

**School of Nursing and Midwifery**

**Diabetes Care:  
The status of diabetes care in Queensland residential aged facilities**

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**This thesis is presented for the Degree of  
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## Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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## **Abstract of Thesis**

Diabetes care of the elderly in residential aged care facilities has often been unstructured and non-standardised, with disparities in both the practice and knowledge of health care workers caring for this vulnerable group. Poorly controlled diabetes can contribute to a range of adverse events, including impaired wound health and cardiovascular events. The purpose of this study was to establish if current Australian diabetes management guidelines for the elderly are being met in residential aged care facilities in Queensland and identify areas for clinical practice improvement.

A cross-sectional, descriptive design was employed to measure demographic data, perceived and actual diabetes-related knowledge, availability of diabetes management and care guidelines, and facilitators and barriers to meeting diabetes related care. A sample of 109 health care workers from residential aged care facilities completed a postal survey.

Diabetes guidelines shown to be available in residential aged care facilities were aimed at care planning, with guidelines for both screening and monitoring of diabetes and diabetes care specific skills more available in private aged care and high care classified facilities. Limited monitoring of outcomes of diabetes care were evident. Overall, participants perceived their diabetes knowledge as “good”, however deficits were found in the level of actual knowledge on diabetes complications and medication management. Ratings for perceived and actual diabetes knowledge was

higher with older aged health care workers by those employed in their current position the longest. Furthermore, a positive relationship was shown between perceived and actual diabetes knowledge with years of experience in aged care, employment status (RNs/ENs, AINs and other health care workers) and education status (grade 12 schooling, Technology and Further Education and university award). Diabetes – related knowledge was shown to be the most significant facilitator as well as barrier to diabetes care provision. Factors affecting perceived level of confidence in providing diabetes self-management education included experience in aged care, employment position and level of education.

The contribution of this research to the area of study was to provide important data on the availability of diabetes guidelines and protocols and diabetes knowledge base. Data has also been provided for the availability of diabetes guidelines and protocols in different facility types and with different classifications of care as well as data for the perceived level of confidence in providing diabetes care in residential aged care facilities. Study findings indicate a need for an increased focus on diabetes care in residential aged care to improve health outcomes.

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## **List of Non-Statistical Abbreviations**

AIN Assistant in Nursing

DSME Diabetes Self –Management Education

DBKT Diabetes Basic Knowledge Test

DSRT Diabetes Self Report Tool

DKQ Diabetes Knowledge Questionnaire

EN Enrolled Nurse

HbA<sub>1c</sub> Glycated Haemoglobin

NADC National Association of Diabetes Centres

RN Registered Nurse

## CHAPTER 1: INTRODUCTION

Diabetes, a chronic metabolic disorder, is one of Australia's most challenging health problems and is responsible for significant rates of death and disability, particularly from end organ damage (Australian Institute of Health and Welfare [AIHW], 2008). Of significance, diabetes is the commonest chronic condition among the elderly (Australian Diabetes Educators Association [ADEA], 2003), with prevalence in older Australians, above 65 years, reported to be 40.9 % (AIHW, 2008). Therefore, this group can expect marked rates of diabetes related complications and premature death (ADEA, 2003; AIHW, 2008). The management of chronic conditions in the elderly is challenging, requiring individualised systems of care structured to address barriers -visual, hearing and cognitive impairment, depression, reduced mobility and manual dexterity, financial and social difficulties - which are common in the elderly (ADEA, 2003; AIHW, 2008).

In spite of the emphasis on healthy ageing and community based care directed towards supporting an elderly person to remain in their home, many individuals require admission to a residential care facility. In Australia, it is estimated that 6% of over 65 year olds live in residential aged care facilities (Dixon, 2005). Since the merging of Australian hostels and nursing home, (Nay, Garrett & Koch, 1999), as part of legislative reform, the term "residential aged care facility" has been used to describe regulated accommodation for older persons who require ongoing assistance with activities of daily living and nursing care (Commonwealth Department of Health and Aged Care, 1997). This term is now used interchangeably with

convalescent home, aged care facility and long-term care facility (Phillips et al., 2006).

Most recently, both in Australia and internationally, a greater emphasis has been placed on promoting community based care for the frail elderly, enabling them to remain in their own home (Davies & Higginson, 2004; Office for National Statistics: Community Care Statistics, 2000). As a consequence, older persons residing in residential aged care are more likely to be those with dementia (60%), chronic pain (40-50%) and depression (40%) (Australian Government Department of Health and Ageing, 2004; Royal Australian College of General Practitioners, 2006). Given the increasing prevalence of diabetes in the ageing population, diabetes is also likely to be evident in a high proportion of aged care residents (ADEA, 2003; AIHW, 2008).

The ADEA have developed evidence based guidelines for the management and care of diabetes in the elderly. However, these guidelines do not apply to residents in aged care facilities (ADEA, 2003). The challenge faced by residential aged care facilities is to provide diabetes care which meets the evidence based practice inherent to these guidelines. Evidence from overseas suggests that care for people with diabetes in residential aged care facilities is often inadequate and staff may not receive the necessary training to provide adequate care (Benbow, Walsh & Gill, 1997; Douek, Bowman & Croxson, 2001; Tattersall & Page, 1998).

This chapter provides an overview of diabetes mellitus and the burden of diabetes in Australia and introduces the status of diabetes care in Queensland residential aged facilities.

## **DIABETES**

Diabetes is a chronic metabolic disorder of multiple aetiology. It is characterised by chronic elevation of blood glucose (hyperglycaemia), with disturbances of carbohydrate, fat and protein metabolism, resulting from deficits in insulin secretion, insulin action or both (AIHW, 2008; International Diabetes Federation [IDF], 2007; International Diabetes Institute [IDI], 2005-2006). There are two main types of diabetes: type 1 and type 2. Type 1 diabetes accounts for 10 to 15% of all diagnosed cases and the remainder are attributed primarily to type 2 (IDF, 2007; World Health Organization [WHO], 2009).

Type 1 diabetes is characterised by an absolute deficiency of insulin secretion, which has resulted from the insulin producing cells, pancreatic beta cells, being destroyed by an autoimmune response (Diabetes Australia, 2009a; Diabetes Australia, 2009b; Harmel & Mathur, 2004; WHO, 2009). Insulin replacement therapy is required to control blood glucose levels and is essential for survival (Diabetes Australia, 2009b; IDI, 2005-2006; WHO, 2009). In the Australian Diabetes, Obesity and Lifestyle Study it was reported that type 1 diabetes accounted for approximately 8.1% of all diagnosed cases in people aged 25 years and older (Dunstan, et al., 2002). This equates to nearly 35,500 Australian adults (Diabetes Australia-Queensland, 2006).

In contrast, type 2 diabetes' pathophysiology is related to insulin resistance and inadequate insulin secretion (Harmel & Mathur, 2004). Type 2 diabetes is often referred to as a lifestyle disease because it is largely preventable, with modifiable risk factors that include physical inactivity, excess weight, and poor diet and nutrition (Commonwealth Department of Health and Ageing, 2008). In addition, there is a strong link with high blood pressure, high cholesterol and excess waist girth and an association with the metabolic syndrome (insulin resistance) (Diabetes Australia- Queensland, 2006; Harmel & Mathur, 2004; IDF, 2007; WHO, 2009). The Australian Bureau of Statistics series of National Health Surveys reported that type 2 diabetes accounted for 83% of all diabetes in 2004-2005, representing approximately 582,800 Australians (AIHW, 2008).

Regardless of the age group and type of diabetes, the chronic progressive nature of the disease can lead to substantial morbidity and mortality primarily from cardiovascular complications, kidney and eye disease and limb amputations (Barr et.al., 2006; IDF, 2007; WHO, 2009). Specifically, it is the chronic hyperglycaemia that gives rise to the long term effects of diabetes, which include the microvascular complications of neuropathy, nephropathy and retinopathy and the macrovascular complications of cardiovascular, cerebrovascular and peripheral vascular disease (Dunning, 2005a; Dunstan, et al., 2001; IDF, 2007; WHO, 2009; AIHW, 2008). Furthermore, poor circulation and atherosclerosis are often associated with increased age, resulting in an increased prevalence of peripheral vascular disease and retinopathy in the elderly population (Eliopoulos, 2005).

Management of these diabetes complications presents a myriad of challenges for the aged care worker in residential aged care facilities. The residents' aged-related changes, reduced levels of independence, impaired dexterity, mobility and self care capacity, places much of the responsibility for provision of high quality and safe care upon the aged care workers (Dunning, 2005b). The issues surrounding diabetes care provision in aged care facilities will be furthered examined in Chapter two.

### **PREVALENCE OF DIABETES**

Globally, there has been a dramatic increase in the prevalence of diabetes, with estimates of approximately 246 million people worldwide affected in 2007 (IDF, 2007). It has been predicted that this number will continue to increase to such an extent that by 2025, the number of cases is expected to rise to 380 million (AIHW, 2008; Dixon, 2005; IDF, 2007).

The prevalence of diabetes in Australia is one of the highest for a Western nation, with an estimated one million Australians aged 25 years and over, or 7.4% of the adult population affected (AIHW, 2008). In Australia, 1 in 4 adults over the age of 25 years have either diabetes mellitus or impaired glucose metabolism (a prediabetes state), (Barr, et al., 2006). In particular, diabetes has become one of the commonest chronic diseases affecting elderly people; with the life expectancy of older Australians increasing, so too is the prevalence of diabetes. Currently 17.9% of the Australian population between 65-74 years and 23% aged over 75 years have diabetes, and this is projected to increase (ADEA, 2003). Not only is the incidence of diabetes rising, but the disease is associated with a significant impact on death rates

(Barr, et al., 2006). A five year study by Barr et. al. (2006) found that people with previously known diabetes were twice as likely to die.

## **BURDEN OF DIABETES**

Diabetes is a common, chronic health condition and due to the associated co morbidities and management requirements a costly condition. Thus it poses social and economic challenges to both individual and population health. The condition places a substantial financial burden on those affected, as well as their family and carers, health services and governments. In a report by Dixon (2005) on the cost of diabetes in Australia, diabetes mellitus was recorded as the sixth most common problem managed by general practitioners in 2002. Direct health expenditure on diabetes for older Australians, above 65 years, living in aged care homes, was reported as 37.7 million (Dixon, 2005). However, the indirect social and personal costs remain incalculable. The Australian health system expenditure on diabetes in 2000-01 was recorded as \$784 million while total expenditure for older people with diabetes, was \$419 million (Diabetes Australia, 2009b; Dixon, 2005; IDF, 2007) Specifically, \$37.7 million, or 4.8% of the total allocated health expenditure on diabetes in 2000 to 2001 was for the elderly with diabetes, who resided in residential aged care and required 24 hour nursing care (Dixon, 2005). Literature has emphasised the substantial financial burden of diabetes in Australia, notably as the prevalence of diabetes increases with age so too does health expenditure (Diabetes Australia, 2009b; Dixon, 2005; IDF, 2007).

## **MEETING THE DIABETES CARE NEEDS OF OLDER AUSTRALIANS IN RESIDENTIAL AGED CARE**

Managing the complex care needs of an ageing population is challenging. Given escalating health care costs, the prevalence of diabetes and the associated devastating consequences, it is imperative that this condition be managed appropriately. Optimal management of diabetes involves consideration of multiple components, such as medications, blood glucose monitoring, education, dietary modifications, exercise, managing co-morbidities and regular screening for complications (ADEA, 2003; Bryant, 2006). Age specific issues such as co-morbidities, polypharmacy, declining cognitive function and social isolation, can complicate the provision of effective preventative and management services (Australian Government Department of Health and Ageing, 1999). In addition, the elderly experience age-related physiological changes which can present unique challenges in diabetes management differing from that of other aged groups. For example, the physiological deterioration of glucose tolerance can manifest with increasing age, resulting in fluctuations in blood glucose levels, which put the elderly individual at risk of hyperglycaemia (elevated blood glucose) or hypoglycaemia (decreased blood glucose), (Dunning, 2005a; Eliopoulos, 2005). Hypoglycaemia in the elderly may be exhibited as abnormal behaviour, somnolence, confusion, altered sleep patterns, or slurred speech, rather than the classic symptoms - tachycardia, restlessness, perspiration and anxiety - which may be absent (Eliopoulos, 2005). Advancing age and changes in health status can influence the therapeutic interventions, underscoring the importance of systematic disease management approaches with the elderly.

## **DIABETES GUIDELINES FOR THE ELDERLY**

In recognition of the specific diabetes management needs in the elderly some guidelines have been developed. There are some prepared in the United States of America, the United Kingdom and internationally (Brown, Mangione, Saliba & Sarkisian, 2003; Department of Health, 2001; European Diabetes Working Party for Older People, 2004; IDF, 2005). In Australia, the development of guidelines for the management and care of diabetes in the elderly was conducted by the Australian Diabetes Educators Association (ADEA, 2003), following an extensive literature review and consultation process. These guidelines were developed to provide specific standards for diabetes prevention, diagnosis, treatment and long term management of the 'healthy' elderly person with, or at risk of diabetes (ADEA, 2003). These guidelines will be discussed in more detail in chapter 2.

If these guidelines were to be applied in a residential aged care setting, a range of system, patient and provider factors need to be considered. Key characteristics of the residential aged care environment include privatised facilities, medical care provision that is dependent on care provided by general practitioners, a diverse skill mix among health care workers, and high levels of regulation (Phillips, Davidson, Kristjanson, Jackson & Daly, 2006). The Australian aged care setting is characterized by wide variations in workforce profiles, where typically large numbers of unregulated and untrained workers are employed to provide personal care. This disparate staff profile is particularly challenging for effective diabetes care delivery, as quality care of older people has been shown to require adequate numbers of specifically trained and qualified health care workers (Australian Nursing Federation [ANF], 2009; Nay, Garratt & Koch, 1999). Furthermore, there is a high

staff turnover in aged care which in some instances has resulted in an increased use of agency staff, which is likely to impact on the continuity of care (Chenoweth & Kilstoff, 2002). The residential aged care workforce and resulting impact upon diabetes care provision will be examined further in chapter 2.

The purpose of this study was to establish if current Australian diabetes management guidelines for the elderly could be met in residential aged care facilities in Queensland. The objectives guiding this research study were to:

1. Determine the presence and nature of diabetes protocols/guidelines in residential aged care facilities.
2. Identify the knowledge base regarding diabetes management of Queensland health care workers in residential aged care facilities.
3. Ascertain the factors enhancing or inhibiting diabetes care provision by health care workers residential in residential aged care facilities.
4. Determine the levels of perceived confidence of health care workers in residential aged care facilities to provide diabetes care.

## **SIGNIFICANCE OF THE STUDY**

The information gathered from this study makes a contribution to understanding current diabetes management among the elderly living in residential and aged care facilities. This study generated important preliminary data to inform investigation of diabetes care in residential aged care in the Australian context. Firstly, it evaluated the acceptability and utility of a test battery to investigate diabetes care in residential aged care. Secondly, it provided important baseline data from which to inform future

intervention studies. In particular, recommendations have been made to support practice change and policy directions towards meeting the Australian diabetes management and care guidelines for the elderly within residential aged care facilities. Adoption of evidence based practice guidelines should result in improvement in the well-being of elderly people living with diabetes in residential aged care facilities. However, it is well recognised that clinical guidelines alone do not result in practice change, so a range of implementation strategies are also need (Australian Centre for Diabetes Strategies; 2005; Department of Health, 2001; European Diabetes Working Party for Older People, 2004).

The structure of this thesis contains five chapters. The first chapter has introduced the purpose and rationale for the study, objectives, background to the problem and the significance to the management of diabetes in aged care facilities within the Australian context. The background to the study is presented in chapter 2, including the literature review of studies which have explored diabetes management in aged care. Chapter 3 details the methods and procedures that were applied to obtain the data required for the study and method of analysis. Chapter 4 presents the findings of the study, whilst chapter 5 discusses key findings within the context of the current literature and makes recommendations regarding the provision of diabetes care in Queensland aged care facilities.

## **CHAPTER 2: LITERATURE REVIEW**

### **INTRODUCTION**

Diabetes is a chronic, progressive disease which can lead to disability and early death (Diabetes Australia, 2009b). Within Australia, those aged 65 years and over account for the highest rates of type 2 diabetes (AIHW, 2008; DiabCost Australia, 2002; Dunstan et al., 2002; IDF, 2007). Of this elderly population with diabetes, 8% reside in Australian residential aged care facilities (Dunning, 2005a). Although diabetes management guidelines for the elderly have been developed, they are not specific to residential aged care facilities (ADEA, 2003). To understand the importance of these factors on diabetes care, this chapter explores current issues in residential aged care, and in particular focus on diabetes management and the delivery of nursing care in the aged care setting.

### **RESIDENTIAL AGED CARE**

The Australian Government has developed a national strategy for addressing the specific needs associated with an ageing population, which covers retirement income support, work force, housing, social inclusion, education, medical, health and aged care services (Australian Government Department of Health and Ageing, 2008). These policy initiatives have been in response to the rise in the ageing of the Australian population. In Australia it is expected that there will be a 50% rise over the next 10 years of people aged over 65 years, furthermore there will be a doubling of Australians aged over 80 years over the next 20 years. The Australian Government reports that in 2007, nine percent of the Australian population were aged 70 years or

older, and four percent were aged 80 years and over (Australian Government Department of Health and Ageing, 2008).

The Australian Government provides subsidised aged care homes, which are operated by organisations such as religious groups or charities, private businesses, community groups and state, territory and local governments. These providers have been approved by the Australian Government as an ‘Approved Provider’ for providing aged care services (Australian Government Department of Health and Ageing, 2007a; Australian Government Department of Health and Ageing, 2007b). Furthermore, the organisations are accredited by the Aged Care Standards and Accreditation Agency, which is an authorised independent body, regulated by the Australian Government, that monitor an organisation’s compliance with the specified standards of care. To achieve accreditation, aged care facilities are assessed against the Australian Government’s legislated accreditation standards which cover the physical environment; the health, safety and personal care of residents; appropriate management of staff and facility; ability to provide care which enhances the dignity and rights of residents (Australian Government Department of Health and Ageing, 2007c; Australian Government Department of Health and Ageing, 2008; Commonwealth of Australia, 2007a). With regards to resident care, these standards include the monitoring of health and personal care needs, such as medication management, clinical care, dietary requirements, oral and dental health, and mobility (Australian Government Department of Health and Ageing, 2007c). Although diabetes requirements for care are not specifically mentioned in the accreditation standards, it can be seen that the elements within the standards would apply to the provision of diabetes –related care in aged care facilities.

The Australian Commonwealth Department of Health and Ageing provides an assessment of an older person's need for residential aged care through the Aged Care Assessment Teams (ACAT) (Commonwealth of Australia, 2007a). The care and services that are provided depend upon the level of disability, availability of support services and dependence of the older person. There are two types of residential aged care classification in Australia, these are high care and low care (Commonwealth of Australia, 2007a). Residents in a home with a classification of high level care require assistance in activities of daily living, including meals, laundry, cleaning and personal care. In addition, high care residents must also be provided with supportive care and services including access to health practitioner led services, specific therapy services, rehabilitation and nursing services, equipment such as continence aids, mobility equipment, basic medical and pharmaceutical supplies and equipment, medication assistance and short term oxygen if required (Australian Government Department of Health and Ageing, 2009). While low level care focuses on personal care services, for example dressing, eating, bathing, laundry, cleaning and some allied health services (Australian Government Department of Health and Ageing, 2009). The prevalence of residents with a high care dependency level was reported to be 64%, while those with a low care dependency level were reported as 36% (Commonwealth of Australia, 2007b).

The care required for an older person with diabetes in aged care facilities can be directly impacted by the level of care dependency. High-level care residents are more dependent upon the health care worker to meet nursing and personal care needs, and this has major implications in the management of residents with diabetes. For example, residents may require full assistance with the monitoring of blood glucose

levels, dietary requirements, urinalysis and medication administration. As well, diabetes care specific skills, such as foot assessment and blood pressure may be required. In contrast, low-level care residents are less dependent and are better able to manage some of their diabetes care requirements, such as medication administration and nutrition.

### **DIABETES CARE IN RESIDENTIAL AGED CARE**

The increase in the Australian elderly population with diabetes will be accompanied by a concomitant increase in the number of individuals in aged care facilities with diabetes. Unless managed appropriately diabetes can cause increased disability and suffering. This increases costs to the community as well as distress and disability for individuals and their families. As indicated in chapter 1, Australian residential aged care facilities are home to 6% of people aged 65 years or older and in Australia the prevalence of diabetes in this age group is reported to be 40.9% (AIHW, 2008). The proportion of people with diabetes increases notably with age, with the highest prevalence of diabetes reported for those aged 65-74 years (AIHW, 2008). An elderly person with this disease is twice as likely to be admitted to an aged care facility and will require more skilled nursing care upon admission than perhaps required by other residents (Holt, Schwartz & Shubrook, 2007). Furthermore, the literature indicates that effective management of diabetes can reduce the risk and magnitude of complications, such as wound healing and pressure areas and mortality (ADEA, 2003; Colagiuri, 2008; Douek et. al., 2001).

