

Promoting Information Literacy among Medical Students by Librarians in Universities: An Evidence-Based Study in Delta State

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ABSTRACT

Information literacy (IL) is a cornerstone of evidence-based medical practice, equipping future physicians with the skills to locate, evaluate, and apply research findings in clinical decision-making. This study investigates the role of university librarians in promoting IL among medical students in Delta State, Nigeria. Using a descriptive survey design, data were collected from 386 medical students and 15 librarians across three universities offering medical programs in Delta State. Findings reveal that while students demonstrate moderate awareness of IL concepts, their practical competencies—particularly in using specialized medical databases such as MEDLINE, HINARI, and CINAHL—remain inadequate. Librarians are actively involved in IL instruction, primarily through orientation programs, workshops, and embedded instructional sessions, but these efforts are constrained by limited time allocation, insufficient ICT infrastructure, and lack of formal IL integration into the medical curriculum. A significant positive relationship was established between IL skills and effective utilization of information resources ($r = 0.62$, $p < 0.05$). The study concludes that a structured, curriculum-integrated IL program led by librarians is essential for producing information-competent medical graduates. Recommendations include developing a formal IL policy, integrating credit-bearing IL courses into the medical curriculum, enhancing ICT infrastructure, and adopting blended instructional approaches combining face-to-face and online modalities.

KEYWORDS: Information literacy, Medical students, Librarians, Delta State, evidence-based practice, and Curriculum integration.

INTRODUCTION

The contemporary healthcare landscape demands more than clinical knowledge from medical practitioners; it requires the ability to navigate an ever-expanding universe of biomedical information, critically evaluate research evidence, and apply findings to patient care. Information literacy—defined as the set of competencies enabling

individuals to recognize when information is needed and to locate, evaluate, and effectively use that information—has thus become indispensable to medical education and practice [-1](#). As the volume of medical literature grows exponentially and digital resources proliferate, the capacity to engage with information efficiently and ethically distinguishes competent clinicians from those who may rely on outdated or unreliable sources.

Medical students, as the next generation of physicians, must acquire IL skills early in their training to support lifelong learning and evidence-based practice. However, research across Nigeria and other developing countries consistently reveals significant gaps in IL competencies among health sciences students. For instance, studies conducted at Delta State University revealed that most medical students were unaware of and did not utilize key medical databases such as MEDLINE, HINARI, and CINAHL, with many citing lack of training and ineffective user education programs as primary barriers [-2](#). This scenario is not unique to Delta State; similar findings have been reported in Lagos, Ilorin, and other Nigerian universities [-5-14](#).

University librarians occupy a strategic position in addressing these gaps. As custodians of information resources and experts in information retrieval and organization, librarians are natural leaders in IL instruction. However, the extent to which librarians can effectively promote IL depends on institutional support, curriculum structures, collaboration with faculty, and availability of technological infrastructure. In Delta State, where medical education faces challenges common to many developing regions, understanding the current state of IL promotion is crucial for developing evidence-based interventions.

This study, therefore, examines the role of librarians in promoting IL among medical students in Delta State universities, assessing current practices, challenges, and outcomes to inform policy and practice.

STATEMENT OF THE PROBLEM

Medical students in Delta State, as elsewhere in Nigeria, are expected to graduate with competencies in locating, evaluating, and using medical information to support evidence-based clinical practice. However, mounting evidence suggests that many students lack these essential skills. A foundational study at Delta State University, Abraka, found that the majority of medical students were neither aware of nor used key online medical databases, attributing this deficiency to inadequate training and ineffective user education programs. More recent investigations in Lagos State confirmed a positive significant relationship between IL skills and use of information resources, suggesting that deficiencies in IL directly impair students' ability to access and apply medical information.

The problem is compounded by the absence of a structured, credit-bearing IL curriculum in most Nigerian medical schools. Library orientation programs, typically offered at the beginning of students' academic careers, are often insufficient to impart lasting competencies. Furthermore, there is limited collaboration between librarians and medical faculty in designing and delivering IL instruction. While some librarians make commendable efforts through workshops and embedded instruction, these initiatives are frequently constrained by time, inadequate resources, and lack of institutional prioritization.

This study addresses the following critical questions: What IL competencies do medical students in Delta State possess? What strategies are librarians employing to promote IL? What challenges impede effective IL instruction? How can IL promotion be strengthened to produce information-competent medical graduates? By answering these

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questions, the study aims to provide empirical evidence to guide policy and practice in medical education in Delta State and beyond.

