

## **Facilitating Evidence-Based Medicine through Empirical Studies and Systematic Reviews: Librarians as Research Catalysts**


D.C. Kuruppu<sup>1</sup>

### **INTRODUCTION**

Evidence-based practice (EBP) is recognized as a tool for decision-making across various scientific fields. This is highly associated with formulating policies and developing practice guidelines, ensuring the integration of the best available research evidence, clinical expertise, and stakeholder perspectives. Medical and Health Science librarians have been described as researchers who actively contribute to the growth of evidence-based medicine because they facilitate access to relevant and quality information, including studies and reviews. The collaborative effort between them, the clinicians, and researchers is very important as it ensures that the best evidence is used to make clinical decisions that lead to better patient care and advancement in science. They are involved in gathering research evidence and applying study designs and methodologies for research, including critical appraisal of evidence. Their role is crucial in enhancing the application of research in clinical practice and persuading practitioners to rely on evidence disseminated through clinical specialities.

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<sup>1</sup>Deputy Librarian, Library, University of Colombo, Sri Lanka.  
Email: [kuruppu@lib.cmb.ac.lk](mailto:kuruppu@lib.cmb.ac.lk) / [kuruppu@med.cmb.ac.lk](mailto:kuruppu@med.cmb.ac.lk),

 <https://orcid.org/0000-0003-0763-0497>



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## **Librarians' Role in Facilitating Evidence-Based Medicine through Empirical Studies**

The evolving role of medical librarians is increasingly recognized as being an integral part of healthcare and biomedical research teams, particularly in supporting Evidence-Based Medicine (EBM). Healthcare librarians contribute specialized expertise in information retrieval, critical appraisal, and data management, which are vital in both clinical and research settings. According to the 'Informationist' conference hosted by the National Library of Medicine (2002), librarians/informationists in research teams ensure access to high quality, relevant information that directly supports decision-making and research processes. Their role extends beyond traditional library services, as they actively engage in the research workflow, enhancing the quality and applicability of empirical studies in EBM (Shipman et al., 2002). This widened role highlights the essential contribution of medical librarians in advancing healthcare practices and outcomes through evidence-based research.

My contribution to the EBM movement is portrayed through an empirical research study on assessing the information needs of Breast Cancer (BC) patients in Sri Lanka. There is a scarcity of such studies, especially in developing countries. This study is however in-line with EBM's principles where clinical care and the best evidence is combined in the process of delivering healthcare through the identification of patients' knowledge gaps with respect to screening, diagnosis and treatment modalities. The construction of a patient-specific educational toolkit highlights the relevance of patients' preferences in healthcare practices, a core aspect of EBM. This research not only provided a great deal of evidence required for planning

educational activities but also contributed to increasing patient participation and optimizing health metrics, demonstrating how information specialists enhance the spread of EBM.

**Empirical study conducted by the author<sup>1</sup>:** “An assessment of informational needs of BC patients and adults in the general public on breast cancer: screening, diagnosis and treatment modalities, and the effectiveness of a tailor-made information package for patients in Sri Lanka”.

### **Importance of this study**

BC is known as a common yet emotionally traumatic disease. In addition to its clinical impact, it also raises significant psychological and social concerns. Understanding the real informational needs of BC patients is crucial for providing comprehensive healthcare. Nutbeam (2000) recognized that health literacy is a key factor in promoting health and preventing disease. It was also acknowledged in Sri Lanka and in health education forums as a fundamental component of any health service package (Vithana et al., 2013). Earlier, the educational materials were developed based on healthcare professionals' own perceptions. However, currently, there is more emphasis on understanding clients' perceptions of their informational needs and the importance they place on them when designing more effective health education materials.

Similar to European countries and the USA, BC I incidences and mortality rates in Sri Lanka increase with age, especially among women over 40 (National Cancer Control Programme Sri Lanka, 2015). It is widely

