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Initial experiences of embedded librarianship at a Danish University Hospital

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Abstract
The aim of this article is to summarise and present experiences with embedded librarianship, particularly in a diagnostic biomedical field, and reflections on how medical librarians can form partnerships in research teams to produce systematic reviews to strengthen the scientific basis in medical research. The article also outlines the different roles of the librarian as from the perspective of stakeholders and in light of the current literature. Additionally, the article describes some of the potentials and pitfalls in the role of an embedded librarian in a clinical research team.

Key words: medical libraries; library services; information literacy; professional competence; evidence-based medicine.

Introduction

Partnerships between libraries and faculty in health science is presently an established part of academic libraries' portfolio of services. A brief search of the literature on inter-professional collaboration between librarians and faculties in biomedicine showed that most of these collaborations were built around teaching and developing information literacy (IL) and evidence-based practice skills (1, 2). Collaborations outside the library or the curriculum are much less present in the literature. Although there is a solid and growing body of literature regarding librarians working with systematic reviews (3-6), few studies have focused on librarians embedded in clinical research teams (7).

In parallel to an exponential rise in scientific publishing (8) within biomedical research (9), there is also an exponential increase in the number of published systematic reviews and research syntheses. This is also the case at Aalborg University Hospital. Doctors are only able to read a fraction of these original articles per year (10, 11). Knowing how to find, select, use and appraise academic papers is essential for doctors when they do research as well as part of their clinical work, but research demonstrates, that doctors' level of IL skills upon graduation are low (12). Thus, there is a clear need to support doctors and assist them with literature searches. Forming teams and collaborations with researchers is one way to achieve this goal.

The objective of this article is to reflect upon the inter-professional experiences drawn from both the partnership itself and working as an embedded librarian in the Department of Nuclear Medicine at Aalborg University Hospital, particularly in terms of literature searching and supporting systematic reviews as well as clinical guidelines.

Embedded librarian at the Department of Nuclear Medicine Bone Group

The Medical Library at Aalborg University Hospital in the North Denmark Region is a health scientific library with six employees, including the head of the library. In 2013, the library launched the "Research Librarian" project to further develop the library's research support as one of its core services. Research support is already well incorporated into the library's regular service, but we wanted to structure our research service as a complete package solution and boost the library's profile in the hospital.

The Research Librarian Project has, side from a significant rise in the number of search sessions, time spent per search, consultancies, acknowledgements and co-authorships, led to a formalised partnership

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with a clinical research team. Upon request, a librarian joined a research team, the Department of Nuclear Medicine Bone Group, also entitled Nuclear Medicine Aalborg Bone Group (NMA Bone Group) on a regular basis as of February 2016.

The NMA Bone Group consists of a clinical professor, a chief physician (registrar), who is also associate research professor, a number of PhD students, junior doctors, and medical students. In addition, the group include an ad-hoc statistician from the Unit for Clinical Epidemiology and Biostatistics and a librarian from the Medical Library under the Department of Research, Education and Innovation. The statistician and librarian are full-fledged members of the group, and, as such, they are not restricted to serving only in an advisory role. The main research interest of the NMA Bone Group is diagnostic test accuracy studies, primarily with prostate cancer and bone metastases. The projects range from interventional trials with novel imaging methods, retrospective studies, systematic reviews, and research methodological studies.

As part of the project, the embedded librarian completed a course on diagnostic test accuracy studies arranged by the York Health Economics Consortium in June 2016. The course was primarily focused on challenges and strategies when identifying diagnostic test accuracy studies because the librarian's existing knowledge in this specific area of searching at that point was still limited. Because the course was taken early in the project, the timing was good, as were the benefits of the course.

Librarian's role

The librarian participates in regular meetings in the NMA Bone Group. These meeting are held in conference rooms in the Department of Nuclear Medicine. The rest of the time allocated to the NMA Bone Group is spent in the Medical Library while maintaining close contact with the NMA Bone Group through telephone and mail correspondence. If something urgent needs to be discussed, the team meets in person. Some NMA Bone Group projects are in collaboration with research teams outside Aalborg University Hospital, and, in these cases, different forms of conference calls are also used.

Table 1 is a list of the different tasks performed by the librarian as co-author in the three publications, of which two are systematic reviews and one is a case report with a comprehensive overview of the literature (13-15).

Embedded librarian's tasks in reviews

1. Plan the process
2. Define search question(s) and prospective inclusion and exclusion criteria
   a. Search models as PICO(S) or PIRO for diagnostic studies
3. Conduct preliminary search to clarify the scope
4. Choose relevant data sources
5. Reformulate the research question
6. Develop search terms and synonyms using controlled vocabulary and text words
7. Execute search
8. Adjust searches according to database platform and interface
9. Document the search through search protocol
10. Document search results
11. Manage references
    a. Import the search results to reference software
    b. Search for duplicate references
    c. Removal of duplicate references
12. Exporting to Covidence (SR-tool)
    a. Apply review settings
    b. Guide researchers in the use of SR-tools
13. Provide full texts for review
14. Deliver consort diagrams according to PRISMA
15. Suggest journal for publication based on:
    a. Indexing
    b. Topic
    c. Impact indicators
16. Suggest author keywords
17. Co-authorship
    a. Write the relevant method section at a minimum
    b. Revise manuscript, tables and figures
    c. Check and update references
    d. Apply and adjust output style for target journal

Table 1. *Embedded librarian's tasks as co-author in reviews.*

Other tasks for the embedded librarian have evolved in the process and now involves training sessions on basic and advanced PubMed searching, including post-training examination and certification, for clinical staff in the Department of Nuclear Medicine. These training sessions are driven by a combination of increased awareness of the librarian's expertise in searching and a realisation of the need to develop the doctor's information literacy in clinical practise. There is also an increase in individual requests from the clinical staff directed to the embedded librarian. In that way, word has spread and the portfolio of services delivered by the embedded librarian continues to expand.