Research Questions

1. What is the level of information literacy awareness and competencies among medical students in Delta State universities?
2. What information literacy instructional strategies and programs are provided by librarians to medical students in Delta State?
3. What are the challenges faced by librarians in promoting information literacy among medical students in Delta State universities?
4. What is the relationship between information literacy competencies and medical students' utilization of information resources in Delta State universities?

OBJECTIVES OF THE STUDY

1. To assess the level of information literacy awareness and competencies among medical students in Delta State universities.
2. To identify the information literacy instructional strategies and programs provided by librarians to medical students in Delta State.
3. To determine the challenges faced by librarians in promoting information literacy among medical students in Delta State universities.
4. To establish the relationship between information literacy competencies and medical students' utilization of information resources in Delta State universities.

LITERATURE REVIEW

Conceptual Framework:

Information Literacy in Medical Education

Information literacy, as conceptualized by the Association of College and Research Libraries (ACRL), encompasses the ability to determine the extent of information needed, access needed information effectively and efficiently, evaluate information and its sources critically, incorporate selected information into one's knowledge base, use information effectively to accomplish a specific purpose, and understand the economic, legal, and social issues surrounding the use of information. For medical students, these competencies are critical for evidence-based practice, clinical decision-making, and lifelong learning [-3](#).

The importance of IL in medical education has been increasingly recognized in both developed and developing countries. A study of health science students in Kano found that although some aspects of IL were indirectly taught through research-based coursework, there was no structured IL program formally embedded in the curriculum, resulting in many students lacking adequate skills in information sourcing and evaluation [-1](#). Similarly, research in South-East Nigeria revealed that physicians had inadequate IL tuition during professional training, leading to an informal information culture heavily dependent on human sources for medical information.

The Role of Librarians in Promoting Information Literacy

Librarians are uniquely positioned to lead IL instruction in academic settings. As experts in information retrieval, organization, and evaluation, they possess skills that complement the clinical expertise of medical faculty. The literature suggests several models for librarian involvement in IL instruction, including one-shot instruction sessions, workshop series, embedded librarianship, and for-credit courses.

Evidence from international contexts indicates that librarian-led IL instruction can significantly improve medical students' information-seeking behavior. A study at Georgetown University Medical Center found that librarian-led instruction on clinical-specific resources correlated with improvements in students' searching behavior, particularly when instruction was embedded in real-world activities such as Grand Rounds exercises. The study emphasized the importance of early and frequent instruction sessions paired with formative feedback from librarian-educators.

In the Nigerian context, librarians face distinct challenges in promoting IL. Baro and colleagues' foundational work at Niger Delta University and Delta State University highlighted the need for collaboration between librarians and faculty in integrating IL skills into medical school curricula. More recent research in Lagos State found that medical students' IL skills significantly predicted their use of information resources, underscoring the critical role of librarians in developing these competencies.

Empirical Evidence on Information Literacy and Medical Students in Nigeria

Several empirical studies have examined IL and medical students in Nigeria, providing a foundation for this investigation. Akpovire and colleagues studied the role of IL skills on use of information resources by medical students in Lagos State, finding a significant positive relationship between IL competence and use of information resources ($r = 0.600$, $p < 0.05$). The study also revealed that medical students used information resources primarily for examination preparation, research projects, and obtaining information about patient diagnosis and intervention.

Similarly, a study in Federal University libraries in South-South Nigeria examined the influence of IL variables such as ability to use information access tools and ability to evaluate information resources on medical students' utilization of information resources. The findings emphasized the importance of user education in enhancing information use. Bashorun's study at the University of Ilorin found a significant relationship between IL competence and use of electronic resources among medical students, concluding that IL programs should cover the entire period of medical education rather than being confined to orientation periods.

These studies consistently highlight the gap between the IL skills students possess and those they need for effective information use. The challenge is not merely one of awareness but of practical competencies: students may know that databases exist but lack the skills to navigate and retrieve information effectively. This gap is where librarian intervention is most critical.

METHODOLOGY

Research Design

This study adopted a descriptive survey research design, suitable for describing the current state of IL promotion among medical students and librarians in Delta State. The design allowed for the collection of quantitative data through structured questionnaires and qualitative insights through interviews. The study was conducted in Delta State, Nigeria, focusing on universities offering medical programs. Delta State University (DELSU), Abraka, was

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the primary institution, as it has a well-established College of Health Sciences. Other institutions with medical programs in the state were also included to enhance representativeness.

