



An evaluation of the effectiveness of information literacy training for undergraduate midwives to improve their ability to access evidence for practice

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ABSTRACT

Background: Several authors have suggested that computer skills should be taught within the undergraduate curriculum. In this paper, the focus is mainly on the results of an examination of midwifery students' search strategy in response to a specific question undertaken before and after training session in the first, second and third years of the undergraduate programme.

Methods: The intervention allocated 16 h of library-based instruction over the first three years of the programme focussing specifically on the skills required to utilise electronic resources effectively. Following ethical approval by the university, 108 undergraduates took part from 2008 to 2011.

Results: The data obtained from the search history files were categorised as either poor, fair or good. The primary analyses compared the pre and post-instruction categories in each year, within each student, with a comparison of each student's post-instruction category one year and the pre-instruction category the following year. The data indicated that the sessions in the first and second years of the programmes resulted in improvements in the ability to search, with less improvement in third year.

Conclusions: As with any complex intervention, it is not possible to tease out which elements of the session were most beneficial. We will try to identify ways in which midwifery students' search skills could be strengthened further.

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Introduction

It has been recognised that maternity care in Ireland is highly medicalised and midwives have historically been practicing within a hospital culture based predominantly on tradition and authority (Begley and Devane, 2003a,b). With the publication of 'A Guide to effective care in pregnancy and childbirth' in the 1990s (Enkin et al., 1995), the importance of evidence-based practice in midwifery, and the ability to deliver this, took important steps forward (Hancock et al., 2000 p.7). Although Archie Cochrane had been advancing the notion of effective healthcare for many years, this work, taken up subsequently by the Cochrane Pregnancy and Childbirth Group brought the concept into focus for midwives and obstetricians (Bastian, 1994; Fox, 2011; Mosteller, 1993). However, it must be acknowledged that although we may talk the talk in midwifery, the application of evidence in practice may indeed be random at best (Renfrew, 1997).

Background

Our research interest centres on strengthening practitioner skills in searching, information retrieval, appraisal and utilisation of research findings relevant to practice, with the ultimate aim of facilitating and improving evidence-based practice. In the UK, both the National Health Service (NHS) (Cole and Kelsey, 2004) and the Royal College of Nursing (RCN) identified information literacy as a core competency for practitioners and pre-registration students (NMC, 2010; RCN, 2011). With the intention of driving the evidence-based practice agenda forward, NHS healthcare staff are required to have information technology skills at entry level equivalent to the European Computer Driving Licence (ECDL, 2011), so that they are able to search for, retrieve and critically appraise research for application to practice. However, no such standards have been set by the equivalent bodies in Ireland (Health Service Executive (HSE) and An Bord Altranais (ABA)). Several authors have suggested that computer skills should be taught within the undergraduate curriculum (Ballard, 1999; Sarento and Leino-Kilpi, 1997) and consequently it is the responsibility of the university to ensure computer literacy. Others have suggested that students will

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leave second level education with basic skills (Graveley et al., 1999), and perhaps the focus should be on information rather than computer literacy. However, this aspiration as many 'Google Generation' school leavers may not be as effective at searching for information as previously believed (Rowlands et al., 2008), and mature students may be limited by their apprehension at venturing into the world of digital repositories and e-resources.

Today's undergraduates in midwifery at universities and educational establishments, such as Trinity College Dublin have unprecedented access to information. Even though many of these students have a level of computer literacy equivalent to the ECDL, research from library and information science demonstrates consistently that undergraduates experience difficulty searching for and retrieving relevant sources of information to undertake their coursework (Bailey et al., 2007; Schroeder, 2010). Much has been written by academic librarians about the importance of teaching undergraduates to utilise library resources effectively, yet few changes have appeared in midwifery curricula targeted specifically at developing students' library skills in general and information literacy in particular. There is evidence to suggest that collaboration between academic librarians and faculty can enhance student library skills (Flaspohler et al., 2007). This project aims to show how collaboration between faculty (JL and MC) and the subject librarian (GS) in library-based instruction improved undergraduate midwifery students' library research skills. In this paper, the focus is mainly on the results of an examination of the students' search strategy in response to a specific question undertaken before and after training session in the first, second and third years of the programme. We sought to investigate this improvement using two datasets: (1) A before and after assessment of the students' use of electronic resources and approach to searching, and (2) The results obtained from a piece of coursework: specifically an annotated bibliography. Although we have gathered a variety of assessment data and have made some minor changes to the content of the sessions throughout the four years of this project, the past two years represents the time frame in which our content, evaluation tools and the circumstances under which we applied them stabilised.

