Review Article

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Quick Response Code:

Website: www.jehp.net

DOI: 10.4103/jehp.jehp_272_20

Clinical informationist educational needs and goals: A scoping review

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Abstract:

Clinical informationist (CI) is one of the current trends in the field of medical librarianship and information science. CIs are members of clinical care teams, and their main duty is to fill the gap in the information needs of health-care workers and patients using information sources. They need an official and standard education. This study aims to identify the educational goals and needs of CIs. To this end, a scoping review was conducted using the Preferred Reporting Item for Systematic Reviews and Meta-analyses guidelines. The ISI Web of Science, Scopus, Proquest (MEDLINE), Science Direct, Emerald, ERIC, Cochrane, and Library, Information Science and Technology Abstracts were searched. The *Journal of the European Association for Health Information and Libraries* was hand searched for relevant studies. A total of 1026 studies were extracted, and 38 studies were selected for the final review. The review resulted in identifying 18 goals in cognitive, emotional, and psychomotor areas. Furthermore, the educational needs were identified in eight educational needs including research method and statistics, education, medical knowledge, information and librarianship science, clinical environment knowledge, evidence-based knowledge, information technologies and systems, management, and leadership. Although part of these educational needs can be met through general medical librarianship and information science education, further specialized education for CIs requires specific aims and curriculum. Thus, the results of this study can be the basis for future studies regarding the competencies of CI in order to provide a more precise and detailed curriculum based on these educational needs.

Keywords:

Education, information science, librarians, library science

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Received: 01-05-2020
Accepted: 16-05-2020
Published: 28-07-2020

Introduction

Clinical informationist (CI) is one of the current trends in the field of medical Librarianship and Information Science. CIs are members of clinical care teams,[1] whose primary responsibility is to fill the gap in the information needs of health-care workers and patients via information sources.[2] Today, CIs, as capable and adept individuals, act as a liaison between information sources and medical and clinical professionals, and they have active roles in evidence-based medicine. To participate in medical teams and fulfill their duties effectively, CIs require medical knowledge, familiarity with medical jargon and clinical environment, and organizational policies. In addition, they need proper communication with members of the medical team and patients and their families to deal with stressful environments.[3]

The concept of CI was first introduced by Davidoff and Florance in 2000[2] using mutual education between medical, computer science, and information science fields. They stated that the clinical librarianship programs often remain outside of normal clinical workflow, making clinical librarians be still dependent on libraries. While a clinical librarian receives a short-term education before providing clinical librarianship services, CI, also being

How to cite this article: Hashemian M, Rahimi A, Yamani N, Adibi P, Zare-Farashbandi F. Clinical informationist educational needs and goals: A scoping review. J Edu Health Promot 2020;9:193.

a librarian, requires more official and standardized education, including basic medical concepts, principles of clinical epidemiology, biostatistics, critical appraisal, and information management. Moreover, CIs need practical skills for retrieving, synthesizing, and presenting medical information to be able to work as part of clinical care teams.[2]

To develop an effective educational program for CIs, it is necessary to identify their required competencies. Although the necessary competencies of CIs have not been studied exclusively, some efforts have been made in order to determine the necessary competencies for health librarians. The Medical Library Association (MLA) presents the required competencies for health information professionals in the following six categories: information services, information management, instruction, and instructional design, leadership and management, evidence-based practices and research, and health information professionalism.[4] In addition, Ma *et al*. determined the essential competencies for health information professionals and compared them to those introduced by MLA.[5] Some curricula in the field of medical librarianship and information science or informationist are also developed according to the new trends and emerging roles of medical librarians.[6-12]

As Davidoff and Florance stated, CI is a professional position, for which specialized educations required. Given that, no studies have specifically investigated the necessary competencies for CIs, the present study aims to identify the required competencies for CIs in order to determine the educational needs for CIs. To this end, the main objective of the study is to answer the following questions:

1. What are the educational needs of CIs?
2. What are the goals of educational programs for CIs?

Methods

This scoping review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.[13] To achieve the intended studies, published studies were searched in the Web of Science, Scopus, Proquest (MEDLINE), Science Direct, Emerald, ERIC, Cochrane and Library, Information Science and Technology Abstracts databases, using the keywords of Informationist, Clinical Informationist, Information Specialist, Information Specialist in context, Clinical Librarian, Clinical Medical Librarian, Clinical Librarianship, Health librarian, Medical librarian, Health librarianship, Medical librarianship, Education, Training, Instruction, Curriculum, Curricula, Competency, Role, Duty, Task, and Responsibility. In addition, the *Journal of the European Association for Health Information and Libraries* was hand searched for relevant studies.

