

Diabetes knowledge levels in medical and surgical nurses

Cathy Nugent and Leigh Kinsman

Introduction

Diabetes is associated with acute and chronic complications that can result in hospitalisation. It has been estimated that up to 50% of people with diabetes will undergo surgery due to complications related to the disease process (Oulette et al, 1998; Jacober and Sowers, 1999). A sound knowledge base of diabetes treatment and management is required by nurses in both medical and surgical wards to provide competent nursing care to these patients. This article describes a study that compared the diabetes knowledge of registered nurses employed in medical and surgical units. The study found that medical nurses had a better knowledge of diabetes than surgical nurses. Potential reasons for this are outlined and the implications of the findings discussed.

Diabetes is one of the most common metabolic disorders and affects approximately 940 000 Australian adults (Australian Diabetes, Obesity and Lifestyle Study, 2001). A broad knowledge of diabetes is required by nurses to provide optimal nursing care, patient education and assist in reaching positive outcomes for hospitalised people with diabetes. Nursing care of people with diabetes is often complex and challenging, as diabetes is a condition that is associated with both acute and chronic complications. Jacober and Sowers (1999) estimate that 25–50% of people with diabetes will undergo surgery due to complications related to the disease process. Surgical ward nurses need skills and knowledge about surgical procedures, and the condition of diabetes for the provision of optimal nursing care.

Review of the literature

Several studies related to the diabetes knowledge of nurses emphasise the various roles that the nurse plays in the care of the person with diabetes during acute hospitalisation. These roles include assessment, direct nursing care and education of the person with diabetes. (Hare, 1997; Leggett-Frazier et al, 1994; Jayne and Rankin, 1993; Drass et al, 1989).

A general consensus throughout the literature is that ward/staff nurses spend the most time with hospitalised patients

and are therefore in the best position to assess patient self-care and provide education (Drass et al, 1989; Burden, 1993; Gossain et al 1993; Jayne and Rankin, 1993; Baxley et al, 1997).

The diabetes knowledge of nurses has been investigated among groups of nurses in various settings. Leggett-Frazier and colleagues (1994) reported a diabetes knowledge score of 67% among nurses employed in care facilities for older people. Adams and Cook (1994) compared home healthcare agencies with and without diabetes nurse educators (DNE). Diabetes knowledge scores were reported as being 73% with a DNE and 61% without a DNE. A study by Lipman and Mahon (1999) in a paediatric hospital yielded a diabetes knowledge score of 63.5%. Wamae and Da Costa (1999), Baxley et al (1997), Burden (1993), Gossain et al (1993) and Drass et al (1989) studied the diabetes knowledge of nurses employed in acute general hospitals and obtained knowledge scores of 78%, 73.3%, 68%, 69% and 66.8%, respectively. These scores cannot be compared but they serve to highlight that deficits in diabetes knowledge exist among nurses.

Although studies have been carried out about the diabetes knowledge of nurses in diverse settings among many specialties of nursing, only one study has directly measured and compared the knowledge of medical and surgical nurses (Scheiderich

ARTICLE POINTS

1 There is an increasing need for both medical and surgical nurses to have a sound knowledge of diabetes.

2 A demographic data sheet and a multiple choice test were completed by 48 registered nurses (23 medical nurses, 22 surgical nurses and 3 others).

3 Nurses from the medical unit had higher knowledge scores than those from the surgical unit.

4 The diabetes knowledge scores obtained could not be explained by the demographic variables measured.

5 Despite the limitations of the study, there are immediate implications for the education of surgical nurses.

KEY WORDS

- Diabetes knowledge
- Medical nurses
- Surgical nurses
- Education

Cathy Nugent is a Research Assistant and Sessional Teacher and Leigh Kinsman is a Lecturer in Nursing at La Trobe University, Bendigo Campus, Victoria, Australia.

PAGE POINTS

1 People with diabetes are more likely to have surgery than are the rest of the population.

2 The diabetes basic knowledge test and the demographic data sheet used in this study were modified to reflect Australian terminology, scientific accuracy of questions and answers and a relevant local and Australian context.

3 The instrument was pilot tested before distribution to the participants in order to identify any problems with the wording or perceived relevance of the demographic questions and for feedback on potential difficulties when answering the questions.

4 The researcher attended two changes of shift periods (evening and night handover) for a period of 1 week in each participating unit and asked for volunteers to participate in the study.

et al, 1983). Although not statistically significant the results of this study indicated that the mean knowledge scores were lower for surgical nurses than for medical nurses ($p=0.055$).