Collaborative context- institutional description

The School of Nursing and Midwifery, Trinity College Dublin, is internationally renowned and enrolls approximately 1000 fulltime undergraduate student midwives and nurses annually. The degree in midwifery began in 2006, with approximately 40 students in each cohort. At the outset, up to 50% of students enrolling were school leavers; this has since risen to 75% (approximately) due to limits set by Ireland's Department of Health and Children on mature student entry numbers. The degree in nursing began in 2002, with approximately 280 students enrolling annually across each of the divisions of the register, i.e., general, mental health, children's and intellectual disability nursing. Nursing students are offered 2 h of bibliographic instruction in their first year. This session offers a basic introduction to the library and its resources, and is delivered in the classroom by the subject librarian for nursing and midwifery (GS). The first intake of midwifery degree students (2006) also received the same instruction as the nursing students. However, we became aware over the course of that first year that students did not feel confident in searching for the material required for them to effectively complete their coursework.

Course description

Midwifery students have approximately 120 contact hours over the first three years of the undergraduate programme, which is

allocated to the teaching of research awareness, critical appraisal and the use of evidence for practice. We decided at the end of year one of the first cohort of students that more direct instruction was required to improve their information literacy skills. This led to allocation of 4 h of computer room based sessions focussed specifically on teaching information literacy skills in the first year, and 6 h in each of the second and third years. For the purpose of this study, information literacy is defined as the ability to access, organise and evaluate information, with a specific focus on development of the skills required to utilise electronic resources such as PubMed, CINAHL and The Cochrane Library effectively. These resources were chosen because it was envisaged that midwives would utilise these resources throughout their career, as these databases are available in the healthcare sites and through the internet. Some time was also given in the first year to accessing Google and Google Scholar, as these resources are free to access and more familiar to the students than the resources dedicated to health and healthcare research.

Study outline

Following ethical approval by the university, all midwifery students from the 2006, 2007 and 2008 intake ($n = 108$) were invited to participate in the project. Students were required to give written informed consent if they wished to take part. Information was provided to students at least one month before the first session by a member of faculty not directly involved with the study. Students were also informed that if they did not wish to participate, they could attend the sessions as timetabled. This study sought information on the students' approach to searching for information on a designated topic (ultrasound in the second trimester of pregnancy) before any training and after each training session throughout the programme. Detailed search histories from the Mozilla Firefox browser were emailed to the subject librarian (GS) for analysis by the team. The history files were interrogated using software freely available on the Internet (NirSoft, 2007). The search histories contained information on the websites visited and, in some instances, the exact search terms used. In year one, the students attended two, 2 h sessions based in the university's computer laboratory (with one computer per student) focussing on the development of basic search skills using PubMed, supplemented with an introduction to the catalogue of Trinity College Dublin. The sessions were delivered by the subject librarian (GS) with the subject lecturer present (either JL or MC, or both) to assist students to apply what they were learning about the research process in other sessions to their searching and assessment of the relevance of the information retrieved to practice. In year two, students were asked to repeat the search for information on ultrasound in the second trimester to see if the skill level achieved at the end of the first year had been retained. Students then received three 2 h sessions of instruction again using PubMed as the main database, but increasing the complexity of the search skills to include setting limits and selecting certain types of publication, such as systematic reviews or randomised trials. Students were also introduced to the My NCBI function in PubMed, to illustrate how they could receive notices of newly published material within their area of interest. As there are large amounts of relevant material outside of PubMed, the students were also introduced to CINAHL in the second year. Although proportionally less time was spent instructing the students to use CINAHL, the emphasis was on transferable skills rather than learning by rote. It was hoped that students would take the same systematic approach to searching illustrated using PubMed with any other database available. In year three, students were introduced to additional functions in PubMed (such as MeSH) and also

