



Information Literacy Skills Training Model for Clinicians Based on a Case Study of their Information Experiences and Practices in South-East, Nigeria

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Abstract

This paper is the outcome of an exploratory case study of Paediatricians in a tertiary hospital in Southeast, Nigeria, which aimed at providing understanding of the relationship between their information experiences, practices and their decisions in patient care. It was conducted using the qualitative method, with data obtained through interviews, diaries and observation. Paediatricians in the cadres of: Consultants, Senior Registrars, Registrars and Residents provided data which was coded thematically with the Nvivo software and analysed using the interpretative method. The findings are that in general: i) there was haphazard approach to information literacy training for the clinicians during professional education resulting in varied information capabilities, and inadequacy of knowledge and skills for good information practice; ii) obtaining medical information from colleagues was the predominant feature of paediatricians' information practices; iii) printed textbooks were the paediatricians preferred source for obtaining medical evidence, however, there was a growing popularity in the use of electronic medical information sources, including at the point of care; iv) there was general perception by the paediatricians that access to, and use of medical information supports patient care and achievement of better treatment outcomes. This perception instilled a sense of value for information use, demonstrated through the clinicians' dedication to the self-provision of information resources; vi) a dearth of medical resources germane to the contextual management of illnesses led to inadequate clinician knowledge in a good number of cases. The study recommends among others that the information literacy skills training (ILST) model developed from the findings, be used as a practical training tool for information literacy for the paediatricians' at the level of residency training to enhance their skills in medical information sourcing and use in patient care.

Keywords: paediatric physicians; information experiences; information practices; information behaviour; information literacy skills, training model

1.1 Introduction

Information literacy entails the knowledge of how to access, interrogate and use information effectively in problem

solving contexts, such as in healthcare provision. It is important for physicians to be information literate given the view of Hoyer (2011, p.21) that 'information best practices

are highly dependent on the context in which individuals find themselves'. This ability becomes more critical where valid decisions are needed in the specific contexts.

Adequate access to and appropriate use of medical evidence by clinicians have been posited as influencing the quality of clinical decisions and outcomes of patient care. In this vein, Shanahan (2007) avers that the physician's possession of competence for appropriate access and use of information is considered a characteristic necessary for coping with the constant changes in present day medical practice. As D'Alessandro *et al.*, (2004) note, a major factor of the constant changes in the 21st century clinical practice is an ever-increasing amount of medical information produced in diverse formats. To cope with this, Shanahan, (2007); Ford and Hibberd (2012) argue that physicians need to possess the competence for accessing sources of medical evidence, evaluating and applying the knowledge obtained from those sources, for taking *the most appropriate clinical decisions*.

There is an ever increasing acceptance in the literature that good clinical practice in present day medical practice should be predicated on the use of evidence. Sackett *et al.*, (2000, p.1), define evidence-based medicine (EBM) as *'the integration of best research evidence with clinical expertise and patient values'*. Evidence-based medicine had earlier been defined by Sackett as cited in Green *et al.*, (2000, p. 218), as the *'conscientious, explicit and judicious use of the current best evidence in making decisions about the care of patients'*.

It is believed that physicians are enabled in discharging their professional roles more effectively when they combined personal knowledge with the correct application of medical information Clarke *et al.*, 2013). Urquhart (2011, p. 39) posits that the use of evidence in patient care implies that *'what practitioners do, and the decisions they make should be based on research evidence of what works, and why it works'*. This view is supported by Morley's (2014) description of evidence-

based medicine as the corollary of information literacy in health care.

1.2 Research Questions

The study posed three questions as follows:

- i. What information experiences do paediatric physicians studied have?
- ii. In what ways do paediatric physicians engage in information practices towards patient care?
- iii. Does the paediatricians' information experience have implications for their information practices and patient care?

2.1 Literature Review

It has been argued that information seeking is driven by the information needs that people have as a general rule of information behaviour. Callen *et al.* (2008) infer that physicians need access to reliable medical information to be able to deliver best possible care to their patients. Their proposition infers that the main reason physicians need information is for the appropriate treatment of their patients. Similarly, Ely *et al.* (2005) suggests that physicians' information need may be about specific patients or general information. Other authors found that there is progressive increase in the role of information use in healthcare and that physicians' information needs are on: diagnosis, drug therapy, epidemiology, and treatment therapy (Davies and Harrison, 2007, p.79). Clarke *et al.* (2013) revealed the types of patient-specific information needs of primary care physicians as; information on diagnosis, medications, treatment, epidemiology, prognosis and aetiology, and stated that both resident and attending physicians had the same information needs. Dee and Blazek (1993) noted that physicians obtain information about new medical findings, new prescription drugs, and how information services contribute distinctly to patient care.

