



# Integrating evidence-based practice into the diabetes nurse curriculum in Bergen

## Perceived barriers to finding, reading and using research in practice

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### Introduction

Over recent years there has been a considerable growth in international interest in developing healthcare systems that are built on the basis of best evidence.<sup>1</sup> In order for nurses to provide safe and effective care, they need to be able to locate research literature, to review this literature critically, and then effectively transform knowledge into practice.

Nurses play a key role in the care and management of people with chronic illnesses. More specifically,

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**Received:** 20 April 2009

**Accepted in revised form:**  
18 December 2009

### Abstract

**Background:** There is rising international interest in developing healthcare systems that are built on the basis of best evidence. However, it is a challenge to integrate evidence-based practice skills into existing educational courses, in a manner that enables students to interpret and use such skills effectively.

**Aims:** To study students' abilities to find, read and critique research literature and to explore students' perceptions of barriers to implementing evidence-based knowledge and skills into their practice.

**Methods:** An evidence-based approach was integrated into the curriculum of a postgraduate diabetes education programme. At the start of the course and after its completion, questionnaire data were collected to assess students' ability to find, read and critique research literature, and students' perceptions of barriers to implementing new knowledge and skills into practice. Qualitative data on barriers to transferring evidence into practice were also collected.

**Results:** Thirty-three experienced nurses (all female), mean age 40 years (SD 7.7; range 28–52 years), mean work experience 12.8 years (SD 7.9; range 3–30 years) attended the course and completed the initial questionnaire. By the end of the course, three students (9%) had left because of maternity leave or health issues, and six students (18%) did not return the final questionnaires. The remaining students reported greater ability to find and critique research literature (increasing respectively from 6.7% to 40.0% and from 27.3% to 41.7% during the course). Perceived barriers of using research in practice were: lack of time (69.7%); workplace environment (30.4%); structural and organisational problems (25.0%). The qualitative findings indicated that hierarchy, fear of negative judgements, competing demands, and fear of change were perceived barriers.

**Conclusion:** Students commented that the course had provided them with enhanced evidence-based practice skills for finding and interpreting research. However, postgraduate training should be linked very closely to the student's workplace, in order to support the transfer of best evidence into practice.

*Eur Diabetes Nursing* 2010; 7(1): 10–15

### Key Words

Evidence-based practice; barriers to evidence transfer; postgraduate diabetes

the contribution of diabetes specialist nurses may be an important factor that improves both adherence to guidelines and raises the overall quality of diabetes care.<sup>2</sup> However, implementing evidence into practice is a complex process that involves an array of organisational, social and professional barriers.<sup>3</sup> It is also challenging to try and integrate evidence-based practice into existing education courses. However, this is necessary to enable nursing students to acquire

the knowledge and skills needed to find and interpret research, and to provide them with further support as they adopt new attitudes and skills into the workplace.<sup>4</sup> A systematic review showed that teaching evidence-based practice achieves small to moderate improvements in skills and knowledge in postgraduate healthcare workers.<sup>5</sup> A major challenge is engaging the whole healthcare team in learning about evidence-based practice and making it part of



| Course content  | Teaching methods  | Learning activities  |
|-----------------|---|--|
| First semester  | General introduction to evidence-based practice, information sources, databases and searching principles  | Teaching knowledge and skills to find, read and critique research literature   |
| Second semester | Working in groups, critically interpreting literature and research studies, study design and methods, assessing methodological quality                | Opportunity for discussions in relation to students' own practices, based on new insights from theoretical knowledge and research studies  |
| Third semester  | Supervised groups, video-taped role-plays of research arguing and discussion. Written assignments: literature reviews, articles or research proposals | Opportunity to discuss theoretical knowledge and research in relation to practice. Students are offered participation at a conference presenting their work as oral presentations or posters |

**Table 1.** Content, teaching methods and activities relating to evidence-based practice for a postgraduate diabetes course

routine clinical practice.<sup>6</sup> Students need to integrate the steps of evidence-based practice with real clinical problems.<sup>7</sup>

An evidence-based approach has been integrated into the postgraduate diabetes nurse education curriculum (60 ECTS) at Bergen University College in Norway. The course was developed in collaboration with clinical diabetes nurses, lecturers and diabetes researchers at the college in 2001. An outline of the course content, teaching methods and learning activities is shown above in Table 1.