The inclusion criteria encompassed all the associated studies published in English until the end of 2018, which were accessible in full texts.

In the initial search, 1026 studies were retrieved. The retrieved sources were added to the EndNote software. After the elimination of duplicates, 329 studies remained. In the next stage, first, the title and abstract of the remaining studies were reviewed and 236 studies were excluded. Then, two members of the research reviewed the full text of the remaining 93 studies based on inclusion criteria and selected 38 studies. The selection process is presented in Figure 1.

The data were extracted related to author, title, year of publication, study design, study goal(s), study results, educational goals, and educational needs using an extraction form [Table 1]. Two members of the research team extracted the data from each study individually and then compared their results. The third reviewer made the final decision in disagreements.

Results

The final literature review resulted in 33 educational goals from 38 studies. After the evaluation by the research team (including medical librarianship and information science experts, clinical experts, and educational planning experts) and elimination of duplicates, a total of 18 educational goals were obtained in cognitive, emotional, and psychomotor areas [Table 2].

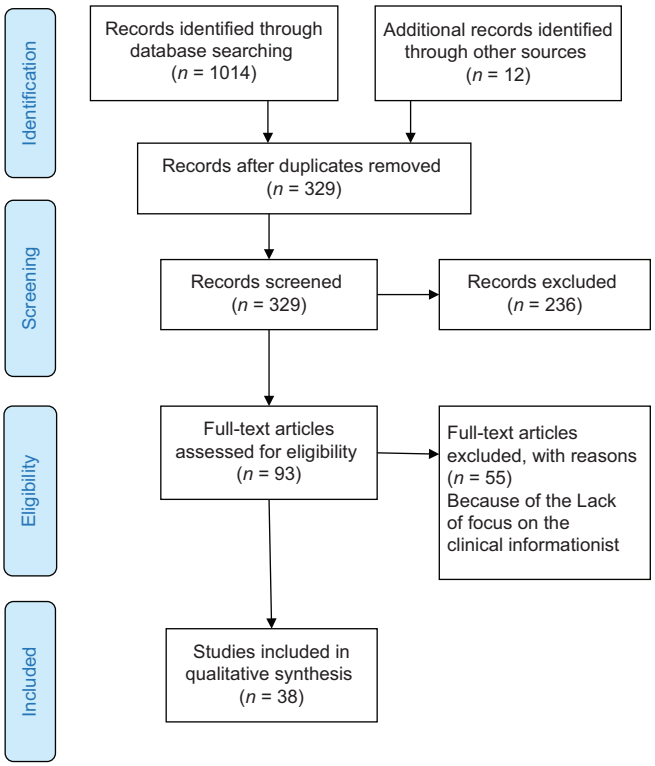

Figure 1: PRISMA flow diagram of the review process

Table 1: An example of data extraction form

Author/title/year of publication	Study design	Main goal(s)	Main results	Question 1: What are the educational needs of CIs?	Question 2: What are the goals of educational programs for CIs?
Gefsheim, Suzanne F./The informationist: building evidence for an emerging health profession/2010	Survey	Investigating the effect of informationist on clinical team information behavior	Informationists can play an important role in improving the information behavior of clinical professionals. They should take courses based on the team they work for	Subject knowledge and evidence-based medicine	aware of related clinical areas (cognitive goal)

CIs=Clinical informationists

Table 2: The educational goals for clinical informationist according to literature

Area	Needs (references)
Cognitive	CI must be knowledgeable in related clinical fields[1,14]
	CI must have basic scientific knowledge[7]
	CI must have an understanding regarding research evidence[7]
	CI must have sufficient knowledge for using clinical and biomedical information databases[7]
Emotional	CI must have sufficient self-esteem[3,15]
	CI must feel like part of a uniform team[3]
	CI must feel accepted by the clinical team[3]
	CI must be interested in helping others[3]
	CI must feel that his presence is making a valuable difference in the team[3] CI must have positive communication with healthcare providers[3]
	CI must be able to have positive communications with patients' families[3]
	CI must resist negative behavior shown by others[3]
	CI must be resistant against occurrences such as patients' deaths and emergency conditions[3]
	CI must have sufficient motivation for working in a clinical environment[16]
	CI must be willing to answer clinical questions[17]
	CI must be interested in clinical and specialized topics[17]
Psychomotor	CI must have the ability to use information technologies and systems[18]
	CI must be able to search, retrieve and extract information from information sources and articles through an advanced filtration process[7]