Plugging the information needs of physicians at the right time with appropriate

medical information has become vital for effective patient care because of the gaps that exist between physicians' medical knowledge of good patient care and the actual knowledge that was applied during patient care (Gertrude Lamb cited in Lipscomb, 2000). This gap in the applied knowledge detaches physicians' training and knowledge of best practices from the actual practice. There is an increasingly popular perspective that the physician's possession of functional information literacy provides capability to resolve this gap between knowledge and practice. Keating *et al.* (2004) applauded the importance of providing doctors with evidence-based clinical guidelines for use in the Emergency Department of hospitals as contributory to ensuring best practice and achievement of right results. Clarke *et al.* (2013) similarly buttressed this imperative:

“if information needs remain unanswered at the time physicians and nurses are making clinical decisions, then delayed or uninformed decisions might occur with consequences for medical errors like incorrect diagnosis, error in administering treatment or failure to provide prophylactic treatment which impacts the quality and outcome of decisions”(p.179).

D'Alessandro *et al.* (2004) suggest that a physician's decision making at the point of care is affected by information resources at their disposal in the decision making process. The authors further posit that:

“medical decision making is being revolutionized by new techniques in information management, improved methods for accessing the medical literature, and the growing application of expert systems to clinical practice”(p. 378).

The information needs of physicians vary according to their different specialties. However, the specific information needs of paediatric physicians as a distinct group have not been deeply studied and outlined in the

literature (D'Alessandro *et al.*,2004, p.18). Their study reveal that the most common generic questions paediatricians ask in expression of their major areas of information need is; “*What is the dosage of drug X? What is the treatment for condition X? What is condition X?*” (p. 21).

The main areas that safety was often sought were on a drug's indication and use, dosage and administration, and adverse effects. This subsequently provides direction to the physicians' in their prescription of the drug for their patients. According to Helm & Shishmanian (1997) Paediatricians also need to know about any special health services initiated in support of child health care. These relate to early preventive treatment services where paediatricians are well positioned to play key roles in identifying children in need of the services.

The imperative of paediatric physicians developing information sourcing and utilization capacity for clinical practice was highlighted in a study which revealed that the paediatricians '*often are asked or ask themselves questions for which they do not have a ready answer*' (Norlin, *et al.*, 2007, p. 396). This finding underscores the value of information in enhancing the paediatrician's ability to master practice expectations and stimulate the trust of patients during care.

A few studies have been conducted on the information behaviour of physicians in Nigeria with respect to the information sources they use. Such previous studies on the information use of healthcare professionals in Nigeria Baro (2013); Komolafe and Onatola (2008) and Ajuwon (2006) indicate that medical professionals use various forms of information resources, mostly from explicit sources, for anchoring their decisions in patient care.

Ajuwon's (2006) study of physicians' use of the internet for health information in a teaching hospital in South West Nigeria reveals that 90% of doctors used internet to obtain information for patient care. However, their use of evidence-based medicine resources was

minimal. Another study of three teaching hospitals in south west Nigeria by Idowu, *et al.* (2003) revealed that the hospitals did not provide internet connectivity forcing doctors to use private means to access the internet. The clinicians also relied heavily on mobile phones for communication between wards, consultation and patient care administration, mirroring a combination of explicit and oral sources of information. Both studies agree that doctors used the internet as a source of information, with Ajuwon (2006) revealing that e-mail was the most commonly used internet service among the doctors.

In a different study of two teaching hospitals in South West Nigeria, Oduwole (1999) indicated that the doctors sought information for the purposes of managing patients, evaluating new drugs and support for the diagnosis of ailments. The doctors utilised sources such as; scientific and technical journals, Index Medicus, Excerpta Medical, CD-ROM (MEDLINE) databases, and foreign magazines (p.109). The doctors in the study rated the information from these sources as very useful for clinical decisions during patient care. Meremikwu *et al.* (2011) inferred in another study that the number of Nigerian physicians contributing to the Cochrane evidence-base medical database has increased in the recent past. This development is indicative of a positive disposition by Nigerian physicians the use of electronic information resources. Apart from physicians, other health care professionals' information behaviour has been similarly reported in the literature. Komolafe and Onatola (2008) and Baro (2013) studied the information-seeking behaviour and information use among nurses in Nigeria and reported the use of explicit sources such as textbooks. Ajuwon (2003) studied the internet information use by trainee nurses and first year clinical students. The study revealed that 63% of medical students regularly obtained health-related information from the Internet. The study further revealed that although cyber café

was the most commonly used source for internet access, majority of the students had never searched a medical database.