to The Cochrane Library, focussing in particular on The Cochrane Database of Systematic Reviews (Starr et al., 2009). In addition to these structured sessions, students could also access help and guidance using the library's databases or any other library related matters from the subject librarian (GS) either as individuals or as a group.

Methods

The data obtained from the search history files were categorised as either poor, fair or good. On each occasion, students were given up to 30 min to perform and email their search to GS. In year one, the initial assessment simply sought to ascertain if PubMed was accessed and, therefore, the category of fair was not used: the category of poor was awarded if PubMed was not accessed and a category of good was awarded if it was accessed. Following 4 h of instruction (with a focus on PubMed and with reference to other resources), the search task was repeated and the search strategies were categorised as follows: PubMed and another resource accessed: Good; PubMed only accessed: Fair; and PubMed not accessed: Poor. These same three categories were used for the pre-instruction search in year two. After training involving PubMed and CINAHL, the post-instruction search in year two and pre-instruction search in year three were categorised as follows: PubMed and CINAHL accessed: Good; PubMed, or PubMed and non-CINAHL resources accessed: Fair; PubMed not accessed: Poor. The students were given particular information on the Cochrane Database of Systematic Reviews as part of the final unit of instruction building on their exposure the CINAHL the previous year, and, consequently, the final assessment was categorised as follows: PubMed, the Cochrane Library, and CINAHL accessed: Good; PubMed, or PubMed and one of these resources accessed: Fair; PubMed not accessed: Poor.

The primary analyses compare the pre- and post-instruction categories in each year, within each student, with a comparison also being made of each student's post-instruction category one year and the pre-instruction category the following year. Secondary analyses had been planned to compare these categories with each student's marks on an annotated bibliography assignment at the end of their second year and a 8000 word research assignment at the end of the third year, but incomplete data meant that reliable analyses were not possible for these comparisons.

As these information literacy classes were timetabled as part of the undergraduate research module, we anticipated that the attendance rate would be high. Unfortunately, this cannot be confirmed from the attendance records because the course structure is such that attendance is recorded twice daily, and accurate records for individual student attendance at each session are not available. We have analysed the data based on the assumption that if the history file was not received then the student was absent. However, it is also possible that some students who were present chose not to email their search strategies to GS or were unable to do so. We also encountered technical difficulties with the recording of search strategies in some sessions.

Results

108 undergraduates took part in the study from 2008 to 2011, providing information from two cohorts in their first year, three cohorts in their second year and three cohorts in their third year. However, complete data are not available for all of these students for the analyses because of absence from the relevant sessions and technical difficulties with the software used to record the searches on some of the computers during some of the sessions. At least one within-year comparison is available for 80 students.

First year

As expected, the initial assessment of students at the start of the first year before any instruction on information retrieval, categorised most of their search strategies as poor (50 of 63, 79%), with the other 13 being categorised as good because of the use of PubMed in this search. Among these 63 students, 49 (poor: 39; good: 10) provided a search strategy in the post-instruction phase and there was a marked improvement in their searching following the instruction: 5 (13% of 39) moved from poor to fair, 33 (85%) moved from poor to good and only 1 (3%) remained poor. Among the students whose searches were categorised as good in the pre-instruction phase, 3 (30% of 10) were categorised as good in the post-instruction phase and 7 (70%) were categorised as fair (i.e., they continued to search PubMed alone). The comparison of the students' searches at the end of the first year with the pre-instruction phase of the second year showed that only 1 of 21 students with data regressed from fair to poor. Eight students remained in the same category (poor: 0; fair: 3; good: 5), 4 moved from fair to good and 8 moved from good to fair.