Diabetes is associated with both acute and long-term complications that can result in hospitalisation. People with diabetes are more likely to have surgery than are the rest of the population. Therefore, medical and surgical nurses both care for a significant number of patients with diabetes.

Sample and setting

A convenience sample for this study was derived from registered nurses (division I – from an accredited university course) working in medical and surgical units of a large regional Australian hospital. Convenience sampling entails the use of the most conveniently available people or objects for use in a study. It is a form of non-probability sampling.

Measures

Two instruments developed by Drass et al (1989) were used: a demographic data sheet and the diabetes basic knowledge test (DBKT). The original DBKT consists of 45 multiple-choice items. Drass et al (1989) examined the instrument for validity and reliability. Reliability for the knowledge test items was reported as 0.79 as determined by Cronbach’s standardised α -coefficient. These instruments have been used to test the diabetes knowledge of nurses in various settings (Baxley et al, 1997; Burden 1993; Gossain et al, 1993; Jayne and Rankin, 1993).

The DBKT and the demographic data sheet used in this study were modified to reflect Australian terminology, scientific accuracy of questions and answers (as of September 2001) and a relevant local and Australian context. The modifications made to the measurement tools for the current study were completed in consultation with two DNEs employed at the facility. The instrument was pilot tested on eight nurses before the distribution to the participants in this study. The purpose of the pilot test was to identify any problems with the wording or perceived relevance of the demographic questions and for feedback on potential difficulties when answering

the questions. No potential problems were identified.

Ethical considerations

The ethics committee of the facility granted permission for the study. Nurses who volunteered to participate were given a package that contained an information letter, the measurement tool and a sealable envelope. Consent was implied on completion of the questionnaire. Anonymity was ensured as no identifying codes or personal identification were required.

Data collection

Data collection took place over a period of 2 weeks between July–August 2002. The researcher attended two changes of shift periods (evening and night handover) for a period of 1 week in each participating unit. Division I nurses were asked to remain after handover while the researcher provided information regarding the study and requested volunteers. Volunteers were then asked to complete the forms immediately to inhibit consultation amongst each other. Participants were advised that completed instruments were to be placed in a sealed box. These were collected by the researcher at the completion of the data collection period.

Data coding and entry

The forms were scored by hand and the results were entered into SPSS. To ensure accuracy of data entry, raw data were visually scanned and checked by tabulated frequencies for all demographic and diabetes knowledge questions. The second author performed an audit of six randomly selected questionnaires and 100% agreement on data entry was found.

Data analysis

Descriptive statistics were used to profile the demographic characteristics of the sample. ANOVA was used to compare mean diabetes knowledge scores according to years of nursing experience, education level, diabetes education, type of employment, history of diabetes existing in self, family or friends and perception of competency. An independent samples t-test was used to compare mean knowledge

scores according to unit of employment and years at the facility.

Results

A sample of 98 registered nurses (division 1) were invited to participate and 55 questionnaires were returned. Seven questionnaires were excluded; four were unsuitable (as they had too much missing data) and three were returned too late to be included in the analysis. This left a sample of 48 (49%).

The employment profiles of the 48 participants are shown in Table 1 and employment profiles according to employing units are shown in Table 2.

The level of education and the length of time since the nurses attended diabetes education sessions/in-service is indicated in Table 3. The largest proportion of participants (54.2%) stated that an undergraduate university degree was their highest level of education obtained. Twenty-one participants (44%) reported attending no diabetes in-service/education programmes or attending an in-service/education programme for more than 2 years.

Most respondents (45; 94%) stated that they cared for four or more patients with diabetes per month. The majority of respondents (26; 54%) stated that they had no history of diabetes themselves or within their immediate family or friends. Fifteen respondents (31%) reported having a history of diabetes in their immediate family and seven respondents (15%) reported having a friend with diabetes. In summary, there were no substantial differences between the medical and surgical units.

Knowledge scores

Participants answered a total of 45 questions on basic diabetes knowledge. The mean knowledge score of all nurses was 66.8% (SD 5.19). No nurse was able to correctly answer all questions; the number of correct answers ranged from 18–39. The scores appeared to be normally distributed (see Figure 1).