From overseas studies there is evidence to suggest that older people with diabetes in residential aged care are a population often receiving suboptimal diabetes management and the provision of care is often unstructured (Benbow et al., 1997; Douek et al., 2001; Stewart & Troop, 2008). Practice guidelines and care plans were identified as inadequate or notably deficient. Furthermore, the literature indicated an inadequate level of diabetes care specific skills (foot assessment, blood pressure) and screening and monitoring (blood glucose, eye examination, and urinalysis) by health care workers in the aged care facilities. Older people, especially those in aged care facilities, commonly have age specific issues, such as decreased level of independence, impaired mobility and dexterity, inadequate social support, reduced capacity for self care, and co-morbidities. These factors have been found to have an impact on glycaemic control, diabetes management and subsequent health outcomes (ADEA, 2003).

In a British study by Benbow et al. (1997), which measured patterns of care, levels of complications and resource usage by people with diabetes in residential or nursing homes, a greater prevalence of diabetic complications (e.g. amputation, peripheral vascular disease, and foot ulcers) was found than evident in non-residential elderly people with diabetes. It was also noted that of the 159 participants in the study who had diabetes, 27% were not being monitored for diabetic control through urinalysis and blood glucose monitoring and 64% did not have a record of anyone being medically responsible for their diabetes management and review in the previous year. It was recommended by the researchers that to assist this neglected, vulnerable group improvements were needed in staff training, preparation of individualised care plans,

and urgent implementation of regional health guidelines and standards for management of residents with diabetes.

Further research from the UK, involving nurse managers from 40 nursing homes, was conducted to determine if diabetes policies and procedures specifically developed for nursing home residents were available for evidence-based diabetes management, (Douek et al., 2001). Data were collected on whether each nursing home had protocols for the day to day and longer term diabetes care. In parallel with the findings of Benbow et al. (1997) this study also identified inadequate formal diabetes care, with only 7 of the 40 nursing homes providing a written management protocol for diabetes, specifically for residents being treated by insulin, tablets and diet. The remaining 33 institutions had no specific protocols, with health care staff relying upon the information gained principally on admission being incorporated into the residents' care plan (Douek et al., 2001). Moreover, diabetes practices were questionable, for example, the sharing of capillary blood glucose measurement equipment and a lack of systematic approach to calibration, raises concerns of infection risk and accuracy in blood glucose testing practices. Another key finding was poor management of hypoglycemic episodes, with only 16 of the 40 facilities having a defined treatment protocol and the remainder relying on the general training of professional staff. These findings were also similar to those found by Benbow and colleagues, with an identified lack of consistency in the delivery of diabetes care, protocols and formal policies for the management and treatment of residents with diabetes. Further, these two studies clearly highlight the need for diabetes care guidelines specific to the aged care setting and structured training for nursing staff in aged care facilities.

The need for practice guidelines to improve the quality and consistency of care for elderly with diabetes residing in aged care facilities was reported in an American study by Holt et al. (2007). This study found that the management of diabetes in institutionalized elderly is less than optimal due to the complex nature of this population's health care needs. This study used retrospective chart data from 108 elderly people with diabetes residing in 11 aged care facilities in the Midwestern USA. The researchers found that although 94% of the residents had monthly blood pressure checks, only 55% met the guideline goal for blood pressure parameters, annual eye examinations were documented in less than half of the diabetic residents (42%) and worse still annual lipid check were recorded in only 31% of residents. Conversely, monthly foot exams were regularly performed in 87% of residents, which met with the American Diabetes Association (ADA) diabetes treatment guidelines (Holt et al., 2007). Although the ADA guidelines are inclusive for the elderly, they are not specific to the needs of the elderly residing in aged care facilities (Holt et al., 2007). As in the Benbow et al. study (1997), the study by Holt et al. (2007) also highlighted the inadequate provision of diabetic care in this vulnerable population.

## **NURSES WORKING IN AGED CARE**

Providing holistic care to the elderly in aged care facilities requires taking into consideration knowledge, research and best practice from a range of health disciplines. The importance of maintaining the delivery of high quality and safe nursing care has long been an issue of concern to policy makers and the general public (Australian Government Department of Health and Ageing, 2008). Recent research has focused on the need to improve staffing levels, especially registered

nurse (RN) staffing, in order to improve the quality of care in aged care facilities (Konetzka, Stearns & Park, 2008; Stearns et al., 2007). The researchers have suggested that a higher nursing staff level and more skilled nursing staff mix correspond to a better provision of care for the elderly in aged care facilities.

In the aged care sector, there are a number of different positions for nurses and care staff, each with varying skills levels. According to the Australian Nurses Federation (ANF) (ANF, 2008) the role of the registered nurse in aged care settings includes providing personal care that are within the scope of practice of the RN, such as, making observations, assessments and recording of symptoms and progress for the residents. Registered nurses are also responsible for collaborating with the General Practitioner (GP) and other allied health personnel in treatment, administration of medications and the development of care plans (Cawley, Grabowski & Hirth, 2006). In addition, the RN carries out the review and management of diabetes care plans and monitoring, including diabetic assessments and targets (blood glucose monitoring, diet, insulin and diabetic medications, foot assessment, blood pressure, glycaemia control, eye exam, kidney function and lipid profile). The ANF distinguishes between the role expectations of the RN and the enrolled nurse (EN). An EN may provide personal care, under the direction and responsibility of the RN, where the care can be safely delegated to an enrolled nurse (ANF, 2008). This may also include administration of oral diabetic medications, as well as assisting the RN in the monitoring of blood glucose, dietary requirements, foot assessment, blood pressure and urine tests. The assistant in nursing (AIN) provides the majority of non-technical direct care to the residents that in the professional judgement of the RN may be safely delegated to the AIN, under the direction and supervision of the RN

(ANF, 2008). This care consists of activities of daily living, such as eating, dressing, bathing, toileting and mobilising the residents (Cawley et al., 2006).

Recent studies have reported on the appropriate skills mix of staff in aged care. An American study was conducted using longitudinal data obtained from 170 residential/assisted living facilities in four states (Stearns et al., 2007). This study provided descriptive assessments of overall staff availability; staffing intensity and skill mix. The researchers suggested that the type or mix of nursing staff may be more important in affecting outcomes or processes of care, than the total number of nursing staff hours. Key findings that had implications for the workforce skill mix were that a greater level of supervision or involvement in residential aged care by more highly trained staff may result in a quicker identification of medical problems, improved treatment administration, monitoring and overall reduction in hospitalizations (Stearns et al., 2007). Similar findings were noted in another American study by Konetzka et al., (2008). In this study, the researchers analysed clinical outcomes and case-mix data on residents in certified nursing home facilities in five states from 1997-2000 and estimated effects based on changes to nursing staff levels and outcomes over a period of time. As in the Stearns et al. study, this study also identified that increased RN staffing levels resulted in statistically significant improvements in resident outcomes. It was suggested that access to education and training for nursing staff may produce positive outcomes for the elderly by increasing nurse's skills and knowledge, which in turn, improves quality of care. Minimal research has been done in Australia to investigate the implications of nursing and skill mix, with the focus on aged care based, health care workers.

From the review of the literature, it was concluded that skilled and adequate staffing levels are crucial in maintaining the delivery of high quality and safe nursing care in residential aged care facilities. The workforce in aged care has been a focus in Australia, with a recent restructuring of nursing staff in aged care facilities, and an overall increase in nursing care delivered by AIN's, rather than RNs and ENs (Australian Government Department of Health & Ageing, 2007b; ANF, 2009). A national shortage of RN's and a lower level of pay satisfaction amongst aged care workers, has contributed to the difficulties in recruiting and retaining staff (Australian Government Department of Health & Ageing, 2007b). These changes have been demonstrated by the steady increase in the proportion of AINs in residential aged care, and with the total employment numbers of RNs and ENs reportedly decreasing by almost 20% since 2003 (Australian Government Department of Health & Ageing, 2007b; ANF, 2008). The ANF (2009) reported the distribution of the direct care workforce, in both private and public residential aged care, is currently RNs 21.4%, ENs 14.4% and AINs 56.5%. The decline in the number of RNs and ENs highlights the loss of skills and qualifications available to the residential aged care facilities. This is also reflected in the demographics of the 2007 National Aged Care Workforce Census and Survey (Australian Government Department of Health & Ageing, 2007b) where it was reported that 46.6% of AIN's had completed Certificate III in Aged Care and 11.3% had completed Certificate IV in Aged Care, however 30% of AINs had no formal aged care qualification.

## **DIABETES KNOWLEDGE**

Studies have been conducted which highlight the disparity in both the knowledge base and practice of nursing staff in providing appropriate diabetes care (Baxley,

Brown, Pokorny & Swanson, 1997; El-Deirawi & Zuraikat, 2001; Leggett-Frazier, Turner & Vincent, 1994; Lipman & Mahon, 1999). These studies have raised questions about the competency of nursing staff in the area of diabetes management.

A study by Leggett-Frazier et al (1994) involving 59 nurses (RNs and ENs) employed in four aged care facilities in America, was performed using a diabetes knowledge test developed by the researchers. This questionnaire, derived from guidelines from the American Association of Diabetes Educators and the American Diabetes Association, comprised of the categories hypoglycaemia, monitoring, medication, hyperglycaemia, illness care, diet, exercise, foot care and patient and family education. Findings indicated that the nurses identified they had a lack of diabetes knowledge. Furthermore, participants viewed themselves as “poorly equipped” and “inadequately supported” to provide diabetes care, and perceived they lacked knowledge of the role of allied health professionals in diabetes care. In particular, this study revealed a lack of diabetes knowledge in assessment skills, most notably blood glucose monitoring, diabetic medications and hypoglycaemia. Furthermore, it was suggested that assessment is a major function of the RN/EN in residential aged care, with accurate assessments forming the basis for identifying appropriate actions to avoid diabetic complications. Leggett-Frazier et al. (1994) stressed that the elderly residents with diabetes would suffer and possibly experience irreparable damage if nursing staff were not properly equipped to assist general practitioners with diabetes-related assessments and management. Based on these observations, it is apparent that in order to improve the quality of care provision, education and training opportunities are required for nursing staff to increase their skills and knowledge. As the residents in aged care facilities may have poor cognitive function, and are a dependant and vulnerable group, the provision of

diabetes care is very reliant upon the aged care workers. Without a sound knowledge base of diabetes, nursing staff may not identify the signs and symptoms of complications and therefore not respond accurately.

Another study in the field assessing the adequacy of knowledge regarding diabetes mellitus held by 32 nurses employed in a rural hospital in America was investigated by Baxley et al. (1997). This study investigated the staff nurses' perception of their diabetes knowledge, the actual level of diabetes knowledge and the relationship between the perceived competence and actual knowledge. The Diabetes Basic Knowledge Test (DBKT), a 45 item multiple choice questionnaire, which assesses the level of basic diabetes knowledge, and the Diabetes Self Report Tool (DSRT), which scores the perception of diabetes knowledge with a Likert scale, were utilized in the study. The validity and reliability of the DBKT and DSRT had previously been established, with Cronbach's alpha reliability coefficients of 0.91 and 0.79 respectively (Drass, Muir-Nash, Boykin, Turek & Baker, 1998). As with the Leggett-Frazier et al. (1994) study, knowledge items which received the lowest correct scores included blood glucose monitoring, medications and hypoglycaemia treatment. The researchers also noted a lack of knowledge concerning the aetiology of type 1 diabetes and urine testing. Although this study has a hospital focus, it highlights the importance of identifying nursing knowledge and experience in diabetes care, and emphasises the need for continuing professional development to update diabetes knowledge.

In another American study, Lipman and Mahon (1999) also reported that inadequate diabetes knowledge was evident in nursing staff. The researchers surveyed 155

registered nurses and university nursing students utilizing the Diabetes Knowledge Questionnaire (DKQ). This 20 item questionnaire was developed by the researchers to assess knowledge of diabetes classification and aetiology, insulin action, diet, hypoglycaemia and hyperglycaemia. The categories and questions were based on the 1995 American Diabetes Association guidelines. Findings from the DKQ identified a knowledge deficit in both nursing staff and student nurses, notably in the signs, symptoms and treatment of high blood glucose (hyperglycaemia), ketoacidosis (hyperglycaemia coupled with ketosis) and the action of insulin. However, they scored highly in categories related to patient/family education and foot care. These results are comparable to the Leggett-Frazier (1994) study, where nurses also scored poorly in the diabetes monitoring and assessment skills categories.

A further study exploring the actual and perceived knowledge of diabetes was conducted by El-Deirawi and Zuraikat (2001). The researchers surveyed 79 RNs at a community hospital and home healthcare agency, in the United States of America, using the Diabetes Basic Knowledge Test (DBKT) and Diabetes Self-Report Tool (DSRT). As mentioned previously, the DBKT and DSRT are questionnaires which were developed to assess the actual and perceived level of knowledge of diabetes (Drass et al., 1989; Scheiderich, Freibaum & Peterson, 1983). A mean score of 72.2% for nurses' knowledge of diabetes was found on the DBKT, which is comparable with results from Baxley et al. (1997) who reported a mean knowledge score of 75.3%. Some of the results were consistent with previous studies, indicating a knowledge deficit of basic information in hypoglycaemic management, blood glucose monitoring and insulin administration (Drass et al., 1989; El-Deirawi & Zuraikat, 2001; Baxley et al., 1997; Leggett-Frazier et al., 1994; Lipman & Mahon,

1999). It was also noted by El-Deirawi and Zuraikat (2001) that 79.7% of the nurses in the study either had not attended diabetes in-service programs or had not attended more recently than 2 years ago.

Nurses play a fundamental role in the diabetes management of residents in aged care facilities, as they provide the most extensive contact. Therefore, the related knowledge base and skills held by this professional group has implications for the elderly, who depend upon health care workers for their diabetes management and care. The need for research in Australia to ascertain the diabetes knowledge base and provision of diabetes care in aged care facilities has been highlighted by the lack of studies in this area. The UK and USA have provided most of the research to date. This study provides valuable preliminary data, within the Australian context, and will be discussed further in the following chapters.

## **DIABETES GUIDELINES FOR THE ELDERLY**

Globally, there has been a lack of specific management guidelines for the elderly with diabetes (Australian Centre for Diabetes Strategies, 2005; ADEA, 2003; European Diabetes Working Party for Older People, 2004; IDF, 2005). This is evident despite literature suggesting that the implementation of diabetes guidelines may provide clinicians with a better understanding of diabetes thereby reducing diabetic complications (Australian Centre for Diabetes Strategies, 2005; ADEA, 2003; Department of Health, 2001; IDF, 2005).

The IDF (2005) developed the international guidelines “Global Guidelines for type 2 Diabetes”, to potentiate the improvement of the immediate and long term care of

people with type 2 diabetes. The IDF presents evidence based care guidelines, which promote optimal, cost-effective management of diabetes. Although these guidelines provide a practical approach to implementing diabetes care, they were not developed with the specific care requirements of the elderly residing in aged care facilities in mind.

In the United Kingdom, the Department of Health (2001) developed the National Service Framework for Diabetes Standards, which includes 12 standards and key interventions to improve the standard of diabetes care. These standards were developed to help deliver a holistic service, which would empower people with diabetes through skills, knowledge and improved access to diabetes services and care. Although these standards advocate that adults with diabetes receive good quality care, these diabetes standards are also not specifically aimed at the elderly person.

Diabetes Australia, in conjunction with the Royal Australian College of General Practitioners (RACGP), has developed guidelines for optimum management of people with type 2 diabetes, focussing on the general practice setting (Diabetes Australia, 2009a). The aim of these guidelines is to improve the duration and quality of life in a person with type 2 diabetes as well as encouraging an active role in the management and prevention of diabetic complications. Similarly, the Australian Centre for Diabetes Strategies (2005) also developed evidence based guidelines for the prevention, diagnosis and management of type 2 diabetes. However, as with the Diabetes Australia (2009a) and IDF (2005) guidelines, these diabetes guidelines are not applicable to all age groups in all circumstances, specifically the elderly residing in aged care facilities.

Guidelines, based on best practices for the management of diabetes with the elderly, specifically targeting the older person who is of sound physical and mental health, were developed in 2003 by the Australian Diabetes Educators Association (ADEA). In an effort to improve the standard of care provided to elderly people (over the age of 65 years) with, or at risk of diabetes, the ADEA produced guidelines for this population. These guidelines are aimed at informing health professionals, including general practitioners, community nurses, allied health professionals and aged care workers about evidence based practice in diabetes care, and to promote standards and consistency. The ADEA guidelines for diabetes in the elderly comprise case detection and diagnosis, assessments and targets, special treatments, barriers to health care and education, hypoglycaemia, hyperglycaemia and primary prevention. As outlined in chapter 3, some elements within the ADEA (2003) clinical guidelines were considered in the survey developed for the present research study. Whilst these guidelines are not focussed specifically on the needs of the elderly living in residential care settings, they are useful benchmarks given they are directed towards the care requirements appropriate to the older population. Likewise, evidence-based guidelines for improving the care of the older person with diabetes mellitus were developed in America (Brown et al., 2003). These guidelines were developed specifically for the elderly person (aged 65 and older), and include goals of care and target outcomes. However, as with the previously mentioned guidelines, they do not address the management of diabetes in residential aged care.

What are needed are guidelines that have applicability to the elderly person living in a residential aged facility. This is the case evident in the European Diabetes Working Party for Older People who developed guidelines in 2004 specifically for the elderly with diabetes, in response to variations in clinical practice, a lack of access to services for the elderly and inadequate specialist provision resulting in poorer clinical outcomes. The result was a set of guidelines which focussed on the aims of care, framework for diabetes care, functional impairment and physical disability, cardiovascular risk and aspirin therapy, treatment strategies (glucose regulation, blood pressure and hyperlipidaemia), and recommendations relating to specific complications. These comprehensive guidelines address diabetes management in residential aged care.

Whilst there have been limited reported studies in Australia specifically investigating diabetes care in the residential aged care setting, several studies have explored general nursing care in this context. The literature has indicated that diabetes management in Australian residential aged care facilities is often suboptimal, with insufficient knowledge by staff about diabetes (Dunning, 2005b). Australian reports have also suggested the aims of diabetes management are to control hyperglycaemia, avoid hypoglycaemia and prevent diabetic complications (Baxter, 2007; Tacon & Veitch, 2007) however, due to age related changes in the residents and the fixed nature of many aged care facility routines, current diabetes management is not appropriate to all situations. As previously discussed, Australian guidelines for the management of diabetes in the elderly have been devised (ADEA, 2003), however they are not specific to the elderly residing in residential aged care facilities. The importance of diabetes guidelines in the provision of care has been established;

however there is limited evidence for their application to residential aged care (Dunning, 2005a; Colagiuri, 2008). Given the paucity of evidence in Australia, the proposed research is indicated to assess the current status of diabetes management and care in residential and aged care settings in the Australian context. The ADEA (2003) endorses the need for research of this nature, as it recognises the need for more evidence-based standards of care for older Australians with, or at risk, of diabetes. Moreover, the majority of the literature reviewed has involved studies from the United States and the United Kingdom. This has highlighted the need for further studies, within the Australian context, to identify the current status of diabetes care in aged care facilities and the ability of the aged care staff to provide it.

Chapter 3 will explore the details of the methods and procedures which were utilized to obtain and analyse the data for the study.

## **CHAPTER 3: METHODOLOGY**

This chapter provides the rationale for the design of the study, and presents a detailed description of the methods and procedures that were applied to obtain the data required for the study. It describes the research design, the population, the data collection instrument, the pilot study, data analysis and statistical methods used in this study. Finally, the ethical aspects of the research are presented.

### **STUDY OBJECTIVES**

The purpose of this study was to establish if current Australian diabetes management guidelines for the elderly could be met in residential aged care facilities in Queensland. The objectives guiding this research study were to:

1. Determine the presence and nature of diabetes protocols/guidelines provided in nursing homes.
2. Identify the knowledge base of Queensland health care workers in aged care facilities regarding diabetes management.
3. Ascertain the factors enhancing or inhibiting diabetes care provision by nursing home health care workers.
4. Determine the levels of perceived confidence of health care workers in residential aged care facilities to provide diabetes care.