Baro's study of two hospitals in Bayelsa State in South-South Nigeria revealed that better patient care was the strongest reason nurses sought for information. This reason was followed by information on medication, better job performance and keeping up-to-date. The sources that the nurses consulted for information, agrees with the findings of Komolafe and Onatola (2008) with the exception of seminars and workshops were; colleagues, Nursing Journals, Internet, Medical databases, Librarians and books were the sources nurses relied on for medical information. A study of information behaviour of medical students in South-South Nigeria by Baro *et al.* (2011) revealed that more explicit sources of information: print and electronic were utilised for meeting their information needs. The specific information sources used by the students were ranked in order of importance as; medical journals, textbooks, Internet, Colleagues and the National University Commission (NUC) virtual library. These studies found for the literature review on Nigeria had a regional focus in coverage. The majority of the studies were conducted with scope covering the South-west part of Nigeria. Only Baro (2013) and Baro *et al.* (2011) provided perspectives from another part of the country, precisely the South-south region. The reviewed studies revealed that healthcare professionals in the two regions valued the importance of information use for patient care, and demonstrated this value by their use of various information sources that were mostly explicit. Also the common thread uniting majority of the reports were the inadequacy of supportive information infrastructure and services to ensure effectiveness in the information practices of the healthcare professionals. A diagrammatic summary of the salient views raised in the literature is presented hereunder.

Physicians' information needs

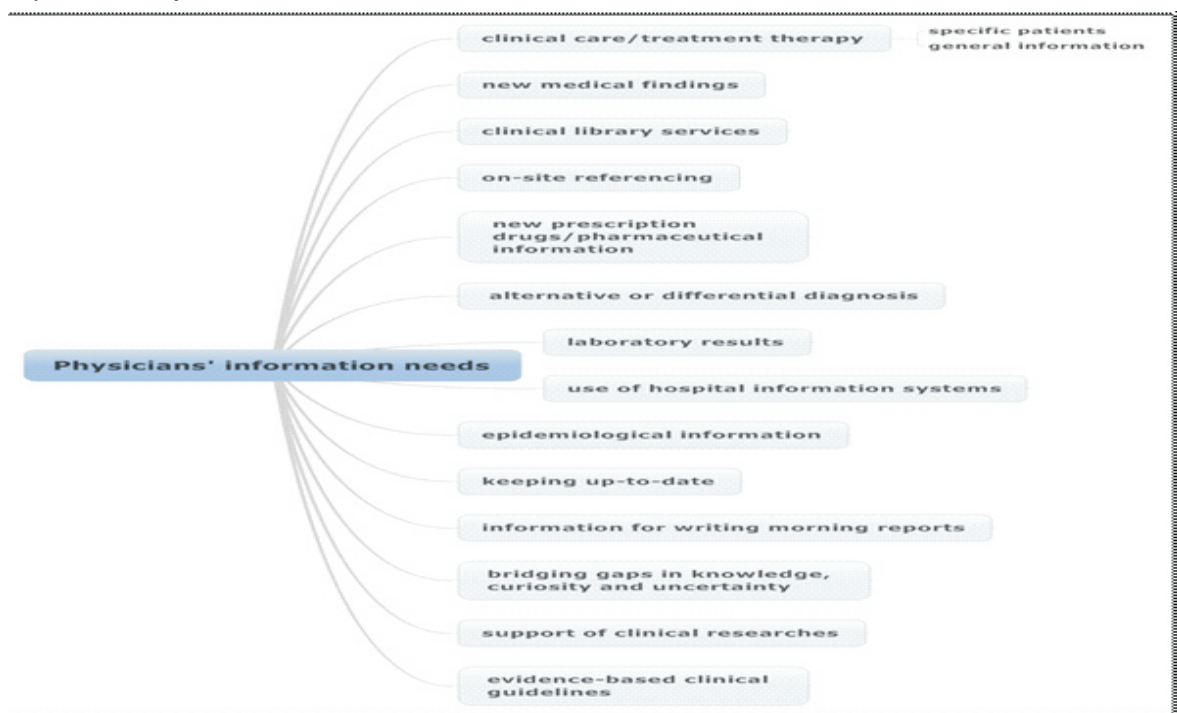


Figure 1: Summary of physicians' information needs as identified in the reviewed literature

Figure 1 shows that previous studies have identified fourteen general information needs of physicians practicing in all sub-specialties of medicine. The diagram which is not hierarchical represents the needs that every physician encounters during practice for patient care. It was identified that physicians generally need information for/on: i) clinical care and treatment therapy, which in turn could be for a specific patient or on a general note, ii) new medical findings, iii) clinical library services, iv) on-site referencing, v) new prescription drugs and other pharmaceutical information, vi) alternative or differential

diagnosis, vii) laboratory results, viii) use of hospital information systems, ix) epidemiological information, x) keeping up-to-date, xi) writing morning reports, xii) bridging gaps in knowledge, satisfying curiosity and resolving uncertainties, xiii) support for conducting clinical researches, and xiv) evidence-based clinical guidelines.