Employing unit and knowledge scores

Nurses from the medical unit had statistically significant higher knowledge

Table 1: Employment profile of respondents (n=48)

Years of experience	Number of respondents	Percentage of respondents
0–3	16	33.3%
4–14	16	33.3%
14+	16	33.3%
Years at facility		
0–3	25	52.1%
4+	23	47.9%
Type of employment		
Full time	16	33.3%
Part time	29	60.4%
Bank/casual	3	6.3%
Employing unit		
Medical	23	47.9%
Surgical	22	45.8%
Other	3*	6.3%

* = were from other speciality areas but were working in either medical or surgical units during data collection period

Table 2: Employment profile of surgical and medical units (n=45)

Years of experience	Medical nurses	Surgical nurses
0–3	6	9
4–14	7	7
14+	10	6
Years at facility		
0–3	10	12
4+	13	10
Type of employment		
Full time	6	10
Part time	16	11
Bank/casual	1	1

Table 3: Educational background and history of diabetes in-service/continuing education (n=48)

	Number of respondents	Percentage of respondents
Highest education preparation		
Hospital certificate	11	22.9%
Tertiary degree	26	54.2%
Graduate diploma	11	22.9%
Time since in-service regarding diabetes		
Never	7	14.6%
Within last 6 months	10	20.8%
6–12 months	7	14.5%
1–2 years	9	18.8%
Over 2 years	14	29.2%
Missing	1	2.1%

Table 4. Comparison of mean knowledge scores categorised by employing unit (n=45)

Employing unit	n	Mean Score	Standard Deviation	t value	p value
Medical	23	32.13	4.13	2.627	0.012
Surgical	22	28.27	5.64		

scores than nurses in the surgical unit (p=0.012; t=2.627) which can be seen in Table 4.

PAGE POINTS

1 The mean score of 63% achieved by the surgical nurses in this study is low in comparison to previously cited studies and would represent an insufficient knowledge base according to the majority of cited authors.

2 Perhaps the difference in knowledge scores could be attributed to the nurses in the surgical unit seeing diabetes as being a secondary diagnosis and not as important as the primary diagnosis.

Discussion

The diabetes knowledge scores obtained in this study could not be explained by the demographic variables that were measured. The sample in this study was derived from the medical and surgical units of an Australian regional hospital. The overall mean scores were 71% in the medical nurse group versus 63% in the surgical nurse group (p=0.012). The power of the t-test was calculated to be 0.09 (Cohen, 1988) and indicates a very small effect size. This study therefore provides a low level of evidence that these scores may reflect the broader Australian nursing population. However, Scheiderich et al (1983) found a strong trend (p=0.055) for surgical nurses to score lower than medical unit nurses on a diabetes knowledge test.

The mean score of 71% obtained by the medical nurses in this study was comparative to previously cited studies in other groups of nurses. However, the mean score of 63% achieved by the surgical nurses in this study

is low in comparison to previously cited studies and would represent an insufficient knowledge base according to the majority of cited authors. Given that the surgical nurses in the current study indicated that they cared for a significant number of patients with diabetes per month, this result is a source of concern.

The differences in diabetes knowledge scores between medical and surgical nurses in this study could not be explained by demographic variables. Perhaps the difference in knowledge scores could be attributed to the nurses in the surgical unit seeing diabetes as being a secondary diagnosis and not as important as the primary diagnosis. Possibly, medical nurses are expected to provide more diabetes education functions to people with diabetes than surgical nurses. Further investigation in the differences of knowledge levels of medical and surgical nurses is warranted.

Limitations

Drass et al (1989) originally designed the DBKT used in this study. The measuring tool used was designed to measure basic diabetes knowledge. Nurses required knowledge in many areas of diabetes to achieve a good result. Nurses who responded in this study may not have believed that such knowledge was relevant to clinical practice. It is possible that the test measured a set of theoretical concepts satisfactorily, but that the concepts measured were inappropriate. However two DNEs checked the DBKT and considered it an appropriate instrument to measure diabetes knowledge in the sample population.

The population for the current study was drawn from only two units of one Australian regional hospital. Combined with the small sample size, this makes it difficult to generalise the results beyond the sample to the wider nursing population.

Implications and recommendations for future research

This study identified that the nursing population sampled has knowledge deficits in relation to diabetes care and management. If these findings are reflective of the care provided to people with diabetes by the Australian nursing profession then