## **STUDY DESIGN**

The study design consisted of a cross-sectional, descriptive study, involving a postal survey of health care workers employed within Queensland residential aged care facilities, to capture the current management and care of diabetes in the elderly residents. According to Bland (2000) this design is relatively inexpensive and can be carried out over a short period of time and therefore it was feasible for the present study. In addition, minimal investigation has occurred in this area, therefore a descriptive study was warranted to address the exploratory nature of the phenomenon. Mailed questionnaires have advantages, such as cost effectiveness and efficiency, and require minimal administration (Hardy, Ogunmokun & Winter, 2005). However, mailed questionnaires present several inherent limitations; such as there is no assurance that questions are understood or that the people given the questionnaire are actually the ones who respond as well as possibly suffering from lower response rates (Heyman, Buchanan, Marlowe & Sealy, 2006; Sharp, Cochran, Cotton, Gray & Gallagher, 2006). In a comparative survey report of staff in residential aged care homes rating level of job satisfaction, the response rate was reported at 31% (Australian Government Department of Health and Ageing, 2008). For the most part, it is acknowledged that postal surveys can have a reduced response rate, typically less than 50% (Leedy & Ormond, 2005), with public participation in surveys rated between 10 and 50%. The response rate of this study is difficult to determine accurately due to the method of distribution and the method of accurately determining the number of workers in residential aged care. However, it is possible to say that 24% of the 145 facilities approached in Brisbane agreed to participate in the study. Therefore, if the staff profile is estimated to be 35 per agency, the total sample was potentially 665. Based on the number of postal surveys returned equal to

109, the participant response rate was 6.1%. Despite potential limitations, a postal questionnaire survey was considered the most feasible approach to provide answers to the study's purpose and objectives. It allowed a large number of Queensland aged care facilities to participate, that could otherwise not have been accessed.

## ETHICS

Permission to conduct this research has been sought from each residential aged care facility. Ethical approval was also gained at any participating agency that had its own ethics committee requirements. In addition, approval to undertake this study was sought and approval given, from the Human Ethics Review Committee at Curtin University (Approval number SONM 12-2008). Each participant was provided with a participant information sheet outlining the study (Appendix A). Consent was assumed if the participants returned a completed questionnaire. Confidentiality and anonymity has been maintained at all times. No identifiable data is on the survey; therefore, neither the facility nor the study participant can be identified. Data has been analysed on an aggregated basis. Participants had the right to refuse to complete the questionnaire.

Ethical guidelines were adhered to according to those recommended by the National Health and Medical Research Council (NHMRC) (NHMRC, 2007). Only the study supervisors and the researcher have access to the questionnaire surveys. Data will be stored in a secure location for five years. Data will only be used for purposes as described in the research study.

## **STUDY SETTING**

The research study was conducted in Queensland residential aged care facilities. A list of 145 aged care facilities was obtained from the “David’s Publishing Services Aged Care Guide Queensland, 2008 Edition”, and were invited to participate in the study. Brisbane was selected because the researcher works in the aged care sector in this area and has more ready access to these facilities. No evidence is available to suggest that the location has marked characteristics that distinguish it from other cities in Australia and thus it was expected that the residential aged care facilities would be representative of facilities in other metropolitan regions throughout Australia.

Australian aged care homes provide care and services which vary according to whether the resident is classified as ‘low care’, ‘high-care’, or ‘other’ (David’s Publishing Services, 2008). A low care facility offers services for older people who may need help with some daily living tasks (i.e. dressing, eating, bathing), but can manage to mobilise on their own, while a ‘high care’ resident requires assistance with most tasks of daily living (i.e. showering, dressing, toileting, meals, mobility, medications) (Australian Government Department of Health and Ageing, 2009). The term ‘other’ refers to residents who are able to live with little assistance with daily tasks but with the security of a supported environment (i.e. supported living, independent living, retirement living) (David’s Publishing Services, 2008).

## **PARTICIPANTS**

The participants for the study comprised of registered nurses, enrolled nurses, nursing assistants and allied health workers (managers, clinical nurse, diversional therapist, personal carers, patient support officer, nursing student) employed in Queensland residential aged care facilities. Consultations with several residential aged care facilities have indicated that the typical profile of staff in these facilities is approximately 22% RNs, 8% EN and 70% AINs. The actual professional status of participants, who completed the staffing position demographics question, is described in Table 3. 1. As can be seen the RN's population is larger and the AINs lower than what was ascertained from anecdotal evidence.

**TABLE 3.1**

*Staffing profiles*

Staffing Position	<i>N</i> (%)
Registered Nurse	39 (39.4%)
Enrolled Nurse	8 (8.1%)
Assistant in Nursing	40 (40.4%)
Other	12 (12.1%)
Total	99

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Note: *N* = number of participants.

The recruitment process attempted to gain a cohort that was representative of the staffing profile. The support of the Director of the facility was gained and they were requested to disseminate the survey, whilst encouraging all levels of staff to complete the survey. This profile has also been considered in the analysis phase of the study.

## **STUDY INSTRUMENT**

The measurement instrument used for the present study was an eight page questionnaire to assess the level of understanding of current diabetes management for the elderly living in residential and aged care facilities (Appendix B). Item generation for the study instrument was based upon an extensive literature review, mapping of clinical guidelines from the Australian Diabetes Educator Association Guidelines for the Elderly (2003), the research objectives guiding the study and available pertinent instruments. The instruments selected for the study were the most suitable instruments available that had congruency with the study purposes and objectives. Permission to use these instruments has been gained from the developers. Through this development process a questionnaire comprised of three parts was formed.

### ***Part A***

The first part of the questionnaire collected demographic data including professional and educational background of participants and organisational characteristics of the aged care facility.

### ***Part B***

The second part of the questionnaire collected data on diabetes related knowledge and care and perceived confidence in providing diabetes care. It is comprised of a component of the Diabetes Care Profile, developed by the Michigan Diabetes

Research Training Centre and a knowledge questionnaire from the National Association of Diabetes Centres (NADC) in Australia. The former, designed for use with health care professionals, includes items requiring participants to rate their understanding of diabetes related variables using a 5 point Likert type scale from 1 “poor” to 5 “excellent”. This instrument has been used extensively and has established validity and reliability (Cronbach alpha .68 to .97), (Fitzgerald, et al., 1996; Fitzgerald, et al., 1998). The NADC knowledge questionnaire involves 19 multiple choice style questions to elicit diabetes related knowledge, it has been designed to assess nursing staff’s knowledge of diabetes in the community setting. The Diabetes Self-Management Education Confidence Scale (DSMEC), currently under development by Dr Patricia Rapley, Curtin University, was used to measure the confidence of staff to provide diabetes care. The DSMEC was divided into two sections. The first question related to the participants general confidence about providing diabetes self-management education. Responses to this DSMEC question were rated on a Likert scale from 1 to 5, with higher scores indicating greater confidence regarding a participant’s capacity to support diabetes self-management. The second section contained three questions related to how the participants felt about providing diabetes self-management education. Validity and reliability of the NADC and DSMEC has not yet been established, therefore assessment of construct validity was included in this study, and is described in the next section.

### *Part C*

The third part of the questionnaire comprised of items which were aimed at identifying the nature and extent of diabetes management and care guidelines available in the facility and the barriers and facilitators to meeting diabetes related care. Components of the Association of the British Clinical Diabetologist survey

(ABCD) of consultant diabetiologist-led services were used to inform items in this part of the questionnaire. From the ABCD survey three sections were formed. The first section contained three questions related to the participants management of diabetes in the workplace, and were rated as “yes”, “no” or “unsure”. The second section comprised of three questions related to barriers and facilitators in meeting diabetes management and care guidelines. Responses to one of these questions were rated on a Likert scale, from 1 to 10, with higher scores indicating greater possibility regarding improving diabetes education and care, while the other two comprised open-ended questions designed to elicit information about positive and negative factors affecting provision of diabetes care. The third section in Part C elicited responses regarding diabetes education, focusing on areas of diabetes education which would be most beneficial for the development of the participant and prior diabetes education. These items were measured on an ordinal scale of measurement. Respondents indicated their responses to the closed-ended items which asked, “in which areas have you received diabetes education?”, with a “tick”. Like the other instruments that have been used in this study, this is also not a validated instrument and has been managed as described for the instruments in Part B.

### **DATA COLLECTION PROCEDURE**

Two residential aged care facilities had been approached during the feasibility stage of the study to discuss and determine the level of interest in the proposed study. Their feedback was used to inform the planning phase of the study and their expression of interest is noted in Appendix C.

### *Phase 1*

A pilot test of the questionnaire was conducted to assess for construct validity. A panel was established, comprising six nursing staff working in a Queensland Hospital Facility, who were familiar with caring for the elderly with diabetes. The panel members included 2 AIN's, 1 EN, 1 RN, 1 Nurse Unit Manager and 1 Nursing Director. The profile of the panel was representative of the profile of staff working in residential aged care. These panel members did not participate in phase 2 of the study. Each member had been provided with prepared guidelines for assessing the instrument (Appendix D) as well as a copy of the questionnaire. The guidelines were specifically prepared for this study to test the questionnaire's face and content validity and to rectify and refine problem areas, enabling the researcher to achieve meaningful feedback. The assessors completed the questionnaire and evaluated it according to specified criteria in the guidelines. A space for comments was also included in the evaluation form. The evaluation criteria covered the principles of clarity, relevance and legibility. Overall, the participants evaluated the instrument highly in terms of legibility and clarity. They also judged the items to be relevant in terms of determining the current status of diabetes related care in residential aged facilities.

It was anticipated that the instrument would need refining to be congruent with the Australian context and the educational level of all participants. Feedback was used to modify or remove ambiguous redundant items thus improving the validity of the questionnaire. The clarity of some items in Section B was found to be unclear and the assessors recommended that they be reformulated. For example, wording for the statement "overall diabetes care of the elderly" was changed to "overall care of the

diabetic elderly”. The statement, “use of insulin/diabetic tablets” was changed to “use of insulin” and “use of diabetic tablets”. “Monitoring of urine” was changed to “monitoring of urine status”. The open ended question “please describe 3 barriers that negatively affect the provision of diabetes care at work” was modified to read “please describe 3 barriers that negatively affect the provision of diabetes care in your workplace”. A second open-ended question, “please describe 3 factors that positively affect the provision of diabetes care at work” was amended to “please describe 3 factors that positively affect the provision of diabetes care in your workplace.

### ***Phase 2***

Invitations to 145 agencies occurred by a letter of invitation, sent via post in September, 2008. The nurse manager of each facility was provided with a sample of the questionnaire and invited to consider the involvement of their staff in the research study. A return paid slip for confirming interest and the number of surveys required was included with the invitation letter (Appendix E).

Whilst overall ethical approval was gained through the Curtin University Human Ethics Committee, discussed later, several agencies required ethical approval to be gained through their own system. Applications were made to the Human Research Ethics Committee for two aged care facilities, prior to their participation.

On receipt of expressions of interest, questionnaires were then posted to the Nursing Director at each of the participating residential aged care facility, who was then

requested to distribute the questionnaires to all eligible staff at the facility. A participant information sheet (Appendix A) and a reply paid, addressed envelope was included with each questionnaire. In total 145 agencies were recruited, of which 109 personnel returned questionnaires, providing a response rate of 7.4%. The data collection period extended over a seven month period, from September 2008 to March 2009.

## **STATISTICAL METHODS**

The Statistical Package for the Social Sciences (SPSS Version 17.0) has been used to manage the data from the questionnaire. Research team members at Curtin University provided data entry. Initially, an exploratory analysis using descriptive statistics, frequency and plots, was used to describe and summarize survey data. Inferential statistics were conducted also. This included crosstabs and the Chi square test to identify associations between demographical and organizational characteristics and categorical data, for example identified barriers and facilitators of diabetes care. Parametric tests, T-test and Anova, were used on normally distributed data to seek relationships between demographics and nominal data. Where assumptions of normality were not met non-parametric equivalents, Kruskal-Wallis and Mann U Whitney, have been used. Confirmation of the methodology was addressed through accurate data collection and by endeavoring to provide sufficient detail and exemplars within the report.

## **SUMMARY**

This research was conducted using a quantitative cross sectional, descriptive design, and aimed to capture the current management and care of diabetes in the elderly residents within Queensland residential aged facilities. The researcher conducted a pilot study to enhance the construct validity of the questionnaire. Implementation of a postal survey of health care workers was employed to collect data, with the resultant study participation by 109 respondents. Collected data was analysed using descriptive and inferential statistics, including crosstabs and calculating the Chi-square. Throughout the study, the researcher applied specific measures to ensure that ethical principles were being adhered to according to the NHMRC. The research findings are presented in Chapter 4.

## **CHAPTER 4: RESULTS**

This chapter describes the survey results. As outlined in the previous chapters, the survey sought to determine if current Australian diabetes management guidelines for the elderly can be met in residential aged care facilities in Queensland. Methodological considerations were described in the previous chapter.

Specifically, the study determined the existence and characteristics of diabetes protocols/guidelines provided in residential aged care facilities. The survey also assessed diabetes management knowledge in a sample of Queensland health care workers. Factors enhancing or inhibiting diabetes care by residential aged care workers were ascertained. Finally, the study established the levels of perceived confidence of health care workers in residential aged care facilities to provide diabetes care.

Data were analysed using SPSS for Windows (Version 17.0). Univariate and bivariate descriptive statistics were used to examine the sample characteristics. No attempts were made to impute missing data, therefore the total numbers of respondents to each particular item are provided. An exploratory analysis using descriptive statistics, frequency and plots, was used to describe and summarize survey data. Parametric tests, including chi-square, independent samples *t*-tests, ANOVA statistics and Bonferroni correction were used to identify associations

between demographic categories and participant factors. This chapter presents the demographic results first and then findings pertinent to each of the study objectives.

## **BACKGROUND OF PARTICIPANTS**

The questionnaire collected demographic information for all participants. This comprised information on age, gender, work status (full time, part-time or casual), residential aged care classification (high care, low care or a combination) and type of aged care provider (not for profit or private). Demographic data grouped for meaningful comparisons included career term (categorised as new to career, middle career, end career), work tenure (new to aged care, experienced in aged care, very experienced in aged care), employment position (registered nurse [RN] enrolled nurse [EN], assistant in nursing [AIN], other) and highest level of education (school, TAFE, university award). The age of the participants ranged from 18 to 70 years, with a mean age of 45.2 years ( $SD \pm 13.3$ ). In addition, 84% ( $n = 92$ ) of the participants in this study were female and 16% ( $n = 17$ ) male. These findings are comparable to reports on the Australian aged care workforce, which finds 47% of workers are aged between 35 to 54 years and 93% are women (Commonwealth of Australia, 2007b).

The participants in this study are shown to be reasonably representative of the Australian aged care workforce, with a mean duration of time worked in aged care of 10 years ( $SD \pm 9.5$ ), and average time worked in current position five years ( $SD \pm 5.8$ ). Australian government reports indicate that nearly two thirds of residential aged

care workers have worked in aged care for 10 years or more and the length of time in current position is between one to five years (Commonwealth of Australia, 2007b).

Of the 106 participants who responded to the question on employment status, it was reported that 33.0% ( $n = 35$ ) were employed full-time, 58.5% ( $n = 62$ ) part-time, while 8.5% ( $n = 9$ ) maintained casual employment. The findings for employment status indicate a greater percentage of people working full time and less in casual positions than the Australian residential aged care workforce, where reports suggest 9.1% of aged care workers are employed full time, 68.6% part-time and 22.3% casual for the period 2003- 2007 (Commonwealth of Australia, 2007b). The significance of these findings is explored further in chapter 5.

Further demographic data revealed the majority of participants (57.3%,  $n = 55$ ) worked for not-for-profit care providers, 42.7% ( $n = 41$ ) were employed in private aged care facilities, while 13 participants did not provide details of their facility. As shown in Table 4.1, the level of care provided by the aged care facilities was classed as high care only by 35.8% ( $n = 39$ ), 7.3% ( $n = 8$ ) low care only and 1.8% ( $n = 2$ ) indicated “other”, which refers to residents who are able to live with little assistance with daily tasks but within the security of a supported environment. However, some participants ticked more than one level of care in the survey, which resulted in the combinations of levels of care, high and low care (37.6%,  $n = 41$ ) and high, low and other care (14.7%,  $n = 16$ ). Three participants did not indicate the level of care provided by their aged care facility.

**TABLE 4.1.*****Levels of Care Provided***

<b>Care level</b>	<b><i>n</i> (%)</b>
High care only	39 (35.8%)
Low care only	8 (7.3%)
Other	2 (1.8%)
High & low care	41 (37.6%)
High, low & other care	16 (14.7%)

*n* = number of participants.

Thirty nine participants reported being currently employed as a RN (39.3%, *n* = 39), 8.4% (*n* = 8) an EN and 38.3% (*n* = 40) an AIN, while 12.1% (*n* = 12) identified themselves as other workforce personnel, which included allied health workers, management, nursing students, personal carer, clinical nurse and a clinical nurse consultant. Based on the Commonwealth of Australia (2007b) statistics, the Australian aged care workforce consists of 16.8% RN's, 12.2% EN's, 63.6% AIN's, and 7.4% allied health workers. In contrast to these figures the present study had a greater proportion of RNs, less ENs and AIN's. This may affect the interpretation of the results and is discussed in the next chapter.

The levels of education of the aged care workforce may provide an indicator of potential skills and capacity in the workforce to provide quality care, therefore, this information was sought from the participants. Table 4.2 shows the highest level of education completed by the participants.

**TABLE 4.2.*****Levels of Education Completed***

<b>Education level</b>	<b><i>n</i> (%)</b>
Grade 12 schooling	14 (14.1%)
Technical and Further Education	31 (31.3%)
University Award	54 (54.5%)

*n* = number of participants.

The Grade 12 category referred to the completion of Grade 12, Technical and Further Education category referred to certificate III in aged care, certificate IV in aged care and other TAFE courses and the university award category comprised undergraduate/Bachelor degree, graduate certificate, graduate diploma, master's degree and other university courses. It was found that 14% of participants ( $n = 14$ ) did not have post-school qualifications whilst 86% ( $n = 85$ ) of participants completed TAFE or University award level education, with notably 54.5% ( $n = 54$ ) completing university studies. A small number of participants ( $n = 10$ , 9%) did not indicate completion of education in any of the listed categories. These results are comparable to the Commonwealth of Australia (2007b) findings which estimates 20% of the residential aged care workforce do not have post-school qualifications. However, fewer Australian residential aged care workers (70.4%) have completed TAFE courses than the study participants, and only 26.8% have achieved university award qualifications. These findings will be explored in greater detail in chapter 5.

## **OBJECTIVE 1: WHAT IS THE PRESENCE AND NATURE OF DIABETES PROTOCOLS/GUIDELINES PROVIDED IN RESIDENTIAL AGED CARE?**

As discussed previously, the study sought to identify the availability and use of protocols in residential aged care to guide diabetes related care. The survey asked questions relating to the management of diabetes, specifically the presence of guidelines and the potential to tailor interventions to meet specific needs. Participants had the opportunity to answer, “yes”, “no” or “unsure”.

The guidelines/protocols investigated were grouped into three categories: care plans-review and revision, screening and monitoring, and diabetes care specific skills. The category, care plans-review and revision, comprised statements requesting awareness of agency protocols on care plans reviewed and revised within a specified timeframe, care plans written with an individualised approach, written care plans produced for the residents, and care plans which have individualised diabetic management targets for the residents. The second category, screening and monitoring, explored the availability of written diabetes management guidelines for monitoring blood glucose levels (BGL), dietary recommendations, monitoring of urinalysis, insulin injection technique, management of low blood glucose, eye examination, screening for kidney function and lipid profile. In the diabetes care specific skills category, the accessibility of guidelines for foot assessment, cognitive function assessment (Mini Mental State Exam), blood pressure, and glycaemic control, were examined.

Table 4.3 reports on participants’ responses to 16 items addressing evidence based diabetes management. There was considerable variation in guideline availability.

Fewer guidelines for screening and monitoring of diabetes were reported, with lipid profile, kidney function and eye examination, recording the lowest percentage of “yes” responses from participants, while also reporting the highest percentage of “unsure” responses, indicating that a specific guideline for some aspects of diabetes care was not available or the participant was unsure if they existed. The majority of guidelines that were known to be available were related to care planning with the exception of the guideline related to diabetic targets, which was notably deficient relative to the others. Generally diabetes care specific skills were reported as available by approximately 75% of the participants. The implications of guidelines availability are explored in the discussion of the results in Chapter 5.

**TABLE 4.3.***Availability of Diabetes Guidelines and Care Plans in Residential Aged Care Facilities*

	<b>Yes n (%)</b>	<b>No n (%)</b>	<b>Unsure n (%)</b>
<b>Care plans – review and revision</b>			
Care plans reviewed & revised	92 (88.5%)	5 (4.8%)	7 (6.7%)
Individualised approach	90 (88.2%)	4 (3.9%)	8 (7.8%)
Written care plans	87 (86.1%)	10 (9.9%)	4 (4.0%)
Diabetic targets	68 (67.3%)	22 (21.8%)	11 (10.9%)
<b>Screening and monitoring</b>			
Monitoring BGL	89 (85.6%)	6 (5.8%)	9 (8.7%)
Management of low BGL	83 (82.2%)	9 (8.9%)	9 (8.9%)
Dietary recommendations	84 (80.8%)	11 (10.6%)	9 (8.7%)
Insulin injection technique	78 (78.0%)	10 (10.0%)	12 (12.0%)
Urinalysis (glucose & ketone)	69 (67.0%)	18 (17.5%)	16 (15.5%)
Eye exam	54 (54.5%)	22 (22.2%)	23 (23.2%)
Kidney function	40 (40.8%)	24 (24.5%)	34 (34.7%)
Lipid profile	37 (37.4%)	27 (27.3%)	35 (35.4%)
<b>Diabetes care specific skills</b>			
Foot assessment	77 (74.8%)	12 (11.7%)	14 (13.6%)
Cognitive function	73 (73.7%)	11 (11.1%)	15 (15.2%)
Blood pressure	74 (73.3%)	11 (10.9%)	16 (15.8%)
Glycaemic control	75 (72.8%)	11 (10.7%)	17 (16.5%)

Note. n= number of participants; BGL = blood glucose level.