Paediatric physicians' information needs

The literature review further identified the specific information needs of physicians practicing in the sub-specialty of paediatrics as shown in figure 2.

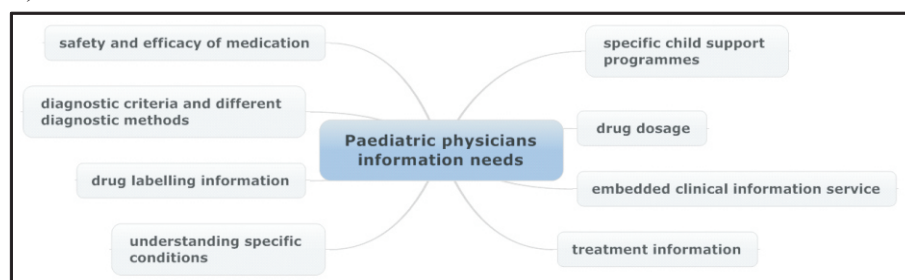


Figure 2: Information needs of paediatric physicians as identified in the reviewed literature

As shown in figure 2, paediatric physicians need information for/on: i) the safety and efficacy of medication (drugs), ii) diagnostic criteria and different diagnostic methods, iii) drug label/leaflets information, iv) understanding specific disease/treatment conditions, v) specific child support programmes, vi) drug dosage, vii) embedded clinical information service, and viii) treatment information.

Physicians' information seeking behaviour

The reviewed literature identified the information-seeking behaviour of physicians in relation to efforts geared at satisfying individual information needs. This is shown in figure 3.

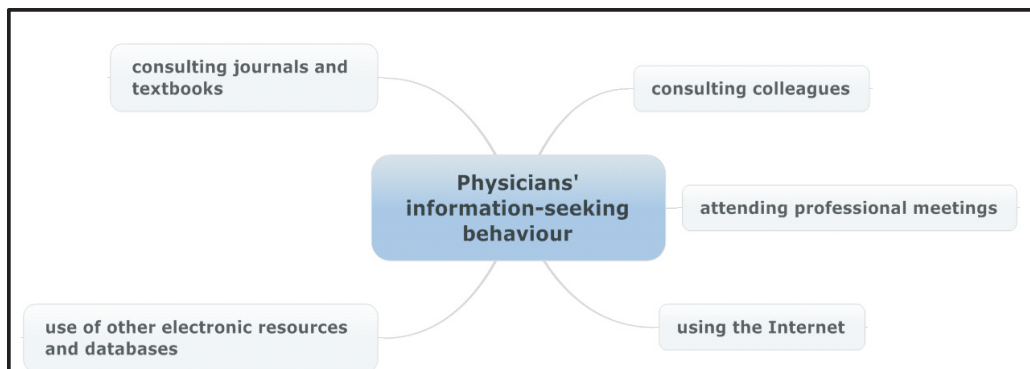


Figure 3: Physicians' information seeking behaviour as identified in the reviewed literature

Figure 3 shows that the literature review identified five major means physicians' adopt for satisfying their information needs. The five means are: i) use of journals and textbooks, ii) use of electronic resources and databases, iii) consulting colleagues, iv) attending professional meetings, and v) using the internet.

Information literacy practice

The identified capabilities which are associated with people's practice of information literacy from the literature are presented in figure 4.