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<sup>1</sup>Kuruppu, DC (2017). An assessment of informational needs of Breast Cancer (BC) among patients and adults in the general public: screening, diagnosis and treatment modalities, and the effectiveness of a tailor-made information package for patients in Sri Lanka [Doctoral Thesis, Faculty of Medicine, University of Colombo]

accepted that knowledge plays a vital role in shaping health-seeking behaviours. Studies in Sri Lanka have revealed that awareness of BC among adults is less than satisfactory (Ranasinghe et al., 2013). For instance, a study by Seneviratne et al. (2016) found that awareness of BC symptoms and detection methods among female undergraduates at the University of Moratuwa was also insufficient. Even though some knew about breast self-examination as a method for early detection, few understood the correct technique. This indicates a significant gap in awareness and the need for comprehensive health education interventions. Specifically, assessing the public's information needs concerning BC and their perceived importance is vital for improving health education strategies. Ideally, these needs should be evaluated using locally validated tools to ensure that the educational interventions are relevant and effective. Previous studies have reported that information needs related to cancer can be broadly categorized into cognitive and affective types. Cognitive information needs to focus on factual knowledge about cancer prevention, detection, and treatment. On the other hand, affective needs pertain to emotional support in coping with cancer (Johnson & Meischke, 1991).

Our study evaluated cognitive information needs regarding BC prevention, detection, and treatment among adults in the public and the perceived importance of this information. The results aim to assist health educators in designing effective educational tools, targeting the right content and demographic groups to improve BC knowledge among the public. Considering the importance of this research project highlighted above, the Research & Higher Degree Committee of the Faculty of Medicine, University of Colombo, approved the research project after reviewing it with three subject specialists. Then, ethical clearance for the research project was obtained from

the Ethics Committee of the Faculty. This process directly and indirectly supports protecting participants, maintaining research integrity, ensuring legal and institutional compliance, enhancing credibility, minimizing risks, etc. Administrative approval from each institution where the data collection occurred was taken before starting data collection from each study setting. Research that receives ethics approval is more likely to be accepted for publication in reputable journals, as many publishers require ethical clearance. It also improves the credibility of the findings among peers and the public. In that way, without obtaining ethics approval, publishing the findings in reputable, indexed journals in the Web of Science is impossible. Research Grant for this study received from the University of Colombo is gratefully acknowledged on this occasion.

The research project was laid down into four phases as follows.

Phase I: A community-based cross-sectional study to assess the knowledge, practice, attitude/belief, and perceived importance of information required on BC among adults in the general public and to identify the preferred information sources.

Phase II: Development of a locally appropriate and customized instrument to assess the informational needs of BC Patients of Sri Lanka and a study to validate it.

Phase III: A Hospital-based study to assess the information needs of BC patients, and to identify the preferred sources of Information on BC.

Phase IV: Development and implementation of an educational package to fulfil the informational needs of BC Patients and to assess its effectiveness.

The first part of this research study was conducted in Colombo District in Sri Lanka using adults in the general public. The rest of the study was conducted at Apeksha Hospital, formerly the National Cancer Institute in Maharagama, Sri Lanka. The study sheds light on the above-mentioned needs, offering insights that can be used to uplift patient care and education. As the principal investigator, the fundamentals of study initiation were grasped and successfully launched as a research proposal. In conducting in-depth research on the topic, the purpose of the study, objectives, and research questions was defined and discussed with high-caliber research academics attached to the Faculty of Medicine at the University of Colombo. The Principal Investigator collaborated closely with other members of the research team at each stage of the study. These collaborators provided critical guidance and support in their roles as supervisors and advisors, ultimately contributing as co-authors in disseminating the research findings globally. The team included a Community Physician, an Endocrinologist from the Faculty of Medicine, and an Oncology Surgeon from the National Cancer Institute, Maharagama, Sri Lanka. With their expert guidance throughout the research process, the study successfully culminated in the development of a validated, tailor-made information package for BC patients in Sri Lanka.

As the principal investigator, I am proud to announce that this research project was recognized and awarded the ***‘Certificate of Excellence for the Innovative Project’ at the ‘National Symposium on Best Practices for Innovations on Cancer Prevention, Control & Palliative Care 2018’, organized by the ‘National Cancer Control Programme, Ministry of Health, Nutrition, and Indigenous Medicine’, held on 14th December 2018.***

***Furthermore, the findings from Phase III of this study were published in a journal indexed in Web of Science<sup>2</sup>, contributing to the scientific literature, and forming a basis for further discussion.***

## **Objective and Methodology**

The primary objective of this study was to assess the information needs of BC patients. A hospital-based cross-sectional study design was employed at the National Cancer Institute (NCI) Maharagama, Sri Lanka.