*Diabetes guideline availability with different aged care providers and facility types*

The three categories of guidelines, described in Table 4.3, were analysed further to determine if the participant's awareness of these guidelines were associated with any facility factors. In particular the relationship between facility type (non-profit, private) and level of care given (high care, low care/other) was explored using Chi-square and cross tab procedures. The results from this analysis are reported next. Only statistically significant results are discussed.

Table 4.4 illustrates the relation between the availability of diabetes guidelines for the monitoring of urinalysis with the type of residential aged care provider (non-profit or private). This association was found to be statistically significant,  $X^2(2, N = 91) = 6.447, p = .04$ , with a higher percentage of staff in private aged care facilities reporting the availability of diabetes guidelines for the monitoring of urinalysis than non-profit aged care facilities. Two other significant associations were found between the type of aged care provider and the serum lipid profile, which comprises cholesterol, triglycerides and lipoproteins, and kidney function. The relationships between the availability of lipid profile guidelines and kidney function guidelines and the type of aged care provider indicates that there is a greater knowledge of guidelines for the management of lipid profile and kidney function by participants working in private aged care facilities than participants working in non-profit aged care facilities. These relationships were shown to be statistically significant with the lipid profile  $X^2(2, N = 87) = 11.82, p < .001$  and kidney function  $X^2(2, N = 86) = 10.11, p < .01$ . However, cell counts in both of these statistical procedures are less than five and therefore care is required in the interpretation of these findings. All other associations between items in the categories, care plans–review and revision,

screening and monitoring, and diabetes care specific skills, were not statistically significant against the participant factor, type of facility.

**TABLE 4.4.**

*Guidelines for the Monitoring of Urinalysis, Lipid Profile and Kidney Function in Non-Profit and Private Sector Aged Care Facilities*

<b>Guidelines</b>	<b>Non- profit n (%)</b>	<b>Private n (%)</b>	<b>Total n (%)</b>	<b>p-value</b>
<b>Urinalysis</b>	<i>n</i> = 52	<i>n</i> = 39	<i>n</i> = 91	<i>p</i> = .040*
Have guidelines	33 (63.5 %)	32 (82.1%)	65 (71.4%)	
No guidelines	13 (25.0%)	2 (5.1%)	15 (16.5%)	
Unsure	6 (11.5%)	5 (12.8%)	11 (12.1%)	
<b>Lipid Profile</b>	<i>n</i> = 48	<i>n</i> = 39	<i>n</i> = 87	<i>p</i> < .001***
Have guidelines	14 (29.2%)	19 (48.7%)	33 (37.9%)	
No guidelines	21(43.8%)	4 (10.3%)	25 (28.7%)	
Unsure	13 (27.1%)	16 (41.0%)	29 (33.3%)	
<b>Kidney Function</b>	<i>n</i> = 48	<i>n</i> = 38	<i>n</i> = 86	<i>p</i> = .006**
Have guidelines	17 (35.4%)	19 (50.0%)	36 (41.9%)	
No guidelines	18 (37.5%)	3 (7.9%)	21 (24.4%)	
Unsure	13 (27.1%)	16 (42.1%)	29 (33.7%)	

Note: \**p* < .05, \*\* *p* < .01, \*\*\**p* < .001.

Further analysis explored differences between the facility level of care (high care, low care/other) and the items within the three categories of guidelines. Table 4.5 reports the relation between the accessibility of screening and monitoring guidelines

for both lipid profile and kidney function, and the facility level of care provision; these relationships were statistically significant  $X^2(4, N = 97) = 16.67, p < .001$  and  $X^2(4, N = 96) = 10.11, p = .04$ , respectively. A higher percentage of staff working in high care classified residential aged care facilities indicated the accessibility of diabetes guidelines for the screening and monitoring of both lipid profile and kidney function, than aged care workers employed in low care/other facilities. Although the relation between the care level and eye exam was not found to be statistically significant at the  $p < .05$  level, there is a close relationship  $X^2(4, N = 97) = 9.45, p = .051$ . No further statistically significant relationships were identified between the categories, care plan-review and revision, screening and monitoring and diabetes care specific skills with the facility level of care factor.

Further analysis explored the possibility of relationships between several personal factors and awareness of protocols and guidelines and in the aged care agency. The level of health professional's qualification (RN/EN, AIN, other workforce personnel) was explored with the awareness of diabetes management guidelines for screening/monitoring, care plans and diabetes care specific skills. However, the personal demographics were not significantly associated with awareness of protocols and guidelines.

In the next objective, the results from the analysis on the level of perceived and actual knowledge base of health care workers are reported.

**TABLE 4.5.**

*Comparison of Guidelines for Screening and Monitoring with Classification of Care*

<b>Guidelines</b>	<b>High Care n (%)</b>	<b>Low Care/Other n (%)</b>	<b>Total n</b>	<b>p-value</b>
<b>Lipid Profile</b>				<i>p &lt; .01**</i>
Have guidelines	30 (81.1%)	24 (64.9%)	37	
No guidelines	24 (92.3%)	22 (84.6%)	26	
Unsure	34 (100.0%)	16 (47.1%)	34	
<b>Kidney Function</b>				<i>p = .039</i>
Have guidelines	35 (87.5%)	24 (60.0%)	40	
No guidelines	20 (87.0%)	20 (87.0%)	23	
Unsure	32 (97.0%)	17 (51.5%)	33	
<b>Eye Examination</b>				<i>p = .051</i>
Have guidelines	48 (88.9%)	33 (61.1%)	54	
No guidelines	18 (85.7%)	18 (85.7%)	21	
Unsure	22 (100.0%)	11 (50.0%)	22	

Note: \*\**p* < .01.

## **OBJECTIVE 2: WHAT IS THE KNOWLEDGE BASE OF QUEENSLAND HEALTH CARE WORKERS IN AGED CARE FACILITIES REGARDING DIABETES MANAGEMENT?**

The study sought to identify the level of knowledge of diabetes management in a sample of Queensland health care workers in residential aged care facilities. To achieve this, the survey asked questions which measured both the perceived and

actual knowledge base of participants in diabetes management. This section presents the findings from this analysis.

To ascertain the perceived knowledge of diabetes, participants were asked questions related to both diabetes in general and diabetes care specific to the elderly. These questions were developed by the Michigan Diabetes Research Training Centre, as part of the Diabetes Care Profile and modified to reflect the Australian context. Utilizing a Likert scale, participant's responses were rated from 1 to 5, with higher scores indicating greater understanding (reported as "excellent") and lower scores indicating a lower understanding (reported as "poor"). Middle scores indicated a "good" understanding of diabetes. Questions reflecting perceived understanding were categorised into five categories: diabetes management, lifestyle, medication, blood glucose and complications. The diabetes management category comprised four items: overall care of diabetic elderly, Australian diabetes guidelines for elderly, regular foot care and eye care management. The lifestyle category comprised of two items: special diet needs and the role of exercise in diet care. The medications category comprised of two items, which were the use of insulin or oral hypoglycaemic tablets. Four items comprised the blood glucose categories: blood glucose monitoring, prevention and treatment of high blood glucose levels, prevention and treatment of low blood glucose levels and the benefits of improving blood glucose control. The complications category comprised of one item, long term complications of diabetes, which includes neuropathy, nephropathy, and retinopathy, cardiovascular, cerebrovascular and peripheral vascular disease.

In contrast the actual knowledge base of participants was determined indirectly by the participant's education and directly by the level of actual knowledge of key diabetes concepts. Prior diabetes education received by participants was assessed by responses to eight closed-ended items which were measured on a nominal scale of measurement (yes/no). Actual knowledge items comprised of 18 multiple choice style questions, which were based on the National Association of Diabetes Centres (NADC) knowledge questionnaire. Participants had the opportunity to answer "don't know". These items were categorised into the same five categories used for perceived knowledge; diabetes management, lifestyle, medications, blood glucose and complications.

Initial analyses used descriptive statistics, followed by independent sample t-test or one way ANOVA, or appropriate non-parametric equivalents at  $\alpha < .05$ , to explore if knowledge scores were influenced by several participant and agency factors. Bonferroni correction is reported if applicable. Comparisons were done against the perceived and actual knowledge of the five diabetes categories and participant factors (age in years, work situation, time in current position, time worked in aged care, employment status, levels of education completed), and facility-related factors (level of facility and level of care provided).

Table 4.6 shows the percentage of participants who have received diabetes education on a variety of related topics. Healthy eating is the most frequently received education (73.3%,  $n = 63$ ) closely followed by blood glucose monitoring (70.9%,  $n = 61$ ). The least common topic concerned sick day management (23.3%,  $n = 20$ ), which

is the management of diabetic control in the presence of infection of any kind (Harmel & Mathur, 2004). Whilst 22.1% ( $n = 19$ ) indicated they have not received any diabetes management education. The implications of the knowledge base of participants regarding diabetes management are discussed in the following chapter.

**TABLE 4.6.**

*Education Received*

<b>Item</b>	<b><i>n</i> (%)</b>
Diet	63 (73.3%)
BGL monitoring	61 (70.9%)
Low BGL	55 (64.0%)
Weight	54 (62.8%)
Foot care	47 (54.7%)
Insulin	45 (52.3%)
Sick day	20 (23.3%)
Education not received	19 (22.1%)
Other	9 (10.5%)

Note.  $n$  = number of participants; BGL= blood glucose level.

Table 4.7 shows the perceived and diabetes related knowledge scores. From a possible range of 1 to 5 the mean score was 3.31 ( $SD = .84$ ). As can be seen across all five categories, participants felt they were reasonably knowledgeable, with a mean score greater than three. This indicates participants felt their diabetes knowledge was at least “good”. Participants elicited higher scores in the perceived knowledge base categories, lifestyle, blood glucose and complications categories compared to diabetes management and medication categories. Although the diabetes

management mean score was rated “good”, one item in particular has a lower mean score than all other items in this category and across the other categories. This item is related to the participants perceived understanding of the Australian diabetes guidelines for the elderly ( $M = 2.86$ ,  $SD = .90$ ,  $n = 98$ ), which suggest that participants were not particularly familiar with these management guidelines. With regards to actual diabetes knowledge, the mean total score on the NADC for the 109 participants was 11.44 ( $SD = 3.47$ ) from a total possible score of 18, which suggests an overall deficit in the level of diabetes knowledge. The actual knowledge score is based on the five categories previously mentioned, which comprised of a range of 1 to 5 questions per category. As shown in Table 4.7 the areas where the deficit was most apparent in participant’s actual knowledge base relates to complication and medication knowledge. Lifestyle and blood glucose questions reported the highest number of correct answers. Some discrepancy between perceived and actual scores was noted, particularly with the complications category, these are discussed later.

**TABLE 4.7.**

*Perceived and Actual Knowledge of Diabetes*

<b>Diabetes category</b>	<b><u>Perceived Knowledge</u></b>			<b><u>Actual Knowledge</u></b>			
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<b>min/max scores</b>
Diabetes management	104	3.19	.80	109	2.44	.73	1-3
Lifestyle	103	3.39	.85	109	3.01	1.34	1-5
Medication	102	3.23	.99	109	1.22	.60	1-2
Blood glucose	102	3.40	.917	109	3.01	1.39	1-5
Complications	102	3.44	1.04	109	1.06	.71	1-2

Note:  $n$  = number of participants;  $M$  = mean;  $SD$  = standard deviation; perceived knowledge score = (1 – 5).

### *Impact of personal participant factors on perceived and actual knowledge of diabetes*

Further analysis explored relations across participant factors on perceived and actual knowledge. These are reported next, with the personal factors explored first, and then facility factors.

#### *Age*

The first comparisons against the perceived and actual knowledge of diabetes categories were conducted using ANOVA against the participant factor, age in years. This participant factor comprised of participants who are new to field (ages 18-35), middle age (ages 36-52) and oldest age (ages 53-70). Table 4.8 shows the findings for the association between the level of perceived and actual knowledge of diabetes with age. The results indicate the rating for perceived knowledge of the lifestyle category differs significantly for participants with different age status ( $F(2, 90) = 4.72, p = .011$ ). A post hoc analysis ( $p < .05$ ) indicates that participants who are oldest rate their level of knowledge in the lifestyle category significantly higher ( $M = 3.60, SD = .87, n = 31$ ) than those aged 18 to 35, who are new to field ( $M = 2.96, SD = .73, n = 27$ ). Application of the Bonferroni correction at alpha .016 was still significant. The level of perceived knowledge across ages was not statistically significant for diabetes management, medication, blood glucose and complications.

The findings in Table 4.8 also show a statistically significant difference in the level of actual knowledge in the blood glucose category ( $F(2, 95) = 3.32, p = .040$ ). However, the Bonferroni correction was not significant. Although exploration with a Kruskal-Wallis test indicates a significance in the level of actual diabetes knowledge in the blood glucose category with older and middle age than those participants who are new to field ( $X^2(2) = 6.32, p = .042$ ). However, diabetes management, lifestyle,

medication and diabetes complication questions did not show statistically significant differences.

**TABLE 4.8.**

*Proportion of Perceived and Actual Diabetes Knowledge with Age*

	<u>Perceived knowledge</u>			<u>Actual knowledge</u>			
	df	F	Sig.	df	F	Sig.	min/max scores
Diabetes management	2	1.28	.283	2	2.79	.067	1-3
Lifestyle	2	4.72	.011*	2	.55	.580	1-5
Medication	2	.93	.400	2	.39	.677	1-2
Blood glucose	2	1.83	.165	2	3.32	.040*	1-5
Complications	2	3.13	.048	2	.75	.474	1-2

Note: \*  $p < .05$ ; df = degrees of freedom; F = F-ratio; perceived knowledge score range = (1 – 5).

***Work Situation***

With regards to the perceived level of diabetes knowledge, the participant factor work situation (full-time, part time/casual) was found not to be statistically significant. However, as shown in Table 4.9, a significant association was found between work situation with the level of actual diabetes knowledge in the area of diabetes management ( $t(104) = 2.15, p = .034$ ). Participants who are full-time ( $M = 2.66, SD = .639, n = 35$ ) rated higher in the actual diabetes management knowledge than those part-time/casual ( $M = 2.34, SD = .755, n = 71$ ). The 95% confidence interval for the difference between the actual knowledge of diabetes management and the participant factor, work situation, is from .02 and .61 total correct answers.

However, the lifestyle, medication, blood glucose and complications categories were not statistically significant.

**TABLE 4.9.**

***Proportion of Perceived and Actual Diabetes Knowledge with Work Situation***

	<u>Perceived knowledge</u>			<u>Actual knowledge</u>			
	df	<i>t</i>	Sig.	df	<i>t</i>	Sig.	min/max scores
Diabetes management	100	.12	.906	104	2.15	.034*	1-3
Lifestyle	100	.39	.698	104	1.81	.073	1-5
Medication	99	1.12	.267	104	.95	.343	1-2
Blood glucose	99	1.61	.110	104	.64	.523	1-5
Complications	99	.70	.487	104	1.10	.275	1-2

Note: \*  $p < .05$ ; df = degrees of freedom;  $t$  = F-ratio; perceived knowledge score range = (1 - 5).

***Time in Current Position***

An examination of association was explored against the participant factor, time in current position, with perceived and actual knowledge of diabetes categories. The time in current position was grouped into new to career (0-2) years, middle career (3-10 years) and end career (11-30 years). As indicated in Table 4.10, the association with the perceived level of understanding of blood glucose and time in current position was statistically significant ( $F(2, 91) = 4.56, p < .05$ ) as was the understanding of diabetes complications ( $F(2, 91) = 3.79, p < .05$ ). The Bonferroni correction was still significant when applied at alpha .016. However, the diabetes management, lifestyle and medications categories were not statistically significant ( $\alpha$

> .05). Participants who are in middle career ( $M = 3.64$ ,  $SD = .73$ ,  $n = 41$ ) and end career participants ( $M = 3.50$ ,  $SD = .73$ ,  $n = 13$ ) categories rate their perceived level of understanding of both blood glucose and diabetes complications higher than new to career ( $M = 3.10$ ,  $SD = .95$ ,  $n = 40$ ).

With regards to actual diabetes knowledge by participants, the blood glucose category ( $F(2, 96) = 4.82$ ,  $p < .05$ ) was found to be statistically significant. Application of the Bonferroni correction at alpha .016 was still significant. However the diabetes management, lifestyle, medication and diabetes complications were not statistically significant. Participants who are in end career ( $M = 2.64$ ,  $SD = 1.28$ ,  $n = 14$ ) and middle career ( $M = 3.50$ ,  $SD = 1.28$ ,  $n = 44$ ) categories rated higher in the actual blood glucose knowledge than those new to career ( $M = 2.63$ ,  $SD = 1.50$ ,  $n = 41$ ).

**TABLE 4.10.**

*Time in Current Position*

	<u>Perceived knowledge</u>			<u>Actual knowledge</u>			
	df	F	Sig.	df	F	Sig.	min/max scores
Diabetes management	2	1.06	.350	2	1.01	.370	1-3
Lifestyle	2	1.98	.144	2	2.82	.064	1-5
Medication	2	1.56	.215	2	2.12	.126	1-2
Blood glucose	2	4.56	.013*	2	4.82	.010*	1-5
Complications	2	3.79	.026*	2	.93	.397	1-2

Note: \*  $p < .05$ ; df = degrees of freedom; F = F-ratio; perceived knowledge score range = (1 – 5).

### *Duration of Employment in Aged Care*

An examination of the length of time participants had worked in aged care was explored with actual and perceived knowledge levels. This participant factor represented the length of time participants worked in aged care facilities (in years) and comprised of new to aged care (0-3 years), experienced in aged care (4-11 years) and very experienced in aged care (12-40 years). The results of comparisons made using ANOVA are shown in Table 4.11. Statistically significant differences were revealed in the perceived level of knowledge in the blood glucose category ( $F(2, 93) = 4.73, p < .05$ ) and in the complications category ( $F(2, 93) = 4.38, p < .05$ ). Application of the Bonferroni correction at alpha .016 was still significant. There were no statistically significant findings for the diabetes management, lifestyle and medication categories. The perceived level of understanding of blood glucose category by participants who were experienced in aged care ( $M = 3.61, SD = .74, n = 31$ ) and very experienced ( $M = 3.53, SD = .80, n = 35$ ) was rated higher than participants who were new to aged care ( $M = 2.99, SD = 1.06, n = 30$ ). With regards to the diabetes complications category, participants experienced in aged care ( $M = 3.66, SD = .87, n = 32$ ) and very experienced ( $M = 3.60, SD = .91, n = 35$ ) also rated their perceived level of understanding higher than participants who were new to aged care ( $M = 2.97, SD = 1.24, n = 29$ ).

Statistically significant differences were also shown between the actual level of knowledge in both the lifestyle ( $F(2, 98) = 7.48, p < .05$ ) and medication ( $F(2, 98) = 5.15, p < .05$ ) categories. Significance was also shown with application of the Bonferroni correction at alpha .016. However, no statistically significant findings were identified for the diabetes management, blood glucose and complications

categories. Post hoc analysis revealed participants experienced in aged care ( $M = 3.09$ ,  $SD = 1.40$ ,  $n = 33$ ) and very experienced ( $M = 3.35$ ,  $SD = 1.25$ ,  $n = 37$ ) rated higher in their actual level of understanding of the lifestyle category higher than participants who were new to aged care ( $M = 2.65$ ,  $SD = 1.60$ ,  $n = 31$ ). Participants experienced in aged care ( $M = 1.24$ ,  $SD = .71$ ,  $n = 33$ ) and very experienced ( $M = 1.03$ ,  $SD = .69$ ,  $n = 37$ ) also rated higher in the medication category than new to aged care participants ( $M = 1.03$ ,  $SD = .71$ ,  $n = 31$ ).

**TABLE 4.11.**

*Time Worked in Aged Care*

	<u>Perceived knowledge</u>			<u>Actual knowledge</u>			
	df	F	Sig.	df	F	Sig.	min/max scores
Diabetes management	2	3.17	.046	2	1.87	.159	1-3
Lifestyle	2	2.85	.063	2	7.48	.010*	1-5
Medication	2	1.49	.231	2	5.15	.007*	1-2
Blood glucose	2	4.73	.011*	2	2.12	.125	1-5
Complications	2	4.38	.015*	2	1.03	.361	1-2

Note: \*  $p < .05$ ; df = degrees of freedom; F = F-ratio; perceived knowledge score range = (1 – 5).