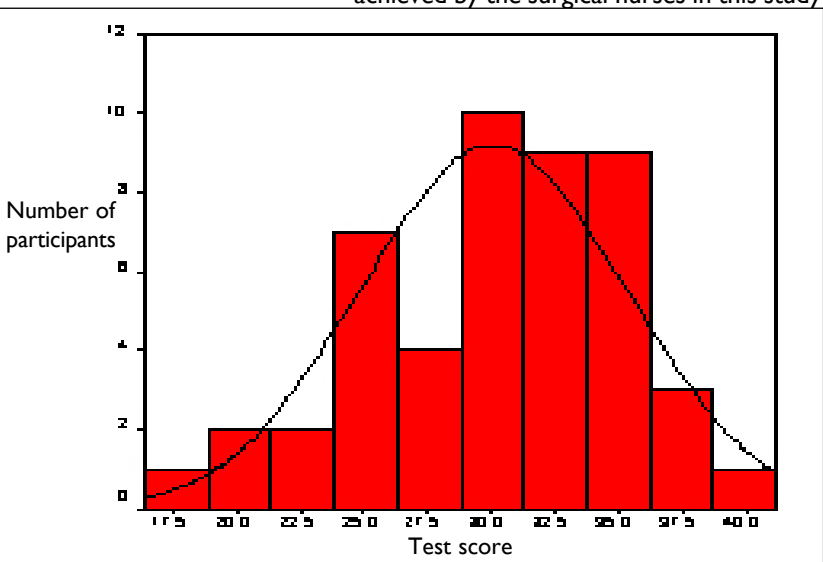


Figure 1. Histogram of mean knowledge scores (out of a possible 45 points)

there may be serious implications. It is recommended that this study be replicated to ascertain if the current findings are duplicated in other Australian nursing populations.

The rate of surgery is higher for the diabetes population than the rest of the population. It is of concern that surgical nurses scored lower than medical nurses in this study and much lower than comparative studies. Consequently, it is recommended that further research is required to examine why surgical nurses scored lower on the diabetes knowledge test in this sample and if this result represents the broader surgical nursing community. There are immediate implications for the education of surgical nurses in this study.

Conclusion

Diabetes is a serious and growing health problem in Australia. The nature of diabetes is such that nurses in medical and surgical units are likely to care for increasing numbers of patients with diabetes. Broad diabetes knowledge is necessary to ensure excellence in the nursing care of this growing population. ■

Adams C, Cook D (1994) The impact of a diabetes nurse educator on nurses' knowledge of diabetes and nursing home interventions in a home care setting. *The Diabetes Educator* **20(1)**: 49–52

Australian Diabetes, Obesity and Lifestyle Study (2001) *Diabetes and associated disorders in Australia 2000. The accelerating epidemic*. International Diabetes Institute, Melbourne

Baxley SG, Brown ST, Pokorny ME, Swanson MS (1997) Perceived competence and actual level of knowledge of diabetes mellitus among nurses. *Journal of Staff Development*. **13(2)**: 93–98

Burden ML (1993) Education on diabetes for the hospital-based nurse. *Practical Diabetes* **10(4)**: 153–154

Cohen J (1998) *Statistical power analysis for the behavioural sciences 2nd Edition*. Lawrence Erlbaum Associates, New Jersey

Drass JA, Muir-Nash J, Boykin PC, Turek JM, Baker KL (1989) Perceived and actual level of knowledge of diabetes mellitus among nurses. *Diabetes Care* **12(5)**: 351–56

Gossain VV, Bowman KA, Rovner DR (1993) The actual and perceived knowledge of diabetes among staff nurses. *The Diabetes Educator* **29(3)**: 215–19

Hare M (1997) Diabetes care in nursing homes: who cares. *Journal of Diabetes Nursing*. **1(4)**:104–07

Jacober SJ, Sowers JR (1999) An update on perioperative management of diabetes. *Archives of Internal Medicine*. **159(20)**: http://infotrac.galegroup.com/itw...!xrn_!_0A58054346?sw_aep=latrobe [accessed 22/04/02]

Jayne R, Rankin S (1993) Revisiting nurse knowledge

about diabetes: an update and implications for practice. *The Diabetes Educator* **19(6)**: 493–502

Leggat-Frazier N, Turner MS, Vincent PA (1994) Measuring the diabetes knowledge of nurses in long-term care facilities. *The Diabetes Educator* **20(4)**:104–07

Lipman TH, Mahon MM (1999) Nurses knowledge of diabetes. *Journal of Nursing Education* **38(2)**:92–95

Ouletter SM (1998) AANA journal course: Update for nurse anaesthetists. Diabetes mellitus: overview and current concepts in anaesthetic management. *Journal of the American Association of Nurse Anaesthetists* **66(1)**: 65–76

Scheiderich SD, Freibaum CN, Peterson LM (1983) Registered nurses' knowledge about diabetes mellitus. *Diabetes Care*. **15(4)**:176–79

Wamae D, Da Costa S (1999) An educator project to improve ward nurses' knowledge of diabetes. *Journal of Diabetes Nursing* **3(3)**: 75–78

PAGE POINTS

- 1 It is recommended that further research is required to examine why surgical nurses scored lower on the diabetes knowledge test in this sample and if this result represents the broader surgical nursing community.
- 2 Broad diabetes knowledge is necessary to ensure excellence in the nursing care of this growing population.