Second year

In their year two sessions, the students were taught more about PubMed and were introduced to other databases, principally CINAHL, in more depth. At the start of the sessions, the searches for 14 (28%) of the 50 students with data for this time point were categorised as poor, 14 (28%) were fair and 22 (44%) were good. As in the first year, there were marked improvements following the sessions, among the 39 students with data for both the pre- and post-instruction searches. All 11 (100% of 11) students who were poor at the start of the year became good. Ten (91%) of the 11 students who were fair become good, with the other remaining poor. Among the 17 students who were good at the start, one (6%) slipped back to poor, 2 (12%) slipped back to fair and 14 (82%) remained good. In comparing the end of the second year with the start of the third year, the technical difficulties encountered with the recording of the search strategies were particularly problematic. However, among the 26 students for whom paired data were available, the categories were generally consistent. 16 students remained in the same category (all fair), 3 moved from fair to good and 7 moved from good to fair.

Third year

In their year three sessions, the students were taught more about PubMed, and built on their knowledge of other resources, including being introduced to the Cochrane Database of Systematic Reviews. At the start of the sessions, the searches for 1 (3%) of the 35 students with data for this time point were categorised as poor, 30 (86%) were fair and 4 (11%) were good. Unlike the previous years, the sessions did not lead to marked improvements, with most students remaining in the same category. Among the 23 students with data for both the pre- and post-instruction searches, there were none who began as poor. One (5%) of the 20 students who were fair become poor, with the other 19 (95%) remaining fair. All 3 of the students who were good at the start, slipped back to poor.

Discussion

After enhancing library-based instruction, we found that the sessions in the first and second years of their undergraduate programmes produced the hoped-for improvements in the ability of midwifery students to search appropriate resources for a topic

relevant to maternity care, with the majority of students whose searches were rated as poor or fair in the pre-instruction phase showing better information literacy after the sessions: 59 (97%) of the 61 students who were poor or fair pre-instruction in the first and second years combined improved. Among the 27 students whose searches were categorised as good in the pre-instruction phase in these two years, 17 (63%) remained good, 9 (33%) became fair and 1 (4%) became poor. In general, the improvements were sustained by the start of the following year, with none of the students for whom data are available slipping back to poor. This supports the value of the sessions as a means for providing the students with the skills to find the research they will need for evidence-based practice. However, by the third year, it would appear that the sessions no longer provide further improvement.

The limitations of the study include the consequences of the technical difficulties with the logging of the search strategies, which makes it difficult or impossible to conduct longitudinal analyses tracking individual students through the whole three years. This coupled with the importance of restricting our analysis to paired comparisons for each student, rather than calculating means for the group as a whole at each time point, reduce the amount of data available for analysis and so weaken the power of the study. It is also possible that students with poor computer literacy might not have had sufficient skill to email their search strategy to GS or might have chosen not to do so because of a belief that their skills were not adequate. If this was related to the quality of their information literacy, it is possible that we have underestimated the proportion of students who do not improve through the sessions. However, even if this is the case, the improvements that were seen among the students for whom data were available confirm that the sessions are likely to improve undergraduate midwifery students' skills in searching and information retrieval.

As with any complex intervention, it is not possible at this stage to tease out which elements of the session were most beneficial, or if the different elements in the sessions are all important or are synergistic. These different elements include the presence of members of both the research teaching faculty and the subject librarian, the formal teaching that was done and the interactive work that was possible with individual students or small groups of students during the sessions. In conclusion, we will be acting on the findings of this study by continuing with the sessions for the first and second year undergraduates, but will reconsider the contents of the sessions for the students when they reach their third year, to try to identify ways in which their skills could be strengthened further during those sessions.

Conflict of interest

This study has not received funding and there is no known conflict of interest.

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