The target population comprised all medical students enrolled in undergraduate programs in Delta State universities offering medical education, estimated at approximately 1,200 students, and all librarians working in these institutions. A sample of 386 medical students was selected using stratified random sampling to ensure representation across year levels and institutions. All 15 librarians working in the universities were included in the study through purposive sampling. Two sets of structured questionnaires were developed for data collection. The Medical Students' Information Literacy Questionnaire (MSILQ) assessed students' IL awareness, competencies, and resource utilization on a four-point Likert scale. The Librarians' Information Literacy Practices Questionnaire (LILPQ) gathered data on instructional strategies, collaboration with faculty, challenges, and institutional support. The instruments were validated by experts in Library and Information Science and tested for reliability, yielding Cronbach's alpha coefficients of 0.84 and 0.79, respectively.

Semi-structured interviews were also conducted with selected librarians to obtain qualitative insights into their experiences, strategies, and challenges in promoting IL.

Data were collected over a period of eight weeks. Questionnaires were administered to students during class sessions after obtaining permission from faculty and informed consent from participants. Librarian questionnaires were distributed in person, and interviews were conducted at the librarians' convenience. Completed questionnaires were collected immediately to ensure high response rates. Quantitative data were analyzed using descriptive statistics (frequency counts, percentages, means, standard deviations) to answer research questions 1-3. Inferential statistics (Pearson Product Moment Correlation) were used to address research question 4. Qualitative data from interviews were transcribed and thematically analyzed to complement quantitative findings.

ANALYSIS AND TABLES

Research Question 1: Level of Information Literacy Awareness and Competencies among Medical Students

Table 1: Medical Students' Awareness of Information Literacy Concepts (N = 386)

Statement	Aware (%)	Not Aware (%)	Mean	SD
Familiar with the term "information literacy"	42.7	57.3	2.34	1.18
Recognize the need for IL skills in medical practice	78.2	21.8	3.25	0.92
Aware of specialized medical databases (MEDLINE, HINARI, CINAHL)	34.5	65.5	2.12	1.21
Know how to formulate effective search strategies	45.6	54.4	2.45	1.15

Statement	Aware (%)	Not Aware (%)	Mean	SD
Can evaluate the quality/credibility of medical information sources	52.8	47.2	2.68	1.09
Understand importance of citing sources and avoiding plagiarism	67.4	32.6	3.14	0.95

Note: Mean scores based on 4-point scale: 1=Strongly Disagree, 4=Strongly Agree

Research Question 2: Information Literacy Instructional Strategies Provided by Librarians

Table 2: Medical Students' Self-Assessed Information Literacy Competencies (N = 386)

Competency Area	High Competence (%)	Moderate Competence (%)	Low Competence (%)	Mean	SD
Identifying information needs	34.2	48.7	17.1	2.88	0.82
Locating information resources	28.5	52.3	19.2	2.65	0.89
Using online databases	18.9	41.7	39.4	2.24	0.95
Evaluating information quality	31.6	47.9	20.5	2.72	0.84
Organizing and synthesizing information	29.3	51.8	18.9	2.69	0.86
Citing sources using standard formats	37.8	44.6	17.6	2.93	0.81

Table 3: Information Literacy Instructional Strategies Offered by Librarians (N = 15)

Instructional Strategy	Always Offered (%)	Sometimes Offered (%)	Rarely Offered (%)	Not Offered (%)	Mean	SD
Library orientation for new students	100	0	0	0	4.00	0.00
Workshop on use of medical databases	46.7	33.3	13.3	6.7	3.20	0.94
Embedded IL instruction in coursework	20.0	40.0	26.7	13.3	2.67	0.98

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Instructional Strategy	Always Offered (%)	Sometimes Offered (%)	Rarely Offered (%)	Not Offered (%)	Mean	SD
One-on-one research consultations	33.3	40.0	20.0	6.7	3.00	0.93
Development of IL guides/tutorials	26.7	46.7	20.0	6.7	2.93	0.88
Credit-bearing IL courses	6.7	13.3	26.7	53.3	1.73	0.96
Online IL training modules	13.3	26.7	33.3	26.7	2.27	1.03

Note: Mean scores based on 4-point scale: 1=Not Offered, 4=Always Offered

Table 4: Collaboration Between Librarians and Medical Faculty (N = 15)

Collaboration Aspect	Yes (%)	No (%)
Formal collaboration with faculty on IL instruction	26.7	73.3
Discuss IL needs with faculty	46.7	53.3
Faculty refer students for IL assistance	53.3	46.7
Joint development of IL learning materials	20.0	80.0
Participation in curriculum development meetings	13.3	86.7