There are several definitions of evidence-based practice. The diabetes postgraduate curriculum bases its core content on the definition of Straus *et al.*<sup>8</sup>: 'Evidence-based medicine is conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual expertise with the best available external

evidence from systematic research.' For nurses this means using research-based evidence together with other theoretical knowledge and professional competence, to decide on the appropriate actions to be performed in given situations.

The aims of the present study were to assess the students' ability to find, read and critique research literature and to explore the students' perceptions of barriers to the implementation of evidence-based knowledge and skills into practice.

## Methods

### Study design and sample

The study was conducted between January 2006 and June 2007. The learning objectives for students attending the course were to acquire knowledge and skills in finding research; to develop skills in interpreting research; and to understand how to apply these skills in practice. All students attending the course were invited to participate in the study (convenience sample).

### Data collection

Students were asked to rate their ability to find, read, and critique research literature at the beginning and end of the course. The self-reported questionnaire consisted of questions with four response alternatives: 'not at all'; 'little degree'; 'some degree'; 'high degree'. Participants were also asked about barriers to reading research literature in English; Norwegian is their native language. The number of articles the students had read in English during the previous six months was collected as a category variable (0, 1–2, 3–5, 6–10, 11–20, >20) at study start, and again at the end of the course. Students' perceptions of barriers to implementing new knowledge and skills were also collected.

Qualitative data were collected during an in-class evaluation session, where all students provided individual written notes that reflected on barriers to transfer of evidence into practice, in either themselves or their workplace. The intention was to obtain more detailed information about students' perceptions of challenges by giving them the opportunity to describe perceived barriers to research utilisation in their own words.

### Analysis

Quantitative data were analysed by descriptive statistics: mean, SD, and percentages were calculated. Statistical analyses were conducted using SPSS software, version 16.0. The qualitative data, consisting of short textual elements, were analysed using content analysis to evaluate perceptions of barriers to applying evidence-based practice skills.<sup>9</sup> Sentences and phrases were translated into English by one researcher (RØB). Then, data were independently reviewed by two researchers (RØB, JH) according to the following stages:

- Material was read to identify all existing barriers;



| Perceived barriers                     | High degree n (%) | Some degree n (%) | Little degree n (%) | Not at all n (%) |
|--|-------------------|-------------------|---------------------|------------------|
| Lack of critical appraisal skills      | 5 (15.1)          | 19 (57.6)         | 9 (27.3)            | –                |
| Lack of time                           | 23 (69.7)         | 7 (21.2)          | 1 (3.1)             | 2 (6.1)          |
| Work place environment                 | 10 (30.4)         | 13 (39.4)         | 6 (18.2)            | 4 (12.2)         |
| Structural and organisational problems | 6 (25.0)          | 12 (50.0)         | 5 (20.8)            | 1 (4.2)          |
| Lack of support from leader(s)         | 3 (12.5)          | 12 (50.0)         | 5 (20.8)            | 4 (16.7)         |
| Jantelaw*                              | 1 (4.2)           | 8 (33.3)          | 10 (41.7)           | 5 (20.8)         |

\* Jantelaw is a colloquial term used in Scandinavia to describe negative attitudes towards individuality, effort and success. Used by people who feel they are not permitted to take credit for their own achievements, or who believe that someone is being overly self-critical<sup>10</sup>

**Table 2.** Perceived barriers to transferring evidence-based skills in to practice, described by nurses on a postgraduate diabetes course

- Similar phrases were clustered;
- Language in different phrases was compared in order to decide how many barriers to code for;
- Descriptions of barriers were reviewed and decisions made on how to distinguish between concepts;
- Final definitions of concepts were developed and discussed with the first author (MG).