*Employment Status*

A statistically significant difference was shown between the perceived understanding of diabetes categories and the participant factor, employment status. The employment categories comprised RN/EN (registered nurse/enrolled nurse), AIN (assistant in nursing) and other (allied health worker, management, nursing student, personal carer, clinical nurse, clinical nurse consultant). As shown in table 4.12,

statistically significant results can be seen in the level of perceived understanding in diabetes medications ( $F(2, 97) = 13.76, p < .001$ ), blood glucose ( $F(2, 97) = 13.99, p < .001$ ) and diabetes complications ( $F(2, 97) = 6.31, p < .01$ ) by participants with different employment status. Application of the Bonferroni correction at alpha .016 was still significant. There were no statistically significant results found in the diabetes management and lifestyle categories. Participants in the RN/EN category ( $M = 3.69, SD = .76, n = 48$ ) rated their level of understanding of diabetes medications, higher than the AIN's ( $M = 2.69, SD = .97, n = 37$ ) or other health care workers ( $M = 3.27, SD = .96, n = 15$ ). With regards to level of perceived understanding of blood glucose, participants in the RN/EN category ( $M = 3.82, SD = .72, n = 48$ ) rated higher than either the AIN's ( $M = 2.90, SD = .85, n = 37$ ) or other health care workers ( $M = 3.42, SD = .88, n = 15$ ). Similar findings were identified with the level of perceived understanding of diabetes complications, with participants in the RN/EN category ( $M = 3.77, SD = .87, n = 47$ ) rating higher than AIN's ( $M = 3.03, SD = 1.13, n = 38$ ) or other health care workers ( $M = 3.60, SD = .83, n = 15$ ).

Further application of ANOVA ascertained differences in the actual diabetes knowledge in relation to employment status. In Table 4.12, statistically significant results were associated with all diabetes knowledge categories. The results show that participants employed as RN/EN ( $M = 2.82, SD = .43, n = 51$ ) and other health care workers ( $M = 2.47, SD = .64, n = 15$ ) demonstrate a higher level of knowledge in diabetes management than AIN's ( $M = 1.95, SD = .77, n = 41$ ). Actual level of blood glucose knowledge was also shown to be higher with the RN/EN's ( $M = 3.65, SD = 1.21, n = 51$ ) and other health care workers ( $M = 2.80, SD = 1.15, n = 15$ ), than the AIN's ( $M = 2.41, SD = 1.34, n = 41$ ). With regards to knowledge of diabetes

complications, RN/EN's ( $M = 1.33$ ,  $SD = .65$ ,  $n = 51$ ) and other health care workers ( $M = 1.20$ ,  $SD = .68$ ,  $n = 15$ ) were shown to have a higher level of knowledge than AIN's ( $M = .66$ ,  $SD = .62$ ,  $n = 41$ ). However, participants employed as other health care workers ( $M = 3.60$ ,  $SD = 1.18$ ,  $n = 15$ ) were shown to have higher actual knowledge of lifestyle than both RN/EN's ( $M = 3.45$ ,  $SD = 1.21$ ,  $n = 51$ ) and AIN's ( $M = 2.24$ ,  $SD = 1.24$ ,  $n = 41$ ). Similarly, participants employed as other health care workers ( $M = 1.53$ ,  $SD = .52$ ,  $n = 15$ ) were also shown to have a higher level of knowledge of diabetes medications than either RN/EN's ( $M = 1.31$ ,  $SD = .55$ ,  $n = 51$ ) or AIN's ( $M = .98$ ,  $SD = .61$ ,  $n = 41$ ). The significance of these findings will be further explored in chapter 5.

**TABLE 4.12.**

*Effect of Employment Status on Perceived and Actual Diabetes Knowledge*

	<u>Perceived knowledge</u>			<u>Actual knowledge</u>			
	df	F	Sig.	df	F	Sig.	min/max scores
Diabetes management	2	2.98	.056	2	23.04	.000***	1-3
Lifestyle	2	1.49	.231	2	13.26	.000***	1-5
Medication	2	13.76	.000***	2	6.74	.002**	1-2
Blood glucose	2	13.99	.000***	2	11.31	.000***	1-5
Complications	2	6.31	.003**	2	12.97	.000***	1-2

Note: \*\*  $p < .01$ , \*\*\*  $p < .001$ ; df = degrees of freedom; F = F-ratio; perceived knowledge score range = (1 – 5).

*Education Status*

The education status of participants was tested against the understanding of diabetes categories with ANOVA procedures. In Table 4.13, a statistically significant

difference is shown in the perceived level of understanding of diabetes medications by the participants with different education status ( $F(2, 90) = 4.34, p < .05$ ). Application of the Bonferroni correction at alpha .016 was still significant. The participants in the School category ( $M = 3.38, SD = 1.23, n = 12$ ) (grade 12) and the University award category ( $M = 3.42, SD = .95, n = 52$ ) (university graduate/ masters), tended to rate their perceived level of knowledge of diabetes medications higher than participants with qualification levels in the TAFE category ( $M = 2.78, SD = .88, n = 29$ ). The perceived level of understanding for the categories diabetes management, lifestyle, blood glucose and complications were not statistically significant ( $p > .05$ ) when compared with level of education.

As shown in Table 4.13, statistically significant differences in actual knowledge were found in the categories diabetes management ( $F(2, 96) = 3.62, p < .05$ ), blood glucose ( $F(2, 96) = 3.81, p < .05$ ) and diabetes complications ( $F(2, 96) = 6.95, p < .05$ ) with education levels. Application of the Bonferroni correction at alpha .016 was still significant. Health care workers who have university level qualifications ( $M = 2.59, SD = .74, n = 54$ ) have a higher level of actual diabetes knowledge in diabetes management, than those with either grade 12 schooling ( $M = 2.21, SD = .80, n = 14$ ) or Technical and Further Education (qualifications) ( $M = 2.19, SD = .65, n = 31$ ). Participants with university award level qualifications also demonstrated a higher level knowledge of blood glucose questions ( $M = 3.35, SD = 1.39, n = 54$ ) than either participants with grade 12 schooling ( $M = 2.64, SD = 1.39, n = 14$ ) or Technical and Further Education qualifications ( $M = 2.58, SD = 1.26, n = 31$ ). Similarly, participants in the university award category also scored higher in the diabetes complications questions ( $M = 1.26, SD = .71, n = 54$ ), than health care

workers in either the grade 12 schooling category ( $M = 1.07$ ,  $SD = .83$ ,  $n = 14$ ) or the Technical and Further Education category ( $M = .68$ ,  $SD = .60$ ,  $n = 31$ ). The actual level of diabetes knowledge for the lifestyle and medication categories were not statistically significant ( $p < .05$ ) when compared with the participant factor, level of education.

**TABLE 4.13.**

*Level of Education*

	<u>Perceived knowledge</u>			<u>Actual knowledge</u>			
	df	F	Sig.	df	F	Sig.	min/max scores
Diabetes management	2	.13	.882	2	3.62	.031*	1-3
Lifestyle	2	.12	.889	2	1.67	.194	1-5
Medication	2	4.34	.016*	2	.69	.505	1-2
Blood glucose	2	1.46	.238	2	3.81	.025*	1-5
Complications	2	.05	.955	2	6.95	.002**	1-2

Note: \*  $p < .05$ , \*\*  $p < .01$ ; df = degrees of freedom; F = F-ratio; perceived knowledge score range = (1 – 5).

*Impact of facility-related factors on perceived and actual knowledge of diabetes*

Further analyses explored the relations across facility factors on perceived and actual diabetes knowledge as previously described. As shown in Table 4.14, there were no significant findings across the facility factor, level of facility (not for profit, private) with participant factors for perceived level of diabetes knowledge. However, a statistically significant association was found between the level of facility and the

actual diabetes knowledge of blood glucose ( $t(94) = 3.83, p = .000$ ). The 95% confidence interval for the difference between actual blood glucose knowledge by participants employed in not for profit facilities and private facilities is from 0.49 and 1.53. In this sample the mean actual knowledge level of blood glucose questions by participants employed in not for profit facilities ( $M = 3.62, SD = 1.30, n = 55$ ) was higher than the mean actual knowledge of participants employed in private facilities ( $M = 2.61, SD = 1.24, n = 41$ ).

**TABLE 4.14.**

*Proportion of Perceived and Actual Diabetes Knowledge with Level of Facility*

	<u>Perceived knowledge</u>			<u>Actual knowledge</u>			<u>min/max scores</u>
	<b>df</b>	<b>t</b>	<b>Sig.</b>	<b>df</b>	<b>t</b>	<b>Sig.</b>	
Diabetes management	91	.16	.875	94	1.19	.236	1-3
Lifestyle	91	-.03	.980	94	.54	.592	1-5
Medication	90	-1.20	.238	94	-.41	.685	1-2
Blood glucose	90	-.56	.576	94	3.83	.000***	1-5
Complications	91	-.30	.764	94	.21	.837	1-2

Note: \*\*\*  $p < .001$ ; df = degrees of freedom;  $t$  = F-ratio; perceived knowledge score range = (1 – 5).

In summary, the perceived and actual knowledge of both diabetes in general and diabetes care specific to the elderly was ascertained. The current study showed health care workers who are in the ‘oldest’ age category demonstrate a high level of perceived knowledge in diabetes lifestyle, as well as showing a good level of actual knowledge in blood glucose. Staff employed either full-time or part-time/casual did

not show significant differences in their perceived understanding of the five diabetes categories. However, their actual level of knowledge in diabetes management was significantly different. New to career health care workers perceived a higher expertise in both blood glucose and diabetes complications. Furthermore, the actual level of diabetes knowledge in very experienced staff for diabetes lifestyle and complications was significant. Employment position had the greatest significance in the level of understanding of the 5 diabetes categories. This was demonstrated by the registered and enrolled nurse's higher level of understanding in diabetes management, medication, blood glucose and diabetes complications. Health care workers with a higher level of education demonstrated more understanding of diabetes medication. In objective 3, the factors enhancing or inhibiting diabetes care will be explored using t-tests and Chi-square analysis.

### **OBJECTIVE 3: WHAT ARE THE FACTORS MODERATING DIABETES CARE PROVISION BY HEALTH CARE WORKERS IN RESIDENTIAL AGED CARE FACILITIES?**

As previously discussed in chapter 3, factors acting as barriers or facilitators for meeting diabetes management and care guidelines were established from responses to several questions. One question specifically gauged the overall possibility or likelihood of improving diabetes education and care in their facility using a Likert scale rating of 1 to 10. Higher scores indicated greater possibility/likelihood of improving diabetes education and care and lower overall scores indicated lower possibility /likelihood. Other questions specifically solicited information relating to barriers and facilitators using open-ended responses. For data analysis purposes

these responses were categorised into four barriers and facilitators: diabetes management, knowledge, workforce and health care team.

First, the overall measures are discussed, followed by the facilitators then barriers. Finally, further analysis is discussed which explored the possibility of relationships between the facilitators and barriers categories and facility-related factors. From Table 4.15 it can be seen that 57.2% ( $n = 89$ ) of participants rated the likelihood of change in the facility at a score of eight or higher, suggesting a strong possibility that improvements in diabetes education and care could be made in their facility. The mean score was found to be  $M=7.52$  ( $SD \pm 1.73$ ).

**TABLE 4.15.**

*Possibility of Improving Diabetes Education and Care in Facility*

<i>Score</i>	<i>n (%)</i>
<i>1-Low possible/unlikely</i>	0.0
2	1 (1.1%)
4	3 (3.4%)
5	9 (10.1%)
6	12 (13.5%)
7	13 (14.6%)
8	22 (24.7%)
9	19 (21.3%)
<i>10 Highly possible/highly likely</i>	10 (11.2%)

Note:  $n$  = number of respondents for each item.

### *Facilitators and barriers in diabetes care provision*

Analysis of the responses pertaining to factors which positively or negatively affect the provision of diabetes care in aged care facilities involved descriptive statistics, and the chi square statistic to explore associations between the barriers and facilitators with facility factors: facility type and level of care given. The diabetes management barriers were concerned with compliance to diabetes guidelines, the level of diabetes knowledge and effective communication between aged care residents and staff; whilst facilitators were seen to be the availability of diabetes guidelines to assist improved diabetes monitoring and care plans. The diabetes-related knowledge category also included diabetes-related care experiences. Workforce issues acted as barriers when lack of time to provide diabetes-specific care comprised care, as did the level of interest in diabetes, the availability and support of the health care team, including medical staff. In contrast, workforce facilitators were the opposite, i.e. interest in diabetes care, good communication amongst carers and support from health care team, including support and availability of allied health personnel to assist in improved diabetes care.

From Table 4.16, it can be seen that diabetes-related knowledge acted as both the most significant facilitator as well as barrier to diabetes care provision. Of the 48 participants who responded, 71.2% ( $n = 37$ ) indicated that the level of diabetes knowledge positively influences diabetes care, while 52.1 % ( $n = 25$ ) indicated a lack of diabetes knowledge to be a barrier to providing diabetes care in their aged care facility. The next highest category of facilitators and barriers was diabetes management related issues. Specifically, in this category, facilitating factors that were mentioned included the availability of care plans (11.5%,  $n = 6$ ) and the

availability of diabetes monitoring and guidelines (34.6%,  $n = 18$ ), while barriers included compliance issues (39.6%,  $n = 19$ ) and communication (12.5%,  $n = 6$ ). In the workforce category, facilitators included the level of staff interest in diabetes care (15.4%,  $n = 8$ ), effective communication among staff and aged care residents (7.7%,  $n = 4$ ) and support from management and the health care team (13.5%,  $n = 7$ ). Barriers to diabetes care in the workforce category included staff workload (14.6%,  $n = 7$ ), insufficient time (6.3%,  $n = 3$ ) and a disinterest in diabetes, which were reported as more of a barrier to providing diabetes care than the availability and support of the health care team (20.8%,  $n = 10$ ). Participants indicated that the health care team was the least significant facilitator as well as barrier to diabetes care provision. Factors mentioned in particular to this category included the accessibility of allied health staff as a facilitative factor in providing diabetes care (26.9%,  $n = 14$ ), while a barrier was insufficient medical support (20.8%,  $n = 10$ ).

**TABLE 4.16.**

*Facilitators and Barriers to Diabetes Care Provision*

<b>Category</b>	<b>Facilitators <math>n</math> ( %)</b>	<b>Barriers <math>n</math> ( %)</b>
Diabetes-related knowledge	37 (71.2%)	25 (52.1%)
Diabetes management	22 (42.3%)	23 (47.9%)
Workforce	19 (36.5%)	13 (27.1%)
Health care team	14 (26.9%)	10 (20.8%)

Note:  $n$  = number of respondents for each item.

### *Areas Which Benefit Education*

With regards to diabetes knowledge, participants were asked to identify specific educational topics from a list comprising: healthy eating, foot care, low blood glucose (BGL) management, monitoring blood glucose, insulin injections, weight management, sick day management and other education, which they perceived would be beneficial to receive in order to improve the provision of care to their residents with diabetes. Ninety-seven participants responded, ticking more than one education category in the survey. From Table 4.17 it can be seen that 82.5% (n = 80) of participants indicated the area which would benefit them most significantly from receiving education was healthy eating. Similarly, foot care (69.1%, n = 67) and low blood glucose management (69.1%, n = 67) education were identified as areas beneficial to receive. The topic perceived as least beneficial to participant's needs was sick day management (58.8%, n = 57). The category other education (17.5%, n = 17) included diabetes pathology, high BGL management and eye care as well as the need for ongoing diabetes education and review.

**TABLE 4.17.**

#### *Areas Which Could Benefit From Education*

<b>Item (n)</b>	Education Benefits
	<b>n (%)</b>
Healthy eating	80 (82.5%)
Foot care	67 (69.1%)
Low BGL management	67 (69.1%)
Monitoring blood glucose	63 (64.9%)
Insulin injections	62 (63.9%)
Weight management	63 (64.9%)
Sick day management	57 (58.8%)
Other education	17 (17.5%)

*Note.* n = number of respondents for each item.

Related to the workforce category, participants were also asked to identify if they were aware of any staff members with specific diabetes expertise. Whilst 30.5% ( $n = 29$ ) of the 95 health care workers who responded to this question indicated they were aware of a staff member, 69.5% ( $n = 66$ ) were not aware of anyone with diabetes proficiency in their agency.

Further analysis explored for associations between two facility factors - facility (not for profit, private) and level of care (high care, low care/ other) - with the four categories of facilitators and barriers. Chi-square tests and cross-tab procedures were used. No statistically significant results were found.

In summary, findings were presented regarding factors which positively or negatively affect the provision of diabetes care in residential aged care facilities. This chapter explored factors which act as a facilitator for the provision of diabetes care. Specifically, the current study showed the availability of care plans, monitoring, diabetes guidelines and diabetes specific education as significant facilitators. In contrast, staff workload, insufficient time and inadequate interest in diabetes were highlighted as barriers to providing good diabetes care. Furthermore, health care workers identified healthy eating, foot care and low blood glucose management as areas which they would most benefit from receiving education.

In objective 4, the levels of perceived confidence by health care workers in providing diabetes care will be analysed using ANOVA tests and equivalent non-parametric tests where appropriate.

#### **OBJECTIVE 4: WHAT ARE THE LEVELS OF PERCEIVED CONFIDENCE OF HEALTH CARE WORKERS IN RESIDENTIAL AGED CARE FACILITIES TO PROVIDE DIABETES CARE?**

As discussed previously, the study aimed to identify the perceived level of confidence of health care workers to provide diabetes care. In order to measure the perceived level of confidence in providing information about diabetes self-management, the Diabetes Self-Management Education Confidence Scale was utilised. This scale comprised the categorical responses from 1 “not at all confident” to 5 “confident about all aspects”, higher scores indicating greater confidence regarding the individual’s capacity to support diabetes self-management.

Four items were used to assess confidence; these were perceived level of confidence that information provided to residents about DSME is correct, providing DSME without hesitation, confidence in talking to residents about the management of their diabetes and satisfaction with performance. Of those that responded, participants indicated higher scores for feeling satisfied with performance ( $M = 3.99$ ,  $SD = 1.18$ ,  $n = 96$ ), closely followed by confidence in talking about diabetes management ( $M = 3.98$ ,  $SD = 1.26$ ,  $n = 100$ ) and feeling certain about providing DSME without hesitation ( $M = 3.77$ ,  $SD = 1.31$ ,  $n = 98$ ). However, participants reported less confidence in providing correct information about diabetes self-management ( $M = 3.00$ ,  $SD = 0.93$ ,  $n = 92$ ). Comparisons were made against the DSME categories with participant factors (age in years, work situation, time in current position, time worked in aged care, employment position, level of education) and facility factors (level of facility and level of care provided). Data was analysed using ANOVA tests and equivalent non-parametric tests where appropriate; these are reported next.

### *Time Worked in Aged Care*

Comparisons were made against the four items previously mentioned and the participant factor, time worked in aged care, which was grouped into the following categories: new to aged care (0-3 years), experienced in aged care (4-11 years) and very experienced in aged care (12-40 years). As shown in Table 4.18, confidence in providing diabetes self-management education without hesitation was significant ( $F(2, 95) = 3.14, p = .048$ ). A Bonferroni correction at alpha .016 was still significant. Post hoc analysis revealed that health care workers who are experienced in aged care ( $M = 3.93, SD = 1.05, n = 30$ ) and very experienced ( $M = 3.91, SD = 1.29, n = 34$ ) perceive a higher level of confidence in providing DSME than those who are new to aged care ( $M = 3.19, SD = 1.49, n = 27$ ).

**TABLE 4.18.**

*Length of Time Worked in Aged Care*

<b>DSME category</b>	<b>Time worked in aged care</b>		
	<b>df</b>	<b>F</b>	<b>Sig.</b>
Information provided is correct	2	3.16	.047*
Providing DSME without hesitation	2	3.14	.048*
Talking about management of diabetes	2	1.64	.200
Satisfaction with performance	2	1.71	.186

Note: df = degrees of freedom;  $F$  = F-ratio; DSME = Diabetes Self- Management Education; \*  $p < .05$ .

### *Professional Employment Position*

Further analysis explored for an association between the level of perceived confidence in providing diabetes self management education and the participant

factor of professional employment position (RN/EN, AIN and other). The findings in Table 4.19 show statistically significant results in all DSME categories. Confidence that information provided about DSME was correct was significant ( $F(2, 87) = 8.82, p < .001$ ). A Bonferroni correction at alpha .016 was still significant. Post hoc analysis revealed that health care workers who were employed as RN/EN ( $M = 3.37, SD = 0.79, n = 43$ ) and other ( $M = 3.00, SD = 0.93, n = 15$ ) perceived a higher level of confidence in providing correct DSME information than those who were employed as AIN's ( $M = 2.53, SD = 0.92, n = 32$ ). Findings also showed a significance in providing DSME without hesitation ( $F(2, 93) = 9.13, p < .001$ ) with a Bonferroni correction at alpha .016 still significant. RN/EN's scored higher in the certainty they could provide DSME without hesitation ( $M = 4.27, SD = 1.12, n = 48$ ) than either health care workers employed as other ( $M = 3.92, SD = 1.32, n = 13$ ) or AIN's ( $M = 3.17, SD = 1.15, n = 35$ ). With regards to level of confidence in talking about the management of diabetes, this was also found to be significant ( $F(2, 95) = 9.42, p < .001$ ). A Bonferroni correction at alpha .016 was still significant. Health care workers employed as RN/EN's ( $M = 4.46, SD = 1.05, n = 48$ ) perceived a higher level of confidence in talking about DSME than health care workers employed as other ( $M = 4.21, SD = 1.31, n = 14$ ) or AIN's ( $M = 3.42, SD = 1.08, n = 36$ ). Satisfaction with performance in providing diabetes self-management education also showed significance ( $F(2, 91) = 6.82, p < .01$ ), with a Bonferroni correction at alpha .016 still significant. The RN/EN's reported a higher level of satisfaction in their performance ( $M = 4.39, SD = 1.09, n = 46$ ) than either participants employed as other ( $M = 4.21, SD = 1.19, n = 14$ ) or as AIN's ( $M = 3.52, SD = 1.05, n = 34$ ).