Results

The Embedded Librarian Project was initiated in February 2016; as of December 2016, the Department of Nuclear Medicine has hired a librarian to work the equivalent of one full day per week on a contractual basis. The fact that the Department of Nuclear Medicine took the initiative to offer to pay for embedded librarian services on a contractual basis is an objective measure supporting the assumed value of the librarian embedded in the research team.

At this point, two systematic reviews and a case report have been published with the librarian as a co-author; and currently more manuscripts are in progress or under review (13-15).

In our experience, medical librarians' expertise can be useful in evidence-based medicine due to the searching and filtering methods, which result in high-level evidence when involved in the literature reviews, clinical guidelines and so forth. When librarians provide structured and more exhaustive searches, the scientific basis is strengthened. It is also beneficial to be part of the entire process, starting in the early phases.

This project has given the library staff experience, particularly in searching for diagnostic test accuracy studies and experiences with systematic reviews. Earlier, librarians in the library would have primarily been involved only in the search process.

Researcher's perspectives

The Department of Nuclear Medicine was previously satisfied with the Medical Library's services and are even more so now. Having all communication, work tasks and sessions handled by the same librarian also adds value for the team in terms of continuity and results in time savings for the researchers because of the expert knowledge in this specific medical field of diagnostic accuracy within nuclear medicine.

The librarian delivers systematic, well documented, and exhaustive searches in more databases, whereas doctors perform more simple searches in fewer databases on a daily or weekly basis, primarily in PubMed. Despite the larger result sets, the embedded librarian is perceived as offering relief in terms of workload, even though the researchers need to review a significantly larger number of references due to the higher quality of the searches. This is supported by Rethlefsen et al., who argues that involving librarians in the search process correlates with higher quality reviews (16).

Our collaborators state that they experience faster literature searches and, most importantly, a sense of confidence in terms of relying on the librarian's search results compared to when they perform the literature searches themselves.

The reasons to engage with a medical librarian in this project is an expression of the fact that search strategies developed by the researchers themselves are lacking in terms of quality and therefore are biased. This is line with Janke and Rush, who state that conducting comprehensive literature searches is difficult unless you have sufficient expertise and experience within information retrieval (17).

The way in which our collaboration is now formalized has made the library's offerings even more clear to our partners. Medical researchers recognise that the library offers a more complete package to support research and clinical work. Based on the training sessions and presence in the department, there is now general awareness of the complexity of information searching amongst health professionals in terms of clinical questions or research questions.

Discussion

In the following section, we briefly discuss our experiences from the stakeholders' perspectives.

This project has required a large amount of flexibility on the part of the head of the Medical Library and colleagues because of the significant differences in the workload over time, which sometimes influences the ability to plan accordingly. Therefore, organisational

support has great significance for the success of such collaborations (18).

Because the embedded librarian is primarily physically situated in the Medical Library, a 10-minutes' walk from the Department of Nuclear Medicine, it is easy to meet with the team when needed. On the other hand, when spending this much time outside the library, it is not possible to provide the same amount of service to all our users without requiring larger amounts of financial resources and in terms of allocating time to participate in other research teams. Our collaboration also provides flexibility for the librarian to work from home on the days allocated to the Department of Nuclear Medicine.

From the researcher's point of view, there have only been a few minor misunderstandings, e.g. problems in communication in the early phases of the project, which meant that a search had to be changed. This, of course, meant extra work for both the researchers and the librarian. This is in line with Seeley et al. and underlines the importance of an ongoing dialogue to make sure that the searches are moving forward in the right direction (19). Maintaining this ongoing dialogue is facilitated by having the librarian embedded into the project, instead of using the library as an external service.

Adding to the amount of work that the library contributes automatically increases the overall time spent per research project, but at the same time, it results in better quality searches and co-authorships. Thus, time is well spent on both parts.

Conclusion

Librarians embedded in research teams carry out different roles, such as expert searcher, co-author and teacher (20), which is supported by Kirtley, who foresees librarians in a future role outside the library embedded in research teams and departments while supporting literature searches for systematic reviews. Kirtley strongly advocates that all relevant stakeholders acknowledge and leverage the librarians' professional competencies to increase value (21).

We expect this collaboration to result in co-authorship in several systematic reviews and other scientific material, which depend on thorough review of the medical literature. At this point, a number of manuscripts are either ready for submission or are being written. Prospectively, we also hope to be able to form new partnerships in other medical specialties within our institution.

Embedded librarianship has the potential to expand the librarians' role in health science and enhance the librarians' qualifications in information science and as research professionals, who submit research in their own domain, not merely as facilitators of the research of others.

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