Research Question 3: Challenges Faced by Librarians in Promoting Information Literacy

Table 5: Challenges in Promoting Information Literacy Among Medical Students (N = 15)

Challenge	Very Challenging (%)	Challenging (%)	Neutral (%)	Not Challenging (%)	Mean	SD
Inadequate time allocated for IL instruction	53.3	33.3	6.7	6.7	3.33	0.90
Insufficient ICT infrastructure/resources	46.7	40.0	6.7	6.7	3.27	0.88
Lack of formal IL policy or curriculum	40.0	46.7	6.7	6.7	3.20	0.86
Low student	26.7	40.0	20.0	13.3	2.80	1.01

Challenge	Very Challenging (%)	Challenging (%)	Neutral (%)	Not Challenging (%)	Mean	SD
interest/motivation						
Inadequate librarian training in IL pedagogy	20.0	33.3	33.3	13.3	2.60	1.06
Poor collaboration with faculty	33.3	40.0	13.3	13.3	2.93	0.96
Lack of administrative support	20.0	33.3	26.7	20.0	2.53	1.06

Research Question 4: Relationship Between Information Literacy Competencies and Utilization of Information Resources

Table 6: Correlation Between IL Competencies and Utilization of Information Resources

Variable	Mean	SD	N	R	Sig.	Remark
IL Competencies (Composite)	2.68	0.76	386	0.62	0.000	Significant
Utilization of Information Resources (Composite)	2.95	0.71	386			

Significant at $p < 0.05$ level

The analysis reveals a significant positive relationship between IL competencies and utilization of information resources among medical students in Delta State universities ($r = 0.62$, $p < 0.05$). This finding suggests that students with higher IL competencies are more likely to utilize information resources effectively. Conversely, deficiencies in IL skills correlate with underutilization of available information resources.

Qualitative Findings from Librarian Interviews

Thematic analysis of interviews with librarians revealed several significant themes:

1. **Limited Time Allocation:** Librarians consistently mentioned that IL instruction is squeezed into brief orientation sessions, typically lasting one hour or less, which they described as "grossly inadequate" for imparting meaningful IL skills.
2. **Absence of Formal IL Framework:** Most librarians noted the lack of a formal IL policy or curriculum framework, stating that IL instruction is conducted "ad hoc" and dependent on individual librarian initiative.
3. **Infrastructure Challenges:** Inadequate computers, unreliable internet connectivity, and limited access to subscribed databases were cited as major barriers to effective IL instruction.
4. **Faculty Collaboration Gap:** While many librarians expressed desire for greater collaboration with medical faculty, few formal mechanisms existed for such partnerships.

DISCUSSION OF FINDINGS

Level of Information Literacy Awareness and Competencies

The findings reveal that while a majority of medical students (78.2%) recognize the importance of IL skills for medical practice, actual awareness and competencies lag significantly behind this recognition. Only 42.7% of students were familiar with the term "information literacy," and just 34.5% were aware of specialized medical databases such as MEDLINE, HINARI, and CINAHL. This finding corroborates earlier research at Delta State University, which found that most students were not aware of and did not use these databases.

Students demonstrated moderate competencies in identifying information needs (mean = 2.88) and citing sources (mean = 2.93), but scored lowest in using online databases (mean = 2.24). This pattern suggests that students can recognize when they need information and can cite sources reasonably well but lack the practical skills to navigate and retrieve information from specialized digital sources. This finding aligns with Ibenne's study of clinicians in South-East Nigeria, which found that physicians possessed inadequate knowledge of information sources and limited navigational skills.

The relatively higher competency in citing sources (67.4% aware of importance) suggests that instruction on academic integrity may be more systematically delivered than instruction on information retrieval. However, the low competency in database use is concerning, as these resources represent the primary tools for evidence-based medical practice.

Information Literacy Instructional Strategies

Librarians in Delta State are actively engaged in IL promotion, but their efforts are limited in scope and impact. All librarians (100%) reported offering library orientation for new students, indicating that initial exposure to library resources is universal. However, this orientation is typically brief and insufficient for developing lasting IL competencies.

Only 20% of librarians reported embedding IL instruction in coursework, and a mere 6.7% offered credit-bearing IL courses. These findings reflect a global challenge noted in the literature: while library orientation is common, comprehensive IL integration is rare. The low rate of credit-bearing courses (6.7%) is particularly concerning given international evidence suggesting that for-credit IL courses are more effective than one-shot sessions.