**TABLE 4.19.***Employment Status*

DSME category	Employed as		
	<b>df</b>	<b>F</b>	<b>Sig.</b>
Information provided is correct	2	8.82	.000***
Provide DSME without hesitation	2	9.13	.000***
Talking about management of diabetes	2	9.42	.000***
Satisfaction with performance	2	6.82	.002**

Note: df = degrees of freedom; *F* = F-ratio; DSME = Diabetes Self- Management Education; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

*Level of Education*

In the next comparison the application of ANOVA ascertained the level of perceived confidence in the DSME categories in relation to the participant factor, education level (grade 12 schooling, Technical and Further Education, university award). In Table 4.20 statistically significant results were identified in the level of confidence in talking to residents on management of diabetes ( $F(2, 88) = 3.12, p < .05$ ). Participants whose highest level of education completed consisted of grade 12 schooling ( $M = 4.07, SD = 1.64, n = 14$ ) or university award ( $M = 4.22, SD = 1.21, n = 51$ ) perceived a much higher level of confidence in talking about diabetes management to residents than those with a TAFE background ( $M = 3.46, SD = 1.14, n = 26$ ).

**TABLE 4.20.***Highest Level of Education Completed*

DSME category	Education		
	<b>df</b>	<b>F</b>	<b>Sig.</b>
Information provided is correct	2	2.78	.068
Provide DSME without hesitation	2	2.22	.115
Talking about management of diabetes	2	3.12	.049*
Satisfaction with performance	2	2.24	.112

Note: df = degrees of freedom; *F* = F-ratio; DSME = Diabetes Self- Management Education; \*  $p < .05$ .

The examination of association for the perceived level of confidence in the DSME categories against the participant factors, age in years, work situation, time in current position and the facility-related factors, level of facility and level of care provided, were found to be not statistically significant.

In summary, this chapter also presented the findings for the levels of perceived confidence of health care workers to provide diabetes care to residents in aged care facilities. Specifically, participants perceived their overall level of confidence as “fairly confident in most aspects” of the four DSME categories. However, a lower perceived level of confidence was shown by health care workers in providing correct information regarding diabetes self-management. The current study was able to show employment position was significant, with RNs and ENs indicating a higher level of confidence in all four DSME categories, and AIN’s the least. Furthermore, education level affected the level of confidence in talking to residents on management of

diabetes, with the highest level of perceived confidence shown by participants with either grade 12 or university education.

The following chapter will explore possible reasons for the findings and conclusions will be drawn from the results. The implications for clinical practice will be discussed, and how this impacts the provision of diabetes care in Queensland aged care facilities. Recommendations for clinical practice and policy changes will be considered.

## **CHAPTER 5: DISCUSSION**

This study presented preliminary research conducted in Australia on diabetes care provision in residential aged care facilities. The study purpose was to establish elderly guidelines application in residential aged care facilities in Queensland. This quantitative study employed a cross-sectional, descriptive design, with a postal survey used to collect data. The survey comprised items to assess demographic data, diabetes related knowledge, perceived confidence in providing diabetes care, awareness of the availability of diabetes management and care guidelines, facilitators and barriers to meeting diabetes related care guidelines and confidence in diabetes self-management education. Participants included 109 health care workers, including registered nurses, enrolled nurses and nursing assistants employed in Queensland residential aged care facilities.

The principal findings and the implications for the management of diabetes among the elderly living in residential aged care facilities are discussed in this chapter in light of empirical evidence and this provides answers to the study objectives. Australian research investigating diabetes care in the elderly has been limited to date, with the majority of the research investigating general nursing care in residential aged care facilities (Baxter, 2007; Dunning, 2005b; Tacon & Veitch, 2007). Findings from overseas studies which have focused on diabetes care provision by nurses working in aged care have investigated nurses' level of knowledge regarding diabetes and diabetes guidelines (Baxley et al., 1997; El-Deirawi & Zuraikat, 2001;

Leggett-Frazier et al., 1994; Lipman & Mahon, 1999). The majority of research in the field is from the United States and the United Kingdom. There was no research evident from Australia and therefore this study appears to be a first of its kind and an important contribution to the field. In particular the current study has provided important preliminary data on diabetes related care in residential aged care facilities and secondly the study presents pertinent baseline data to support practice change and policy directions for the purpose of assisting Australian diabetes management and care guidelines for the elderly in residential aged care facilities. Finally, the strengths and limitations of the current study are reviewed and recommendations suggested.

#### **OBJECTIVE 1: THE PRESENCE AND NATURE OF DIABETES PROTOCOL/GUIDELINES IN RESIDENTIAL AGED CARE**

The literature suggests that the availability of diabetes guidelines in health care settings is important for the implementation of quality diabetes care (Australian Centre for Diabetes Strategies, 2005; ADEA, 2003; Department of Health, 2001; Diabetes Australia, 2009a; IDF, 2005). Specifically it has been shown that adherence to guidelines can improve diabetes knowledge and understanding in general practitioners, health care workers, allied health professionals, and the person with diabetes, thus potentially reducing the risk of diabetic complications (Australian Centre for Diabetes Strategies, 2005; ADEA, 2003; Department of Health, 2001; New South Wales Department of Health, 1996). Although evidence based diabetes guidelines are widely available in the literature, few guidelines specifically target the elderly population (ADEA, 2003; Brown et al., 2003; European Working Party for Older People, 2004). The need for guidelines explicitly for the elderly with diabetes

has been identified, particularly as this population often have age specific issues such as decreased levels of independence, reduced mobility and a decreased capability for self care (ADEA, 2003; European Working Party for Older People, 2004). Consequently, international evidence based guidelines for elderly people with diabetes have been developed with the aim of improving the standard of diabetes management and promotes consistency of care (ADEA, 2003; Brown et al., 2003; European Working Party for Older People, 2004). In Australia, diabetes-related guidelines for the elderly have been developed by the Australian Diabetes Educators Association (ADEA) and made available since 2003. However, neither the international nor Australian guidelines for diabetes are specifically designed for the elderly residing in aged care facilities.

#### ***Care plans for diabetes management***

The current study investigated the accessibility and application of diabetes protocols and guidelines within Queensland residential aged care facilities. The guidelines and protocols investigated were grouped into three categories; care plans- review and revision, screening and monitoring and diabetes care specific skills. Most of the diabetes care planning guidelines recalled by the participants were those aimed at care plans and their review and revision (88.5%), individualising care (88.2%), and writing plans (86.1%). These findings are in contrast to those reported in the literature, which suggest an overall deficit in the availability of diabetes guidelines exists, and therefore recommend the implementation of individualised care plans to provide a framework for health care workers in their delivery of diabetes care in order to rectify this situation (Benbow et al., 1997; Douek et al., 2001; Holt et al., 2007).

An area addressed in the care plans- review and revision category pertained to individual diabetic management targets for the residents. A notable deficit in target guidelines was found relative to the other guidelines and protocols in this category, with only 67.3% of health care workers suggesting they were aware of guidelines of this nature. This could possibly indicate that either diabetic target guidelines were not available or the health care workers were unsure if they existed. The lack of target guidelines are comparable to that found in an American study by Holt et al. (2007), which investigated the management of elderly people with diabetes residing in aged care facilities. Although the current study did not aim to identify if diabetes targets were met, the Holt et al. (2007) study confirmed poor attainment of diabetic targets and subsequently recommended the need for practice guidelines to improve the quality and consistency of care of elderly people with diabetes residing in aged care facilities. Given some lack of awareness of these target guidelines was noted in the present study it is possible that target clinical indicators are not being met. Exploring collaborative approaches to care using case conferences funded by the Medical Benefits Schedule is a potential solution.

### ***Screening and monitoring of diabetes***

In the current study, aged care workers were more aware of guidelines related to screening and monitoring of diabetes than guidelines pertaining to diabetes care specific skills. In particular a high percentage were aware of guidelines for monitoring blood glucose levels (85.6%), low blood glucose management (82.2%), dietary recommendations (80.8%) insulin injection technique (78.0%) and urinalysis (67.0%). This is in contrast to guidelines for the screening and monitoring of the eye (54.5%), kidney function (40.8%) and lipid profile (37.4%), which staff were less

familiar with. This data is important, as it appears some key diabetes guidelines are being made available for the health care workers in Queensland residential aged care facilities. Furthermore, the ADEA (2003) recommends elderly people with diabetes receive ongoing evaluation of their metabolic control and screening, and results from the current study show some guidelines and protocols are in place to help achieve this. In accordance with Holt et al. (2007), this study identified the need for practice guidelines. Holt et al. (2007) found care of the elderly with diabetes insufficient, with screening and monitoring of kidney function performed for only 7% of patients in the study, lipid profile for 31% and eye examination for 42% of patients. Furthermore, a study in the United Kingdom by Benbow et al. (1997) reported similar findings, although they explored actual provision of care rather than awareness of guidelines and found the rate of eye examination in that study was 72%, which was significantly higher than the rate of 54.5% found in the current study. The importance of having guidelines for the screening and monitoring of diabetes has been highlighted in the literature. For example, assessment of kidney function is an early screening measure to detect renal failure, therefore an annual check is recommended for all elderly people with diabetes, increasing to every 3 to 6 months if microalbuminuria or proteinuria is present (ADEA, 2003; Diabetes Australia, 2009a). The screening and monitoring of lipid profile is also important, as cardiovascular risk factors are increased in people with diabetes and can lead to substantial morbidity and mortality (Barr et al., 2005; IDF, 2007; WHO, 2009). According to ADEA (2003), the best practice guidelines for diabetes in the elderly recommend that lipid profiles are assessed annually if lipid profile presents as normal and every 3 to 6 months if abnormal. Retinopathy is another important complication for people with diabetes, which worsens if left unchecked. The best practice recommendation is an eye

examination every second year if no diabetic retinopathy is present, yearly if minimal retinopathy and immediately if moderate retinopathy is present (ADEA, 2003; Dunstan et al., 2001; IDF, 2007; WHO, 2009).

Despite the evidence base underlying the need for screening and monitoring guidelines, the lack of awareness by health care workers of some guidelines targeting key parameters and complications of diabetes is concerning. It is plausible that diabetes care in this area is neglected if guidelines and protocols are not available to staff. It could be further suggested that screening and monitoring are more likely to be carried out by medical staff, such as a visiting GP, rather than nursing staff, since the aged care workforce has a high level of low skilled staff. Nevertheless, from a clinical perspective, the findings suggest the need for diabetes guidelines and protocols in order to ensure diabetes care in aged care facilities meets the evidence base.

#### *Diabetes care specific skills*

Several guidelines, targeting diabetes care specific skills of health care workers, were investigated. These guidelines, which comprised those for foot assessment, cognitive function assessment, blood pressure monitoring and glycaemic control, were generally available in the aged care facilities studied. In particular, participants reported the availability of guidelines for diabetes care specific skills for foot assessment (74.8%), cognitive function assessment (73.7%), blood pressure (73.3%) and glycaemic control (72.8%). The current literature has explored both the awareness of guidelines and protocols for diabetes care specific skills and the

utilisation of these guidelines. Although Holt et al. (2007) showed poor adherence to diabetes guidelines in a number of areas, they reported similar findings to the current study in the availability of guidelines for foot assessment (87%), blood pressure monitoring (94%) and glycaemic control (67%). Conversely, in the United Kingdom Benbow et al. (1997) reported a significantly lower rate of diabetes practices for foot assessment (18%) and blood pressure monitoring (29%) were available.

The literature has shown that in order to reduce diabetes complications and optimise quality of life in the elderly, implementation of guidelines for the management of diabetes care specific skills is crucial (ADEA, 2003; Diabetes Australia, 2009a). For instance, elderly people with diabetes are at increased risk of developing a foot ulcer or requiring an amputation (ADEA, 2003; Diabetes Australia, 2009a). As a result, routine foot assessments are advised in both general guidelines and guidelines for elderly diabetics, at least once a year in people without foot problems and every 3 to 6 months in individuals at risk of developing foot problems (ADEA, 2003; Diabetes Australia, 2009a). Diabetes is also associated with a decline in cognition in the elderly, therefore routine assessment of cognitive function is important (Brown et al., 2003). In addition, blood pressure control is significant in reducing macro and microvascular complications, therefore assessments are recommended at least every three months in the elderly with hypertension and every six months if normotensive (Brown et al., 2003; Diabetes Australia, 2009a). With regards to the monitoring of blood glucose levels, glycaemic control should be individualised, taking into account frailty and life expectancy (ADEA, 2003; Brown et al., 2003). However, the literature is inconsistent in how often to test for glycaemic control by HbA<sub>1c</sub> (haemoglobin A<sub>1c</sub>) with recommendations ranging from one to two times a year if

glycaemic control is stable, and from quarterly to every six months if inadequate glycaemic control (ADEA, 2003; Brown et al., 2003; Diabetes Australia, 2009a).

The evidence from the current study suggests health care workers have access to guidelines and protocols for diabetes care specific skills in many of the facilities involved in the study. However, a lack of awareness of some guidelines may infer that they are not always being implemented in the resident's diabetes management plan. Although the focus of the study was on nursing staff it is important to consider that general practitioners play an important role in monitoring and adhering to clinical practice guidelines. In addition, the clinical knowledge required to assess and interpret diabetes care specific skills is likely to be within the scope of practice of medical staff or higher skilled nursing staff. Thus the high rate of low skilled staff in aged care facilities who are reliant on the knowledge of trained staff present to assure diabetes care is provided is a concern. Implementing specialist outreach, mentoring programs for health care providers may be a pragmatic solution to address the documented barriers.

***The availability of diabetes guidelines in different aged care providers and facilities***

As indicated in chapter 2, aged care facilities in Australia are monitored and accredited by the Australian Government. This provides a structured approach to the regulation and management of quality care in both non-profit and private residential aged care facilities (Australian Government Department of Health and Ageing, 2007c; Commonwealth of Australia, 2007a). Aged care facilities are classified as high care or low care depending upon the level of care dependency of residents

(Commonwealth of Australia, 2007a). Aged care providers are also responsible for ensuring compliance with all relevant legislation and professional standards, including guidelines about resident's health and personal care (Australian Government Department of Health and Ageing, 2007c).

In the current study, an association between the availability of guidelines for care plans— review and revision, diabetes screening and the monitoring and diabetes care specific skills in both non-profit and private residential aged care was explored. Findings from the current study indicated that in the main, although there were no differences between the types of agencies, the availability of some screening and monitoring guidelines were statistically significant in the private sector aged care facilities. Overall staff from private residential aged care facilities indicated more awareness of diabetes guidelines for the screening and monitoring of urinalysis (82.1%), lipid profile (48.7%) and kidney function (50.0%) compared to staff working in non-profit facilities (urinalysis 63.5%; lipid profile 29.2%; kidney function 35.4%). There were no reported studies available in the literature that investigated the nature of the aged care facility and this appears to be a first in presenting such comparative data. The heterogeneity of funding models internationally challenges comparing facilities. This higher rate of awareness of screening and monitoring guidelines in private aged care residential facilities may suggest more key parameters are being incorporated into the diabetes management practices at these facilities.

An association between the availability of guidelines for the screening and monitoring of diabetes and the classification of care was also explored. In the current

study, staff employed in high care classified residential aged care facilities were more aware of guidelines for the screening and monitoring of lipid profile (81.1%) and kidney function (87.5%) than in low care facilities (lipid profile 64.9%; kidney function 60.0%). This is important given the prevalence of high care residents in Australian aged care services in 2002-2003 was 64%, while low care dependency was reported to be much lower at 36% (Commonwealth of Australia, 2007b). The elderly residing in high care classified facilities have a higher level of care dependency, and are therefore more reliant upon health care workers in meeting their clinical and personal care needs. This highlights the need for diabetes protocols and guidelines being accessible to health care workers employed in these residential aged care facilities. Although the literature does not provide data specifically concerning the availability of diabetes protocols and guidelines across different classifications of residential aged care facilities, it does raise concerns over the lack of consistency of diabetes management in aged care facilities in general (Douek et al.; Holt et al., 2007). Furthermore, the current study provides important preliminary data in this area, suggesting that with increasing level of care, screening protocols are more evident and thus care provision more likely to meet recommended standards for diabetes care. However, irrespective of where residents reside, the care detailed in the guidelines is evidence based care and applies to all residents, irrespective of the nature of their care facility.

## **OBJECTIVE 2: WHAT IS THE KNOWLEDGE BASE OF QUEENSLAND HEALTH CARE WORKERS IN AGED CARE FACILITIES REGARDING DIABETES MANAGEMENT?**

Diabetes is the most common, chronic condition among the elderly population (ADEA, 2003). Given the prevalence, it is extremely important for health care staff to have knowledge of diabetes management to ensure safe clinical practice. Disparity in both the diabetes knowledge and practice by nursing staff has been highlighted in the literature, in particular with notable differences found between nurses' perceived and actual knowledge (Baxley et al., 1997; El-Deirawi & Zuraikat, 2001; Leggett-Frazier et al., 1994; Lipman & Mahon, 1999).

### ***Education Received***

The current study identified healthy eating as the most frequently received diabetes related education topic (73.3%), followed closely by blood glucose monitoring (70.9%). This is important, as nutrition intervention in the elderly can pose challenges, for example where cognitive dysfunction, impaired swallowing, and age-related decline in taste perception exist (ADEA, 2003). Adequate nutrition can facilitate maintaining glycaemic control and should be included in the overall diabetes management plan. As well, blood glucose monitoring is essential for optimising glycaemic control and thus reducing potential diabetes complications and ultimately improving quality of life (ADEA, 2003; Diabetes Australia, 2009a). The findings suggest education in these two areas is relatively common in Queensland. This is in contrast to evidence in overseas studies, which found diabetes specific education was inadequate, with in-service professional development either not available or not recently attended by staff (Baxley et al., 1997; Lipman & Mahon, 1999; El-Deirawi & Zuraikat, 2001). Although the literature is not conclusive about

the impact of in-service education on knowledge of diabetes, it proposes diabetes management education would enhance the diabetes knowledge of health care workers (Baxley et al., 1997; Lipman & Mahon, 1999; El-Deirawi & Zuraikat, 2001). In the present study 22.1% of the participants indicated they had not received any diabetes management education, given this is almost a quarter of the workforce this is of concern. In particular, almost half had not received education on insulin therapy (52.3%), which may indicate a lack of understanding of insulin action, which is required by staff in order to evaluate the effectiveness of the insulin dose. However, this knowledge would be more pertinent to the RNs than other levels of staff, so is perhaps not a surprising finding. In addition, receipt of sick day management education (23.3%) was low. Given the age group and care dependency of residents, many will be reliant on the prompt attention to blood glucose monitoring and care on sick days and therefore, given these findings, care in this area may be neglected if staff have not received adequate diabetes education on these topics. Although the current study suggests that participants have access to diabetes education on a variety of topics, it did not measure how often or recently this education was received. Furthermore, mandatory staff attendance and education session times were issues not explored in the current study, but could impact on the quality and extent of diabetes education received by staff.

#### ***Perceived and actual knowledge of diabetes***

In the current study, questions were asked relating both to perceived diabetes knowledge and actual knowledge. Overall, health care workers perceived their knowledge of diabetes as at least “good”, in the categories which involved special diet needs and exercise ( $M = 3.39$ ), blood glucose monitoring ( $M = 3.40$ ), and long

term complications of diabetes ( $M = 3.44$ ). Significantly, the perceived level of understanding of the Australian diabetes guidelines for the elderly was rated lowest ( $M = 2.86$ ). This may suggest that although some health care workers were at least aware of these guidelines, they may not have the knowledge or understanding of the content within them. In accordance with the findings in the diabetes knowledge literature, although the participants perceived themselves generally competent, the actual knowledge data suggests an overall deficit in the level of diabetes knowledge, notably of diabetes complications and medications; this has been shown by other researchers (Baxley et al., 1997; El-Deirawi & Zuraikat, 2001; Leggett-Frazier et al., 1994; Lipman & Mahon, 1999). In particular, the lack of knowledge of diabetes complication assessment skills is of concern, as the best practice in the management of diabetes has shown to be reliant upon these skills. Hence it could be assumed that care in this area may be neglected in aged care residential facilities. The deficit in actual diabetes medication knowledge in the current study may be a result of the nature of the aged care workforce, in which only 39.3% of participants were RN's, who were responsible for administration of diabetes medications. This suggests a need to increase the knowledge of this workforce, and redefine the role of AIN's in the care of elderly residents in aged care facilities with diabetes, who are reliant upon the health care workers for their diabetes management.