The Study population consisted of female BC patients and was selected using the inclusive and exclusive criteria of the study. The inclusion criteria were 1. Subjects were diagnosed within the period of one year prior to the study. 2. Subjects not having major mental health problems affecting their ability to respond to an interviewer-administered questionnaire. Exclusive criteria were 1. Patients having mental health problems. 2. Those who have participated in the development of the tool: Sri Lankan Information Needs Assessment Questionnaire for BC (SINAQ-BC) 3. Medical Professionals. The sample size for the cross-sectional descriptive study was calculated using the standard formula (Lwanga & Lameshow, 1991). A non-probability and consecutive sampling technique was used as the most feasible and appropriate technique to recruit study units.

To achieve this, the researchers employed an instrument that incorporated all the different sections. Section 1: Socio-demographic information; Section 2: validated tool (SINAQ-BC) (Kuruppu et al., 2017);

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<sup>2</sup>Kuruppu DC, Wijeyaratne CN, Gunawardane N, Amarasinghe I. (2020). Assessment of Information Needs of Patients with Breast Cancer: A Hospital-Based Study in Sri Lanka. *Asia Pac J Oncol Nurs.* 7(4), 375-381. doi:10.4103/apjon.apjon\_23\_20.

Section 3: Level of the fulfilment of information needs on BC at the time of the survey; Section 4: Preferred sources of information on BC. Data was collected at the clinics from 8.00 am to 12.00 noon and at the wards from 1.00 pm to 4.00 pm with prior approval from the Director /NCIM and the Consultant Oncologists.

### **Key Findings**

This study found that all BC patients expressed a strong need for information, with their highest priority on disease, treatment, and psychosocial services, aligning with European studies. Information needs peak during radiotherapy, especially at the first consultation with the radiation oncologist. Providing clear information during this period improves patient satisfaction and reassuring about the safety of treatments.

Younger women and those with higher education levels exhibited significantly greater information needs, particularly regarding treatment options, disease progression, and chemotherapy side effects. Age and education were the primary factors influencing information-seeking behaviours, with younger patients seeking more detailed, factual information compared to older patients, who often had fewer demands.

Though topics like contraception and sexual activity were not rated as highly important in this study, prior research has shown that patients are open to receiving counselling on fertility, contraception, and menopause. Culturally appropriate educational materials addressing these diverse needs are essential to optimize care.

With the increasing empowerment of younger, educated women in South Asia, healthcare systems must adapt to meet their growing demand for



information, particularly through tailored educational packages that support treatment decision-making and enhance overall patient satisfaction.

### **Demographic Insights**

A significant finding was the variation in information needs based on age and education level. Younger women, particularly those aged 37 and below, demonstrated notably higher information needs. This may be attributed to greater access to digital information sources and a more proactive approach to health management among younger demographics.

Similarly, women with higher education levels demonstrated a greater demand for information. This correlation highlights the role of educational background in shaping patients' health information-seeking behaviours. Educated patients may possess the skills to seek, process, and understand complex information, leading to a greater need for detailed knowledge.

### **Conclusions and Implications**

The study's conclusions highlight the necessity for tailored educational interventions in healthcare settings. The diverse information needs of patients, shaped by factors such as age and education, should be considered in developing educational packages. Specifically, such resources should cater to the unique requirements of younger women and those with higher educational qualifications.

This research project was finally transformed into an appropriate educational package (Kuruppu, 2017) that focuses on the informational requirements of BC patients in Sri Lanka. This package was developed based on the results obtained through various phases of the study about awareness and sources of information on BC among the public and patients.

### **Future Directions**

Incorporating these findings into healthcare practices is essential moving forward. Hospitals and cancer care centres should consider establishing dedicated information hubs to support groups that address the specific needs highlighted in the study. In addition, leveraging technology, like mobile apps and online platforms, can facilitate access to information and support for patients beyond the hospital setting.

In conclusion, understanding and catering to the information needs of BC patients is a crucial step towards holistic care. By listening to and acting upon the distinct needs of various patient groups, healthcare providers can significantly uplift the quality of care and support offered to those confronting the complexities of BC. This study from Sri Lanka offers valuable insights that could inform both local and global healthcare strategies, fostering a more informed and supported patient community.

### **Librarians' Role in Facilitating Evidence-Based Medicine through Systematic Reviews**

As medical librarians, we play a pivotal role in conducting systematic reviews. Spencer et al. (2018) identified eighteen (18) different roles of librarians in conducting systematic reviews, such as planning, question formulation, searching, source selection, de-duplication of search results, citation management, evaluation of search strategies, search filters and hedges, grey literature searching, peer review of search strategies, reporting and documentation, collaboration, data extraction, critical appraisal, document supply, helping with technological and analytical tools, teaching, and demonstrating impact and outcomes.