These definitions were used to complete the coding of phrases.

This process resulted in a reflection of the major statements and feelings expressed by individuals. As data took the form of short sentences or phrases for each category, analysis was limited to identifying the main concepts rather than the relationships between them.

#### Ethical considerations

Ethical approval for course evaluation is normally granted by the Dean of the college as there is no national requirement to obtain approval through a research ethics committee. Approval was given to

collect and analyse anonymised data. Student data were kept confidential at all times, as both qualitative and quantitative responses were anonymously reported. Participants created their own personal codes by using grandmothers' initials and mothers' birth dates. Thus, we were able to compare data from the study start with the study end on an individual level. Participants were asked to provide written consent to take part in the study. However, because of the anonymous nature of data collection, they were not offered the opportunity to withdraw from the research later on.

#### Results

All 33 students attending the course participated in the study and provided survey data at study start. Their mean age at the start of this study was 40 years (SD 7.7, range 28–52 years). The students were experienced female nurses (mean work experience 12.8 years; SD 7.9, range 3–30 years). At the end of the study period, question-

naires were returned by 24 of the 33 students: three students had left prematurely (due to maternity leave or health reasons) and six of those who completed the course did not return the questionnaires.

#### Quantitative data

The majority of students reported improved skills in finding research between the start and end of the study. At the start, only 6.7% of the 33 participants reported great ability to find useful information searching the internet, whereas 40% of the 24 students reported great ability by the end of the course. Results also showed self-reported improvements in the ability to conduct more targeted literature searching after the first semester. Library databases were used to a high degree by 33.3% of the students, whereas only 7.4% used Google searches to a high degree. During the course, students reported improvements in critical appraisal skills: 27.3% reported little or no problems after finishing some modules, and this



| Themes                                       | Quotes  |
|--|---|
| <b>Hierarchy</b>                             | 'Insecurity and imbalance between physician/nurse. Difficult to show who I am and what I am capable of. More knowledge [in nurses] becomes a threat for the physician'  |
| <b>Fear of negative judgements</b>           | '[I'm afraid of] sticking my head above the parapet. Fear that others think that there isn't any point in changing anything. To be laughed at'<br>There were many quotes in this category about 'Jantelaw': a common concern about fear of reactions from others in Scandinavian society: 'Don't think you're anyone special or that you're better than us' <sup>10</sup>   |
| <b>Competing demands</b>                     | 'During the working day, there are many tasks' 'Busy working days "eat you up", so that the enthusiasm and engagement runs out'   |
| <b>Fear of Hierarchy</b>                     | 'What we have is safe, even if it isn't always the best'  |
| <b>Confidence</b>                            | 'Don't trust enough the knowledge I've accumulated, when others with long experience come with well formulated arguments'<br>'A feeling of not having enough knowledge...[not being] secure enough about what I argue for. Which leads to the fact that I'm backing out or don't say anything'<br>'Afraid to launch something that's very new – imagine if you don't after all have enough knowledge about the subject. Don't feel secure enough' |
| <b>Support from colleagues or management</b> | 'Management isn't interested, much resistance – not enabled with regard to new knowledge'<br>'The management doesn't direct it, does not give enough time'  |

**Table 3.** Quotes illustrating barriers to implementing evidence-based practice

percentage had risen to 41.7% by the end of the study.

Barriers to reading research literature decreased during the course. At the start 31.4% reported that reading English articles was a barrier of 'high degree', decreasing to 16.7% at the end of the course. Findings relating to reading habits also changed correspondingly. Before the study start, only 2.9% of the students reported to having read  $\geq 11$  English articles in the previous six months, but at the study end 66.7% were reading this number of papers. The proportion of students reading Norwegian articles had also increased, although a limited number

of research articles in Norwegian are available: most Norwegian research is published in international journals.