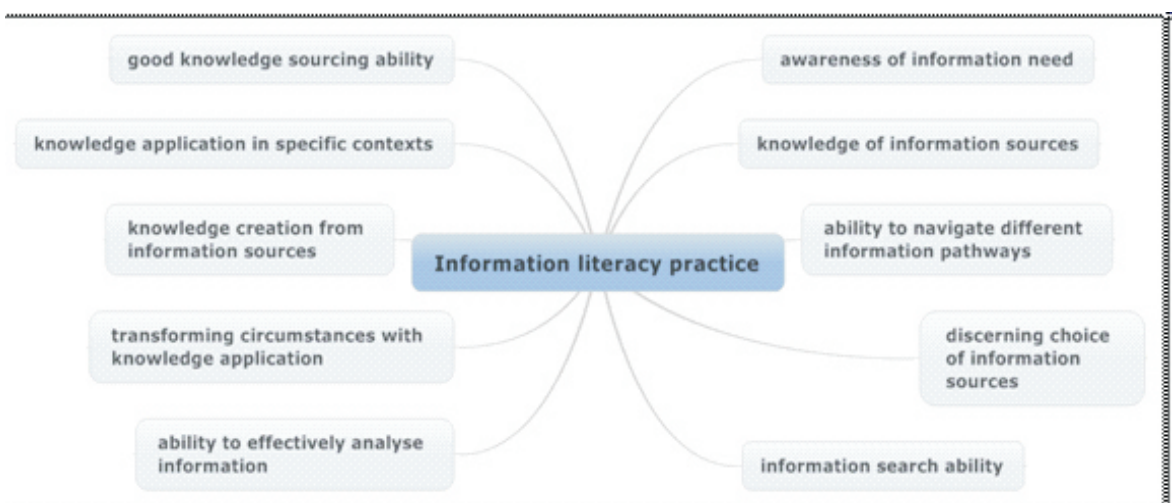


Figure 4: Capabilities associated with information literacy practice as identified in the reviewed literature

This is a non-hierarchical diagram in figure 4 which lists ten capabilities of information literacy practice as: i) good knowledge sourcing ability, ii) knowledge application in specific contexts, iii) knowledge creation from information sources, iv) transforming circumstances with knowledge application, v) ability to effectively analyse information, vi) awareness of information need, vii) knowledge of information sources, viii) ability to navigate different information pathways, ix) discerning choice of information sources, and x) information search ability. These

capabilities are exhibited by information literate individuals with none being more or less important. All the capabilities contribute to enabling the information literate person to be able to practically use information for solving specific individual, everyday life and workplace problems.

Ways of experiencing information literacy

The specific ways people become information literate to be able to demonstrate the capabilities outlined above is shown in figure 5.

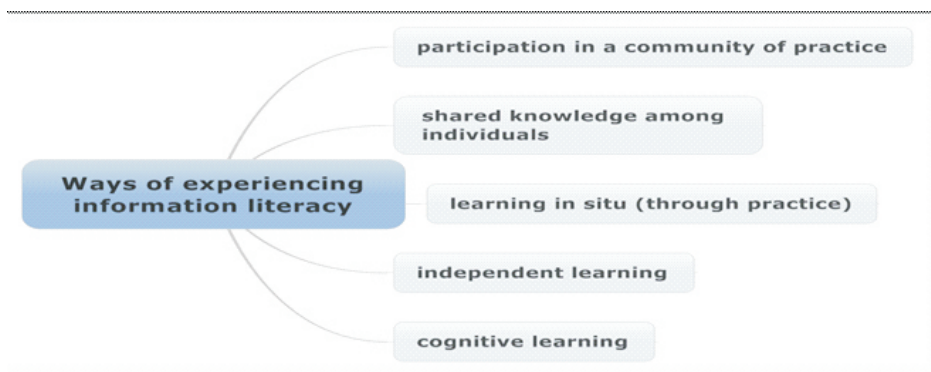


Figure 5: Ways of experiencing information literacy as identified in the reviewed literature

Figure 5 is a representation of the means through which people become information literate as identified in the literature. This indicates the five different ways of experiencing information literacy as: i) participation in a community of practice; ii) shared knowledge among individuals or colleagues; iii) learning in situ or learning during practice; iv) independent learning; and v) cognitive learning experiences such as taught information literacy programmes.

Information sources used by physicians in Nigeria

The literature review identified the information sources presently used by physicians in Nigeria's health care system as shown in figure 6.



Figure 6: Sources of information used by physicians in Nigeria

Figure 6 shows the information sources used by healthcare professionals in Nigeria to satisfy their information needs as identified in the reviewed literature. Six sources were identified: i) use of the internet, ii) using the hospital/ clinical library, iii) personal information materials, iv) CD-ROM MEDLINE, v) medical journals, and vi) mobile phones which were useful for/during; communication between wards, consulting patients and patient management.

Purpose and Value of information use by physicians in Nigeria

The purpose of use and perception of usefulness of information sources by health care personnel in Nigeria as found in the literature is presented in figure 7.