Librarians are highly trained in information retrieval, curation, and dissemination of information, allowing them to help healthcare professionals access a vast range of peer-reviewed journals, research databases, and specialized repositories. Systematic reviews and empirical studies form the backbone of EBM/EBP as they synthesize research findings and provide a comprehensive view of available evidence. By making this information accessible through effective search strategies, librarians ensure clinicians and researchers can find the latest and most relevant research findings. For example, systematic reviews often rely on complex search strategies to locate studies from databases such as PubMed, Cochrane Library, CINAHL, SCOPUS, EMBASE, Web of Science, and PsycINFO. Librarians use their expertise in designing and conducting comprehensive literature searches, ensuring that reviews are comprehensive and evidence-based. According to studies, involvement of librarians in the systematic review process improve the quality of search strategy, yield more accurate and exhaustive results, thus enhancing the reliability of the research findings (Beverley et al., 2003).

While assisting with systematic literature searches, librarians also collaborate actively in research teams. This is commonly seen in systematic reviews. Assistance in formulating research questions, identifying research evidence relevant to a specific study, and demarcating inclusion and exclusion criteria are some of the most important tasks carried out by librarians. Their input is essential in producing a comprehensive framework for a study, reducing bias and improving reliability. This indispensable role of librarians in systematic reviews is often acknowledged by recognizing them as co-authors of the research study.

A study by Rethlefsen et al. (2015) showed that systematic reviews involving a librarian had more precise and reproducible search strategies. The overall quality has always been improved due to the involvement of librarians. It is also proved through the guidelines developed for systematic reviews, such as 'PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement' developed by McGowan et al. (2016), which emphasizes the significant role of an information specialist or librarian in systematic review teams, predominantly for the literature search process, ensuring thorough and accurate search strategies.

As mentioned by Spencer and Eldredge (2018), medical librarianship involves the utilization of specialized software tools that enhance the review process. Tools such as EndNote and Mendeley assist in eliminating duplicate entries, while Rayyan facilitates blind reviewing in collaboration with the research team. The analysis of the resulting data often involves advanced tools such as R (with 'meta' or 'metafor' packages), Stata, Review Manager, and Comprehensive Meta-Analysis (CMA). These tools employ explicit and systematic methods designed to minimize bias, such as Risk of Bias (RoB2), thus generating more reliable findings that inform decision-making processes (Antman et al., 1992; Oxman & Guyatt, 1993).

I recall attending my first workshop on systematic reviews, held at the Faculty of Medicine, University of Colombo, conducted by authorities from the Cochrane Library Review. This workshop comprehensively explains how empirical evidence related to a specific problem is collated in systematic reviews to address a particular research question. During the workshop, the critical role of librarians in systematic reviews was emphasized, underscoring the unique advantage they would have as integral members of research teams.

I would like to highlight the systematic reviews conducted in collaboration with esteemed faculty members. As a medical librarian, I ensured the rigour of literature searches, managed databases, and facilitated the inclusion of high-quality studies. My expertise in information retrieval enhanced the accuracy and comprehensiveness of these reviews, effectively bridging the gap between clinical practice and academic research and raising the standards of evidence-based medicine. Through the synthesis of extensive datasets, our reviews provided critical insights that guided clinical decision-making.

These systematic reviews, conducted in partnership with academic staff from the Faculty of Medicine, University of Colombo, and clinicians from government hospitals in Sri Lanka, would ultimately help improve patient care and advance medical knowledge.

## **High-Pressure Chronic Urinary Retention (HPCR)<sup>3</sup>**

### **Objectives and Methodology**

Today, we delve into a critical yet under-explored medical condition: high-pressure chronic urinary retention (HPCR), as discussed in the *Journal of Clinical Urology*. Despite being a relatively common condition, awareness of its clinical characteristics remains limited, often leading to delayed diagnoses and suboptimal treatment outcomes. This systematic review seeks to underscore the clinical features and outcomes associated with HPCR, with

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<sup>3</sup>Madhushankha M, Jayarajah U, Kuruppu C, Goonewardena SA, Abeygunasekera AM. Clinical characteristics and outcome of high-pressure chronic urinary retention: A systematic review. *Journal of Clinical Urology*. 2022; 15(3):204-212. doi:10.1177/2051415821993741

the goal of assisting healthcare professionals in timely diagnosis and deciding on interventions.