More than half the students experienced problems transferring evidence-based skills in to practice. Lack of time was deemed the most important limiting factor, although structural and organisational problems, and workplace environment, also played a part (Table 2).

#### Qualitative data

Qualitative research findings showed that students' perceptions of organisational barriers included hierarchy, fear of negative judgements, competing demands and fear of change

(Table 3). More detailed information about students' perceptions of challenges was provided by their individual written reflections, which enabled them to describe perceived barriers of research utilisation in their own words. Confidence, or lack of confidence, to implement evidence-based skills in the workplace was a key element in the students' perceptions. Participants felt that greater support from their colleagues and management was needed.

#### Discussion

The present study aimed to explore perceived abilities in finding and interpreting research, and perceived barriers to research utilisation, as described by experienced nurses attending a postgraduate diabetes education course.

Findings from the quantitative part of the study showed that some students became more familiar with finding, reading and interpreting research literature, especially articles in English, during the course. These improvements are relevant steps in the process towards a higher degree of research utilisation and professional development: the skills associated with finding, reading and interpreting research improve a student's ability to contribute in professional discussions within the multi-disciplinary team. The next step is to apply new knowledge and skills in practice. However, previous research shows a discrepancy between positive attitudes towards evidence-based practice and what nurses actually do in practice.<sup>4</sup>

Results from the qualitative part of the study are consistent with previous research on barriers to using research in practice.<sup>11,12</sup> Therefore, in general we assume that diabetes nurses in the clinical setting encounter similar challenges when transferring evidence into practice. However, such barriers have been reported since the 1980s and one





can only speculate why things have not changed. According to Van Achterberg *et al.*, the gap between current knowledge and practice is frustrating to academics, but implementation difficulties are even more threatening to the safety and quality of patient care.<sup>13</sup> Determinants of successful change or resistance in nursing are numerous, and the use of theory and evidence from implementation science might facilitate the transfer of evidence into clinical practice settings.

Findings of the present study show that 'competing demands' have to be taken seriously by leaders as well as the multidisciplinary team. Our questionnaire data show that 69.7% (n=33) of the students perceived lack of time to be a major barrier, and this finding is further supported by the qualitative data. Workplace environment and structural and organisational barriers also underline the complexity of promoting a research culture in the clinic. It is important to understand the contextual barriers to creating environments that can support nurses' use of research in practice. In a literature review by Meijers *et al.*, the relationships between six contextual factors (education, support, time, access, climate and role) and uptake of evidence in nursing practice were identified. Workplace contextual factors make an important contribution to a nurse's ability to use research in practice.<sup>14</sup> Consequently, initiatives that promote the development of a learning organisation and a supportive professional environment are likely to facilitate enhanced use of evidence-based knowledge in practice and improvements in patient outcomes.<sup>15</sup>

In this study, students commented that the course provided enhanced evidence-based practice skills for finding and interpreting research. To promote high-quality care and transfer best evidence into

practice, postgraduate training should be linked very closely to the students' workplace. An evidence-based approach in teaching should be more integrated with clinical practice by focusing on current clinical problems, and engage the whole healthcare team by making this approach part of routine (standard) care.<sup>6</sup> Complex decision making in diabetes nursing care needs to be linked to quality improvement processes in the clinical setting.

