

# Research and diabetes nursing. Part 5: Reviews, case studies and audit

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## Article points

1. In this article, the author considers the strengths and applications of systematic literature reviews, the use of case studies to indicate the effects of a service innovation and the application of audit methodology for enhancing evidence-based practice.
2. Systematic reviews follow an explicit process to address a specific clinical question and to provide the evidence on which future clinical decisions can be made.
3. Case studies may be the design of choice in health care when seeking to investigate a situation in detail.
4. One mechanism by which services can be evaluated is by the process of clinical audit.

## Key words

- Audit
- Case study
- Research
- Systematic literature review

Author's details can be found at the end of this article.

**In this fifth article in the research and diabetes nursing series, the use of literature reviews (for finding evidence), case studies and audits are outlined. Given the wealth of material published on diabetes, locating appropriate evidence to inform practice can in itself be a challenge. The results of systematic literature reviews are considered to deliver the most robust form of evidence to inform practice. In contrast, case studies are often criticised as offering a weaker research design and audit is not considered as research, but does provide evidence about the standard of a particular service. All of these activities are important elements that can contribute to the overall research engagement of diabetes nurses and the drive towards evidence-based diabetes practice.**

In the first article in this research series, Dunning (2011) reminded us of the focus on evidence-based practice in the current healthcare climate. Although not all nurses working in diabetes may be directly involved in research themselves, there is the expectation that they will use research to inform their practice. When seeking to improve practice the starting place is often to establish what is known about a topic through the published literature.

Review articles can be extremely useful for accessing the relevant research on a topic in a timely and efficient way. For example, research may generate results that can then be used to inform care guidelines. Therefore, in this article, the author first considers the strengths and applications of systematic literature reviews and makes reference to an example of such a review. Once informed about relevant evidence, diabetes nurses are

then in an ideal position to use it to improve care. Of note, the process of using research to inform and implement clinical guidelines and care pathways is not without its difficulties (Miller and Kearney, 2004). However, diabetes nurses are in positions of authority that can be harnessed to help enable practice development. Assuming then that steps have been taken to improve practice, the next logical step is to see if care outcomes have improved.

Improvements in service delivery can be evaluated through a variety of service evaluation processes or via audit. In this article, the use of a case-study approach to indicate the effects of a service innovation is described and the application of audit methodology is outlined and illustrated. Through presenting these contrasting approaches to enhancing evidence-based practice it is intended to illustrate that all these different approaches have a place in

current health care. Although some research methods are thought to produce more robust evidence than others, there is a place for all of these techniques as they have different functions within the overall provision of diabetes care. As in the previous articles in this research series, design and methods are the focus rather than the results.

### Systematic literature reviews

Some literature reviews are conducted to provide background information on a topic. For example, Pendlebury and Holt (2010) provide a review of the literature relating to managing diabetes in people with severe mental illness (SMI). They cover a broad array of topics such as clarifying what is meant by SMI, its causes, the implications of SMI on diabetes care and the role of the DSN. A wide range of relevant research articles are included and, as a result, the reader gains a broad understanding of the issues. Such reviews give context to an aspect of our work, but they are not thought of as a research process. Conversely, systematic reviews follow an explicit process to address a specific clinical question and to provide the evidence on which future clinical decisions can be made. They are at the top of the hierarchy of evidence (Powers and Knapp, 2006; Brown, 2009).

In some systematic reviews it is possible to take data from the different studies being reviewed and amalgamate the results in a process known as meta-analysis. There are different ways in which this may be conducted; one way would be to pool the results and to determine the average effect across the range of studies included in the review (Powers and Knapp, 2006). In contrast, a meta-synthesis is a qualitative approach to drawing together the results and conclusions from a range of studies to provide a new interpretation based on the collective results.