Collaboration with faculty presents another significant gap. Only 26.7% of librarians reported formal collaboration with medical faculty on IL instruction, and a mere 13.3% participated in curriculum development meetings. This finding is consistent with studies suggesting that limited faculty-librarian collaboration undermines IL integration in medical curricula.

Challenges in Promoting Information Literacy

The three most significant challenges identified by librarians were inadequate time allocated for IL instruction (mean = 3.33), insufficient ICT infrastructure (mean = 3.27), and lack of formal IL policy or curriculum (mean = 3.20). These challenges are interconnected: without a formal IL policy, time is not allocated; without time, meaningful instruction cannot occur; without adequate ICT infrastructure, even well-designed instruction cannot be effectively delivered.

The challenge of low student interest (mean = 2.80) is worth noting. This may reflect students' lack of awareness of IL's importance for their clinical careers, suggesting that librarians need to emphasize the practical, clinical applications of IL skills. These challenges mirror findings from other Nigerian institutions. Studies in Kano and Lagos similarly identified curriculum gaps and infrastructure deficiencies as major barriers to IL promotion.

Relationship Between Information Literacy and Utilization of Information Resources

The significant positive correlation between IL competencies and utilization of information resources ($r = 0.62$, $p < 0.05$) is perhaps the study's most compelling finding. This result strongly confirms that IL skills are not merely academic luxuries but practical necessities for effective information use. Students with stronger IL competencies are more likely to utilize available information resources, including specialized medical databases.

This finding is consistent with Akpovire and colleagues' study in Lagos State, which found a correlation of $r = 0.600$ ($p < 0.05$) between IL competence and resource use. It also aligns with Bashorun's findings at the University of Ilorin, which established a significant relationship between IL competence and use of electronic resources.

The implication is clear: interventions to enhance IL competencies will directly improve students' use of medical information resources, which in turn supports better academic performance and, ultimately, better clinical practice.

CONCLUSION AND RECOMMENDATIONS

This study has demonstrated that promoting information literacy among medical students in Delta State universities is both critical and challenging. While librarians are actively engaged in IL instruction, their efforts are constrained by inadequate time allocation, insufficient infrastructure, and limited curricular integration. The significant positive relationship between IL competencies and utilization of information resources underscores the practical importance of IL for medical education and clinical practice.

The findings contribute to the growing body of evidence from Nigeria and other developing countries that structured, librarian-led IL programs are essential for producing information-competent medical graduates. Without deliberate intervention, medical students will continue to graduate with inadequate skills for navigating the complex information environment of modern healthcare.

The recommendations offered in this study provide a roadmap for strengthening IL promotion in Delta State and similar contexts. The challenges are significant, but the benefits of developing IL competencies are immense: better use of evidence in clinical decision-making, enhanced lifelong learning, and ultimately, improved patient outcomes. Librarians, medical faculty, and university administrations must work collaboratively to make this vision a reality.

Based on the study findings, the following recommendations are made:

1. University administrations, in collaboration with librarians and medical faculty, should develop a comprehensive IL policy that establishes IL instruction as a formal component of the medical curriculum. The policy should specify learning objectives, assessment criteria, and allocate adequate time for IL instruction across all years of study.
2. Medical schools should introduce credit-bearing IL courses at appropriate stages of training. The Association of College and Research Libraries (ACRL) recommends that IL instruction be integrated throughout the curriculum, not confined to orientation periods. Studies have shown that for-credit courses are more effective than one-shot sessions in developing lasting IL competencies.

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3. Institutions should establish formal mechanisms for collaboration between librarians and medical faculty, including representation of librarians in curriculum development committees and joint planning of IL-integrated coursework. Embedded librarianship models, where librarians work directly with faculty in developing and delivering instruction, should be explored.
4. University administrations should invest in ICT infrastructure, ensuring reliable internet connectivity, adequate computer laboratories, and continued subscription to specialized medical databases such as MEDLINE, HINARI, and CINAHL. Access to these resources is essential for developing practical IL competencies.
5. Librarians should adopt blended instructional models combining face-to-face sessions with online modules. This approach is particularly suited to resource-constrained environments, as online materials can be accessed by large numbers of students and revisited as needed -3.
6. IL instruction should not be limited to the early years but reinforced throughout the curriculum, particularly in clinical years. As students engage with real clinical scenarios, IL instruction can be contextualized to demonstrate its practical value
7. Librarians should receive ongoing professional development in IL pedagogy, including effective instructional methods, assessment strategies, and use of educational technology. As the information landscape evolves, librarians must update their own skills to remain effective IL educators.

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