CI=Clinical informationist

Investigating the literature resulted in the identification of 123 competencies, duties, and skills for health librarians and after evaluation by the research team, topics related to CIs were selected through the agreement between researchers. Then, the duplicates were eliminated, and similar topics were categorized together as the educational needs for CIs. On this basis, a total of eight educational needs were identified, including research method and statistics, education, medical knowledge, information and librarianship knowledge, clinical environment knowledge, evidence-based practice knowledge, information technology and systems, management, and leadership [Table 3].

Discussion

According to Davidoff and Florance, being a CI requires professional education.[2] Detlefsen proposed that CIs' need experience and educational competencies.[36] Although part of these educational needs can be met through general medical librarianship and information science education, further specialized education for CIs requires a specific curriculum. On the other hand, the results of the study by Detlefsen showed no librarianship and information science courses in North America, especially the target medical librarianship and information science.[29]

Despite CI has been one of the current trends in medical librarianship and information science in recent years, few specific curriculum and educational goals have been developed for this purpose. Therefore, identifying the educational needs of CIs and creating necessary curriculums can be a major step toward providing the CI services. The current study aimed to determine the educational goals and needs of CIs. A review of current literature resulted in the identification of 18 goals in the cognitive, emotional, and psychomotor areas and 8 main and 65 secondary educational needs.

The identified educational goals in this study are based on the current evidence and might not be comprehensive. Therefore, a more detailed investigation of the required competencies and educational needs of CIs can develop more comprehensive educational goals for CIs. Because educational goals have not been fully documented in any studies, the results of this study can facilitate the further

Table 3: Educational needs for clinical informationist

n	Main needs	Secondary needs	References
1	Research methods and statistics	Familiarity with qualitative and quantitative research methods	[5,8,12,14-17,19-27]
		Familiarity with medical research methods	
		Knowledge of research design, interpretation, and evaluation	
		Familiarity with design and implementation of systematic reviews	
		Critical evaluation	
		Biostatistics and clinical statistics	
		Clinical epidemiology	
2	Education	Ability to develop patient educational programs	[1,3,5,8,10,12,15,16,20,24,25,27-34]
		Ability to participate in medical education programs	
		Ability to create information literacy educational programs	
		Ability to provide the necessary education for clinical staff	
		Ability to participate in continuous medical training	
		Ability to teach information seeking skills	
3	Medical knowledge	General and basic medical knowledge	[3,5,9,12,14,15,17,22,25,28,35]
		Specialized knowledge in the relevant clinical or research area	
		Medical terminology	
		Health-care knowledge	
		Drugs information	
4	Information and librarianship knowledge	Ability to understand and evaluate the information needs of users	[3,5,11,16,18,21,25,26,28,36-38]
		Familiarity with information-seeking behaviors and decision-making methods of clinical specialists	
		Providing information services based on users' needs	
		Ability to search specified information sources related to clinical fields	
		Knowledge of medical and clinical databases	
		Familiarity with different sources and scientific evidence	
		Familiarity with referencing methods and related software	
		Knowledge of MeSH and NLM cataloging	
		Health information literacy	
		Familiarity with management and organization of health information sources	
		Familiarity with information services in health sciences	
		Understanding regarding health information resource management with different formats	
		Data/information/knowledge management	
		Familiarity with biomedical resources	
		Access to organizational data	
		Basic competencies in information transfer (inter-disciplinary)	
		Knowledge of information environment	
5	Clinical environment knowledge	Familiarity with healthcare and clinical environment and policies	[3,8-10,12,15,16,24,25,27,30,31,34,39]
		Familiarity with hospital processes	
		Knowledge of financial support and planning of medical cares	
		Knowledge of health-care services in the country and abroad and their relations	
		Knowledge of legal and ethical considerations in healthcare	
		Knowledge of international medical organizations	
		Knowledge of national medical organizations and their duties	
		Familiarity with clinical teams and their roles	
6	Evidence-based practices knowledge	Familiarity with the evidence-based process	[1,12,14,17,32-34]
		Familiarity with the design and formulation of clinical inquiries	
		Ability to answer clinical inquiries	
		Ability to summarize and distribute research results	
		Ability to combine different information	
		Reasoning abilities	
		Providing evidence-based documents	

Contd...