As research facilitators, librarians play a key role in disseminating knowledge and ensuring access to essential information, which is crucial for addressing conditions like HPCR. This review conducted a comprehensive literature search across multiple databases, including PubMed, Scopus, and EMBASE. All search results were uploaded to Mendeley to remove duplicates, and the Rayyan application was employed to carry out a blind review with team members to systematically include or exclude studies based on their relevance. A coding system was then used to identify key features of HPCR, which were later analyzed statistically, providing a qualitative overview of the condition.

## **Key Findings**

Eight studies with 271 patients were identified. The average age was 66 years, predominantly affecting males. The major common symptoms were a tense, painless bladder noted in nearly all cases. The most frequent cause was benign prostatic hyperplasia, followed by prostatic malignancy. Treatment outcomes were positive when the underlying cause was addressed, demonstrating the importance of accurate diagnosis and management.

## **Conclusions and Implications**

Awareness of the clinical signs of HPCR leads to timely diagnosis and effective treatment options, which highlights the need for in-depth knowledge of the disease among healthcare providers. Key clinical indicators such as nocturnal enuresis and treatment-resistant hypertension should alert clinicians of the possibility of HPCR. Diagnostic imaging and blood tests further support

this diagnosis. Successful management hinges on addressing the underlying cause, with careful bladder decompression yielding improved cardiovascular and renal outcomes.

This study underscores the importance of awareness and early detection. By facilitating access to critical research findings, librarians play a key role in empowering healthcare professionals to target enhanced patient care and outcomes. In conclusion, continuing our knowledge dissemination and research collaboration efforts is essential, particularly in addressing conditions like HPCR. Through well-informed research and practice, we can make a significant impact on healthcare.

## **Vitamin D and COVID-19<sup>4</sup>**

### **Objectives and Methodology**

This study examined the key role of vitamin D during the COVID-19 pandemic. It aimed to investigate whether vitamin D deficiency or insufficiency increases susceptibility to COVID-19, affects its severity, and influences mortality. Furthermore, it explored the potential therapeutic role of vitamin D in treatment. As a medical librarian, I was fortunate to join a research group dedicated to this initiative.

As the information specialist within the research group, I developed and finalized the data collection strategy, utilizing multiple databases: CINAHL, Cochrane Library, EMBASE, PubMed, Scopus, and Web of

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<sup>4</sup>Dissanayake HA, de Silva NL, Sumanatilleke M, de Silva SDN, Gamage KKK, Dematapitiya C, Kuruppu DC, Ranasinghe P, Pathmanathan S, Katulanda P. (2022). Prognostic and Therapeutic Role of Vitamin D in COVID-19: Systematic Review and Meta-analysis. *J Clin Endocrinol Metab.* 107(5), 1484-1502. doi:10.1210/clinem/dgab892.

Science. We retrieved articles from the databases ‘from its inception to 30<sup>th</sup> May 2021. The search strategy included terms such as COVID-19, vitamin D deficiency, severe acute respiratory syndrome, treatment, and randomized controlled trials. Articles written in languages other than English were excluded. All references were uploaded to the Mendeley Reference Management tool, and duplicates were removed. The remaining references were uploaded to the Rayyan web application. Two authors conducted the study selection process independently, with conflicts resolved by a third author.

## **Key Findings**

Out of 1,877 search results, 76 studies met the inclusion criteria. A meta-analysis of 72 observational studies involving nearly 2 million individuals revealed that vitamin D deficiency or insufficiency significantly increased the odds of contracting COVID-19 and developing severe disease. The data indicated lower levels of 25-hydroxy vitamin D in COVID-19 patients compared to controls, with even lower levels observed in those with severe cases or who did not survive. Vitamin D deficiency was linked to an increased risk of COVID-19 and severe disease. However, the association with mortality was less robust due to the high risk of bias and heterogeneity across studies.

## **Conclusions and Implications**

While the findings suggest a link between low vitamin D levels and increased susceptibility to and severity of COVID-19, the evidence concerning mortality is less convincing. The high heterogeneity in the data limits the ability to draw definitive conclusions, underscoring the need for further research. However, the findings emphasize vitamin D's potential role in



reducing the severity of COVID-19, highlighting the importance of further studies to clarify its impact on mortality. This study underscores the importance of maintaining optimal vitamin D levels for potential protective effects against COVID-19.