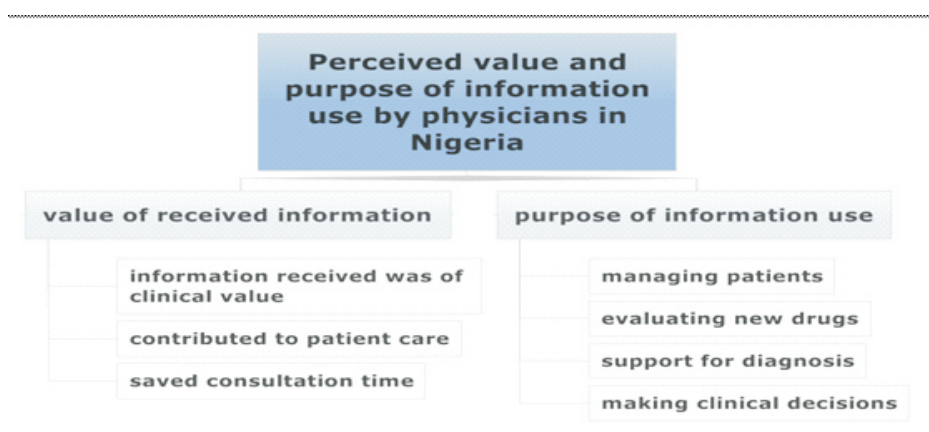


Figure 7: Purpose of use and perceived value of information sources by physicians in Nigeria

Figure 7 shows that physicians' in Nigeria perceived that the information they received from various information sources had clinical value for decision making, contributed to their care of patients and saved consultation time through increasing their personal knowledge. The physicians' attributed the purpose of information use to: i) managing patients, ii) evaluating new drugs, iii) support for diagnosis and, iv), making clinical or patient care decisions.

4.1 Results based on the Research Questions

The following summary of answers to the research questions from the different data sources revealed as follows:

4.2 What information experiences do paediatric physicians in Nigeria have?

- The paediatricians experienced inadequate information literacy tuition during professional training leading to their adopting mainly an informal information

culture that was largely dependent on human sources for medical information.

- There was a strong value for and practice of information sharing and collaboration among the paediatricians
- There was ineffectual hospital library information service (evidenced in: librarian ineffectiveness; out dated/ insufficient resources), inadequate information infrastructure, resulting mainly in paediatricians' adopting self-help measures.
- There were limited sponsorships to conferences/ workshops/seminars and other continuous medical education (CME) programmes for the paediatricians.

There was a general admission of inadequacy by clinicians over their personal capabilities in the knowledge of information sources. Although a few felt they were very good in using resources on the internet, many admitted possessing limited ability for successfully navigating around and accessing the information resources they needed from online sources. Some of the

information literacy needs of the clinicians in this regard ranged from 'how to recognise good sites' to 'Knowing how to find information' because in the view of this clinician:

"Some of us know about a few medical sources of information, but have no real knowledge on how to access and use them, especially the electronic ones, so some training will be beneficial to us"(Interview 5, Resident, male).

A consultant admitted his limitation in the knowledge of online medical sources:

"[...] one of the limitations I have is that I don't know too many sites and databases. It used to be only PubMed, Medscape until someone told me about Google Scholar recently"

This admission by one of the most senior doctors indicates that this limitation in the information access capability of people could cut across the entire rank of the paediatricians. Other limitations faced by the clinicians include not possessing adequate skills to understand the technicalities of navigating some online sources. One clinician noted that there were *'technical difficulties associated with trying to browse some sites on the Net [which are] very discouraging ...'* Similarly one clinician also admitted; *'there are sites [he finds] difficult to access'*. The clinicians generally accepted the necessity for information literacy training for increasing their knowledge and capacity for information use in general and particularly from online sources. Some of the clinicians said:

I think it will be necessary for the hospital to organise a workshop to train doctors on how to source for medical information from the various sources available (Interview 5, Resident, male).

I think everybody here will benefit if the hospital puts up a training course for doctors on how to access and use information from sources relevant to their fields, particularly the internet based sources

(Interview 20, Resident, female).

4.3 In what ways do paediatric physicians in Nigeria engage in information practices towards patient care?

- Paediatricians' preferred the use of text books for evidence, while colleagues were primarily the source of routine information (interpersonal discussions, group studies, internal seminars, and other forms of collaboration/information sharing).
- The use of the Internet and electronic medical sources is increasingly popular, accompanied by a growing interest in point of care information access, mainly from personal portable i-media devices.
- When managing critical incidents, resident physicians preferred obtaining information from colleagues, while clinicians in the higher ranks of registrars to consultants preferred using the internet.