### Example of a systematic literature review

Gray (2009) states that:

*“A systematic review of all the evidence available is always more reliable than any single piece of evidence.”*

In the third article in this series (Coates, 2011), a randomised controlled trial by New et al (2003) on the effectiveness of specialist nurse-led clinics for people with diabetes and hypertension and/or hyperlipidaemia was outlined. However, to establish the impact of nurse-led interventions from a wider body of evidence, Clark et al (2011) conducted a systematic review and meta-analysis.

The design and methods of the review were stated, specifying the databases searched (including MEDLINE, Embase, CINAHL and the Cochrane Central Register of Controlled Trials). Only studies using a randomised controlled design, comparing nurse-led interventions with usual care, for adults with diabetes and either blood pressure higher than a specified target or diagnosed hypertension, were selected. These articles were published in English between 2002 and 2009. From a potential pool of 1531 articles, initial screening reduced the number down to 71 full studies and then to 11 that met all the inclusion criteria. The review gained rigor through this process of explicitly stating which studies were included and why. Subsequently, the review process was conducted along specified criteria (Alderson et al, 2004) by two independent reviewers.

The data from the independent studies were used to conduct a meta-analysis and the process was explained. As a result of this analysis the authors were able to draw conclusions relating to the effects of the interventions, the use of treatment algorithms, nurse prescribing, community monitoring and nurse-led clinics. As the results were based on the combined effects of 11 randomised controlled trials, they provide a greater level of evidence than could be gained from any single study. Such a review provides evidence that other healthcare professionals may then apply to their own practice or service.

Following service development, it is then important to undertake an evaluation to determine if it is making any difference to outcomes. In the next sections of this article, two ways in which service evaluation can be undertaken are outlined.

### Page points

1. In some systematic reviews it is possible to take the data from the different studies being reviewed and amalgamate the results in a process known as meta-analysis.
2. A meta-synthesis is a qualitative approach to drawing together the results and conclusions from a range of studies to provide a new interpretation based on the collective results.
3. To establish the impact of nurse-led interventions from a wider body of evidence, Clark et al conducted a systematic review and meta-analysis of studies using a randomised controlled design, comparing nurse-led interventions with usual care, for adults with diabetes and either blood pressure higher than a specified target or diagnosed hypertension.

### Page points

1. Case studies are investigations that usually deal with a specific population – sometimes a single individual or a single unit. They can be designed in a variety of ways and can involve quantitative, qualitative or both investigative approaches.
2. Alabraba et al looked at various facets of a diabetes inpatient specialist nursing (DISN) service by analysing the activities of the DISN team on one hospital site over a 6-month period.
3. These results of the study by Alabraba et al enabled the diabetes team to then gain a better understanding of their workforce and workload in terms of nurse-to-patient ratio, continuity of care, non-medical prescribing and implications for training and practice.

### A case study approach to service improvement

As the name implies, case studies focus on a particular situation – the “case”. They are investigations that usually deal with a specific population – sometimes a single individual or a single unit. They can be designed in a variety of ways and can involve quantitative, qualitative or both investigative approaches.

*“As a form of research, case study is defined by interesting individual cases, not by the method of inquiry used” (Stake, 2000).*

Data analysis varies according to the design used; however, it is usually of a descriptive nature as case studies lend themselves to providing detail and depth to the phenomena being investigated. Case studies are bounded by a timeframe and by a particular activity, such as an event or a process (Parahoo, 2006). They are used in a wide variety of disciplines and are:

*“... the preferred strategy ... when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context” (Yin, 2003).*

Therefore, it appears that case studies may be the design of choice in health care when seeking to investigate a situation in detail.

#### Example of a case study

A case study approach was used by Alabraba et al (2010) when seeking to describe various facets of a diabetes inpatient specialist nursing (DISN) service in their trust. The authors were able to draw on the evidence produced by others (Cavan et al, 2001; Davies et al, 2001; Sampson et al, 2006; Courtney et al, 2007) to support the potential value of a DISN service. They then profile their locality, prevalence of diabetes, the diabetes service and the structure of their diabetes nursing team. The role of the DISN was then described, providing the context of the case. They analysed the activities of the DISN team on one hospital site over a 6-month period, giving rise to the crucial data for this case study.