#### Study strengths and limitations

The present study has limitations. All of the participants were female, which may have affected the results. Also, the findings might not be representative for postgraduate diabetes nursing students in Norway, because the size of the convenience sample was relatively small and participants were probably highly motivated to learn, and read research. In addition, because of the drop-off rate in the present study, some results (such as the greater numbers of English articles read by the study end) might have given too positive a picture of the situation. Certainly, however, all participating students provided some reflection on their experiences. This strengthens our findings, as a broad range of perceptions were collected for the total student group. Internationally, there are few validated instruments for objectively assessing evidence-based skills,<sup>16</sup> and none are available in Norwegian. Consequently, the questionnaire we used was specifically developed for the present study and its psychometric properties were not tested. The reported changes were self-reported and there was no assessment of each participant's actual ability to search or conduct a critical appraisal. In the qualitative analysis, selective reduction of written material may have been subject to misinterpretation, as there was no opportunity to return

to participants for clarification. The original data, however, were in the form of phrases, as was the content analysis, thereby limiting potential misinterpretation. In addition, we limited subjectivity by using two researchers to conduct the content analysis. A strength of the study was that it applied mixed methods.

#### Conclusions

Students participating in this study reported that the course provided them with enhanced evidence-based practice skills for finding and interpreting research. However, postgraduate training should be linked very closely to the students' workplace, in order to support the transfer of best evidence into practice. Courses designed to improve evidence-based knowledge and skills need to be supplemented by a collaborative approach, which addresses students' perceived barriers to evidence transfer into their workplace. Further research should include long-term outcomes assessment, for example, after 12 months, and it is essential to note actual research-based activities. Also, the construct of confidence should be studied with further qualitative research, preferably using interviews or focus groups, to explore factors that limit or foster confidence in greater depth. Providing students with confidence and faith in overcoming such barriers seems to be of great importance.

#### Acknowledgements

We thank all of the students enrolled in the Postgraduate Diabetes Nursing Education 2006–2007, Bergen University College, Norway, for their willingness to participate.

#### Conflict of interest statement

None declared.

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## Type 1 diabetes self-management: a patient's experience of using CGMS

Sir, I have had brittle type 1 diabetes for 32 years from the age of 10, developing cataracts and peripheral neuropathy at 13 years, and autonomic neuropathy and severe gastroparesis aged 20 causing difficulty in matching my insulin needs to the rate of digestion. In 2000 I gained funding for insulin pump therapy, allowing me to moderate my basal and bolus insulin requirements accordingly. My complications have stabilised and my average HbA<sub>1c</sub> is always 6–7%. I do not have a pump-trained diabetes consultant.

In April 2009 I asked my PCT to fund a CGMS, stating the reasons why I have a clinical need for this treatment, emphasising my frequent hypoglycaemia with no warning signs. I pointed out that a system that could warn me of my blood glucose trends would be of immense benefit to my quality of life. I also provided the annual CGMS funding costs. In May 2009 my PCT agreed ongoing funding of an insulin pump with integral CGMS.

The CGMS is calibrated 3–4 times a day with SMBG levels for optimal results. I insert the sensor subcutaneously into my abdomen and it reads interstitial glucose levels every 10 minutes. This signal is transmitted to the pump's software, forming a graph displayed on the pump screen. I set my desired glucose limits at 4–10mmol/L to gain tighter control with gastroparesis, resulting in frequent alarms as the pump alerts me of predicted glucose trends. I have opted to silence the nocturnal expected high alarms because of disturbed sleep.

Many of the alarms are predicted post-prandial highs allowing me to fine-tune my bolus and basal insulin requirements after meals. I soon realised that tissue and blood glucose levels are dissimilar. When comparing the accuracy of a typical six-day (144 hours) sensor life, only half of my paired sensor and blood glucose readings are the same or within 0.5mmol/L, but at least five

readings show a difference of 9mmol/L or more.

It is difficult to maintain normoglycaemia without the increased risk of hypoglycaemia as diabetes control is tightened. However the benefits of using this system far outweigh any disadvantages in replacing my absent hypoglycaemia warning signs, allowing me to take remedial action and giving peace of mind. It has also enabled improved glycaemic control which will help slow the progression of current and future complications of diabetes. I would recommend the CGMS to anyone wishing to effectively self-manage their diabetes.

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