4.4 Does the paediatricians' information experience have implications for their information practices and patient care?

- The paediatricians' negative experiences with the information services at the hospital library, contrived what the researcher labelled as information service rejection behaviour (ISRB), evident in the rare use of the library, the librarians and the HINARI electronic database.
- The paediatricians possessed inadequate knowledge and skills for evidence-based practice due to poor information literacy training.
- There is probability that their inability to use what Harrison and Beraquet (2009, p. 130) described as *'first class evidence'*, could affect quality of clinical decisions and patient treatment outcomes.
- Over-dependence on textbooks for evidence portends that superseded information could be used for clinical decisions, even as colleagues could offer anecdotal

information with probable negative consequences for decisions about patients' health.

5.1 Discussion of Findings

The study discovered that the paediatricians' had an over-reliance on textbooks as sources of evidence, and oral sources in every day clinical decisions. In the case of books, this information behaviour could result in their utilising superseded information for making decisions on patient's health with potential negative consequences. Although the use of Medscape database was increasingly becoming popular, the paediatricians' most preferred source for obtaining medical evidence was textbooks due to a perception of reliability of content. The prevalent use of oral medical information from colleagues for patient care decisions, does not also guarantee reliability of information use. This factor is more problematic for the Resident Paediatricians who revealed that they depended on the use of oral information during critical patient care. Furthermore, the general lack of capacity for evidence-based practice among the paediatricians could negatively affect the quality of clinical decisions and the eventual outcomes of patient care.

There was lack of adequate information skills due to poor information literacy tuition evidenced in inadequate knowledge of information sources and their appropriate usage. Other identified barriers were; poor hospital library services including; lack of current books, information literacy programme for clinicians, support for evidence-based practice and poor internet service. The costs to the paediatricians for undertaking self-subscriptions to information devices and resources hindered adequate access to information.

The paediatricians equally contended with the paucity of knowledge caused by a dearth of local medical resources appropriate for the contextual management of rarely occurring, and some other types of tropical childhood diseases. The study revealed that the paediatricians encountered a dearth of local

resources when they had information needs on some illnesses especially those that rarely occurred in the tropics. One of the reasons discovered to precipitate the paediatricians' information need generally, was an understanding of the geographical context of managing diseases, particularly those diseases that were rare locally. This, together with information on new technologies, was also a major reason physicians in Tanzania gave in a case study conducted by Norbert and Lwoga (2012) on the information seeking behaviour of physicians. This dearth of medical resources on some subjects was attributed to the fact that geographical and contextual peculiarities in illness occurrence affect medical resource publication and the probability of its availability.

Specifically, the study discovered that the paediatricians' had impaired ability to effectively use evidence sources in patient care, due mainly to inadequate knowledge of evidence-based practice, lack of knowledge about evidence sources, poor navigational skills and inadequacy of available resources at the hospital. Oral-based sources, usually colleagues, were chiefly utilised for obtaining medical information. Encouragingly, however, there was a growing interest in the use of the Internet and other electronic sources by the physicians, including at the point of care.

The study deduced that there was haphazard approach to information literacy training during professional preparation at the respective medical schools where paediatricians' trained. This orchestrated inadequate and varied information practice capabilities for them. Despite this negative experience, the paediatricians other information experiences outside formal medical training, have instilled in them the perception that access to, and correct use of medical information enables the provision of appropriate healthcare. However, in general, the paediatricians' possessed a good degree of awareness about the value of information for patient care; however, there was inadequacy of appropriate supportive information services at the hospital to ensure they maintained good

information practices. The poor and unsatisfactory information services of the hospital library had resulted in paediatricians developing information service rejection behaviour (ISRB) towards the ineffectual services.

5.2 Proposed Information Literacy Skills Training (ILST) Model for the Physicians

The study's summary of findings above was used to design a proposed ILST model which suggests collaborative information literacy training for the Paediatricians during residency training. The suggestion is for this training to be mediated by the medical faculty and librarians. This is the study's contribution to existing body of knowledge on clinicians' information literacy training, and most importantly, information behavior in clinical practice. The ILST model proposes a suitable training framework to adequately inculcate information literacy, as premised on the deficiencies revealed by the study on the paediatricians' present information literacy practices. The ILST is envisaged in particular, to contribute to solving the problem of overarching oral-ness of the paediatricians' information behaviour, which rarely supported appropriate evidence-based practice.

The ILST model essentially demands that

besides a didactic tuition of formal information literacy courses; that the information literacy programme takes into account the oral aspects of the paediatricians' information-seeking behaviour, in line with the study's findings. Consequently, interpersonal methods supervised mainly by the librarians and medical faculty would be best suited for developing this aspect of information literacy skills. The study presumes that factoring the paediatricians' oral-predominate information behaviour into an information literacy programme will yield desired result in inculcating overall good information practices.