Within the 6-month timeframe, 400 patients were reviewed, which involved 944 face-to-face contacts and 225 telephone contacts. From this cohort it was possible to explore which clinical staff had requested the review, the nature of the review and how many were valid as opposed to inappropriate referrals. These results enabled the diabetes team to then gain a better understanding of their workforce and workload in terms of nurse-to-patient ratio, continuity of care, non-medical prescribing and implications for training and practice.

The findings from this case study are most useful for those in the particular trust involved and help identify strengths and limitations in the DISN service. However, one of the criticisms of case study design is that it can lack generalisability (Yin, 2003). Nonetheless, the description of the service and consequent strengths and weaknesses might be useful for other clinical teams seeking to either establish or enhance a DISN service.

### Audit

Research and audit are inextricably linked as research results may indicate where care could be updated or improved. Then, following a process of service development, it is important to evaluate whether any improvements have been achieved. One mechanism by which services can be evaluated is by the process of clinical audit. Furthermore, if the audit indicates failures or gaps in a service then this data can be the foundation for future research. Thus, research and audit may be bound together in a cyclic approach. Clinical audit has been defined as:

*“... a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change. Aspects of the structure, processes, and outcomes of care are selected and systematically evaluated against explicit criteria. Where indicated, changes are implemented at an individual, team, or service level and further monitoring is used to confirm improvement in healthcare delivery” (NICE, 2002).*

As in the case of research, the design of an audit is extremely important. Sale (2000) suggests the following steps to enable a successful audit to be conducted:

1. Win the support and commitment of colleagues.
2. Decide on an area to audit.
3. Identify who will do the audit.
4. Set objectives.
5. Develop standards to measure current performance/establish the baseline.
6. Collect reliable, valid data.
7. Review the results.
8. Identify improvements.
9. Develop an action plan.
10. Implement the action plan.
11. Evaluate and report.

Within the domain of diabetes care there are well established, evidence-based standards set for the care of people with diabetes (e.g. NICE, 2011). These may be used as the basis for an

audit in a locality, or clinicians may wish to determine their own area of audit. However, it is always vital to have credible standards against which practice can be measured.

#### **Example of an audit**

The use of audit methodology can be illustrated through the work of Hicks and McAuley (2010) following the redesign of their community diabetes service. The service was developed over several years in response to changes in healthcare policy, updates to the diabetes care pathway and organisational changes. Although patient and GP satisfaction surveys had been conducted and indicated that the service was well received, the team wanted to establish whether the service was also making a difference to patients' clinical diabetes outcomes. Thus, the aim of the audit was to assess the effectiveness of the Enfield intermediate diabetes service on clinical outcomes in people with diabetes.

#### **Page points**

1. Within the domain of diabetes care there are well established, evidence-based standards set for the care of people with diabetes.
2. It is always vital to have credible standards against which practice can be measured.

***“Although not all DSNs will be instigators of research studies it is to their advantage that they remain engaged in research activity ... DSNs are a vital element of the driving force for improving diabetes care, and research, service/practice development and evaluation must be part of their role.”***

The audit was conducted by members of the diabetes team who reviewed the outcomes of those people referred to the diabetes service between November 2005 and May 2009 ( $n=361$ ). The inclusion and exclusion criteria for patient referrals were stated. Demographic data regarding details such as “referring GP and date of referral” and data relating more closely to standards of care such as HbA<sub>1c</sub> level on referral and at last appointment were collected. Specific standards for the clinical outcomes were not stated in the methods, but in the results mean values for HbA<sub>1c</sub> levels, total cholesterol levels and blood pressure were given for both time of referral and end of the audit and were discussed relative to research-based target values.

The demographic results could not be compared with standards (as there were none), but these results help to illustrate the context in which care was provided and emerging trends from across the primary care trust were identified. Strengths in the service were noted and through the conclusion it was evident that this audit was part of a cycle of activity aiming at enhancing the quality of patient care over time, which is also part of the audit philosophy.