### ***Impact of personal and agency factors on perceived and actual knowledge of diabetes***

#### **Personal factors**

As indicated in chapter 2, the Australian residential aged care workforce is comprised of 22.5% of workers aged 55 or older (Australian Government

Department of Health and Ageing, 2007b). In the current study, the mean age of the participants was shown to be 45.2 years ( $SD \pm 13.3$ ). While the literature does not explore the relations across age with perceived and actual diabetes knowledge, the findings from the current study relating to health care worker's age provided initial data related to the Australian aged care workforce. Observations from the current study showed health care workers who are older in age have a higher level of perceived diabetes knowledge, specifically perceived knowledge in diabetes dietary requirements and the role of exercise in diabetes care. However, this was not translated into a statistically significant difference when actual knowledge was tested. Nevertheless, the level of actual diabetes knowledge of blood glucose monitoring, management and control was significantly associated with age ( $p = .040$ ). This may suggest knowledge in this area could be attributed to the knowledge and experience accumulated over time during the health care workers career.

#### Work Situation and Time in Current Position

The current literature pertaining to diabetes knowledge does not provide data specifically on the relationship between diabetes knowledge and different work situation or length of time worked in aged care, however it does raise concerns over the lack of knowledge in diabetes and its management by health care professionals (Baxley et al., 1997; Drass et al., 1989; El-Deirawi & Zuraikat, 2001; Leggett-Frazer et al., Lipman & Mahon, 1999) and this may have been accounted for by work situation and duration of employment. The current study showed health care workers' perceived level of diabetes knowledge was not significantly influenced by their work status (full-time, part-time/casual). However, there was evidence of a

significant association between the levels of actual diabetes knowledge in diabetes management and work status ( $p = .034$ ), with full-time workers being more knowledgeable than part time/casual employment. The findings could be attributed to the amount of time the health care worker spends caring for the elderly with diabetes, and full-time employment providing more opportunities to expand diabetes knowledge and clinical skills.

With regards to the length of time health care workers have worked in their current position, statistically significant differences were shown in both the perceived and actual level of understanding of diabetes knowledge. Specifically, health care workers who were new to aged care perceived they had a greater level of understanding of both blood glucose ( $p = .013$ ) and diabetes complications ( $p = .026$ ) than health care workers who were employed longer in aged care (11-30 years). In addition, the actual diabetes knowledge of blood glucose ( $p = .010$ ) was also higher in staff who were newer to aged care. The findings in the current study suggest a greater theoretical knowledge of diabetes is being achieved in health workers new to aged care either through the curriculum, in university or TAFE nursing courses.

#### Time Worked in Aged Care

Closely associated with time in current position is the time participants have worked in an aged care setting. In the present study the tenure of the aged care workforce was shown to be an influence in the knowledge base of the health care workers. The length of employment in aged care has a significant effect on participant's perceived level of knowledge in both the blood glucose ( $p = .011$ ) and complications ( $p = .015$ )

categories, although neither of these translated to statistically significant differences in actual knowledge. Those who had worked in aged care longest perceived they had a higher level of knowledge, which may be expected since they would have the greatest clinical experience. However, those who had worked longer in aged care facilities had a statistically significant difference in knowledge pertaining to both lifestyle ( $p = .010$ ) and medication ( $p = .007$ ) categories than those who had worked for less than three years. The findings suggest that staff who have worked longer in aged care facilities may have more opportunities to acquire knowledge of lifestyle measures, either through staff training or clinical experience. Furthermore, increased staff exposure to administration of insulin or oral hypoglycaemic medications, may contribute to an increased level of knowledge. The literature explores the correlation between nursing staff's actual knowledge of diabetes and perceived level of diabetes knowledge, however a significant relationship between years of experience and the level of diabetes knowledge was not found (Drass et al., 1989; El-Deirawi & Zuraikat, 2001). Furthermore, the literature has suggested nursing staff who perceive they possess a higher level of diabetes knowledge may not feel it necessary to improve their knowledge level or seek out additional resources (Baxley et al., 1997; Drass et al., 1989). In light of this, findings from the present study indicated that staff tended to rate high levels of perceived knowledge and therefore this is of concern.

### Employment Status

Employment status was shown to be a significant factor in the level of both perceived and actual diabetes knowledge of diabetes management, lifestyle, medication, blood glucose and complications categories, with registered nurses and

enrolled nurses demonstrating a higher level of actual diabetes knowledge overall than AIN's. Although the literature provides data for perceived and actual diabetes knowledge of RN's, there is little data specifically for EN's and AIN's. However, the literature did suggest there is a general lack of knowledge about diabetes among nursing staff (Baxley et al., 1997; El-Deirawi & Zuraikat, 2001). Furthermore, the literature has suggested the importance of both perceived and actual knowledge among nursing staff, and stressed the importance of continually updating diabetes knowledge (Baxley et al., 1997; Drass et al., 1989; El-Deirawi & Zuraikat, 2001) In the current study, the AIN's were shown to have the lowest level of perceived and actual knowledge of diabetes care, which would be expected as AIN's work under the direction and supervision of the RN (ANF, 2008). However, the AIN's are instrumental in the majority of non-technical, direct care activities. As such, the AIN would be required to possess a level of understanding of regular foot care, diet and exercise, and have the ability to identify a hypoglycaemic episode and report it to the RN. Lipman & Mahon (1999) have indicated that diabetes knowledge by the RNs and ENs is important as they provide direct care to the elderly residents. In the current study, the overall level of diabetes knowledge appeared relatively strong amongst the RNs and ENs and could be attributed to the fact that, as previously discussed, the majority of participants have received some form of diabetes management education. In addition, the training requirements for an RN and EN would presumably include at least a basic knowledge base about diabetes.

#### Education Status

The literature pertaining to diabetes knowledge literature suggests a positive relationship between nurses' education status and their level of diabetes knowledge exists (El-Deirawi & Zuraikat, 2001; Gossain, Bowman & Rovner, 1993) and this is confirmed in the current study. In the current study, the level of perceived knowledge for diabetes medications (insulin, oral hypoglycaemic tablets) was shown to be significantly higher for health care workers whose highest completed education was at a university award level. However, education status did not have a significant relationship with the perceived level of understanding of diabetes management, lifestyle, blood glucose and complications categories.

With regards to the actual diabetes knowledge, staff with a university education demonstrated greater understanding in the diabetes management, blood glucose and diabetes complications categories. This finding suggests staff with a higher level of education have a better understanding of knowledge associated with caring for the elderly with diabetes. This finding is important, as nursing staff must be able to identify the signs and symptoms of complications and instigate appropriate actions. However, the difference in the actual and perceived level of knowledge of diabetes medications may suggest that although medication education and endorsement had previously been completed at university, staff may not have retained the information they learned, or may not have learnt it sufficiently or had insufficient opportunity for application in the clinical setting. Furthermore, EN's would not be expected to have the same frequency for administering diabetes medications as the RN's. Therefore, findings related to educational background are closely associated with the staff level, given the university is the training area for RNs, whilst ENs receive training through TAFE.

### Impact of facility-related factors

The relationship across facility factors (not for profit and private), and the level of perceived and actual diabetes knowledge were explored. The perceived level of diabetes knowledge was not associated with the level of facility. However, health care workers in not for profit facilities showed a higher level of actual diabetes knowledge, specifically in the blood glucose category. No other significant findings were reported in either the perceived or actual knowledge categories between the two levels of facility. The results of the current study are important because staff showed a good understanding of the blood glucose category (blood glucose monitoring, prevention and treatment of high blood glucose levels, prevention and treatment of low blood glucose levels and the benefits of improving blood glucose control). Blood glucose assessment is an important indicator of the effectiveness of diabetes management (Dunning, 2005). Although the Australian accreditation standards require management and staff to have appropriate knowledge and skills, which includes education and staff development (Australian Government Department of Health and Ageing, 2007b), they do not discriminate between different levels of facilities. The findings of the current study may suggest staff are receiving more education opportunities, such as in-services in this area of diabetes care in the not for profit facilities. Furthermore, the current study provides important preliminary data in this area.

### **OBJECTIVE 3: WHAT ARE THE FACTORS MODERATING DIABETES CARE PROVISION BY HEALTH CARE WORKERS IN RESIDENTIAL AGED CARE FACILITIES?**

Factors which affect the delivery of diabetes care by health care workers were investigated, including diabetes management, actual diabetes knowledge, workforce and health care team factors. Over half of the participants (57.2%) suggested that improvements in diabetes education and care could be made in their aged care facility. This is a positive finding as it suggests health care workers are confident in their nursing administration to refine their diabetes management protocols and guidelines. It may also suggest nursing staff have support from their nursing administration, or possibly a working environment which promotes best practice.

In the current study, the most significant barriers to providing diabetes care were shown to be inadequate diabetes-related knowledge and experience (52.1%), compliance issues by residents (39.6%) and insufficient communication amongst staff and residents (12.5%). In addressing the most problematic barrier, it seems health care workers recognise the importance of having a knowledge base about diabetes for providing appropriate care and management to the elderly with diabetes. The extant literature has highlighted the importance of diabetes knowledge by health care workers in providing competent and high quality diabetes care (Baxley et al., 1997; Drass et al., 1989; El-Deirawi & Zuraikat, 2001; Leggett-Frazier et al., 1994; Lipman & Mahon, 1999). Furthermore, Drass et al. (1989) suggests a lack of diabetes knowledge may lead to variable care which could negatively affect the confidence residents have in the diabetes care received, leading to non compliance. The findings from the current study may suggest the need for professional

development opportunities, including a diabetes educator involvement, which enable staff to up skill and expand their diabetes-related knowledge. In addition, as suggested by Drass et al. (1989), the increase in diabetes knowledge could positively impact compliance by residents. Staff-resident ratios also need to be explored, as it may be suggested that insufficient communication amongst staff and residents could be related to time constraints. Factors which positively affect the provision of diabetes care were also explored in the current study, with diabetes-related knowledge shown to be the most significant facilitator (71.2%). In addition, diabetes management related issues, specifically the availability of diabetes monitoring guidelines (34.6%) and the availability of care plans (11.5%) were also identified as significant facilitators in providing diabetes care. The current study seems to indicate that staff perceived the importance of diabetes knowledge on the provision of diabetes care. In accordance with the literature, the effectiveness of diabetes guidelines as a facilitator, providing a framework for health care workers in their delivery of diabetes care has been identified (Australian Centre for Diabetes Strategies, 2005; ADEA, 2003; Department of Health, 2001; Diabetes Australia, 2009a; IDF, 2005). This may suggest the availability of both care plans and diabetes monitoring guidelines in aged care facilities may have a positive impact on the provision of diabetes care by health care workers.

**OBJECTIVE 4: WHAT ARE THE LEVELS OF PERCEIVED CONFIDENCE OF HEALTH CARE WORKERS IN RESIDENTIAL AGED CARE FACILITIES TO PROVIDE DIABETES CARE?**

The current study aimed to identify the perceived level of confidence of health care workers to provide diabetes self-management education (DSME). Health care

workers indicated highest scores overall for feeling satisfied with their performance in providing diabetes care ( $M = 3.99$ ) and having confidence in talking about diabetes management ( $M = 3.98$ ). Although staff reported less confidence in providing correct information about diabetes self-management ( $M = 3.00$ ), the score is still positive as it identifies staff perceive some confidence. Furthermore, a lack of confidence in this DSME category may reflect a lack of diabetes knowledge or clinical skills by staff in providing diabetes care. This is in accordance with the findings on the level of actual diabetes knowledge, where participant's rated their knowledge as average ( $M = 11.44$ ,  $SD = 3.47$ ). It may also reflect the high level of low skilled staff, which is likely not to have such diabetes knowledge. The literature does not provide data specifically for perceived confidence in providing diabetes care, and therefore this study appears to be a first of its kind and makes an important contribution to the field.

#### ***Time Worked in Aged Care***

The time worked in aged care, which was categorised as new to aged care (0-3 years), experienced in aged care (4-11 years) and very experienced in aged care (12-40 years), was compared against the four confidences in DSME categories previously mentioned. Health care workers who are experienced in aged care ( $M = 3.93$ ) and very experienced ( $M = 3.91$ ) were shown to perceive a higher level of confidence in providing DSME than staff who have less experience in aged care ( $M = 3.19$ ). The level of confidence seems to be related to the actual level of diabetes knowledge, specifically in lifestyle and medication categories, with staff more experienced in aged care rating higher than staff with less experience. This suggests that staff more experienced in aged care have gained knowledge of diabetes over a longer period of time, and perceive they are more confident in providing diabetes care.

### ***Professional Employment Position***

Nurses play a key role in the management of elderly residents with diabetes as they have ongoing contact, and provide primary care. In the current study, the level of perceived confidence in providing DSME and the participant factor of professional employment position (RN/EN, AIN's) were explored for association. Health care workers employed as RN/EN's perceived a higher level of confidence in both providing correct DSME information and providing DSME without hesitation as compared to those employed as AIN's. With regards to talking about the management of diabetes, RN's scored higher than AIN's and also indicated more satisfaction with their performance in providing diabetes self-management education than AIN's. This is in contrast to El-Deirawi & Zuraikat (2001), who found only 11.4% of the registered nurses who participated in their study perceived themselves as very competent in providing diabetes care; although they did not use the same instrument and rating scale as the present study. In the current study, it may be suggested that the higher level of perceived confidence by RN/EN's in all DSME categories may be because of the higher education and skill level associated with their training. It may also be suggested that since AIN's do not have a background of formal education or extensive clinical skills experience, they may perceive themselves as having a lower level of diabetes knowledge. As stated previously, although the AIN's assist in certain primary care activities, such as hygiene, nutrition and foot care, they work under the direction and supervision of the RN, so are not required to have the same level of diabetes knowledge as the RN/EN's. It may be suggested therefore, that although AIN's rate themselves lower in the DSME categories, it is not of concern as this corresponds with the AIN's scope of practice.

### ***Level of Education***

The level of perceived confidence in the DSME categories mentioned previously were compared with the education level of the participant, which comprised; grade 12 schooling, Technical and Further Education and university award categories. With regards to talking to residents on management of diabetes, participants with a university education ( $M = 4.22$ ) and grade 12 schooling ( $M = 4.07$ ), perceived a much higher level of confidence in talking about diabetes management than staff who had completed Technical and Further Education. In explanation, the RN's are most likely to have a university education, as this is part of the basic education for this profession. In contrast, the perceived diabetes knowledge literature has suggested nurses' perceptions of providing diabetes care are not positively correlated with their level of education (Drass et al., 1989; El-Deirawi & Zuraikat, 2001). However it may be suggested that health care workers with more education would have more knowledge about diabetes. It may also be suggested that the higher perceived level of confidence from staff with less education is reflective of the ratio of low skilled staff employed in residential aged care facilities.

### **LIMITATIONS OF THE STUDY**

This study has a few limitations that affect its outcomes. One potential limitation is the use of a self-report questionnaire to collect data in this study. Self report is reliant upon participants accurately filling in the questionnaire and taking the time to do so. It may also cause response bias such that participants may fail to provide critical information by misunderstanding or overlooking questions, or if providing responses to questions in the way they think the questioner wants them to answer rather than to their own beliefs (Heyman et al., 2006; Sharp et al., 2006). Another limitation to the

study instrument is the lack of established validity and reliability for the NADC and DSMEC based questions, which were used in the questionnaire. Although construct validity assessment was performed, continued research using the NADC and DSMEC is needed to accrue evidence of validity and reliability.

Sample size was another limiting factor in this study. As a result of the limited size of the sample group for some data analyses, two or three group comparisons were utilised in these instances. In some case group size within categories was lower than ideal and therefore these results must be interpreted with caution.

The current study attempted to assess staff awareness of the presence of diabetes guidelines in their residential aged care facilities. However, measures did not show whether guidelines were present or not, only the participant's awareness of them. Hence, the actual presence of diabetes guidelines in Queensland residential aged care facilities may not be fully represented. In addition, the actual undertaking of diabetes guidelines was not assessed. Therefore, triangulation of findings to support evidence gained in this study was not done.

## **RECOMMENDATIONS**

The findings of this study suggest greater awareness and availability of guidelines for the elderly with diabetes in aged care facilities are needed. In addition, specific and strategic evaluation of guideline implementation including both outcome and process measures are needed. All levels of nurses in aged care facilities provide direct care for the elderly residents with diabetes. Therefore they must be knowledgeable to provide safe care and have access to experts in discrete specialties, such as diabetes.

Specific guidelines concerning the care of this population would provide health care workers a framework for providing diabetes care. The ADEA (2003) recommends elderly people with diabetes receive ongoing evaluation of their metabolic control and screening, however as previously discussed, these guidelines are not specific to elderly residing in residential aged care facilities. The findings of the current study indicated that only 67.3% of health care workers are aware of guidelines pertaining to individual diabetic management targets for residents, although some key diabetes guidelines pertaining to diabetes care specific skills are in place. Therefore, it is recommended that diabetes guidelines be developed, specifically for aged care facilities, addressing the specific needs of the elderly in these facilities. In addition, a recommendation concerns the need to increase the guideline availability, with management in the aged care facilities providing processes and mechanisms for staff to utilise them. The guidelines should be made easily available to staff, with in-service education included, providing training through which staff may gain the practical knowledge to enhance their care delivery.

Management in the aged care facilities should be committed to educational programmes and resources for staff on diabetes, given the prevalence of residents with this chronic disease. The provision of staff development, by up skilling and keeping current, is imperative as diabetes care is always progressing. The need for periodic diabetes education classes for all health care workers has been identified in the present study, with 22.1% of health care workers not having received any diabetes management education. Diabetes educators working in collaboration with nurses could provide in-services conducted within the aged care facilities, which enhance nurses' knowledge of diabetes and clinical skills. The education sessions

would need to reflect the aged care workforce, which is comprised of a high rate of low skilled staff in aged care facilities and be directed to the role within their scope of practice. It is recommended that diabetes education appropriate to scope of practice be incorporated into in-services. The increasing population of elderly with diabetes in aged care facilities in Queensland demands that health care workers perform effective diabetes care. Diabetes educators could assist staff in gaining a better diabetes knowledge base and clinical skills, which are essential to effectively perform this role.

Not only should clinical guidelines be accessible and educational strategies provided, these activities should be linked to both process and outcome indicators. Theoretically, if diabetes was more judiciously managed in residential aged care unnecessary disability could be avoided.

## **FUTURE IMPLICATIONS**

The current study focussed on the level of diabetes knowledge of health care workers employed in residential aged care facilities. Further research could compare the level of diabetes knowledge of health care workers in residential aged care with that of health care workers employed in other settings. This could determine if there is a difference in diabetes knowledge base in different settings and assist in targeting and tailoring interventions. Furthermore, improvements in diabetes knowledge through in services by diabetes educators could be evaluated by measuring diabetes knowledge test scores after in service education has been provided. This data could help determine future in service requirements for health care workers in aged care facilities and also evaluate the current diabetes education being provided. In addition,

the development and implementation of diabetes guidelines specific for the needs of the elderly needs further exploration. The availability and understanding of diabetes guidelines and protocols has been established in the current study, raising questions concerning the implementation of these guidelines in providing diabetes care in residential aged care facilities. Potentially outreach models of care from the specialist setting and mentoring for staff working in residential aged care may improve the management of diabetes.

## **CONCLUSION**

The findings of this study provide important information regarding the availability of diabetes guidelines/protocols; the level of diabetes knowledge of health care providers; their level of confidence in providing diabetes care; and the facilitators and barriers providing evidence-based diabetes care. This data has important implications for policy, practice and research. The current study has provided data in both non-profit and private residential aged care and with different classifications of care. These data provide an important baseline for future quality improvement initiatives. Another important contribution to the field is evidence on the perceived confidence of the aged care workforce in providing diabetes care in residential aged care facilities. A striking finding of this study is the sparse investigation of diabetes in residential aged care in spite of the burden of disease. Study findings suggest that educational programmes should be designed specifically to meet the learning needs of each group of staff to up skill and maintain their currency of practice. The residential aged care workforce has an important responsibility of providing best practice diabetes care, so diabetes knowledge and management skills need to be current and appropriate to the elderly population. Management within the residential

aged care facilities need to be committed to ongoing staff education and in-service programmes and implement diabetes guidelines based on best practice. Potential improvements to be gained through acting on the evidence provided in the current study may contribute to reforms in quality care and clinical outcomes for the residential aged care population.

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## Appendix A



### Participant Information Sheet

My name is Carrie DeBeyer I am currently completing a research study for my Master of Science (Nursing) at Curtin University of Technology.

#### **Purpose of Research**

I am investigating the level of diabetes care possible in residential aged care facilities. It is hoped that this study will result in improvements in the well-being of elderly people living with diabetes in aged care facilities.

#### **Your Role**

I am interested in finding out your general knowledge base of diabetes and identifying variables that assist or hinder you when providing diabetes care to the residents. It is hoped that the information gathered from this study will result in improvement in the well-being in elderly people living with diabetes in aged care facilities. I am asking you to complete a questionnaire, which will take approximately 15 minutes of your time.