Table 3: Contd...

n	Main needs	Secondary needs	References
7	Information technology and systems	Familiarity with information technologies and systems The ability to use information and communication technology in medical communications Familiarity with applications in health care Familiarity with medical information retrieval systems Ability to use technologies and systems for information management Using software to access databases and knowledgebase Ability to support web and multimedia services Familiarity with ontologies and the ability to design Familiarity with medical information retrieval systems	[5,11,12,15,18,21,22,24,25,27,28,31,34,36,39-41]
8	Management and leadership	Familiarity with management and organizational behavior Familiarity with leadership skills Familiarity with financial issues Familiarity with communication skills Project management capabilities	[5,8,10,11,15-18,20,22,24-28,31,36,37,39,40]

MeSH=Medical Subject Headings, NLM=National Library of Medicine

efforts to develop a comprehensive set of educational goals for CIs.

The educational needs identified in this study are beyond what mentioned by Davidoff and Florance.[2] To put it differently, the educational needs in the areas of education, clinical environment knowledge, evidence-based processes, and management and leadership do not exist in the educational needs introduced by Davidoff and Florance.[2] The findings of this study are highly compatible with MLA competencies.[4] Although MLA competencies are developed for health information specialists with some of their details related to library services and not a clinical environment, the MLA competencies can still be used as the basis for CI curriculums.

Some evidence attempted to develop a comprehensive curriculum for CIs. The educational content proposed by Byrd for the CI curriculum in a 6-year pharmaceutical educational program covers not only the educational topics mentioned by Davidoff and Florance,[2] but also includes specialized pharmaceutical topics that can prepare CIs for pharmaceutical environments. The specialized pharmaceutical topics proposed in the study by Byrd, are similar to the medical knowledge requirement identified in the current study. Although Byrd emphasized on the pharmaceutical specialized knowledge, the results of this current study provided a more comprehensive framework.[6] The educational content proposed by Lyon for a short modular CI educational program in the area of biology includes specialized topics in the fields of genetics, laboratory techniques, and molecular biology alongside topics related to librarianship and information science. This educational content is also similar to the medical knowledge and librarianship and information science needs identified in this study.[6]

The fellowship program for CIs proposed by Campbell and Roderer does not emphasize a specific clinical specialization. According to Campbell, although different environments have different educational needs, it is possible to design a general and reliable framework applicable to all environments, including health-care knowledge, management and organizational behavior, research techniques and methods, training, and information management. The subjects stated by Campbell are similar to the educational needs identified in the current study except for knowledge of evidence-based processes and systems and information technology. Similar to Campbell *et al*., there is no emphasis on the specific clinical disciplines in the current study. As stated by Campbell, one of the important required elements is for the CIs to work with clinical teams with different specializations and acquire the necessary specialized knowledge as part of the work experience.[8]

A review of previous studies regarding the development of curriculums for CI showed that some of these studies accentuated specific disciplines and specializations, whereas others aimed to provide a general framework. However, it is not clear whether it is better to provide CI education with a focus on specific disciplines and specializations or to provide a general framework. Furthermore, it is also not clear whether the long-term programs with official academic education are superior to short-term courses. Continuing education, peer education, and education through experience are among the important subjects, which should be further investigated.

Limitations

One limitation of this study was that it included only English-language studies whose full-text was available. Therefore, systematic reviews are necessary to

conduct, to include all available resources. In addition, further research is needed to identify competencies, educational needs, and goals from the perspective of stakeholders such as the library and information sciences professionals, clinicians, and other practitioners.

Conclusion

In order to improve the skills of medical and health science librarians to act as competent CIs and support evidence-based medicine, it is essential that they develop the required competencies via proper educational programs, which, in turn, require proper educational curriculums. The first step in curriculum development is the determination of educational needs on which the development of educational goals based. The results of the present study can be used in the curriculum development for CIs. Furthermore, they can provide the basis for future studies regarding a more precise and detailed curriculum based on educational needs.

Acknowledgment

We would like to thank all the researchers whose studies have been used for this review.

Financial support and sponsorship

This manuscript is the result of a part of a Ph.D. thesis in librarianship and information science supported by the Isfahan University of Medical Sciences, with the registered number of 397437.

Conflicts of interest

There are no conflicts of interest.

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