### Conclusion

Patient safety and high-quality care are fashionable terms in today’s healthcare culture. Unfortunately, research and development are less fashionable terms, yet they are fundamental to both patient safety and quality care. Without robust evidence and means of evaluating service provision how can safety and quality be promoted? A survey of the evolving roles of DSNs (James et al, 2009) found that in recent years DSNs were less likely to participate in research-related activity than was the case 10 years ago. Perhaps research and development are viewed as optional extras relative to the priorities of clinical care rather than an integral part. Although not all DSNs will be instigators of research studies it is to their advantage that they remain engaged in research activity. As Hicks and McAuley (2010) noted, this is not a time to “sit on our laurels”.

In this article, the spectrum from the most robust of research designs (systematic reviews)

through case studies to audit, which is regarded as a means of service evaluation rather than research, has been briefly spanned. These are only a few of the designs and approaches that DSNs may use to inform their care. DSNs are a vital element of the driving force for improving diabetes care, and research, service/practice development and evaluation must be part of their role. ■

- Alabraba V, Floyd E, Wallymahmed M (2010) *Journal of Diabetes Nursing* **14**: 388–9
- Alderson P, Green S, Higgins JP (2004) Cochrane Reviewers’ Handbook 4.2.3. In: *The Cochrane Library, Issue 1*. John Wiley & Sons Ltd, Chichester
- Brown SJ (2009) *Evidence-Based Nursing: The Research-Practice Connection*. Jones and Bartlett Publishers, Sudbury, MA, USA
- Cavan D, Hamilton P, Everet J, Kerr D (2001) *Diabet Med* **18**: 162–4
- Clark CE, Smith LF, Taylor RS, Campbell JL (2011) *Diabet Med* **28**: 250–61
- Coates V (2011) *Journal of Diabetes Nursing* **15**: 113–17
- Courtney M, Carey N, James J et al (2007) *Practical Diabetes International* **24**: 1–6
- Davies M, Dixon S, Currie CJ et al (2001) *Diabet Med* **18**: 301–7
- Dunning T (2011) *Journal of Diabetes Nursing* **15**: 9–14
- Gray M (2009) *Evidence-based Healthcare and Public Health: How to Make Decisions About Health Services and Public Health*. 3rd edn. Churchill Livingstone Elsevier, Edinburgh
- Hicks D, McAuley K (2010) *Journal of Diabetes Nursing* **14**: 348–52
- James J, Gosden C, Winocour P et al (2009) *Diabet Med* **26**: 560–5
- Miller M, Kearney N (2004) *Int J Nurs Stud* **41**: 813–21
- New JP, Mason JM, Freemantle N et al (2003) *Diabetes Care* **26**: 2250–5
- NICE (2002) *Principles for Best Practice in Clinical Audit*. Radcliffe Medical Press, Oxford
- NICE (2011) *Quality Standards Programme: Diabetes in Adults*. NICE, London
- Parahoo K (2006) *Nursing Research: Principles, Process and Issues*. 2nd edn. Palgrave Macmillan, Basingstoke
- Pendlebury J, Holt RI (2010) *Journal of Diabetes Nursing* **14**: 328–9
- Powers BA, Knapp TR (2006) *Dictionary of Nursing Theory and Research*. 3rd edn. Springer Publishing Company, New York, NY, USA
- Sale DN (2000) *Quality Assurance: A Pathway to Excellence*. Macmillan Press Ltd, Basingstoke
- Sampson MJ, Crowle T, Dhatariya K et al (2006) *Diabet Med* **23**: 1008–15
- Stake RE (2000) Case studies. In: Denzin NK, Lincoln YS (eds). *Handbook of Qualitative Research*. 2nd edn. SAGE Publications, Thousand Oaks, CA: 435–54
- Yin RK (2003) *Case Study Research: Design and Methods*. 3rd edn. SAGE Publications, Thousand Oaks, CA, USA

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