First, it is recommended that ensuring uniformity of good information practice requires the implementation of systematic development of the paediatricians' information capabilities. For example, embedding uniform information literacy courses and non-formal information literacy training in the paediatric residency is envisaged to have potentials for improving information practices of the clinicians. The suggested components of this model aim at plugging the information literacy capability inadequacies identified through this study, which adversely affected the paediatricians' information practices. These components areas outlined in the ILST model in figure 8.

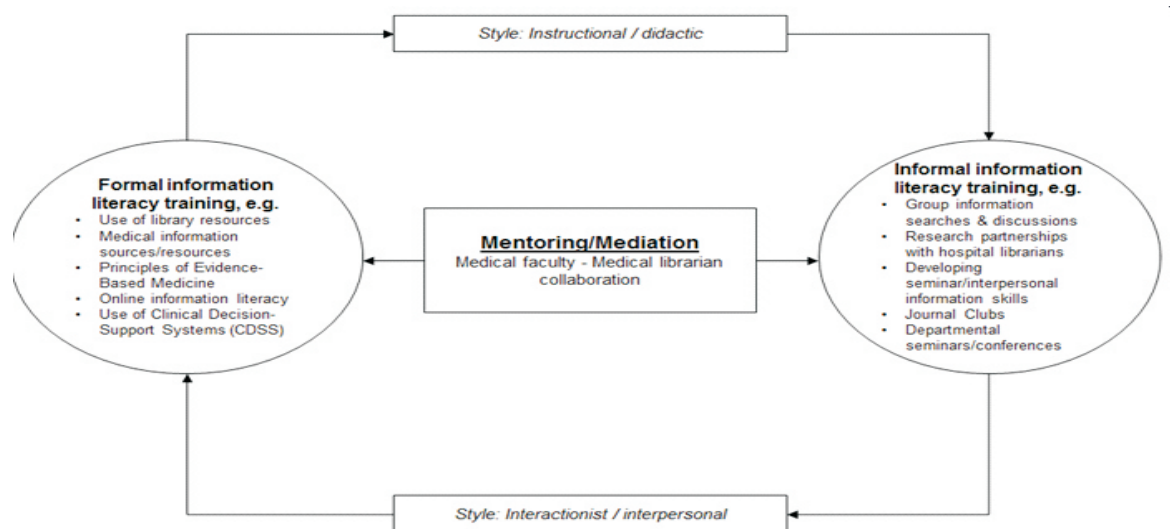


Figure 8: Information Literacy Skills Training (ILST) Model for the Paediatricians: A Proposal by the Researcher

The rationale for adopting the ILST model is that there is need for the modification of paediatric residency training methods on information literacy and competences to reflect changing global trends and engender better information capacity for the paediatricians. The training of paediatric residents requires placing more emphasis on the clinicians' development of information literacy capabilities in aid of the practice of evidence-based medicine.

It is envisaged that the ILST model fits into the information literacy training needs of health care professionals in different specialties. It is, therefore, recommended that the ILST model be adopted for the inculcation of information literacy skills to trainee and practicing physicians and healthcare givers in other specialties. The practice identified in this study, where there was a top-down attribution of information authority based on seniority and practice experience, could be leveraged on for providing a more definite form of mentoring system for training junior paediatricians on information skills. A personalised, better structured form of mentoring appears plausible for maximising the potentials of this type of information practice in enhancing the information experiences and knowledge of the junior clinicians.

Mentoring, where the consultants played a greater role in training junior clinicians could become more formalised within the residency programme. This would enable better tuition, information and knowledge sharing which could empower the junior clinicians with more knowledge and better clinical competence.

Conclusion

This paper concludes that providing training on information literacy has become paramount for producing effective paediatric physicians. It ought to be noted that the

peculiarity of paediatricians' information needs in aspects of decision-making at the point of care, heightens the imperative for providing them with adequate information capabilities through planned information literacy training, towards supporting their evidence-based decision making.

Recommendations

The study recommends that:

1. Training for information literacy skills during professional training of the paediatricians is accorded more seriousness in order to curb the observed tendencies of their adopting mainly an informal information culture that was largely dependent on human sources for medical information.
2. Ensuring uniformity of good information practice requires the implementation of systematic development of the paediatricians' information capabilities by embedding uniform information literacy courses and non-formal information literacy training in the paediatric residency for improving the information practices of the clinicians.
3. This information literacy skills training (ILST) model, be used as a practical guide for inculcating information literacy to the paediatricians' at the level of residency training to enhance the physicians information literacy skills in medical information sourcing and use in patient care.

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