### **Consent to Participate**

Your involvement in the research is entirely voluntary. You have the right to withdraw at any stage without affecting your rights or my responsibilities. When you have completed and returned the questionnaire, I will assume that you have agreed to participate and allow me to use your data in this research. At the end of the study dissemination of the results may occur at conferences and educational meetings. Findings may be submitted to a peer reviewed journal or diabetes professional organisational newsletters for publication. Your personal information or other identifying information will not be revealed in any presentation or publication.

### **Confidentiality**

The survey will not have your name or any other identifying information on it and in adherence to university policy, the survey will be kept in a locked cabinet for 5 years before it is destroyed.

### **Further Information**

This research has been reviewed and given approval by Curtin University of Technology Human Research Ethics Committee (Approval number SONM 12-2008). If you would like further information about the study, please feel free to contact me on 3325 3066 or by email: [hardy99@tpg.com.au](mailto:hardy99@tpg.com.au). Alternatively, you can contact my supervisor Karen Glaister at [k.glaister@curtin.edu.au](mailto:k.glaister@curtin.edu.au).

**Thank you very much for considering your involvement in this research, your participation is greatly appreciated.**

Carrie DeBeyer,

Clinical Nurse, Diabetes Educator, Master of Diabetes Education (Student)

This study has been approved by the Curtin University Human Research Ethics Committee (Approval Number SONM 12-2008). If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784 or emailing [hrec@curtin.edu.au](mailto:hrec@curtin.edu.au).



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**PART B: This section contains questions about your understanding of diabetes.**

For the following questions, please circle the appropriate response (circle one answer for each line).

10. How do you rate your understanding of:	Poor		Good		Excellent
a) overall diabetes care of the elderly	1	2	3	4	5
b) Australian diabetes guidelines of the elderly	1	2	3	4	5
c) special diet needs	1	2	3	4	5
d) the role of exercise in diabetes care	1	2	3	4	5
e) use of insulin	1	2	3	4	5
f) use of diabetic tablets	1	2	3	4	5
g) blood glucose monitoring	1	2	3	4	5
h) regular foot care	1	2	3	4	5
i) prevention and treatment of high blood glucose levels	1	2	3	4	5
j) prevention and treatment of low blood glucose levels	1	2	3	4	5
k) the long-term complications of diabetes	1	2	3	4	5
l) eye care management	1	2	3	4	5
m) benefits of improving blood glucose control	1	2	3	4	5

**Please continue to next page**

Please indicate by circling what you feel is the most correct answer from the choices provided for each question. (circle ONE ONLY for each question) The survey is being completed by all levels of staff. If you are not sure of the answer, just tick the "Don't Know" box.

<p><b>11. Diabetes is caused by:</b></p> <p><input type="checkbox"/> Not enough effective insulin in the body</p> <p><input type="checkbox"/> Eating too much sugar and sweet foods</p> <p><input type="checkbox"/> Too much sugar produced by the kidney</p> <p><input type="checkbox"/> Increased receptor sensitivity</p> <p><input type="checkbox"/> Don't know</p>	<p><b>14. The best assessment method for diabetes is:</b></p> <p><input type="checkbox"/> Urine tests for glucose</p> <p><input type="checkbox"/> Urine test for ketones</p> <p><input type="checkbox"/> Blood tests for glucose</p> <p><input type="checkbox"/> Microalbuminuria</p> <p><input type="checkbox"/> Don't know</p>	<p><b>17. The best treatment for low blood glucose is:</b></p> <p><input type="checkbox"/> Lie down and rest</p> <p><input type="checkbox"/> Exercise for 30 minutes</p> <p><input type="checkbox"/> Drink lo-cal (diet) fluids</p> <p><input type="checkbox"/> Drink ½ glass orange juice</p> <p><input type="checkbox"/> Don't know</p>
<p><b>12. What is an acceptable blood glucose level (BGL) for people with diabetes?</b></p> <p><input type="checkbox"/> 3-7 mmol/l</p> <p><input type="checkbox"/> 4-8 mmol/l</p> <p><input type="checkbox"/> 8-12 mmol/l</p> <p><input type="checkbox"/> 10-15 mmol/l</p> <p><input type="checkbox"/> Don't know</p>	<p><b>15. Which food nutrients have a direct effect on blood glucose levels?</b></p> <p><input type="checkbox"/> Carbohydrate</p> <p><input type="checkbox"/> Fat</p> <p><input type="checkbox"/> Protein</p> <p><input type="checkbox"/> Fiber</p> <p><input type="checkbox"/> Don't know</p>	<p><b>18. The snack which contains the most fat is:</b></p> <p><input type="checkbox"/> 1 banana</p> <p><input type="checkbox"/> A diet yogurt</p> <p><input type="checkbox"/> 3 Sao biscuits</p> <p><input type="checkbox"/> An icy pole</p> <p><input type="checkbox"/> Don't know</p>
<p><b>13. Being overweight:</b></p> <p><input type="checkbox"/> Causes low blood glucose</p> <p><input type="checkbox"/> Is harmless for people with diabetes</p> <p><input type="checkbox"/> Increases insulin resistance</p> <p><input type="checkbox"/> Decreases insulin resistance</p> <p><input type="checkbox"/> Don't know</p>	<p><b>16. Which is the best method for testing blood glucose?</b></p> <p><input type="checkbox"/> Urine testing.</p> <p><input type="checkbox"/> Blood testing.</p> <p><input type="checkbox"/> Both are equally good.</p> <p><input type="checkbox"/> Don't know</p>	<p><b>19. The best way to take care of the feet of a person's with diabetes is to?</b></p> <p><input type="checkbox"/> Look at and wash them each day</p> <p><input type="checkbox"/> Massage them with alcohol each day</p> <p><input type="checkbox"/> Soak them for one hour each day</p> <p><input type="checkbox"/> Buy shoes a size larger than usual</p> <p><input type="checkbox"/> Don't know</p>

<p><b>20. Eating foods lower in fat decreases the person with diabetes risk of?</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>Nerve disease</li> <li><input type="checkbox"/>Kidney disease</li> <li><input type="checkbox"/>Heart disease</li> <li><input type="checkbox"/>Eye disease</li> <li><input type="checkbox"/>Don't know</li> </ul> <p><b>21. Which of the following are all sources of carbohydrate?</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>Rice, banana, egg</li> <li><input type="checkbox"/>Apple, chicken, porridge</li> <li><input type="checkbox"/>Ice cream, margarine, biscuits</li> <li><input type="checkbox"/>Mashed potato, sugar, bread</li> <li><input type="checkbox"/>Don't know</li> </ul> <p><b>22. Long term complications of diabetes:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>Are symptomatic from the early stages</li> <li><input type="checkbox"/>May remain asymptomatic for many years</li> <li><input type="checkbox"/>Can be detected by regular blood tests only</li> <li><input type="checkbox"/>Require monthly check-ups by the GP</li> <li><input type="checkbox"/>Don't know</li> </ul>	<p><b>23. Which of the following are all good sources of fiber</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>White rice, porridge</li> <li><input type="checkbox"/>Wholegrain bread, cheese</li> <li><input type="checkbox"/>Apple, whole meal pasta</li> <li><input type="checkbox"/>Jatz biscuits, dried fruit</li> <li><input type="checkbox"/>Don't know</li> </ul> <p><b>24. The preferred injection site for insulin is:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>Thighs</li> <li><input type="checkbox"/>Upper arms</li> <li><input type="checkbox"/>Buttocks</li> <li><input type="checkbox"/>Abdomen</li> <li><input type="checkbox"/>Don't know</li> </ul> <p><b>25. Insulin which is being used should be stored in:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>The butter section of the fridge</li> <li><input type="checkbox"/>The bathroom shelf</li> <li><input type="checkbox"/>A cool cupboard</li> <li><input type="checkbox"/>It doesn't matter</li> <li><input type="checkbox"/>Don't know</li> </ul>	<p><b>26. Which should not be used to treat low blood glucose?</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>3 hard candies</li> <li><input type="checkbox"/>½ cup orange juice.</li> <li><input type="checkbox"/>1 cup diet soft drink.</li> <li><input type="checkbox"/>1 cup of skim milk.</li> <li><input type="checkbox"/>Don't know</li> </ul> <p><b>27. Which of the following is usually not associated with diabetes?</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>Vision problems</li> <li><input type="checkbox"/>Kidney problems</li> <li><input type="checkbox"/>Nerve problems</li> <li><input type="checkbox"/>Lung problems</li> <li><input type="checkbox"/>Don't know</li> </ul> <p><b>28. What times for BGL testing are advised?</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/>2 hours before and after meals</li> <li><input type="checkbox"/>Before meals and half hour after meals</li> <li><input type="checkbox"/>Before meals and 2 hours after meals</li> <li><input type="checkbox"/>2 hours before and half hour after meals</li> <li><input type="checkbox"/>Don't know</li> </ul>
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**These questions are about your confidence in providing diabetes self-management education (DSME).**

29 I am confident that the information I provide about diabetes self-management is correct.  
*Please circle one of the numbers that best represents how you feel.*

- Not at all confident. 1
- Confident about selected aspects only. 2
- Fairly confident about most aspects 3
- Confident about almost all aspects. 4
- Confident about all aspects. 5

<i>Please circle one of the numbers that best represents how you feel.</i>		Strongly Disagree	Moderately Disagree	Disagree	Agree	Moderately Agree	Strongly Agree
30	I feel certain that I can provide DSME without hesitation	1	2	3	4	5	6
31	I feel sure of myself as I talk to patients about the management of their diabetes.	1	2	3	4	5	6
32	I feel satisfied with my performance.	1	2	3	4	5	6

**Please continue to next page**

**Part C:** This section contains questions about the management of DIABETES in your workplace.

Please tick one answer for each line

33. Do you have written guidelines for the management of:	Yes	No	Unsure
a) monitoring blood glucose (sugar)			
b) dietary recommendations			
c) monitoring of urine status			
d) insulin injection technique			
e) management of low blood glucose (sugar)			

34. Do you have guidelines for the review/management of diabetic assessments/targets:	Yes	No	Unsure
a) glycaemic control (blood sugar control)			
b) blood pressure			
c) lipid profile			
d) kidney function			
e) eye examination)			
d) foot assessment			
e) cognitive function assessment (Mini Mental State Exam)			

35. Care plans/monitoring diabetic residents	Yes	No	Unsure
a) Do you produce written care plans for the residents?			
b) Do the care plans have individualised diabetic targets for the residents?			
c) Are the care plans reviewed and revised within a timeframe?			
d) Are the care plans written with an individual, tailored approach?			

Please continue to next page

The next few questions ask you to identify any barriers and facilitators to meeting the diabetes management and care guidelines.

36. How possible do you think it would be to improve diabetes education and care in your facility?

*Please circle one of the numbers that best represents how you feel*

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Low possibility  
Unlikely

Highly possible  
Highly likely

37. Please describe 3 barriers that negatively affect the provision of diabetes care in your workplace?

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38. Please describe 3 factors that positively affect the provision of diabetes care in your workplace?

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39. In which areas could you benefit from receiving education on providing care to the residents with diabetes? (Please tick all that apply)

- healthy eating
- weight management
- footcare
- monitoring blood glucose
- sick day management
- low blood glucose (Hypo) management
- insulin injections
- others, please specify \_\_\_\_\_

**Please continue to next page**

7

40. In which areas have you received diabetes education? (Please tick all that apply)

healthy eating

weight management

footcare

monitoring blood glucose

sick day management

low blood glucose (Hypo) management

insulin injections

have not received any diabetes education

others, please specify \_\_\_\_\_

41. Are you aware of any staff member who has specific diabetes expertise/education?

Yes

No

**Thank you for taking the time to complete this questionnaire.**

Please return it to Carrie DeBeyer in the FREEPOST envelope provided.

## Appendix C

### Confirmation e-mail from Holy Spirit Home

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Dear Carrie,

My unit will certainly participate in assisting you with your research project. We have 9xRNs 3xEENS and 29xAInS.

I wish you all the very best

Bernadette Redmond | Nurse Unit Manager Shalom & Hospice

HOLY SPIRIT CARE SERVICES

Holy Spirit Home

736 Beams Road, CARSELDINE QLD 4034

PO Box 129, ASPLEY QLD 4034 - AUSTRALIA

T (07) 3263 0336      E bredmond@holyspirit.com.au

F (07) 3263 7732      W www.holyspirit.com.au

### Confirmation e-mail from Masonic Care

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Hello Carrie

Thank you for your email providing a broad outline of your research study. I informed the members of the Masonic Care Queensland – Ethics Committee last night of your request, they supported the participation of staff from this facility in the data collection. The committee did however, ask me to obtain some information from you about the proposed dates that you will be undertaking the data collection, and they also requested if it would be possible for the Care Services Director and myself to have a preview of the questionnaire.

How many participants would you be requiring at a site to complete the questionnaire?

I would appreciate the opportunity to speak with you so that I may clarify the points above. When you have time would it be possible for you to contact me on either

3869 6169 or on my mobile 0419 749 642

Thank you

Regards

Joyce Stephan

Joyce				Stephan
Regional Manager				
Masonic Care Queensland				
Central	and		Southern	Region
Phone:		3869		6169
Mobile:				0419749642
Fax:		3269		2470
Email:				<a href="mailto:Jstephan.cs@masoniccareqld.org.au">Jstephan.cs@masoniccareqld.org.au</a>

***Masonic Care Queensland Disclaimer***

*The information contained or otherwise implied within this E-mail has been provided in good faith and is deemed by the sender to be reliable and accurate. Masonic Care Queensland however, accepts no liability in respect of this E-mail and any person acting solely on the information contained within does so entirely at their own risk.*

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## Appendix D



### School of Nursing and Midwifery

#### **Pilot test: Assessment for face and content validity using a rating panel**

Thank you for agreeing to be a member of a panel assessing the attached instrument to be used in an up-coming study to determine the current status of diabetes related care in residential aged care facilities.

We would like you to read through the attached question and address the following questions:

1. To what extent are the questions clear or unclear?

*Face validity:* Please follow the instructions and complete the form that asks if each question is clear or unclear. Space for further comments is provided beside each item.

2. To what extent does the questionnaire appear to be related to the main topic to be investigated?

*Content validity:* Please read each of the rated questions listed on the provided form to determine whether or not the set of questions appear to be measuring the same thing.

Specific directions are provided on the next page. We would appreciate you completing what is requested for the described questions.

Thank you

Carrie DeBeyer

CN, DE

Master of Diabetes Education (Student)

Specific Directions: Review questionnaire

**Step 1: Please read each statement and indicate in the first column whether the statement is clear (C) or unclear (U). If it is unclear could you please note suggested changes in the space provided.**

<b>Part B Question 10</b>	<b>How do you rate your understanding of:</b>	<b>Is the statement clear/unclear? C/U</b>	<b>Comments/suggested changes</b>
a)	overall diabetes care of the elderly		
b)	Australian diabetes guidelines of the elderly		
c)	special diet needs		
d)	the role of exercise in diabetes care		
e)	use of insulin/diabetic tablets		
f)	blood glucose monitoring		
g)	regular foot care		
h)	prevention and treatment of high blood glucose levels		
i)	prevention and treatment of low blood glucose levels		
j)	what are the long-term complications of diabetes		
k)	eye care management		
l)	benefits of improving blood glucose control		

**Part B Multiple Choice Questions Number 11-28**

a) Do all the multiple choice questions seem to be referring to the same overall topic; *General Knowledge of Diabetes?*

**Please circle:**            Yes or No

If no, which ones do not belong with *General Knowledge of Diabetes?*

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a) Are any of the multiple choice questions repetitive? If yes, which ones would you delete?

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**Diabetes Self-Management Education Questions 29-32**

a) Do all the questions seem to be referring to the same overall topic; *Your Confidence in Providing Diabetes Self-Management Education?*

**Please circle:**            Yes or No

If no, which ones do not belong with *Your Confidence in Providing Diabetes Self-Management Education?*

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b) Are any of the questions repetitive? If yes, which ones would you delete?

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Step 1: Please read each statement and indicate in the first column whether the statement is clear (C) or unclear (U). If it is unclear could you please note suggested changes in the space provided.

<b>Part C Question 33</b>	<b>Do you have written guidelines for the management of:</b>	<b>Is the statement clear/unclear? C/U</b>	<b>Comments</b>
a)	monitoring blood glucose (sugar)		
b)	dietary recommendations		
c)	monitoring of urine		
d)	insulin injection technique		
e)	management of low blood glucose (sugar)		

<b>Part C Question 34</b>	<b>Do you have guidelines for the review/management of diabetic assessments/targets:</b>	<b>Is the statement clear/unclear? C/U</b>	<b>Comments</b>
a)	glycaemic control (blood sugar control)		
b)	blood pressure management		
c)	lipid profile		
d)	kidney function		
e)	eye examination		
f)	foot assessment		
g)	cognitive function assessment (Mini Mental State Exam)		

Part C Question 35	Careplans/monitoring diabetic residents	Is the statement clear/unclear? C/U	Comments
a)	Do you produce written Careplans for the residents?		
b)	Do the Careplans have individualised diabetic targets for the residents?		
c)	Are the Careplans reviewed and revised within a timeframe?		
d)	Are the Careplans written with an individual, tailored approach?		

**Barriers and Facilitators to Meeting the Diabetes Management and Care Guidelines Questions 36-41**

a) Do all the questions seem to be referring to the same overall topic; *Identifying barriers and facilitators to meeting the diabetes management and care guidelines?*

**Please circle:**            Yes or No

If no, which ones do not belong with *Identifying barriers and facilitators to meeting the diabetes management and care guidelines?*

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b) Are any of the questions repetitive? If yes, which ones would you delete?

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**Are there any comments you wish to add about any other part or aspect of the questionnaire?**

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**Thank you for taking the time to complete this pilot questionnaire.**

Please return to Carrie DeBeyer at Geriatric Research, Level 4 Administration

Building

## **Appendix E**



### **Recruitment letter**

My name is Carrie DeBeyer I am currently completing a piece of research for my Master of Science (Nursing) at Curtin University of Technology. I am interested in finding out the level of diabetes care possible in residential aged care facilities. It is hoped that this study will result in improvements in the well-being of elderly people living with diabetes in aged care facilities. At the conclusion of the study an executive summary of the findings will be provided to participating agencies to appraise their own organisational practices in this area.

I would like to survey the registered nurses, enrolled nurses and assistants in nursing working at your agency. I plan to conduct this research using a questionnaire (see attached), which should not take more than 15 minutes of your staff's time to complete. If you approve of this study and are happy for me to approach your staff, I would like to circulate the questionnaires direct to you for you to distribute to your staff. I would like to gain feedback from as many as your staff as possible, therefore your encouragement of your staff to complete the survey would be most appreciated. A return paid envelope will be supplied with each questionnaire, so participants will return the completed survey direct to me and thus not inconveniencing you further. If you would like your agency to be involved with this study please complete the attached request and return in the reply paid envelope.

Your staff's involvement in this survey is entirely voluntary and there are no known or anticipated risks to participation in this study. Your facility will not be identifiable on any of the returned surveys. All information provided will be considered confidential and the questionnaire will not have names or any identifying information on it. You will be able to have access to study findings when they are reported. In adherence to the ethical guidelines the survey will be kept in a locked cabinet for 5 years before it is destroyed.

If you have any questions about this study, or would like additional information to assist you in reaching a decision about participation, please feel free to contact me on 07 3325 3066 or by email: [hardy99@tpg.com.au](mailto:hardy99@tpg.com.au). Alternatively, you can contact my supervisors, Karen Glaister [k.glaister@curtin.edu.au](mailto:k.glaister@curtin.edu.au) and Patricia Davidson [p.davidson@curtin.edu.au](mailto:p.davidson@curtin.edu.au)

This research has been reviewed and given approval by Curtin University of Technology Human Research Ethics Committee (Approval number SONM 12-2008).

**Thank you very much for considering your involvement in this research, your participation is greatly appreciated.**

Carrie DeBeyer

CN, DE

Master of Diabetes Education (Student)

This study has been approved by the Curtin University Human Research Ethics Committee (Approval Number SONM 12-2008). If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784 or emailing [hrec@curtin.edu.au](mailto:hrec@curtin.edu.au).

**Agency details**

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**IF YOU WISH YOUR AGENCY TO BE INVOLVED IN THIS STUDY**

Please complete the following questions

Name of Residential Aged Care Facility.

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Postal address of Residential Aged Care Facility.

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Please indicate how many questionnaire surveys you wish to have posted to your Residential Aged Care Facility.   number of surveys to be posted

Please indicate if you have an ethics committee which the study would need to be approved by.   Yes  
  No

Please indicate what information is required for the ethics committee.

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**Thank you very much for considering your involvement in this research, your participation is greatly appreciated.**

Carrie DeBeyer

CN, DE

Master of Diabetes Education (Student)

**Thank you for taking the time to complete this form.**

**Please return it to Dr Patricia Davidson in the FREEPOST envelope provided.**