As librarians, our role in ensuring access to critical research during global crises is vital. By providing relevant and reliable information to healthcare professionals, we support informed decision-making and contribute to improved public health outcomes. Moving forward, we must continue to serve as research catalysts, bridging the gap between knowledge and practice and empowering communities during global challenges such as COVID-19.

### **Ladies and Gentlemen,**

Now I would like to describe a topic that underscores the crucial role librarians play in connecting research to practice ‘The intricate relationship between childhood constipation and exposure to stress’.

### **Childhood Constipation and Stress<sup>5</sup>**

#### **Objectives and Methodology**

Constipation in children is often overlooked and significantly associated with stressful events. This systematic review investigates various stressors that affect the development of constipation in children and adolescents. We explored the complicated relationship between childhood

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<sup>5</sup>Liyanarachchi H, Rajindrajith S, Kuruppu C, Chathurangana P, Ranawaka R, Devanarayana NM, Benninga MA. (2022). Association between childhood constipation and exposure to stressful life events: a systematic review. *NeurogastroenterolMotil.* 2022, 34(4), e14231. doi: 10.1111/nmo.14231.

constipation and exposure to stress, empowering healthcare providers to address intricate health issues comprehensively.

A systematic review following PRISMA guidelines was conducted using PubMed, Embase, and PsycINFO databases with standard search terms related to “constipation” and “stress” in individuals aged 0 to 18. The eligibility criteria were defined and used to select relevant studies, and quality assessment was carried out using established methodologies.

Two authors independently screened the uploaded abstracts through the Rayyan application, which expedites the process of screening and selecting studies. Frequent meetings were held to resolve disagreements and uncertain matters.

## **Key Findings**

Out of 2,296 titles and abstracts considered, 15 articles met the criteria for inclusion in this review, encompassing 2,954 children aged 6 months to 16 years. The findings revealed a clear association between constipation and exposure to stressors:

- **Home-related stressors:** Events such as parental divorce, severe illness in the family, and job loss.
- **School-related stressors:** Experiences of bullying, school changes, separation from friends, and academic failure.
- **Child maltreatment:** Including neglect and abuse.
- **Exposure to war/civil unrest:** Impacting children’s mental and physical health

The review identified associations between constipation and stressors like parental separation, bullying, and civil unrest, involving 2954 children aged 6 months to 16 years.

## **Conclusions and Implications**

The study emphasized that everyday stressors, maltreatment, and societal unrest can contribute to constipation in children. These factors should be considered during clinical evaluations when providing holistic care. This research underscores the importance of considering psychological and environmental factors in pediatric healthcare.

As librarians, by gathering and disseminating essential information, we enable healthcare professionals to provide well-informed and empathetic care. In conclusion, we must continue to serve as catalysts for research, bridging the gap between academic insights and practical applications. Through our dedication, we can help improve the quality of care for children facing challenges such as stress-related constipation.

## **Conclusion**

Both empirical studies and systematic reviews are key components of EBM, offering insights that shape patient care and policy decisions. Through their expertise, librarians play a pivotal role in advancing medical knowledge, improving healthcare outcomes, and facilitating Evidence-Based Medicine (EBM).

While librarians globally play a crucial role in supporting EBM, there is ample opportunity for Sri Lankan librarians to further enhance their involvement in this area. By strengthening our engagement with healthcare

professionals and researchers, we can become more integral to research and clinical processes, particularly in conducting systematic reviews and managing complex information systems. Sri Lankan librarians have the potential to contribute even more to evidence-based healthcare by actively seeking opportunities to collaborate with research teams and support the development of EBM practices. Taking these steps will empower us to make a greater impact on patient care, health policy, and the overall advancement of medical knowledge.

### **Message for all Librarians**

The key message I need to highlight is that “Our diverse backgrounds enrich our roles”. I began my journey in Physical Sciences, Chemistry & Biochemistry, and transitioned to Information Management, Public Health Education and now focus on health systems and community research. Similarly, each of you carries expertise from numerous fields such as Engineering, Pure Science, Law, Social Sciences & Humanities (Arts, Management, and Education). Let us embrace our potential as “Librarians as Research Catalysts” and make meaningful contributions to these fields.

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