). This suggests that the registration process is not overly challenging; however, MUHAS postgraduates require time and interest in utilising the database. Thus, emphasising best practices by showing their usefulness from other universities is important. Also, it was described that in terms of infrastructure, the quality of internet bandwidth was a challenge in accessing information during student and resident ward rounds (13) while hospitals in Uganda did not have an internet connection (10). Universities should enhance their internet connection to improve information accessibility for clinical purposes, thereby enhancing services. Moreover, it was reported that due to the tiring nature of university activities, such as examinations, assignments, presentations, and tests, during the semester, while practising clinical duties and attending to patients, healthcare practitioners faced the challenge of insufficient time to utilise the database. Similarly, it was challenging to find time at the workplace to search for and read reports and research articles due to a heavy workload (15). The results demonstrated a need to integrate the UpToDate database into higher education curricula to encourage the practical use of the database, particularly in clinical practice.

Conclusion and Recommendations

The UpToDate Database is crucial for accessing clinical information; however, it was underutilised by postgraduate students. Therefore, librarians should find effective ways to communicate with healthcare practitioners to acquire the necessary skills and knowledge to provide accurate medical services. The institution should prioritise the UpToDate database to simplify access to medical expertise, thereby improving patient outcomes and institutional performance. Additionally, it recommends cultivating a culture of utilising databases for decision-making, from learning institutions to working areas, by integrating evidence-based resources, such as the UpToDate database, into curricula in higher learning institutions.

Abbreviations

CDSS	Clinical Decision Support System
HER	Electronic Health Records
KCMUCo	Kilimanjaro Christian Medical University College
LAN	Local Area Network
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
RIMS	Research Information Management System
RSS	Research Support Service

Declarations

Acknowledgments

We acknowledge the efforts of MUHAS in sponsoring the study and funding the research that made this accomplishment possible. Special thanks to MUHAS library staff, faculty and postgraduate students who participated in the study.

Conflict of interest

The authors declare that they have no conflict of interest in this study.

Authors contributions

Both authors contributed to the study; RAC developed the title, study design, data collection, analysis, interpretation, and manuscript writing. Also reviewed under the supervision of EMM.

References

1. Valtis YK, Rosenberg JD, Wachter K, Kisenge R, Mashili F, Mallya RC, et al. Better evidence : Prospective cohort study assessing the utility of an evidence-based clinical resource at the University of Rwanda. BMJ Open. 2019;1–8.
2. Sutton RT, Pincock D, Baumgart DC, Sadowski DC, Fedorak RN, Kroeker KI. An overview of clinical decision support systems: Benefits, risks, and strategies for success. npj Digit Med. 2020;3(1):1–10. Available from: http://dx.doi.org/10.1038/s41746-020-0221-y
3. Ministry of Works, Transport and Communication. National Information and Communications Technology Policy-Tanzania. 2016.
4. Chande-Mallya R. International perspectives and initiatives. Health Info Libr J. 2019;36(3):283–7.
5. UpToDate. Monthly engagement summary: Muhimbili University of Health and Allied Sciences. 2022.
6. Muhimbili University of Health and Allied Sciences. A brief history of MUHAS. 2023.
7. Ershadi A, Karimov A, Chidzonga MM, Ndhlovu C, Dougherty A, Sadigh M. Mitigating the digital divide: Access, attitudes, and training in information and communication technologies among medical students at University of Zimbabwe College of Health Sciences, Harare, Zimbabwe. Ann Glob Heal. 2015;81(1):23.
8. Ghassemi AH, AghazadeAsl E, Bigdeli Z, SakiMalehi A. Surveying the familiarity and usage of up-to-date database among nurses working in the hospitals affiliated with Ahvaz Jundishapur University of Medical Sciences. J Med Life [Internet]. 2015;8(4):65–71. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28316709%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5319300
9. Abdulwadud O, Nyareza S, Nyarango P, Moyo S. Awareness, attitudes and knowledge of evidence-based medicine: A cross-sectional baseline survey among academic healthcare practitioners in Namibia. Glob J Pure Appl Sci. 2017;23(2):347.
10. Kinengyere AA, Rosenberg J, Pickard O, Kamya M. Utilization and uptake of the uptodate clinical decision support tool at the Makerere university college of health sciences (Makchs), Uganda. Afr Health Sci. 2021;21(2):904–11.
11. Ogunlesi TA. A survey of Paediatricians on evidence-based medical practice in Nigeria. Niger J Paediatr. 2019;45(3):163.
12. Nalweyiso DI, Kabanda J, Mubuuke AG, Sanderson K, Nnyanzi LA.Knowledge , attitudes and practices towards evidence based practice:A survey amongst radiographers. Radiography. 2019;25(4):327–32. Available: https://doi.org/10.1016/j.radi.2019.03.004

13. Korukire N, Ngenzi JL, Tuyizere M, Nsereko E, Basheija D, Ineza MC. Utilization of online bibliographic databases by medical doctors in a teaching hospital in Rwanda. Rwanda J Med Heal Sci. 2018;1(1):15–21.
14. Simons M, Rapport F, Zurynski Y, Stoodley M, Cullis J, Davidson AS. Links between evidence-based medicine and shared decision-making in courses for doctors in training : A scoping review. BMJ Open. 2022;12:1–10.
15. Shayan SJ, Kiwanuka F, Nakaye Z. Barriers associated with evidence based practice among nurses in low and middle income countries : A systematic review. Evid Rev. 2018;1–9.